Atlanta Sustainable Building Ordinance
July 6, 2009

For all new construction except low-rise residential

Sustainable Building Task Force

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Introduction

In 2006, Mayor Shirley Franklin identified environmental sustainability as a critical factor in making Atlanta a "best-in-class" city. To that end, Sustainable Atlanta leads Atlanta's quest toward world-class sustainability by developing strategies and policy recommendations through partnerships and collaboration with Atlanta's business, non-profit, academic, community and government leadership.

As a demonstration of her commitment to sustainability, Mayor Shirley Franklin has signed on to the U.S. Mayors Climate Protection Agreement, which commits to reducing Atlanta's carbon footprint to 7% below 1990 levels by 2012. Considering that, according to Architecture 2030, buildings account for 48% of the energy use in our country and that Atlanta continues to grow rapidly, the built environment presents Atlanta with a great opportunity to significantly reduce its carbon footprint.

The U.S. Conference of Mayors has also unanimously adopted the Architecture 2030 Challenge, which sets fossil fuel reduction targets for all new buildings, reducing use incrementally until achieving carbon neutrality in 2030. By improving our building codes and creating incentives for higher performance building, we can move towards this reduction in carbon emissions. We will be tracking our progress to approach the Architecture 2030 Challenge until catching up with the Challenge in 2025 when it calls for 90% reduction in carbon emissions.

In addition to reducing our energy use, it has become increasingly clear that we must also conserve our water resources. Sustainable Atlanta has set planning for Atlanta's water future as one of its top priorities. By reducing the amount of water used in all new and renovated buildings in Atlanta, we have the opportunity to ensure the availability of water for many future generations of Atlantans.

In order to further protect the health, safety, and welfare of Atlantans while safeguarding the economic, social, and environmental competitiveness of Atlanta, we propose the following sustainable building ordinance as a response to proven advances in building technology and environmental science. It improves building codes in the categories of site development, water use efficiency, energy, indoor environmental quality, the building's impact on the atmosphere, materials, and resources, and construction and operations. These categories address building activity that affects our use of energy and water and the health of a building's occupants.

SECTION 1: GENERAL

Chapter 1: Atlanta Sustainable Building Commission

INTENT: To ensure that the Atlanta Sustainable Building Ordinance continues to respond to proven advances in building technology and environmental science and maintains its commitment to meeting the Architecture 2030 Challenge.

1.1 Creation There is hereby created a council to be known as the Atlanta Sustainable Building Commission (ASBC).

1.2 Mission The ASBC shall propose amendments to the Atlanta Sustainable Building Ordinance (ASBO) and revisions to the Atlanta Sustainable Building Standards (ASBS) to achieve increases in efficiency consistent with the goals established within Architecture 2030 (see below section 1.6.1 and online at http://www.architecture2030.org/2030_challenge/index.html) to reduce fossil fuel (GHG emitting fuel) use in buildings subject to this ordinance. The ASBC may review and respond to regional sustainability issues related to the built environment and issue alerts concerning such issues.

1.3 Membership The ASBC shall be comprised of 20 members, appointed and confirmed by the Council as follows:

a) Two members shall be appointed by the mayor to serve as chairman and vice-chairman;
b) One member nominated by the Atlanta Chapter of the American Institute of Architects;
c) One member nominated by the Atlanta District Council of the Urban Land Institute;
d) One member nominated by the Georgia Chapter of the American Society of Landscape Architects;
e) One member nominated by the Georgia Chapter of the International Interior Design Association;
f) One member nominated by the Atlanta Apartment Association;
g) One member nominated by the Atlanta Branch of the Building Owners and Managers Association;
h) One member nominated by the Greater Atlanta Home Builders Association;
i) One member nominated by the Georgia Branch of the Association of General Contractors;
j) One member nominated by the Atlanta Chapter of the International Council of Shopping Centers;
k) One member nominated by the Georgia Society of Professional Engineers;
l) One member nominated by the Georgia Chapter of the National Association of Industrial & Office Properties;
m) One member nominated by the Council for Quality Growth;
n) One member nominated by the Atlanta Branch of the U.S. Green Building Council Georgia State Chapter;
o) One member nominated by the Georgia Environmental Facilities Authority; and

p) Four members, one nominated by each three council members (Districts 1-3, 4-6, 7-9, and 10-12).

1.4 Powers and Duties The ASBC shall have the following powers and duties:

1.4.1 Goals Review The ASBC shall review reports from the Bureau of Buildings, updates and research from Architecture 2030, and the minutes and notes from previous commissions to establish new goals for Building Performance.

1.4.2 Standard Review The ASBC shall convene every three years at the direction of the Chairman or Vice-Chairman to review the current version of the ASBO and the ASBS and other standards referenced in the ASBO and to propose amendments to the Ordinance to maintain alignment with and progress toward Architecture 2030 objectives.

1.4.3 Terms Beginning ninety (90) days after enactment of the ASBO, the ASBC shall convene at the direction of the Chairman or Vice-Chairman for a period of one (1) year to work in an advisory capacity to support implementation of the ASBO and to resolve and document frequently asked questions (FAQ's). The ASBC shall convene every three years thereafter at the direction of the Chairman or Vice-Chairman, serving for a term of one hundred and twenty (120) days. The ASBC may convene at the direction of the Chairman or Vice-Chairman annually to respond to new standards, compliance options and changes in technology.

1.5 Plan of Action

1.5.1 Carbon Neutral by 2030 The ASBC shall recommend amendments to the ASBO consistent with the following schedule to maintain progress and alignment with Architecture 2030's goal of reducing carbon emissions from new buildings using the current standard as a baseline:

60% reduction of carbon emissions in 2010
70% reduction of carbon emissions in 2015
80% reduction of carbon emissions in 2020
90% reduction of carbon emissions in 2025
Carbon-neutral by 2030 (zero fossil-fuel, GHG emitting energy to operate).
Additionally, target values per specific building types can be downloaded at:
http://www.architecture2030.org/downloads/2030_Challenge_Targets_National.pdf

1.5.2 Atlanta Sustainable Building Standards The ASBC shall review the ASBS and adjust them to correspond to any changes in the LEED, Green Globes or Earthcraft compliance option alternatives.

Chapter 2: Phasing, Scope, and Compliance Paths

INTENT: To define this ordinance as applying to commercial, institutional and industrial buildings and multi-family buildings exceeding three stories in height.

2.1 Scope The provisions of this standard do not apply to:

a) single-family houses
b) multi-family structures of three stories (as defined by Section 101.4 of the Atlanta Building Code) or fewer above grade.
c) buildings that use none of the following: electricity from non-renewable sources, fossil fuel, or water.
d) historic buildings where specific requirements of this ordinance would conflict with attributes of historic buildings to the extent that the ordinance would affect the building's historic designation. Such buildings must comply with the remaining requirements of this ordinance.

NOTE: As specified in Chapter 2, Section 2.5, projects costing less than $50,000 must comply with the provisions of the ordinance but are not required to comply with the certification and compliance bond requirements.

2.2 Phasing

2.2.1 Phase 1 Compliance The ASBO will apply to all new construction projects applying for building permits one (1) year after enactment in the scope defined in 2.1, except as follows:

a) Commercial buildings of less than 20,000 sq. ft. must only comply with Chapter 6: Site Development.
b) Commercial buildings of 20,000 square feet or more that have applied for a land disturbance permit prior to the implementation date of this ordinance have up to one year beyond the implementation date to apply for a building permit to remain exempt from this ordinance.

2.2.2 Compliance option phasing Two years after the implementation date of the ASBO, the LEED compliance option in 2.4(b) will change to LEED-NC Silver, the Green Globes compliance option in 2.4(c) will change to a certification level of two globes, and, if applicable, the Earthcraft compliance option in 2.4(d) will change to Tier 2 certification. The ASBC shall review the ASBS and adjust them to correspond to any changes in the LEED, Green Globes or Earthcraft compliance option alternatives.

2.3 Phase 2 Compliance The ASBO will apply to all projects applying for a building permit beginning three (3) years after the enactment date except those exempted in the scope defined in 2.1.

2.4 Compliance Options:

INTENT: To provide owners and designers flexibility in compliance while still achieving ordinance goals.

Projects must demonstrate compliance in one of the following ways:

a) Atlanta Sustainable Building Standards (ASBS);
b) LEED Green Building Design and Construction 2009Certified Rating, with credits SS6.2, SS7.1, SS7.2, WE1.1, WE3.1, and 2 points in EA1 achieved; or LEED Green Interior Design and Construction 2009 where the project involves no site work and exterior shell work where the cost of the work does not exceed more than 5% of the overall project.
c) Green Globes certification achieving the following:
    1. **B.2 Ecological Impacts:**
        1) Provide natural cover including trees that within 5 years will shade at least 30% of impermeable surfaces. At minimum there should be one tree for every 1000sq. ft. of impermeable surface including parking, walkways, and plazas. Where natural shading is not possible, install artificial shading such as covered walks, or light colored, high albedo materials (reflectance of at least 0.3) over the sites impervious surfaces;
        2) Specify measure to reduce heat build-up on the roof (either high-albedo roofing materials- reflectance of at least 0.65 and emissivity of at least 0.9 for a minimum of 75% of the roof surface- OR a green roof, OR a combination of both);
    2. **D.2 Water Conservation Features:** Specify a water-efficient irrigation system (e.g. high efficiency technology, rain sensors). Provide landscaping that can withstand extreme local weather conditions and require minimal irrigation;
    3. **D.1 Water Use Performance:** Less than 20 gal/sq ft/year or less than 33,000 gal/ apartment/year, or less than 25 gal/ student/ year; and
    4. **C.1 Energy Performance 20%**
d) EarthCraft certification achieving the following:
    1. **17 points in Site Planning**: Erosion control site plan(2.0 points),permanent erosion control measures(i.e. rain swales and gardens)(3.0 Points),downstream water quality testing(3.0 points) and Tree preservation plan (3.0 points), protected tree save area (2.0 points), and tree planting (4.0 points) OR permeable materials in 50% or more of walkways (3.0 points), permeable material in 50% or more of parking surfaces (3.0 points), street trees (3.0 points);
    2. **2 points in Durability:** Light roof color-tile or metal (2.0 points), Innovations Green Roof (points TBD);
    3. **10 points in Water- Outdoors;**
    4. **11 points in Water- Indoors;**
    5. **1 point Energy Efficient Building Envelopes and Systems:** ENERGY STAR CERTIFICATION or Energy Modeling combined with commissioning procedures reflecting a minimum of 15% improvement over 2006 IECC minimums.

2.5 Certification and Commissioning Bond

INTENT: To incent compliance with the sustainable building ordinance requirements.

2.5.1 Prior to issuance of Certificate of Occupancy evidence of the following shall be submitted:

a) The building commissioning or acceptance report per section 11.1 or 11.2

b) Compliance option certification

2.5.2 If the requirements of 2.5.1 cannot be satisfied prior to desired occupancy, a certificate of occupancy shall be issued upon payment of a financial security (and satisfaction of all other requirements as required by the City of Atlanta Bureau of Buildings, the Zoning Division, the Arborist Division or the Department of Water Shed Management) to ensure successful completion of the requirements of section 2.5.1. The amount of the financial security, which shall be in the form of a letter of credit, escrow deposit, or bond, shall be the lesser of the following:

a) the amount of an approved fixed price contract to complete work and/or testing in order to satisfy the requirements of building commissioning or acceptance report per section 11.1 or 11.2. for buildings following the compliance option in sections 2.4 (a) OR

b) the amount of certification fees plus the amount of an approved fixed price contract to complete work necessary for submittal of final construction certification associated with the chosen compliance option for buildings following the compliance option in sections 2.4 (b, c or d), OR

c) 1.2% of total construction costs

2.5.3 The financial security shall be released only upon delivery of one of the following within three years of issuance of Certificate of Occupancy:

a) Building commission or acceptance report per section 11.1 or 11.2

b) Compliance option certification.

Chapter 3: Sustainable Building Data Collection

3.1 Water Use

INTENT:

- To identify major consumers and develop methods and practices to reduce consumption.
- To provide for the ongoing accountability of building water consumption over time and predict future demand for a growing population.

3.1.1 Water Use Measurement. The domestic water supply (both potable and reclaimed) entering the *building project* shall be measured. In addition, for individual leased, rented, or other tenant or sub-tenant space within any building totaling in excess of 50,000 sq. ft. or if the space or any part thereof is used for a laundry/cleaners operation, restaurant/food service, medical/dental office, laboratory, or beauty salon/barbershop, separate measuring devices shall be provided. For buildings that use evaporative cooling, cooling tower(s), *hot water makeup system*s, or automatic landscape irrigation system(s), separate measuring devices shall be provided for each such application. Measuring devices with remote reading capability or automatic meter reading (AMR) capability shall be provided to collect water use data for each water supply source (e.g. *potable water*, reclaimed water, rainwater) to the project that exceeds the thresholds listed in Table 3.1.1-1. Utility company service entrance/interval meters are allowed to be used provided they are configured for automatic meter reading (AMR) capability.

Table 3.1.1-1 Water Supply Source Meter Thresholds.

Water Source	Main Metering Threshold
Potable Water	1,000 gal/day
Alternate sources of water	500 gal/day

Measuring devices with remote reading capability or automatic meter reading (AMR) capability shall be provided to collect water use data for each of following building subsystems, if they are sized above the threshold levels listed in Table 3.1.1-2:

Table 3.1.1-2 Subsystem Water Metering Thresholds

Subsystem	Sub-Metering Threshold
Cooling Towers	Primary flow > 500 gpm
Evaporative Coolers	Makeup water > 0.6 gpm
Steam and hot-water boilers	> 500,000 Btu/h input
Irrigated landscape area with controllers	> 25,000 sq. ft.
Separate campus or project buildings	Consumption > 1,000 gal/day
Separately leased or rental space	Consumption > 1,000 gal/day
Any large water using process	Consumption > 1,000 gal/day

3.1.2 Data Collection. All building measuring devices installed to comply with the thresholds limits in 3.1.1 shall be configured to communicate water consumption data to a data management system. Measuring devices shall have the capacity to provide data at a minimum frequency of daily and shall record a minimum of hourly consumption of water.

3.1.3 Data Storage and Retrieval. The data management system shall be capable of electronically storing water consumption data and creating user reports showing calculated hourly, daily, monthly and annual water consumption for each measurement device.

3.2 Energy Use

INTENT:

- To identify major consumers and develop methods and practices to reduce consumption.
- To provide for on-going accountability of building consumption over time.

3.2.1 Measurement Devices. Measurement devices with remote reading capability or automatic meter reading (AMR) capability shall be provided to collect energy use data for each supply energy source (e.g. gas, electricity, district steam) to the building that exceeds the thresholds listed in Table 3.2.1-1. Utility company service entrance/interval meters are allowed to be used provided they are configured for automatic meter reading (AMR) capability.

Table 3.2.1-1 Energy Source Meter Thresholds

Energy Source	Main Metering Threshold
Electrical service	> 200 kVA
On-site renewable energy power	All systems > 1 kVA (peak)
Gas and steam service	> 300 kW (1,000,000 Btu/h)
Geothermal	> 300 kW (1,000,000 Btu/h) heating
Solar thermal	> 10 kW (30,000 Btu/h)

Measuring devices with remote reading capability or automatic meter reading (AMR) capability shall be provided to collect energy use data for each subsystem component in accordance with Table 3.2.1-2:

Table 3.2.1-2 Component Energy Metering Thresholds

Component	Sub-Metering Threshold
Chillers/heat pumps	> 70 kW (240,000 Btu/h) cooling capacity
Packaged AC units	> 70 kW (240,000 Btu/h) cooling
Fans	> 15 kW (20 hp)
Pumps	> 15 kW (20 hp)
Cooling towers	> 15 kW (20 hp)
Boilers and other heating equipment	> 300 kW (1,000,000 Btu/h) input

General lighting circuits	> 100 kVA
Miscellaneous electric loads	> 100 kVA

Measuring devices shall be digital-type. Existing buildings are allowed to reuse installed existing analog-type utility company service/interval meters.

3.2.2 Data Collection. All building measurement devices shall be configured to communicate energy consumption data to a data management system. Measuring devices shall have the capacity to provide data at a minimum frequency of daily and shall record a minimum of hourly consumption of energy.

3.2.3 Data Storage and Retrieval. The data management system shall be capable of electronically storing energy data and creating user reports showing calculated hourly, daily, monthly and annual energy consumption for each measurement device.

SECTION 2: SUSTAINABLE BUILDING STANDARDS

Chapter 4: Definitions

action level: the differential between zone and outdoor CO2 concentrations, above which action is to be taken to temporarily increase outdoor air flow to the space.

adapted plants: see *plants, adapted.*

agricultural land: land that is, or was within 10 years prior to the date of the building permit application for the building project, primarily devoted to the commercial production of horticultural, viticultural, floricultural, dairy, apiary, vegetable, or animal products or of berries, grain, hay, straw, turf, seed, finfish in upland hatcheries, or livestock, and that has long-term commercial significance for agricultural production. Land that meets this definition is agricultural land regardless of how the land is zoned by the local government with zoning jurisdiction over that land.

alternate on-site sources of water: see *water, alternate on-site sources of*.

attic and other roofs: all other roofs, including roofs with insulation entirely below (inside of) the roof structure (i.e., attics, cathedral ceilings, and single-rafter ceilings), roofs with insulation both above and below the roof structure, and roofs without insulation but excluding metal building roofs.

authority having jurisdiction (AHJ): the agency or agent responsible for enforcing this standard.

basis of design (BOD): a document that records the concepts, calculations, decisions, and product selections used to meet code compliance plan 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. (See *code compliance plan*.)

biobased product: a commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable agricultural materials (including plant, animal, and marine materials) or forestry materials.

bio-diverse plantings: non-homogeneous, multiple-species plantings.

breathing zone: the region within an occupied space between planes 3 and 72in. (75 and 1800mm) above the floor and more than 2 ft. (600mm) from the walls or fixed air conditioning equipment.

brownfield site: a site documented as contaminated by means of an ASTM E1903 Phase II Environmental Site Assessment or a site classified as a brownfield by a local, State, or Federal government agency.

building entrance: any doorway, set of doors, turnstile, vestibule, or other form of portal that is ordinarily used to gain access to the building by its users and occupants.

building envelope: the exterior plus the semi-exterior portions of a building. For the purposes of determining building envelope requirements, the classifications are defined as follows:

> **building envelope, exterior:** the elements of a building that separate conditioned spaces from the exterior.

Building envelope, interior: the elements of a building that separate conditioned space from unconditioned space or that encloses semi-heated spaces through which thermal energy may be transferred to or from the exterior, or to or from unconditioned spaces.

building project: a building or group of buildings and site which utilize a single submittal for a construction permit or that are within the boundary of contiguous properties under single ownership.

classroom: a space primarily used for scheduled instructional activities.

clerestory: that part of a building that rises clear of the roofs or other parts and whose walls contain windows for lighting the interior.

climate zone: see Section 5.1.4 of ASHRAE/IESNA Standard 90.1.

code compliance plan (CCP): a written document that details the functional requirements of a project and the expectations of how it will be used to comply with the ASBO. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

commissioning authority (CxA): An entity identified by the owner who leads, plans, schedules, and coordinates the commissioning team to implement the building commissioning process. (See *commissioning process*.)

commissioning plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the building commissioning process. (See *commissioning process*.)

commissioning process: A quality-focused process for enhancing the delivery of a project. The process focuses upon verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the code compliance plan. (See *code compliance plan*.)

complete operational cycle: a period of time as long as one-year so as to account for climactic variations affecting outdoor water consumption.

composting: partially decomposed organic plant and animal matter that can be used as a soil conditioner or fertilizer

conditioned space: the part of a building that is capable of being thermally conditioned for the comfort of occupants.

construction checklist: a form used by the contractor to verify that appropriate components are onsite, ready for installation, correctly installed, and functional.

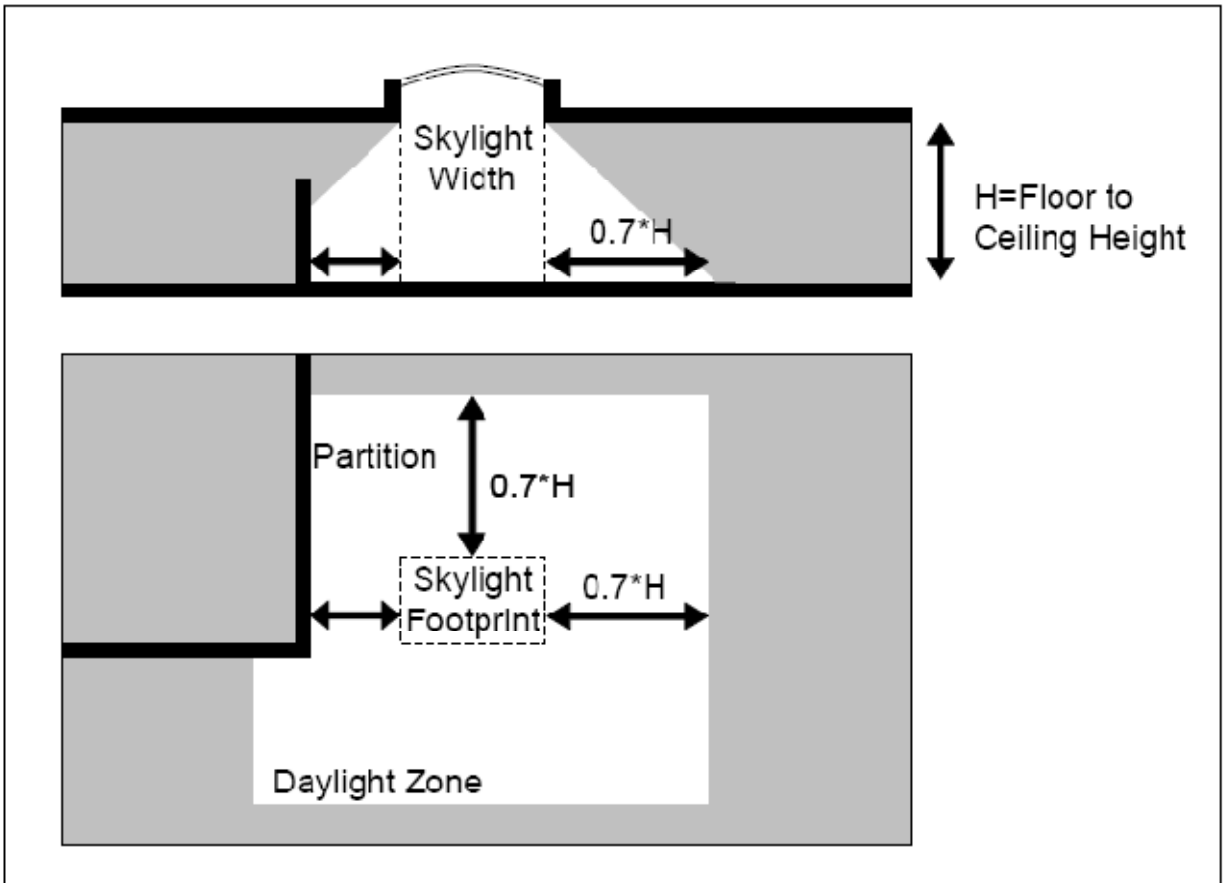
continuous air barrier: the combination of interconnected materials, assemblies and flexible sealed joints and components of the building envelope that provide air-tightness to a specified permeability. (See *building envelope*.)

daylight zone:
(a) adjacent to vertical fenestration: the area illuminated by vertical glazing calculated as the daylit depth multiplied by the daylit width, where the daylit depth is 15 ft, or the distance on the floor, perpendicular to the glazing, to the nearest 60 in. or higher permanent partition, whichever is less; and the daylit width is the width of the window plus, on each side, either 2 ft, the distance to a permanent partition, or one half the distance to the closest skylight or vertical fenestration, whichever is least. (See *skylight, roof monitor, clerestory, tubular daylighting device,* and *vertical fenestration*.)

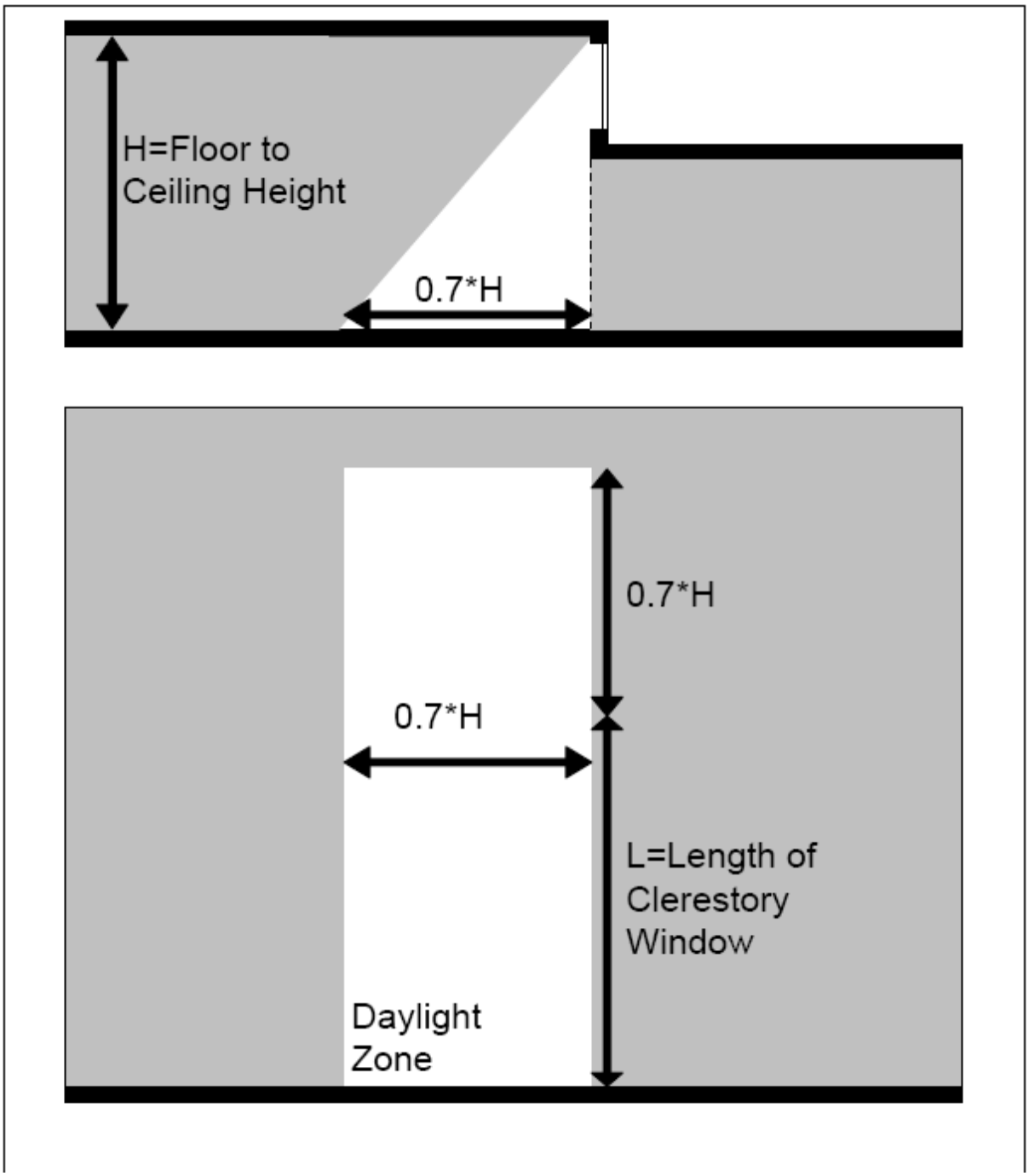
(b) under skylights and tubular daylighting devices: the area illuminated by skylights calculated by adding the rough opening of the skylight plus, in each of the lateral and longitudinal dimensions of the skylight, the lesser of 70% of the floor-to-ceiling height, the distance to the nearest 60 in.)or higher permanent partition, or one half the horizontal distance to the edge of the closest skylight, roof monitor, clerestory window, tubular daylighting device, or vertical fenestration. (See *skylight, roof monitor, clerestory, tubular daylighting device,* and *vertical fenestration*.)

(c) under roof monitor: the area illuminated by vertical fenestration in a roof monitor calculated by adding the rough opening of the roof monitor plus in each of the lateral and longitudinal dimensions of the opening, the lesser of 70% of the floor-to-ceiling height, the distance to the nearest 60 in. or higher permanent partition, or one half the horizontal distance to the edge of the closest skylight, roof monitor, clerestory window, or vertical fenestration. (See *skylight, roof monitor, clerestory, tubular daylighting device,* and *vertical fenestration*.)

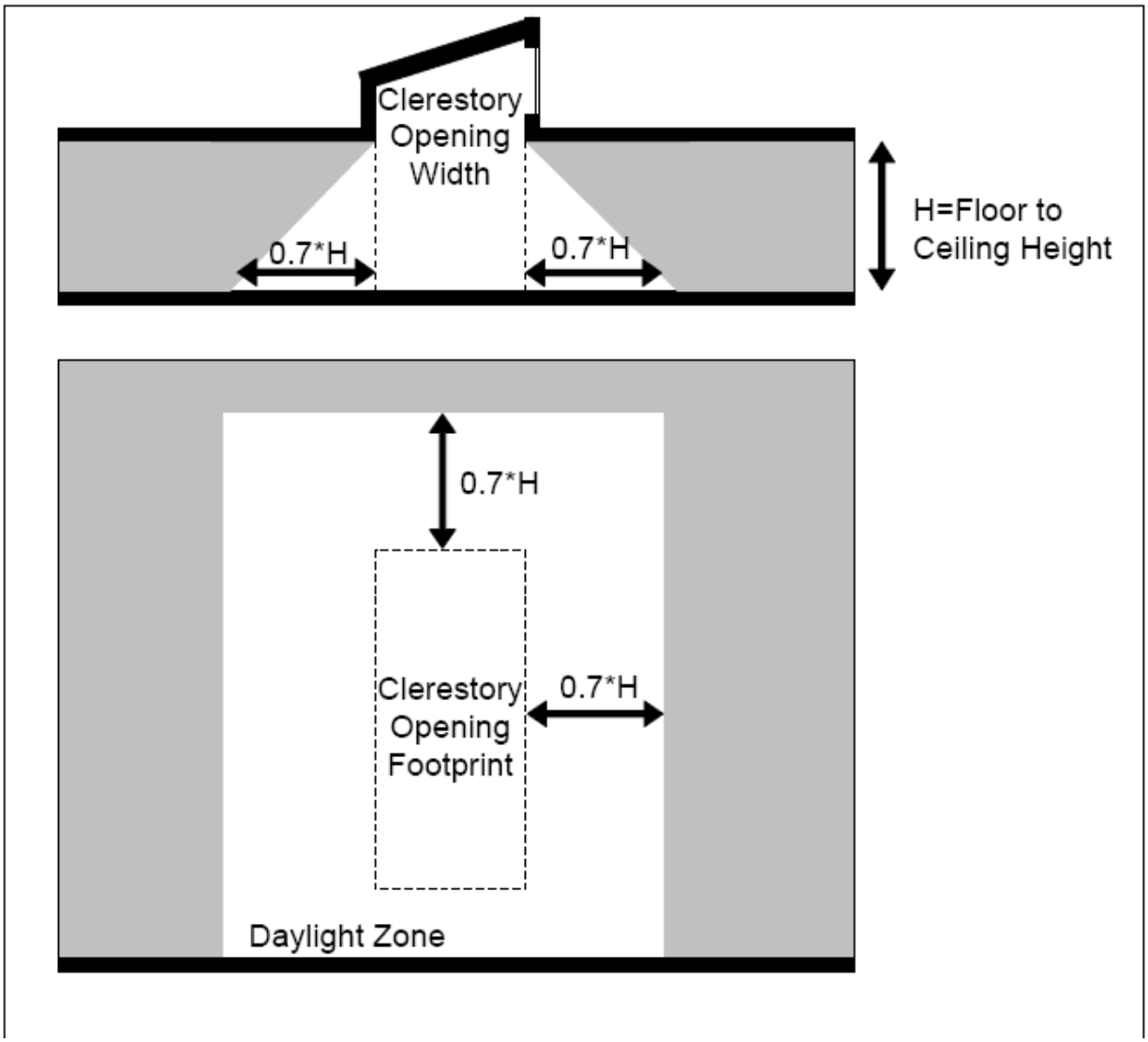
(d) under clerestory: the area illuminated by vertical fenestration in a clerestory calculated as the daylit depth multiplied by the daylit width, where the daylit depth is the lesser of 70% of the floor-to-ceiling height, the distance to the nearest 60 in. or higher permanent partition, or one half the horizontal distance to the edge of the closest skylight, and the daylit width is the length of the window plus the lesser of 70% of the floor-to-ceiling height, the distance to the nearest 60 in. or higher permanent partition, or one half the horizontal distance to the edge of the closest skylight, roof monitor, clerestory window, or vertical fenestration in each longitudinal direction. (See *skylight, roof monitor, clerestory,* and *vertical fenestration*.)



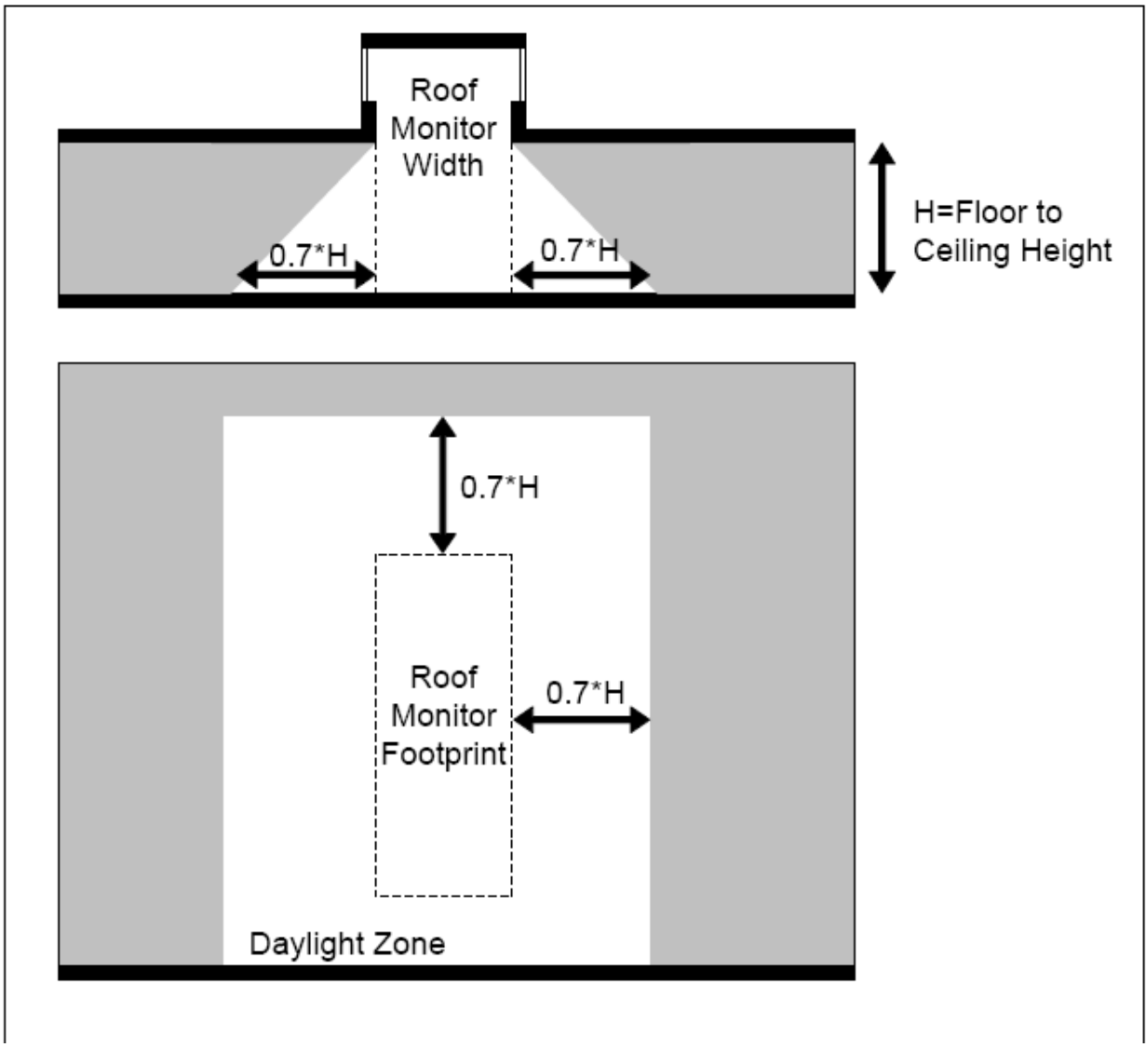
Reference: Daylight Zone Under Skylights (source: ASHRAE/USGBC Standard 189 draft)



Reference: Daylight Zone Under Clerestory (source: ASHRAE/USGBC Standard 189 draft)



Reference: Daylight Zone Under Clerestory Roof Monitor (source: ASHRAE/USGBC Standard 189 draft)



Reference: Daylight Zone Under Roof Monitor (source: ASHRAE/USGBC Standard 189 draft)

densely occupied space: those spaces with a design occupant density greater than or equal to 15 people per 1000 ft^2.

design minimum outdoor airflow rate: the rate of outdoor airflow provided by a ventilation system at design conditions.

designated park land: federal, state or local government owned land that is formally designated and set aside as park land or wildlife preserve.

development footprint: the total land area of a project site that will be developed with impervious surfaces constructed as part of the project such as buildings, streets, other areas that have been graded so as to be effectively impervious, and parking areas.

door: all operable opening areas (which are not fenestration) in the building envelope, including swinging and roll-up doors, fire doors, and access to hatches. Doors that are more than one-half glass

are considered fenestration. (See *fenestration.)* For the purposes of determining building envelope requirements, the classifications are defined as follows:

nonswinging: roll-up, sliding, and all other doors that are not swinging doors

swinging: all operable opaque panels with hinges on one side and opaque revolving doors.

door area: total area of door measured using the rough opening and including the door slab and frame. (See *fenestration area.*)

drip irrigation: An irrigation method which minimizes the use of water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters.

dwelling unit: a single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.

edible plants: plants that can be eaten without harm, non-toxic to humans; suitable for consumption.

effective aperture for vertical fenestration (EAvf): the product of the visible transmittance of the overall vertical fenestration product (entire rough opening including glass, sash, and frame) and the vertical fenestration area as a percentage of the gross wall area. Visible transmittance is determined in accordance with ASHRAE/IESNA Standard 90.1, Section 5.8.2.6. (See *fenestration area*, *gross wall area*, and *vertical fenestration*.)

emergency ride home: access to transportation home in the case of a personal emergency or unscheduled overtime for employees who commute via transit, carpool or vanpool.

enclosed space: a volume substantially surrounded by solid surfaces such as walls, floors, roofs, and openable devices such as doors and operable windows.

evapotranspiration (ET): the sum of evaporation and plant transpiration. Evaporation accounts for the movement of water to the air from sources such as the soil, canopy interception, and water bodies. Transpiration accounts for the movement of water within a plant and the subsequent loss of water as vapor through stomata in its leaves.

fenestration: all areas (including the frames) in the building envelope that let in light, including windows, plastic panels, clerestories, skylights, doors that are more than one-half glass, and glass block walls. (See *building envelope* and *door*).

fenestration area: total area of the fenestration measured using the rough opening and including the glazing, sash, and frame. 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. (See *door area.*)

forest land: all designated state and national forests, land that is, or was within 10 years prior to the date of the building permit for the building project, primarily devoted to growing trees for long-term commercial timber production.

generally accepted engineering standard: a specification, rule, guide, or procedure in the field of engineering, or related thereto, recognized and accepted as authoritative.

grasscyling: practice of leaving grass clippings on the lawn to allow for decomposition which nutrients to the soil and reduces the work of disposal.

***greenfield site*:** a site of which 30% or less has been previously developed with impervious surfaces.

***greyfield site**:* a site of which more than 30% is already developed with impervious surfaces.

gross roof area: the area of the roof measured from the exterior faces of walls or from the centerline of party walls. (See *roof* and *wall*.)

gross wall area: the area of the wall measured on the exterior face from the top of the floor to the bottom of the roof.

hardscape: site paved areas including roads, driveways, parking lots, walkways, courtyards, and plazas.

heat island effect: the tendency of urban areas to be at a warmer temperature than surrounding rural areas caused by the replacement of plants that transpire water (therefore lowering surrounding temperatures) with concrete and asphalt, which are thermal masses that collect solar heat (therefore raising surrounding air temperatures)

high-performance green building: a building designed, constructed and capable of being operated in a manner which increases environmental performance and economic value over time, safeguards the health of occupants, and enhances satisfaction and productivity of workers through integration of environmentally-preferable building materials, and water-efficient and energy-efficient systems

historic building: a building that has been designated or listed by a governing authority's historic preservation program. Such designations or listing may be awarded by the City of Atlanta, the State of Georgia Department of Natural Resources or the federal government Department of the Interior. Such buildings would be included within designated or listed districts.

hydrozone: to divide the landscape irrigation system according to each zone's water needs based on plant materials, soil and other factors.

improved landscape: any disturbed area of the site where new plant and/or grass materials are to be used including green roofs, plantings for stormwater controls, planting boxes, and similar vegetative use. Improved landscape shall not include hardscape areas such as sidewalks, driveways, or other paved areas, and swimming pools or decking.

integrated design process/integrated project delivery: a design process utilizing early and complete collaboration amongst representatives of each stakeholder and participating consultant on the project. Unlike the conventional or linear design process, integrated design requires broad stakeholder/consultant participation.

integrated pest management: a technique in which as many pest-control methods as possible are used in an ecologically harmonious manner to keep infestation within manageable limits.

irrigation adequacy: a representation of how well irrigation meets the needs of the plant material. This reflects the percentage of required water for turf or plant material supplied by rainfall and controller-scheduled irrigations.

irrigation excess: a representation of how much irrigation water was applied beyond the needs of the plant material. This reflects the percentage of water applied in excess of 100% of required water.

landscape establishment period: a time period, beginning on the date of completion of permanent plantings and not exceeding 18 months, intended to allow the permanent landscape to become sufficiently established to remain viable.

life cycle assessment (LCA): a compilation and evaluation of the inputs, outputs, and the potential environmental impacts of a building system throughout its life cycle. LCA addresses the environmental aspects and potential environmental impacts (e.g., use of resources and environmental consequences of releases) throughout a building's life cycle from raw material acquisition through manufacturing, construction, use, operation, end-of life treatment, recycling, and final disposal (end-of-life). Thpurpose is to identify opportunities to improve the environmental performance of buildings throughout their life cycles.

light rail: a streetcar-type vehicle that has step entry or level boarding entry and is operated on city streets, semi-exclusive rights-of-way, or exclusive rights-of-way.

lighting power allowance:

> ***interior lighting power allowance:*** the maximum lighting power in watts allowed for the interior of building.
>
> ***exterior lighting power allowance:*** the maximum lighting power in watts allowed for the exterior of a building.

load factor: the calculated annual electrical consumption in kWh divided by the product of the calculated annual peak electrical demand in kW and 8760 hours.

low-rise residential: residential construction three stories or less above grade.

low impact trail: trail development that preserves and protects natural-resource systems; aims to preserve and protect important natural characteristics of sites and areas, maintaining pre-development water quality, and maintaining or replicating pre-development groundwater and surface water volume and flow characteristics.

native plants: see *plants, native.*

non-densely occupied space: a space that is not a densely occupied space. (See *densely occupied space*.)

non-potable water: see *water, non-potable.*

nonresidential: all occupancies other than residential. See *residential.*

occupiable space: any enclosed space inside the pressure boundary and intended for human activities, including, but not limited to, all habitable spaces, toilets, closets, halls, storage and utility areas, and laundry areas.

on-site renewable energy power system: photovoltaic, solar thermal, geothermal, and wind systems used to generate electrical power and located on the building site.

once-through cooling: the practice of using potable water to cool a condenser or other item of process or building equipment and then discarding of the water to a sanitation drain. Once-through cooling also includes the use of potable water to temper hot water or steam before sending it to a sanitation drain.

outdoor(outside) air: air that is outside the building envelope or is taken from outside the building that has not been previously circulated through the building.

permeable pavement: pervious concrete or porous asphalt that allows the movement of water and air through the paving material, and primarily used as paving for roads, parking lots and walkways. Permeable paving materials have an open-graded coarse aggregate with interconnected voids.

permeable pavers*:* concrete or masonry units that present a solid surface but allow natural drainage and migration of water into the base below by permitting water to drain through the spaces between the pavers.

plants:
(a) adapted (or introduced) plants: plants that reliably grow well in a given habitat with minimal attention from humans in the form of winter protection, pest protection, water irrigation, or fertilization once root systems are established in the soil. Adapted plants are considered to be low maintenance but not invasive.
(b) invasive plants: plants, both indigenous and non-indigenous species or strains, which are characteristically adaptable, aggressive, have a high reproductive capacity and tend to overrun the ecosystems in which they inhabit. Collectively they are one of the great threats to biodiversity and ecosystem stability.
(c) native (or indigenous) plants: plants that adapted to a given area during a defined time period and are not invasive. In America, the term often refers to plants growing in a region prior to the time of settlement by people of European descent.

porous pavers (open-grid pavers): concrete or masonry units where at least 40% of the surface area consists of holes or openings that are filled with sand, gravel, other porous material, or vegetation.

post-consumer recycled content: proportion 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. This includes returns of material from the distribution chain. (See *recycled material*.)

potable water: see *water, potable.*

pre-consumer recycled content: proportion of recycled material in a product diverted from the waste stream during the manufacturing process. Content that shall not be considered pre-consumer recycled includes the re-utilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it. (See *recycled material*.)

pre-engineered building: a metal building built of or using prefabricated sections or parts.

pre-fabricated building: a type of building that consists of several factory-built components or units that are assembled on-site to complete the unit.

projection factor (PF): the ratio of horizontal depth of the external shading projected divided by the sum of the height of the fenestration and the distance from the top of the fenestration to the bottom of the farthest point of external shading projection, in consistent units.

projection factor, interior: the ratio of the horizontal depth of the external shading projection divided by the sum of the height of the fenestration and the distance from the top of the fenestration to the bottom of the farthest point of the external shading projection, in consistent units.

rapidly renewable materials: materials made from agricultural products, both fiber and animal, that take ten (10) years or less to grow or raise, and to harvest in an ongoing and sustainable fashion. Typical

examples of rapidly renewable materials include bamboo, wool, cotton insulation, agrifiber, linoleum, wheatboard, strawboard and cork.

recovered 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 new primary material, for a recycling or a manufacturing process.

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

recycled material: material that has been reprocessed from recovered (reclaimed) material by means of a manufacturing process and made into a final product or into a component for incorporation into a product. (See *recovered material*.)

regularly occupied space: a space that is scheduled to be used more than 4 hours per day.

repair: the reconstruction or renewal of any part of an existing building for the purpose of its maintenance.

residential: spaces in buildings used primarily for living and sleeping. Residential spaces include, but are not limited to, dwelling units, hotel/motel guest rooms, dormitories, nursing homes, patient rooms in hospitals, lodging houses, fraternity/sorority houses, hostels, prisons, and fire stations.

roof: the upper portion of the building envelope, including opaque areas and fenestration, that is horizontal or tilted at an angle less than 60 degrees from horizontal.

roof area, gross: the area of the roof measure from the exterior faces or walls or from the centerline of party walls. (See *roof* and *wall).*

roof monitor: a raised central portion of a roof having vertical fenestration (see diagram..).

roof penetrations: include all mechanical assemblies, elevator shafts, generators, cisterns, etc. See ASHRAE 90.1 requirements of 6.1.2.4

semiheated space: an enclosed space within a building that is heated by a heating system whose output capacity is greater than or equal to 3.4 Btu/h•ft^2 or floor area but is not a conditioned space.

service overcurrent protection device rating: the fuse or circuit breaker rating in kVA specified to protect the service entrance conductors to the building. The rating shall be converted to kVA by multiplying the device ampere rating by the service supply voltage. For circuit breakers with adjustable trip settings or replaceable trip units, the rating shall be the actual setting or trip unit of the circuit breaker specified. Where the service entrance conductors are protected by multiple overcurrent devices or the building has more than one service, the service overcurrent protection device rating shall be the combined ratings of all such devices.

service water heating: heating water for domestic or commercial purposes other than space heating and process requirements.

sidelighting: daylighting provided by vertical fenestration mounted below the ceiling plane.

single-rafter roof: a subcategory of attic roofs where the roof above and the ceiling below are both attached to the same wood rafter and where insulation is located in the space between these wood rafters.

site: a contiguous area of land that is under the ownership or control of one entity.

skylight: a fenestration surface having a slope of less than 60 degrees from the horizontal plane. Other fenestration, even if mounted on the roof of a building, is considered *vertical fenestration.*

smart controller (weather-based irrigation controller): a device that estimates or measures depletion of water from the soil moisture reservoir and operates an irrigation system to replenish water as needed while minimizing excess.

solar energy system: any device or combination of devices or elements which rely upon direct sunlight as an energy source, including but not limited to any substance or device which collects sunlight for use in:
(a) the heating or cooling of a structure or building;
(b) the heating or pumping of water;
(c) industrial, commercial, or agricultural processes; or
(d) the generation of electricity.

solar heat gain coefficient (SHGC): the ratio of the solar hear gain entering the space through the fenestration area to the incident solar radiation. Solar heat gain includes transmitted solar heat and absorbed solar radiation, which is reradiated, conducted, or convected into the space. (See *fenestration area).*

solar reflectance index (SRI)*:* a measure of a constructed surface's ability to reflect solar heat, as shown by a small temperature rise. A standard black surface (reflectance 0.05, emittance 0.90) is 0 and a standard white surface (reflectance 0.80, emittance 0.90) is 100. The SRI shall be calculated in accordance with ASTM E1980 for medium-speed wind conditions. The SRI shall be based upon solar reflectance as measured in accordance with ASTM E1918 or ASTM C1549, and the thermal emittance as measured in accordance with ASTM E408 or ASTM C1371. For roofing products, the values for solar reflectance and thermal emittance shall be determined by a laboratory accredited by a nationally recognized accreditation organization, such as the Cool Roof Rating Council CRRC-1 Product Rating Program, and shall be labeled and certified by the manufacturer. For building materials other than roofing products, the values for solar reflectance and thermal emittance shall be determined by an independent third party.

sustainable Landscape management:

toplighting: daylighting provided by fenestration mounted above the ceiling plane, including skylights, tubular daylighting devices, and vertical fenestration in roof monitors; and fenestration mounted above a lower adjacent ceiling plane in the space in clerestories.

tubular daylighting device: a means to capture sunlight from a rooftop. Sunlight is then redirected down from a highly reflective shaft and diffused throughout interior space.

turfgrass: grasses that are regularly mowed and, as a consequence, form a dense growth of leaf blades and roots.

undeveloped land: a parcel of land which does not have an inhabitable building, has not been graded on more than 5% of its area nor contains impervious cover greater than 5% of its area or where uninhabitable buildings occupy no more than 3% of the total parcel area.

usable open space: as defined in the Atlanta Zoning Ordinance

vendor: a company that furnishes products to project contractors and/or subcontractors for on-site installation.

variable air volume (VAV) system: HVAC system that controls the dry-bulb temperature within a space by varying the volumetric flow of heated or cooled supply air to the space.

vegetated green roof: a roof of a building or covered parking area that is partially or completely covered with vegetation and soil, or a growing medium, planted over a waterproofing membrane. It may also include additional layers such as a tray, root barrier, and drainage and irrigation systems. Design for green roofs must be executed by a registered landscape architect or a Certified Green Roof Professional.

verification: The process by which specific documents, components, equipment, assemblies, systems, and interfaces among systems are confirmed to comply with the criteria described in the code compliance plan requirements. (See *code compliance plan*.)

vertical fenestration: all fenestration other than *skylights.* Trombe wall assemblies, where glazing is installed within 12 in. of a mass wall, are considered walls, not fenestration.

wall: the portion of the building envelope, including opaque area and fenestration, that is vertical or tilted at an angle of 60 degrees from horizontal or greater. This includes above- and below-grade walls, between floor spandrels, peripheral edges or floors, and foundation walls. For the purposed of determining building envelope requirements, the classifications are defined as follows:

> ***above grade wall:*** a wall that is not a below-grade wall.
>
> ***below grade wall:*** that portion of a wall in the building envelope that is entirely below the finish grade in contact with the ground.

wall area, gross: the area of the wall measured on the exterior face from the top of the floor to the bottom of the roof.

water, alternate on-site sources of: must be non-potable, treated as required and may include but are not limited to:
(a) rainwater or stormwater harvesting;
(b) air conditioner condensate;
(c) gray water from interior applications;
(d) swimming pool filter backwash water;
(e) cooling tower blowdown water;
(f) foundation drain water;
(g) industrial process water; or
(h) on-site wastewater treatment plant effluent.

water, non-potable: water that is not potable water. (See *potable water*.)

water, potable: water from public drinking water systems or from natural freshwater sources such as lakes, streams, and aquifers where water from such natural sources would or could meet drinking water standards.

water factor (WF):
(a) clothes washer (residential & commercial: the quotient of the total weighted per-cycle water consumption divided by the capacity of the clothes washer (gallons per cycle per cubic foot).
(b) residential dishwasher the quotient of the total weighted per-cycle water consumption divided by the capacity of the clothes washer (gallons per cycle per cubic foot) for full machine wash and rinse cycle.

***wetlands*:** those areas, designated in accordance with the United States Army Corps of Engineers' *Wetland Delineation Manual* or as more broadly defined by other City ordinances, 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 adapted for life in saturated soil conditions.

yearly average day-night average sound levels: level of the time-mean-square A-weighted sound pressure averaged over a one-year period with ten dB added to sound levels occurring in each night-time period from 2200 hours to 0700 hours, expressed in dB.

zone primary airflow: used to determine system ventilation efficiency. The *zone primary outdoor air fraction* $Z_p=V_{oz}/V_{pz}$ where V_{pz} is the zone primary airflow, i.e., the primary airflow to the zone from the air handler including outdoor air and recirculated return air. See ASHRAE Standard 62.1 Section 6.2.5.1.

Chapter 5: Administration

INTENT: To develop an efficient and affordable system to ensure compliance with the ASBO without adding significant burden to existing Bureau of Buildings staff.

5.1 Compliance Review

5.1.1 Compliance Policy
The Bureau of Buildings shall develop a policy for Third Party Plan Review for Compliance with the ASBO. Third Party Plan Review for Compliance shall not in any way circumvent the current building permit application process established by the City of Atlanta Bureau of Buildings, the Zoning Division, the Arborist Division or the Department of Water Shed Management.

5.1.2 Third Party Plan Review

5.1.2.1 Plan Reviewer Professional Qualifications
ASBO Plan Review providers shall have at a minimum the following qualifications:

a) Registered Architect or Professional Engineer in good standing in the State of Georgia or a US Green Building Council LEED Accredited Professional under the employ of a Registered Architect or Professional Engineer for a minimum of three years.
b) The plan reviewer shall have attended an initial ASBO class and all recurring trainings sponsored by the Bureau of Buildings.
c) The plan reviewer shall have successfully passed an ASBO test sponsored by the Bureau of Buildings.

A plan review provider may not review plans for which he/she has any involvement in preparing but may review plans prepared within his/her firm outside of his/her involvement.
Exception to 5.1.2.1:

a) A registered Architect of record on projects larger than 10,000 sq. ft. may review plans for which he/she has had any involvement if he/she meets the following qualifications:
    a. The Architect shall have attended a Sustainable Building Ordinance class sponsored by the Bureau of Buildings.
    b. The Architect shall have successfully passed a Sustainable Building Ordinance test sponsored by the Bureau of Buildings.
    c. The Architect shall be responsible for coordination of all design professionals on the project including commissioning engineers.
    d. The Architect shall have been retained for Construction Administration phase of the project.
b) A Professional Engineer on projects larger than 10,000 sq. ft. where the only work being completed within the project falls completely under his/her responsibility may review plans for which he/she has had any involvement if he/she meets the following qualifications:
    a. The Engineer shall have attended a Sustainable Building Ordinance class sponsored by the Bureau of Buildings.
    b. The Engineer shall have successfully passed a Sustainable Building Ordinance test sponsored by the Bureau of Buildings.
    c. The Engineer shall have been retained for Construction Administration phase of the project.

5.1.2.2 General Plan Review Procedures
The Bureau of Buildings shall develop compliance procedures to be followed by Plan Reviewer (Standards of Practice).

5.1.3 Submittal
The plan reviewer shall submit the Compliance Review's Affidavit in the form as shown on Appendix A attached hereto with the submitted Construction Documents as evidence that the project is designed to be in full compliance with this ordinance. Providers shall withdraw their affidavit should any of their qualifications change status by submitting a letter stating such to the Director of the Bureau of Buildings via registered mail. Such withdrawal will initiate a stop work order for the project within 30 business days if affidavit is not replaced.

5.1.4 Auditing
The Bureau of Buildings shall audit every seventh building that receives a permit under compliance option 3.1(a).

Exception: Section 5.1 shall not apply to projects under $50,000.00

5.2 Atlanta Sustainable Building Ordinance Administrative Variance Committee (ASBOAVC)

INTENT: To provide a means to adjust the ASBO in the event of unforeseeable situations where a requirement of the ASBO would inhibit the construction of high performance buildings.

5.2.1 Purpose and Intent Where this ordinance creates an undue hardship a variance may be granted.

5.2.2 Committee
The ASBOAVC shall consist of the Chief Building Inspector, Chief Plan Reviewer, Zoning reviewer, One Plan reviewer, and City Arborist. One member of the ASBC shall be appointed ex-officio member of the committee.

5.2.3 Administration

a) After consultation with the ASBOAVC, the Director of Bureau of Buildings (DirBoB) may grant variances to specific requirements of the ASBO which has been set by this article when due to special conditions, a literal enforcement of the terms of this article will result in an undue hardship.
b) The DirBoB may, but is not required to, include one or more conditions to a variance as necessary to mitigate the effect of reduced building performance. Typical conditions for mitigation may include but are not limited to:
    1. Increased building envelope efficiency
    2. Adjusted ventilation requirements
    3. Increased shading requirements
    4. Increased water efficiency requirements
    5. Permeable paving requirements
    6. Modifications to site design
c) Variances expire at issuance of the certificate of occupancy and any new work shall be subject to the SBO in effect at that time

5.2.4 Criteria to be considered for granting an ASBO variance

The Dir BOB and the ASBOAVC shall consider the following criteria, where applicable, when reviewing any application for variance from the operation of this ordinance:

a) Undue hardship due to unusual building type, size, and site development.
b) *historic buildings, or buildings qualifying for such designation where eligibility can be documented.*
c) *Reasonable economic use.* The commissioner shall consider whether the property has a reasonable economic use if the variance is denied.
d) Conflict with community goals stated in the Comprehensive Development Plan
e) historically accurate building restoration projects

5.2.5 General procedures for ASBO variance applications

a) Persons seeking ASBO variances from this article shall complete an application on a form supplied by the DirBoB.
b) General requirements for all applications.
    1. Each application shall be signed by the applicant and shall only be accepted after the payment of any required fees.
    2. All plans, calculations and specifications required by an application shall be prepared, signed, and sealed by an architect, engineer, or landscape architect, registered to practice in the State of Georgia.
    3. No application shall be processed until all material required in this article has been submitted.
c) When an application is deemed complete as set forth in this article the DirBoB shall forward all applications to the ASBOAVC for their review and recommendation.
d) The DirBoB is authorized to draft rules of procedure which may assist in the administration of this article but such rules shall not:
    1. Reduce any notice or reporting requirements;
    2. Shorten any period specified for review, processing time, or appeal of a decision of the DirBoB; or
    3. Reduce the requirements for the granting of applications.

5.2.6 Contents of an application for ASBO variance

a) An application for an ASBO variance request shall be forwarded to the ASBOAVC when all of the following materials have been received:
    1. Preliminary design documents;
    2. Preliminary engineering calculations related to the variance requested;
    3. Narrative describing need for variance; and
    4. Narrative describing potential offsets for reduced building performance.
b) The DirBoB and ASBOAVC may require that other information reasonably considered necessary to evaluate an application be supplied. An applicant has 30 days from the date of request to supply the information requested to the office of the DirBoB. In the event that the DirBoB or ASBOAVC requests that the applicant supply additional information, the time for processing of an application shall be extended for an additional 15 days from the date of receipt of such information in the office of the DirBoB. If additional information has been requested by the ASBOAVC, the DirBoB shall forward such information within three days of its receipt.

5.2.7 Processing of ASBO ordinance variance applications

a) Recommendations of the ASBOAVC shall be made to the DirBoB within 15 days of the time an application is received unless additional information is requested, in which case, recommendation shall be made 15 days after the receipt of the additional information by the ASBOAVC. The ASBOAVC must request all additional information at one time.

b) The recommendations of the ASBOAVC shall be in writing and shall include a specific finding on each of the applicable main criteria for allowing an ASBO variance. The recommendation of the ASBOAVC may but is not required to make a separate finding on each of the sub-items contained in each of the main criteria.

c) The ASBOAVC may recommend and the DirBoB may take any of the following actions on an application for an ASBO variance:
    1. Issue the ASBO variance as requested in the application;
    2. Issue an ASBO variance with written conditions necessary to assure conformity with the requirements and stated intent of this article;
    3. Deny the application.

d) DirBoB shall issue a decision in writing within 15 days of the date of the decision of the ASBOAVC unless the DirBoB deems it necessary to request additional information from the applicant, in which case, the decision of DirBoB may be deferred pending receipt of such additional information. If additional information has been requested from the applicant, DirBoB shall have 15 days from receipt of the additional information to issue a decision. The DirBoB must request all additional information at one time.

e) If DirBoB has not:
    1. Issued an ASBO variance;
    2. Requested additional information in writing;
    3. Issued an ASBO variance with conditions; or
    4. Issued a denial in writing stating the grounds for denial,

    Or, if the ASBOAVC has not:
    1. Recommended approval of an ASBO variance;
    2. Requested additional information in writing;
    3. Recommended issuance of an ASBO variance with conditions; or
    4. Recommended issuance of a denial in writing stating the grounds for denial,

    Within 30 days after receipt of the variance application or the receipt of additional requested information from the applicant, the variance shall automatically be granted.

f) DirBoB shall make a quarterly report to the ASBC stating the location of all ASBO building variance applications and stating all decisions on the issuance or denial of any variance since the prior report.

Exception to 5.2.7: If more than three variance applications are requested for a new building or 5 variance applications for an existing building are requested for one project, 5.2.7 (e) does not apply.

5.2.8 Judicial review of decisions of DirBoB on ASBO variances

Any person who is dissatisfied with a final decision of the DirBoB on an ASBO variance has the right to appeal said decision to the superior court of the county where the property is located. Such appeals shall be filed within 30 days of the issuance of the permit

5.2.9 Liability

Neither the issuance of a development permit or compliance with this article shall relieve any person from civil liability to any person or property otherwise imposed by law, or constitute the assumption of such liability.

5.2.10 Zoning

In the event of a conflict between the ASBS and Atlanta's zoning districts requirements, the city of Atlanta's zoning requirements shall supersede the requirements of the ASBS.

Chapter 6: Site Improvements

6.1 Mandatory Provisions

INTENT: To avoid development of inappropriate sites and reduce the environmental impact of the location of a building on a site.

6.1.1 Wetland Protection There shall be no *site* disturbance or development within 75 ft of any *wetland* unless the *site* disturbance or development involves plantings or habitat enhancement of the functions and values of the wetland.
Exception to 6.1.1: Development of a *low-impact trail* exclusively designed for pedestrians is allowed within 15 ft of a *wetland*.

6.1.2 Mitigation of Heat Island Effect

INTENT: To reduce the thermal gradient between developed and undeveloped areas and to minimize impact on microclimate and human and wildlife habitat.

6.1.2.1 Vehicular Traffic Hardscape The *vehicular traffic hardscape* includes roads and parking lots but not sidewalks, courtyards, the constructed building surfaces, nor portion of the *site hardscape* covered by photovoltaic panels generating electricity or other *solar energy systems* used for space heating or water heating. Not less than 50% of the *site vehicular traffic hardscape* shall be provided with any combination of the following:

a) shading by *bio-diverse plantings* of *native plants* and *adapted plants* (trees and vegetation) planted to provide shade within 5 years of issuance of the final certificate of occupancy, as recommended by the City of Atlanta Arborist Division's Recommended Tree List.
b) paving materials with a minimum initial *solar reflective index (SRI)* of 29. A default *SRI* value of 35 for new concrete without added color pigment is allowed to be used in lieu of measurements.
c) shading through the use of structures, provided that the top surface of the shading structure complies with 6.1.2.4.
d) parking under a building, provided that the roof of the building complies with 6.1.2.4.

6.1.2.2 Other Site Hardscape The *site hardscape* includes sidewalks and courtyards but not the constructed building surfaces nor portion of the *site hardscape* covered by photovoltaic panels generating electricity or other *solar energy systems* used for space heating or water heating. Not less than 90% of the *site hardscape*, excluding *vehicular traffic hardscape*, shall be provided with any combination of the following::

a) *bio-diverse plantings* of *native plants* and *adapted plants* (trees and vegetation) planted to provide shade within 5 years of issuance of the final certificate of occupancy, as recommended by the City of Atlanta Arborist Division's Recommended Tree List.
b) paving materials with a minimum initial *solar reflective index (SRI)* of 29. A default *SRI* value of 35 for new concrete without added color pigment is allowed to be used in lieu of measurements.

c) shading through the use of structures, provided that the top surface of the shading structure complies with 6.1.2.4.

6.1.2.3 Building Walls Above-grade building *walls* and retaining walls shall be shaded in accordance with this section. The building is allowed to be rotated up to 45 degrees to the nearest cardinal orientation for purposes of calculations and showing compliance. Compliance with this section is allowed to be achieved through the use of shade-providing plants, man-made structures, existing buildings, hillsides, permanent building projections, or a combination of these, using the following criteria:

a) shade shall be provided on at least 30% of the east and west above-grade *walls* and retaining walls from grade level to a height of 20 ft above-grade or the top of the exterior wall, whichever is less, within 5 years of issuance of the final certificate of occupancy. Shade coverage shall be calculated at 10 am for the east *walls* and 3 pm for the west *walls* on the summer solstice.
b) where shading is provided by vegetation, vegetation (including trees) shall be *bio-diverse plantings* of *native plants* and *adapted plants* and appropriately sized, selected, planted and maintained so that they do not interfere with overhead power lines or underground water and sewer lines. Such trees shall be placed a minimum of 5 ft from and within 50 ft of the building or retaining wall.

Exceptions to 6.1.2.3:

a) The requirements of this section are satisfied if 75% or more of the opaque *wall* surfaces on the east and west have a minimum *SRI* of 29 as installed. Each *wall* is allowed to be considered separately for this exception.
b) Portions of walls that are used for *renewable energy power systems* shall count toward the required shaded area.

6.1.2.4 Roofs This section applies to the building and covered parking roof surfaces. A minimum of 75% of the entire roof surface that is not used for *roof penetrations*, *renewable energy power systems* (e.g. photovoltaic or solar thermal collectors), or harvesting systems for rainwater to be used on-site shall be covered with products that comply with one or more of the following standards:

a) a minimum initial *SRI* of 78 for a low-sloped roof (a slope less than or equal to 2:12) and a minimum initial *SRI* of 29 for a steep-sloped roof (a slope of more than 2:12).
b) the USEPA's Energy Star Program Requirements for Roof Products – Eligibility Criteria.
c) *vegetated green roofs(see definition in Chapter 4)*

Exceptions to 6.1.2.4:

a) *Building projects* where an annual energy analysis simulation demonstrates that the total annual building energy cost, as calculated in accordance with Chapter 8, are both 2% less for the proposed roof than with a roof material complying with the requirements of 6.1.2.4 (a).
b) Roofs used to shade or cover parking and roofs over unheated or semi-heated spaces provided that they have a minimum initial *SRI* of 29. A default *SRI* value of 35 for new concrete without added color pigment is allowed to be used in lieu of measurements.
c) Buildings designated as Historic Buildings or Landmark Buildings by the Atlanta Urban Design Commission.

6.1.3 Light Pollution Outdoor lighting shall comply with IESNA Standard RP-33. Lighting shall not exceed 80% of lighting power density for exterior areas and 50% of lighting power density for building facades and landscape features as defined in the current version of ASHRAE/IESNA Standard 90.1.

6.1.4 Greenfield Sites

INTENT: To conserve natural areas and promote biodiversity

On a *greenfield site*, a minimum of 20% of the *usable open space* shall be developed or retained as vegetated area. Such vegetated areas include bioretention facilities, raingardens, filter strips, grass swales, vegetated level spreaders, constructed *wetlands*, planters, vegetated green roofs, or open space with plantings. A minimum of 60% of such vegetated area shall consist of *biodiverse planting* of *native plants, adapted plants, other than turf grass,* or *edible plants*. When sites of different categories are combined (e.g. one greenfield site and one previously developed site) calculations shall be performed for the greenfield portion of the site only.

Chapter 7: Water Use Efficiency

7.1 Mandatory Provisions

7.2 Building Water Use

Buildings must comply with either 7.2.1 or 7.2.2.

INTENT: To maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater system

7.2.1 Building Water Use Prescriptive Option

7.2.1.1 Fixtures and Fittings Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following requirements:

a) Water closets (toilets) flushometer valve type: For single flush, maximum flush volume when determined in accordance with ASME A112.19.2 is 1.28 gal. For dual-flush, effective flush volume determined in accordance with ASME A112.19.4 and Section 3.2, USEPA WaterSense Tank-Type High Efficiency Toilet Specification is 1.28 gal.
b) Water closets (toilets) tank-type: Tank-type water closets shall comply with the performance criteria of the U.S. EPA WaterSense Tank-Type High-Efficiency Toilet Specification.
c) Urinals: Maximum flush volume when determined in accordance with ASME A112.19.2 is 0.5 gal. Non-water urinals shall comply with ASME A112.19.19 (vitreous china) or IAPMO Z124.9 (plastic) as appropriate.
d) Public lavatory faucets: Maximum flow rate is 0.5 gal/min when tested in accordance with ASME A112.18.1/CSA B125.1.
e) Public metering self-closing faucet: Maximum water use is 0.25 gal per metering cycle when tested in accordance with ASME A112.18.1/CSA B125.1.
f) *Residential* bathroom lavatory sink faucets: Maximum flow rate is 0.5 gal/min when tested in accordance with ASME A112.18.1/CSA B125.1. *Residential* bathroom lavatory sink faucets shall comply with the performance criteria of the USEPA WaterSense High-Efficiency Lavatory Faucet Specification.
g) *Residential* kitchen faucets: Maximum flow rate is 2.2 gal/min when tested in accordance with ASME A112.18.1/CSA B125.1.
h) *Residential* showerheads: Maximum flow rate is 2.0 gal/min when tested in accordance with ASME A112.18.1/CSA B125.1.
i) *Residential* shower compartment (stall) in *dwelling units* and guest rooms: The allowable flow rate from all shower outlets (including rain systems, waterfalls, body sprays, and jets) that can operate simultaneously shall be limited to a total of 2.0 gal/min.

7.2.1.2 Appliances

a) Clothes washers and dishwashers installed within *dwelling units* shall comply with the USEPA Energy Star Program Requirements for Clothes Washers and Energy Star Program Requirements for Dishwashers. Maximum water use shall be as follows:
    a. Clothes Washers: maximum of 6.0 gal/ft3 of drum capacity
    b. Dishwashers: maximum WF of 5.8 gal/full operating cycle

b) Clothes washers installed in publicly accessible spaces (e.g. multifamily and hotel common areas) and coin- and card-operated clothes washers of any size used in Laundromats shall have a maximum WF of 7.5 gal/ft3 of drum capacity-normal cycle.

7.2.1.3 Cooling Towers The water being discharged for cooling towers for air conditioning systems such as chilled water systems shall be limited in accordance with (a) or (b):

a) for makeup waters having less than 200 ppm of total hardness expressed as calcium carbonate, by achieving a minimum of five (5) cycles of concentration based on a ratio of the conductivity of the water being discharged (blowdown) divided by the conductivity of the feed (makeup) water(s);
b) for makeup waters with more than 200 mg/L of total hardness expressed as calcium carbonate, by achieving a minimum of 3.5 cycles of concentration based on a ratio of the conductivity of the water being discharged (blowdown) divided by the conductivity of the feed (makeup) water(s

Exception to 7.2.1.3: Where the blowdown's total dissolved solids concentration exceeds 1500 ppm, or silica exceeds 150 ppm of silica measured as silicon dioxide before the above cycles of concentration are reached.

7.2.1.4 HVAC Systems and Equipment

a) *Once-through cooling* with *potable water* is prohibited.
b) Cooling towers and evaporative coolers shall be equipped with makeup and blowdown meters, conductivity controllers and overflow alarms. Cooling towers shall be equipped with efficient drift eliminators that achieve drift reduction to 0.002 percent of the circulated water volume for counterflow towers and 0.005% for cross-flow towers.
c) Condensate from air conditioning units with a capacity greater than 120,000 Btuh and from all steam systems shall be recovered for re-use.

7.2.1.5 Commercial Food Service Operations Commercial food service operations (e.g. restaurants, cafeterias, food preparation kitchens, caterers, etc.):

a) shall use high-efficiency pre-rinse spray valves (i.e. valves which function at 1.3 gal per minute or less and comply with a 26-second performance requirement when tested in accordance with ASTM F2324),
b) shall use dishwashers that comply with the requirements of the USEPA Energy Star Program for Commercial Dishwashers,
c) shall use boilerless/connectionless food steamers that consume no more than 2.0 gal per hour in the full operational mode,
d) shall use combination ovens that consume not more than 10 gpm in the full operational mode,
e) shall use air-cooled ice machines that comply with the requirements of the USEPA Energy Star Program for Commercial Ice Machines, and
Exception: Machines using building HVAC chilled water and/or condenser water are exempt from 7.2.1.5 (e).
f) shall be equipped with hands-free faucet controllers (e.g. foot controllers or sensor-activated) for all faucet fittings within the food preparation area of the kitchen and the dish room, including pot sinks and washing sinks.

Exception to 7.2.1.5: Reclaimed or reused equipment is exempt from 7.2.1.5.

7.2.1.6 Medical and Laboratory Facilities Medical and laboratory facilities (e.g. clinics, hospitals, medical centers, physician and dental offices, and medical and non-medical laboratories of all types):

a) shall use water-efficient steam sterilizers that use (1) water tempering devices that only allow water to flow when the discharge of condensate or hot water from the sterilizer exceeds 140 °F and (2) mechanical vacuum equipment in place of venturi-type vacuum systems for vacuum sterilizers,
b) shall use film processor water recycling units where large frame x-ray films of more than 6 in. in either length or width are processed (small dental x-ray equipment is exempt from this requirement),
c) shall use digital imaging and radiography systems where the digital networks are installed (as opposed to conventional film-based systems),
d) shall use a dry-hood scrubber system or, if the applicant determines that a wet-hood scrubber system is required, the scrubber shall be equipped with a water recirculation system. For perchlorate hoods and other applications where a hood wash-down system is required, the hood shall be equipped with self-closing valves on those wash-down systems,
e) shall use dry vacuum pumps, unless fire and safety codes for explosive, corrosive or oxidative gasses requires a liquid ring pump, and,
f) shall use efficient water treatment systems that comply with the following criteria:
    a. for all filtration processes, pressure gauges shall determine and display when to backwash or change cartridges;
    b. for all ion exchange and softening processes, recharge cycles shall be set by volume of water treated or based upon conductivity or hardness;
    c. for reverse osmosis and nanofiltration equipment, reject water shall not exceed 60 % of the feed water and shall be used as scrubber feed water or other beneficial uses on the project *site*.

Exception to 7.2.1.6: Food service operations within medical facilities shall comply with 7.2.1.5.

7.2.1.7 Special Water Features Water use shall comply with the following:
a) Ornamental fountains and other ornamental water features shall be supplied by *alternate on-site sources of water*. Fountains and other features shall be equipped with: (1) leak detection devices that shut off water flow if a leak of more than 1.0 gal per hour is detected, and (3) equipment to recirculate, filter, and treat all water for reuse within the system.
b) Pools and spas:
    a. Backwash water: recover filter backwash water for other applications, or treat and reuse backwash water within the system.
    b. Filtration: For filters with removable cartridges, only reusable cartridges and systems shall be used. For filters with backwash capability, use only pool filter equipment that includes (a) a pressure drop gauge to determine when the filter needs to be backwashed and (b) a sight glass enabling the operator to determine when to stop the backwash cycle.
    c. Pool splash troughs, if provided, shall drain back into the pool system.

7.2.1.8 Vehicle Washing
a) Vehicle wash facilities using conveyorized, touchless, and/or rollover in-bay technology shall reuse a minimum of 75% of water from previous vehicle rinses in subsequent washes.

b) Vehicle wash facilities using reverse osmosis to produce water rinse with a lower mineral content shall incorporate the unused concentrate in subsequent vehicle washes.
c) Self-service spray wands shall emit no more than three gallons of water per minute.

7.2.2 Building Water Use Performance Option: 40% Savings

Calculations shall be done in accordance with *generally accepted engineering standards* and handbooks acceptable to the *authority having jurisdiction*.

A schedule of plumbing fixtures and fixture fittings that, through higher efficiency and the use of *alternative on-site sources of water*, reduce the overall use of potable water within the building by 40% shall be provided. The reduction shall be based on the maximum allowable water use per plumbing fixture and fittings as required by the Georgia State Minimum Standard Plumbing Code.

7.3 Site Water Use Reduction Buildings must comply with either 7.3.1 or 7.3.2.

INTENT: To reduce the use of potable water, or other natural surface or subsurface water resources available, on or near the project site, for landscape irrigation.

7.3.1 Site Water Use Prescriptive Option

7.3.1.2 Site Water Use Reduction
7.3.1.2.1 Landscape Design. A minimum of 60% of the area of the *improved landscape* shall be in *bio-diverse planting* of *native plants, edible* and *adapted plants other than turf grass*.
Exception to 7.3.1.2.1: The area of dedicated athletic fields shall be excluded from the calculation of the *improved landscape* for schools, residential common areas, or public recreational facilities.
7.3.1.2.2 Irrigation System Design. *Hydrozoning* of automatic irrigation systems to water different plant materials such as *turfgrass* vs. shrubs is required. Landscaping sprinklers shall not be permitted to spray water directly on a building and within 3 feet of a building.
7.3.2.1.3 Controls. Any irrigation system for the project *site,* including a *vegetated green roof*, shall be controlled by a *smart controller* that uses *evapotranspiration* and weather data to adjust irrigation schedules and that complies with the minimum requirements as listed below when tested in accordance with IA SWAT Climatological Based Controllers 7th Draft Testing Protocol. All such control systems shall also incorporate an on-site rain or moisture sensor that automatically shuts the system off after a predetermined amount of rainfall or sensed moisture in the soil.

a) *Irrigation adequacy* – 80 % minimum evapotranspiration.
b) *Irrigation excess* – not to exceed 10 %.

Exceptions to 7.3.1.2:

a) A temporary irrigation system used exclusively for the establishment of new landscape shall be exempt from this requirement. Temporary irrigation systems shall be removed or permanently disabled at such time as the *landscape establishment period* has expired.
b) Supplemental watering may be used on non-irrigated vegetated green roofs during periods without adequate rainfall to maintain the plants. This watering must be done in accordance with state and local regulations.

7.3.2 Site Water Use Performance Option

All permanent irrigation beyond the landscape establishment period, including watering of artificial turf, shall be provided from *alternate on-site sources of water*.
Exception to 7.3.2: Potable water may be used to irrigate edible plants.

Chapter 8: Energy

INTENT: To establish a minimum level of energy efficiency for the proposed building and systems.

8.1 Mandatory Provisions

Comply with mandatory provisions of the current version of ASHRAE/IESNA Standard 90.1 (Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4 of ASHRAE/IESNA 90.1)

Buildings must comply with either 8.2 or 8.3

8.2 Prescriptive Option

8.2.1 ASHRAE Advanced Energy Design Guides Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guides (AEDG). The AEDGs refer to specific building types and sizes and must be designed to the climate zone where the building is sited.

a. Small Office Buildings
b. Small Retail Buildings
c. K – 12 School Buildings
d. Small Warehouses and Small Storage Buildings

8.2.2 Prescriptive Based Analysis Tools Demonstrate 30% improvement over current version of ASHRAE/IESNA Standard 90.1 using prescriptive based analysis tool such as COMcheck.

8.3 Performance Option: 14% over ASHRAE Standard 90.1

Building Projects shall exceed the current version of ASHRAE/IESNA Standard 90.l by at least 14%. Projects must meet the Mandatory Provisions of the Standard

Demonstrate the percent improvement over ASHRAE IESNA Standard 90.1 by using a whole building project simulation using the Building Performance Rating Method in Appendix G of the Standard. Simulation Software must be capable of whole building energy performance analysis for 8760 hours per year and capable of using local energy rates to determine performance.

The Energy Cost Budget option in Chapter 11 of ASHRAE/IESNA Standard 90.1 shall not be used.

Chapter 9: Indoor Environmental Quality

INTENT: To enhance air quality in buildings to protect the comfort and well-being of occupants.

9.1 Mandatory Provisions

9.1.1 Minimum Indoor Air Quality. The building shall comply with Sections 4-7 of the current version of ASHRAE Standard 62.1 with the following modifications and additions. When a requirement is provided below, this supersedes the requirements in ASHRAE Standard 62.1.

a) Section 5.9 of ASHRAE Standard 62.1: The particulate matter filters or air cleaners shall have a MERV of not less than 8 and shall comply with and be provided where required in Section 5.9 of ASHRAE Standard 62.1.
b) Section 6.2.2 of ASHRAE Standard 62.1: The zone-level *design minimum outdoor airflow rates* in all *occupiable spaces* shall be greater than or equal to the airflow calculated using the Ventilation Rate Procedure in Section 6.2 of ASHRAE Standard 62.1.
c) Section 6.2 of ASHRAE Standard 62.1: The system-level *design minimum outdoor airflow rate* calculation shall be based on the zone-level *design minimum outdoor airflow rates* calculated in ASHRAE Standard 62.1 7.1.1 (c).
d) Section 6.2.1.1 of ASHRAE Standard 62.1: In addition to Section 6.2.1.1, when the building is located in an area that is in "non-attainment" with the National Ambient Air Quality Standards for PM2.5 as determined in Section 4 of ASHRAE Standard 62.1, particle filters or air-cleaning devices having a MERV of not less than 13 when rated in accordance with ASHRAE Standard 52.2 shall be provided to clean *outdoor air* at any location prior to its introduction to occupied spaces. Filter frames, filter racks, access doors, and filter cartridges shall be sealed to eliminate air bypass pathways.
   Exception to 9.1.1 (d): the particle filters or air cleaning devices on systems with a capacity less than 65000 BTU/hr must have a MERV of not less than 8.
e) Section 6.2.9 of ASHRAE Standard 62.1: Section 6.2.9 of ASHRAE Standard 62.1 is superseded by ASHRAE Standard 62.1section 7.1.2.

9.1.2 Radon Resistant Construction

INTENT: To reduce health risks to building occupants associated with high indoor radon levels

Buildings must implement one of the following radon resistant new construction techniques, as outlined in Chapter 2 of the EPA guide to Radon Prevention in the Design and Construction of Schools and other Large Buildings, Third Printing with Addendum, June 1994 (EPA 625-R-92-016):

a) Soil Depressurization
   a. Place a continuous 4- to 6-in. layer of clean, coarse aggregate under the slab.
   b. Eliminate barriers to sub-slab airflow such as sub-slab walls.
   c. Install a 4- by 4-ft area by 8-in. deep radon suction pit (or equivalent) under the slab.
   d. Run a 6-in. diameter PVC radon vent pipe from the radon suction pit to the outdoors.

b) **Building Pressurization** Indoor/outdoor pressure relationships must be controlled to prevent radon entry. More outdoor air is supplied than exhausted so that the building is slightly pressurized compared to both the exterior of the building and the sub-slab area.
c) **Sealing Radon Entry Routes** Seal major radon entry routes to block or minimize radon entry.

9.1.3 Blower Door Testing

INTENT: To determine a building's air-tightness, which in turn reduces energy consumption due to air leakage, avoids moisture condensation problems, which adversely affects both the longevity of the building and the health of its occupants, avoids uncomfortable drafts caused by cold air leaking in from the outdoors, and ensures that the home's air quality is not too contaminated by indoor air pollution.

In multi-family buildings, acceptable sealing of residential units shall be demonstrated by a blower door test conducted on a 10% representative sample of units in accordance with ANSI/ASTM-E779-03, Standard Test Method for Determining Air Leakage Rate by Fan Pressurization. Residential units must demonstrate less than 1.25 square inches leakage per 100 square feet of enclosure are (i.e., sum of all wall, ceiling and floor areas).

9.1.4 Environmental Tobacco Smoke Control Smoking will be prohibited indoors except in interior designated smoking areas. Designated exterior smoking areas must be located at least 25 ft away from entries, outdoor air intakes, and operable windows. Interior designated smoking rooms must effectively contain, capture, and remove ETS from the building. At a minimum, the smoking room must be directly exhausted to the outdoors with no recirculation of ETS-containing air to the non-smoking area of the building, and enclosed with impermeable deck-to-deck partitions. With the doors to the smoking room closed, operate exhaust sufficient to create a negative pressure with respect to the adjacent spaces of at least an average of 5 Pa (0.02 inches of water gauge) and with a minimum of 1 Pa (0.0004 inches of water gauge). Performance of the smoking room differential air pressures shall be verified by conducting 15 minutes of measurement, with a minimum of one measurement every 10 seconds, or the differential pressure in the smoking room with respect to each adjacent area and in each adjacent vertical chase with the doors to the smoking room closed. The testing will be conducted with each space configured for worst case conditions of transport of air from the smoking rooms to adjacent spaces with the smoking rooms' doors closed to the adjacent spaces.

9.1.5 Outdoor Air Delivery Monitoring in Spaces Ventilated by Mechanical Systems

INTENT: To provide additional outdoor air ventilation to improve indoor air quality for improved occupant comfort, well-being, and productivity.

a) For each *densely occupied space*, a permanently installed carbon dioxide CO2 monitoring system shall be provided that records ventilation system performance in terms of differential indoor-to-outdoor CO2 levels. CO2 sensors or air sampling probes shall be located in the room between 3 ft and 6 ft above the floor. The CO2 monitoring system shall be capable of indicating the CO2 level in a direct read-out display in the occupied space, conveying such level to a building central monitoring system, or both. The CO2 sensors shall be capable of an accuracy level of ± 50 ppm. *Outdoor air* CO2 concentrations shall be determined by one of the following:

a. CO_2 concentration shall be assumed to be 400 ppmv without any direct measurement; or
b. CO_2 concentration shall be dynamically measured using a CO_2 sensor located near the position of the *outdoor air* intake.

b) For each mechanical ventilation system serving only *non-densely occupied spaces*, a permanently mounted, direct total outdoor airflow measurement device shall be provided that is capable of measuring the *design minimum outdoor airflow rate*, as defined by 9.1.1. The device shall be capable of measuring flow within an accuracy of ±15% of the minimum outdoor airflow rate. The device shall also be capable of signaling an alarm to the building operator and initiating return to required levels.

c) For each mechanical ventilation system serving a combination of *densely occupied spaces* and *non-densely occupied spaces*, a direct total outdoor airflow measurement device shall be provided that is capable of measuring the *design minimum outdoor airflow rate*, as defined by 9.1.1. The device shall be capable of measuring flow within an accuracy of ±15% of the minimum outdoor airflow rate. The device shall also be capable of signaling an alarm to the building operator and initiating return to required levels. In addition, each *densely occupied space* in such as system shall have CO_2 monitoring complying with the requirements specified in 9.1.5.1(a).

9.1.6 Thermal Comfort

INTENT: To provide a high level of thermal comfort to promote the productivity, comfort, and well-being of occupants.

The building shall be designed to provide indoor conditions that comply with the comfort requirements of ASHRAE Standard 55.

9.1.7 Building Entrances

INTENT: To minimize exposure of building occupants to potentially hazardous particulates and chemicals.

All *building entrances* to common circulation areas shall employ an entry mat system that shall have a scraper surface, an absorption surface, and a finishing surface. Each surface shall be a minimum of the width of the entry opening, and the minimum length is measured in the primary direction of travel.

9.1.7.1 Scraper Surface. The scraper surface shall comply with the following:

a) shall be the first surface stepped on when entering the building.
b) shall be either immediately outside or inside the entry.
c) shall be a minimum of 3 ft long.
d) shall be either permanently mounted grates or removable mats with knobby or squeegee-like projections.

9.1.7.2 Absorption Surface. The absorption surface shall comply with the following:

a) shall be the second surface stepped on when entering the building.
b) shall be a minimum of 3 ft long, and generally made from nylon or combinations of nylon and heavily textured piles of polypropylene that can perform both a scraping action and a moisture wicking action.

9.1.7.3 Finishing Surface. The finishing surface shall comply with the following:

a) shall be the third surface stepped on when entering the building.

b) shall be a minimum of 4 ft long, and generally made from polypropylene with a course fiber surface that will both capture and hold any remaining particles or moisture.

Exception to 9.1.7: Length of entry mat surfaces is allowed to be reduced due to a barrier, such as a counter, partition, or wall, or local regulations prohibiting the use of scraper surfaces outside the entry. In this case entry mat surfaces shall have a minimum length of 3 ft of indoor surface, with a minimum combined length of 6 ft.

9.1.8 Acoustical Control

INTENT: To encourage longevity of tenancy and to promote healthier living and working environments.

9.1.8.1 Exterior Sound. *Wall* and roof-ceiling assemblies that are part of the *building envelope* shall have an STC rating of 50 or greater, and *fenestration* that is part of the *building envelope* shall have an STC rating of 30 or greater for any of the following conditions:

a) Buildings within 1000 ft of *expressways*.
b) Buildings within 5 mi of airports serving more than 10,000 commercial jets per year.
c) Where *yearly average day-night average sound levels* at the property line exceed 65 decibels.

9.1.8.2 Interior Sound. Interior wall and floor/ceiling assemblies separating interior rooms and spaces shall be designed in accordance with all of the following:

a) Wall assemblies separating adjacent *dwelling units*, *dwelling units* and public spaces, adjacent tenant spaces, tenant spaces and public places, and adjacent *classrooms* shall have an STC rating of 50 or greater.
b) Floor and ceiling assemblies separating adjacent *dwelling units*, *dwelling units* and public spaces, adjacent tenant spaces, tenant spaces and public places, and adjacent *classrooms* shall have an IIC rating of 50 or greater.
c) Wall assemblies separating hotel rooms, motel rooms, and patient rooms in nursing homes and hospitals shall have an STC rating of 45 or greater.
d) Floor and ceiling assemblies separating hotel rooms, motel rooms, and patient rooms in nursing homes and hospitals shall have an IIC rating of 45 or greater.
e) Wall assemblies separating *classrooms* from rest rooms and showers shall have an STC rating of 53 or greater.
f) Floor and ceiling assemblies separating *classrooms* from rest rooms and showers shall have an IIC rating of 53 or greater.
g) Wall assemblies separating *classrooms* from music rooms, mechanical rooms, cafeteria, gymnasiums, and indoor swimming pools shall have an STC rating of 60 or greater.
h) Floor and ceiling assemblies separating *classrooms* from music rooms, mechanical rooms, cafeteria, gymnasiums, and indoor swimming pools shall have an IIC rating of 60 or greater.

9.1.8.3 Outdoor-Indoor Transmission Class and Sound Transmission Class

INTENT: To reduce the overall loudness of ground and air transportation noise audible inside the building.

OITC values for assemblies and components shall be determined in accordance with ASTM E1332. STC values for assemblies and components shall be determined in accordance with ASTM E90 and ASTM E413.

9.1.9 Daylighting by Toplighting.

INTENT: To provide for the building occupants a connection between indoor spaces and outdoor environments through the introduction of daylight into regularly occupied space. To use natural light to reduce lighting demands and save energy.

There shall be a minimum *fenestration area* providing daylighting by *toplighting* for large enclosed spaces. In buildings three stories and less above grade, conditioned or unconditioned enclosed spaces that are greater than 20,000 sq. ft. directly under a roof with a finished ceiling heights greater than 12 ft and that have a lighting power density (LPD) for general lighting equal to or greater than 0.5 W/ft2 shall comply with the following:

a) Minimum Daylight Zone by Toplighting. A minimum of 50% of the floor area directly under a roof shall be in the *daylight zone*. Areas that are daylit shall have a minimum *toplighting* area to *daylight zone* area ratio as shown in Table 9.1.9.

Table 9.1.9 Minimum Toplighting Area

General Lighting Power Density in Daylight Zone (W/ft2)	Minimum Toplighting Area to Daylight Zone Area Ratio
1.4 W/ft2 ≤ LPD	3.6%
1.0 W/ft2 ≤ LPD < 1.4 W/ft2	3.3%
0.5 W/ft2 ≤ LPD < 1.0 W/ft2	3.0%

b) Skylight Characteristics. *Skylights* shall have a glazing material or diffuser that has a measured haze value greater than 90%, tested according to ASTM D1003 (notwithstanding its scope) or other test method approved by the *authority having jurisdiction*.
Exceptions to 9.1.9(b):
   a. *Tubular daylighting devices* having a diffuser.
   b. *Roof monitors* and clerestories having one or more of the following that prevent direct sunlight from entering the space below the well:
      i. automated shading devices.
      ii. a diffuser.
      iii. fixed internal baffles.

Exceptions to 9.1.9 Auditoria, theaters, museums, places of worship, and refrigerated warehouses.

9.2 Daylighting Buildings must comply with 9.2.1 or 9.2.2

INTENT: To provide for the building occupants a connection between indoor spaces and outdoor environments through the introduction of daylight into regularly occupied space. To use natural light to reduce lighting demands and save energy.

9.2.1 Daylighting—prescriptive option

9.2.1.1 Daylighting by Sidelighting

9.2.1.2 Minimum Effective Aperture. Office spaces and *classrooms* shall comply with the following criteria:

a) All north-, south-, and east-facing facades for those spaces shall have a minimum *effective aperture for vertical fenestration* (EAvf) of .10.
b) Interior surfaces in *daylight zones* shall have visible light reflectances greater than or equal to 80% for ceilings and 70% for partitions higher than 60 in. in *daylight zones*.

Exceptions to 9.2.1.2:

a) Spaces with programming that requires dark conditions (e.g. photographic processing centers, museums).
b) Spaces required to have *toplighting* under 9.1.9.
c) Facades that are less than 10 ft from an adjacent building. (For a space with multiple facades, those portions of other facades that do not qualify under this exception shall comply with 9.2.1.1.)

9.2.1.3 Office Space Shading. Each west-, south-, and east-facing façade, shall have a shading *projection factor* no less than .50. Shading is allowed to be external or internal. The building is allowed to be rotated up to 45 degrees for purposes of calculations and showing compliance. The following shading devices are allowed to be used:

a) Louvers, sun shades, light shelves, and any other permanent device. Any *vertical fenestration* that employs a combination of interior and external shading is allowed to be separated into multiple segments for compliance purposes. Each segment shall comply with the requirements for either external or *interior projection factor*.
b) Building self-shading through roof overhangs or recessed windows.
c) External buildings and other permanent infrastructure or geological formations that are not part of the building. Trees, shrubs, or any other organic shading device shall not be used to comply with the shading *projection factor* requirements.

Exception to 9.2.1.3: Translucent panels and glazing systems with a measured haze value greater than 90%, tested according to ASTM D1003 (notwithstanding its scope) or other test method approved by the *authority having jurisdiction* do not require external shading devices.

9.2.2 Daylighting – performance option

Projects complying with 9.2.2 must comply with either 9.2.2.1 or 9.2.2.2.

9.2.2.1 Daylighting Simulation.

9.2.2.1.1 Usable Illuminance in Office Spaces and Classrooms. The design for the *building project* shall demonstrate a useable illuminance of 300 lux (30 fc) on all work surfaces at a distance of 15 ft from the façade at noon on the equinox using an accurate physical or computer daylighting model that includes all regularly occupied daylit spaces.

a) Computer models shall be built using daylight simulation software based on the ray-tracing or radiosity methodology.
b) Simulation is to be done using either the CIE Overcast Sky Model or the CIE Clear Sky Model and measurements shall be taken at noon on the equinox.

c) Simulation shall measure illuminance at points 30 in. above the floor on a 10 ft by 10 ft grid. Every modeled point within a space shall achieve the minimum illuminance.
d) Achievement of minimum illuminance levels shall not include measurement points on which there is a direct beam solar component that is incident on the measured plane. If an advanced daylighting system is used to harness and redirect direct solar radiation, then direct beam solar component is allowed to be included in the simulation, as long as it is not used to comply with the minimum illuminance through direct incidence on the measured plane.
e) Scheduling used to determine *regularly occupied spaces* shall be consistent with energy calculation scheduling.

9.2.2.1.2 Direct Sun Limitation on Occupiable Space in Offices. It shall be demonstrated that direct sun does not strike the *occupiable space* in any daylit space for more than 20% of the occupied hours during an equinox day in regularly occupied office spaces.

9.2.2.2 20% Reduction in Lighting Load. Demonstrate that the power required for lighting is 20% less than required by ASHRAE Standard 90.1 Section 9.4.1.

9.3 Low-Emitting Materials Buildings must comply with 9.3.1 or 9.3.2

INTENT: To reduce the quantity of indoor air contaminants that are odorous, irritating, and harmful to the comfort and well-being of installers and occupants.

9.3.1 Low-emitting Materials - Prescriptive Option

9.3.1.1 Adhesives and Sealants. All adhesives and sealants used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall comply with the requirements of the following reference standards:
a) Adhesives, Sealants and Sealant Primers: VOC content shall be determined according to and comply with the limit requirements of SCAQMD Rule 1168 or Greenguard.
b) Aerosol Adhesives: VOC content shall be determined according to and comply with the limit requirements of Green Seal Standard GS-36.

9.3.1.2 Paints and Coatings. Paints and coatings used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall comply with the following criteria:
a) Architectural paints, coatings and primers applied to interior walls and ceilings: VOC content shall be determined according to and comply with the limit requirements of Green Seal Standard GS-11 or Greenguard.
b) Clear wood finishes, floor coatings, stains, sealers, and shellacs: VOC content shall be determined according to and comply with the limit requirements of SCAQMD Rule 1113 or Greenguard.

9.3.1.3 Floor Covering Materials. Floor covering materials installed in the building interior shall comply with the following:

a) Carpet: Carpet shall be tested in accordance with and shown to be compliant with the requirements of the Carpet and Rug Institute's (CRI) Green Label Plus program. Products that have been verified and labeled to be in compliance with the CRI Green Label Plus program comply with this requirement.
b) Hard surface flooring in office spaces and *classrooms* shall comply with one of the following:
    1. Materials shall be tested in accordance with and shown to be compliant with the requirements of SCS-EC10.2. Products that have been verified and labeled to be in compliance with SCS-EC10.2 by a third-party certifier comply with this requirement.
    2. Materials shall be tested in accordance with Greenguard standards

9.3.1.4 Composite Wood, Plywood and Agrifiber Products. Composite wood, plywood and agrifiber products used on the interior of the building (defined as inside of the weatherproofing system) shall contain no added urea-formaldehyde resins. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins. Composite wood and agrifiber products are defined as: particleboard, medium density fiberboard (MDF), wheatboard, strawboard, panel substrates and door cores. Materials considered fit-out, furniture, and equipment (FF&E) are not considered base building elements and are not included.
Exception to 6.4.4: Structural panel components such as plywood, particle board, wafer board, and oriented strand board identified as "EXPOSURE 1", "EXTERIOR" or "HUD-APPROVED" are considered acceptable for interior use.

9.3.2 Low-Emitting Materials – Performance option

Spaces within the building shall be modeled for VOC concentration and shall be shown to be in compliance with CA/DHS/EHLB/R-174. Reference SCAQMD Method 313-91 or ASTM D-6886-03 for low VOC testing standards. Modeling shall use standardized building scenarios. Spaces other than *classrooms* shall use the office space scenario. Materials used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall be tested in accordance with the requirements of CA/DHS/EHLB/R-174.
All of the following products shall be tested in whole or by representative sample in small-scale environmental chambers:

a) Tile, strip, panel and plank products including vinyl composition tile, resilient floor tile, linoleum tile, wood floor strips, parquet flooring, laminated flooring, and modular carpet tile.
b) Sheet and roll goods including broadloom carpet, sheet vinyl, sheet linoleum, carpet cushion, wallcovering, and other fabric.
c) Rigid panel products including gypsum board, other wall paneling, insulation board, oriented strand board, medium density fiber board, plywood, acoustical ceiling tiles, and particleboard.
d) Insulation batt products.
e) Containerized products including adhesives, sealants, paints, other coatings, primers and other "wet" products.
f) Cabinets, shelves, and worksurfaces that are permanently attached to the building before occupancy.

Exception to 9.3.2: Salvaged materials that have not been refurbished or refinished within one year prior to installation are exempt from this requirement.

Chapter 10: The Building's Impact on the Atmosphere, Materials and Resources

INTENT: To encourage the implementation of design and construction practices that maximize the efficient use of building materials, minimize construction waste and divert waste from disposal in landfills and incinerators and redirect recyclable resources back to the manufacturing process for new materials and products. To encourage the use of materials that are extracted, harvested and processed in Georgia helping a healthy state economy.

10.1 Mandatory Provisions

10.1.1 Construction Waste Management A minimum of 50% of non-hazardous construction and demolition waste material shall be diverted from disposal in landfills and incinerators by recycling and/or reuse. Excavated soil and land-clearing debris shall not be included in the calculation. Calculations may be based on either weight or volume, but shall be consistent throughout. One or more specific areas on the construction *site* shall be designated for the collection of recyclable and reusable materials.

10.1.2 Wood Products Wood products in the project, other than *recovered material* or reused wood:

a) shall be harvested according to the laws and regulations of the country of origin.
b) shall not contain wood from endangered wood species, unless their trade conforms with the requirements of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
c) where possible, use of *rapidly renewable materials* is recommended

10.1.3 Refrigerants Chlorofluorocarbon and hydrofluorocarbon-based refrigerants shall not be used in HVAC&R systems.

10.1.4 Storage and Collection of Recyclables and Discarded Goods There shall be one or more areas that serve the entire building and are dedicated to the collection and storage of non-hazardous materials for recycling. The size and functionality of the recycling areas shall be coordinated with the anticipated collection services for glass, plastic, office paper, newspaper, cardboard and organic wastes so as to maximize the effectiveness of the dedicated areas.

Buildings must comply with either 10.2 or 10.3

10.2 Prescriptive Option

10.2.1 Recycled Content The sum of *post-consumer recycled content* plus one-half of the *pre-consumer recycled content* shall constitute a minimum of 10%, based on cost, of the total materials in the *building project*. The *recycled content* value of a material assembly shall be determined by weight. The recycled fraction of the assembly shall then be multiplied by the cost of assembly to determine the *recycled content* value. Not more than 5% (one-half of the 10%) of the *recycled content* for this requirement shall come from one type of material such as steel or concrete.

The annual average industry values for the *recycled content* of steel products manufactured in basic oxygen furnaces and electric arc furnaces are allowed to be used as the *recycled content* of the steel. The *recycled content* of the supplementary cementious materials (e.g. fly ash, slag cement, or silica fume) in concrete is allowed to be used as the *recycled content* of the concrete when the total amount of cementious materials in the actual mix design is not increased compared to a baseline 28-day strength mix design using only Portland cement and complying with the same specified performance requirements.

Components of mechanical, electrical, and plumbing systems, and elevators and equipment shall not be included in the following calculations. Calculations shall only include materials permanently installed in the project. For calculation, a value of 45% of the total construction cost is allowed to be used in lieu of the actual total cost of materials.

10.2.2 Regionally Extracted/Harvested/Recovered and Manufactured Materials and Biobased Products. A minimum of 20% of building materials or products used, based on cost, shall be regionally extracted/harvested/recovered and manufactured and/or biobased.

For a building material or product to qualify as regionally extracted/harvested/recovered and manufactured, a minimum of 80% of the mass of the building material or product shall be extracted/harvested/recovered and manufactured within a radius of 800 km (500 mi) of the project *site* or within the state of Georgia.

For a building material or product to qualify as biobased, it shall comply with the minimum biobased contents of the USDA's Designation of Biobased Items for Federal Procurement, contain the “USDA Certified *Biobased Product*” label, or be composed of solid wood, engineered wood, bamboo, wool, cotton, cork, agricultural fibers, or other biobased materials with at least 50% biobased content. Wood building components used to comply with this requirement shall be from sources that harvest the wood according to the laws and regulations of the country of origin and which practice sustainable (environmentally preferable) forest management as verified through accredited, independent, third-party certification bodies.

Chain of custody documentation is required and shall verify that certified components contain a minimum of 70% certified raw material. Acceptable forest management certification bodies are those with principles, criteria, and standards developed using ISO/IEC Guide 59 Code of Good Practice for Standardization, or the World Trade Organization (WTO) Technical Barriers to Trade (TBT) Agreement Annex 3 Code of Good Practice for the Preparation, Adoption and Application of Standards. Wood building components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood window sash and frames, solid wood doors, and architectural millwork. Wood building components from a *vendor* are allowed to comply when the annual average amount of certified wood products purchased by the *vendor*, for which they have chain of custody *verification* not older than two years, is 70% or greater of their total annual wood products purchased.

Exception to 10.2. 2: For building materials or products shipped in part by rail or water, that portion of the distance shipped by rail or water shall be multiplied by 0.25 and added to that portion not shipped by rail or water, provided that the total does not exceed 800 km (500 mi).

10.3 Performance Option

10.3.1 Life Cycle Assessment Perform a *life cycle assessment* according to ISO Standard 14044 of a minimum of two building alternatives, both of which shall conform to the *code compliance plan*. Each building alternate shall consist of a common design, construction, and materials for the locale, including building size and use, as commonly approved by the *authority having jurisdiction*. Each building alternate shall comply with Section 7. The service life of the buildings shall be not less than that determined using Table 11.3, except that the design life of long-life buildings shall be no less than 75 years.

10.3.1.1 Performance Metric The building chosen for the project shall demonstrate at least a 5% improvement over the other building alternates in a minimum of two of the following impact categories: land use (or habitat alteration), resource use, climate change, ozone layer depletion, human health effects, ecotoxicity, smog, acidification, and eutrophication.

10.3.1.2 Procedure The life cycle assessment shall include the following three steps:

a) Step 1: Perform a life cycle inventory (LCI). The LCI accounts for all the individual material and energy flows to and from the products in a building throughout its life cycle.
    a. The LCI shall include the materials and energy consumed and the emissions to air, land, and water for each of the following stages:
        i. Extracting and harvesting materials and fuel sources from nature.
        ii. Processing building materials and manufacturing building components.
        iii. Transporting materials and components.
        iv. Assembly and construction.
        v. Operation including energy consumption, maintenance, repair, and replacement during the design life.
        vi. Demolition, disposal, recycling, and reuse of the building at the end of its life cycle.
    b. The LCI shall account for emissions to air for the following:
        i. The six principle pollutants for which the USEPA has set National Ambient Air Quality Standards as required by the Clean Air Act and its amendments: carbon monoxide , nitrogen dioxide, lead , sulfur oxides , particulate matter (PM10 and PM2.5), and ozone.
        ii. Greenhouse gases (not including water vapor and ozone) as described in the Inventory of U.S. Greenhouse Gas Emissions and Sinks: carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, hydrochlorofluorocarbons, bromofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, sulfur dioxide, and VOCs.
        iii. Hazardous air pollutants listed in the Clean Air Act and its amendments.
b) Step 2: Compare the two building alternates using a published third-party impact indicator method that includes, at a minimum the impact categories listed in 10.3.1.1. A life cycle assessment report shall be prepared containing:
    a. A description of the building alternatives including:
        i. a description of the system boundary used,
        ii. the design life of each building, and

iii. the physical differences between buildings.

b. The impact indicator method and impact categories used, including an explanation of the rationale for choosing the categories used.

c. The results of the life cycle assessment indicating a minimum of 5% improvement in the proposed building compared to the other building alternate for a minimum of two impact categories, including an explanation of the rationale for the weighting and averaging of the impacts.

c) Step 3: Conduct a critical review by an external expert independent of those performing the life cycle assessment.

10.3.1.3 Reporting The following shall be submitted to the *authority having jurisdiction*:

a) The life cycle assessment report.
b) The documentation of critical peer review by a third party including the results from the review and the reviewer's name and contact information.

Chapter 11: Construction and Operation Plans

INTENT: To verify that the building's energy related systems are installed, calibrated, and perform in accordance with the owner's project requirements, basis of design, and construction documents.

Buildings containing over 20,000 sq. ft. shall comply with 11.1, and buildings containing 20,000 sq. ft. or less shall comply with 11.1 or 11.2.

11.1 Project Commissioning

11.1.1 Scope. Commissioning of the project's energy and water related systems shall be performed in accordance with this section using *generally accepted engineering standards* and handbooks acceptable to the *authority having jurisdiction*. A *commissioning process* shall be incorporated into the design and construction of the *building project* that verifies that the building energy systems comply with the requirements of this ordinance and related energy and water efficiency codes adopted by the City of Atlanta.

11.1.2 Activities prior to Building Permit Issuance. The following activities shall be completed:

a) Designate a project *commissioning authority* (CxA) to lead, review and oversee completion of the *commissioning process* activities prior to completion of schematic design.
b) The owner, in conjunction with the CxA and design team as necessary, shall develop the Owner's Project Requirements (OPR) that defines the owner's approach to meeting the requirements of this ordinance in the pre-design phase of the project. The OPR shall be updated by the owner's team as necessary to communicate changes by the team in meeting the requirements of this ordinance. The OPR shall be provided to the City of Atlanta with the permit application.
c) The design team shall develop the *basis of design (BOD)*.
d) Commissioning requirements shall be incorporated into project specifications and other construction documents developed by the design team.
e) Develop and implement a *commissioning plan* containing all required forms and procedures for the complete testing of all equipment, systems and controls included in 11.1.5.

11.1.3 Activities prior to Certificate of Occupancy Issuance. The following activities shall be completed:

a) Verify the installation and performance of the systems to be commissioned, including completion of *construction checklist* and *verification*.
   Exception: Systems that, because their operation is seasonally dependent, cannot be fully commissioned in accordance with the *commissioning plan* at time of occupancy shall be commissioned at the earliest time after occupancy when operation of systems is allowed to be fully demonstrated as determined by CxA.
b) Verify the owner requirements for training operating personnel and building occupants are completed.
   Exception: Training for systems whose operational seasonal dependence results in their not being fully commissioned at the time of occupancy shall have their training completed at earliest time after occupancy when operation of systems is allowed to be fully demonstrated as determined by CxA.
c) Complete preliminary commissioning report.

d) Verify a system manual has been prepared that includes O&M documentation, full warranty information and provides operating staff the information needed to understand and optimally operate the commissioned systems.

11.1.4 Activities prior to Final Completion:

a) CxA documentation of commissioned systems perform in accordance with OPR, BOD, construction documents, and generally accepted engineering practices.
Exception: Systems that, because their operation is seasonally dependent**,** cannot be fully commissioned in accordance with the *commissioning plan* at time of occupancy. These systems shall be *commissioned at the* earliest time after occupancy when operation of systems is allowed to be fully demonstrated as determined by CxA.
b) Document the OPR training requirements for operating personnel and building occupants is completed.
Exception: Additional training of operation and maintenance personnel on building management systems shall be completed within 6 months of date of occupancy.
c) Provide a systems manual in addition to the O&M documentation that includes the final OPR, BOD, commissioning issues log, field reports, completed construction checklists, overview of commissioned systems operation, and suggested operating procedures to maximize building efficient operation operating.
d) Complete any commissioning activities called out in the commissioning plan for systems whose commissioning can only be completed subsequent to building occupancy, including trend logging and off-season testing.
e) Complete a final commissioning report;

11.1.5 Systems. The following systems, if included in the *building project*, shall be commissioned:

a) Heating, ventilating, air conditioning, IAQ and refrigeration systems (mechanical and/or passive) and associated controls. Control sequences to be verified for compliance with construction documentation as part of *verification*.
b) All lighting controls and shading controls.
c) Irrigation
d) Plumbing fixture water efficiency and operation
e) Domestic water pumping and mixing systems.
f) *Service water heating* systems.
g) Renewable energy systems.

11.1.6 Documentation. Owner shall retain the System Manual and Final Commissioning Report for future use by owner and for local, state and federal agencies or their representatives that may request these data.

11.2 Building Acceptance Testing

11.2.1 Scope. Acceptance testing shall be performed in accordance with this section using *generally accepted engineering standards* and handbooks acceptable to the *authority having jurisdiction*. An acceptance testing process shall be incorporated into the design and construction of the *building project* that verifies systems specified in this section perform in accordance with construction documents.

11.2.2 Activities prior to Building Permit Issuance. Complete the following:

a) Designate a project Acceptance Agent to lead, review and oversee completion of the acceptance testing activities.
b) Construction documents indicating clearly who is to perform acceptance tests and the details of the tests to be performed
c) Acceptance Agent to review construction documents to verify relevant sensor locations, devices and control sequences are properly documented,

11.2.3 Activities prior to Certificate of Occupancy Issuance. Complete the following:
a) Verify proper installation and start-up of the systems
b) Perform Acceptance Tests. For each Acceptance Test, complete test form and include a signature and license number, as appropriate, for the party who has performed the test.
c) Verify a system manual has been prepared that includes O&M documentation, full warranty information and provides operating staff the information needed to understand and optimally operate building systems.

11.2.4 Systems. The following systems, if included in the *building project*, shall have Acceptance Testing:
a) Heating, ventilating, air conditioning, IAQ, and refrigeration systems (mechanical and/or passive) and associated controls.
b) All lighting controls and shading controls.
c) *Service water heating* systems.
d) Renewable energy systems.

11.3 Service Life Plan. A service life plan is required for "pre-engineered" and "pre-fabricated buildings" and shall it be developed to estimate to what extent structural, *building envelope* (but not mechanical and electrical), and *hardscape* materials will need to be repaired or replaced during the service life of the building. The design service life of the building shall be no less than that determined using Table 11.3. The estimated service life shall be specified for building assemblies, products, and materials that will need to be inspected, repaired and/or replaced during the service life of the building. *Site* improvements and *hardscape* shall also be included. Documentation in the service life plan shall include the project design service life and basis for determination, and the following for each assembly or component:
a) Building assembly description.
b) Materials or products.
c) Design or estimated service life, years.
d) Maintenance frequency.
e) Maintenance access for components with an estimated service life less than the service life of the building.

The service life plan shall be submitted to the owner for approval prior to the completion of design development. Owner shall retain a copy of the service life plan for use during the life of building.

TABLE 11.3 Minimum Design Service Life for Buildings

Category	Minimum Service Life	Building Types
Temporary	Up to 10 Years	* Non-permanent construction buildings (sales offices, bunkhouses) * Temporary exhibition buildings

Medium life	25 Years	* Industrial buildings * Stand-alone parking structures
Long life	50 Years	* All buildings not temporary or medium life, including the parking structures below buildings designed for long life category

11.4 Indoor Air Quality (IAQ) Construction Management Plan. An Indoor Air Quality (IAQ) Construction Management Plan shall be developed and implemented as follows:
11.4.1 IAQ Plan Before construction, develop a written IAQ plan.
11.4.2 Construction IAQ Management During construction, meet or exceed the recommended Control Measures of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3.
11.4.3 Post-Construction After construction ends, prior to occupancy and with all interior finishes installed, a building flush-out shall be performed by one of the following methods:

a. Supplying a total air volume of 14,000 cu. ft. of *outdoor air* per sq. ft. of floor area while maintaining an internal temperature of a minimum of 60 ºF and relative humidity no higher than 60%.
b. If occupancy is desired prior to completion of the flush-out, the space is allowed to be occupied following delivery of a minimum of 3,500 cu. ft. of *outdoor air* per sq. ft. of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq. ft. of *outdoor air*. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cu. ft. of *outdoor air* per sq. ft. of floor area has been delivered to the space.
c. Baseline IAQ testing shall be conducted after construction ends and prior to occupancy using testing protocols consistent with the USEPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air. The testing shall demonstrate that the contaminant maximum concentrations listed in Table 11.4.3 are not exceeded. For each sampling point where the maximum concentration limits are exceeded conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met. When retesting non-complying building areas, take samples from the same locations as in the first test.

TABLE 11.4.3 Maximum Concentration of Air Pollutants

Contaminant	**Maximum Concentration**
Formaldehyde	50 parts per billion
Particulates (PM10)	50 ppb
Total Volatile Organic Compounds (TVOC)	500 ppb
4-Phenylcyclohexene (4-PCH)a (This test is only required if carpets and fabrics with styrene butadiene rubber (SBR) latex backing material are installed as part of the base building systems.)	6.5 ppb

Carbon Monoxide (CO)	9 ppm and no greater than 2 ppm above outdoor levels

11.5 Construction. The following shall be adhered to during project construction.

11.5.1 Construction Activity Pollution Prevention: No-idling of Construction Vehicles. Operators of diesel construction vehicles are not allowed to idle their vehicles' engines during any part of the building's construction. Vehicle staging areas shall be established for waiting to load or unload materials. These staging areas shall be located 100 ft (30 m) from any *outdoor air* intakes, operable openings, and hospitals, schools, residences, hotels, daycare facilities, elderly housing, and convalescent facilities. No load/unload location *owner* shall cause vehicles covered by this provision to idle for a period greater than 15 minutes while waiting to load or unload at a location under their control. No *owner* or operator of a vehicle shall cause or permit vehicles covered by this provision to idle for more than 5 consecutive minutes in any 60-minute period.

Exceptions to 11.5.1: Construction vehicles may idle in the following instances:

a) While forced to remain motionless at the direction of a law enforcement official;
b) When operating defrosters, heaters, air conditioners, or installing equipment solely to prevent a safety or health emergency, and not as part of a rest period;
c) The primary propulsion engine idles for maintenance, servicing, repairing, or diagnostic purposes if idling is required for such activity;
d) Idling of the primary propulsion engine is necessary to power work-related mechanical or electrical operations other than propulsion (e.g., mixing or processing cargo or straight truck refrigeration, including hoisting and lifting operations, or straight truck refrigeration). This exemption does not apply when idling for cabin comfort or to operate non-essential on-board equipment; or
e) For purposes of air conditioning or heating while waiting to load or unload due to mechanical difficulties over which the driver has no control.

11.5.2 Moisture Control. The following items to control moisture shall be implemented during construction:

a) Materials stored on-site or materials installed that are absorptive shall be protected from moisture damage.
b) Building construction materials which show visual evidence of biological growth due to the presence of moisture shall not be installed on building project.

SECTION 3: INFORMATIVE STANDARDS

Chapter 12: Post-Occupancy Guidelines

12.1 Site Sustainability. Where trees and vegetation are used to comply with the shade requirements of 6.1.2, building owners should verify that this shade is obtained within 5 years after trees and vegetation are planted at project *site*.

12.2 Water Use Efficiency. For systems where metering is required, building owners should verify and measure water use in order to ensure that fixtures and other building equipment are operating as specified. This should involve both the short-term measurement of specific equipment at the time of installation and permanent metering and sub-metering of major water using components at each facility within the project.

12.3 Water Consumption Baseline. After installation and commissioning of a metered and sub-metered piece of water-using equipment or system and subsequent to issuance of certificate of occupancy, building owners should measure water use through a *complete operational cycle*. This should be allowed to be performed with any type of calibrated measurement device or water meter. The measured output should serve as the baseline water use for comparison to on-going measured water consumption by metered and sub-metered water consuming equipment and systems.

Output from master meters and sub-meters and instrumentation should be integrated into the master measurement and *verification* plans for the project. The output should be displayed and recorded through electronic or other means such that consumption anomalies can be readily identified by facility operators on an ongoing basis.

12.4 Post-Occupancy Water Measurement and Verification. A maximum of 12 months after baseline water consumption values are established for any metered or sub-metered piece of water-using equipment or system, the measured water consumption should be compared against the predicted water consumption as identified in the baseline calculation. Any variations of 10% or greater in the baseline water consumption versus the actual measured water consumption should be documented and corrective action should be taken by the facility operators where warranted. New baseline water consumption levels shall be established where building or operational conditions warrant such an adjustment. This new baseline water consumption data should be fully documented and used for future post-occupancy evaluations of water use. Subsequent evaluations of measured water consumption relative to the baseline shall be performed thereafter, a minimum of yearly after the initial evaluation.

12.5 Documentation of Water Efficiency.

a) Building Owners should document initial baseline water measurement and *verification* (M&V) activities and create a report summarizing baseline water consumption data. Owner should retain documentation for future use by owner and for local, state and federal agencies or their representatives that may request this data.
b) Building owners should document post-occupancy water consumption M&V activities and create report summarizing measured meter and sub-meter consumption relative to baseline consumption, for the most recent post-occupancy period. These documents, along with a report

of actions taken by facility operators and their results, should be retained by owner for future post-occupancy evaluations and for any local, state and federal agencies or their representatives that may request this data.

c) Building owners should retain all collected meter and sub-meter data for a minimum of 3 years.

12.6 Energy Efficiency. Building owners should use energy metering collection/storage infrastructure to collect and store meter data for each meter and sub-meter, and should start no later than after the *commissioning process* has been completed and either occupancy certificate has been issued or a minimum of 80% of occupancy occurs.
Building projects whose size exceeds the applicable threshold in Table 12.8.1 should perform energy measurement and *verification* activities in accordance with no less than one of the following two compliance paths:

a) Benchmark performance against the USDOE Commercial Building Energy Consumption Survey (CBECS) database.
b) Benchmark performance using energy simulation model.

12.7 CBECS Benchmarking Compliance Path. After 12 months and no later than 18 months after either certificate of occupancy has been issued or a minimum of 80% occupancy occurs, the owner should compare whole building energy consumption data to other buildings of the same floor area and space type in the same climate region within the current CBECS database to determine relative building performance. The comparison should be weather normalized and should use default average values for all other building parameters (e.g. number of occupants, hours of operation, equipment loads, etc.) such as the USEPA Portfolio Manager for those building uses that are addressed in this program.

If the building is not rated in the top 8% of CBECS buildings on an energy consumption per unit area basis (92 or greater on the Energy Star Portfolio Manager scale), the owner shall retain the services of a CxA. The CxA should analyze systems operation and document for the owner reasons why whole building performance does not comply with criteria, along with recommendations for actions that would correct performance. The CxA should submit a commissioning report documenting system deficiencies to the *authority having jurisdiction* and to the owner.

Subsequent evaluations of whole building measured energy performance relative to CBECS should be performed thereafter, a minimum of every three years after the initial evaluation.

12.8 Energy Simulation Compliance Path

Intent : To provide recommended best practices for the ongoing operation and maintenance of sustainable buildings

12.8.1 Initial Measurement and Verification. Perform the following to baseline energy performance:

Table 12.8.1 Threshold for Energy M&V Evaluation

Building Usage Category	M&V Threshold, ft2
Food Service (Restaurant)/ Food Sales (Grocery Store) Health Care Inpatient Health	>20,000
Lodging Office Public Order & Safety Outpatient Health Public Assembly Education	> 40,000
Retail Religious Worship	> 50,000
Warehouse Non-Refrigerated Storage	> 80,000
Other*	> 20,000

*For buildings in "Other" category, threshold is allowed to be raised to 40,000 sq. ft. if the whole building annual energy intensity is less than 80,000 Btu/sq. ft.

After 12 months and no later than 18 months after meter data collection begins, compare all measured energy consumption from the main meters and sub-meters against the predicted energy consumption of the systems and subsystems, as obtained by an energy simulation model for the whole building. If an existing building energy simulation model has been created previously, this model is allowed to be re-used; otherwise, a new energy simulation model shall be created using as-built construction documentation.

Variations of 10% or more in the predicted annual energy consumption versus measured energy consumption and/or variations of 20% or more in peak demand or consumption for any individual month shall be documented. If required in order to reconcile measured building energy meter data to the energy model predicted values, provide short-term metering for sub-systems and process loads that do not have permanent metering, documenting findings.

Establish an updated baseline for monthly and annual energy consumption and demand for the building at the building boundary. Correct and calibrate the energy simulation model for each major energy consuming system by normalizing based on actual weather and operational conditions (e.g., use and occupancy patterns, equipment operating schedules) during the timeframe meter data was collected so it matches the energy baseline within 10% annually and within 20% for each individual month.

12.8.2 Post Occupancy Measurement and Verification Evaluation.

Perform periodic post-occupancy evaluations of energy performance as follows:

a) three years after receiving the certificate of occupancy or a minimum of 80% of occupancy, whichever is later, then
b) subsequent post-occupancy evaluations of energy performance shall be performed a minimum of every three years.

Evaluate building energy monthly consumption and peak demand and system and sub-system performance using meter and sub-meter data (collected for the prior 12 months, the "occupancy period") relative to baseline monthly energy consumption and peak demand data. The impact of any functional changes that might have occurred during or prior to the occupancy period shall be documented and credited or debited against the baseline monthly energy consumption and peak demand data and actual weather data for the occupancy period used to adjust baseline energy use. If the measured results are not within the 10% of the established baseline annual energy use or within 20% of the established baseline monthly energy consumption and peak demand, the owner shall retain the services of a CxA. The CxA shall analyze systems operation and document for the owner reasons why deviations exceed maximums for any metered energy using system, along with recommendations for actions that would correct any documented degradation in systems' performance.

Where the building or the building's use changes significantly enough over time to warrant permanent adjustment to the energy baseline, a new energy baseline is allowed to be established. This new baseline energy consumption data shall be documented and shall be used for future post-occupancy evaluations of building energy performance.

12.8.3 Documentation of Energy Efficiency.

a) If performance has been benchmarked using the CBECS compliance path, document the CBECS benchmarking M&V activities. Create report documenting measured annual energy use intensity for the overall building and by fuel, in kBtu/sq. ft., along with comparison of building performance relative to appropriate CBECS data set. These documents, along with the CxA's report, shall be retained by owner for future post-occupancy evaluations by owner and for any local, state and federal agencies or their representatives.
b) If performance has been benchmarked using the energy simulation compliance path, then:
    a. Document initial baseline energy simulation M&V activities. Create reports summarizing measured meter and sub-meter data and baseline energy consumption data, with metrics summarizing the baseline annual energy use intensity for the overall building and by fuel, in kBtu/ sq. ft. Owner shall retain documentation for future use by owner and for local, state and federal agencies or their representatives that may request this data.
    b. Document post-occupancy energy simulation M&V activities. Create reports summarizing measured meter and sub-meter relative to baseline energy consumption along with metrics of corrected baseline annual energy use for the overall building and by fuel, in kBtu/ sq. ft, for the occupancy period. These documents, along with the CxA's report, shall be retained by owner for future post-occupancy evaluations by owner and for any local, state and federal agencies or their representatives.
c) Retain all collected meter and sub-meter data for a minimum of 3 years.

12.8.4 Indoor Environmental Quality (IEQ). An Indoor Air Quality (IAQ) Management Plan shall be developed and implemented. The plan shall develop and document procedures for implementing a

regular monitoring program after building occupancy using the equipment required for monitoring of CO2 levels or *outdoor air* flow specified. The plan procedures shall contain the following:

a) For spaces being mechanically ventilated that are required to conduct CO2 monitoring, a procedure shall be in place to react to elevated CO2 levels by temporarily increasing the *outdoor air* flow for the ventilation system. The procedure shall include the definition of the *action level* for elevated CO2 concentrations for each zone. The CO2 concentration data shall also be reviewed on a regular basis, but no less frequently than monthly. If CO2 levels are found to be elevated, adjustments to the ventilation system equipment shall be made and the CO2 levels shall be checked daily for a minimum of one week to ensure the system is back in compliance with the ventilation requirements. In addition, check operation of all CO2 sensors annually and recalibrate or replace sensing elements for all CO2 sensors at the manufacturer's recommended interval or a minimum of every 5 years, whichever is shorter.
Exception to 12.8.4(a): The *outdoor air* ventilation rate is not required to be larger than the design *outdoor air* ventilation rate required by complying with Chapter 9, regardless of CO2 concentration.

b) For each mechanical ventilation system where direct outdoor airflow measurement is required, a procedure shall be in place to react to when the outdoor airflow is 15% or more lower than *design minimum outdoor airflow rate*. Verify that the device which measures *outdoor air* flow is actually measuring the flow rate within ±15% of the sensor output reading at the *design minimum outdoor airflow rates*. If the sensor is not within ±15%, then recalibrate the sensor. *Verification* of outdoor airflow shall be done on a quarterly basis and records maintained on-site. Recalibrate direct outdoor airflow measurement devices at the manufacturer's recommended interval or a minimum of annually.

c) For naturally ventilated spaces, a procedure shall be in place to conduct CO2 monitoring and react to elevated CO2 levels. The procedure shall include also the definition of the *action level* for elevated CO2 concentrations for each zone. CO2 levels shall be checked at least monthly to verify the natural ventilation system has the capability to properly ventilate spaces. During the first full year of occupancy, after receipt of final certificate of occupancy, the CO2 levels shall be checked on a weekly basis to verify the natural ventilation system operation. If elevated concentration levels are found, verify with building occupants (for manual natural ventilation systems) and/or through the energy management system that natural ventilation strategies are being followed per design intent. If, when operated properly, spaces are found that cannot be ventilated sufficiently to lower concentration levels, retain the services of an independent third-party (e.g., a consulting engineer or the CxA) to review system operations and provide recommendations for needed modifications. After the first full year of occupancy, the CO2 levels shall be checked on a monthly basis. In addition, check all CO2 sensors functioning annually and recalibrate or replace sensing elements at the manufacturer's recommended interval or a minimum of every five years, whichever is shorter.

d) The IAQ Management Plan shall include a list of each zone or building space that requires CO2 monitoring.

e) The outdoor ambient CO2 concentration shall be determined either through direct measurement or by assuming that the ambient concentration is 400 ppm.

f) Owner shall maintain following documentation for IEQ measurement and *verification*:
    a. IEQ Measurement and *Verification* Plan, including:
        i. A list of each zone or building space that requires CO2 monitoring, the *action level* concentration for each zone.
        ii. A list of each air system requiring *outdoor air* flow measurement.

iii. Monitoring procedures and monitoring frequencies for each monitored sensing device, including a description of the specific response measures to be taken if needed.

b. Dated records of CO2 concentrations and airflow rates measured and reviewed as part of the above listed requirements, along with dated documentation of any corrective actions taken and any sensor recalibrations or replacements.

c. All IEQ measurement and *verification* data and documentation shall be made available to local, state and federal agencies, or their representatives, that may request it.

12.8.5 The Building's Impact on the Atmosphere, Materials and Resources.
There shall be an annual *verification* that areas for recyclables and reusable goods are maintained. Certificates of lamp and ballast recycling shall be maintained by owner on an ongoing basis, beginning with the first lamp and ballast retrofit and/or replacement project within the building. These certificates shall be made available to local, state and federal agencies, or their representatives.

12.8.6 Energy Use Reporting. The project owner shall enter the building's annual energy use into the Environmental Protection Agency's Energy Star Portfolio Manager Tool every third year after initial the building *commissioning process* has been completed and either the occupancy certificate has been issued or a minimum occupancy of 80% is reached for the life of the building. Owner shall print and retain input and summary report pages from Portfolio Manager for their building on each occasion when annual energy use data is entered. This documentation shall be made available to local, state or federal agencies, or their representatives, that may request it.
Exception to 12.8.6: Building types not included in Energy Star Portfolio Manager are excluded from this reporting requirement.

12.9 Sustainable Landscape Management

INTENT: To focus on biodiversity, soil health, water efficiency, and long term prevention of pest problems with minimum negative impact on human health and the environment.

All landscape renovations, construction and maintenance shall employ sustainable landscape management techniques wherever possible, including, but not limited to, integrated pest management, grasscycling, composting, drip irrigation and procurement and use of mulch and compost that give preference to those produced from regionally generated plant debris and/or food waste programs.

a) Site planning should evaluate climate, topography, soil, and water conditions.
b) Manage pest problems through adoption and implementation of an organic pest management plan or Integrated Pest Management (IPM) plan using the least toxic pest control as a last resort.
c) Grasscycling for at least 50 percent of all mowings.
d) Structural pruning of trees, shrubs and other plants to improve plant health, stability and form.
e) Avoid synthetic quick release fertilizers that frequently wash through the soil before they are taken up by the plants. When possible, avoid the use of weed and feed formulations. Fertilize on an as needed basis, as indicated by a soil analysis. Slow release and/or organic fertilizers are preferred when possible.

f) Establish irrigation schedule based on weather and soil moisture whenever possible. Drip irrigation is preferred whenever practical.
g) Irrigate landscapes with recycled water where possible.
h) Limit turf areas to recreational uses. All other landscaping (such as for views) should be accomplished with low-water plantings.
i) Recycle plant debris by composting and/or mulching. Maintain a minimum 2-inch layer under all trees, shrubs and ground covers and a 3-inch layer in all open areas. Allow leaf drop to become part of the mulch layer in tree, shrub and groundcover areas where possible to avoid soil compaction, reduction of nutrient levels, erosion and other undesirable effects for maintaining soil health.
j) Select biodiverse plantings of native plants, edibles and adapted plants that are compatible with the site and microclimate.

12.10 Commercial Food Service Operations Commercial food service operations (e.g. restaurants, cafeterias, food preparation kitchens, caterers, etc.) should capture and separate food and other organic residuals from the kitchen for on- or off-site composting.

Appendix A: Compliance Reviewer's Affidavit

I certify that the construction documents herewith presented in support of this project's application for a Building Permit from the Bureau of Buildings, City of Atlanta demonstrate that the project has been designed to be in full compliance with the ASBO.

By signing this affidavit I am indicating that I have read and understand the Atlanta Sustainable Building Ordinance compliance policy of the Bureau of Buildings, City of Atlanta, that I have fulfilled all requirements therein, and further understand that failure to fulfill the conditions of this compliance will result in revocation of compliance privileges by the Bureau of Buildings, City of Atlanta.

Full name of Certifying Professional

Professional Status of Certifying Professional

State of Georgia Registration Number

Address of property

Signature

Professional Seal (if applicable)

Appendix B: References and Resources

Referenced Standards and Documents:
ANSI/ASTM-E779-03, Standard Test Method for Determining Air Leakage Rate By Fan Pressurization
ASHRAE Standard 62.1
ASHRAE Standard 90.1
CA/DHS/EHLB/R-174
Carpet and Rug Institute's Green Label Plus Program
GREENGUARD Indoor Air Quality Certified
Green Seal Standards
IA SWAT Climatological Based Controllers 7th Draft Testing Protocol
IESNA Standard RP-33
LEED-NC
SCAQMD: South Coast Air Quality Management District Rules
SMACNA IAQ Guidelines for Occupied Buildings under Construction, 1995

Resources:
Architecture 2030, http://www.architecture2030.org/
Atlanta Bureau of Buildings, http://www.atlantaga.gov/government/planning/burofbuildings.aspx
Atlanta Urban Design Commission, http://www.atlantaga.gov/government/urbandesign.aspx
EarthCraft House, http://www.earthcrafthouse.com/
Energy Star, http://www.energystar.gov/
Green Globes, http://www.greenglobes.com/design/homeca.asp
Green Roofs for Healthy Cities, www.greenroofs.org
GREENGUARD Mold and Moisture Management Standard
Southface Energy Institute, www.southface.org
US Green Building Council, www.usgbc.org