

Public Review Draft

Proposed Addendum d to Standard 189.1-2020

Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

First Public Review Draft (March 2021)
(Draft Shows Proposed Changes to Current Standard)

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(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

Foreword

This addendum revises the definition of ‘building project’ and removes the ‘site’ definition. The intent is to clarify the meaning of building project which currently includes both building and site. In every instance where ‘site’ is used in the standard, the addendum changes it to a non-defined term and revises the provisions, where needed, into the context of its use.

This change is intended to clarify the standard and reduce confusion. Removing the definition of site allows the use of site in the standard to follow standard industry usage or an existing definition used by a jurisdiction. This change is not expected to result in any increase in cost or complexity but may reduce costs through reduction of confusing terminology. The only impact on code enforcement is expected to be improvements due to eliminating the possibility of conflicting definitions of “site.” Removing the definition of site adds flexibility such that the site can be determined on a case-by-case basis considering the specifics of a particular project. This change also brings the standard into better alignment with existing codes by using any existing definition of “site.”

[Note to Reviewers: This addendum makes proposed changes to the standard. These changes are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]

Addendum d to 189.1-2020

Revise Section 2.1 as follows:

2.1 This standard contains requirements that

a. apply to the following *building projects*:

1. New buildings and their systems
2. New portions of buildings and their systems
3. New systems and equipment in existing buildings
4. Relocated existing buildings and temporary structures where specified in this standard

b. address ~~site~~ site sustainability, water use efficiency, energy efficiency, indoor

environmental quality (IEQ), materials and resources, and construction and plans for operation.

Revise the following definitions to Section 3.2:

brownfield: a ~~site~~ parcel of land 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 project: ~~a building, or group of buildings, and site that utilize a single submittal for a construction permit or that are within the boundary of contiguous properties under single ownership or effective control. (See owner.)~~ One or more buildings and the site on which they are located that are subject to one or more permits issued by the AHJ.

greenfield: a ~~site~~ parcel of land of which 20% or less has been previously developed with impervious surfaces.

greyfield: a ~~site~~ parcel of land of which more than 20% is currently or has been previously developed with impervious surfaces.

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

improved landscape: any disturbed area of the ~~site~~ 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, other paved areas, and swimming pools or decking.

plants:

...

- b. ***invasive plants:*** species of *plants* that are not native to the ~~building project site~~ site and that cause or are likely to cause environmental harm. At a minimum, the list of invasive species for a ~~building project site~~ site includes *plants* included in city, county, and regional lists and state and federal noxious weeds laws.

...

- d. ***rainfall-ET_c compatible plants:*** *plants* with documented ET_c rates and having all of the following characteristics: (1) not native or invasive to the local geographic area ~~of the site~~; (2) after the *landscape establishment period*, do not require supplemental annual irrigation, based on the ten-year average annual rainfall of the local climate and based on 80% of the *plant's* ET_c.

salvaged material: material, component, or assembly removed in a whole form from a structure or ~~site~~ site in which it was permanently installed and subsequently reused in the building project.

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

Revise Section 5.1 as follows:

5.1 Scope. This section addresses requirements for *building projects* that pertain to *site* site selection, *site* site development, mitigation of *heat island effect*, light pollution reduction, and mitigation of transportation impacts.

Revise Section 5.3.1.1 as follows:

5.3.1.1 Allowable Sites. The *building project* shall take place in or on one of the following:

- a. An existing *building envelope*.
- b. A *brownfield*.
- c. A *greyfield*.
- d. A *greenfield* that is not agricultural land, forest land, or designated park land and that meets one or more of the following:
 1. The boundary of the area of the proposed *building project* is within 1/2 mi (800 m) 1/4 mile (400 m) of residential land that is developed, or that has one or more *residential* buildings under construction, and the average *dwelling unit* density of the *residential* land is not less than with an average density of ten *dwelling units* per acre (4 units per ha) unless that *site* is *agricultural land* or *forest land*. Proximity is determined by drawing a circle with a 1/2 mi (800 m) radius around the center of the proposed *site*.
 - e. 2. A *greenfield* where the The proposed building complies with ASTM E2843, unless that *site* is *agricultural land* or *forest land*.
 - f. 3. A *greenfield* where the The proposed building complies with ASTM E2844, unless that *site* is *agricultural land* or *forest land*.
- ~~g.~~ e. A *greenfield* that is *agricultural land*, and the purpose of the proposed building is related to the agricultural use of the land.
- ~~h.~~ f. A *greenfield* that is *forest land*, and the purpose of the proposed building is related to the forestry use of the land.
- ~~i.~~ g. A *greenfield* that is *designated park land*, and the purpose of the proposed building is related to the use of the land as a park.

Revise Section 5.3.1.2 as follows:

5.3.1.2 Prohibited Development Activity. There shall be no *site* site disturbance or development of the following:

- a. Previously undeveloped land having an elevation lower than 5 ft (1.5 m) above the elevation of the 100-year flood, as defined by USFEMA

Exceptions to 5.3.1.2(a):

1. Development of *low-impact trails* shall be allowed anywhere within a flood zone.
2. Development of building structures shall be allowed in alluvial “AO” designated flood zones, provided that such structures include engineered floodproofing up to an elevation that is at least as high as the minimum lowest floor elevation determined by the *authority having jurisdiction (AHJ)*, and provided that the *site* site includes drainage paths constructed to guide floodwaters around and away from the structures.

- ~~b.~~ Land within 150 ft (50 m) of any *fish and wildlife habitat conservation area*

Exceptions to 5.3.1.2(b):

1. Development of *low-impact trails* shall be allowed, provided that such trails are located at least 15 ft (4.5 m) from the area.

2. ~~Site~~ Site disturbance or development shall be allowed for habitat enhancement measures.
- c. Land within 100 ft (35 m) of any *wetland*

Exceptions to 5.3.1.2(c):

1. Development of *low-impact trails* shall be allowed, provided that such trails are located at least 15 ft (4.5 m) from the *wetland*.
2. ~~Site~~ Site disturbance or development shall be allowed for habitat enhancement measures or for restoration of the functions of the *wetland*.

Revise Section 5.3.2 as follows:

5.3.2 Predesign Site Inventory and Assessment. A predesign inventory and assessment of the natural resources of the ~~building project site~~ site shall be submitted with the ~~site~~ site design and *construction documents*. The inventory and assessment shall include all of the following:

- a. Location of any prohibited development areas identified in Section 5.3.1.2 that are located on or adjacent to the ~~building project site~~ site
- b. Identification of *invasive plant species* ~~on the site~~
- c. Identification of *native plant species* ~~on the site~~
- d. Identification of ~~site~~ site features designated for preservation

Revise Section 5.3.3 as follows:

5.3.3 Plants

5.3.3.1 Invasive Plants. *Invasive plants* shall be removed from the ~~building project site~~ site and destroyed or disposed of in a land fill. *Invasive plants* shall not be planted on the ~~building project site~~ site.

5.3.3.2 Greenfield Sites

a. More than 20% existing native or adapted plants. Where more than 20% of the area of the predevelopment ~~site~~ site has existing *native plants* or *adapted plants*, a minimum of 20% of the area of *native plants* or *adapted plants* shall be retained.

b. Less than 20% existing native or adapted plants

1. Where 20% or less of the area of the predevelopment ~~site~~ site has existing *native plants* or *adapted plants*, a minimum of 20% of the ~~site~~ site shall be developed or retained as vegetated area. Such vegetated areas include bioretention facilities, rain gardens, filter strips, grass swales, vegetated level spreaders, constructed *wetlands*, planters, and open space with plantings.
2. A minimum of 60% of the vegetated area shall consist of *biodiverse planting* of *native plants* or *adapted plants* other than *turfgrass*.

Exception to 5.3.3.2(b)(2): The following areas shall not be included in the calculations: dedicated sports fields, driving ranges, burial grounds, vegetated pavers, and the minimum fire lanes required by the jurisdiction.

Revise Section 5.3.4 as follows:

5.3.4 Stormwater Management. Stormwater management systems shall be provided on the ~~building site~~ site. Except to the extent that other stormwater management approaches are required by a local, state, or federal jurisdiction, these systems shall be limited to one or more of the following management methods:

- a. Infiltration
- b. *Evapotranspiration*

- c. Rainwater harvesting
- d. Stormwater collection and use

5.3.4.1 Projects on Greenfields. Projects on *greenfields* shall comply with at least one of the following:

- a. Stormwater management systems shall retain on ~~site~~ site no less than the volume of precipitation during a single 24-hour period equal to the 95th percentile precipitation event. *Building projects* with stormwater management systems that are designed to retain volumes greater than that of the 98th percentile precipitation event shall conduct a hydrologic analysis of the building ~~site~~ site to determine the water balance of the ~~site~~ site prior to its development, clearing, and filling and to demonstrate that the stormwater management system will not cause ecological impairment by starving receiving waters downstream of the ~~site~~ site.
- b. The stormwater management system design shall maintain ~~site~~ site water balance (the combined runoff, infiltration, and *evapotranspiration*) based on a hydrologic analysis of the ~~site's~~ site's conditions prior to development, clearing, and filling. Postconstruction runoff rate, volume, and duration shall not exceed rates preceding development, clearing, or filling of the ~~site~~ site.

5.3.4.2 Projects on Greyfields. Projects on *greyfields* shall retain on ~~site~~ site no less than the volume of precipitation during a single 24 h period equal to or greater than the 60th percentile precipitation event.

Exception to 5.3.4.2: Where any fraction of the 60th percentile precipitation event cannot be retained, that fraction shall be treated to limit total suspended solids to 25 mg/L in the remaining discharge.

5.3.4.3 Discharge Rate. *Building projects* ~~sites~~ shall be designed and constructed to comply with one of the following requirements:

- a. The discharge of the design storm shall occur over a period of not less than 48 hours.
- b. The discharge flow duration curve at any point in time shall be plus or minus 10% of the flow duration curve for channel-forming discharges for the ~~site~~ parcel of land prior to its development, clearing, or filling.

5.3.4.4 Adjoining Lots. The stormwater management system shall direct ~~or concentrate~~ off-site discharge to avoid increased erosion or other drainage-related damage to adjoining *lots* or public property.

5.3.4.5 Discharges from Contaminated Soils. Stormwater management systems on areas of *brownfields* where contaminated soils are left in place shall not use infiltration practices that will result in pollutant discharges to groundwater. Stormwater discharge from *brownfields* shall be treated to limit total suspended solids to 25 mg/L. Stormwater management systems shall not penetrate, damage, or otherwise compromise remediation actions at the ~~building~~ site site.

...

Revise Section 5.3.5.1 as follows:

5.3.5.1 Site Hardscape. At least 50% of the ~~site~~ building project *hardscape* that is not covered by *solar energy systems* shall be provided with one or any combination of the following:

...

- f. Buildings or structures that provide shade to the ~~site~~ hardscape. The effective shade coverage on the *hardscape* shall be the arithmetic mean of the shade coverage calculated at 10 a.m., noon, and 3 p.m. on the summer solstice.

Revise Exception 7 of Section 5.3.6.1 as follows:

7. Lighting for industrial production, material handling, transportation ~~sites~~ sites, and associated storage areas.

Revise Section 5.3.7.1.1 as follows:

5.3.7.1.1 Pedestrian Walkways. Each *primary building entrance* shall be provided with a pedestrian walkway that extends to either a *public way* or a transit stop. Walkways shall not be less than 5 ft (1.5 m) in width and shall be clearly delineated.

A public-use walkway shall be provided along the length of the adjoining public-way frontage of the *building project-site*, and such walkways shall connect to adjacent public-use walkways.

Revise Exception 2 of Section 5.3.7.2.1 as follows:

2. The number of bicycle parking spaces shall be allowed to be reduced where a transportation plan, prepared by a *registered design professional*, that demonstrates the likelihood that building occupants will use public transportation and/or walk to the *building project-site site* has been *approved*.

Revise Section 5.3.8 and the first section of Section 5.3.8.1 as follows:

5.3.8 Building Project Site Waste Management

5.3.8.1 Building Project Site Waste Management Plan. A *building site project site* waste management plan shall be developed and implemented for excavated soil, rock, and land-clearing debris. Land-clearing debris is limited to stumps and vegetation. Diverted land-clearing debris and removed rock and soil shall not be sent to ~~sites~~ sites where development activity is prohibited by Section 5.3.1.2 or to *greenfields* other than those being used for agricultural purposes or being developed as part of a *building project*.

Revise Section 6.1 as follows:

6.1 Scope. This section specifies requirements for *potable water* and *nonpotable water* use efficiency, both for the ~~site~~ site and for the building, and water monitoring.

Revise exception to Section 6.3.1.2 as follows

Exception to 6.3.1.2: *Potable water* is allowed to be temporarily used on such newly installed landscape for the *landscape establishment period*. The amount of *potable water* allowed to be applied to the newly planted areas during the temporary *landscape establishment period* shall not exceed 70% of ET_o for *turfgrass* and 55% of ET_o for other plantings. Where municipally reclaimed water is available at a water main within 200 ft (60 m) of the project ~~site~~ site, such water shall be used instead of *potable water* during the *landscape establishment period*. After the *land- scape establishment period* has expired, all irrigation water use shall comply with the requirements established elsewhere in this standard.

Revise Section 6.3.1.2.2 as follows:

6.3.1.2.2 Controls. Where any irrigation system for the project ~~site~~ site uses an *automatic* controller, the system shall be controlled by a qualifying *smart controller* that uses *evapotranspiration (ET)* and weather data to adjust irrigation schedules and complies with the minimum requirements. Alternatively, the system shall be controlled by an on-site rain or moisture sensor that automatically shuts off the system after a predetermined amount of rainfall or sensed moisture in the soil. Qualifying *smart controllers* shall be *labeled* according to

USEPA *Water-Sense Specification for Weather-Based Irrigation Controllers* or tested in accordance with Irrigation Association SWAT Climatologically Based Controllers, 8th Testing Protocol. *Smart controllers* that use *ET* data shall provide the following irrigation amounts:

- a. *Irrigation adequacy*—80% minimum ET_c
- b. *Irrigation excess*—not to exceed 10% of ET_c

Revise Section 6.3.1.2.3 as follows:

6.3.1.2.3 Irrigation of Rainfall- ET_c Compatible Plants. The use of *potable water* or *reclaimed water* for irrigation of *adapted plants* is prohibited after the *landscape establishment period*. In-ground irrigation systems for *rainfall- ET_c compatible plants* using *potable water* or off-site treated *reclaimed water* are prohibited. After the *landscape establishment period* of *adapted plants*, the irrigation system using *potable water* or *reclaimed water* shall be permanently disabled or removed from ~~site~~ site.

Revise Section 6.3.2.4(c) as follows:

- c. The use of *potable water* or *reclaimed water* for irrigation of vegetated (green) *roofs* is prohibited after the vegetation establishment period or 18 months after the initial installation, whichever is less. After the *landscape plants* are established, the irrigation system using *potable water* or *reclaimed water* shall be removed from ~~site~~ site.

Revise item 3 of Section 6.3.2.6(f) as follows:

- 3. For reverse osmosis and nanofiltration equipment with capacity greater than 27 gal/h (100 L/h), reject water shall not exceed 60% of the feed water and shall be used as scrubber feed water or for other beneficial uses on the project ~~site~~ site.

Revise exception to Section 6.3.4(a) as follows:

Exception to 6.3.4(a): Where *alternate on-site sources of water* or *municipally reclaimed water* are not available within 500 ft (150 m) of the *building project site*, *potable water* is allowed to be used for water features with less than 10,000 gal (38,000 L) capacity.

Revise Section 7.4.1.3(e) as follows:

- e. The generation source shall be located where the energy can be delivered to the building ~~site~~ site by any of the following:
 - 1. Direct connection to the off-site renewable energy facility
 - 2. The local utility or distribution entity
 - 3. An interconnected electrical network where energy delivery capacity between the generator and the building ~~site~~ site is available (**Informative Note:** Examples of interconnected electrical networks include regional power pools and regions served by Independent System Operators or Regional Transmission Organizations.)

Revise item 3 of Section 8.3.1.6.1(a) as follows:

- 3. Variable HVAC zone supply air reheat using ~~site~~ site-recovered energy or ~~site~~ site solar energy.

Revise Section 9.3.1.3(d) as follows:

- d. Identify service providers and designate destination facilities for construction and demolition waste materials generated ~~at the job site~~.

Revise Section 9.4.1.2 as follows:

9.4.1.2 Regional Materials. A minimum of 15% of building materials or products used, based on cost, shall be regionally extracted/harvested/recovered or manufactured within a radius of 500 mi (800 km) of the project ~~site~~ site. If only a fraction of a product or material is extracted/harvested/ recovered or manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

Revise Section 10.4.3 as follows:

10.4.3 Construction Activity Pollution Prevention: Idling of Construction Vehicles. Construction-related vehicles shall not idle on the construction ~~site~~ site for more than five minutes in any 60-minute period, except where necessary to perform their construction-related function. Signage shall be posted at vehicle entrances to the *building project* providing notice of this requirement.

Revise Section 10.4.5.1 as follows:

10.4.5.1 Collection. Specific areas on the construction ~~site~~ site shall be designated for the collection of recyclable and reusable materials. Alternatively, off-site storage and sorting of materials shall be permitted. Diversion efforts shall be tracked throughout the construction process.

Revise Section 10.9.1 as follows:

10.9.1 Site Sustainability. A ~~site~~ site sustainability portion of the plan for operation shall be developed and shall contain the following provisions:

Revise Section 10.9.10(e) as follows:

- e. Documentation of the plan and of completed maintenance procedures shall be maintained on the building ~~site~~ site at all times in
1. electronic format for storage on the building energy management system (EMS), building management system (BMS), computerized maintenance management system (CMMS), or other computer storage means, or
 2. maintenance manuals specifically developed and maintained for documenting completed maintenance activities.

Revise Section 10.10 as follows:

10.10 [JO] Service Life Plan. A service life plan that is consistent with the *OPR* shall be developed to estimate to what extent structural, *building envelope* (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 10.10. The estimated service life shall be documented for building assemblies, products, and materials that will need to be inspected, repaired, and/or

replaced during the service life of the building. ~~Site~~ Site improvements and *hardscape* shall also be included. Documentation in the service life plan shall include the *building 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 in years
- d. Maintenance frequency
- e. Maintenance access for components with an estimated service life less than the service life of the building

Provide a service life plan at the completion of design development. The *owner* shall retain a copy of the service life plan for use during the life of building.

Revise Appendix C Section C1.1 as follows:

C1.1 Renewable, Recovered, and Purchased Energy. *On-site renewable energy systems* and ~~site~~ site-recovered energy: The modeling requirements for *on-site renewable energy systems* in the *proposed building performance* in ANSI/ASHRAE/IES Standard 90.1, Section G2.4.1, shall not apply and are superseded by Table C1.1, Section 15, “Renewable Energy Systems.”

Revise Appendix F Section F1.1.1 as follows:

F1.1.1 Charrette Process. Experienced personnel representing each specialty should participate in the charrette process. A discussion of all systems and all items that affect the *integrated design* should be discussed. Stakeholders should be able to decide and vote on the best integrated system.

The integrative team process should entail the following steps of design optimization:

- a. The original goals and budget of the project should be revisited to see whether the overall intentions of the project are intact.
- b. The project should be compared with this standard or at least one existing green rating system.
- c. Each of the building and ~~site~~ site components should be scrutinized to help ensure that natural systems for energy conservation, lighting, ventilation, and passive heating and cooling are maximized before mechanical systems are engaged.
- d. The appropriateness and integration logic of the building’s primary systems should be confirmed.
- e. The impact of the design on the ~~site~~ site and its larger context should be evaluated, including the environmental impact on a life-cycle cost basis.
- f. Building information modeling (BIM) software, design tools, and the experience of the design team should be used, where practical, to help optimize the design.
- g. All members of the design team should be included when making design decisions.
- h. Commissioning and consideration of future operation and maintenance (O&M) requirements should be included within the design optimization process.

Revise Appendix F Section F1.1.2 as follows:

F1.1.2 Design Charrette Matrix. At the end of the charrette process, a matrix for each proposed building scheme can be developed and evaluated to summarize the impact on the ~~site~~ site, water, energy, materials, and indoor environmental quality and to help in deciding on the best integrated system. The matrix contains cells indicating the high-performance value, grading a particular building system to its appropriate high-

performance criteria. Each high-performance value is qualitatively rated from 1 to 10, with 1 being the lowest (minimal energy savings, low air quality, low water efficiency, high cost) and 10 being the highest (high energy savings, high air quality, high water efficiency, low cost). The average of the high-performance values for each building system is the aggregate index. Selection of the best system should be based on a comparison of the aggregate indices for each matrix.

Revise Appendix K Section K2.6(c) as follows:

- c. Engineering and institutional control information for ~~sites~~ sites that have previously been a *brownfield* or that have required environmental corrective action, remediation, or restoration at the federal, state, or local level.

For Reference Only:

Changes to Section C1.1. of 189.1-2020 are also being proposed in a separate proposal titled Addendum e. If both Addendum d and Addendum e are approved for publication, Section C1.1 will appear as follows:

C1.1 Renewable, Recovered, and Purchased Energy. *On-site renewable energy systems and site-recovered energy:* The modeling requirements for *on-site renewable energy systems* in the *proposed building performance* in ANSI/ASHRAE/IES Standard 90.1, Section G2.4.1, shall not apply and are superseded by Table C1.1, Section 15, “Renewable Energy Systems.”