

VA



U.S. Department  
of Veterans Affairs

Office of Construction &  
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# Sustainable design manual

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# SUSTAINABLE DESIGN MANUAL

**U.S. Department of Veterans Affairs  
Office of Construction & Facilities Management**

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**Table of Contents**

1.0 GENERAL ..... 1

    1.1 INTENT ..... 1

    1.2 MANDATORY USE ..... 1

    1.3 MASTER CONSTRUCTION SPECIFICATIONS..... 2

    1.4 RELATED DOCUMENTS..... 2

    1.5 MINIMUM REQUIREMENTS ..... 2

2.0 GENERAL PROJECT REQUIREMENTS ..... 3

    2.1 INTEGRATED DESIGN ..... 3

    2.2 LIFE-CYCLE COST ANALYSIS ..... 3

    2.3 SUSTAINABLE FACILITY AWARDS ..... 3

    2.4 ‘GUIDING PRINCIPLES’ COMPLIANCE AND VALIDATION ..... 4

    2.5 COMMISSIONING ..... 4

    2.6 METERING ..... 4

3.0 SITE SELECTION & DEVELOPMENT..... 6

    3.1 SITE SELECTION ..... 6

    3.2 SITE DEVELOPMENT ..... 7

4.0 ENERGY ..... 8

    4.1 ENERGY CONSERVATION ..... 8

    4.2 RENEWABLE ENERGY ..... 9

    4.3 ENERGY-EFFICIENT PRODUCTS AND EQUIPMENT ..... 10

    4.4 ENERGY-RELATED EQUIPMENT REQUIREMENTS ..... 11

5.0 WATER..... 12

    5.1 MINIMUM WATER EFFICIENCY REQUIREMENTS..... 12

    5.2 WATER-EFFICIENT PRODUCTS AND EQUIPMENT REQUIREMENTS..... 12

6.0 INDOOR ENVIRONMENTAL QUALITY ..... 13

    6.1 THERMAL COMFORT ..... 13

    6.2 VENTILATION..... 13

    6.3 MOISTURE CONTROL ..... 13

    6.4 DAYLIGHTING ..... 13



6.5 LOW POLLUTANT-EMITTING MATERIALS ..... 13

6.6 PROTECT INDOOR AIR QUALITY DURING CONSTRUCTION ..... 13

6.7 ENVIRONMENTAL TOBACCO SMOKE CONTROL..... 13

6.8 TOXIC AND HAZARDOUS MATERIALS ..... 14

6.9 ACOUSTICS ..... 14

7.0 ENVIRONMENTAL IMPACTS OF MATERIALS..... 15

7.1 RECYCLED CONTENT ..... 15

7.2 BIOBASED CONTENT ..... 15

7.3 SOLID WASTE DIVERSION..... 15

7.4 COMPOSTING..... 16

7.5 RECYCLING ..... 16

7.6 OZONE DEPLETING SUBSTANCES..... 16

APPENDIX A - SUSTAINABLE DESIGN REFERENCES..... 17

APPENDIX B - ACRONYMS..... 18

Have a question, comment, or suggestion?  
Contact CFM’s Facilities Standards Service  
via email, [TIL@va.gov](mailto:TIL@va.gov)



## 1.0 GENERAL

### 1.1 INTENT

1.1.1 CFM’s Sustainable Design Program serves to enhance VA’s ability to provide outstanding service to Veterans of the United States Armed Forces. This is accomplished by improving facility performance, conserving resources, improving occupant health, and more.

1.1.2 Questions regarding project-specific application of the requirements in this manual should be directed to CFM’s Consulting Support Service (CSS) by email at [cfm-css@va.gov](mailto:cfm-css@va.gov). Questions regarding the content of this manual should be directed to CFM’s Facilities Standards Service (FSS) by email at [TIL@va.gov](mailto:TIL@va.gov).

### 1.2 MANDATORY USE

1.2.1 Compliance with this manual is mandatory for all categories of construction, renovation, and non-recurring maintenance projects.

1.2.2 Major New construction and Major Renovation projects shall meet all requirements outlined in this manual.

1.2.3 Non-recurring maintenance (NRM) projects shall meet the requirements outlined in the following sections of this manual:

- a. Chapter 1 (General)
- b. Section 2.2 (Life-Cycle Cost Analysis)
- c. Section 4.3 (Energy Efficient Products and Equipment)
- d. Section 5.2 (Water-Efficient Products and Equipment Requirements)
- e. Section 6.5 (Low-Pollutant Emitting Materials)
- f. Section 6.7 (Environmental Tobacco Smoke Control)
- g. Section 6.8 (Toxic and Hazardous Materials)
- h. Chapter 7 (Environmental Impacts of Materials), *except Section 7.4 (Composting)*

1.2.4 Minor Construction projects shall meet requirements outlined in the following sections of this manual:

- a. Chapter 1 (General)
- b. Section 2.2 (Life-Cycle Cost Analysis)
- c. Section 2.4 (‘Guiding Principles’ Compliance and Validation)
- d. Section 2.6 (Metering) (*Only if project involves a system shown*)
- e. Section 4.3 (Energy-Efficiency Products and Equipment)
- f. Section 5.2 (Water-Efficient Products and Equipment Requirements)
- g. Section 6.5 (Low-Pollutant Emitting Materials)
- h. Section 6.7 (Environmental Tobacco Smoke Control)
- i. Section 6.8 (Toxic and Hazardous Materials)
- j. Chapter 7 (Environmental Impacts of Materials), *except Section 7.4 (Composting)*



### 1.3 MASTER CONSTRUCTION SPECIFICATIONS

1.3.1 All construction specifications shall be prepared using VA's [Master Construction Specifications](#) available on CFM's Technical Information Library (TIL), and can be accessed at <https://www.cfm.va.gov/til/>. Cemetery project specifications shall be prepared using the VA National Cemetery Administration's [NCA Master Construction Specifications](#).

1.3.2 In addition to the requirements in this manual, designers shall incorporate the sustainable design requirements shown in Master Construction Specifications section 01 81 13, *Sustainable Construction Requirements*.

### 1.4 RELATED DOCUMENTS

1.4.1 This manual supersedes the *VA Sustainable Design & Energy Reduction Manual* (April 2010).

1.4.2 Project managers for projects in design or construction prior to publication of this manual, or any subsequent revisions, should consider modifying existing contracts to accommodate new requirements.

1.4.3 Appendix A contains a comprehensive list of documents used in the development of this manual.

1.4.4 CFM strives to synchronize design requirement documents. Project teams are encouraged to notify Facilities Standards Service via email at [TIL@va.gov](mailto:TIL@va.gov) if they find any conflicting requirements.

### 1.5 MINIMUM REQUIREMENTS

1.5.1 The requirements outlined in this manual are minimum requirements.

1.5.2 Project teams are encouraged to exceed these requirements whenever an analysis indicates an overall benefit to VA. This analysis should consider all costs and benefits, including financial considerations, improvement of services to Veterans, and any other relevant factor.

1.5.3 Project teams shall ensure projects comply with all laws and regulations applicable to their project(s), including state and local laws or codes, and any guidance published by VA or the project's parent administration (i.e. Veterans Health Administration (VHA), Veterans Benefits Administration (VBA), or National Cemetery Administration (NCA)).

1.5.4 In the event an applicable law or policy has a more stringent requirement than this manual, the more stringent requirement will apply.

1.5.5 In the event an applicable law or policy appears to conflict with the requirements of this manual, project teams shall seek to harmonize these requirements in consultation with relevant oversight or regulatory agencies and stakeholders.



## 2.0 GENERAL PROJECT REQUIREMENTS

### 2.1 INTEGRATED DESIGN

2.1.1 Project teams shall use a collaborative process that integrates sustainability throughout all stages of project planning and delivery.

2.1.2 Follow the integrated design process outlined in the Whole Building Design Guide's [Engage the Integrated Design Process](#) document. The design process shall include operations and maintenance staff, energy manager, and Green Environmental Management System (GEMS) coordinator (for VHA projects) or Cemetery Environmental Management System (CEMS) coordinator (for NCA projects), when available. If local-level staff is not available, involve region-level staff.

2.1.3 Project teams shall establish performance goals for siting, energy, water, materials, and indoor environmental quality, along with other comprehensive design goals and ensure incorporation of these goals throughout the design and lifecycle of the building. These goals shall be included in the pre-design, or conceptual design, phase submittal and presented during all design review meetings.

2.1.4 Project teams shall consider all stages of the building's lifecycle, including deconstruction.

### 2.2 LIFE-CYCLE COST ANALYSIS

2.2.1 When developing a Life-Cycle Cost Analysis (LCCA), design teams shall use an analysis approach consistent with the requirements of Title 10, CFR 436 or NIST Handbook 135.

2.2.2 To comply with LCCA requirements, design teams shall use the current version of the Building Lifecycle Cost (BLCC) program to perform LCCAs. If BLCC is not appropriate, an alternative methodology may be approved by the contracting officer.

2.2.3 When conducting LCCA for an individual system, use the equipment's expected life or a time-period of 40 years, whichever is shorter. When comparing multiple systems with unequal lifespans, use 40 years for the analysis and include all replacement costs expected to be incurred during that time period.

2.2.4 LCCAs shall include all life-cycle costs, such as upfront, non-fuel operation and maintenance, replacement (minus salvage value), and energy/water costs.

### 2.3 SUSTAINABLE FACILITY AWARDS

2.3.1 Project teams are encouraged to submit their project for consideration under sustainable facilities awards programs, such as the VA Sustainability Achievement Awards and GreenGov Presidential Awards. VA projects receiving sustainability awards help to promote VA's sustainability efforts and the Department's service to Veterans.



## 2.4 'GUIDING PRINCIPLES' COMPLIANCE AND VALIDATION

2.4.1 All VA construction and renovation projects occurring on buildings of 5,000 square feet, or more, shall comply with the 2016 *Guiding Principles for Sustainable Federal Buildings* (Guiding Principles). In addition, all applicable projects shall validate compliance with the *Guiding Principles*. Projects shall use one of the following paths for validation of compliance:

a. Option A (*preferred method*): Internal Certification

During every design phase, complete a 2016 *Guiding Principles Checklist*, available on VA's Technical Information Library. Include the checklist, and required supporting documentation during every design submission. Upon project completion, email final checklist and supporting documentation to CFM's Sustainable Design Program at [SustainableDesign@va.gov](mailto:SustainableDesign@va.gov), for Major projects, or to VA's Green Management Program (GMP) at [Energy@va.gov](mailto:Energy@va.gov), for Minor projects.

b. Option B: Green Globes Certification and Checklist Completion

Certify the project using Green Building Initiative's "Green Globes" program. Achieve a minimum of two Green Globes.

During every design phase, complete a 2016 *Guiding Principles Checklist*, available on VA's Technical Information Library. Include the checklist, and required supporting documentation during every design submission. Upon project completion, email final checklist and supporting documentation to CFM's Sustainable Design Program at [SustainableDesign@va.gov](mailto:SustainableDesign@va.gov).

c. Option C: LEED Certification and Checklist Completion

Certify the project using the "Leadership in Energy and Environmental Design" (LEED) program. Achieve a minimum of LEED Silver.

During every design phase, complete a 2016 *Guiding Principles Checklist*, available on VA's Technical Information Library. Include the checklist, and required supporting documentation during every design submission. Upon project completion, email final checklist and supporting documentation to CFM's Sustainable Design Program at [SustainableDesign@va.gov](mailto:SustainableDesign@va.gov).

## 2.5 COMMISSIONING

2.5.1 Employ commissioning practices tailored to the size and complexity of the building and its system components in order to verify performance of building components and systems and help ensure that design requirements have been met.

2.5.2 Comply with VA's Whole Building Commissioning Process Manual.

## 2.6 METERING

2.6.1 All buildings greater than 5,000 square feet shall install building-level advanced utility meters for electricity, natural gas, and/or steam, if used. In addition, install advanced utility meters for steam condensate, chilled water, hot water, domestic water, and/or non-potable water, if used.



- 2.6.2 Install sub-meters for cooling tower makeup water and boiler makeup water.
- 2.6.3 Energy-intensive buildings (i.e. laundry facilities and data centers), regardless of size, shall be similarly metered.
- 2.6.4 Advanced meters or metering devices and supporting systems (e.g. transmitters, web connections) shall provide data at least once every 15 minutes.
- 2.6.5 In addition to providing data to building operators, building-level meters shall transmit meter data directly to the existing data aggregation device in use at the facility. If there is no data aggregation device in use at the facility, one shall be installed as part of the project and shall be compatible with the VA Advanced Utility Metering System (AUMS).
- 2.6.6 Projects involving metering or installation of a data aggregation device shall follow VA Master Construction Specifications section 25 10 10, *Advanced Utility Metering System*.



## 3.0 SITE SELECTION & DEVELOPMENT

### 3.1 SITE SELECTION

3.1.1 While mission related requirements typically drive site selection, the following considerations should also be considered during the site selection process. Sites which meet all, or some, of the following criteria shall be given preference over sites that do not meet them.

3.1.2 Existing Building Reuse

3.1.3 When selecting a site for a future VA project, project planners shall consider reuse of existing buildings, including historic buildings, as potential sites.

3.1.4 Locate Near Diverse Housing Resources

3.1.5 Consider sites in areas that are easily accessible to many employees and visitors, as well as sites that will minimize travel distance for employees and Veterans visiting the facility.

3.1.6 Locate in High-Density Zoning Areas

3.1.7 The site selection team shall consider high-density locations and construct new facilities in high-density areas whenever possible. First consideration shall be given to central business districts and rural town centers. This consideration does not apply to cemetery projects.

3.1.8 Coordination with Local/Regional Planning Officials

- a. Prior to site selection, the project team shall engage planning officials at the state, metropolitan, or municipal level to identify ways the project can support community sustainability and align the project with local and regional long-range plans and objectives.
- b. National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) requirements should also be followed during coordination efforts.
- c. At a minimum, project teams shall discuss potential impacts to transportation infrastructure and traffic patterns with local officials.

3.1.9 Alternative Transportation

- a. Project teams shall consider, and prefer, locations that provide multiple transportation options (pedestrian, bicycle, rail, bus, and etc.).
- b. During project planning and design, coordinate with facility staff and local transportation officials to identify opportunities for alternative transportation.
- c. Provide appropriate infrastructure to support planned alternative transportation resources, including bicycle racks and changing rooms, when appropriate.
- d. If there are plans to bring bus transportation to the facility, including VA-operated shuttle, provide bus shelters. Locate bus shelters near major building entrances. Avoid locating shelters near smoking facilities, dumpsters, building exhaust, or any source of pollution that would negatively impact shelter occupants.



### 3.1.10 Site Reuse

Project teams shall prefer selection of sites that have been previously developed, or which will require minimal site disturbance when compared to other site options, to the extent determined to be cost-effective. At a minimum, the analysis should consider local government incentives and reduced costs resulting from reuse of site utilities and features. Sites that require additional state and local infrastructure investment solely to meet the Federal need should be minimized unless it supports state and local plans.

## 3.2 SITE DEVELOPMENT

### 3.2.1 Heat Island Effect

Implement techniques to reduce the heat island effect impacts on facility cooling energy demand. At a minimum, design teams shall consider the use of cool roof technologies, including vegetative roofing. Design packages shall include a summary of measures taken to reduce the heat island effect.

### 3.2.2 Storm Water Runoff

- a. Employ design and construction strategies that reduce storm water runoff and discharges of polluted waters offsite.
- b. Comply with section 438 of the Energy Independence and Security Act of 2007, which states: “The sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.” Project documents shall show how site planning, design, construction, and maintenance strategies will meet this requirement.

### 3.2.3 Historic Buildings

- a. Historic buildings<sup>1</sup> can present both opportunities and challenges for sustainable design initiatives. Project teams are encouraged to reuse existing buildings, including historic buildings, to achieve sustainable design goals.
- b. Project teams are encouraged to utilize best practices and technologies in retrofitting in order to promote the long-term viability of historic buildings.
- c. Project teams shall consult and seek agreement with State Historic Preservation Officers and other stakeholders in identifying historic buildings and planning for their reuse or replacement.

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<sup>1</sup> “Historic Buildings” are those buildings included in, or eligible for, the National Register of Historic Places (NRHP), or that contribute to the character of districts included in, or eligible for, the National Register; note that such buildings may or may not be identified in facility master plans and inventories, and may require evaluation for NRHP eligibility during project planning.



## 4.0 ENERGY

### 4.1 ENERGY CONSERVATION

4.1.1 This chapter highlights numerous requirements for the energy efficient design of VA facilities. It is important to note that most of these requirements support one another and should be viewed as a comprehensive approach to energy efficiency. If any requirement exceeds the requirements of another section within this chapter, the more stringent requirement shall prevail.

#### 4.1.2 Baseline Standard – Renovations

- a. Major Renovation projects shall be designed to reduce energy use by a minimum of 30 percent compared to the baseline building performance rating per ASHRAE 90.1-2007, Appendix G.

#### 4.1.3 Baseline Standard – New Construction

- a. All new, VA-owned buildings, except low-rise residential buildings, entering design on or after November 6th, 2016, shall be designed to meet the requirements of ASHRAE 90.1-2013. If lifecycle cost-effective, reduce energy use by 30 percent compared to the baseline building performance rating per ASHRAE 90.1-2013, excluding receptacle and process loads.

If a lifecycle cost-effective design cannot be achieved that meets the 30% reduction requirement, select the most efficient design that is lifecycle cost-effective and meets all minimum requirements of ASHRAE 90.1-2013.

- b. Low-rise residential buildings shall be designed to perform 30 percent better than the 2009 version of the International Energy Conservation Code (IECC). Energy consumption for the purposes of calculating the 30 percent savings shall include space heating, space cooling, and domestic water heating. This requirement applies to designs beginning on, or after, August 10th, 2012.

#### 4.1.4 Energy Modeling

- a. Project designers shall use an energy model to aid in determining the most energy-efficient design of a project and to demonstrate compliance with sections 4.1.2 (Baseline Standard – Renovations) or 4.1.3 (Baseline Standard – New Construction), of this manual, whichever applies.
- b. Energy modeling software shall be capable of: 1) Interfacing with the Building Information Modeling (BIM) software being used for the project, 2) Providing whole building simulation, and 3) Providing system optimization recommendations.
- c. Results of the energy model shall be updated in every design phase and included in project deliverables. Documentation shall clearly list all parameters and assumptions used in the model.
- d. Energy modeling shall be performed in accordance with the requirements of ASHRAE 90.1, Appendix G (Performance Rating Method). Projects that involve predominantly laboratory space may use the Labs21 Laboratory Modeling Guidelines.



#### 4.1.5 Source Energy Reduction Credit

- a. If a project incorporates any technology that increases site energy consumption while decreasing source energy consumption (i.e. cogeneration projects), deduct source energy savings when calculating compliance with energy reduction requirements. To qualify for this credit, the technologies used to pursue the credit shall be LCC-effective.
- b. In all design phases, clearly identify energy reduction with, and without, source energy reduction credit.
- c. Refer to Department of Energy *Section 502(e) Guidance (Providing Credit Toward Energy Efficiency Goals for Cost-Effective Projects Where Source Energy Use Declines But Site Energy Use Increases) (Oct 2004)* for additional guidance.

#### 4.1.6 Documentation of Options Considered

Project documentation shall show: 1) All energy reduction options the team considered, 2) all energy reduction options incorporated, and 3) all energy reduction options the team rejected and reasons why. Documentation shall include energy modeling data associated with each option. This documentation shall be updated and included in every design phase submittal package.

## 4.2 RENEWABLE ENERGY

4.2.1 Focus on energy efficiency first. VA's intent is to maximize energy efficiency in design to ultimately spend less on purchased energy, including renewable energy. The goal in all projects should first be to reduce energy needs and then to meet some, or all, of the remaining energy needs using renewable energy sources.

4.2.2 While in the planning phase:

- a. All projects shall conduct comprehensive renewable energy feasibility studies for all potential renewable energy technologies at the projected sites. Ensure studies are conducted, and results concluded and agreed upon, prior to requesting funds. If the studies conclude renewable energy will be LCC-effective, include funding in the project application process.
- b. Feasibility studies shall include consideration of the amount of space required for renewable energy equipment and all costs associated with interconnection to the local utility grid.
- c. Planners shall consider environmental, historical, and permitting requirements before including renewable energy technologies in a project.
- d. Coordinate renewable energy plans with facility master plans and with applicable historic preservation or historic resource management plans, memoranda of agreement, or programmatic agreements.

#### 4.2.3 Renewable Energy Design

- a. Install onsite renewable electrical energy technologies sufficient for providing a minimum of 10% of the facility's expected annual electricity consumption, to the extent technically and economically feasible.



- b. All renewable energy designs shall be LCC-effective, unless energy modeling demonstrates that the building design would be less than 30% more efficient than ASHRAE 90.1-2007 without including the renewable energy project.
- c. An allowance for renewable energy is included in the cost target for all major projects, where determined technically and economically feasible. These funds can only be used for costs related to the installation of renewable energy technologies, including applicable indirect costs such as permits and interconnection agreements.
- d. All determinations that renewable energy will not be technically feasible, economically feasible, or LCC-effective shall be documented in each relevant design submission, including all supporting calculations and assumptions used.
- e. If renewable energy is determined not to be technically feasible, economically feasible, or LCC-effective, include infrastructure necessary to support the future installation of renewable energy equipment, in accordance with section 7.3.2 of ASHRAE 189.1-2014.

4.2.4 In accordance with EAct 2005, VA considers 'renewable electrical energy' to be electricity generated from solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, or municipal solid waste.

4.2.5 A minimum of 30% of hot water demand in new buildings and Major Renovations shall be met with solar hot water technologies if deemed to be LCC-effective.

4.2.6 Design documents shall clearly show lifecycle cost calculations for renewable energy equipment, including the cost of all supporting infrastructure installed specifically for the purpose of supporting the renewable energy generation equipment.

#### 4.2.7 Utility Interconnection

All distributed generation initiatives, including Combined Heat and Power (CHP), solar, and any other source of energy generated on-site shall enter into an interconnection agreement with the local utility provider. Begin the interconnection process with the local utility at the beginning of the Design Development phase to ensure the project can meet utility interconnection requirements.

### 4.3 ENERGY-EFFICIENT PRODUCTS AND EQUIPMENT

#### 4.3.1 Energy Efficient Products and Equipment Requirements

- a. All materials, products, and equipment being installed which fall into a category covered by the ENERGY STAR® program shall be ENERGY STAR®-labeled.
- b. All materials, products, and equipment being installed which fall into a category covered by the Federal Energy Management Program (FEMP) designated energy efficient products program shall be FEMP-designated.
- c. All electronic products and equipment being installed which fall into a category covered by the Electronic Product Environmental Assessment Tool (EPEAT) program shall be EPEAT-registered.
- d. VA's Master Construction Specifications contain additional information on product-specific requirements.



#### 4.3.2 Low Standby Power Requirement

- a. All commercially available, off-the-shelf, electronic products and devices being installed shall meet FEMP low standby power requirements, unless determined not to be LCC-effective or if the product's utility or performance are compromised as a result.
- b. If such products are not available, purchase products with the lowest standby power available. Refer to the Department of Energy's (DOE) Energy Efficiency & Renewable Energy (EERE) Federal Energy Management Program (FEMP) [Standby Power Data Center](#) website for a list of covered products and their required standby power levels.
- c. VA's Master Construction Specifications contain additional information on product-specific requirements.

### 4.4 ENERGY-RELATED EQUIPMENT REQUIREMENTS

#### 4.4.1 Combined Heat and Power

Combined Heat and Power shall be considered for inclusion in all projects. CHP systems shall be lifecycle cost-effective.



## 5.0 WATER

### 5.1 MINIMUM WATER EFFICIENCY REQUIREMENTS

5.1.1 Employ strategies that in aggregate use a minimum of 20 percent less potable water than the indoor water use baseline calculated for the building, after meeting the Energy Policy Act of 1992, and the International Plumbing Code 2006 fixture performance requirements.

5.1.2 As part of the water reduction strategy, identify opportunities for use of alternative water sources, including water recycling, industrial water reuse, water reclamation, and stormwater harvesting. Provide appropriate infrastructure to support selected opportunities. Obtain all necessary permits and ensure use of these resources comply with all applicable Federal, state and/or local laws, regulations, and codes regarding public health and safety. Ensure usage will not violate water rights held by others.

5.1.3 Use water efficient landscape and irrigation strategies, such as water reuse, recycling, and the use of harvested rainwater, to reduce outdoor potable water consumption by a minimum of 50 percent over that consumed by conventional means (plant species and plant densities).

5.1.4 Install advanced water meters to measure water use for irrigated landscape areas exceeding the minimum thresholds shown in table 6.3.3.B of ASHRAE 189.1-2009.

5.1.5 Install advanced water meters on all water wells installed on VA-owned property for agency use.

5.1.6 Advanced water meters shall be capable of providing, at a minimum, remote data access, interval data capabilities that collect hourly data, and electronic data storage and reporting capability.

5.1.7 When using potable water to improve a building's energy efficiency, deploy lifecycle cost-effective water conservation measures. Summarize all energy conservation measures falling into this category in design documents.

5.1.8 Irrigation professionals shall be certified under a WaterSense® labeled certification program.

### 5.2 WATER-EFFICIENT PRODUCTS AND EQUIPMENT REQUIREMENTS

5.2.1 Ensure that all products and equipment being installed are water-efficient, when available. Ensure use of water-efficient products, equipment, and practices during construction.

5.2.2 All materials, products, and equipment being installed which fall into a category covered by the U.S. Environmental Protection Agency's (EPA) WaterSense® program shall be WaterSense®-labeled or meet or exceed WaterSense® program performance requirements, unless disallowed for infection control reasons.

5.2.3 VA's Master Construction Specifications contain additional information on product-specific requirements.



## 6.0 INDOOR ENVIRONMENTAL QUALITY

### 6.1 THERMAL COMFORT

Comply with thermal comfort requirements in the VA *HVAC Design Manual*.

### 6.2 VENTILATION

Comply with ventilation requirements in the VA *HVAC Design Manual*.

### 6.3 MOISTURE CONTROL

Establish and implement a moisture control strategy for controlling flows and condensation to prevent building damage, minimize mold contamination, and reduce health risks related to moisture.

### 6.4 DAYLIGHTING

6.4.1 All new construction, and modernization, projects of 5,000 square feet, or more, shall maximize opportunities for daylighting in regularly occupied space, except where not appropriate because of building function, mission, or structural constraints. Provide adequate documentation to demonstrate compliance with this requirement in all design phases.

6.4.2 Comply with automatic dimming control requirements shown in VA's *Lighting Design Manual*.

### 6.5 LOW POLLUTANT-EMITTING MATERIALS

Specify materials and products with low pollutant emissions, including composite wood products, adhesives, sealants, interior paints and finishes, carpet systems, and furnishings.

### 6.6 PROTECT INDOOR AIR QUALITY DURING CONSTRUCTION

6.6.1 Follow the recommended approach of the Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) *Indoor Air Quality Guidelines for Occupied Buildings under Construction*, 2007.

6.6.2 After construction and prior to occupancy, conduct a minimum 72-hour flush-out with maximum outdoor air consistent with achieving relative humidity no greater than 60 percent at 60 degrees Fahrenheit.

6.6.3 After occupancy, continue flush-out as necessary to minimize exposure to contaminants from new building materials.

### 6.7 ENVIRONMENTAL TOBACCO SMOKE CONTROL

6.7.1 Locate all smoking shelters more than 25 feet from any building entrance, operable window, or ventilation intake. In addition, design health care facilities to comply with VHA Directive 2008-052, August 2008.



6.7.2 Post signage indicating that smoking is prohibited within the building and within 25 feet of all building entrances, operable windows, and ventilation intakes. For health care facilities, signs should reflect the distance appropriate to the facility, in compliance with VHA directive 2008-052, August 2008.

## 6.8 TOXIC AND HAZARDOUS MATERIALS

Minimize use and release of toxic and hazardous chemicals and materials, including toxic chemicals, hazardous substances, ozone-depleting substances, and other pollutants that may result in significant harm to human health or the environment.

## 6.9 ACOUSTICS

6.9.1 Design health care facilities to meet the acoustics requirements set forth in PG 18-3, Topic 11, [Noise Transmission Control](#).

6.9.2 Comply with mechanical equipment acoustics requirements outlined in the *HVAC Design Manual*.



## **7.0 ENVIRONMENTAL IMPACTS OF MATERIALS**

### **7.1 RECYCLED CONTENT**

7.1.1 Any product being installed or used that is listed on EPA's designated product list shall meet or exceed EPA's recycled content recommendations when the product meets VA's performance requirements and is available at a reasonable cost. For products not on EPA's designated product list, specify materials and products with recycled content, when practicable.

7.1.2 VA's Master Construction Specifications contain additional information on product-specific requirements.

7.1.3 Provide documentation for any products listed on the EPA designated product list but not selected for the project. Provide details on the reason(s) for the decision to not buy the recycled content product (i.e., price, performance, and/or availability).

### **7.2 BIOBASED CONTENT**

7.2.1 Any materials and equipment being installed or used that are listed on USDA's designated product list shall meet or exceed USDA's requirement for biobased content when the materials and equipment meet VA's performance requirements and are available at a reasonable cost. For products not on the USDA designated product list, specify biobased products made from rapidly renewable resources and certified sustainable wood products whenever available.

7.2.2 VA's Master Construction Specifications contain additional information on product-specific requirements.

### **7.3 SOLID WASTE DIVERSION**

7.3.1 During project planning, identify local recycling and salvage operations that can process site-related construction and demolition (C&D) waste. During construction, recycle and salvage at least 50 percent of non-hazardous construction, demolition, and land clearing materials, excluding soil, where markets or on-site recycling opportunities exist. Renovation projects shall maximize materials reuse opportunities to the extent practicable. Refer to Master Construction Specifications section 01 74 19, *Construction Waste Management*, for detailed requirements.

7.3.2 Construction contractors shall submit monthly reports indicating the total weight of C&D solid waste diverted from landfills in compliance with paragraph 7.3.1 above. Reports shall include the total weight of C&D waste generated and the total weight of C&D waste diverted. For CFM-managed projects, provide C&D diversion rate reports to the CFM project manager or Contracting Officer's Representative (COR). For projects occurring at an existing VHA facility, submit a copy of the report to the facility's GEMS coordinator. For NCA projects, submit a copy of the report to the Memorial Service Network CEMS coordinator. For projects being constructed without the presence of an existing facility, monthly reports shall be kept in the official project record for reporting purposes.



## 7.4 COMPOSTING

7.4.1 Consult with facility operations personnel to determine if there is a desire to compost food and/or landscaping-related waste. If an analysis indicates the project is a suitable candidate for composting, the project team shall provide space and equipment to accommodate the collection, processing, and storage of compostable materials.

7.4.2 If compost materials cannot be used on-site, the project team shall contact local and regional officials to determine the availability of composting facilities. If composting facilities are available, the project team shall provide space and equipment to accommodate the collection and storage of compostable materials.

## 7.5 RECYCLING

All projects shall provide sufficient space, equipment, and transportation accommodations to support the collection and storage of recyclable materials during regular facility operations. This includes providing recycling receptacles in common areas for use by building occupants.

## 7.6 OZONE DEPLETING SUBSTANCES

7.6.1 Eliminate the use of ozone depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990, or equivalent overall air quality benefits that take into account lifecycle impacts.

7.6.2 Use only safe alternatives to ozone depleting substances (ODSs), as approved by EPA's [Significant New Alternatives Policy \(SNAP\) program](#). Eliminate the use of ODSs in new equipment and facilities and phase out ODS applications as the existing equipment using ODSs reaches its expected service life.



## APPENDIX A - SUSTAINABLE DESIGN REFERENCES

- 10 CFR Part 436, Subpart A (Methodology and Procedures for Life Cycle Cost Analyses)
- Determining Compliance with the Guiding Principles for Sustainable Federal Buildings, Feb 2016
- DOE Green Building Certification System Review, Mar 2012
- DOE Guidance for Electric Metering in Federal Buildings, Feb 2006
- DOE Reporting Guidance for Federal Agency Annual Report on Energy Management - Attachment 3: Guidance for Receiving Credit on Energy Performance Goals for Projects that Save Source Energy but Increase Site-Delivered Energy, Sep 2013
- Energy Independence & Security Act of 2007 (EISA)
- Energy Policy Act of 2005 (EPAAct)
- ENERGY STAR: Find ENERGY STAR Products
- Executive Order 13693 (Planning for Federal Sustainability in the Next Decade), Mar 2015
- Guiding Principles for Sustainable Federal Buildings and Associated Instructions, Feb 2016
- Implementing Instructions: Federal Agency Implementation of Water Efficiency and Management Provisions of EO 13514, July 2013
- National Energy Conservation Policy Act of 1978 (NECPA)
- National Environmental Policy Act of 1969 (NEPA)
- National Historic Preservation Act of 1966 (NHPA)
- Sustainable Locations for Federal Facilities – Implementing Instructions, Sep 2011
- VA Directive 0055 (VA Energy and Water Management Program), Dec 2014
- VA Directive 0056 (VA Sustainable Buildings Program), Oct 2012
- VA Directive 0057 (VA Environmental Management Program), Jan 2010
- VA Directive 0058 (VA Green Purchasing Program), July 2013
- VA Directive 0059 (VA Chemicals Management and Pollution Prevention), May 2012
- VA Directive 0062 (Environmental Compliance Management), Jan 2012
- VA Directive 0063 (Waste Prevention and Recycling Program), Oct 2011
- VA Directive 0064 (VA Environmental Management Systems), Jan 2012
- VA Directive 0066 (VA Sustainable Locations Program), Jun 2012
- VA Handbook 0056 (VA Sustainable Buildings Program), Oct 2012
- VA Handbook 0058 (VA Green Purchasing Program), July 2013
- VA Handbook 0059 (Chemicals Management and Pollution Prevention), May 2012
- VA Handbook 0062 (Environmental Compliance Management), Jan 2012
- VA Handbook 0063 (Waste Prevention and Recycling Program), Oct 2011
- VA Handbook 0064 (VA Environmental Management Systems), Jan 2012
- VA Green Buildings Action Plan, Mar 2007
- VA Strategic Sustainability Performance Plan, Nov 2012



**APPENDIX B - ACRONYMS**

ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
BLCC	Building Life Cycle Cost
C&D	Construction and Demolition
CEMS	Cemetery Environmental Managements System
CFM	Construction & Facilities Management (also known as 'OCFM')
CHP	Combined Heat and Power
CLC	Community Living Center
COR	Contracting Officer's Representative
DOE	U.S. Department of Energy
EERE	Energy Efficiency and Renewable Energy
EISA	Energy Independence and Security Act of 2007
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 2005
EPEAT	Electronic Product Environmental Assessment Tool
FEMP	Federal Energy Management Program
GEMS	Green Environmental Management System
HVAC	Heating, Ventilation, and Air Conditioning
LCC	Life-Cycle Cost
LCCA	Life-Cycle Cost Analysis
LEED	Leadership in Energy and Environmental Design
NCA	National Cemetery Administration
NEPA	National Environmental Policy Act
NRM	Non-Recurring Maintenance
TIL	Technical Information Library
USDA	U.S. Department of Agriculture
VA	U.S. Department of Veterans Affairs
VBA	Veterans Benefits Administration
VHA	Veterans Health Administration

