SECTION **01 81 13** - **SUSTAINABLE DESIGN REQUIREMENTS - NEW CONSTRUCTION, MODERNIZATION, AND MAJOR RENOVATIONS**

If Project design team does not include a LEED Accredited Professional (LEED AP), consider engaging a Sustainability Consultant; INc "LEED Accredited Professional" applies if at least one principal participant of Project team is a LEED AP. Note that all LEED credits are optional, so delete requirements for credits not sought.

1. GENERAL
	* + 1. SUMMARY

Section Includes:

General requirements and procedures for compliance with federal standards as they apply to New Construction, Modernization, and Major Renovation projects.

General requirements and procedures for compliance with USGBC's LEED prerequisites and credits needed for Project to obtain LEED Silver certification based on USGBC's "LEED v4 for Building Design and Construction" (hereafter, LEED v4 BD+C).

Specific requirements for LEED are also included in other Sections.

Other LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests

A copy of LEED Project checklist is attached at end of this Section for information only.

Some LEED prerequisites and credits needed to obtain indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.

* + - 1. DEFINITIONS

ANSI/BIFMA e3 Furniture Sustainability Standard: Standard addressing environmental and social impacts throughout the furniture supply chain.

* + - * 1. Bio-Based Materials: Products containing some percentage of biologically renewable resource.
				2. BUG Rating Method: The BUG rating of a fixture determines how much light trespass is produced by considering backlight (B), uplight (U), and glare (G).
				3. CDPH (California Department of Public Health) Standard Method v1.2-2017: Standard method for testing and evaluation of volatile organic chemical emissions from indoor sources. Compliance can be shown through independent laboratory testing or certification by one of the following:

CHPS Products by Collaborative for High Performance Schools.

Clean Air Gold by Intertek.

ClearChem by Berkeley Analytical.

FloorScore by SCS.

Green Label Plus by CRI.

GREENGUARD Gold by UL.

Indoor Advantage Gold by SCS.

MAS Certified Green.

NSF / ANSI 140 Multi-attribute certifications for carpet.

NSF / ANSI 332 Multi-attribute certifications for resilient flooring.

VOC Green Program by Benchmark International.

* + - * 1. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001. Certificates to include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
				2. Cradle to Cradle: Product certification assessing material health, material reutilization, renewable energy and carbon management, water stewardship, and social fairness.
				3. Declare: A product transparency disclosure that identifies material source, composition, and end-of-life procedures.
				4. Environmental Product Declaration (EPD): A transparency reporting tool communicating what a product is made of and the environmental impact.
				5. Extended Producer Responsibility: A waste management strategy promoting integration of life-cycle costs associated with goods into the market price of products. Typically, this involves a take-back or recycling program run by manufacturer at the end of the product's lifespan.
				6. Facts: Standard evaluating sustainability of furniture products over the product life cycle.
				7. GreenChill: EPA partnership with food retailers to reduce refrigerant emissions.
				8. Health Product Declaration (HPD): Disclosure of products contents and associated health information.
				9. LEED: USGBC's "LEED v4 for Building Design and Construction." Definitions that are part of this document apply to this Section.
				10. Living Product Challenge: A product framework for manufacturers examining place, water, energy, health, materials, and equity in production of materials.
				11. Manufacturer Inventory: A published, complete content inventory for products.
				12. Product Lens: Transparency disclosure highlighting hazard information.
				13. REACH Optimization: International standard outlining hazardous substances of high concern to be avoided in material composition.
				14. Recycled Content: The recycled content value of a material assembly to be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.

"Postconsumer" material is defined as waste material 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.

"Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Reutilization of materials (such as rework, regrind, or scrap, generated in a process and capable of being reclaimed within the same process that generated it) is excluded.

Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) contributes to the regional value.

* + - * 1. WaterSense Label: The WaterSense label from the EPA specifies water efficiency and performance.
				2. Whole-Building Life-Cycle Assessment: The Life Cycle Assessment (LCA) is a methodology that evaluates the carbon and other environmental impacts of building materials over the projected lifespan of the building.
			1. PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>. Review sustainability goals, municipal and state sustainability requirements, LEED objectives, and action plans for meeting requirements.

* + - 1. ADMINISTRATIVE REQUIREMENTS
				1. Develop and maintain all of the submittal documentation that are the Contractor's responsibility including and not limited to calculations and required uploads. Collection and coalition of all materials to be turned over to the Government.

Respond to questions about USGBC's LEED prerequisites and credits that are Contractor's responsibility, that depend on product selection or product qualities, or that depend on Contractor's procedures.

* + - * 1. Submit documentation to Government and respond to questions and requests from Government about LEED prerequisites and credits that are Contractor's responsibility, that depend on product selection or product qualities, or that depend on Contractor's procedures.
			1. ACTION SUBMITTALS

General: Submit sustainable design submittals noted below and as required by other Sections.

* + - * 1. Submittals for products and materials that are required to comply with this Section will not be considered ready for review until the required sustainable design documentation is provided for review. Mark sustainable design documentation as "Sustainable Design Submittal".
				2. Sustainable design submittals are in addition to other submittals.

If submitted item is identical to that submitted to comply with other requirements, include additional copy with other submittal as a record of compliance with indicated LEED requirements instead of separate sustainable design submittal. Mark additional copy "Sustainable design submittal."

Sustainable Design Documentation Submittals:

Plumbing submittal packages.

Mechanical submittal packages.

For products in Divisions 3-10, 12, 31, and 32, submit the following:

EPDs complying with LEED requirements.

Documentation for products that comply with LEED requirements for multi-attribute optimization.

Sustainability reports for products that comply with LEED requirements for sourcing of raw materials.

Material ingredient reports for products that comply with LEED requirements for material ingredient reporting.

Documentation for products that comply with LEED requirements for material ingredient optimization.

Laboratory test reports for flooring, indicating compliance with requirements for low-emitting materials.

Laboratory test reports for wall materials, indicating compliance with requirements for low-emitting materials.

Laboratory test reports for ceilings, indicating compliance with requirements for low-emitting materials.

Laboratory test reports for insulation, indicating compliance with requirements for low-emitting materials.

Laboratory test reports for furniture, indicating compliance with requirements for low-emitting materials.

Laboratory test reports for products containing composite wood or agrifiber products or wood glues, indicating compliance with requirements for low-emitting materials.

Documentation for products that comply with 7 U.S.C. § 8102 requirements for bio-based material content.

Documentation for products that comply with 42 U.S.C. § 6962 et seq. requirements for recycled material content.

Documentation for products that comply with 42 U.S.C § 8259b and 10 CFR § 436.40– 436.43 requirements for ENERGY STAR and FEMP-designated products.

Documentation complying with Section 01 74 19 "Construction Waste Management and Disposal."

Product data for adhesives and sealants used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.

Product data for paints and coatings used inside the weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.

Construction Activity Pollution Prevention:

Plans and descriptions of compliance with EPA Construction General Permit through a Stormwater Pollution Prevention Plan (SWPPP).

Construction Documentation: Six photographs at three different times during construction period, along with a brief description documenting implementation of SWPPP measures.

Construction Indoor Air Quality (IAQ) Management:

Construction IAQ management plan.

Product data for temporary filtration media.

Product data for filtration media used during occupancy.

Construction Documentation: Six photographs at three different times during construction period, along with a brief description of SMACNA approach employed, documenting implementation of IAQ management measures, including protection of ducts and on-site stored or installed absorptive materials.

IAQ Assessment:

Signed statement describing the building air flush-out procedures, including dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.

Product data for filtration media used during flush-out and occupancy.

Report from testing and inspecting agency indicating results of IAQ testing and documentation showing compliance with IAQ testing procedures and requirements.

* + - 1. INFORMATIONAL SUBMITTALS

Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:

Materials meeting requirements of LEED for the following LEED credits:

MR: Environmental Product Declarations

MR: Sourcing of Raw Materials

MR: Material Ingredients

EQ: Low-Emitting Materials

Plumbing.

Mechanical.

Electrical.

Specialty items, such as elevators and equipment.

Sustainable Design Action Plans: Provide preliminary submittals within **30** days of date established for the Notice to Proceed, indicating how the following requirements will be met:

List of proposed products with EPDs.

List of proposed products complying with requirements for multi-attribute optimization.

List of proposed products complying with requirements for sourcing of raw materials.

List of proposed products complying with requirements for material ingredient reporting.

List of proposed products complying with requirements for material ingredient optimization.

Waste audit results and waste management plan for top four waste streams.

Waste management plan complying with Section 01 74 19 "Construction Waste Management and Disposal."

Construction IAQ management plan.

IAQ assessment plan.

Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.

* + - 1. QUALITY ASSURANCE

LEED Coordinator: Engage an experienced LEED AP to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

1. PRODUCTS
	* + 1. PRODUCTS

Ensure installation of ENERGY STAR and FEMP-designated products in all procurements involving energy-consuming products and services, in accordance with 42 U.S.C § 8259b and 10 CFR § 436.40– 436.43

* + - 1. MATERIALS

Provide products and procedures necessary to obtain LEED credits indicated as Contractor's responsibility. Although other Sections may specify some requirements that contribute to these LEED credits, Contractor provides additional materials and procedures necessary to obtain LEED credits indicated.

* + - * 1. LEED v4 BD+C, Materials and Resources credit 2 (MRc2) - Environmental Product Declarations (2 points):

Option 1. Environmental Product Declarations (1 point): At least 20 different products from at least five different manufacturers have EPDs that comply with LEED requirements. Product-specific Type III EPDs are valued as one and one-half of a product.

Option 2. Multi-attribute Optimization (1 point): At least 50 percent, by cost, of permanently installed products for Project comply with LEED requirements for multi-attribute optimization.

* + - * 1. LEED v4 BD+C Materials and Resources credit 3 (MRc3) - Sourcing of Raw Materials (2 points):

Option 1. Raw Material Source and Extraction (1 point): At least 20 different products from at least five different manufacturers have publicly released reports that comply with LEED requirements for sourcing of raw materials.

Option 2. Leadership Extraction Practices (1 point): At least 25 percent, by cost, of permanently installed products for Project comply with LEED requirements for responsible extraction criteria.

* + - * 1. LEED v4 BD+C Materials and Resources credit 4 (MRc4) - Material Ingredients (2 points):

Option 1. Material Ingredient Reporting (1 point): At least 20 different products from at least five different manufacturers comply with LEED requirements for material ingredient reporting.

Option 2. Material Ingredient Optimization (1 point): At least 25 percent, by cost, of permanently installed products for Project comply with LEED requirements for material ingredient optimization.

* + - * 1. Biobased Content: Use U.S. Department of Agriculture (USDA) Bio Preferred products, which are designated products with the highest content level per USDA’s biobased content recommendations, in accordance with 7 U.S.C. § 8102.
				2. Recycled Content: Use Resource Conservation and Recovery Act (RCRA) section 6002 compliant products that meet or exceed EPA’s Comprehensive Procurement Guideline Program, which provides recycled content recommendations for building construction, modifications, operations, and maintenance, in accordance with 42 U.S.C. § 6962 et seq.
			1. LOW-EMITTING MATERIALS

Paints and Coatings: For field applications that are inside the weatherproofing system, 75 percent of paints and coatings meet the VOC emissions evaluation and 100 percent meet the VOC content evaluations.

* + - * 1. Adhesives and Sealants: For field applications that are inside the weatherproofing system, 75 percent of adhesives and sealants meet the VOC emissions evaluation and 100 percent meet the VOC content evaluations.
				2. Flooring: A minimum of 90 percent of flooring products meet the VOC emissions evaluation or inherently non-emitting sources criteria or salvaged and reused materials criteria. Subflooring is excluded.
				3. Walls: A minimum of 75 percent of wall panel products meet the VOC emissions evaluation or inherently non-emitting sources criteria or salvaged and reused materials criteria. Wall panel products include wall paneling, wall coverings, wall tile, surface wall structures, cubicle/curtain/partition walls, trim, doors, frames, windows, and window treatments. Removable/interchangeable fabric panels, built-in cabinetry, and vertical structural elements are excluded.
				4. Ceilings: A minimum of 90 percent of ceilings meet the VOC emissions evaluation or inherently non-emitting sources criteria or salvaged and reused materials criteria. Ceiling products include ceiling panels, ceiling tile, surface ceiling structures, suspended systems, and glazed skylights. Overhead structural elements are excluded.
				5. Insulation: A minimum of 75 percent of insulation products meet the VOC emissions evaluation. Insulation products include all thermal and acoustic boards, batts, rolls, blankets, sound attenuation fire blankets, and foamed-in-place, loose-fill, blown, and sprayed insulation. HVAC duct and plumbing piping insulation are excluded.
				6. Furniture: A minimum of 75 percent of furniture meets the furniture emissions evaluation or inherently non-emitting sources or salvaged and reused materials criteria. All standalone furniture is included.
				7. Composite Wood: A minimum of 75 percent of all composite wood meet the formaldehyde emissions evaluation or salvaged and reused materials criteria. Composite wood materials include particleboard, MDF, hardwood veneer plywood, and structural composite wood.
1. EXECUTION
	* + 1. NONSMOKING BUILDING

Smoking is not permitted within the building or within 25 ft. (8 m) of entrances, operable windows, or outdoor-air intakes.

* + - 1. CONSTRUCTION WASTE MANAGEMENT

Comply with Section 01 74 19 "Construction Waste Management and Disposal."

* + - 1. CONSTRUCTION ACTIVITY POLLUTION PREVENTION

LEED v4 BD+C Sustainable Sites prerequisite 1 (SSp1) Construction Activity Pollution Prevention:

Comply with requirements of the EPA Construction General Permit (CGP).

* + - 1. CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT

LEED v4 BD+C Indoor Environmental Quality credit 3 (IEQc3) Construction Indoor Air Quality Management Plan (1 point): Develop and implement an indoor air quality (IAQ) management plan for the construction and preoccupancy phases of the building that complies with LEED requirements.

Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."

If Government authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Section 01 50 00 "Temporary Facilities and Controls," install MERV 8 filter media at each return-air inlet for the air-handling system used during construction.

Replace air filters immediately prior to occupancy with new filters specified in Section 23 41 00 "Particulate Air Filtration."

* + - 1. INDOOR AIR QUALITY (IAQ) ASSESSMENT

LEED v4 BD+C Indoor Environmental Quality credit (IEQc4) Indoor Air Quality Assessment (2 points):

Option 1. Flush-Out (1 point): Follow Path 1 or Path 2:

Path 1. Before Occupancy: After construction ends, prior to occupancy and with all interior finishes installed, install new filtration media and perform a building flush-out by supplying a total volume of 14,000 cu. ft. (4 300 000 L) of outdoor air per sq. ft. (sq. m) of floor area while maintaining an internal temperature of at least 60 deg F (16 deg C) and a relative humidity no higher than 60 percent.

<**Insert operating requirements**>.

Path 2. During Occupancy: If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. (1 070 000 L) of outdoor air per sq. ft. (sq. m) of floor area to the space. Once a space is occupied, it is ventilated at a minimum rate of 0.30 cfm per sq. ft. (1.52 L/s per sq. m) of outside air or the design minimum outside-air rate prerequisite, whichever is greater. During each day of the flush-out period, ventilation begins a minimum of three hours prior to occupancy and continues during occupancy. These conditions are maintained until a total of 14,000 cu. ft./sq. ft. (4 300 000 L/sq. m) of outside air has been delivered to the space.

<**Insert operating requirements**>.

Option 2. Air-Quality Testing (2 points): [**Engage**][**Owner will engage**] testing agency to perform the following:

Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in USGBC's "LEED v4 Reference Guide for Building Design and Construction."

Demonstrate that contaminant maximum concentrations listed below are not exceeded:

Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.

Particulates (PM10): 50 mcg/cu. m.

Particulates (PM2.5): 12 mcg/cu. m.

Ozone: 0.075 ppm, in accordance with ASTM D5149.

Formaldehyde: 20 mcg/cu. m.

Acetaldehyde: 140 mcg/cu. m.

Benzene: 3 mcg/cu. m.

Hexane: 7000 mcg/cu. m.

Naphthalene: 9 mcg/cu. m.

Phenol: 200 mcg/cu. m.

Styrene: 900 mcg/cu. m.

Tetrachloroethylene: 35 mcg/cu. m.

Toluene: 300 mcg/cu. m.

Vinyl Acetate: 200 mcg/cu. m.

Dichlorobenzene: 800 mcg/cu. m.

Xylenes - Total: 700 mcg/cu. m.

For each sampling point where the maximum concentration limits are exceeded, take corrective action until requirements have been met.

Air-sample testing to be conducted as follows:

All measurements to be conducted prior to occupancy but during normal occupied hours, and with building ventilation system starting at the normal daily start time and operated at the minimum outside-airflow rate for the occupied mode throughout the duration of the air testing.

Building to have all interior finishes installed, including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings such as workstations and partitions are encouraged, but not required, to be in place for the testing.

Number of sampling locations varies depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points to not be less than one per 5000 sq. ft. (465 sq. m).[ **For large open spaces, one sampling point per** 50,000 sq. ft. (4654 sq. m) **may be used.**]

Air samples to be collected between 3 and 6 ft. (0.9 and 1.8 m) from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

* + - 1. ATTACHMENTS
				1. LEED v4 BD+C Checklist
				2. LEED v4 BD+C Low Emitting Materials Calculator.
				3. LEED v4 BD+C Building Products Calculator.

END OF SECTION