SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 01 74 19 Construction and Demolition Waste Management and Disposal
- C. Section 01 81 19 Construction Indoor Air Quality Requirements
- D. LEED Reference Guide for Building Design and Construction (BD+C), version 4, U.S. Green Building Council
- E. LEED v4.1 Building Design and Construction (BD+C), Getting Started Guide for Beta Participants (Beta Guide), U.S. Green Building Council, issued January 2020.
- 1.2 DESCRIPTION OF WORK
 - A. Section includes general, administrative, procedural, and product requirements for compliance with the prerequisites and credits of the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) for Building Design and Construction (BD+C), Version 4 Green Building Rating System for New Construction (NC) and select credits of the USGBC LEED for BD+C Version 4.1 Beta Rating System for New Construction (NC).
 - B. Section includes the following appendices:
 - 1. APPENDIX A-018113 VOC LIMITS
 - 2. APPENDIX B-018113 LEED APPRAISAL
 - 3. APPENDIX C-018113 LEED v4.1 MATERIALS REPORTING FORM
 - 4. APPENDIX D-018113 TARGETED BPDO PRODUCT TABLE
 - 5. APPENDIX E-018113 LEED BOUNDARY
 - C. The Owner has established that this Project shall achieve at a minimum LEED Platinum. LEED requirements outlined in this Section apply to all Work within the LEED Boundary provided in the Appendix of this Section.
 - D. Several 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.
 - E. Any discrepancies between the LEED Requirements outlined in this Section and those in other Sections require notification of the Architect and the Architect's approval of the resolution.

- F. LEED Platinum goals and targeted credits are outlined in the LEED Appraisal appended at the end of this Section. The Contractor is responsible for LEED credits highlighted in **yellow** in the LEED Appraisal in the Appendix of this Section.
- G. Note: For clarity, identification numbers have been added to LEED v4 and LEED v4.1 prerequisite and credit names as used throughout this Section.

1.3 SUSTAINABLE BUILDING REQUIREMENTS

- A. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED v4 Platinum Certification. Specific project goals that may impact this area of work include, but not limited to:
 - 1. Reduction of facility energy and water consumption.
 - 2. Reduction of exposure of occupants to potentially harmful pollutants.
 - 3. Reuse and recycling of construction materials.
 - 4. Construction air quality protection control.
 - 5. Construction water quality protection control.
 - 6. Sourcing of products from manufacturers that disclose information on material impacts, chemical content of products, and manufacturing practices.
 - 7. Sourcing of products that minimize negative environmental and human health impacts.
- B. The Contractor shall ensure that the requirements related to these goals, as defined in the Articles below, are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the aforementioned environmental goals and LEED certification.

1.4 REFERENCES

- A. Abbreviations and Acronyms:
 - 1. BD+C: Building Design + Construction
 - 2. BPDO: Building Product Disclosure + Optimization
 - 3. CARB: California Air Resources Board
 - 4. CDPH: California Department of Public Health
 - 5. CFC: Chlorofluorocarbons
 - 6. CGP: Construction General Permit
 - 7. CoC: Chain-of-Custody
 - 8. CSR: Corporate Sustainability Reports
 - 9. EA: Energy & Atmosphere
 - 10. EPAct: Energy Policy Act

- 11. EPD: Environmental Product Declaration
- 12. EPR: Extended Producer Responsibility
- 13. ESC: Erosion and Sedimentation Control
- 14. EQ: Environmental Quality
- 15. FSC: Forest Stewardship Council
- 16. GBCI: Green Business Certification Inc.
- 17. GRI: Global Reporting Initiative
- 18. HPD: Health Product Declaration
- 19. IN: Innovation in Design
- 20. LCA: Life Cycle Assessments
- 21. LEED: Leadership in Energy and Environmental Design
- 22. LEM: Low-Emitting Materials
- 23. MERV: Minimum Efficiency Reporting Value
- 24. MR: Materials and Resources
- 25. MSDS: Material Data Safety Sheet
- 26. NAF: No Added Formaldehyde
- 27. NC: New Construction
- 28. PCB: Polychlorinated Biphenyls
- 29. SANSA: Sustainable Agricultural Network's Sustainable Agricultural
- 30. SCAQMD: South Coast Air Quality Management District
- 31. SCM: Suggested Control Measure
- 32. SR: Solar Reflectance
- 33. SRI: Solar Reflectance Index
- 34. SS: Sustainable Sites
- 35. TVOC: Total Volatile Organic Compound
- 36. ULEF: Ultra-Low-Emitting Formaldehyde
- 37. USGBC: US Green Building Council
- 38. VOC: Volatile Organic Compound
- 39. WE: Water Efficiency
- B. Reference Standards
 - 1. ANSI/ASHRAE/IESNA 90.1-2010 Energy Standard for Buildings Except Low-Rise Residential Buildings

- 2. ANSI/ASHRAE 52.2-2007 Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
- 3. ANSI/ASHRAE 62.1-2010 Ventilation for Acceptable Indoor Air Quality
- 4. ANSI/ASTM-E779-10 Determining Air Leakage Rate by Fan Pressurization
- 5. ASHRAE 52.2-2007 Filtration Minimum Efficiency Reporting Value (MERV)
- 6. ASHRAE Guideline 0 2005, The Commissioning Process
- 7. ASHRAE Guideline 1.1-2007, HVAC&R Technical Requirements for the Commissioning Process
- 8. ASHRAE 55-2010 Thermal Comfort Conditions for Human Occupancy
- 9. ASTM C1371-04 (R2010) Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
- 10. ASTM C1549-04 Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
- 11. ASTM D1003-11 Haze and Luminous Transmittance of Transparent Plastics
- 12. ASTM E408-13 Methods for Total Normal Emittances of Surfaces Using Inspection-Meter Techniques
- 13. ASTM E903-12 Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres
- 14. ASTM E1903-11– Phase II Environmental Site Assessment.
- 15. ASTM E1918-06 Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field
- 16. ASTM E1980-11 Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces
- 17. ASTM/BIFMA Standard Method M7.1-2011 (R2016), Standard Test Method for Determining Emissions from Office Furniture Systems, Components and Seating – Furniture evaluation standard for VOC emissions
- 18. ATSM/BIFMA e3-2014e Furniture Sustainability Standard Section 7.6.1 and 7.6.2 VOC emission limits for office furniture, components and seating
- 19. California Air Resources Board (CARB) Airborne Toxic Measure to Reduce Formaldehyde Emissions from Composite Wood Products Regulation
- 20. CARB Suggested Control Measure for Architectural Coatings, 2007
- 21. California Title 24-2013, Part 6 Building Energy Efficiency Standards
- 22. California Dept. of Public Health Standard Method v1.2-2017, Standard Method for The Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers
- 23. (The) Carbon Trust Good Practice Guide (GPG) 237, Natural Ventilation in Non-Domestic Buildings, A Guide for Designers, Developers, and Owners, 1998

- 24. CIBSE Chartered Institute of Building Services Engineers Applications Manual 10, Natural Ventilation in Non-Domestic Buildings, 2005
- 25. CRI Carpet and Rug Institute Green Label and Green Label Plus Testing Program
- 26. IgCC/ASHRAE 189.1 Cooling Tower & Evaporative Condenser Requirements
- 27. EN 717-1: 2014 Wood-based Panels Determination of Formaldehyde Release Formaldehyde Emission by the Chamber Method
- 28. EN 15804 Sustainability of Construction Works, Environmental Product Declarations, Core Rules for the Product Category of Construction Products
- 29. EPA ENERGY STAR Qualified Products
- 30. EPA Construction General Permit (CGP): 2012
- 31. EPA Brownfields Definition Sustainable Redevelopment of Brownfields Program
- 32. EPA Clean Air Act, Title VI, Section 608, Compliance with the Section 608 Refrigerant Recycling Rule
- 33. EPA Energy Policy Act (EPAct) of 1992 (and as amended), Fixture Flow Requirements
- 34. EPA Energy Policy Act (EPAct) of 2005, Fixture Flow Requirements
- 35. EPA Energy Star Roofing Guidelines
- 36. EPA 832-R-92-005 Storm Water Management for Construction Activities, Chapter 3
- 37. EPA 840-B-92-002, Jan 1993 Guidance Specifying Management Measures for Sources of Non-Point Pollution in Coastal Waters
- 38. EPA PB90200288 Compendium of Methods for the Determination of Air Pollutants in Indoor Air
- 39. EPA 763-E-C-40-CFR Asbestos Remediation Testing
- 40. EPA TSCA Title VI The Formaldehyde Standards for Composite Wood Products
- 41. FEMA 100-Year Flood Definition
- 42. FSC Forest Stewardship Council's Principles and Criteria
- 43. Greenguard Certification Program Greenguard Environmental Institute
- 44. IAPMO/ ANSI UPC 1-2006 Uniform Plumbing Code 2006 Section 402.0 Water-Conserving Fixtures and fittings, effective 2006
- 45. ICC International Plumbing Code 2006, Section 604, Design of Building Water Distribution System, effective 2006
- 46. ISO 14025 Environmental Labels and Declarations Type III Environmental Declarations Principles and Procedures
- 47. ISO 14044 Environmental Management Life Cycle Assessment Requirements and Guidelines

- ISO 14071 Environmental Management Life Cycle Assessment Critical Review Processes and Reviewer Competencies: Additional Requirements and Guidelines to ISO 14044: 2006
- 49. ISO 21930 Sustainability in Buildings and Civil Engineering Works Core Rules for Environmental Product Declarations of Construction Products and Services
- 50. South Coast Air Quality Management District (SCAQMD) Rule #1113 VOC Limits for Architectural Coatings, effective February 5, 2016
- 51. SCAQMD Amendment to South Coast Rule #1168 VOC Limits for Adhesives, Sealant and Sealant Primers, effective October 6, 2017
- 52. SMACNA/ANSI 008-2008 IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007
- 53. USGBC LEED Version 4 BD+C Reference Guide
- 54. USGBC LEED v4.1 BD+C Beta Guide
- C. Definitions
 - 1. Brownfield: U.S. EPA Definition of Brownfields With certain legal exclusions and additions, brownfield site means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.
 - 2. Chain-of-Custody (CoC): A tracking procedure to document the status of a wood product from the point of harvest or extraction to the ultimate end use. A "vendor" is defined as the company that supplies wood products to project contractors or subcontractors for on-site installation.
 - 3. Chain-of-custody certification: Awarded to companies that produce, sell, promote, or trade forest products after audits verify proper accounting of material flows and proper use of the Forest Stewardship Council name and logo. The CoC certificate number is listed on invoices for non-labeled products to document that an entity has followed FSC guidelines for product accounting.
 - 4. Chlorofluorocarbons (CFCs): Hydrocarbons that deplete the stratospheric ozone layer.
 - 5. Composite wood: Consists of wood or plant particles or fibers bonded by a synthetic resin or binder. Examples include particleboard, medium-density fiberboard (MDF), plywood, oriented-strand board (OSB), wheatboard, strawboard, and structural composite wood.
 - 6. Environmental Product Declaration (EPD): A statement that the product meets the environmental requirements of ISO 14025, and EN 15804 or ISO 21930.
 - 7. Extended Producer Responsibility (EPR): Program implemented by a product manufacturer to accept its own and sometimes other manufacturers' products as postconsumer waste at the end of the products' useful life. Alternatively known as a manufacturer's take-back program.
 - 8. Forest Stewardship Council (FSC): An independent, non-governmental, not for profit organization established to promote the responsible management of the world's forests. FSC provides certifications to award forest managers who adopt environmentally and

socially responsible forest management practices and to companies that manufacture and sell products that directly support responsible forest management.

- 9. Formaldehyde Emissions Evaluation: Evaluation demonstrating that the product meets one of the following:
 - a. EPA TSCA Title VI or California Air Resources Board (CARB) ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins.
 - b. EPA TSCA Title VI or CARB ATCM formaldehyde requirements for no added formaldehyde resins (NAF).
 - c. Tested per EN 717-1:2014 for formaldehyde emissions and complies with emissions class E1.
 - d. Structural composite wood product made with moisture resistant adhesives meeting ASTM 2559, no surface treatments with added urea-formaldehyde resins or coatings, and certified according to one of the industry standards as described in the LEED v4.1 BD+C Beta Guide.
- 10. Furniture Emissions Evaluation: Evaluation demonstrating that new furniture and furnishing items are tested in accordance with ANSI/BIFMA Standard Method M7.1–2011 (R2016) and compliant with ANSI/BIFMA e3-2014e Furniture Sustainability Standard, Sections 7.6.1 or 7.6.2. Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use. Seating products must be evaluated using the seating scenario. Classroom furniture must be evaluated using the standard school classroom scenario. Other products must be evaluated using the open plan or private office scenario, as appropriate. Statements of product compliance must include the exposure scenario(s). Organizations that certify manufacturers' claims must be accredited under ISO Guide 17065.
- 11. Health Product Declaration (HPD): Products with a published and complete HPD with full disclosure of known hazards and residuals disclosure at no less stringent than 1,000 parts per millions (ppm), in compliance with the Health Product Declaration Open Standard as maintained by the Health Product Declaration Collaborative (www.hpd-collaborative.org).
- 12. Hydrochlorofluorocarbons (HCFCs): Refrigerants used in building equipment that deplete the stratospheric ozone layer, but to a lesser extent than CFCs.
- 13. Inherently Non-emitting Materials: Naturally occurring materials and products made from inorganic materials that emit either very low or no VOCs. Products that are inherently nonemitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring) are considered fully compliant with the Low-Emitting Materials credit without any VOC emissions testing, if they do not include integral organic based surface coatings, binders, or sealants.
- 14. Life Cycle Assessment (LCA): An evaluation of the environmental effects of a product from cradle (resource extraction) to grave (product disposal), as defined by ISO 14040–2006 and ISO 14044–2006.
- 15. Low-Emitting Materials (LEM) Product Categories: flooring; composite wood; ceilings; wall panels; insulation; field-applied adhesives and sealants; field-applied paints and coatings; and furniture products.

- 16. Material Cost: For the purposes of LEED calculations and tracking, the dollar value of a product furnished for the Project including the cost of materials, shop labor, Contractor markups, taxes, fees, delivery costs, and all expenses incurred by the Contractor to bring the product to the Project site. Material cost excludes any cost for site labor and site equipment required for installation on the Project site.
- 17. Point of Harvest/Extraction/Recovery: Location where raw material is gathered for use in production.
- 18. Point of Manufacturing: Location where individual components are assembled into a product that is furnished and installed on site.
- 19. Point of Purchase: Location of the purchase transaction for a product. For online or other transactions that do not occur in person, the point of purchase is considered the location of product distribution.
- 20. Pre-Consumer Recycled Content: Defined as material diverted from the waste stream during the manufacturing process. Examples in this category include planer shavings, plytrim, sawdust, chips, bagasse, sunflower seed hulls, walnut shells, culls, trimmed materials, print overruns, over-issue publications, and obsolete inventories. Excluded is 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. (Previously referred to as Post-industrial Content.)
- 21. Post-Consumer Waste: 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. This includes returns of materials from the distribution chain. Examples of this category include construction and demolition debris, materials collected through curbside and drop-off recycling programs, broken pallets, discarded products (e.g., furniture, cabinetry and decking) and urban maintenance waste (e.g., leaves, grass clippings, tree trimmings, etc.).
- 22. Solar Reflectance (SR): the fraction of solar energy that is reflected by a surface on a scale of 0 to 1. It is defined so that a standard black has a solar reflectance of 0 and a standard white has a solar reflectance of 1.
- 23. Solar Reflectance Index (SRI): A measure of a material's ability to reject solar heat, as shown by a small temperature rise. It is defined so that a standard black (reflectance 0.05, emittance 0.9) has a SRI of 0, and a standard white (reflectance 0.80, emittance 0.90) has a SRI of 100.
- 24. Vendor: A Vendor of certified wood is the organization that sells/supplies wood products to contractors or subcontractors. A vendor must have a FSC Chain of Custody (CoC) certificate if it is selling FSC-certified products for which its packaging or form will be modified and/or products that are not individually labeled; this includes most lumber.
- 25. Volatile Organic Compounds (VOCs): Carbon-containing compounds that participate in atmospheric photochemical reactions (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonates, and ammonium carbonate). The compounds vaporize (become a gas) at normal room temperatures.
- 26. VOC Emissions Evaluation: Evaluation demonstrating that the product has been tested according to California Department of Public Health (CDPH) Standard Method v1.2–2017 and complies with the VOC limits in Table 4-1 of the method. Additionally, the range of total VOCs after 14 days (336 hours) was measured as specified in the CDPH Standard Method

v1.2 and is reported (TVOC ranges: 0.5 mg/m3 or less, between 0.5 and 5 mg/m3, or 5 mg/m3 or more). Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use. Products used in school classrooms must be evaluated using the classroom scenario, products used in other spaces must be evaluated using the default private office scenario. The statement of product compliance must include the exposure scenario(s) used, the amount of wet-applied product applied in mass per surface area (if applicable), the range of total VOCs, and follow guidelines in CDPH Standard Method v1.2-2017, Section 8. Organizations that certify manufacturers' claims must be accredited under ISO Guide 17065.

27. Total Volatile Organic Compounds (TVOCs): Sum of the concentrations of all identified and unidentified VOCs between and including n-pentane through n-heptadecane (i.e., C₅ - C₁₇) as measured by the gas chromatography/mass spectrometry (GC/MS) total ion-current chromatogram (TIC) method and expressed as a toluene equivalent value.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Respond to questions and requests from Architect and Sustainability/LEED Consultant regarding LEED credits that are the responsibility of the Contractor, that depend on product selection or product qualities, or that depend on Contractor's procedures until the GBCI has made its final determination on the project's LEED certification application. Document responses as informational submittals.

1.6 SUBMITTALS

- A. General Requirements:
 - 1. Submit additional LEED submittals required by other Specification Sections.
- B. LEED Product Submittals
 - 1. Projects seeking LEED certification must track and record product, material, and cost information for LEED credit documentation. The contractor shall complete and submit the LEED v4 Materials Reporting Form with product submittals for the following:
 - a. All permanently installed products and materials related to the work of any Section installed on the interior of the building (i.e. inside the weatherproofing membrane) and falling within one of the applicable LEM Product Categories.
 - b. All permanently installed products and materials specified in CSI MasterFormat 2012 Edition Divisions 03-12, 31 (Sections relating to Foundations), and 32 (Sections relating to Pavings, Site Improvements, and Planting).
 - 2. For each building product and material listed on the Materials Reporting Form, provide information and support documentation for the product as defined in this Section to support all environmental claims listed in the Materials Reporting Form. Submittal requirements for the support documentation can be found in the "LEED Credit-Specific Submittal" paragraph of this Section.
 - 3. A sample Materials Reporting Form for this project has been included in the Appendix of this Section.

- C. LEED Credit-Specific Submittals
 - 1. General
 - a. For detailed explanation of credit requirements, refer to LEED v4 BD+C Reference Guide and LEED v4.1 BD+C Beta Guide.
 - b. For MR Credits 2, 3, and 4 Building Product Disclosure and Optimization (BPDO) listed below:
 - Submittals apply to permanently installed products and materials specified in CSI MasterFormat 2012 Edition Divisions 3-12, 31 (Sections relating to Foundations), and 32 (Sections relating to Pavings, Site Improvements, and Planting).
 - 2) Submit the following for any regionally sourced products that have raw materials extracted, are manufactured (including distribution), and are purchased within 100 miles of the Project site, provide cut sheet or a written affidavit from the manufacturer indicating:
 - a) The Point of Purchase (location of purchase transaction). If purchased online or not in-person, Point of Purchase is considered the location of product distribution.
 - b) Breakdown of product component materials which are extracted, manufactured, and purchased within 100 miles of the project site and the material percentage of each component by weight.
 - c) The distance in miles from the Points of raw material extraction, product manufacturing, and purchasing/distribution to the Project site location, measured as the most direct route between points.
 - c. For EQ Credit 2 Low-Emitting Materials, submittals apply to permanently installed products and materials related to the work of any Section on the interior of the building (i.e. inside the weatherproofing membrane) and falling within one of the applicable LEM Product Categories.
 - 2. SS Prerequisite 1 Construction Activity Pollution Prevention: The Contractor shall implement and document the Project Erosion and Sedimentation Control (ESC) Plan for construction activities associated with the project.
 - a. The documentation shall consist of one or more of the following measures, as determined by the Owner and Architect.
 - 1) The Contractor shall declare the occurrence of periodic inspections throughout the construction process and provide documentation and reporting that the Erosion and Sedimentation Control Plan was executed appropriately. The documentation must include the following:
 - a) Documentation of sample dates.

- b) Inspection frequency, which shall occur a minimum of once per month.
- c) Minimum of three (3) inspections equally spaced over the duration of site work.
- d) Detailed descriptions of corrective actions taken.
- 2) The Contractor shall provide date-stamped photos which shall document the implemented measures prescribed by the Erosion and Sedimentation Control Plan and document corrective actions taken during construction.
- 3) The Contractor shall provide a narrative describing the measures taken to implement the Erosion and Sedimentation Control Plan.
- 3. SS Credit 5 Heat Island Reduction: submit the following documentation:
 - a. For roofing materials, submit cut sheets indicating three-year aged Solar Reflectance Index (SRI) values. Initial SRI values are acceptable only if three-year aged SRI values are not available.
 - b. For hardscape materials, submit cut sheets indicating three-year aged Solar Reflectance (SR) values. Initial SR values are acceptable only if three-year aged SRI values are not available.
- 4. WE Prerequisite 2 and Credit 2 Indoor Water Use Reduction: for plumbing fixtures, submit cut sheets with water consumption flow or flush rates highlighted.
- 5. WE Prerequisite 1 and Credit 1 Outdoor Water Use Reduction: submit cut sheets for components of the landscape irrigation system (if applicable) indicating water saving efficiency.
- 6. MR Prerequisite 2 Construction and Demolition Waste Management Planning: For submittal requirements, refer to Section 017419 Construction and Demolition Waste Management.
- 7. MR Credit 2 BPDO Environmental Product Declarations (EPD): submit the following documentation, as described in the LEED v4.1 BD+C Beta Guide.
 - a. Credit Option 1 (EPD): submit at least one of the following for each applicable product:
 - 1) Life-cycle assessment: manufacturer's publicly available, critically reviewed product-specific life-cycle assessment (LCA) conforming to ISO 14044 and that has at least a cradle to gate scope.
 - 2) Product-specific Type III EPD Internally Reviewed: manufacturer's internally reviewed product-specific LCA in accordance with ISO 14071, and productspecific internal EPD conforming to ISO 14025, and EN 15804 or ISO 21930 and that has at least a cradle to gate scope.
 - 3) Industry-wide Type III EPD Externally Reviewed: externally reviewed industry-wide Type III EPD conforming to ISO 14025, and EN 15804 or ISO 21930 and that has at least a cradle to gate scope and recognizes the manufacturer as a participant by the program operator.

- 4) Product-specific Type III EPD Externally Reviewed: externally reviewed product-specific Type III EPD conforming to ISO 14025 and EN 15804 or ISO 21930 and that has at least a cradle to gate scope.
- b. Credit Option 2 (Multi-Attribute Optimization): submit at least one of the following for each applicable product:
 - 1) Life Cycle Impact Reduction Action Plan: manufacturer's publicly available plan to mitigate or reduce product life cycle impacts identified in product-specific LCA using EN 15804 or ISO 21930.
 - 2) Life Cycle Impact Reductions in Embodied Carbon Comparative Analysis: two iterations of the manufacturer's third-party verified LCA or EPD (for the same product or product type) in accordance with MR Credit 2 Option 1 requirements above, and manufacturer's publicly available narrative, demonstrating the required environmental impact reductions in global warming potential.
- 8. MR Credit 3 BPDO Sourcing of Raw Materials: submit the following documentation as described in the LEED v4.1 BD+C Beta Guide, as applicable.
 - a. For products purchased from a manufacturer (producer) that participates in an extended producer responsibility (i.e., take-back) program, provide company brochure or similar describing the program, including contact information and verification that the product is included in the program.
 - b. For products containing bio-based materials, provide documentation from the rawmaterial manufacturer stating conformance to testing per ASTM Method D6866 and legal harvesting, as defined by the exporting and receiving country. If available, provide documentation from the raw-material manufacturer stating conformance to the Sustainable Agricultural Network's Sustainable Agricultural (SANSA) Standard in the form of a signed letter on company letterhead.
 - c. For products that are salvaged, refurbished, or reused, provide statement of source of materials, including statement of costs. The cost of reused or reclaimed materials is either the actual cost paid or the replacement value, whichever is higher. Replacement cost is determined by pricing comparable materials in the local market, excluding labor and shipping, and shall reflect any price discounts if applicable.
 - d. For products containing recycled content, provide product cut sheet or a written affidavit on company letterhead (email is not acceptable) from the manufacturer indicating the percentages, by material weight, of post-consumer and pre-consumer recycled content.
 - e. For permanently installed non-recycled wood and wood-based material, submit the following:
 - Forest Stewardship Council's Chain of Custody (CoC) Certification Number for each installed certified wood product, declaring conformance with FSC Guidelines for certified wood. CoC numbers shall be obtained from the manufacturer and must be itemized on a line-item basis. When applicable, a CoC number is required by the source forest, transportation entity, supplier/manufacturer, and vendors of the material.

- 2) Vendor invoices, including all FSC-certified and non FSC-certified wood products purchased. Vendors are defined as those companies that sell products to the project contractor or subcontractors for installation on the Project site. Invoices must include:
 - a) Itemization of each wood product identified as such on a line item basis.
 - b) FSC products identified as such on a line-item basis and must be identified as "FSC Pure, FSC Mixed Credit", or "FSC Mixed [NN] %".
 - c) The dollar value of each line item.
 - d) iv. The vendor's chain-of-custody (CoC) number must be shown on any invoice that includes FSC products.
 - e) If it is impractical for a vendor to invoice wood products on a line-item basis because the invoice would be excessive in length, the invoice should indicate the aggregate value of wood products sold by the vendor.
- 9. MR Credit 4 BPDO Material Ingredients: submit the following documentation, as described in the LEED v4.1 BD+C Beta Guide.
 - a. Credit Option 1 (Material Ingredient Reporting): Submit at least one of the following demonstrating a chemical inventory of the product to at least 0.1% (1000 ppm) for each applicable product:
 - 1) Manufacturer's publicly available ingredient inventory
 - 2) Health Product Declaration (HPD)
 - 3) Cradle to Cradle Material Health Certificate
 - 4) Cradle to Cradle certificate (minimum v3 with Material Health achievement level at the Bronze level or higher)
 - 5) Declare product label
 - 6) ANSI/BIFMA e3 Furniture Sustainability Standard
 - 7) UL Product Lens certificate
 - 8) Facts NSF/ANSI 336: Sustainability Assessment for Commercial Furnishings Fabric
 - b. Credit Option 2 (Material Ingredient Optimization): Submit at least one of the following for each applicable product:
 - 1) Material ingredient screening and optimization action plan for optimizing chemical inventory reported under MR Credit 4 Option 1.
 - Third-party verified manufacturer's publicly available ingredient inventory or HPD demonstrating the product's chemical inventory to at least 0.01% (100 ppm), showing compliance with at least one of the following:
 - a) No GreenScreen LT-1 hazards or GHS Category 1 hazards.

- b) At least 75% by weight of the product is assessed using GreenScreen Benchmark assessment, with the remaining percentage inventoried.
- 3) Third-party verified Declare label designated as Red List Free.
- 4) Cradle to Cradle Material Health Certificate
- 5) Cradle to Cradle certificate (minimum v3 with Material Health Achievement level at the Silver level or higher)
- 10. MR Credit 5 Construction and Demolition Waste Management: For submittal requirements, refer to Section 017419 Construction and Demolition Waste Management.
- 11. EQ Credit 2 Low-Emitting Materials: submit the following documentation, as applicable and as described in the LEED v4.1 BD+C Beta Guide.
 - a. For composite wood products, including but not limited to particleboard, medium density fiberboard, plywood, and structural composite wood, submit a cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with Formaldehyde Emissions Evaluation, as defined in this Section.
 - b. For interior flooring products, including but not limited to carpet, resilient flooring, engineered wood, and mineral-based tile, submit a cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with VOC Emissions Evaluation or inherently non-emitting sources criteria for each installed product or system.
 - c. For wet-applied, field-installed interior products including adhesives, sealants, paints, and coatings, submit the following:
 - 1) Material Data Safety Sheet (MSDS) or product data sheets highlighting VOC content measured in grams per liter (g/L) less water and exempt solvents.
 - 2) A cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with VOC Emissions Evaluation.
 - d. For interior ceiling assemblies, including but not limited to ceiling panels, ceiling tile, surface ceiling structures such as gypsum or plaster, suspended systems (including canopies and clouds), and glazed skylights, submit a cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with VOC Emissions Evaluation or inherently non-emitting sources criteria for each installed product or system.
 - e. For wall panels, including but not limited to finish wall treatments, surface wall structures such as gypsum or plaster, cubicle/curtain/partition walls, trim, doors, frames, windows, and window treatments, submit a cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with VOC Emissions Evaluation or inherently non-emitting sources criteria for each installed product or system.
 - f. For insulation, including but not limited to thermal and acoustic boards, batts, rolls, blankets, sound attention fire blankets, foamed-in place, loose-fill, blown, and sprayed insulation, submit a cut sheet, approved third-party certification, test report,

or written affidavit from the manufacturer demonstrating compliance with VOC Emissions Evaluation for each installed product or system.

- g. For interior furniture and furnishings, submit a cut sheet, approved third-party certification, test report, or written affidavit from the manufacturer demonstrating compliance with Furniture Emissions Evaluation, including testing per ANSI/BIFMA Standard Method M7.1-2011 (R2016) and compliance with ANSI/BIFMA e3-2014e Furniture Sustainability Standard, Sections 7.6.1 or 7.6.2, or inherently non-emitting sources criteria.
- 12. EQ Credit 3 Construction Indoor Air Quality Management Plan: For submittal requirements, refer to Section 018119 Construction Indoor Air Quality Requirements.
- 13. EQ Credit 4 Indoor Air Quality Assessment: For submittal requirements, refer to Section 018119 Construction Indoor Air Quality Requirements.
- ID Credit 1 Verified Construction and Demolition Rates: For submittal requirements, refer to Section 017419 - Construction and Demolition Waste Management. LEED intent and requirements also available for reference at <u>https://www.usgbc.org/credits/newconstruction-core-and-shell-schools-new-construction-retail-new-constructioncommercia-3.
 </u>
- D. LEED Materials Tracking Submittals
 - 1. The Contractor shall complete a LEED v4/v4.1 Building Product Disclosure + Optimization (BPDO) Calculator for products in CSI MasterFormat 2012 Edition Divisions 03-12, 31 (Sections relating to Foundations), and 32 (Sections relating to Paving, Site Improvements, and Planting) according to the following schedule and requirements:
 - a. The LEED v4 BPDO Calculator is available for download at <u>http://www.usgbc.org/resources/bpdo-calculator</u>.
 - b. At the commencement of construction, submit a BPDO Calculator with preliminary materials cost information and the anticipated submittal log.
 - c. On a monthly basis during construction, update and submit the BPDO Calculator with actual product data and cost information from approved LEED Product Submittals.
 - d. At substantial completion, submit a final and complete BPDO Calculator with required product data and cost data.
 - 2. The Contractor shall complete a LEED v4/4.1 Low-Emitting Materials Calculator for permanently installed interior products related to the work of any Section, for the applicable LEM Product Categories.
 - a. The LEED v4 Low-Emitting Materials Calculator is available for download at http://www.usgbc.org/resouces/low-emitting-materials-calculator.
 - b. On a monthly basis during construction, update and submit the Low-Emitting Materials Calculator with actual product data from approved LEED Product Submittals
 - c. At substantial completion, submit a final and complete Low-Emitting Materials Calculator with required product data.

- 3. The Contractor shall consider using established LEED management software, such GreenBadger and/or GreenHalo.
- E. LEED Submission Documentation:
 - 1. At or before substantial completion, the Contractor shall prepare supporting documentation for each LEED construction prerequisite and credit to be attempted, which have been assigned to the Contractor by the Owner or Architect.
 - a. Sustainability/LEED Consultant shall prepare and distribute a LEED v4/4.1 Documentation Matrix to the Contractor. The LEED v4/4.1 Documentation Matrix illustrates the deliverables required to adequately record that the project has met the intent of each credit.
 - b. Contractor shall register and log-in to LEED Online (http://www.leedonline.com).
 - c. Contractor shall complete LEED Online credit forms and upload associated required backup documentation for all the credits assigned in LEED v4/4.1 Documentation Matrix.
 - The LEED Online credit forms shall contain all proper data fields completed declaring that the project has met the intent of the credit, including narrative(s) when applicable. Provide electronic signature of Contractor and date signed, where required.
 - 2) For credits requiring product data, compile all LEED product data into one package per credit. Irrelevant product data shall be excluded from the backup documentation.
 - d. The contractor shall notify sustainability/LEED Consultant of completion of LEED Online documentation and availability for review and coordinate with sustainability/LEED Consultant for preparation of final documentation of LEED submission.

1.7 QUALITY ASSURANCE

- A. The Contractor shall retain a dedicated Sustainability Representative to oversee all on-site activities related to compliance with LEED criteria. The Sustainability Representative shall, at minimum:
 - 1. Be a LEED Green Associate.
 - 2. Be assigned to manage on-site construction administration of the Project's Sustainable Design Requirements, including but not limited to, Erosion and Sedimentation Control, Construction and Demolition Waste Management, indoor air quality, and material tracking.
 - 3. Take primary responsibility for managing the process of implementing and documenting the construction-related LEED prerequisites and credits for which the Contractor will be responsible, including collecting, organizing, and uploading the documentation required for the Project's LEED submission to LEED Online.
 - 4. Preference for staff with experience on LEED v4/ v4.1 projects.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections may specify some requirements that contribute to LEED credits, the Contractor shall determine additional materials and procedures necessary to obtain LEED credits indicated.
- B. LEED Performance Criteria: Products and Materials shall meet the following project-wide criteria as well as applicable product-specific criteria in Part 2 of this Section.
 - 1. MR Credit 2 BPDO EPD, Option 1 (EPD):
 - Install at least twenty (20) different permanently installed products sourced from at least five (5) different manufacturers that meet criteria described in the LEED v4.1 BD+C Beta Guide.
 - b. For a list of specific products that have been identified as contributing towards this credit, refer to the Targeted BPDO Product Table in the Appendix of this Section.
 - 2. MR Credit 2 BPDO EPD, Option 2 (Multi-Attribute Optimization):
 - a. Use products that comply with credit criteria described in the LEED v4.1 BD+C Beta Guide for at least 10%, by cost, of the total value of permanently installed products in the Project, or use at least ten (10) different permanently installed products sourced from at least three (3) different manufacturers that meet credit criteria described in the LEED v4.1 BD+C Beta Guide.
 - b. For a list of specific products that have been identified as contributing towards this credit, refer to the Targeted BPDO Product Table in the Appendix of this Section.
 - 3. MR Credit 3 BPDO Sourcing of Raw Materials:
 - Install products that meet at least one (1) of the responsible extraction criterion described in the LEED v4.1 BD+C Beta Guide and in aggregate comprise at least 20 percent, by cost, of the total value of permanently installed building products in the Project.
 - 4. MR Credit 4 BPDO Material Ingredients, Option 1 (Material Ingredient Reporting):
 - Install at least twenty (20) different permanently installed products sourced from at least five (5) different manufacturers that meet criteria described in the LEED v4.1 BD+C Beta Guide.
 - b. For a list of specific products that have been identified as contributing towards this credit, refer to the Targeted BPDO Product Table in the Appendix of this Section.
 - 5. MR Credit 4 BPDO Material Ingredients, Option 2 (Material Ingredient Optimization):
 - a. Use permanently installed products from at least three (3) different manufacturers that document their material ingredient optimization in accordance with criteria described in the LEED v4.1 BD+C Beta Guide for at least ten (10) different permanently installed products or for products that constitute at least 10%, by cost, of the total value of permanently installed products in the Project.

- b. For a list of specific products that have been identified as contributing towards this credit, refer to the Targeted BPDO Product Table in the Appendix of this Section.
- 6. EQ Credit 2 Low-Emitting Materials: Install interior products that meet overall Project compliance levels, as listed below and described in the LEED v4.1 BD+C Beta Guide.
 - a. Wet-applied interior adhesives and sealants applied on site:
 - 1) 100 percent compliance for VOC Content Evaluation for adhesives and sealants.
 - 2) Minimum 75 percent compliance (by volume or surface area) for VOC Emissions Evaluation.
 - b. Wet-applied interior paints and architectural coatings applied on site:
 - 1) 100 percent compliance for VOC Content Evaluation for paints and coatings.
 - 2) Minimum 75 percent compliance (by volume or surface area) for VOC Emissions Evaluation.
 - c. Interior flooring products: minimum 90 percent compliance (by cost or surface area) for VOC Emissions Evaluation or inherently non-emitting sources criteria.
 - d. Interior composite wood products: minimum 75 percent compliance (by cost or surface area) for Formaldehyde Emissions Evaluation.
 - e. Interior ceiling assemblies: minimum 90 percent compliance (by cost or surface area) for VOC Emissions Evaluation or inherently non-emitting sources criteria.
 - f. Interior wall panels: minimum 75 percent compliance (by cost or surface area) for VOC Emissions Evaluation or inherently non-emitting sources criteria.
 - g. Interior insulation: minimum 75 percent compliance for VOC emissions evaluation.
 - h. Interior furniture and furnishings installed at time of Project occupancy: minimum 75 percent compliance (by cost) for Furniture Emissions Evaluation or inherently non-emitting sources criteria.

2.2 ADHESIVES AND SEALANTS

- A. Wet-applied adhesives and sealants installed in the building interior (i.e. inside of the weatherproofing membrane) must comply with the following:
 - 1. VOC Emissions Evaluation, as defined in this Section.
 - 2. VOC Content Evaluation for adhesives and sealants, as defined below:
 - a. Methylene chloride (CAS # 75-09-2) and perchloroethylene (CAS # 127-18-4) may not be intentionally added ingredients.
 - b. Chemical content requirements and maximum VOC content limits established by SCAQMD Rule #1168, October 6, 2017 Amendment and listed in the Appendix of this Section.

- 1) VOC limits are defined in grams per liter, less water and less exempt compounds unless otherwise noted.
- 2) VOC contents are determined by the methods of EPA Reference Test Method 24.

2.3 PAINTS AND COATINGS

- A. Wet-applied paints and coatings installed in the building interior (i.e. inside of the weatherproofing membrane) must comply with the following:
 - 1. VOC Emissions Evaluation, as defined in this Section.
 - 2. VOC Content Evaluation for paints and coatings, as defined below:
 - a. Methylene chloride (CAS # 75-09-2) and perchloroethylene (CAS # 127-18-4) may not be intentionally added ingredients.
 - b. Maximum VOC content limits established by California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule #1113, February 5, 2016 Amendment and listed in the Appendix of this Section.
 - 1) VOC limits are defined in grams per liter, less water and less exempt compounds unless otherwise noted.
 - 2) VOC contents are determined by the methods of EPA Reference Test Method 24.

2.4 FLOORING SYSTEMS

- A. Carpet systems or assemblies: must meet VOC Emissions Evaluation requirements as defined in this Section.
 - 1. Carpet adhesives must meet the product requirements for Adhesives, as defined in this Section.
- B. Hard and soft surface flooring, wall base, underlayments, and other floor coverings:
 - 1. Flooring products must meet VOC Emissions Evaluation requirements, as defined in this Section. Products which qualify as Inherently Non-emitting Material, as defined in this Section, are exempt from this requirement.
 - 2. Associated site-applied adhesives, grouts, epoxies, mortars, finishes and sealers must meet applicable requirements for Adhesives, Sealants, or Coatings, as defined in this Section.
- C. Site-applied concrete, wood, bamboo and cork floor finishes such as sealer, stain and finish: must meet applicable requirements for Adhesives, Sealants, or Coatings, as defined in this Section.
- D. Tile setting adhesives and grout: must meet applicable requirements for Adhesives, Sealants, or Coatings, as defined in this Section.

2.5 CEILING SYSTEMS

A. Ceiling systems such as ceiling panels, ceiling tile, surface ceiling structures such as gypsum or plaster, suspended systems (including canopies and clouds), and glazed skylights, must meet VOC Emissions Evaluation requirements as defined in this Section.

2.6 WALL PANELS

A. Wall panels such as finish wall treatments (wall coverings, wall paneling, wall tile), surface wall structures such as gypsum or plaster, cubicle/curtain/partition walls, trim, doors, frame, windows, and window treatments, must meet VOC Emissions Evaluation requirements as defined in this Section.

2.7 INSULATION

A. Insulation such as thermal and acoustic boards, batts, rolls, blankets, sound attention fire blankets, foamed-in place, loose-fill and sprayed insulation must meet VOC Emissions Evaluation requirements as defined in this Section.

2.8 WOOD AND WOOD PRODUCTS

- A. New, non-recycled wood and wood-based materials shall be certified in accordance with Forest Stewardship Council (FSC) Guidelines. This includes wood permanently installed in the project but is not limited to structural framing and dimensional lumber, blocking, flooring, finished woodwork, millwork, casework, and non-rented temporary construction applications including bracing, concrete form work, and pedestrian barriers.
- B. No partial claims shall be made for products that contain FSC certified wood but are not sold with a FSC claim. A product that contains a mix of FSC-certified components with non-certified components is not considered a FSC Mixed product in an assembly and is not eligible to receive credit for the certified portion. The product shall only contribute to the MR LEED credit if the product complies with FSC Chain-of-Custody rules for Mixed products and the invoice carries a valid FSC claim and chain of custody number.
- C. Contractors and subcontractors that temporarily possess FSC-certified material prior to installation shall not mix FSC-certified material with non-FSC-certified material.
- D. Chain of Custody (CoC) Requirements:
 - 1. Transportation entities shall require a CoC when the transport to the next entity involves a change of ownership of the material or product. Shippers or transport companies handling goods owned by FSC CoC certified companies are exempt.
 - 2. Each wood products supplier and/or manufacturer that invoices FSC-certified wood products to a vendor must be certified by an FSC-accredited certifier.
 - 3. Each wood products vendor that invoices FSC-certified wood products to product contractors and subcontractors must be certified by an FSC-accredited certifier.

- 4. Parties that manufacture FSC-certified wood products off-site and then install them on-site must be FSC CoC certified for the products to contribute to LEED credit MRc7. This includes, but is not limited to, cabinetmakers and architectural millworkers.
- 5. Parties that do not manufacture, but install an FSC-certified product on the project site, do not require FSC Chain of Custody certification as long as they do not modify the product packaging or form except for the purposes of installation. This includes, but is not limited to, contractors, subcontractors, and furniture installers.
- 6. If a manufacturer places its FSC CoC label on product packaging used for individual sale (generally applying to fabricated products), then subsequent entities in the supply chain are not required to have CoC certification unless the product's packaging or form is changed before it reaches the end consumer.
- 7. For products that are not individually packaged for sale to be sold as FSC certified, the vendor to the consumer is required to have CoC certification. Contractors and subcontractors are considered the end consumers and may demonstrate with copies of invoices (if requested) the quantity purchased for the job and their suppliers' CoC numbers.

2.9 COMPOSITE WOOD PRODUCTS

A. Composite wood products such as particleboard, medium density fiberboard, hardwood veneer plywood, and structural composite wood shall comply with the Formaldehyde Emissions Evaluation, as defined in this Section.

2.10 FURNITURE AND FURNISHINGS

A. Furniture and furnishing items purchased and installed for the Project shall meet the Furniture Emissions Evaluation requirements as defined in this Section.

2.11 PLUMBING FIXTURES

- A. All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled.
- B. Plumbing fixtures scheduled in the Construction Documents have been specified to meet a calculated aggregate reduction in potable water consumption by thirty percent (30%) compared to a LEED v4 calculated baseline. Substitutions shall not be allowed if such changes compromise the required reduction.

2.12 APPLIANCES

- A. Appliances shall meet the following requirements:
 - 1. Residential dishwashers (standard and compact): Energy Star or performance equivalent
 - 2. Ice machines: Energy Star or performance equivalent and use either air-cooled or closedloop cooling, such as chilled or condenser water system
 - 3. Residential refrigerators: Energy Star or performance equivalent

PART 3 - EXECUTION

3.1 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

- A. For the following credits, comply with Section 017419 Construction and Demolition Waste Management:
 - 1. MR Prerequisite 2 Construction and Demolition Waste Management Planning
 - 2. MR Credit 5 Construction and Demolition Waste Management

3.2 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

- A. For the following credits, comply with Section 018119 Construction Indoor Air Quality Requirements:
 - 1. EQ Credit 3 Construction IAQ Management Plan
 - 2. EQ Credit 4 Indoor Air Quality Assessment

3.3 EROSION AND SEDIMENTATION CONTROL

- A. SS Prerequisite 1 Construction Activity Pollution Prevention: [Comply with Section 31 25 00 Erosion and Sedimentation Control.] Develop, implement and document the Project Erosion and Sedimentation Control (ESC) Plan.
 - a. The contractor shall be responsible for the development and implementation of the ESC Plan in compliance with the 2012 U.S. Environmental Protection Agency Construction General Permit (CGP) or more stringent local equivalent, which may include, but shall not be limited to the following:
 - 1) The prevention of soil loss from stormwater runoff and wind erosion, including the protection and stockpiling of topsoil for reuse.
 - 2) The prevention of sedimentation of storm sewers and receiving streams.
 - 3) The prevention of air pollution from dust and particulate matter.
 - b. The contractor shall be responsible for the documentation of the pollution prevention measures implemented during construction, per Submittal requirements of this Section.

3.4 LEED APPRAISAL

- A. The Contractor is responsible for ensuring compliance with LEED prerequisites and credits highlighted in **[yellow]** in the LEED Appraisal in the Appendix of this Section.
- B. Updates to the LEED Appraisal will be provided by the LEED consultant throughout construction.

- 3.5 APPENDICES
 - A. APPENDIX A-018113 VOC LIMITS
 - B. APPENDIX B-018113 LEED APPRAISAL
 - C. APPENDIX C-018113 LEED v4 MATERIALS REPORTING FORM
 - D. APPENDIX D-018113 TARGETED BPDO PRODUCT TABLE
 - E. APPENDIX E-018113 LEED BOUNDARY

END OF SECTION 018113

APPENDIX A-018113 – VOC LIMITS

Emissions evaluations are also required for these product categories.

Prod	uct Category	VOC Limit (g/L, less water and exempt compounds)		
Adhe	sives: Architectural Applications			
1.	Building envelope membrane adhesive	250		
2.	Indoor carpet adhesive	50		
3.	Carpet pad adhesive	50		
4.	Ceramic glass, porcelain, & stone tile adhesive	65		
5.	Cove base adhesive	50		
6.	Drywall and panel adhesive	50		
7.	Multipurpose construction adhesive	70		
8.	Single ply roof membrane adhesives	250		
9.	All other roof adhesives	250		
10.	Rubber floor adhesive	60		
11.	Structural glazing adhesive	100		
12.	Structural wood member adhesive	140		
13.	Sub-floor adhesive	50		
14.	VCT and asphalt tile adhesive	50		
15.	Wood flooring adhesive	100		
16.	All other indoor floor covering adhesives	50		
17.	All other outdoor floor covering adhesives	150		
Adhesives: Specialty Applications				
18.	Computer diskette manufacturing adhesive	350		
19.	Contact adhesive	80		
20.	Edge glue adhesive	250		
21.	PVC welding cement	510		
22.	CPVC welding cement	490		
23.	ABS welding cement	325		

24.	ABS to PVC transition cement	510
25.	All other plastic welding cements	250
26.	Rubber vulcanization adhesive	250
27.	Special purpose contact adhesive	250
28.	Thin metal laminating adhesive	780
29.	Tire tread adhesive	100
30.	Top and Trim Adhesive	250
31.	Waterproof resorcinol glue	250
32.	All other adhesives	250
Adhe	sives: Substrate Specific Applications	
33.	Metal to metal	30
34.	Plastic foams	50
35.	Porous material (except wood)	50
36.	Wood	30
37.	Fiberglass	80
38.	Reinforced plastic composite	250
Seala	ants	
39.	Clear, paintable, and immediately water-resistant sealant	250
40.	Foam insulation	250
41.	Foam sealant	250
42.	Grout	250
43.	Roadway sealant	250
44.	Non-staining plumbing putty	250
45.	Single Ply Roof Membrane	450
46.	All other roof sealants	300
47.	All other architectural sealants	250
48.	Marine Deck	760
49.	All other sealants	420
Adhe	esive Primer	
50.	Plastic	550
		1 1

51.	Pressure sensitive	250
52.	Traffic marking tape	150
53.	Vehicle glass	250
54.	All other adhesive primers	250
Seala	ant Primer	
55.	Architectural – Nonporous	250
56.	Architectural – Porous	775
57.	Modified Bituminous	500
58.	Marine Deck	760
59.	Other Sealant Primer	750
Paint	ts and Coatings	
60.	Basement specialty coatings	400
61.	Bond breakers	350
62.	Clear wood finishes - Varnish	275
63.	Clear wood finishes - Sanding sealers	275
64.	Clear wood finishes - Lacquer	275
65.	Colorant - Architectural coatings, excluding IM coatings	50
66.	Colorant - Solvent-based IM	600
67.	Colorant - Waterborne IM	50
68.	Concrete - Curing compounds	100
69.	Concrete - Curing compounds for roadways and bridges	350
70.	Concrete masonry sealers	100
71.	Concrete surface retarder	50
72.	Driveway sealer	50
73.	Dry-fog coatings	50
74.	Faux finishing coatings - Clear topcoat	100
75.	Faux finishing coatings - Decorative coatings	350
76.	Faux finishing coatings - Glazes	350
77.	Faux finishing coatings - Japan	350

78.	Faux finishing coatings - Trowel applied coatings	50
79.	Fire-proofing coatings	150
80.	Flats	50
81.	Floor coatings	50
82.	Form release compound	100
83.	Graphic arts (sign) coatings	200
84.	High temperature coatings	420
85.	Industrial maintenance coatings	100
86.	Industrial maintenance coatings – Color indicating safety coatings	480
87.	Industrial maintenance coatings - High temperature IM coatings	420
88.	Industrial maintenance coatings - Non-sacrificial anti-graffiti coatings	100
89.	Industrial maintenance coatings - Zinc-rich IM primers	100
90.	Magnesite cement coatings	450
91.	Mastic coatings	100
92.	Metallic pigmented coatings	150
93.	Multi-Color coatings	250
94.	Nonflat coatings	50
95.	Nonflat coatings – high gloss	150
96.	Pre-treatment wash primers	420
97.	Primers, sealers, and undercoaters	100
98.	Reactive penetrating sealers	350
99.	Recycled coatings	250
100.	Roof coatings	50
101.	Roof coatings, aluminum	100
102.	Roof coatings, bituminous	50
103.	Roof primers, bituminous	350
104.	Rust preventative coatings	100
105.	Sacrificial anti-graffiti coatings	50

106.	Shellac - Clear	730
107.	Shellac - Pigmented	550
108.	Specialty primers, sealers, and undercoaters	100
109.	Stains	100
110.	Stains, interior	250
111.	Stone consolidants	450
112.	Swimming pool coatings	340
113.	Traffic coatings	100
114.	Tub and tile refinish coatings	420
115.	Waterproofing membranes	250
116.	Waterproofing sealers	100
117.	Waterproofing concrete/masonry sealers	100
118.	Wood coatings	275
119.	Wood preservatives	350
120.	Zinc-rich primers	340
121.	Low solids coatings	120*

*measured in g/L of material

Se la	C	Ë	D v4 for BD+C: New Construction and Major Re	novation					
3 10	UNER	Proj	ect Checklist		Project	Name		City of Sunnyvale - City Hall	
					Date:			5/20/2020	
~	2 V	~							
-	_	Credit	Integrative Process	-					
12	2 2	2 Loca	tion and Transportation	16	9	~ V	lateria	s and Resources	13
		Credit	LEED for Neighborhood Development Location	16	>	1	ereq	Storage and Collection of Recyclables	Required
-		Credit	Sensitive Land Protection	-	<mark>≻</mark>	ę.	ereq	Construction and Demolition Waste Management Planning	Required
-	-	1 Credit	High Priority Site	2		ن م	edit	Building Life-Cycle Impact Reduction	5
4	-	Credit	Surrounding Density and Diverse Uses	5	2	5	edit	Building Product Disclosure and Optimization - Environmental Product Declarations V4 1	2
9	-	1 Credit	Access to Quality Transit (V4.1)	2 C	-	5	edit	Building Product Disclosure and Optimization - Sourcing of Raw Materials V4.1	2
-		Credit	Bicycle Facilities (V4.1)	-	-	<u>ک</u>	edit	Building Product Disclosure and Optimization - Material Ingredients V4.1	2
-		Credit	Reduced Parking Footprint	-	2	5	edit	Construction and Demolition Waste Management	2
-		Credit	Electric Vehicles (V4.1)	-					
		1		Ľ	13 2	-	loor	Environmental Quality	16
10	0	0 Sust	ainable Sites	10	7	Æ	bara	Minimum Indoor Air Quality Performance	Required
≻		Prereq	Construction Activity Pollution Prevention	equired	~	ď	ereq	Environmental Tobacco Smoke Control	Required
-		Credit	Site Assessment	-	2	5	edit	Enhanced Indoor Air Quality Strategies	2
2		Credit	Site Development - Protect or Restore Habitat	2	2 1	5	edit	Low-Emitting Materials	8
-		Credit	Open Space (V4.1)	-	-	δ	edit	Construction Indoor Air Quality Management Plan	-
e		Credit	Rainwater Management (V4.1)	e	-	ð	edit	Indoor Air Quality Assessment	2
2		Credit	Heat Island Reduction	2	-	ð	edit	Thermal Comfort	-
-		Credit	Light Pollution Reduction	-	2	õ	edit	Interior Lighting	2
					2	ر	edit	Daylight (V4.1)	3
4	0	7 Wate	er Efficiency	11	-	ð	edit	Quality Views	-
≻		Prereq	Outdoor Water Use Reduction	equired	-	δ	edit	Acoustic Performance	÷
≻		Prereq	Indoor Water Use Reduction	equired					
≻		Prered	Building-Level Water Metering	equired	60	0	novat	on	9
-	-	1 Credit	Outdoor Water Use Reduction	7	5	ō	edit	Innovation	5
2	4	4 Credit	Indoor Water Use Reduction	9	-	5	edit	LEED Accredited Professional	÷
	2	2 Credit	Cooling Tower Water Use (V4.1)	5					
-		Credit	Water Metering	-	3	8	egion	al Priority	4
					-	5	edit	Regional Priority: Optimize Energy Performance (10)	-
28	0	5 Enet	gy and Atmosphere	33	-	5	edit	Regional Priority: Indoor Water Use Reduction (40%) or Building LCI (3)	-
≻		Prereq	Fundamental Commissioning and Verification	equired	-	δ	edit	Regional Priority: Building Product Disclosure and Optimization - Raw Materials (1)	-
≻		Prereq	Minimum Energy Performance	equired	-	δ	edit	Regional Priority: Rainwater Management (3)	-
≻		Prereq	Building-Level Energy Metering	equired					
≻		Prered	Fundamental Refrigerant Management	equired	83 5	22 T	OTAL	Possible Points:	110
4	2	2 Credit	Enhanced Commissioning	9		Ö	ertified:	40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110	
18		Credit	Optimize Energy Performance	18					
-		Credit	Advanced Energy Metering	-		Innova	ition Po	nts:	
2		Credit	Grid Harmonization (V4.1)	2		с	Ac2 Ex	emplary Performance	
e		Credit	Renewable Energy Production	0		2 E	Ac5 Ex	smplary Performance	
	-	Credit	Enhanced Refrigerant Management	-		с С	urchasi	ng lamps (mercury free)	
	2	2 Credit	Green Power and Carbon Offsets	2		4 r	ilot Cre	itt: Daylight - non-regularly occupied spaces	
						5 B	ird Colli	sion Deterrence, OR Design for Active Occupants, OR Green Cleaning Poli	cy

APPENDIX B-018113 - LEED APPRAISAL

SmithGroup - 11244.00

LEED-NC v4 Materials Repor	ting Form appropriate product type and complete all fields as in claim. See page 2 for definitions and submittal required	dicated. Provide backup documentation for each environmental ements.
Submittal Number :	Product Name or Model # :	Total Material Cost (w/o site labor/equip) :
Submittal Name :	Manufacturer :	Location of Product : Interior Exterior
Subcontractor:	Manufacturer Contact:	Interative to weather produing internationality is product used in building structure or enclosure? Y
REQUIRED FOR ALL PRODUCTS - DIVS 3-12, 31,	32 REQUIRED FOR INTERIOR PRODUCTS - ALL DIVS	NOTES
1. MRc2 Environmental Product Declaration (EPD) 4. EQc2 Low-Emitting Materials	
Does the product have one of the documents listed below: v v	N ADHESIVES / SEALANTS / PAINTS / COATINGS	
b) 3rd Party Life Cycle Assessment (LCA)	Provide VOC content (grams/Liter):g/L	
2. MRc3 Sourcing of Raw Materials	Estimate installed volume (Liters):	
Does the product's manufacturer have a corporate sustainability report? $\gamma \square r$	General Emissions Evaluation available?: Y N	
Does the product meet one of the attributes below?	3 rd Party Certificate*	
a) Take-back program	N ☐ 7VOC range: <0.5 mg/m ³ ☐ 0.5-5.0 mg/m ³] >5.0 mg/m ³	
b) Bio-based materials	COMPOSITE WOOD PRONIECTS	
c) Materials reuse	-% Confirm CARB compliance with one of the following:	
d) FSC Certified Wood	% ULEF or NAF or CARB Exempt	
- COC#	EL CODINIC / CEILINICS / WALLS / INISII ATION DOOD ICTS	
e) Recycled content		
- Pre-consumer	7ype of documentation:	
- Post-consumer	_% 3 ^{ra} Party Certificate* or Testing Report	
f) Extraction, manufacture, and purchase $$Y \square 1$$ locations all within 100 miles?	N	
3. MRc4 Material Ingredients	OR, is the product inherently non-emitting? Y	
Does the product disclose material ingredients via one of the applicable programs below?	Furniture Products	
a) Manufacturer Inventory	Type of documentation:	
b) Health Product Declaration	N or Testing Report	
c) Cradle to Cradle Certificate	Contractor Certification:	
d) GreenScreen Assessment	N authorized represent	trative of hereby certify
e) REACH Optimization	N that the material information contained herein is an accurate represent components of the final building construction. Furthermore, 1 underst.	thation of the material qualifications to be provided by us, as and that any channe in such qualification during the purchasing
f) Declare Label	Period will require prior written approval from the Construction Manag	jer and Owner.
g) UL Product Lens	N Signature of Authorized Representative	Date:
atelier ten	* See the USGBC Low-Emitting Materials Thin https://	Party Certification table for acceptable 3rd party certifications and programs: www.usgbc.org/resources/low-emitting-materials-third-party-certification-table

APPENDIX C-018113 – LEED v4.1 MATERIALS REPORTING FORM (FOR REFERENCE ONLY)

Please complete this form for all permanently installed products within the Divisions noted below. Check boxes for the

APPENDIX D-018113 – TARGETED BPDO PRODUCT TABLE

The following tables include products that have been identified as contributing towards the LEED v4.1 Materials & Resources – Building Product Disclosure & Optimization (BPDO) credits listed below. Any product substitutions shall contribute equivalent credit value towards the LEED credits and meet all requirements for substituted products as outlined elsewhere in this specification.

MR Credit	BPDO – Environmental	Product Declarations, Option	1	
Spec Section	Manufacturer	Product Name	Documentation Type	Credit Value
	Sample: Product A	Manufacturer A	Product-specific EPD (Internally Verified)	1 product
	Sample: Product B	Manufacturer B	Industry-wide EPD (Externally Verified)	1 product

MR Credit BPDO – Environmental Product Declarations, Option 2							
Spec Section	Manufacturer	Product Name	GWP Reduction	Credit Value			
	Sample: Product A	Manufacturer A	>10%	1.5 product			
	Sample: Product B	Manufacturer B	>0%	1 product			

MR Credit BPDO – Material Ingredients, Option 1							
Spec Section	Manufacturer	Product Name	Documentation Type	Credit Value			
	Sample: Product A	Manufacturer A	Health Product Declaration	1 product			

Sample: Product B	Manufacturer B	Declare Label	1 product

MR Credit	MR Credit BPDO – Material Ingredients, Option 2							
Spec Section	Manufacturer	Product Name	Documentation Type	Credit Value				
	Sample: Product A	Manufacturer A	Material Ingredient Optimization: Health Product Declaration	1.5 product				
	Sample: Product B	Manufacturer B	Advanced Inventory: Declare Label	1 product				

APPENDIX E-018813 - LEED BOUNDARY

