

# Sustainability Plan

**Stack Infrastructure**  
**SVY03A**  
**26062 Eden Landing Road**  
**Hayward, CA**

**City of Hayward**

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## 1. Introduction

The property located at 26062 Eden Landing Road in Hayward, California, consists of three buildings and a premanufactured guardhouse. As part of the Permit application for the property, the site plan has been included to describe proposed sustainability measures, highlighting provisions which go above and beyond local and state requirements. The property and structures have been designed to incorporate many sustainability interventions which will reduce energy and water use. The property will align with CALGreen 2022 requirements including stringent Title 24 Energy Code compliance.

The functions of the three main buildings is as follows: Building A will house the main data center; Building B will house a smaller data center, and building C will be a security building, all with the same tenant. The sustainability plan will focus on two key sustainability categories; water and energy management, which reflect the primary environmental impact categories related to data center operations. The CALGreen 2022 Checklist can be found in Appendix A for reference.

In addition to measures reducing the water and energy impacts, the project has implemented multiple sustainability features across the site, including:

- Collection bins in the occupied office areas and a secured area on site to collect recyclables and organic waste to promote recycling and composting
- Electric vehicle charging at the buildings to promote the use of electric vehicles
- Short term and long-term bicycle parking is provided at the building for visitors and employees
- Low-emitting paint and materials to reduce VOC emissions exposure the building occupants
- Construction and demolition waste recycling to reduce disposal at landfills during the construction process
- Provisions for future PV panels to be installed on site, and...
- Public benefits package, which includes public amenities such as integration with a cycling path

## 2. Energy Management

The project is meeting the minimum energy efficiency standard per the California Energy Commission (CEC), Title 24 energy code. Energy code compliance for the interior fit-out for each building is expected to follow the requirements of CEC subchapter 5 section 140.1: Performance Approach: Energy Budgets. Energy models are under-going iterations based on project specifics and CEC requirements. All Mandatory requirements per CEC have been or will be incorporated into this design.

The project team is working through the core and shell energy efficiency requirements and will follow the performance path using energy modeling.

### 2.1 Adaptive Equipment

The building tenants will install variable frequency drives or soft starters on most equipment containing motor loads, regulating the electric motor to operate at less than maximum speed to reduce heat generation, voltage sag and energy consumption.

## 2.2 Efficient Lighting and Controls

The buildings at 26062 Eden Landing Road will have a lighting and controls systems that will consist of LED smart lighting fixtures with a rating of 80 CRI and equipped with integrated or remote sensors that can be remotely controlled to adjust light intensity and advanced lighting control system that can significantly reduce energy consumption up to 40% less energy compared to the traditional lighting control and fluorescent lighting systems.

## 2.3 Electronic Power management System

The building tenants will install an electronic power management system (EPMS), which is a high-end power monitoring system allowing end-users to see all the electrical usage of innumerable assets distributed across the buildings and provides detailed information about the flow of power to the buildings. The EPMS will be a system to assist and manage the operational environmental and optimize the HVAC and electrical system settings for the lowest functional energy usage.

## 2.4 Environmentally Conscious Roof Design

The buildings at 26062 Eden Landing Road are designed to have roof with solar-ready features. Providing tenants with solar-ready roofs providing the opportunity for increased renewable energy usage. In additional, the office areas will have daylight controls to reduce the lighting demand and associated electricity usage.

## 2.5 Power Usage Effectiveness

All the features listed in the previous sections contribute to low power usage effectiveness (PUE) for the Building B. PUE is a ratio that describes how efficiently a data center uses energy. It is the ratio of the total amount of energy used by the data center facility to the energy delivered specifically to computing equipment, thus the ideal PUE would be 1.0. The data center in building B will have a peak PUE of 1.28 and average PUE of 1.15. In comparison, Uptime's 2020 global data center survey indicated that global average PUE is currently 1.59 while the United State and Canada average PDU is currently 1.53, which is approximately 33% higher than building B data center's projected PUE.

## 2.6 renewable Energy Usage

The Building B tenant is committed to working with the local power utility to produce a 100% renewable energy mix by 2025. The local power utility Pacific Gas & Electric (PG&E), offers a diverse energy mix including 39% from eligible renewable resources (such a wind, geothermal and solar) and combine total of 85% from renewable or greenhouse gas free sources. PG&E currently offers various renewable programs to customers, including the Solar Choice program. Considering the carbon intensity of electricity demand and renewable energy portfolio, the Building B data center will be able to perform tasks with an 85% lower carbon footprint than a standard data center.

## 2.7 Additional Energy Conservation Measures

The Building B tenant will engage PG&E to stay apprised of all energy efficiency programs that could be implemented, will leverage PG&E incentives to fund energy conservation measures, and will incorporate energy conservation measures into building design where appropriate.

### **3. Water Management**

#### **3.1 Outdoor Water Use**

The project will follow the California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELo) commencing with Section 490 of Chapter 2.7, Division 2, Title 23, California Code of Regulations. The details for outdoor potable water use in landscaped areas are shown on sheet P804.

#### **3.2 Indoor Water Use**

The building design integrated low-flush and low-flow fixtures to reduce the potable water requirements for the occupied areas of the buildings. The effective flush volume of all water closets specified is 1.28 gallons per flush (gpf). The effective flush volume for wall mounted urinals is 0.125 gpf. The showerheads will have a maximum flow rate of not more than 1.8 gallons per minute at 80 psi. Tank-type water closets and showerheads shall be certified to U.S EPA WaterSense specifications. Lavatory faucets shall have a maximum flow rate of not more than 0.5 gallons per minute (gpm) at 60 psi. Kitchen faucets shall have a maximum flow rate of not more than 1.8 gpm at 60 psi. Wash fountains shall have a maximum flow rate of not more than 1.8 gpm/20 (rim space) inches at 60psi. Metering faucets shall not deliver more than 0.2 gallons per cycle. If complying faucets are unavailable, aerators or other means may be used to achieve the necessary reductions.

#### **3.3 Process Water**

Submetering will be placed for makeup water for evaporative coolers > 6 gpm (0.04 L/s), and steam and hot water boilers with energy input more than 500,000 Btu/h (147 kW).

Please see below Section 4 for more details regarding the process water efficiencies in the project.

### **4. Planning Review Comment Response**

The City of Hayward provided the following review comment for Item #12 Sustainability Plan:

*In addition to showing compliance with CalGREEN, update the Sustainability Plan to include measures aimed at reducing energy and water use that go above and beyond State and local requirements. For example, as indicated in the General Comments from Utilities/Environmental Services – Water Resources below, the project should consider connecting to the City’s recycled water infrastructure to reduce the project’s demand for potable water.*

#### **4.1 Project Team Response**

A data centers requires a large portion of its overall electricity demand to cool the server rooms, where significant heat is generated. The SVY03ADC1 has been designed to minimize electricity used for cooling by incorporating a direct evaporative cooling system and using IT equipment that can operate at greater temperatures than a majority of other data center facilities. In addition to save water, the direct evaporative system has been designed to minimize water use. A complete description of the system is provided below.

The portion of the facility that uses water for cooling is the IT space and its ancillary spaces that house Datahall Air Handling Units (DAHUs). The DAHUs are large Direct Evaporative Cooling air handlers located wholly inside building SVY03ADC1. Direct Evaporative Cooling is the most energy-efficient cooling technology for this space. During 99% of the hours of a Typical Meteorological Year

(based on weather in this project's vicinity), these DAHUs will operate in what is known as "Free Air Economization Mode." This means they will cool the IT spaces by using fans to draw outside air into the building and to distribute that cool outside air throughout the IT spaces, using no water in the process. After the IT equipment has cooled its internal components by rejecting heat to this air, an array of rooftop exhaust fans will draw that warmed air up through the building and exhaust it back outside. During the 1% of the hours of a Typical Meteorological Year when the outside air is too hot to be used for IT equipment cooling, the DAHUs will begin using their fans to draw the incoming outdoor air over large, wetted banks of evaporative media, lowering the air's temperature by raising its humidity. The DAHUs will then cool the IT space using this cooler, more humid air. Once the IT equipment has cooled its internal components by rejecting heat into this air, the same array of rooftop exhaust fans will draw this warmed, humidified air up through the building and exhaust it back outside.

While many other types of data center cooling system (e.g. air-cooled chillers, water-cooled chillers, split-system cooling units, etc.) can also operate in some kind of "economization mode," virtually all of them also involve meeting more intense cooling needs by using a "refrigeration cycle" (a.k.a. "heat pump cycle"), where a compressor moves refrigerant around a closed-loop system in a way that allows it to absorb heat from one location in the loop and reject that heat in another location in the loop. These systems all also involve using fans to move air – often both the air used to cooling the indoor space and the air used to reject the heat outdoors. Some of these systems also consume water to reject that heat (e.g. the cooling towers in a water-cooled chiller system.) Others consume no water at all (e.g. air-cooled chillers and split-system cooling units.)

Where the local (meteorological) climate allows their use, Direct Evaporative Cooling systems are almost always markedly more energy-efficient than these other systems for the simple reason that a Direct Evaporative Cooler only spends electrical power on using fans to move air, while these other systems spend electrical power both on using fans to move air and on using compressors to circulate refrigerant. Not only do these other systems need to spend that additional power operating the compressor, but the waste heat given off by the compressor is added to the overall total amount of heat that the system needs to reject.

With Direct Evaporative Cooling systems for IT spaces, the main potential drawback is simply that, in many climates, there will be some times during the year where a direct evaporative cooler cannot lower the temperature of outdoor air low enough to avoid damaging the IT equipment. Other data centers in the same climate as this project may use some of these alternatives to Direct Evaporative Cooling because the IT equipment in their facilities requires cooler operating temperatures because it was not designed to tolerate operating in the slightly warmer conditions that this facility will use. Since this facility will only need to use any water for cooling, at all, during 1% of the hours of a Typical Meteorological year, the facility's water usage will appear very "spiky." In other words, the use of water for cooling is significantly minimized to only those infrequent times of the year and is limited to only using water in proportion to how dire the situation. To ensure this "spikiness" in water demand would not be a problem for the water utility's general operations, the SVY03A Campus includes water storage tanks to "flatten the curve" if required by the City of Hayward.

In short, this facility's specific implementation of Direct Evaporative Cooling was chosen because it uses the least amount of water out of all the options that use some amount of water, and because it's markedly more energy-efficient than all the options that use zero water.

In addition, as discussed in the SVY03A Small Power Plant Exemption, STACK has incorporated the following measure into the design of the facility. This project design measure will ensure that the net electricity use of the campus will not result in indirect greenhouse gas emissions from electricity consumption.

***PD GHG-1.1:*** *The project owner shall participate in PG&E's Regional Renewable Choice (i.e., 100% carbon-free electricity) for electricity accounts associated with the project or participate in a clean energy program that accomplishes the same goal of 100% carbon-free electricity.*

The above project design measure and the electricity and water reduction achieved for cooling the data halls exceeds state and local requirements.

STACK investigated using recycled water instead of potable water for the limited evaporative cooling proposed in SVY03DC1, but since the recycled water quality showed high amounts of ammonia and total alkalinity, pretreatment would be required to make the water suitable for use with the system without causing damage. Since recycled water infrastructure may not be immediately available for use when the SVY03DC1 is operational, the evaporative cooling system has been designed to pivot to utilize recycled water with relative ease, when the source becomes available. The evaporative cooling system provides significant reduction in electrical consumption while efficiently utilizing potable water and minimizing wastewater. Based on site conditions and equipment requirements, the evaporative cooling system is designed to effectively use potable water three times before sending to drain (otherwise known as 3 cycles of concentration). Given the designed use of potable water, reduction in electrical demand, and ability to pivot to a future recycled water source, this system meets the cooling demand of SCY03DC1 with efficiency and flexibility.

The site irrigation system will be designed to specify recycled water compatible equipment but will be charged with the potable water source at the time the SVY03A project becomes operational. Notes and details will be added to the irrigation plan set to meet both the baseline recycled water standards and horizontal and vertical clearances, which will allow the contractor to install the system correctly. Should the system be converted at a future time, the point of connection manifold will be reconnected to the new recycled water source, and additional equipment will be installed at the manifold to comply with standards. Recycled water permitting will be required before this future stage conversion takes place.



## 5. CalGREEN Compliance

The strategies outlined in the report below include the compliance measures for meeting the CalGREEN 2022 Mandatory requirements.

### 5.1 Planning & Design

#### 5.106.1 - Storm water pollution prevention: Mandatory requirement

- A stormwater management and/or erosion control plan will be implemented to prevent the loss of soil through wind or water during construction of the building.
- Refer to best management practices for soil erosion control plan (5.106.1.2). Storm Water Pollution Prevention for projects that disturb less than 1 acre of land.

#### 5.106.5.3 – Electric vehicle (EV) charging: Mandatory requirement

- Utilizing the requirements for the parking count between 51-75 spaces (Table 5.106.5.3.1), the total number of required EV capable spaces is 13, and total required number of EVSE is 3 (total: 16).
- The project is exceeding the required electric vehicle (EV) charging requirements by supplying 19 total electric vehicle (EV) charging spaces.

<b>Mandatory Measures</b>	
Total parking spaces	62
Requirement: Electric vehicle (EV) charging	13
EVSE future charging spaces	3
<b>Provided: Electric vehicle (EV) charging</b>	<b>19</b>

#### 5.106.4.1 – Bicycle Parking: Mandatory requirement

- For short-term bicycle parking: Bicycle racks will be placed within 200 feet of the security building entrance for 5% of visitor parking spaces to utilize before entering the secure area.
- For long-term bicycle parking: Bicycle racks will be conveniently placed for employees within the secured parking area for 5% of parking spaces.

<b>Mandatory measures</b>	
Requirement: Short-term bicycle spaces	2
Provided: Short-term bicycle spaces	2
Requirement: Long-term bicycle spaces	3.1
Provided: Long-term bicycle spaces	4

#### **5.106.8 – Light pollution reduction: Mandatory requirement**

- The project will meet the minimum requirements of California Energy Code for Lighting Zones 1-4 as mentioned in Table 5.106.8. The project will meet the backlight, uplight and glare (BUG) ratings as defined in IES TM – 15-11.

#### **5.106.10 – Grading and paving: Mandatory requirement**

- Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings.
- Surface water will be managed with the help of swales, water collection and disposal systems, french drains, water retention gardens or any other water measures which keep surface water away from buildings and aid in groundwater recharge.

#### **5.408.3 – Excavated soil and land clearing debris: Mandatory requirement**

- All trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled.

### **5.2 Energy Efficiency**

#### **5.201.1 – Meet the minimum energy efficiency standard: Mandatory requirement**

- Energy code compliance for the interior fit-out for each building is expected to follow the requirements of CEC subchapter 5 section 140.1: Performance Approach: Energy Budgets. Energy models are under-going iterations based on project specifics and CEC requirements. All Mandatory requirements per CEC have been or will be incorporated into this design.
- The project team is working through the core and shell energy efficiency requirements and are likely to follow the performance path using energy modeling.

### **5.3 Water Efficiency and Conservation**

#### **5.303.3 – Water conserving plumbing fixtures and fittings: Mandatory requirement**

- The effective flush volume of all water closets shall not exceed 1.28 gallons per flush (gpf).
- The effective flush volume for wall mounted urinals shall not exceed 0.125 gallons per flush (gpf) and for floor mounted urinals shall not exceed 0.5 gallons per flush (gpf).
- Showerheads shall have a maximum flow rate of not more than 1.8 gallons per minute at 80 psi. Tank-type water closets and showerheads shall be certified to U.S EPA WaterSense Specifications.
- Lavatory faucets shall have a maximum flow rate of not more than 0.5 gallons per minute at 60 psi. Kitchen faucets shall have a maximum flow rate of not more than 1.8 gallons per minute at 60 psi.
- Wash fountains shall have a maximum flow rate of not more than 1.8 gallons per minute/20 (rim space) inches at 60psi.
- Metering faucets shall not deliver more than 0.2 gallons per cycle. If complying faucets are unavailable, aerators or other means may be used to achieve reduction.

#### **5.304.1 – Outdoor potable water use in landscape areas: Mandatory requirement**

- The California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELo) commencing with Section 490 of Chapter 2.7, Division 2, Title 23, California Code of Regulations will be followed.

- The details for outdoor potable water use in landscaped areas are shown on sheet P804.

#### **5.303.1 – Water Metering: Mandatory requirement**

- Submetering will be placed for makeup water for evaporative coolers > 6 gpm (0.04 L/s), and steam and hot water boilers with energy input more than 500,000 Btu/h (147 kW).

### **5.4 Material Conservation and Resource Efficiency**

#### **5.407.1 – Weather Protection: Mandatory requirement**

- Primary exterior entries shall be covered to prevent water intrusion by using nonabsorbent floor and wall finishes within at least 2 feet around and perpendicular to such openings.

#### **5.407.2.1 – Sprinklers: Mandatory requirement**

- Sprinklers will be installed in a manner to prevent any water spraying on structures.

#### **5.407.2.2.2 – Flashing: Mandatory requirement**

- Flashings will be integrated with a drainage plane.

#### **5.410.1 Recycling by occupants: Mandatory requirement**

- Dedicated and readily accessible areas for the collection and storage of recyclables will be provided and accessible to waste haulers and building occupants.
- These areas will serve the entire building.
- Recyclables include paper, corrugated cardboard, glass, plastics, organic waste and metals.
- Space allocation for recycling areas shall comply with Chapter 18, Part 3, Division 30 of the Public Resources Code.

#### **5.408.1 – Construction waste management: Mandatory requirement**

- A minimum of 65 percent of nonhazardous construction and demolition (C&D) waste will be recycled and/or salvaged for reuse.
- C&D waste materials will be diverted by recycling, reuse on the project or salvage for future use or sale.
- Diversion facilities will be identified where C&D waste can be collected and taken. The amount of C&D waste materials that are diverted will be calculated by weight or volume but not both.
- A waste management company that can provide verifiable documentation with respect to the percentage of C&D waste diverted will be appointed.
- Dedicated areas for the collection and storage of recyclables will be provided and accessible to waste haulers and building occupants.

#### **5.410.2 – Commissioning new buildings: Mandatory requirement**

- Full building commissioning will be conducted, and the following will be verified:
  - Owner's project requirements
  - Basis of design
  - Commissioning measures shown in the construction documents
  - Commissioning plan
  - Inclusion of system manuals in construction documents

- Functional performance testing
- Documentation and training
- Systems operations training
- Commissioning report

#### **5.410.2 – Testing and Balancing (TAB): Mandatory requirement**

- Testing and adjusting procedures will be carried out as per the Test and Balancing plan. The following systems will be included for testing and adjusting:
  1. HVAC systems and controls
  2. Indoor and outdoor lighting and controls
  3. Water heating systems
  4. Renewable energy systems
  5. Landscape irrigation systems
  6. Water reuse systems

#### **5.410.3 – Procedures: Mandatory requirement**

- The air-conditioning system will be balanced in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards, the National Environmental Balancing Bureau Procedural Standards, Associated Air Balance Council National Standards or as approved by the enforcing agency.

#### **5.410.4.5 – Operation and maintenance (O&M) manual: Mandatory requirement**

- The building owner will be provided with an operation and maintenance manual describing the operating and maintenance instructions in detail and copies of guaranties/warranties of each system. The O&M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142 and other related regulations.

#### **5.508.1 – Ozone depletion and greenhouse gas emissions: Mandatory requirement**

- All HVAC, refrigeration and fire suppression equipment will not contain chlorofluorocarbon (CFC)-based refrigerants or Halons.
- R-410a (HFC) is the only refrigerant used. See sheet M904 and M905 for more details.

#### **5.407.1 – Weather protection: Mandatory requirement**

- A weather-resistant exterior wall and foundation envelope will be designed as required by California Building Code Section 1403.2 (Weather Protection) and California Energy Code Section 150.

### **5.5 Environmental Quality**

#### **Indoor Air Quality during construction**

##### **5.504.1 – Temporary ventilation: Mandatory requirement**

- The permanent HVAC system shall be used during construction only if necessary to maintain a temperature range for material and equipment installation. If the HVAC system is used during construction, return air filters of a Minimum Efficiency Reporting Value of 8 (MERV 8).

#### **Indoor Air Quality post construction**

**5.504.3 – Covering of duct openings and protection of mechanical equipment during construction: Mandatory requirement**

- All duct and other related air distribution component openings shall be covered with tape, plastic, sheet metal or other methods that may reduce the amount of dust, water and debris which may enter the system.

**5.504.4 – Finish material pollutant control: Mandatory requirement**

- Adhesives, adhesive bonding primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable or SCAQMD Rule 1168 VOC limits.

**5.504.4.1 – Adhesives, sealants, and caulks: Mandatory requirement**

- Adhesives and sealants utilized on the project shall comply with local or regional air pollution or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2.
- Aerosol adhesives and smaller unit sizes of adhesives and sealant or caulking compounds (not weighing more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements.

**TABLE 5.504.4.1  
 ADHESIVE VOC LIMIT<sup>1,2</sup>  
 Less Water and Less Exempt Compounds in Grams Per Liter**

ARCHITECTURAL APPLICATIONS	CURRENT VOC LIMIT
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesive	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Drywall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single-ply roof membrane adhesives	250
Other adhesive not specifically listed	50
<b>SPECIALTY APPLICATIONS</b>	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Contact adhesive	80
Special purpose contact adhesive	250
Structural wood member adhesive	140
Top and trim adhesive	250
<b>SUBSTRATE SPECIFIC APPLICATIONS</b>	
Metal to metal	30
Plastic foams	50
Porous material (except wood)	50
Wood	30
Fiberglass	80

1. If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.
2. For additional information regarding methods to measure the VOC content specified in this table, see South Coast Air Quality Management District Rule 1168, <http://www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF>.

**TABLE 5.504.4.2  
 SEALANT VOC LIMIT  
 Less Water and Less Exempt Compounds in Grams per Liter**

SEALANTS	CURRENT VOC LIMIT
Architectural	250
Marine deck	760
Nonmembrane roof	300
Roadway	250
Single-ply roof membrane	450
Other	420
<b>SEALANT PRIMERS</b>	
Architectural	
Nonporous	250
Porous	775
Modified bituminous	500
Marine deck	760
Other	750

Note: For additional information regarding methods to measure the VOC content specified in these tables, see South Coast Air Quality Management District Rule 1168.

**5.504.4.3 – Paints and coatings: Mandatory requirement**

Architectural paints and coatings shall comply with VOC limits shown in the Table 5.504.3

**TABLE 5.504.4.3  
 VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS<sup>1,2</sup>  
 Grams of VOC per Liter of Coating,  
 Less Water and Less Exempt Compounds**

COATING CATEGORY	CURRENT LIMIT
Flat coatings	50
Nonflat coatings	100
Nonflat-high gloss coatings	150
<b>SPECIALTY COATINGS</b>	
Aluminum roof coatings	400
Basement specialty coatings	400
Bituminous roof coatings	50
Bituminous roof primers	350
Bond breakers	350
Concrete curing compounds	350
Concrete/masonry sealers	100
Driveway sealers	50
Dry fog coatings	150
Faux finishing coatings	350
Fire resistive coatings	350
Floor coatings	100
Form-release compounds	250
Graphic arts coatings (sign paints)	500
High temperature coatings	420
Industrial maintenance coatings	250
Low solids coatings <sup>1</sup>	120
Magnesite cement coatings	450
Mastic texture coatings	100
Metallic pigmented coatings	500
Multicolor coatings	250
Pretreatment wash primers	420
Primers, sealers, and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	250
Roof coatings	50
Rust preventative coatings	250
Shellacs	
Clear	730
Opaque	550
Specialty primers, sealers and undercoaters	100
Stains	250
Stone consolidants	450
Swimming pool coatings	340
Traffic marking coatings	100
Tub and tile refinish coatings	420
Waterproofing membranes	250
Wood coatings	275
Wood preservatives	350
Zinc-rich primers	340

1. Grams of VOC per liter of coating, including water and including exempt compounds.
2. The specified limits remain in effect unless revised limits are listed in subsequent columns in the table.
3. Values in this table are derived from those specified by the California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008. More information is available from the Air Resources Board.

**5.504.4.4 – Carpet systems: Mandatory requirement**

- All carpet installed in the building interior shall meet the requirements of the VOC emission limits and testing requirements specified in the California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers, Version 1.2, January 2017 (Emissions testing method for California Specification 01350).

**5.504.4.1 – Carpet cushion: Mandatory requirement**

- All carpet cushion installed in the building interior shall meet the requirements of the California Department of Public Health, “Standard Method for the testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers,” Version 1.2, January 2017 (Emission testing method for California Specification 01350).

**5.504.4.4.2 – Carpet adhesive: Mandatory requirement**

- All carpet adhesive shall meet the requirements of Table 5.504.4.1.

**5.504.4.5 – Composite wood products: Mandatory requirement**

- Hardwood, plywood, particleboard, and medium density fiberboard composite wood products used on the interior or exterior of the buildings shall meet the formaldehyde requirements specified in ARB’s Air Toxics Control Measure (ATCM) for Composite Wood (17 CCR 93120 et seq.)

**TABLE 5.504.4.5  
 FORMALDEHYDE LIMITS<sup>1</sup>  
 Maximum Formaldehyde Emissions in Parts per Million**

PRODUCT	CURRENT LIMIT
Hardwood plywood veneer core	0.05
Hardwood plywood composite core	0.05
Particleboard	0.09
Medium density fiberboard	0.11
Thin medium density fiberboard <sup>2</sup>	0.13

1. Values in this table are derived from those specified by the California Air Resources Board, Air Toxics Control Measure for Composite Wood as tested in accordance with ASTM E1333. For additional information, see *California Code of Regulations*, Title 17, Sections 93120 through 93120.12.

2. Thin medium density fiberboard has a maximum thickness of  $\frac{3}{16}$  inch (8 mm).

**5.504.4.6 – Resilient flooring systems: Mandatory requirement**

For 80% of floor area receiving resilient flooring, installed resilient flooring shall comply with VOC emission limits and testing requirements specified in the California Department of Public Health’s 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.2, January 2017.

**5.504.5.3 – Filters: Mandatory requirement**

- Air filtration media for outside and return air being supplied to the regularly occupied areas of the building will have a Minimum Efficiency Reporting Value of 13 (MERV 13). MERV 13 filters shall be installed prior to occupancy and recommendations for maintenance with filters of the



same value shall be included in the operation and maintenance manual. The MERV rating on the installed filters will be clearly labeled by the manufacturer.

**5.504.7 – Environmental tobacco smoke (ETS) control: Mandatory requirement**

- There will be no smoking in the building or within 25 feet of any building entries, outdoor air intakes and operable windows and within the building. “No Smoking” signage will be installed within 10 feet of all building entrances.

**5.505.1 – Indoor moisture control: Mandatory requirement**

- The building shall meet or exceed the provisions of California Building Code, CCR, Title 24, Part 2, Sections 1202 (Ventilation) and Chapter 14 (Exterior Walls).

**5.506.1 – Outside air delivery: Mandatory requirement**

- The project will meet the minimum requirements of Section 120.1 of the 2022 California Energy Code or applicable code, whichever is more stringent and Division 1, Chapter 4 of CCR, Title 8.

**5.506.2 – Carbon dioxide (CO2) monitoring: Mandatory requirement**

- The project will be equipped with demand control ventilation, CO2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the 2022 California Energy Code, Section 120.1 (c)(4).

**5.507.4 – Acoustical control: Mandatory requirement**

- The project will employ building assemblies and components with Sound Transmission Class (STC) values determined in accordance with ASTM E90 and ASTM E413 or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E1332, using the CadnaA acoustic model for the performance method in Section 5.507.4.2.

**5.504.4.8 – Acoustical ceilings and wall panels: Mandatory requirement**

- All acoustical ceilings and wall panels will comply with the requirements of the California Department of Public Health, “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers,” Version 1.2, January 2017 (Emission testing method for California Specification 01350).
- Verification will be performed on-site in coordination with the contractor.

## Appendix A. CALGREEN Checklist

Y = Yes (section has been selected and/or included)

N/A = Not Applicable (section does not apply; mostly used in additions/alterations)

O = Other (provide explanation)

[N] = New construction, Section 301.3

[A] = Additions/Alterations, Section

301.3

SFO-071 CALGREEN 2022 Checklist					
Requirement	Section Title	Code Section	Y/N	N/A	O
<b>Div 5.1 Planning and Design</b>					
Mandatory	Storm water pollution prevention for projects that disturb less than 1 acre of land	5.106.1 through 5.106.2	Y		
Mandatory	Short-term bicycle parking (with exception)	5.106.4.1.1	Y		
Mandatory	Long-term bicycle parking	5.106.4.1.2 through 5.106.4.1.5	Y		
Mandatory	Electric vehicle (EV) charging [N] w/ exceptions	5.106.5.3	Y		
Mandatory	EV capable spaces [N]	5.106.5.3.1	Y		
Mandatory	Electric vehicle (EV) charging Stations (EVCS)	5.106.5.3.2	Y		
Mandatory	Use of automatic load management systems (ALMS)	5.106.5.3.3			
Mandatory	Accessible EVCS	5.106.5.3.4	Y		
Mandatory	Note for EVCS signs	5.106.5.3.4	Y		
Mandatory	TABLE 5.106.5.3.1 w/ footnotes	5.106.3.1, 5.106.3.2 and 5.106.3.3	Y		
Mandatory	Electric vehicle (EV) charging: medium-duty and heavy-duty [N]	5.106.5.4		N/A	
Mandatory	Electric vehicle charging readiness requirements for warehouses, grocery stores and retail stores with planned off-street loading	5.106.5.4.1		N/A	
Mandatory	TABLE 5.106.5.4.1	5.106.5.4 and 5.106.5.4.1		N/A	
Mandatory	Light pollution reduction [N] (with exceptions, notes and table)	5.106.8 through 5.106.8.2	Y		
Mandatory	Grading and paving (exception for additions and alterations not altering the drainage path)	5.106.10	Y		
<b>Div 5.2 Energy Efficiency</b>					
Mandatory	Meet the minimum energy efficiency standard	5.201.1	Y		
<b>Div 5.3 Water Efficiency and Conservation</b>					
Mandatory	Separate meters (new buildings or additions > 50,000 sf that consume more than 100 gal/day)	5.303.1.1	Y		
Mandatory	Separate meters (for tenants in new buildings or additions that consume more than 1,000 gal/day)	5.303.1.2		N/A	
Mandatory	Water closets shall not exceed 1.28 gallons per flush (gpf)	5.303.3.1	Y		
Mandatory	Wall-mounted urinals shall not exceed 0.125 gpf	5.303.3.2.1	Y		
Mandatory	Floor-mounted urinals shall not exceed 0.5 gpf	5.303.3.2.2	Y		
Mandatory	Single showerhead shall have maximum flow rate of 1.8 gpm (gallons per minute) at 80 psi	5.303.3.3.1	Y		
Mandatory	Multiple showerheads serving one shower shall have a combined flow rate of 1.8 gpm at 80 psi	5.303.3.3.2		N/A	
Mandatory	Nonresidential lavatory faucets	5.303.3.4.1	Y		

Mandatory	Kitchen faucets	5.303.3.4.2	Y		
Mandatory	Wash fountains	5.303.3.4.3		N/A	
Mandatory	Metering faucets	5.303.3.4.4		N/A	
Mandatory	Metering faucets for wash fountains	5.303.3.4.5		N/A	
Mandatory	Pre-rinse spray valve	5.303.3.4.6		N/A	
Mandatory	Food waste disposers	5.303.4.1		N/A	
Mandatory	Areas of additions or alterations	5.303.5		N/A	
Mandatory	Standards for plumbing fixtures and fittings	5.303.6	Y		
Mandatory	Outdoor potable water use in landscape areas (with notes)	5.304.1	Y		
<b>Div 5.4 Material Conservation and Resource Efficiency</b>					
Mandatory	Weather protection	5.407.1	Y		
Mandatory	Moisture control: sprinklers	5.407.2.1	Y		
Mandatory	Moisture control: exterior door protection	5.407.2.2.1	Y		
Mandatory	Moisture control: flashing	5.407.2.2.2	Y		
Mandatory	Construction waste management—comply with either: Sections 5.408.1.1, 5.408.1.2, 5.408.1.3 or more stringent local ordinance	5.408.1.1, 5.408.1.2, 5.408.1.3	Y		
Mandatory	Construction waste management: documentation	5.408.1.4	Y		
Mandatory	Universal waste [A]	5.408.2		N/A	
Mandatory	Excavated soil and land clearing debris (100% reuse or recycle)	5.408.3	Y		
Mandatory	Recycling by occupants (with exception)	5.410.1	Y		
Mandatory	Recycling by occupants: additions (with exception)	5.410.1.1		N/A	
Mandatory	Recycling by occupants: sample ordinance	5.410.1.2	Y		
Mandatory	Commissioning new buildings (≥ 10,000 sf) [N]	5.410.2	Y		
Mandatory	Owner's or owner representative's Project Requirements (OPR) [N]	5.410.2.1	Y		
Mandatory	Basis of Design (BOD) [N]	5.410.2.2	Y		
Mandatory	Commissioning plan [N]	5.410.2.3	Y		
Mandatory	Functional performance testing [N]	5.410.2.4	Y		
Mandatory	Documentation and training [N]	5.410.2.5	Y		
Mandatory	Systems manual [N]	5.410.2.5.1	Y		
Mandatory	Systems operation training [N]	5.410.2.5.2	Y		
Mandatory	Commissioning report [N]	5.410.2.6	Y		
Mandatory	Testing and adjusting for new buildings < 10,000 sf or new systems that serve additions or alterations [A]	5.410.4		N/A	
Mandatory	System testing plan for renewable energy, landscape irrigation and water reuse [A]	5.410.4.2		N/A	

Mandatory	Procedures for testing and adjusting	5.410.4.3	Y		
Mandatory	Procedures for HVAC balancing	5.410.4.3.1	Y		
Mandatory	Reporting for testing and adjusting	5.410.4.4	Y		
Mandatory	Operation and maintenance (O&M) manual	5.410.4.5	Y		
Mandatory	Inspection and reports	5.410.4.5.1	Y		
<b>Div 5.5 Environmental Quality</b>					
Mandatory	Fireplaces	5.503.1		N/A	
Mandatory	Woodstoves	5.503.1.1		N/A	
Mandatory	Temporary ventilation	5.504.1	Y		
Mandatory	Covering of ducts openings and protection of mechanical equipment during construction	5.504.3	Y		
Mandatory	Adhesives, sealants, and caulks	5.504.4.1	Y		
Mandatory	Paints and coatings	5.504.4.3	Y		
Mandatory	Aerosol paints and coatings	5.504.4.3.1	Y		
Mandatory	Aerosol paints and coatings: verification	5.504.4.3.2	Y		
Mandatory	Carpet systems	5.504.4.4	Y		
Mandatory	Carpet cushion	5.504.4.4.1	Y		
Mandatory	Carpet adhesives per Table 5.504.4.1	5.504.4.4.2	Y		
Mandatory	Composite wood products	5.504.4.5	Y		
Mandatory	Composite wood products: documentation	5.504.4.5.3	Y		
Mandatory	Resilient flooring systems	5.504.4.6	Y		
Mandatory	Resilient flooring: verification of compliance	5.504.4.6.1	Y		
Mandatory	Thermal insulation	5.504.4.7	Y		
Mandatory	Thermal insulation verification of compliance	5.504.4.7.1	Y		
Mandatory	Acoustical ceilings and wall panels	5.504.4.8	Y		
Mandatory	Acoustical ceilings and wall panels verification of compliance	5.504.4.8.1	Y		
Mandatory	Filters (with exceptions)	5.504.5.3	Y		
Mandatory	Filters: labeling	5.504.5.3.1	Y		
Mandatory	Environmental tobacco smoke (ETS) control	5.504.7	Y		
Mandatory	Indoor moisture control	5.505.1	Y		
Mandatory	Outside air delivery	5.506.1	Y		
Mandatory	Carbon dioxide (CO2) monitoring	5.506.2	Y		
Mandatory	Acoustical control (with exception)	5.507.4	Y		

Mandatory	Exterior noise transmission, prescriptive method (with exceptions)	5.507.4.1	Y		
Mandatory	Noise exposure where noise contours are not readily available	5.507.4.1.1	Y		
Mandatory	Performance method	5.507.4.2	Y		
Mandatory	Site features	5.507.4.2.1			
Mandatory	Documentation of compliance	5.507.4.2.2			
Mandatory	Interior sound transmission (with note)	5.507.4.3	N	N/A	
Mandatory	Ozone depletion and greenhouse gas reductions	5.508.1			
Mandatory	Chlorofluorocarbons (CFCs)	5.508.1.1	Y		
Mandatory	Halons	5.508.1.2	Y		
Mandatory	Supermarket refrigerant leak reduction for retail food stores 8,000 square feet or more	5.508.2 through 5.508.2.6.3		N/A	