File No. 130841 Committee Item No. 10
Board Item No. _____

COMMITTEE/BOARD OF SUPERVISORS

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Committee: Land Use and Economic Development **Date** October 21, 2013

Board of Supervisors Meeting **Date** _____

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Completed by: Alisa Miller **Date** October 18, 2013
Completed by: _____ **Date** _____

FILE NO. 130841 ORDINANCE NO.

[Green Building Code - Enactment of New Code]

Ordinance enacting a 2013 San Francisco Green Building Code consisting of the 2013 California Green Building Standards Code, as amended by San Francisco; adopting environmental findings and findings required by the California Health and Safety Code, California Public Resources Code, and Title 24 of the California Code of Regulations; providing for an operative date of January 1, 2014; and directing the Clerk of the Board to forward the legislation to the State Building Standards Commission as required by State law.

NOTE: **Unchanged Code text and uncodified text** are in plain Arial font.
Additions to Codes are in *single-underline italics Times New Roman font*.
Deletions to Codes are in ~~*strikethrough italics Times New Roman font*~~.
Board amendment additions are in double-underlined Arial font.
Board amendment deletions are in ~~strikethrough Arial font~~.
Asterisks (* * * *) indicate the omission of unchanged Code subsections or parts of tables.

Be it ordained by the People of the City and County of San Francisco:

Section 1. Environmental Findings. The Planning Department has determined that the actions contemplated in this ordinance comply with the California Environmental Quality Act (California Public Resources Code Sections 21000 et seq.). Said determination is on file with the Clerk of the Board of Supervisors in File No. 130841 and is incorporated herein by reference.

Section 2. General Findings.

A. The State of California adopts a new California Building Standards Code every three years that goes into effect throughout the State 180 days after publication. The California Building Standards Code is contained in Title 24 of the California Code of

Regulations, and consists of several parts that are based upon model codes with amendments made by various State agencies. The California Green Building Standards Code, also known as the CALGreen Code, is Part 11 of Title 24 of the California Code of Regulations. The 2013 California Green Building Standards Code will go into effect throughout California on January 1, 2014.

B. Local jurisdictions are required to enforce the California Green Building Standards Code but they may also enact more stringent standards when reasonably necessary because of local conditions caused by climate, geology or topography.

C. When California first adopted green building standards in the 2010 Code adoption cycle, San Francisco already had existing green building requirements that were codified as Chapter 13C of the San Francisco Building Code. These local requirements were retained as amendments to the 2010 California Building Code. In this Code cycle, San Francisco's green building requirements will be repealed from the San Francisco Building Code and re-enacted into a new San Francisco Green Building Code as amendments to the 2013 California Green Building Standards Code.

D. On August 21, 2013, at a duly noticed public hearing, the Building Inspection Commission considered this legislation.

Section 3. Findings regarding Local Conditions required by the California Health & Safety Code.

A. California Health & Safety Code Section 17958.7 provides that before making any changes or modifications to the California Green Building Standards Code and any other applicable provisions published by the State Building Standards Commission, the governing body must make an express finding that each such change or modification is reasonably necessary because of specified local conditions, and the findings must be filed with the State Building Standards Commission before the local changes or modifications can go into effect.

B. The City and County of San Francisco is unique among California communities with respect to local climatic, geological, topographical, and other conditions. A specific list of findings that support San Francisco's modifications to the 2013 California Green Building Standards Code and a section-by-section correlation of each modification with a specific numbered finding are contained in Exhibit A entitled "Standard Findings for San Francisco Amendments," on file with the Clerk of the Board of Supervisors in File No. 130841, which is hereby declared to be part of this ordinance as if set forth fully therein.

C. Pursuant to California Health and Safety Code Section 17958.7, the Board of Supervisors finds and determines that the local conditions described in Exhibit A constitute a general summary of the most significant local conditions giving rise to the need for modification of the 2013 California Green Building Standards Code provisions published by the State Building Standards Commission. The Board of Supervisors further finds and determines that the proposed modifications are reasonably necessary based upon the local conditions set forth in Exhibit A.

Section 4. Findings required by the California Public Resources Code and Title 24 of the California Code of Regulations.

A. Public Resources Code Section 25402.1(h)(2) and Section 10-106 of the California Code of Regulations, Title 24, Part 1, Locally Adopted Energy Standards, authorize a local jurisdiction to adopt and enforce more stringent local energy standards, provided that the local jurisdiction makes a determination that the local standards are cost effective and will save more energy than the current Statewide standards and provided further that the local jurisdiction files an application for approval with the California Energy Commission together with documentation supporting the cost-effectiveness determination. These local energy standards may take effect only after the California Energy Commission has reviewed and formally approved them.

B. Based upon the findings of a cost-effectiveness study performed on the more stringent local standards contained in the City's proposed 2013 San Francisco Green Building Code, the Board of Supervisors hereby determines that these local energy standards are cost effective and will save more energy than the standards contained in the 2013 California Green Building Standards (CALGreen) Code. A copy of the cost-effectiveness study is on file with the Clerk of the Board of Supervisors in File No. 130841.

Section 5. The 2013 San Francisco Green Building Code is hereby enacted. The Green Building Code being enacted consists of the 2013 California Green Building Standards Code as amended by the San Francisco amendments. A copy of the 2013 California Green Building Standards Code, together with the San Francisco amendments, is on file with the Clerk of the Board of Supervisors in File No. 130941 all of which is hereby declared to be part of this ordinance as if set forth fully therein. Additions to the 2013 California Green Building Standards Code are shown in bold underlined type; deletions are shown with strikethrough.

Section 6. Continuance of Actions Under Prior Code. Nothing contained in this ordinance shall be construed as abating any action now pending under or by virtue of any ordinance of the City and County of San Francisco hereby repealed, nor shall this ordinance be construed as discontinuing, abating, modifying or altering any penalties accruing, or to accrue, or as waiving any right of the City under any such ordinance.

Section 7. Severability. If any section, subsection, sentence, clause, or phrase of this ordinance is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The Board of Supervisors hereby declares that it would have passed this ordinance, and each section, subsection, sentence, clause, or phrase of this Ordinance, irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional.

Section 8. Effective and Operative Dates. This ordinance shall become effective 30 days after enactment. Enactment occurs when the Mayor signs the ordinance, the Mayor returns the ordinance unsigned or does not sign the ordinance within ten days of receiving it, or the Board of Supervisors overrides the Mayor's veto of the ordinance. This ordinance shall take effect and be in full force on and after either January 1, 2014 or its effective date if the effective date is later.

Section 9. Directions to Clerk. Upon final passage of this ordinance, the Clerk of the Board of Supervisors is hereby directed to transmit this ordinance with the Exhibit A attachment and the San Francisco modifications to the 2013 California Green Building Standards Code to the State Building Standards Commission pursuant to the applicable provisions of State law.

APPROVED AS TO FORM:
DENNIS J. HERRERA, City Attorney

By: Judith A. Boyajian
JUDITH A. BOYAJIAN
Deputy City Attorney

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FILE NO. 130841

LEGISLATIVE DIGEST

[Green Building Code - Enactment of New Code]

Ordinance enacting a 2013 San Francisco Green Building Code consisting of the 2013 California Green Building Standards Code, as amended by San Francisco; adopting environmental findings and findings required by the California Health and Safety Code, California Public Resources Code, and Title 24 of the California Code of Regulations; providing for an operative date of January 1, 2014; and directing the Clerk of the Board to forward the legislation to the State Building Standards Commission as required by State law.

Existing Law

The San Francisco Green Building Code enhances the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices in planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. San Francisco's existing green building requirements were enacted before California adopted its the first California Green Building Standards Code (also known as the CALGreen Code) in the 2010 Code cycle and are contained in Chapter 13C of the San Francisco Building Code.

Amendments to Current Law

On January 1, 2014, a new California Green Building Standards Code will go into effect throughout the State. San Francisco's existing green building requirements will not be carried forward unless re-enacted and made applicable to the 2013 California Green Building Standards Code. Therefore, as in past State code adoption cycles, San Francisco will repeal its existing requirements and re-enact them. In this Code cycle, San Francisco will adopt a new San Francisco Green Building Code instead of including the green building requirements in the Building Code. The new San Francisco Green Building Code will consist of the 2013 California Green Building Standards Code with San Francisco amendments. The San Francisco amendments will be those currently contained in Chapter 13C of the 2010 San Francisco Building Code with only minor technical changes.

The San Francisco amendments are not integrated into the text of the California Green Building Standards Code but rather are separately printed in a stand-alone document. Therefore, the user must consult both texts in order to determine the complete code requirement. In the San Francisco amendments, additions to the 2013 California Green Building Standards Code are shown in bold type; deletions are shown with strikethrough.

Background Information

Generally, the State of California adopts a new California Building Standards Code every three years that goes into effect throughout the State 180 days after publication. In this Code cycle, the California Building Standards Code will go into effect on January 1, 2014. The California Building Standards Code is contained in Title 24 of the California Code of Regulations, and consists of several parts that are based upon model codes with amendments made by various State agencies. The California Green Building Standards Code is Part 11 of Title 24 of the California Code of Regulations.

Local jurisdictions are required to enforce the California Green Building Standards Code. Local jurisdictions may also enact more stringent requirements than those contained in the State Code where more stringent requirements are reasonably necessary because of local conditions caused by climate, geology, or topography. The local amendments are not effective until findings supporting any amendments, additions, or deletions to the State Code are adopted and sent to the State Building Standards Commission.

In addition, if a local jurisdiction enacts more stringent energy standards, the local jurisdiction must file an application for approval with the California Energy Commission together with documentation supporting a determination that the local standards are cost-effective and will save more energy than the Statewide standards. These local energy standards may take effect only after the California Energy Commission has reviewed and formally approved them. The City has obtained a cost-effectiveness study for its 2013 Green Building Standards Code and is in the process of obtaining the California Energy Commission's approval of the City's more stringent local requirements.

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EXHIBIT A

STANDARD FINDINGS FOR SAN FRANCISCO BUILDING STANDARDS CODE AMENDMENTS:

1. Certain buildings/occupancies in San Francisco are at increased risk for earthquake-induced failure and consequent fire due to local hazardous microzones, slide areas, and local liquefaction hazards. (Geology)

2. Certain buildings/occupancies in San Francisco are at increased risk of fire due to high density of buildings on very small lots, with many buildings built up to the property lines. (Topography)

3. Topography of San Francisco has let to development of a high density of buildings on small lots, necessitating special provisions for exiting, fire separation, or fire-resistive construction. (Topography)

4. Many buildings are built on steep hills and narrow streets, requiring special safety consideration. (Topography)

5. Additional fire, structural and other protection is required due to high building density and crowded occupancy. (Topography)

6. San Francisco has narrow, crowded sidewalks due to building and population density and unusual topography. (Topography)

7. All rain water in San Francisco drains to the building drains and sewer; unusual geology, occasional extremely high local rainfall amounts, and the configuration of the City as a peninsula restrict the installation of separate storm water and sewer systems. (Topography, Climate, Geology)

8. Moist, corrosive atmosphere of salt-laden fog in San Francisco necessitates additional requirements. (Climate)

9. Not a building standard; no local findings required.

10. Soil conditions in this region induce adverse reactions with some materials, leading to premature failures and subsequent unsanitary conditions. (Climate)

11. The region is subject to fluctuating rainfall due to changes in climatic conditions. (Climate)

12. San Francisco is a peninsula surrounded on three sides by water at sea level;

mitigation of climate change impacts, including sea level rise, is critical to the long term protection of the local built environment and local infrastructure. (Topography)

13. Climate and potential climate change impacts San Francisco's water resources, including reservoirs and distribution facilities. (Climate)

14. Organic material in San Francisco's waste breaks down into methane gas which is a significant contributor to climate change. (Climate)

15. San Francisco is topographically constrained and its built environment occupies most available land, requiring minimization of debris and solid waste. (Topography)

16. Prevailing winds, coastal mountain ranges, and periodic seasonal high temperatures contribute to photochemical reactions that produce smog and ozone; limiting the emission of smog's chemical precursors - volatile organic chemicals and oxides of nitrogen - is necessary to health and safety. (Climate, Topography)

17. The aquifers underlying San Francisco are small relative to local population, necessitating ongoing water imports and special provisions to ensure efficient use of water in local buildings. (Geology)

2013 San Francisco Green Building Code Findings

Section #	Finding #	Section #	Finding #	Section #	Finding #

CHAPTER 1

Section #	Finding #	Section #	Finding#	Section #	Finding #
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101.3	9	101.6.3	9		
101.3.1	9	101.7	9		

CHAPTER 2

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Section #	Finding #	Section #	Finding #	Section #	Finding #
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302.1	9	305.1	9	306.1.1	9
303.1.1.1	9	305.1.1	9		
304.1	9	305.1.2	9		

CHAPTER 4

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4.103.1	9	4.103.2.4	7,11	4.105	9
4.103.1.1	5,7,11,12,13, 14,15,16,17	4.103.2.4.1	7,11	4.105.1	12,14,15
4.103.1.2	7,11	4.103.3	9	4.105.1.1	12,14,15
4.103.2	9	4.103.3.1	5,7,11,12,13, 14,15,16,17	4.105.1.2	12,14,15
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4.103.2.2	11,13,17	4.104.1	12,14,15		

CHAPTER 5

Section #	Finding #	Section #	Finding #	Section #	Finding #
5.101	9	5.103.1.9	5,8,14,15,16	5.103.4.1	5,7,11,12,13, 14,15,16,17
5.103.1	9	5.103.1.10	9	5.103.4.2	5,8,14,15,16
5.103.1.1	5, 7,11,12,13, 14,15,16,17	5.103.2	9	5.104.1	14,15
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5.103.1.7	9	5.103.3.2	5,8,14,15,16		
5.103.1.8	5,8,14,15,16	5.103.4	9		

CHAPTER 6
NO S.F. AMENDMENTS

CHAPTER 7

Section #	Finding #	Section #	Finding #	Section #	Finding #
701	9	702.3	5	7.703.1	9
702.2	9				

PROPOSED SAN FRANCISCO GREEN BUILDING CODE AMENDMENTS 2013 Edition

Chapter 1
GENERAL

SECTION 101 – GENERAL

Revise this section as follows:

101.1 Title. These regulations shall be known as the ~~California~~ **San Francisco** Green Building ~~Standards~~ Code and may be cited as such and will be referred to herein as "this code". ~~It is intended that it shall also be known as the CALGreen Code.~~ The ~~California~~ **San Francisco** Green Building ~~Standards~~ Code consists **of the combination of** ~~is~~ Part 11 ~~of twelve parts~~ of the official compilation and publication of the adoption, amendment and repeal of building regulations to the California Code of Regulations, Title 24, **and Chapter 13C of San Francisco Building Inspection Commission Amendments to** ~~as~~ the California Building Standards Code.

Revise this section as follows:

101.2 Purpose. The purpose of this ~~code~~ **chapter** is to ~~improve public~~ **promote the** health, safety and ~~general~~ welfare **of San Francisco residents, workers, and visitors** by **minimizing waste of energy, water, and other resources in the construction and operation of buildings in the City and County of San Francisco and by providing a healthy indoor environment. The green building practices required by this chapter will also further the goal of reducing the greenhouse gas emissions in the City and County of San Francisco to 25 percent below 1990 levels by the year 2017, as stated in Board of Supervisors Resolution No. 158-02 and San Francisco Environment Code Chapter 9.** ~~enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact, or positive environmental impact~~ and ~~encouraging sustainable construction practices in the following categories:~~

~~1. Planning and design.~~
~~2. Energy efficiency.~~
~~3. Water efficiency and conservation.~~
~~4. Material conservation and resource efficiency.~~
~~5. Environmental quality.~~

Revise this section as follows:

101.3 Scope. The provisions of this code shall apply to the planning, design, operation, construction, use and occupancy of every newly constructed building or structure, unless otherwise indicated in this code, **as well as alterations to existing buildings** throughout the ~~State of California.~~ **the City and County of San Francisco**.

~~It is not the intent that~~ **While** this code ~~substitute or be identified as meeting~~ **references green building programs,** the **City and County of San Francisco does not confer** certification ~~requirements of~~ **under** any green building program.

Revise this section as follows:

101.3.1 ~~State-regulated~~ **Regulated** buildings, structures and applications. Provisions of this code shall apply to the following buildings, structures, and applications regulated by state agencies as specified in Sections 103 through 106 of California Green Building Standards Code Title 24 Part 11, ~~except where~~ modified by local ordinance **with supplemental requirements applicable to occupancy types A, B, I, M, and R as defined by California Building Code Title 24 Section 302 (2013) as amended** pursuant to Section 101.7. When adopted by a state agency, the provisions of this code shall be enforced by the appropriate enforcing agency, but only to the extent of authority granted to such agency by statute.

Revise this section as follows:

101.4 Appendices. ~~Provisions contained in the appendices of this code are not mandatory unless specifically adopted by a State agency or adopted by a city, county, or city and county in compliance with Health and Safety Code Sections 18930 and 18941.5, respectively, for Building Standards Law; Health and Safety Code Section 17950 for State Housing Law; and Health and Safety Code Section 13869.7 for Fire Protection Districts. See Section 101.7 of this code.~~ **[Reserved]**

Revise this section as follows:

101.6.1 Differences. In the event of any differences between these building standards and the standard reference documents, the text of ~~these building standards~~ **this Chapter** shall govern. ~~In the event a local amendment to this code results in differences between these building standards and the amendment, the text of the amendment shall govern.~~

Revise this section as follows:

101.6.3 Conflicts. When the requirements of this code conflict with the requirements of any other part of the California Building Standards Code, Title 24, ~~the most restrictive requirement shall prevail.~~ **any provision contained elsewhere in the San Francisco Municipal Code, or any regulation or requirement adopted by the Public Utilities Commission or other City agency under its Charter authority, the most restrictive requirement shall prevail.**

Revise this section as follows:

101.7 City~~, county, or city~~ and county amendments, additions ~~or~~ and deletions. ~~This code is intended to set mandatory minimum Green Building Standards and includes optional tiers that may, at the discretion of any city, county or city and county, be applied.~~ **This code includes the amendments, deletions, and additions to California green building requirements which maintain stricter local green building standards.**

Revise this section as follows:

101.10 ~~Mandatory requirements. This code contains both mandatory and voluntary green building measures. Mandatory and voluntary measures are identified in the appropriate application checklist contained in this code.~~ **Equivalency. Wherever reference is made to the LEED® or GreenPoint Rated systems, a comparable equivalent rating system may be used if approved by the Director. The applicable LEED®, GreenPoint Rated or equivalent versions of performance standards for applications subject to this chapter are:**

LEED® for Green Interior Design and Construction v2009
LEED® for Building Design and Construction v2009
LEED® for Homes v2008
GreenPoint Rated (GPR) Single Family New Home Construction – v6
GreenPoint Rated (GPR) Multifamily New Home Construction – v6
GreenPoint Rated (GPR) Existing Multifamily – v6

Wherever specific LEED® prerequisites or credits are cited, such references are to LEED® BD&C 2009. More recent LEED® and GreenPoint Rated versions may be used, provided the credits and points achieved are as or at least as stringent as LEED® BD&C 2009 or GPR v6.

Wherever the LEED® or GreenPoint Rated systems include a minimum energy or other performance requirement, the permit applicant may choose to meet the minimum performance requirements with an alternative equivalent method approved by the Director.

Compliance with any of these requirements may be verified and/or certified by any means, including third-party review, as approved by the Director.

Revise this section as follows:

101.11 Effective use of this code. The following steps may be used to establish which provisions of this code are applicable to a specific occupancy:

1. Establish the type of occupancy.
~~2. Verify which state agency has authority for the established occupancy by reviewing the authorities list in Sections103 through 106.~~
2. ~~3. Once the appropriate agency has been identified, find~~ **Find** the section which covers the established occupancy.
3. ~~4. The Matrix Adoption Tables at the beginning of Chapters 4 and 5 i~~**Identify** ~~the mandatory green building measures necessary to meet~~ the minimum requirements of this code for the established occupancy **in Sections 4 and 5**.
~~5. Voluntary tier measures are contained in Appendix Chapters A4 and A5. A Checklist containing each green building measure, both required and voluntary is provided at the end of each appendix chapter. Each measure listed in the application checklist has a section number which correlates to a section where more information about the specific measure is available.~~
~~6. The Application Checklist identifies which measures are required by this code and allows users to check off which voluntary items have been selected to meet voluntary tier levels if desired or mandated by a city, county, or city and county.~~
4. Administrative Bulletin 93, provided by the Department of Building Inspection, summarizes how the requirements of San Francisco Green Building Code and relevant local requirements may be met. Appendices to Administrative Bulletin 93 include tabular summaries of required measures, and provide submittal forms.

Chapter 2
DEFINITIONS

SECTION 202 – DEFINITIONS

Add and amend the following definitions:

GREENPOINT RATED, GREENPOINTS and GREENPOINTS CHECKLIST. The residential green building rating system and checklist and certification methodology of the non-profit organization Build It Green.

HIGH-RISE RESIDENTIAL BUILDING. For the purposes of **this code**~~CalGreen~~, a building that is of Occupancy Group R and is four stories or greater.

HISTORICAL RESOURCE. A property that meets the terms of the definitions in Section 21084.1 of the CEQA Statute (The California Environmental Quality Act [Public Resources Code Section 21084.1]) and Section 15064.5 of the CEQA Guidelines, as determined by the San Francisco Planning Department.

LARGE COMMERCIAL BUILDING. A commercial building or addition of Group B, M, A, or I occupancy that is 25,000 gross square feet or more.

LEED® and LEED® Checklist The Leadership in Energy and Environment Design rating system, certification methodology, and checklist of the United States Green Building Council (USGBC).

LOW-RISE RESIDENTIAL BUILDING. For the purposes of **this code**~~CalGreen~~, a building that is of Occupancy Group R and is three stories or less **or that is a one or two family dwelling or townhouse**.

MAJOR ALTERATIONS. Alterations where interior finishes are removed and significant upgrades to structural and mechanical, electrical and/or plumbing systems are proposed where areas of such construction are 25,000 gross square feet or more in Group B, M or R occupancies of existing buildings.

MID-SIZE COMMERCIAL BUILDING. A commercial building of Group B or M occupancy that is 5,000 or more and less than 25,000 gross square feet, and is not a high-rise building.

NEWLY CONSTRUCTED (or NEW CONSTRUCTION). A newly constructed building (or new construction) **is a building that has never before been used or occupied for any purpose and** does not include additions, alterations or repairs.

NEW LARGE COMMERCIAL INTERIORS. First-time tenant improvements where areas of such construction are over 25,000 gross square feet or more in Group B or M occupancy areas of existing buildings.

Chapter 3
GREEN BUILDING

SECTION 301 –GENERAL

Revise this section as follows:

301.1 Scope. Buildings **in the City and County of San Francisco** shall be designed to include the green building measures specified as mandatory ~~in the application checklists contained in this code. Voluntary green building measures are also included in~~ under the ~~application checklists and may be included~~ **California Green Building Standards Code (CalGreen).** ~~in the design and construction of structures covered by this code but are not required unless adopted by a city, county or city and county as specified in Section 101.7~~

Additional green building requirements established by the City and County of San Francisco are mandatory for:

(1) Newly constructed Group R occupancy buildings,
(2) Newly constructed buildings of Group B, M, A, and I occupancies that are 25,000 gross square feet or more,
(3) New first-time build-outs of commercial interiors that are 25,000 gross square feet or more in buildings of Group B or M occupancies, and
(4) Major alterations that are 25,000 gross square feet or more in existing buildings of Group B, M or R occupancies, where interior finishes are removed and significant upgrades to structural and mechanical, electrical and/or plumbing systems are proposed.

Exempt from additional local requirements of this chapter, unless otherwise noted, are:

(1) Any new building in which laboratory use of any occupancy classification is the primary use, and
(2) Any building undergoing renovation in which the area of renovation will be primarily for laboratory use of any occupancy classification.

SECTION 302 – MIXED OCCUPANCY BUILDINGS

Revise this section as follows:

302.1 Mixed occupancy buildings. In mixed occupancy buildings, each portion of a building shall comply with the specific ~~green building~~ **California Title 24 Part 11 required** measures applicable to each specific occupancy. **However, to fulfill any additional local green building requirements, the project sponsor may apply a single required green building standard to the entire building.**

SECTION 303 – PHASED PROJECTS

Add the following section:

303.1.1.1 Maintenance of required features. Any structure subject to this chapter shall maintain the green building features required herein, or equivalent, regardless of subsequent alterations, additions, or changes of use, unless subject to subsequent or more stringent requirements.

Modify the following section:

SECTION 304 – VOULUNTARY TIERS

This section not applicable in San Francisco.

~~304.1 Purpose. Voluntary tiers are intended to further encourage building practices that improve public health, safety and general welfare by promoting the use of building concepts which minimize the building's impact on the environment and promote a more sustainable design.~~

~~304.1.1 Tiers. The provisions of Divisions A4.6 and A5.6 outline means, in the form of voluntary tiers, of achieving enhanced construction levels by incorporating additional measures for residential and nonresidential new construction. Voluntary tiers may be adopted by local governments and, when adopted, enforced by local enforcing agencies. Buildings complying with tiers specified for each occupancy contain additional prerequisite and elective green building measures necessary to meet the threshold of each tier. See section 101.7 of this code for procedures and requirements related to local amendments, additions or deletions, including changes to energy standards.~~

~~[BSC] Where there are practical difficulties involved in complying with the threshold levels of a tier, the enforcing agency may grant modifications for individual cases. The enforcing agency shall first find that a special individual reason makes the strict letter of the tier impractical and that modification is in conformance with the intent and purpose of the measure. The details of any action granting modification shall be recorded and entered in the files of the enforcing agency.~~

Modify the following section:

SECTION 305 [OSHPD 1] – CALGREEN TIER 1 AND CALGREEN TIER 2

This section not applicable in San Francisco.

~~305.1 CALGreen Tier 1 and CALGreen Tier 2 buildings contain voluntary green building measures necessary to meet the threshold of each level.~~

~~305.1.1 CALGREEN Tier 1. To achieve CALGreen Tier I, buildings must comply with the latest edition of "Savings By Design, Healthcare Modeling Procedures" found online at http://www/energysoft.com/ep/2007SBDHProcedures.pdf~~

~~305.1.2 CALGREEN Tier 2. To achieve CALGreen Tier 2, buildings must exceed the latest edition of "Savings By Design, Healthcare Modeling Procedures" by a minimum of 15%.~~

Modify the following section:

SECTION 306 – VOLUNTARY MEASURES

This section not applicable in San Francisco.

~~306.1 Purpose. Voluntary measures are intended to further encourage building practices that improve public health, safety and general welfare by promoting the use of building concepts which minimize the building's impact on the environment, promote a more sustainable design, and high performance educational facilities.~~

~~306.1.1 The provisions of Appendix A5 outline means of achieving enhanced construction levels by incorporating additional measures.~~

Chapter 4
RESIDENTIAL REQUIREMENTS

Division 4.1
PLANNING AND DESIGN

SECTION 4.101 –GENERAL

Modify the following section:

4.101.1 Scope. The provisions of this division outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore, enhance the environmental quality of the site, ~~and~~ respect the integrity of adjacent properties**, and promote the health, safety and welfare of San Francisco residents.**

Add the following section:

SECTION 4.103 – REQUIREMENTS FOR GROUP R OCCUPANCY BUILDINGS

4.103.1 New low-rise residential buildings.

4.103.1.1 Rating requirements
New low-rise residential buildings must be GreenPoint Rated and applicants must submit documentation demonstrating that a minimum of 75 GreenPoints from the GreenPoints Single Family New Construction Checklist or the GreenPoints Multifamily New Construction Checklist will be achieved. Alternatively, this rating requirement may be met by obtaining LEED Silver certification.

4.103.1.2 Stormwater management
Projects subject to this section shall meet the San Francisco Public Utilities Commission stormwater management requirements.

4.103.2 New high-rise residential buildings

4.103.2.1 Rating requirement

Permit applicants must submit documentation to achieve LEED® "Silver" certification. Alternatively, this rating requirement may be met by obtaining the GreenPoint Rated designation and submitting documentation demonstrating that a minimum of 75 GreenPoints from the GreenPoint Rated Multifamily New Construction checklist will be achieved.

4.103.2.2 Indoor water use reduction. Permit applicants must submit documentation verifying that a minimum 30 percent reduction in the use of indoor potable water is achieved, as calculated to meet LEED® credit WE3.2. Projects applying GreenPoint Rated or other equivalent rating systems may alternately use the CALGreen Performance Method (Title 24 Part 11 Section 4.301.1.2) to demonstrate 30% reduction.

4.103.2.3 Construction debris management. Permit applicants must submit documentation verifying the diversion of a minimum 75 percent of the projects construction and demolition debris, as calculated to meet LEED® credit MR2.2. The waste management plan necessary to meet this requirement shall be updated as necessary and shall be accessible during construction for examination by the Department of Building Inspection. Permit applicants must also meet the requirements of San Francisco Environment Code Chapter 14 and San Francisco Building Code Chapter 13B (Construction and Demolition Debris Recovery Program.)

4.103.2.4 Stormwater management. Projects subject to this section shall meet the San Francisco Public Utilities Commission stormwater management requirements.

4.103.2.4.1 Construction activity stormwater pollution prevention. All projects, whether greater or lesser than one acre, must develop and implement construction activity pollution prevention and site run-off controls adopted by the San Francisco Public Utilities Commission, as well as LEED® prerequisite SSp1, as applicable.

4.103.3 MAJOR ALTERATIONS TO EXISTING GROUP R OCCUPANCY BUILDINGS

4.103.3.1 RATING REQUIREMENT
Permit applicants must submit documentation to achieve a LEED® Gold rating. Alternatively, this rating requirement may be met by obtaining the GreenPoint Rated designation and submitting documentation demonstrating that a minimum of 75 GreenPoints from the GreenPoint Rated Multifamily checklist will be achieved. Major alterations applying to less than 80% of the building's gross floor area may alternately obtain the GreenPoint Rated Elements designation and submit documentation demonstrating that 49 points from the GreenPoint Rated Multifamily checklist have been achieved.

4.103.3.2 LOW-EMITTING MATERIALS
Alterations utilizing LEED® must submit documentation to verify the use of low-emitting materials meeting the LEED® credits EQ 4.1 (adhesives and sealants), EQ 4.2 (paints and coatings), and EQ 4.3 (carpet systems) where applicable.

Alterations utilizing GreenPoint Rated must submit documentation to verify the use of low-emitting materials meeting the GreenPoint Rated Multifamily New Homes measures for low-emitting coatings, adhesives and sealants, and carpet systems.

Add the following section:

SECTION 4.104 – HISTORIC PRESERVATION

4.104.1 On-site retention of historical features. For alterations of buildings determined to be historical resources, after demonstrating compliance with all applicable codes, including the 2013 California Building Energy Efficiency Standards (Title 24, Part 6) and the 2013 California Historical Building Code (Title 24, Part 8), the minimum points or credits required under this chapter shall be reduced for retention and in-situ reuse or restoration of certain character defining features, as follows:

TABLE 4.104.A

SIGNIFICANT HISTORICAL ARCHITECTURAL FEATURES	PERCENT RETAINED*	ADJUSTMENT TO MINIMUM LEED POINT REQUIREMENT	ADJUSTMENT TO MINIMUM GREENPOINTS REQUIREMENT
Windows @ principal façade(s)	At least 50%	2	7
Windows @ principal façade(s)	At least 75%	3	11
Windows @ principal façade(s)	100%	4	15
Other windows	At least 50%	1	3
Other windows	100%	2	6
Exterior doors @ principal façade(s)	100%	1	3
Siding or wall finish @ principal façade(s)	80%	1	4
Trim & casing @ wall openings on principal façade(s)	100%	1	3
Roof cornices or decorative eaves visible from right-of-way	100%	1	3
Sub-cornices, belt courses, water tables, and running trim visible from right-of-way	80%	1	3
Character-defining elements of significant interior spaces	At least 50%	2	7
Character-defining elements of significant interior spaces	100%	4	15
Other exterior ornamentation (e.g. cartouches, corbels, quoins, etc.) visible from right-of-way	80%	1	3

*** Retention includes the rehabilitation and repair of character-defining features that conform to the Secretary of the Interior's Standards for the Treatment of Historic Properties.**

Add the following section:

SECTION 4.105 – DEMOLITION OF EXISTING STRUCTURES

4.105.1 Adjustments to Rating Requirements for Building Demolition and Density. Applications subject to the San Francisco Green Building Code, whereby construction of a new building is proposed within five years of the demolition of a building on the site, where such demolition occurred after the effective date of the Green Building Ordinance - November 3, 2008 - the sustainability requirements for new buildings pursuant to the San Francisco Green Building Code shall be increased as follows:

4.105.1.1 LEED® Projects. For projects attaining a LEED® certification:

(1) Where the building demolished was an historical resource, the required points shall be increased by 10 points.

(2) Where the building demolished was not an historical resource, the required points shall be increased by 6 additional points.

(3) Where the building demolished was not an historical resource and the number of dwellings in the residential portion of the replacement structure are tripled, the required points shall be increased by 5 additional points.

4.105.1.2 GreenPoint Rated Projects. For projects attaining GreenPoint Rated:

(1) Where the building demolished was an historical resource, the required points shall be increased by 25 additional points.

(2) Where the building demolished was not an historical resource, the required points shall be increased by 20 additional points.

(3) Where the building demolished was not an historical resource and the number of dwellings in the residential portion of the replacement structure are tripled, the required points shall be increased by 17 additional points.

Division 4.2
ENERGY EFFICIENCY

SECTION4.201– GENERAL

Add the following section:

4.201.1 Energy Performance. [Reserved]

Chapter 5
NONRESIDENTIAL REQUIREMENTS

Division 5.1
PLANNING AND DESIGN

SECTION 5.101 –GENERAL

Modify the section as follows:

5.101 Scope. The provisions of this chapter outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore, and enhance the environmental quality of the site, ~~and~~ respect the integrity of adjacent properties, **and promote the health, safety and welfare of San Francisco residents.**

Add the following section:

SECTION 5.103 – REQUIREMENTS FOR GROUP A, B, I, and M BUILDINGS

5.103.1 New large commercial buildings

5.103.1.1 Rating Requirement. Permit applicants must submit documentation to achieve LEED® "Gold" certification.

5.103.1.2 Indoor water use reduction . Permit applicants must submit documentation verifying that a minimum 30 percent reduction in the use of indoor potable water is achieved, as calculated to meet LEED® credit WE3.2.

5.103.1.3 Construction debris management. Permit applicants must submit documentation verifying the diversion of a minimum 75 percent of the projects construction and demolition debris, as calculated to meet LEED® credit MR2.2. Permit applicants must also meet the requirements of San Francisco Environment Code Chapter 14 and San Francisco Building Code Chapter 13B (Construction and Demolition Debris Recovery Program.) The waste management plan necessary to meet this requirement shall be updated as necessary and shall be accessible during construction for examination by the Department of Building Inspection.

5.103.1.4 Commissioning . Permit applicants must submit documentation verifying that the facility has been or will meet the criteria necessary to meet LEED® credit EA 3.0 (Enhanced Commissioning), in addition to LEED® prerequisite EAp1 (Fundamental Commissioning of Building Energy Systems.)

5.103.1.5 Renewable energy . Effective January 1, 2012, permit applicants must submit documentation verifying either:

(1) Acquisition of renewable on-site energy or purchase of green energy credits in accord with LEED EA2 or EA6, OR

(2) Achieve a 10% compliance margin over Title 24 Part 6 2013 California Energy Standards.

5.103.1.6 Stormwater Management. Projects subject to this section shall meet the San Francisco Public Utilities Commission stormwater management requirements. All new building projects must develop and implement an Erosion and Sediment Control Plan or Stormwater Pollution Prevention Plan and implement site run-off controls adopted by the San Francisco Public Utilities Commission as applicable.

5.103.1.7 ENERGY PERFORMANCE [Reserved]

5.103.1.8 Temporary ventilation and IAQ Management During construction Permit applicants must submit documentation verifying that an Indoor Air Quality Management Plan is prepared and implemented which meets LEED® credit EQ 3.1. and Title 24 Part 11 5.504.1.3.

5.103.1.9 Low Emitting Materials. Permit applicants must submit documentation verifying that low-emitting materials are used, subject to on-site verification, meeting LEED® credits EQ 4.1, EQ 4.2, EQ 4.3, and EQ 4.4 wherever applicable.

Exceptions: 100% reused or 100% post consumer recycled hard surface flooring may be exempted from this requirement. Projects exercising this exemption must otherwise be eligible for LEED® credit EQ 4.3.

Interior composite wood and agrifiber products shall meet LEED® credit EQ 4.4 by containing no added urea formaldehyde resins. Interior and exterior hardwood plywood, particleboard, and medium density fiberboard composite wood products shall additionally meet California Air Resources Board Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections.

5.103.1.10 CALGreen Mandatory Measures. The following measures are mandatory in California for new non-residential buildings. Optionally, relevant LEED® credits can be used as alternative compliance paths, as noted below:

Title 24 Part 11 Section(s)	Topic/Requirement	Alternate Compliance Option:
5.106.4	Bicycle Parking	N/A
5.106.5	Fuel efficient vehicle and carpool parking	Meet LEED® SSc4.3 and/or SSc4.4, and demonstrate that 8% of parking is designated for fuel efficient vehicle and carpool parking.
5.106.8	Light pollution reduction	Meet LEED® credit SS 8
5.106.10	Drainage management plan	N/A
5.303.1	Water submeters	N/A
5.303.3.3.2	Multiple showerheads in one shower stall must not exceed maximum flow rate for	N/A

	single showerhead	
5.503.1	Fireplaces in non-residential occupancy must meet residential efficiency and emissions requirements,	N/A
5.407.2.2 5.504.5.3	Indoor chemical and pollutant source control	Meet LEED® credit EQ 5
5.507.4 5.507.4.1 5.507.4.2	Acoustical control and noise transmission	N/A
5.508.1.2	Halons not allowed in HVAC, refrigeration and fire suppression equipment.	Meet LEED® credit EA 4, and additionally document that all HVAC&R systems do not contain CFCs or halons.

5.103.2 New mid-size commercial buildings

5.103.2.2 Construction debris management. Permit applicants must submit documentation verifying the diversion of a minimum 75 percent of the projects construction and demolition debris, as calculated either to meet LEED® credit MR2.2 or equivalent. Permit applicants must also meet the requirements of San Francisco Environment Code Chapter 14 and San Francisco Building Code Chapter 13B (Construction and Demolition Debris Recovery Program.) The waste management plan necessary to meet this requirement shall be updated as necessary and shall be accessible during construction for examination by the Department of Building Inspection.

5.103.2.3 Renewable energy . Effective January 1, 2012, permit applicants must submit documentation verifying that either:

(1) Acquisition of renewable on-site energy or purchase of green energy credits in accord with LEED EA2 or EA6, OR

(2) In addition to meeting 5.103.2.5 Energy Performance requirement, achieve an additional 10% compliance margin over Title 24 Part 6 (2013) California Energy Standards,

5.103.2.5 Energy Performance [Reserved]

5.103.3 Major alterations to existing non residential buildings.

5.103.3.1 Rating Requirement. Permit applicants must submit documentation to achieve LEED® "Gold" certification.

5.103.3.2 Low Emitting Materials. Permit applicants must submit documentation to verify the use of low-emitting materials meeting LEED® EQ4.1, EQ4.2, EQ 4.3 and EQ4.4 wherever applicable.

5.103.4 New large commercial interiors

5.103.4.1 Rating Requirement. Permit applicants must submit documentation to achieve LEED®

LEED® "Gold" certification.

5.103.4.2 Low Emitting Materials. Permit applicants must submit documentation verifying that low-emitting materials are used, subject to in-site verification, meeting LEED® credits EQ4.1, EQ4.2, EQ4.3 and EQ 4.4 wherever applicable.

Add the following section:

SECTION 5.104– HISTORIC PRESERVATION

5.104.1 On-site retention of historical features. For alterations of buildings determined to be historical resources, after demonstrating compliance with all applicable codes, including the 2013 California Building energy Efficiency Standards (Title 24, Part 6) and the 2013 California Historical Building Code (Title 24, Part 8), the minimum points or credits required under this chapter shall be reduced for retention and in-situ reuse or restoration of certain character defining features, as follows:

TABLE 5.104.A

SIGNIFICANT HISTORICAL ARCHITECTURAL FEATURES	PERCENT RETAINED*	ADJUSTMENT TO MINIMUM LEED POINT REQUIREMENT	ADJUSTMENT TO MINIMUM GREENPOINTS REQUIREMENT
Windows @ principal façade(s)	At least 50%	2	7
Windows @ principal façade(s)	At least 75%	3	11
Windows @ principal façade(s)	100%	4	15
Other windows	At least 50%	1	3
Other windows	100%	2	6
Exterior doors @ principal façade(s)	100%	1	3
Siding or wall finish @ principal façade(s)	80%	1	4
Trim & casing @ wall openings on principal façade(s)	100%	1	3
Roof cornices or decorative eaves visible from right-of-way	100%	1	3
Sub-cornices, belt courses, water tables, and running trim visible from right-of-way	80%	1	3
Character-defining elements of significant interior spaces	At least 50%	2	7
Character-defining elements of significant interior spaces	100%	4	15

Other exterior ornamentation (e.g. cartouches, corbels, quoins, etc.) visible from right-of-way	80%	1	3

* Retention includes the rehabilitation and repair of character-defining features that conform to the Secretary of the Interior's Standards for the Treatment of Historic Properties.

Add the following section:

SECTION 5.105 – DEMOLITION OF EXISTING STRUCTURES

5.105.1 Adjustments to Rating Requirements. Applications subject to the San Francisco Green Building Code, whereby construction of a new building is proposed within five years of the demolition of a building on the site, where such demolition occurred after November 3, 2008, the sustainability requirements for new buildings pursuant to the San Francisco Green Building Code shall be increased as follows:

5.105.1.1 LEED® Projects. For projects attaining a LEED® certification:

(1) **Where the building demolished was an historical resource, the required points shall be increased by 10 points, which is 10% of the total available in the LEED® rating system, absent demolition.**

(2) **Where the building demolished was not an historical resource, the required points shall be increased by 6 additional points, which is 10% of the maximum total required points under this chapter, absent demolition.**

(3) **Where the building demolished was not an historical resource and the number of dwellings in the residential portion of the replacement structure are tripled, the required points shall be increased by 5 additional points, which is 8% of the maximum total required points under this chapter, absent demolition.**

5.105.1.2 GreenPoint Rated Projects. For projects attaining GreenPoint Rated:

(1) **Where the building demolished was an historical resource, the required points shall be increased by 25 additional points.**

(2) **Where the building demolished was not an historical resource, the required points shall be increased by 20 additional points.**

(3) **Where the building demolished was not an historical resource and the number of dwellings in the residential portion of the replacement structure are tripled, the required points shall be increased by 17 additional points.**

Division 5.2
ENERGY EFFICIENCY

SECTION 5.201 –GENERAL

Add the following section:

5.201.1.1 Energy performance. [Reserved]

Chapter 7
INSTALLER AND SPECIAL INSPECTOR QUALIFICATIONS

SECTION 701–GENERAL

Add the following section:

701.1 These requirements apply to installers and Special inspectors with regards to the requirements of this chapter.

SECTION 702 – QUALIFICATIONS

Modify the following section:

702.2 Special inspection. …

2. Certification by a statewide energy consulting or verification organization, such as HERS raters, building performance contractors, ~~and~~ home energy auditors**, and ICC Certified CALGreen Inspectors**.

Add the section as follows:

702.3 Special inspection. The Director of the Department of Building Inspection may require special inspection to verify compliance with this code or other laws that are enforced by the agency. The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the Director of the Department of Building Inspection, for inspection of the particular type of construction or operation requiring special inspection. In addition, the special inspector shall have a certification from a recognized state, national, or international association, as determined by the Director of the Department of Building Inspection. The area of certification shall be closely related to the primary job function, as determined by the local agency.

SECTION 7.703 – VERIFICATIONS

Modify the section as follows:

7.703.1 Documentation. Documentation used to show compliance with this code shall include but is not limited to, construction documents, plans, specifications, builder or installer certification, inspection reports, or other methods acceptable to the ~~enforcing agency~~ **Director of the Department of Building Inspection** which demonstrate substantial conformance. When specific documentation or special inspection is necessary to verify compliance, that method of compliance will be specified in ~~the appropriate section or identified in the application checklist~~ **Administrative Bulletin 93**.

City and County of San Francisco

2013 San Francisco Green Building Code

Analysis of Cost Effectiveness of Energy Requirements

Version 1 | October 17, 2013

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 214757

Arup North America Ltd
560 Mission Street
Suite 700
San Francisco 94105
United States of America

Prepared for:

SF Environment
Our home. Our city. Our planet.

ARUP

ARUP

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1 Summary

This report presents the results of an energy savings and cost-effectiveness analysis conducted for the City and County of San Francisco, examining the cost-effectiveness of energy efficiency requirements of the San Francisco Green Building Code (2013). The San Francisco Green Building Code (2013) consists of California Green Building Standards Code Title 24 Part 11 (2013), known as CalGreen, and stricter local requirements established for San Francisco in 2008 and updated in 2010.

This report summarizes the cost-effectiveness of energy efficiency requirements for new low-rise residential buildings in San Francisco (or any community located in "Climate Zone 3" as defined by the California Energy Commission.) It is limited to new low-rise residential because the proposed San Francisco Green Building Code (2013) would continue to require such projects to achieve 75 points in GreenPoint Rated and all GreenPoint Rated prerequisites – including a significant cost-effective compliance margin over California's Title 24 Part 6 Energy Standards consistent with this analysis. Build It Green has confirmed that the prescriptive package of cost-effective measures in this report will be accepted as one cost-effective way to meet the minimum requirements of GreenPoint Rated. In practice, projects would continue to have the option of meeting this requirement through a performance-based energy model prepared in California Energy Commission approved energy modeling software, which allows tradeoffs among measures, provided that the resulting designed will consume at least 10% less energy than a similar building which minimally complies with the code.

This report is a part of the application from City of San Francisco to the California Energy Commission (CEC). It is intended to meet the requirements specified in Section 10-106 of the Title 24, Part 6: Locally Adopted Energy Standards, as follows:

> (a) Requirements. Local governmental agencies may adopt and enforce energy standards for newly constructed buildings, additions, alterations, and repairs to existing buildings provided the Energy Commission finds that the standards will require buildings to be designed to consume no more energy than permitted by Title 24, Part 6.
>
> (b) Documentation Application. Local governmental agencies wishing to enforce locally adopted energy standards shall submit an application with the following materials to the Executive Director:
>
> 1. The proposed energy standards.
>
> 2. The local governmental agency's findings and supporting analyses on the energy savings and cost effectiveness of the proposed energy standards.
>
> 3. A statement or finding by the local governmental agency that the local energy standards will require buildings to be designed to consume no more energy than permitted by Part 6.
>
> 4. Any findings, determinations, declarations or reports, including any negative declaration or environmental impact report, required pursuant to the California Environmental Quality Act, Pub. Resources Code Section 21000 et seq.

This report is also the first part of a broader analysis of the potential for cost effective energy efficiency in new construction in general under the 2013 Energy Standards. SF Environment and the Department of Building Inspection will share results of the broader analysis as they become available, as well as technical analysis of LEED v4, which will be optional until at least July 1, 2015. SF Environment prioritized analysis of energy efficiency opportunities in low-rise residential for two reasons:

1. Energy modeling software approved by the California Energy Commission was not available until September, while it was necessary to finalize the draft code by July 2013 in order for the San Francisco Green Building Code to be effective January 1, 2014. The 2013 California Energy Standards are more than 20% stricter than the prior 2010 Energy Standards – so every

project built to the 2013 Energy Standards will be held to a higher efficiency requirement than projects subject to San Francisco's 2010 green building requirements.

2. The San Francisco Green Building Code as proposed would continue to require LEED for Building Design & Construction (BD&C) v2009 rating system (or LEED Core & Shell, etc.) for any applicable non-residential new construction project.[1] In all cases, all projects applying for building permit on or after January 1, 2014 must meet the 2013 California Title 24 Energy Standards. However, for purposes of additionally meeting San Francisco's green building requirements (which extend to many considerations in addition to energy efficiency), LEED BD&C v2009 continues to allow energy efficiency calculations based on ASHRAE 90.1 (2007) or CA Title 24 (2005).[2] As a result, California's Title 24 (2013) Energy Standards are significantly stricter than the minimum requirements of LEED v2009. However, GreenPoint Rated New Home and LEED for Homes are the two rating systems applicable to new residential buildings of 3 floors or less, and both require energy efficiency beyond code compliance.

2 Costs and Savings Analysis

2.1 Base Building Models

Arup is performing a comparative analysis of energy savings and costs using four representative building energy models. Four key building types – single family residential, multifamily, large high-rise office, and low-rise retail – were chosen as representative of anticipated new construction in San Francisco. The baseline models have critical attributes consistent with Title 24 2013, which will become effective on January 1, 2014. Key building characteristics are described in Table 2 in Appendix 0.

2.2 Methods and Assumptions

Energy savings data was developed from energy modeling using an adapted version of EnergyPlus customized for the *Technical Feasibility of Zero Net Energy Buildings in California* Study (ZNE Tool), and cross-verified against results from Codes and Standards Enhancement (CASE) research done for Title 24 2013 development. Energy savings were estimated for a set of sample measures for each model in terms of the CEC approved 2013 Time Dependent Value energy (TDV). Energy and cost savings were scaled to a per-square-foot basis.

Incremental cost data was developed from existing CASE research, from RS Means, and from other sources where CASE data was not available. Cost data was scaled to a per-square-foot basis. Measures such as LED lighting, with long useful lives, were compared against the initial purchase price and eventual replacement cost of comparable equipment (such as a compact fluorescent lamp).

3 Results

3.1 Single Family and Multi-Family Residence

Table 1 shows the feasible energy savings measures beyond code that could be implemented in a low-rise residential building in San Francisco (CZ3). The analysis looked at both single family and multi-

[1] In the case of new high-rise residential, the San Francisco Green Building Code as proposed would continue to allow LEED BD&C v2009 or GreenPoint Rated as compliance options. For the reasons stated, projects that opt for LEED BD&C v2009 would not have mandatory energy efficiency requirements beyond Title 24 (2013) at this time.
[2] LEED v4 references ASHRAE 90.1 (2010), a substantially higher energy efficiency standard.

family prototypes. Percent savings are based off of a housing unit baseline energy consumption of 185,346 TDV kbtu. The group of measures is cost effective.

Table 1: Low-Rise Residence Energy Results

Prescriptive Measure List Description	Lifecycle Savings			First Costs	Lifecycle Benefit : Cost Ratio
	TDV kbtu	TDV Percent %	TDV $/sq ft.	$/sq. ft.	
Wall Insulation R-19 w/R-4ci, 2x6	2,321	1.3%	$0.19	$0.41	0.5
Showerheads 2.0 to 1.8 GPM	1,483	0.8%	$0.12	$0.02	5.1
Kitchen Sinks 1.5 to 1.4 GPM	556	0.3%	$0.05	$0.02	1.9
All Building LED High-Efficacy Lighting	4,887	2.6%	$0.40	$0.05	8.0
Natural Ventilation	3,707	2.0%	$0.30	$0.00	Large
Ducts in conditioned space*	1,199	0.6%	$0.10	$0.40	0.2
Reduced infiltration: 5 ACH50 to 3 ACH50*	4,032	2.2%	$0.33	$0.52	0.6
DHW Heat Recovery**	5,321	2.9%	$0.87	$0.22	4.1
Total Savings	23,506	13%	$2.36	$1.43	1.7

* Single Family Residential focused measures
** Multi-Family Residential focused measures

The package of measures in Table 1 represents one cost-effective path to attaining a substantial compliance margin over 2013 Title 24 Part 6 Energy Standards. Plumbing fitting flow rates, whole building LED high efficacy lighting, and natural ventilation are each anticipated to be afforded prescriptive credit toward the compliance margin due to limitations of commonly available compliance software.[3] In practice, projects may meet the requirement via other design solutions, which could for example include improved efficiency of mechanical equipment, on-site renewable energy generation,[4] or envelope improvements to Passive House standards.

3.2 High-Rise Office

High-Rise Office analysis is underway. Preliminary results indicate an energy efficiency compliance margin in excess of 10% is cost-effective. High rise residential will also be considered in this analysis.

3.3 Small Retail

Small retail analysis is underway. Preliminary results indicate an energy efficiency compliance margin in excess of 10% is cost-effective.

[3] Prescriptive compliance credit would solely be applicable to the required compliance margin, not to minimum compliance with Title 24 2013 Energy Standards.
[4] Photovoltaics and solar hot water heating have been recognized methods to meet San Francisco's supplemental energy performance requirements under the Green Building Ordinance since 2008.

A1 References

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DOE Commercial Prototype Building Models. U.S. Department of Energy (DOE). Accessed October 2013. http://www.energycodes.gov/development/commercial/90.1_models

National Renewable Energy Laboratory (NREL). National Residential Efficiency Measures Database. Accessed October 2013. http://www.nrel.gov/ap/retrofits/measures.cfm

RS Means Online. Accessed October 2013. www.meanscostworks.com

Measure Description	Data Source	URL
Wall Insulation: R-19 w/R-4ci, 2x6	Residential Increased Wall Insulation: 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2011.	http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/current/Reports/Residential/Envelope/2013_CASE_R_Increased_Wall_Insulation_Oct_2011.pdf
Showerhead: 2.0 to 1.8 GPM	Multi-Head Showers and Lower-Flow Shower Heads: 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2011.	http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/current/Reports/Residential/Water_Heating/2013_CASE_R_Shower_Heads_Sept_2011.pdf
Kitchen faucet: 1.5 to 1.4 GPM	Original calculation.	
Ducts in conditioned space	Davis Energy Group research: SFD-Residential EEM Cost_v2.xlsx	
Improve indoor lighting from 50 lm/W to 100 lm/W	Measure Information Template – Residential Lighting, California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. March 2011.	http://www.h-m-g.com/T24/Lighting/draft%20presentations%202011.03.11/Residential%20Lighting%20%20Draft%20CASE%20Report.pdf
Natural Ventilation	Remove cooling load.	
Reduced infiltration: 1.8 SLA / 3.15 ACH50	National Renewable Energy Laboratory (NREL). National Residential Efficiency Measures Database. Accessed October 2013.	http://www.nrel.gov/ap/retrofits/measures.cfm
Drain water heat recovery added	Are potential savings going down the drain? – Clean Energy Resource Team. July 2013.	http://s3.amazonaws.com/zanran_storage/www.duluthenergydesign.com/ContentPages/2489554523.pdf http://www.cleanenergyresourceteams.org/blog/are-potential-savings-going-down-drain

A2 Baseline Building Models

Table 2: Representative Baseline Buildings for Energy Reach Code Analysis

	Single-Family Residence	Multifamily	High-Rise Office	Small Retail
Area (sq. ft.)	2,116	84,360	498,600	22,500
Dimensions	46 ft x 46 ft	152 ft x 56 ft	240 ft x 160 ft	300 ft x 75 ft
Number of Levels	1	10	10 + 2 basement	1
Walls	2'x4', 16" o.c., R-15 w/R-4 rigid c.i. U = 0.065	R-13.0 + R-7.5 c.i. U = 0.064	R-13.0 + R-3.8 c.i. U = 0.084	R-13.0 + R-3.8 c.i. U = 0.084
Window to Wall Ratio (%)	25%	14.9%	40% above-grade	10.5% over all 26% south-facing
Window	U = 0.32 SHGC = 0.25	U = 0.65 SHGC = 0.25	U = 0.65 SHGC = 0.25	U = 0.65 SHGC = 0.25
Skylight	None	None	None	None
Roof	R-30 U = 0.031	R-20.0 c.i. U = 0.048	R-20.0 c.i. U = 0.048	R-20.0 c.i. U = 0.048
Heating System	Gas Furnace	WSHP with CAV	Boiler Hot Water VAV	Gas Furnace
Cooling System	DX PTAC	WHSP with CAV	Water-Cooled Chiller Chilled Water VAV	Packaged SZ CAV DX RTU
Interior Lighting Power Density (LPD)	NA High-efficacy lighting mandatory in many spaces Dimming or vacancy sensor mandatory in many spaces	Apartment: 0.35 W/sf Corridors: 0.55 W/sf Weighted: 0.38 W/sf	1.0 W/sf	High Retail: 2.28 W/sf Mid Retail: 1.7 W/sf Low Retail: 1.3 W/sf Weighted: 1.64 W/sf
Interior Plug Load Density (EPD)	NA	Weighted: 0.80 w/sf	Office: 0.75 W/sf Weighted: 0.727 W/sf	1.0 W/sf
Exterior Lighting Power Density (LPD)	None	13.58 kW installed	60.216 kW installed	9.153 kW installed
Base Total EUI (kbtu / sq. ft.)	24.9	30.4	26.8	45.0

SAN FRANCISCO
PLANNING DEPARTMENT

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
415.558.6378

Fax:
415.558.6409

Planning
Information:
415.558.6377

Certificate of Determination
Exemption from Environmental Review

Case No.:	**2013.1157E**
Project Title:	**2013 San Francisco Building Codes - Proposed Amendments**
Location:	Citywide
Project Sponsor:	Kirk Means, Building Inspector, Department of Building Inspection
Staff Contact:	Christopher Espiritu – (415) 575-9022 Christopher.Espiritu@sfgov.org

PROJECT DESCRIPTION:

The proposed project would include updates to the current San Francisco Building, Residential, Electrical, Plumbing, and Mechanical Codes and the adoption of local amendments to the 2013 California Building Standard Codes. Elements of the proposed 2013 San Francisco Building Code would reflect a similar structure to the previously-adopted 2010 San Francisco Building Code and would retain discrete code sections for Building, Residential, Electrical, Plumbing, and Mechanical. An addition of a new individual section for the San Francisco Green Building Code, which was formerly Section 13C of the 2010 San Francisco Building Code, would be added to the proposed 2013 San Francisco Building Code. The California Green Building Code is part 11 of Title 24 of the California Code of Regulations and will go into effect throughout California at the same time as the 2013 California Building Standards Code, thus a Green Building Code section would be added to the proposed 2013 San Francisco Building Code.
(Continued on next page)

EXEMPT STATUS:

General Rule Exclusion [State Guidelines, Section 15061(b)(3)].

DETERMINATION:

I do hereby certify that the above determination has been made pursuant to State and Local requirements.

Virnaliza Wise for
Sarah Jones
Environmental Review Officer

October 16, 2013
Date

cc: Kirk Means, Building Inspector, DBI
Judy Boyajian, Deputy City Attorney
Virna Byrd, M.D.F.
Bulletin Board

PROJECT DESCRIPTION (continued):

The San Francisco Building Code regulates and controls the design, construction, quality of materials, use and occupancy, location, maintenance and demolition of all buildings and structures, quarrying, grading, excavation and filling of land, in the City and County of San Francisco. In addition, the Code provides safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations. (The full text of proposed amendments is available for review at the Department of Building Inspection (DBI)).

The proposed project is subject to review and adoption by the San Francisco Board of Supervisors. Approval action for the proposed project is the adoption of the proposed project (ordinance) by the Board of Supervisors. Following introduction of the proposed ordinance to the Board of Supervisors, a 30-day review and comment period would be required prior to a Land Use Committee hearing on the proposed changes to the Code. When approved, the Land Use Committee will send the proposed ordinance to the full Board. The Board of Supervisors will review and approve the proposed project (ordinance) and upon approval by the Board of Supervisors, the proposed ordinance will be forwarded to the Mayor for signature. Following mayoral signature of the proposed ordinance, there is a 30-day waiting period before the approved ordinances can become effective.

REMARKS:

Every three years, the State of California adopts new California Building Code Standards, which go into effect throughout the State within 180 days after publication. The 2013 California Building Code will go into effect throughout California on January 1, 2014. The City and County of San Francisco is required, by State law, to enforce the California Building, Electrical, Plumbing, Mechanical, Housing, and Fire Codes.

Additional discretionary actions for local jurisdictions include the ability to enact more stringent standards, or local amendments, to the California Building Code Standards. Local amendments proposed for adoption by the City of San Francisco primarily deal with administrative, procedural, informational, and non-physical aspects of the various Code sections. To the extent that the local amendments relate to physical building conditions, they are intended to improve building safety and regulate building features such as wood decks, balconies, earthquake recording instruments, and sidewalks. The physical effects of such modifications are related to building design features which are very minor, localized in terms of visibility and impact, and intended to improve building safety. In addition, these local amendments provide guidance on specific conditions that are unique to the City of San Francisco such as topography, geology, and climate.

CEQA Guidelines Section 15061(b)(3) provides an exemption from environmental review where it can be seen with certainty that the proposed project would not have a significant effect on the environment. Since the proposed code amendments would have no significant environmental effects, it is appropriately

exempt from environmental review under the General Rule Exclusion (CEQA Guidelines Section 15061(b)(3)).

CEQA State Guidelines Section 15300.2 states that a categorical exemption shall not be used for an activity where there is a reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances. There are no unusual circumstances surrounding the current proposal that would suggest a reasonable possibility of a significant environmental effect. The proposed would have no significant environmental effects. The project would be exempt under the above-cited classification. For the above reasons, the proposed project is appropriately exempt from environmental review.

BUILDING INSPECTION COMMISSION (BIC)

Department of Building Inspection **Voice (415) 558-6164 - Fax (415) 558-6509**
1660 Mission Street, San Francisco, California 94103-2414

August 22, 2013

Edwin M. Lee
Mayor

COMMISSION

Angus McCarthy
President

Warren Mar
Vice-President

Kevin Clinch
Frank Lee
Dr. James McCray, Jr.
Myrna Melgar
Debra Walker

Sonya Harris
Secretary

Tom Hui
Acting Director

Ms. Angela Calvillo
Clerk of the Board
Board of Supervisors, City Hall
1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102-4694

RE: Code amendments to the 2013 California Building, Mechanical, Electrical, Plumbing, Residential & Green Building Codes and recommend approval to the Board of Supervisors.

Dear Ms. Calvillo:

On August 22, 2013 the Building Inspection Commission held a public hearing on the proposed Code amendments referenced above.

The Commission voted unanimously (6-0) to recommend that the Board of Supervisors approve the amendments.

The Commissioners voted as follows:

President McCarthy	Aye	Vice-President Mar	Aye
Commissioner Clinch	Aye	Commissioner Lee	Aye
Commissioner McCray, Jr.	Aye	Commissioner Melgar	Aye
Commissioner Walker, excused			

Enclosed please find the Code Advisory Committee's recommendation to the BIC. Under separate cover, copies of the proposed amendments will follow from the Technical Services Division of the Department of Building Inspection.

Should you have any questions, please do not hesitate to call me at 558-6164.

Sincerely,

Sonya Harris
Commission Secretary

cc: Tom Hui, S.E., Acting Director
Mayor Edwin M. Lee
Supervisor David Chiu
Supervisor Scott Wiener
Supervisor Norman Yee
Supervisor Mark Farrell
Supervisor London Breed
Supervisor Eric Mar
Supervisor Malia Cohen
Deputy City Attorney John Malamut

City and County of San Francisco
Department of Building Inspection



Edwin M. Lee, Mayor
Tom C. Hui, S.E., C.B.O., Acting Director

August 16, 2013

Building Inspection Commission
1660 Mission Street
San Francisco, CA 94103

RE: Proposed 2013 amendments to the California Building Standards Code, CCR Title 24

Honorable Members of the Commission:

At the regular meeting of August 14, 2013, the full Code Advisory Committee (CAC) deliberated on and unanimously voted to approve, and transmit to the Building Inspection Commission, all of the 2013 San Francisco amendments to the 2013 California Title 24 building standards codes. This Committee has labored long and arduous hours over the past five months and feels that the work product before you represents the basis for a continuing safe and healthy building environment in San Francisco.

The San Francisco building standards codes approved and recommended by this Committee are:

1. 2013 San Francisco Building Code
   (which includes the amendments to the California Building and Residential Codes)
2. 2013 San Francisco Mechanical Code
3. 2013 San Francisco Electrical Code
4. 2013 San Francisco Plumbing Code
5. 2013 San Francisco Green Building Code

These documents are transmitted to you for your further action and a final approval to send them on to the Board of Supervisors. If you have any questions, please call me at (415) 575-6832.

Respectfully submitted,

Kirk Means
DBI Technical Services Division
Secretary to the Code Advisory Committee

cc: Tom C. Hui, S.E., C.B.O., Acting Director
Edward Sweeney, Acting Deputy Director
David Leung, Manager, Permit Submittal and Issuance
Ned Fennie, Jr., Chair, Code Advisory Committee
Bill Strawn, Communications Manager

City and County of San Francisco
Department of Building Inspection

Edwin M. Lee, Mayor
Tom C. Hui, S.E., C.B.O., Acting Director

August 29, 2013

RECEIVED
BOARD OF SUPERVISORS
SAN FRANCISCO
2013 AUG 29 PM 3:30
4k

Angela Calvillo, Clerk of the Board
Board of Supervisors
#1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102-4689

Dear Ms. Calvillo:

Attached please find an original and two electronic (CD's) copies of six proposed ordinances (approved by the Building Inspection Commission on August 21, 2013) for the Board of Supervisors approval, which repeal the San Francisco amendments to the 2010 California Building Standards codes and adopt replacement amendments to the new 2013 California Building Standards Codes effective January 1, 2014. (Two copies of these 2013 California Building Standards Codes are hereby provided for your reference in the form of each California adopted model code and their associated California amendments to them.)

The following is a list of accompanying documents (three sets):

1) Environmental Findings (to follow)
2) Exhibit A
3) San Francisco Building Code Ordinance, Legislative Digest, Findings, proposed amendment text (Building)
4) San Francisco Building Code; Residential Building Requirements Ordinance, Legislative Digest, Findings, proposed amendment text. (Residential)
5) San Francisco Electrical Code Ordinance, Legislative Digest, Findings, proposed amendment text (Electrical)
6) San Francisco Mechanical Code Ordinance, Legislative Digest, Findings, proposed amendment text (Mechanical)
7) San Francisco Plumbing Code Ordinance, Legislative Digest, Findings, proposed amendment text (Plumbing)
8) San Francisco Green Building Code Ordinance, Legislative Digest, Findings, proposed amendment text (Green)

In order for the San Francisco code amendments to coordinate with the California codes, which have an effective date of January 1, 2014, the timeline for approval and adoption requires that the codes be submitted to the Board of Supervisors on or before August 30, 2013 for introduction and assignment to the Land Use Committee (on September 10, 2013), a thirty day review and comment period follows prior to hearing at the Land Use Committee on October 21, 2013. When approved, it is proposed that the Board of Supervisors agendize

Readings on October 29, 2013 and November 5, 2013. Upon their approval, the ordinances will be forwarded to the Mayor for signature within 10 days, followed by a 30 day wait period (ending approximately December 15, 2013) before filing with the California Building Standards Commission to become effective for an implementation date of January 1, 2014.

The following person may be contacted regarding this matter:

Kirk Means, Building Inspector
Technical Services Division
Department of Building Inspection
Phone: (415) 575-6832
Fax: (415) 558-6401

Attachments: As stated

BOARD of SUPERVISORS

City Hall
Dr. Carlton B. Goodlett Place, Room 244
San Francisco 94102-4689
Tel. No. 554-5184
Fax No. 554-5163
TDD/TTY No. 554-5227

September 16, 2013

File Nos. 130836-130841

Sarah Jones
Environmental Review Officer
Planning Department
1650 Mission Street, 4th Floor
San Francisco, CA 94103

Dear Ms. Jones:

On September 10, 2013, the Building Inspection Commission introduced the following proposed legislation:

130836 **Building Code - Repeal of Existing 2010 Code and Enactment of 2013 Edition**

Ordinance repealing the 2010 Building Code in its entirety and enacting a 2013 Building Code consisting of the new model code, as amended by the State of California and as further amended by San Francisco; adopting environmental findings and findings of local conditions under the California Health and Safety Code; providing for an operative date of January 1, 2014; and directing the Clerk of the Board to forward the legislation to the State Building Standards Commission as required by State law.

130837 **Building Code - Residential Building Requirements**

Ordinance incorporating the provisions of the 2013 California Residential Code into various chapters of the Building Code with local amendments, and adding Chapter 36 to serve as a directory of where such provisions may be found in the Building Code; adopting environmental findings and findings of local conditions under the California Health and Safety Code; providing for an operative date of January 1, 2014; and directing the Clerk of the Board to forward the legislation to the State Building Standards Commission as required by State law.

130838 **Electrical Code - Repeal of Existing 2010 Code and Enactment of 2013 Edition**

Ordinance repealing the 2010 Electrical Code in its entirety and enacting a 2013 Electrical Code consisting of the new model code, as amended by the State of California and as further amended by San Francisco; adopting environmental findings and findings of local conditions under the California Health and Safety Code; providing for an operative date of January 1, 2014; and directing the Clerk of the Board to forward the legislation to the State Building Standards Commission as required by State law.

130839 **Mechanical Code - Repeal of Existing 2010 Code and Enactment of 2013 Edition**

Ordinance repealing the 2010 Mechanical Code in its entirety and enacting a 2013 Mechanical Code consisting of the new model code, as amended by the State of California and as further amended by San Francisco; adopting environmental findings and findings of local conditions under the California Health and Safety Code; providing for an operative date of January 1, 2014; and directing the Clerk of the Board to forward the legislation to the State Building Standards Commission as required by State law.

130840 **Plumbing Code - Repeal of Existing 2010 Code and Enactment of 2013 Edition**

Ordinance repealing the 2010 Plumbing Code in its entirety and enacting a 2013 Plumbing Code consisting of the new model code, as amended by the State of California and as further amended by San Francisco; adopting environmental findings and findings of local conditions under the California Health and Safety Code; providing for an operative date of January 1, 2014; and directing the Clerk of the Board to forward the legislation to the State Building Standards Commission as required by State law.

130841 **Green Building Code - Enactment of New Code**

Ordinance enacting a 2013 San Francisco Green Building Code consisting of the 2013 California Green Building Standards Code, as amended by San Francisco; adopting environmental findings and findings required by the California Health and Safety Code, California Public Resources Code, and Title 24 of the California Code of Regulations; providing for an operative date of January 1, 2014; and directing the Clerk of the Board to forward the legislation to the State Building Standards Commission as required by State law.

This legislation is being transmitted to you for environmental review.

Angela Calvillo, Clerk of the Board

By: Alisa Miller, Committee Clerk
Land Use & Economic Development Committee

Attachment

c: Monica Pereira, Environmental Planning
Joy Navarrete, Environmental Planning

CALIFORNIA 2013 GREEN BUILDING STANDARDS CODE

*CAL*Green

California Code of Regulations
Title 24, Part 11

California Building Standards Commission

Effective Date: January 1, 2014

2013 California Green Building Standards Code
California Code of Regulations, Title 24, Part 11

First Printing: July 2013

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Sacramento, CA 95833-2936

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PREFACE

This document is the 11th of 12 parts of the official compilation and publication of the adoptions, amendments and repeal of regulations to *California Code of Regulations*, Title 24, also referred to as the *California Building Standards Code*. This part is known as the *California Green Building Standards Code*, and it is intended that it shall also be known as the *CALGreen Code*.

The *California Building Standards Code* is published in its entirety every three years by order of the California Legislature. The California Legislature delegated authority to various State agencies, boards, commissions and departments to create building regulations to implement the State's statutes. These building regulations or standards have the same force of law, and take effect 180 days after their publication unless otherwise stipulated. The *California Building Standards Code* applies to all occupancies in the State of California as annotated.

A city, county, or city and county may establish more restrictive standards reasonably necessary because of local climatic, geological or topographical conditions. For the purpose of this code, these conditions include local environmental conditions as established by a city, county, or city and county. Findings of the local condition(s) and the adopted local building standard(s) must be filed with the California Building Standards Commission to become effective and may not be effective sooner than the effective date of this edition of the *California Building Standards Code*. Local building standards that were adopted and applicable to previous editions of the *California Building Standards Code* do not apply to this edition without appropriate adoption and the required filing.

Should you find publication (e.g., typographical) errors or inconsistencies in this code or wish to offer comments toward improving its format, please address your comments to:

California Building Standards Commission
2525 Natomas Park Drive, Suite 130
Sacramento, CA 95833-2936
Phone: (916) 263-0916
Fax: (916) 263-0959

Website: www.bsc.ca.gov

ACKNOWLEDGMENTS

The 2013 *California Building Standards Code* (Code) was developed through the outstanding collaborative efforts of the Department of Housing and Community Development, the Division of State Architect, the Office of the State Fire Marshal, the Office of Statewide Health Planning and Development, the California Energy Commission, the California Department of Public Health, the California State Lands Commission, the Board of State and Community Corrections, and the California Building Standards Commission (Commission).

This collaborative effort included the assistance of the Commission's Code Advisory Committees and many other volunteers that worked tirelessly to assist the Commission in the production of this Code.

Governor Edmund G. Brown Jr.

Members of the Building Standards Commission

Secretary Anna Caballaro – Chair
James Barthman – Vice-Chair

Stephen Jensen
Randy Twist
Richard Sawhill
Kent Sasaki
Rose Conroy
Sheila Lee
Richard Sierra
Steven Winkel

Erick Mikiten

Jim McGowan – Executive Director
Michael L. Nearman -- Deputy Executive Director

For questions on California state agency amendments; please refer to the contact list on page v.

LEGEND FOR AGENCY ADOPTIONS

Unless otherwise noted, state agency adoptions are indicated by the following banners in the section leaders:

Department of Housing and Community Development: **[HCD]**

California Building Standards Commission: **[BSC]**

Division of the State Architect, Structural Safety: **[DSA-SS]**

Office of Statewide Health Planning and Development: **[OSHPD 1, 2 & 4]**

See Chapter 1, Sections 103–106 for applications regulated by the respective state agencies.

EFFECTIVE USE OF THIS CODE

The format of this code is common to other parts of the *California Building Standards Code* and contains building standards applicable to occupancies which fall under the authority of different state agencies. Occupancies and applications under the authority of a specific state agency are identified in Chapter 1, Sections 103 through 106. Sections of this code which are applicable and adopted by each state agency are identified in the Matrix Adoption Tables located at the beginning of each chapter. The following outline is provided as a guide to establish which provisions are applicable to a specific occupancy.

1. Establish the type of occupancy.
2. Verify which state agency has authority for the established occupancy by reviewing the authorities list in Sections 103 through 106.
3. Once the appropriate agency has been identified, find the chapter which covers the established occupancy.
4. The Matrix Adoption Tables at the beginning of Chapters 4 and 5 identify the required green building measures necessary to meet the minimum requirements of this code for the established occupancy.
5. Voluntary tier measures are contained in Appendix Chapters A4 and A5. A Checklist containing each green building measure, both required and voluntary is provided at the end of each appendix chapter. Each measure listed in the application checklist has a section number which correlates to a section where more information about the specific measure is available.
6. The Application Checklist identifies which measures are required by this code and allows users to check-off which voluntary items have been selected to meet voluntary tier levels if desired or mandated by a city, county, or city and county.

California Code of Regulations, Title 24

California Agency Information Contact List

Board of State and Community Corrections

www.bscc.ca.gov .....(916) 445-5073
Local Adult Jail Standards
Local Juvenile Facility Standards

California Building Standards Commission

www.bsc.ca.gov .....(916) 263-0916

California Energy Commission

*www.enregy.ca.gov ..... **Energy Hotline** (800) 772-3300*
Building Efficiency Standards
Appliance Efficiency Standards
Compliance Manual/Forms

California State Lands Commission

www.slc.ca.gov .....(562) 499-6312
Marine Oil Terminals

California State Library

www.library.ca.gov .....(916) 654-0266

Department of Consumer Affairs:

Acupuncture Board
www.acupuncture.ca.gov .....(916) 515-5200
Office Standards

Board of Pharmacy
www.pharmacy.ca.gov .....(916) 574-7900
Pharmacy Standards

Bureau of Barbering and Cosmetology
www.barbercosmo.ca.gov .....(916) 952-5210
Barber and Beauty Shop,
and College Standards

Bureau of Electronic and Appliance Repair,
Home Furnishings and Thermal Insulation
www.bearhfti.ca.gov.....(916) 999-2041
Insulation Testing Standards

Structural Pest Control Board
www.pestboard.ca.gov .....(800) 737-8188
Structural Standards

Veterinary Medical Board
www.vmb.ca.gov.....(916) 263-2610
Veterinary Hospital Standards

Department of Food and Agriculture

www.cdfa.ca.gov
Meat & Poultry Packing Plant Standards (916) 654-0509
Dairy Standards (916) 654-0773

Department of Housing and Community Development

www.hcd.ca.gov.....(916) 445-9471
Residential- Hotels, Motels, Apartments,
Single-Family Dwellings; and
Permanent Structures in Mobilehome &
Special Occupancy Parks

(916) 445-3338
Factory-Built Housing, Manufactured Housing &
Commercial Modular

Mobilehome- Permits & Inspections
Northern Region–(916) 255-2501
Southern Region–(951) 782-4420

(916) 445-9471
Employee Housing Standards

Department of Public Health

www.dph.ca.gov.....(916) 449-5661
Organized Camps Standards
Public Swimming Pools Standards

Division of the State Architect

www.dgs.ca.gov/dsa.....(916) 445-8100

Access Compliance

Structural Safety
Public Schools Standards
Essential Services Building Standards
Community College Standards

State Historical Building Safety Board
Alternative Building Standards

Office of Statewide Health Planning and Development

www.oshpd.ca.gov.....(916) 440-8356
Hospital Standards
Skilled Nursing Facility Standards &
Clinic Standards
Permits

Office of the State Fire Marshal

osfm.fire.ca.gov .....(916) 445-8200
Code Development and Analysis
Fire Safety Standards

HOW TO DETERMINE WHERE CHANGES HAVE BEEN MADE

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	This symbol indicates that a change has been made.
>	This symbol indicates deletion of language.

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CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 1 – ADMINISTRATION

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below	X		X				X	X	X		X								
Chapter/Section																			
101	X		X				X	X	X		X								
102	X		X				X	X	X		X								
103	X																		
104			X																
105							X												
106								X	X		X								

CHAPTER 1

ADMINISTRATION

SECTION 101
GENERAL

101.1 Title. These regulations shall be known as the *California Green Building Standards Code* and may be cited as such and will be referred to herein as "this code." It is intended that it shall also be known as the *CALGreen* Code. The *California Green Building Standards Code* is Part 11 of twelve parts of the official compilation and publication of the adoption, amendment and repeal of building regulations to the *California Code of Regulations*, Title 24, also referred to as the *California Building Standards Code*.

101.2 Purpose. The purpose of this code is to improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices in the following categories:

1. Planning and design.
2. Energy efficiency.
3. Water efficiency and conservation.
4. Material conservation and resource efficiency.
5. Environmental quality.

101.3 Scope. The provisions of this code shall apply to the planning, design, operation, construction, use and occupancy of every newly constructed building or structure, unless otherwise indicated in this code, throughout the State of California.

It is not the intent that this code substitute or be identified as meeting the certification requirements of any green building program.

101.3.1 State-regulated buildings, structures and applications. Provisions of this code shall apply to the following buildings, structures and applications regulated by state agencies as specified in Sections 103 through 106, except where modified by local ordinance pursuant to Section 101.7. When adopted by a state agency, the provisions of this code shall be enforced by the appropriate enforcing agency, but only to the extent of authority granted to such agency by statute.

1. State-owned buildings, including buildings constructed by the Trustees of the California State University, and to the extent permitted by California law, buildings designed and constructed by the Regents of the University of California and regulated by the Building Standards Commission. See Section 103 for additional scoping provisions.
2. Energy efficiency standards regulated by the California Energy Commission.
3. All residential buildings constructed throughout the State of California, including but not limited to, hotels, motels, lodging houses, apartment houses, dwellings, dormitories, condominiums, shelters for homeless persons, congregate residences, employee housing, factory-built housing and other types of dwellings containing sleeping accommodations with or without common toilets or cooking facilities regulated by the

Department of Housing and Community Development. See Section 104 for additional scoping provisions.

4. Public elementary and secondary schools, and community college buildings regulated by the Division of the State Architect. See Section 105 for additional scoping provisions.
5. Qualified historical buildings and structures and their associated sites regulated by the State Historical Building Safety Board within the Division of the State Architect.
6. General acute care hospitals, acute psychiatric hospitals, skilled nursing and/or intermediate care facilities, clinics licensed by the Department of Public Health and correctional treatment centers regulated by the Office of Statewide Health Planning and Development. See Section 106 for additional scoping provisions.
7. Graywater systems regulated by the Department of Water Resources and the Department of Housing and Community Development.
8. Green building standards for occupancies where no state agency has authority or expertise, adopted by the California Building Standards Commission. See Section 103 for additional scoping provisions.

101.4 Appendices. Provisions contained in the appendices of this code are not mandatory unless specifically adopted by a State agency or adopted by a city, county, or city and county in compliance with *Health and Safety Code* Sections 18930 and 18941.5, respectively, for Building Standards Law; *Health and Safety Code* Section 17950 for State Housing Law; and *Health and Safety Code* Section 13869.7 for Fire Protection Districts. See Section 101.7 of this code.

101.5 Referenced codes and standards. The codes and standards referenced elsewhere in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference.

101.5.1 Building. The provisions of the *California Building Code* and *California Residential Code*, as applicable, shall apply to the construction, alteration, movement, enlargement, replacement, repair, use and occupancy, location, maintenance, removal and demolition of every structure or any appurtenances connected or attached to such buildings or structures.

101.5.2 Electrical. The provisions of the *California Electrical Code* shall apply to the installation of electrical systems, including but not limited to, alterations, repair, replacement, equipment, appliances, fixtures, fittings and appurtenances thereto.

101.5.3 Mechanical. The provisions of the *California Mechanical Code* shall apply to the installation, alterations, repair and replacement of mechanical systems, including equipment, appliances, fixtures, fittings and/or appurtenances, including ventilating, heating, cooling, air-conditioning and refrigeration systems, incinerators and other energy-related systems.

101.5.4 Plumbing. The provisions of the *California Plumbing Code* shall apply to the installation, alteration, repair and replacement of plumbing systems, including equipment, appliances, fixtures, fittings and appurtenances where connected to a water or sewage system.

101.5.5 Fire prevention. The provisions of CCR, Title 19, Division 1 and CCR, Title 24, Part 2 and Part 9 relating to fire and panic safety as adopted by the Office of the State Fire Marshal shall apply to all structures, processes and premises for protection from the hazard of fire, panic and explosion.

101.5.6 Energy. The provisions of the *California Energy Code* shall apply to the minimum design and construction of buildings for energy efficiency.

101.6 Order of precedence and use.

101.6.1 Differences. In the event of any differences between these building standards and the standard reference documents, the text of these building standards shall govern. In the event a local amendment to this code results in differences between these building standards and the amendment, the text of the amendment shall govern.

101.6.2 Specific provision. Where a specific provision varies from a general provision, the specific provision shall apply.

101.6.3 Conflicts. When the requirements of this code conflict with the requirements of any other part of the *California Building Standards Code*, Title 24, the most restrictive requirement shall prevail.

101.6.4. Explanatory notes. Explanatory material, such as references to websites or other sources where additional information may be found, is included in this code in the form of notes. Notes are informational only and are not enforceable requirements of this code.

101.7 City, county, or city and county amendments, additions or deletions. This code is intended to set mandatory minimum Green Building Standards and includes optional tiers that may, at the discretion of any city, county, or city and county, be applied.

This code does not limit the authority of city, county, or city and county governments to make necessary changes to the provisions contained in this code pursuant to Section 101.7.1. The effective date of amendments, additions, or deletions to this code for cities, counties, or cities and counties filed pursuant to Section 101.7.1 shall be the date on which it is filed. However, in no case shall the amendments, additions or deletions to this code be effective any sooner than the effective date of this code.

Local modifications shall comply with *Health and Safety Code* Section 18941.5(b) for Building Standards Law, *Health and Safety Code* Section 17958.5 for State Housing Law or *Health and Safety Code* Section 13869.7 for Fire Protection Districts.

101.7.1 Findings and filings.

1. The city, county, or city and county shall make express findings for each amendment, addition or deletion based upon climatic, topographical or geological conditions. For the purpose of this section, climatic, topographical or geological conditions include local environmental conditions as established by the city, county, or city and county.

2. The city, county, or city and county shall file the amendments, additions or deletions expressly marked and identified as to the applicable findings. Cities, counties, cities and counties, and fire departments shall file the amendments, additions or deletions and the findings with the California Building Standards Commission at 2525 Natomas Park Drive, Suite 130, Sacramento, CA 95833.
3. Findings prepared by fire protection districts shall be ratified by the local city, county, or city and county and filed with the California Department of Housing and Community Development at 1800 3rd Street, Room 260, Sacramento, CA 95811.
4. The city, county, or city and county shall obtain California Energy Commission approval for any energy-related ordinances consistent with *Public Resources Code* Section 25402.1(h)(2) and Title 24, Part 1, Section 10-106. Local governmental agencies may adopt and enforce energy standards for newly constructed buildings, additions, alterations and repairs, provided the California Energy Commission finds that the standards will require buildings to be designed to consume no more energy than permitted by Part 6. Such local standards include, but are not limited to, adopting the requirements of Part 6 before their effective date, requiring additional energy conservation measures, or setting more stringent energy budgets.

101.8 Alternate materials, designs and methods of construction. The provisions of this code are not intended to prevent the use of any alternate material, appliance, installation, device, arrangement, method, design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternate shall be approved on a case-by-case basis where the enforcing agency finds that the proposed alternate is satisfactory and complies with the intent of the provisions of this code and is at least the equivalent of that prescribed in this code in planning and design, energy, water, material conservation and resource efficiency, environmental air quality, performance, safety and the protection of life and health. Consideration and compliance provisions for occupancies regulated by adopting state agencies are found in the sections listed below.

1. Section 1.2.2 in the *California Building Code* (CBC) for the California Building Standards Commission.
2. Section 104.11 of Chapter 1, Division II for the Division of the State Architect.
3. Section 1.8.7, Chapter 1, Administration, Division 1, of the 2013 *California Building Code* and Section 1.2.6, Chapter 1, Administration, Division 1, of the 2013 *California Residential Code* for the Department of Housing and Community Development.
4. Section 7-104, 2013 *California Administrative Code* for the Office of the Statewide Health Planning and Development.

101.9 Effective date of this code. Only those standards approved by the California Building Standards Commission that are effective at the time an application for a building permit is submitted shall apply to the plans and specifications for, and to the construction performed under, that permit. For the effective dates of the provisions contained in this code, see the appropriate application checklist and the History Note page of this code.

101.10 Mandatory requirements. This code contains both mandatory and voluntary green building measures. Mandatory and voluntary measures are identified in the appropriate application checklist contained in this code.

101.11 Effective use of this code. The following steps shall be used to establish which provisions of this code are applicable to a specific occupancy:

1. Establish the type of occupancy.
2. Verify which state agency has authority for the established occupancy by reviewing the authorities list in Sections 103 through 106.
3. Once the appropriate agency has been identified, find the chapter which covers the established occupancy.
4. The Matrix Adoption Tables at the beginning of Chapters 4 and 5 identify the mandatory green building measures necessary to meet the minimum requirements of this code for the established occupancy.
5. Voluntary tier measures are contained in Appendix Chapters A4 and A5. A checklist containing each green building measure, both required and voluntary, is provided at the end of each appendix chapter. Each measure listed in the application checklist has a section number which correlates to a section where more information about the specific measure is available.
6. The application checklist identifies which measures are required by this code and allows users to check off which voluntary items have been selected to meet voluntary tier levels if desired or mandated by a city, county, or city and county.

SECTION 102
CONSTRUCTION DOCUMENTS AND INSTALLATION VERIFICATION

102.1 Submittal documents. Construction documents and other data shall be submitted in one or more sets with each application for a permit. Where special conditions exist, the enforcing agency is authorized to require additional construction documents to be prepared by a licensed design professional and may be submitted separately.

Exception: The enforcing agency is authorized to waive the submission of construction documents and other data not required to be prepared by a licensed design professional.

102.2 Information on construction documents. Construction documents shall be of sufficient clarity to indicate the location, nature and scope of the proposed green building feature and show that it will conform to the provisions of this code, the *California Building Standards Code* and other relevant laws, ordinances, rules and regulations as determined by the enforcing agency.

102.3 Verification. Documentation of conformance for applicable green building measures shall be provided to the enforcing agency. Alternate methods of documentation shall be acceptable when the enforcing agency finds that the proposed alternate documentation is satisfactory to demonstrate substantial conformance with the intent of the proposed green building measure.

SECTION 103
BUILDING STANDARDS COMMISSION

103.1 Specific scope of application of the agency responsible for enforcement, the enforcement agency, and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

1. **Application**—New construction, unless otherwise indicated in this code, of State buildings (all occupancies), including buildings constructed by the Trustees of the California State University and the Regents of the University of California.

   Enforcing agency—State or local agency specified by the applicable provisions of law.

   Authority cited—*Health and Safety Code* Section 18934.5.

   Reference—*Health and Safety Code*, Division 13, Part 2.5, commencing with Section 18901.

2. **Application**—All occupancies where no state agency has the authority to adopt green building standards applicable to those occupancies.

   Enforcing agency—State or local agency specified by the applicable provisions of law.

   Authority cited—*Health and Safety Code* Sections 18930.5 and 18938(b).

   Reference—*Health and Safety Code*, Division 13, Part 2.5, commencing with Section 18901.

3. **University of California, California State Universities and California Community Colleges.**

   Application—Standards for lighting for parking lots and primary campus walkways at the University of California, California State Universities and California Community Colleges.

   Enforcing agency—State or local agency specified by the applicable provisions of law.

   Authority cited—*Government Code* Section 14617.

   Reference—*Government Code* Section 14617.

4. **Existing state-owned buildings, including those owned by the University of California and by the California State University.**

   Application—Building seismic retrofit standards including abating falling hazards of structural and nonstructural components and strengthening of building structures. See also Division of the State Architect.

   Enforcing agency—State or local agency specified by the applicable provisions of law.

   Authority cited—*Health and Safety Code* Section 16600.

   Reference—*Health and Safety Code* Sections 16600 through 16604.

5. **Unreinforced masonry bearing wall buildings.**

   Application—Minimum seismic strengthening standards for buildings specified in Appendix Chapter 1 of the *California Existing Building Code*, except for buildings subject to building standards adopted pursuant to *Health and Safety Code* (commencing) with Section 17910.

   Enforcing agency—State or local agency specified by the applicable provisions of law.

   Authority cited—*Health and Safety Code* Section 18934.6.

   Reference—*Health and Safety Code* Sections 18901 through 18949.

SECTION 104
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

104.1 Specific scope of application of the agency responsible for enforcement, the enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

1. **Housing construction.**

   Application—Hotels, motels, lodging houses, apartment houses, dwellings, dormitories, condominiums, shelters for homeless persons, congregate residences, employee housing, factory-built housing and other types of dwellings containing sleeping accommodations with or without common toilet or cooking facilities including accessory buildings, facilities and uses thereto. Sections of this code which pertain to applications listed in this section are identified in the Matrix Adoption Table using the abbreviation "HCD 1."

   Enforcing agency—Local building department or the Department of Housing and Community Development.

   Authority cited—*Health and Safety Code* Sections 17921, 17922 and 19990.

   Reference—*Health and Safety Code* Sections 17000 through 17060, 17910 through 17990, and 19960 through 19997.

SECTION 105
DIVISION OF THE STATE ARCHITECT

105.1 Specific scope of application of the agency responsible for enforcement, the enforcement agency, and the specific

authority to adopt and enforce such provisions of this code, unless otherwise stated.

105.1.1 Application—Public elementary and secondary schools and community colleges. New building construction and site work on a new or existing site.

Notes for existing sites:

1. Requirements for site work related to Grading and Paving (Section 5.106.10) only applies to areas adjacent to the new building construction.
2. Requirements for Bicycle Parking (Section 5.106.4.2) can be met using a location anywhere on the existing campus and may include the existing bicycle parking. Provide documentation of existing amenities.

Enforcing agency—The Division of the State Architect-Structural Safety (DSA-SS) has been delegated the responsibility and authority by the Department of General Services to review and approve the design and observe the construction of public elementary and secondary schools, and community colleges.

Authority cited—*Education Code* Sections 17310 and 81142.

Reference—*Education Code* Sections 17280 through 17317, and 81130 through 81147.

105.1.2 Applicable administrative standards.

1. **Title 24, Part 1, *California Code of Regulations*:** Sections 4-301 through 4-355, Group 1, Chapter 4, for public elementary and secondary schools, and community colleges.
2. **Title 24, Part 2, *California Code of Regulations*:**
   2.1. Sections 1.1 and 1.9.2 of Chapter 1, Division I.
   2.2. Sections 102.1, 102.2, 102.3, 102.4, 102.5, 104.9, 104.10 and 104.11 of Chapter 1, Division II.

105.1.3 Applicable building standards. *California Building Standards Code*, Title 24, Parts 2, 3, 4, 5, 6, 9, 11 and 12, *California Code of Regulations*, for school buildings and community colleges.

SECTION 106
OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT

106.1 OSHPD 1. Specific scope of application of the agency responsible for enforcement, enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

Application—General acute care hospitals and acute psychiatric hospitals, excluding distinct part units or distinct part freestanding buildings providing skilled nursing or intermediate care services. For structural regulations: Skilled nursing facilities and/or intermediate care facilities except those skilled nursing facilities and intermediate care facilities of single-story, Type V, wood or light steel-frame construction.

Enforcing agency—Office of Statewide Health Planning and Development (OSHPD). The office shall enforce the Division of the State Architect—Access Compliance regulations and the regulations of the Office of the State Fire Marshal for the above-stated facility types.

106.1.1 Applicable administrative standards.

1. Title 24, Part 1, *California Code of Regulations*: Chapters 6 and 7.
2. Title 24, Part 2, *California Code of Regulations*: Sections 1.1 and 1.10 of Chapter 1, Division I and Chapter 1, Division II.

106.1.2 Applicable building standards. *California Building Standards Code*, Title 24, Parts 2, 3, 4, 5, 9, 11 and 12.

106.1.3 Identification of amendments. For applications listed in Section 106.1, amendments appear in this code preceded with the acronym [OSHPD 1].

Authority—*Health and Safety Code* Sections 127010, 127015, 1275 and 129850.

Reference—*Health and Safety Code* Sections 19958, 127010, 127015, 129680, 1275 and 129675 through 130070.

106.2 OSHPD 2. Specific scope of application of the agency responsible for enforcement, enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

Application—Skilled nursing facilities and intermediate care facilities, including distinct part skilled nursing and intermediate care services on a general acute care or acute psychiatric hospital license, provided either are in a separate unit or a free-standing building. For structural regulations: Single-story, Type V skilled nursing facility and/or intermediate care facilities utilizing wood or light steel-frame construction.

Enforcing agency—Office of Statewide Health Planning and Development (OSHPD). The office shall also enforce the Division of the State Architect—Access Compliance regulations and the regulations of the Office of the State Fire Marshal for the above-stated facility type.

106.2.1 Applicable administrative standards.

1. Title 24, Part 1, *California Code of Regulations*: Chapter 7.
2. Title 24, Part 2, *California Code of Regulations*: Sections 1.1 and 1.10 of Chapter 1, Division I and Chapter 1, Division II.

106.2.2 Applicable building standards. *California Building Standards Code*, Title 24, Parts 2, 3, 4, 5, 9, 11 and 12.

106.2.3 Identification of amendments. For applications listed in Section 106.2, amendments appear in this code preceded with the acronym [OSHPD 2].

Authority—*Health and Safety Code* Sections 127010, 127015, 1275 and 129850.

Reference—*Health and Safety Code* Sections 127010, 127015, 1275 and 129680.

106.3 OSHPD 4. Specific scope of application of the agency responsible for enforcement, enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

Application—Correctional treatment centers.

Enforcing agency—Office of Statewide Health Planning and Development (OSHPD). The office shall also enforce the Division of the State Architect—Access Compliance regulations and the regulations of the Office of the State Fire Marshal for the above-stated facility types.

106.3.1 Applicable administrative standards.

1. Title 24, Part 1, *California Code of Regulations*: Chapter 7.
2. Title 24, Part 2, *California Code of Regulations*: Sections 1.1 and 1.10 of Chapter 1, Division I and Chapter 1, Division II.

106.3.2 Applicable building standards. *California Building Standards Code*, Title 24, Parts 2, 3, 4, 5, 9, 11 and 12.

106.3.3 Identification of amendments. For applications listed in Section 106.3, amendments appear in this code preceded with the acronym [OSHPD 4], unless the entire chapter is applicable.

Authority—*Health and Safety Code* Sections 127010, 127010, 127015 and 129790.

References—*Health and Safety Code* Sections 127010, 127015, 1275, and 129675 through 130070.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 2 – DEFINITIONS

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter	X		X				X												
Adopt entire chapter as amended (amended sections listed below)								X	X		X								
Adopt only those sections that are listed below																			
Chapter/Section																			
201																			
CALIFORNIA RESIDENTIAL CODE								†	†		†								
LOW-RISE RESIDENTIAL BUILDING								†	†		†								
PLANTS								†	†		†								
RESIDENTIAL BUILDING								†	†		†								
RESILIENT FLOORING								†	†		†								

The state agency does not adopt sections identified by the following symbol: †.

CHAPTER 2
DEFINITIONS

SECTION 201
GENERAL

201.1 Scope. Unless otherwise stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

201.2 Interchangeability. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

201.3 Terms defined in other documents. Where terms are not defined in this code and are defined in the *California Building Standards Code* or other referenced documents, such terms shall have the meanings ascribed to them as in those publications.

201.4 Terms not defined. Where terms are not defined as specified in this section, such terms shall have ordinarily accepted meanings such as the context implies.

SECTION 202
DEFINITIONS

ADDITION. An extension or increase in floor area of an existing building or structure.

ADJUST. To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

AGRIFIBER PRODUCTS. Agrifiber products include wheatboard, strawboard, panel substrates and door cores, not including furniture, fixtures and equipment (FF&E) not considered base building elements.

ALBEDO. Synonymous with solar reflectance, which is a ratio of the energy reflected back into the atmosphere to the energy absorbed by the surface, with 100 percent being total reflectance.

ALTERATION OR ALTER. Any construction or renovation to an existing structure other than repair for the purpose of maintenance or addition.

ARB (CARB). The California Air Resources Board.

ARTERIAL HIGHWAY. A general term denoting a highway primarily for through traffic usually on a continuous route.

ASSEMBLY (ASSEMBLY PRODUCT). An assembly (assembly product) includes or has been formulated using multiple materials.

AUTOMATIC. Automatic means capable of operating without human intervention.

A-WEIGHTED SOUND LEVEL (dba). The sound pressure level in decibels as measured on a sound level meter using the internationally standardized A-weighting filter or as computed from sound spectral data to which A-weighting adjustments have been made.

BALANCE. To proportion flows within the distribution system, including submains, branches and terminals, according to design quantities.

BIORETENTION. A shallow depression that utilizes conditioned soil and vegetation for the storage, treatment or infiltration of storm water runoff.

BROWNFIELD SITE. 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, with certain legal exclusions and additions.

Note: See the full text at the EPA's website.

1 BTU/HOUR. British thermal units per hour, also referred to as Btu. The amount of heat required to raise one pound of water one degree Fahrenheit per hour, a common measure of heat transfer rate. A ton of refrigeration is 12,000 Btu, the amount of heat required to melt a ton (2,000 pounds) of ice at 32° Fahrenheit.

BUILDING COMMISSIONING. A systematic quality assurance process that spans the entire design and construction process, including verifying and documenting that building systems and components are planned, designed, installed, tested, operated and maintained to meet the owner's project requirements.

BUILDING ENVELOPE. The ensemble of exterior and demising partitions of a building that enclose conditioned space.

CALIFORNIA BUILDING CODE. The current version of the *California Building Code*.

CALIFORNIA ELECTRICAL CODE. The current version of the *California Electrical Code*.

CALIFORNIA ENERGY CODE. The current version of the *California Energy Code*, unless otherwise specified.

CALIFORNIA MECHANICAL CODE. The current version of the *California Mechanical Code*.

CALIFORNIA PLUMBING CODE. The current version of the *California Plumbing Code*.

CALIFORNIA RESIDENTIAL CODE. The current version of the *California Residential Code*.

CHLOROFLUOROCARBON (CFC). A class of compounds primarily used as refrigerants, consisting of only chlorine, fluorine and carbon.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL) HIGHWAY. A metric similar to the day-night average sound level (Ldn), except that a 5 decibel (dB) adjustment is added to the equivalent continuous sound exposure level for evening hours (7 p.m. to 10 p.m.) in addition to the 10 dB nighttime adjustment used in the Ldn.

COMPACT DISHWASHER. A dishwasher that has a capacity of less than eight place settings plus six serving pieces as specified in ANSI/AHAM DW-1.

COMPOSITE WOOD PRODUCTS. Composite wood products include hardwood plywood, particleboard and medium density fiberboard. "Composite wood products" does not include hardboard, structural plywood, structural panels, structural composite lumber, oriented strand board, glued laminated timber, prefabricated wood I-joists or finger-jointed lumber, all as specified in California Code of Regulations (CCR), Title 17, Section 93120.1(a).

Note: See CCR, Title 17, Section 93120.1.

CONDITIONED FLOOR AREA. The floor area (in square feet) of enclosed conditioned space on all floors of a building, as measured at the floor level of the exterior surfaces of exterior walls enclosing the conditioned space.

CONDITIONED SPACE. A space in a building that is either directly conditioned or indirectly conditioned.

CONDITIONED SPACE, DIRECTLY. An enclosed space that is provided with wood heating, is provided with mechanical heating that has a capacity exceeding 10 Btu/hr-ft^2, or is provided with mechanical cooling that has a capacity exceeding 5 Btu/hr-ft^2, unless the space-conditioning system is designed for a process space. (See Process Space.)

CONDITIONED SPACE, INDIRECTLY. Enclosed space, including but not limited to, unconditioned volume in atria, that (1) is not directly conditioned space; and (2) either (a) has a thermal transmittance area product (UA) to directly conditioned space exceeding that to the outdoors or to unconditioned space and does not have fixed vents or openings to the outdoors or to unconditioned space, or (b) is a space through which air from directly conditioned spaces is transferred at a rate exceeding three air changes per hour.

COOL PAVEMENT(S). Includes, but is not limited to, high albedo pavements and coatings, vegetative surfaces, porous or pervious pavements that allow water infiltration, and pavements shaded by trees and other sources of shade.

COOLING EQUIPMENT. Equipment used to provide mechanical cooling for a room or rooms in a building.

CUTOFF LUMINAIRES. Luminaires whose light distribution is such that the candela per 1000 lamp lumens does not numerically exceed 25 (2.5 percent) at an angle of 90 degrees above nadir, and 100 (10 percent) at a vertical angle of 80 degrees above nadir. This applies to all lateral angles around the luminaire.

DAY-NIGHT AVERAGE SOUND LEVEL (L_{dn}). The A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10 p.m. to 7 a.m.).

DECIBEL (dB). A measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power, sound intensity) with respect to a reference quantity.

DEVELOPMENT FOOTPRINT. The total area of the building footprint, hardscape, access roads and parking.

DIRECT-VENT APPLIANCE. A fuel-burning appliance with a sealed combustion system that draws all air for combustion from the outside atmosphere and discharges all flue gases to the outside atmosphere.

DISPOSAL. The management of solid waste through landfilling or transformation at permitted solid waste facilities.

DIVERSION. Activities which reduce or eliminate the amount of solid waste from solid waste disposal for purposes of this code.

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are considered electric vehicles. For purposes of the *California Electrical Code*, off-road, self-propelled electric vehicles, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like, are not included.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors and the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

EMBODIED ENERGY. The energy used for raw material extraction, transportation, manufacturing, assembly, installation and disposal during the life of a product, including the potential energy stored within the product.

ENERGY BUDGET. The sum of the annual TDV energy consumption for energy use components included in the performance compliance approach for the Standard Design Building, as established in the Alternative Calculation Method Reference Manual approved by the Energy Commission and calculated by Compliance Software certified by the Energy Commission.

ENERGY COMMISSION. The California State Energy Resources Conservation and Development Commission.

ENERGY DESIGN RATING. The sum of the annual TDV energy consumption for energy use components included in the performance compliance approach for the Standard Design Building (Energy Budget) and the annual time dependent valuation (TDV) energy consumption for lighting and components not regulated by Title 24, Part 6 (such as domestic appliances and consumer electronics) and accounting for the annual TDV energy offset by an on-site renewable energy system. The Design Rating is calculated by Compliance Software certified by the Energy Commission.

ENERGY EQUIVALENT (NOISE) LEVEL (L_{eq}). The level of a steady noise which would have the same energy as the fluctuating noise level integrated over the time period of interest.

ENFORCING AGENCY. The designated department or agency as specified by statute or regulation.

EUTROPHICATION. The excessive growth of aquatic plants, especially algae, producing bacteria which consume nearly all of the oxygen required to sustain fauna and other flora.

EXFILTRATION. The uncontrolled outward air leakage from inside a building, including leakage through cracks and interstices, around windows and doors, and through any other exterior partition or duct penetration.

EXPRESSWAY. An arterial highway for through traffic which may have partial control of access, but which may or may not be divided or have grade separations at intersections.

FLOOR AREA RATIO. Gross square footage of all structures on a site divided by gross square footage of the site.

FREEWAY. A divided arterial highway with full control of access and with grade separations at intersections.

FRENCH DRAIN. A trench, hole or other depressed area loosely filled with rock, gravel, fragments of brick or similar pervious material used to collect or channel drainage or runoff water.

GEOTHERMAL. Renewable energy generated by deep-earth water or steam.

GLOBAL WARMING POTENTIAL (GWP). The radiative forcing impact of one mass-based unit of a given greenhouse gas relative to an equivalent unit of carbon dioxide over a given period of time. Carbon dioxide is the reference compound with a GWP of one.

GLOBAL WARMING POTENTIAL VALUE (GWP VALUE). The 100-year GWP value published by the Intergovernmental Panel on Climate Change (IPCC) in either its Second Assessment Report (SAR) (IPCC, 1995); or its Fourth Assessment A-3 Report (AR4) (IPCC, 2007). The SAR GWP values are found in column "SAR (100-yr)" of Table 2.14.; the AR4 GWP values are found in column "100 yr" of Table 2.14.

GRAYWATER. Pursuant to Health and Safety Code Section 17922.12, "graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers.

Note: For the purpose of applying the standards contained in this code, "Graywater," as defined above, has the same meaning as "gray water," "grey water," and "greywater."

GREEN BUILDING. A holistic approach to design, construction, and demolition that minimizes the building's impact on the environment, the occupants and the community.

GREENFIELDS. Sites that are not previously developed or graded and remain in a natural state, able to support agriculture, open space or habitat.

Note: Previously developed sites are those that previously contained buildings, roadways or parking lots or were graded or altered by direct human activities.

GREYFIELD SITE. Any site previously developed with at least 50 percent of the surface area covered with impervious material.

HALON. Any of a class of chemical compounds derived from hydrocarbons by replacing one or more hydrogen atoms with bromine atoms, and other hydrogen atoms with other halogen atoms (chlorine, fluorine, iodine).

HAZARDOUS WASTE.

(a) A waste, defined as a "hazardous waste" in accordance with Section 25117 of the *Health and Safety Code*, or a combination of wastes, which because of its quantity, concentration or physical, chemical or infectious characteristics may do either of the following:

(1) Cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.

(2) Pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of, or otherwise managed.

(b) Unless expressly provided otherwise, "hazardous waste" includes extremely hazardous waste and acutely hazardous waste.

HEAT ISLAND EFFECT. "Heat island effect" and "urban heat islands" refer to measurable elevated temperatures in developed areas as compared to more rural surroundings. Temperatures in developed areas are affected by absorption of heat by hardscapes and radiation of heat into surrounding areas resulting in local climate changes. Heat islands are influenced by geographic location and by local weather patterns, with effects changing on a daily or seasonal basis.

HIGH-GWP REFRIGERANT. A compound used as a heat transfer fluid or gas that is: (A) a chlorofluorocarbon, a hydrochlorofluorocarbon, a hydrofluorocarbon, a perfluorocarbon, or any compound or blend of compounds, with a GWP value equal to or greater than 150, or (B) any ozone depleting substance as defined in Title 40 of the Code of Federal Regulations, Part 82, §82.3 (as amended March 10, 2009).

HIGH-RISE RESIDENTIAL BUILDING. For the purposes of *CALGreen*, any building that is of Occupancy Group R and is four stories or greater in height.

HYDROCHLOROFLUOROCARBON (HCFC). A class of compounds primarily used as refrigerants or foam expansion agents, consisting of only hydrogen, chlorine, fluorine, and carbon.

HYDROFLUOROCARBON (HFC). A class of compounds primarily used as refrigerants or foam expansion agents, consisting of only hydrogen, fluorine, and carbon.

HYDROZONE. A portion of the landscaped area having plants with similar water needs.

IESNA. Illuminating Engineering Society of North America.

INERT SOLIDS OR INERT WASTE. A non-liquid solid waste including, but not limited to, soil and concrete, that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board pursuant to Division 7 (commencing with

Section 13000) of the *California Water Code* and does not contain significant quantities of decomposable solid waste.

INFILL SITE. A site in an urbanized area that meets criteria defined in *Public Resources Code* Section 21061.3.

INFILTRATION. An uncontrolled inward air leakage from outside a building or unconditioned space, including leakage through cracks and interstices, around windows and doors and through any other exterior or demising partition or pipe or duct penetration.

INTERIOR BUILDING. The inside of the weatherproofing system.

KITCHEN. That portion in a residential dwelling unit that is a room or area used for cooking, food storage and preparation and washing dishes, including associated counter tops and cabinets, refrigerator, stove, ovens and floor area.

LANDSCAPE (PLANT) COEFFICIENT (Kl). The product of the species factor multiplied by the density factor and the microclimate factor. $\{Kl = K_s \times K_d \times K_{mc}\}$ The landscape coefficient is used in the landscape water budget calculation. (UCCE, 2000)

LIFE CYCLE ASSESSMENT (LCA). A technique to evaluate the relevant energy and material consumed and environmental impacts associated with the entire life of a product, process, activity or service, including a whole building.

LIFE CYCLE INVENTORY (LCI). A process of quantifying energy and raw material requirements, atmospheric emissions, waterborne emissions, solid wastes, and other releases for the entire life cycle of a product, process, or activity, including a whole building.

LONG RADIUS ELBOW. Pipe fitting installed between two lengths of pipe or tubing to allow a change of direction, with a radius 1.5 times the pipe diameter.

LOW-EMITTING AND FUEL EFFICIENT VEHICLES. Eligible vehicles are limited to the following:

1. Zero emission vehicle (ZEV), including neighborhood electric vehicles (NEV), partial zero emission vehicle (PZEV), advanced technology PZEV (AT ZEV) or CNG fueled (original equipment manufacturer only) regulated under *Health and Safety Code* Section 43800 and CCR, Title 13, Sections 1961 and 1962.
2. High-efficiency vehicles, regulated by U.S. EPA, bearing High-occupancy Vehicle (HOV) car pool lane stickers issued by the Department of Motor Vehicles.

LOW-GWP REFRIGERANT. A compound used as a heat transfer fluid or gas that: (A) has a GWP value less than 150, and (B) is not an ozone depleting substance as defined in Title 40 of the Code of Federal Regulations, Part 82, §82.3 (as amended March 10, 2009).

LOW IMPACT DEVELOPMENT (LID). Control of stormwater at its source to mimic drainage services provided by an undisturbed site.

LOW-RISE RESIDENTIAL BUILDING. For the purpose of *CALGreen*, any building that is of Occupancy Group R and is three stories or less.

MAXIMUM INCREMENTAL REACTIVITY (MIR). The maximum change in weight of ozone formed by adding a compound to the "Base Reactive Organic Gas (ROG) Mixture" per weight of compound added, expressed to hundredths of a gram (g O^3/g ROC).

Note: MIR values for individual compounds and hydrocarbon solvents are specified in CCR, Title 17, Sections 94700 and 94701.

MERV Filter minimum efficiency reporting value, based on ASHRAE 52.2-2007.

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO). The California ordinance regulating landscape design, installation and maintenance practices that will ensure commercial, multifamily and other developer installed landscapes greater than 2500 square feet meet an irrigation water budget developed based on landscaped area and climatological parameters.

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO). [HCD] The California model ordinance (California Code of Regulations, Title 23, Division 2, Chapter 2.7), regulating landscape design, installation and maintenance practices. Local agencies are required to adopt the updated MWELO, or adopt a local ordinance at least as effective as the MWELO.

MOISTURE CONTENT. The weight of the water in wood expressed in percentage of the weight of the oven-dry wood.

MOUNTING HEIGHT (MH). The height of the photometric center of a luminaire above grade level.

MULTI-OCCUPANT SPACES. Indoor spaces used for presentations and training, including classrooms and conference rooms.

NEIGHBORHOOD ELECTRIC VEHICLE (NEV). A motor vehicle that meets the definition of "low-speed vehicle" either in Section 385.5 of the Vehicle Code or in 49 CFR571.500 (as it existed on July 1, 2000), and is certified to zero-emission vehicle standards.

NEWLY CONSTRUCTED (or NEW CONSTRUCTION). A newly constructed building (or new construction) does not include additions, alterations or repairs.

NO ADDED FORMALDEHYDE (NAF) BASED RESINS. Resin formulated with no added formaldehyde as part of the resin cross linking structure for making hardwood plywood, particle board or medium density fiberboard. "No added formaldehyde resins" include, but are not limited to, resins made from soy, polyvinyl acetate, or methylene diisocyanate. **[BSC]** See CCR, Title 17, Section 93120.1(a).

OUTDOOR AIR (Outside air). Air taken from outdoors and not previously circulated in the building.

OVE. [BSC, DSA-SS] Optimal Value Engineering, another term for advanced wood framing techniques.

PERMEABLE PAVING. Permeable paving materials and techniques which allow the movement of water around the paving material and allow precipitation to percolate through the paving surface to the soil below.

PLANTS.

Adaptive plants. Adaptive plants are plants that grow well in a given habitat with minimal attention in the form of winter protection, pest protection, irrigation and fertilization once established.

Note: Adaptive plants are considered low in maintenance and are not invasive plants.

Invasive plants. Invasive plants are both indigenous and nonindigenous species with growth habits that are characteristically aggressive.

Note: Invasive plants typically have a high reproductive capacity and tendency to overrun the ecosystems they inhabit.

Native plants. Native plants are plants that have adapted to a given area and are not invasive.

POSTCONSUMER CONTENT. [BSC, DSA-SS] Waste material generated by consumers after it is used and which would otherwise be discarded.

POSTCONSUMER CONTENT. [HCD] Any material which has been used by a consumer and then recycled for use in a new material or product.

POTABLE WATER. Water that is drinkable and meets the U.S. Environmental Protection Agency (EPA) Drinking Water Standards. See definition in the *California Plumbing Code*, Part 5.

POTABLE WATER. [HCD] Water that is satisfactory for drinking, culinary, and domestic purposes, and meets the U.S. Environmental Protection Agency (EPA) Drinking Water Standards and the requirements of the Health Authority Having Jurisdiction.

PRECONSUMER (or POSTINDUSTRIAL) [BSC, DSA-SS] Material diverted from the waste stream during one manufacturing process, including scraps, damaged goods, and excess production, that is used in another manufacturing process.

PRECONSUMER (OR POSTINDUSTRIAL) CONTENT. [HCD] Material diverted from the waste stream during one manufacturing process, including scraps, damaged goods and excess production that is reclaimed and used in another manufacturing process. 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 those wastes.

PROCESS. An activity or treatment that is not related to the space conditioning, lighting, service water heating or ventilating of a building as it relates to human occupancy.

PROCESS SPACE. A space that is thermostatically controlled to maintain a process environment temperature less than 55°F or to maintain a process environment temperature greater than 90° F for the whole space that the system serves, or that is a space with a space-conditioning system designed and controlled to be incapable of operating at temperatures above 55° F or incapable of operating at temperatures below 90° F at design conditions.

PRODUCT-WEIGHTED MIR (PWMIR). The sum of all weighted-MIR for all ingredients in a product subject to this article. The PWMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging).

Note: PWMIR is calculated according to equations found in CCR, Title 17, Section 94521(a).

PROPORTIONAL RECYCLED CONTENT (PRCM). The amount of recycled content of a material in an assembly as related to the percentage of the material in an assembly product. PRCM is derived by multiplying the percentage of each material in an assembly by the percentage of recycled content in the material.

PSIG. Pounds per square inch, gauge.

RAINWATER. Precipitation on any public or private parcel that has not entered an offsite storm drain system or channel, a flood control channel, or any other stream channel, and has not previously been put to beneficial use.

RAINWATER CATCHMENT SYSTEM. A facility designed to capture, retain, and store rainwater flowing off a building, parking lot, or any other manmade impervious surface for subsequent onsite use. Rainwater catchment system is also known as "Rainwater Harvesting System" or "Rainwater Capture System."

REACTIVE ORGANIC COMPOUND (ROC). Any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere.

RECLAIMED (RECYCLED) WATER. [HCD] Nonpotable water that meets California Department of Public Health statewide uniform criteria for disinfected tertiary recycled water. Reclaimed (recycled) water is also known as "recycled water" or "reclaimed water."

RECYCLE or RECYCLING. The process of collecting, sorting, cleansing, treating and reconstituting materials that would otherwise become solid waste, and returning them to the economic mainstream in the form of raw material for new, reused or reconstituted products which meet the quality standards necessary to be used in the marketplace. "Recycling" does not include transformation, as defined in *Public Resources Code* Section 40201.

RECYCLED CONTENT. [BSC, DSA-SS] Refer to International Organization of Standards ISO 14021—Environmental labels and declarations—Self-declared environmental claims (Type II environmental labeling).

RECYCLED CONTENT (RC). [HCD] The amount of recycled material in an assembly product or material. Refer to International Organization for Standardization ISO 14021–Environmental labels and declarations–Self-declared environmental claims (Type II environmental labeling).

RECYCLED CONTENT VALUE (RCV). [BSC, DSA-SS] Material cost multiplied by postconsumer content plus $^1/_2$ the

preconsumer content, or RCV = $ X (postconsumer content + $^1/_2$ preconsumer content).

RECYCLED CONTENT VALUE (RCV). [HCD]

Assembly products (RCVA). Assembly product cost multiplied by the recycled content of the assembly based on all of the postconsumer content and 50 percent of the preconsumer content.

Materials (RCVM). Material cost multiplied by recycled content of the material based on all of the postconsumer content and 50 percent of the preconsumer content.

RECYCLED WATER. Water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur [Water Code Section 13050 (n)]. Simply put, recycled water is water treated to remove waste matter, attaining a quality that is suitable to use the water again.

REFERENCE EVAPOTRANSPIRATION (ETo). [BSC] The estimated rate of evapotranspiration from a standardized surface of well watered, actively growing cool season four- to seven-inch (10.16 to 17.78 cm) turfgrass with sufficient density to fully shade the soil. The water needs of a landscape planting can be calculated by multiplying the Landscape Coefficient [KI] and Reference Evapotranspiration (ETo).

REFERENCE EVAPOTRANSPIRATION (ETo). [HCD] Evapotranspiration is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity. Reference evapotranspiration (ETo) is the industry standard for determining irrigation requirements. ETo is an estimate of the evapotranspiration of a large field of four- to seven-inch tall, cool-season grass that is well watered.

RESIDENTIAL BUILDING. See "LOW-RISE RESIDENTIAL BUILDING" or "HIGH-RISE RESIDENTIAL BUILDING."

RESILIENT FLOORING. Refers to nontextile flooring materials which have a relatively firm surface, yet characteristically have "give" and "bounce back" to their original surface profile from the weight of objects that compress its surface. Resilient flooring materials are made in various shapes and sizes including both tile and roll form. Common types of resilient flooring include but are not limited to:

1. Vinyl composition tile.
2. Vinyl tile and sheet flooring.
3. Linoleum tile and sheet.
4. Cork tile and sheet flooring.
5. Rubber tile and sheet flooring.
6. Polymeric poured seamless flooring.
7. Other types of non-textile synthetic flooring.

RE-USE. The use, in the same form as it was produced, of a material which might otherwise be discarded.

SCHRADER ACCESS VALVES. Access fittings with a valve core installed.

SHORT RADIUS ELBOW. Pipe fitting installed between two lengths of pipe or tubing to allow a change of direction, with a radius 1.0 times the pipe diameter.

SINGLE OCCUPANT SPACES. Private offices, workstations in open offices, reception workstations, and ticket booths.

SOLAR ACCESS. The ratio of solar insolation including shade to the solar insolation without shade. Shading from obstructions located on the roof or any other part of the building shall not be included in determination of annual solar access.

SOLAR REFLECTANCE. A measure of the fraction of solar energy that is reflected by a surface (measured on a scale of zero to one).

SOLAR REFLECTANCE INDEX (SRI). A measure of a material surface's ability to reflect solar heat, as shown by a small temperature rise. It includes both solar reflectance and thermal emittance and is quantified such that a standard black surface (solar reflectance 0.05, thermal emittance 0.90) is zero and a standard white surface (solar reflectance 0.80, thermal emittance 0.90) is 100.

SOLID WASTE.

(a) All putrescible and nonputrescible solid, semisolid and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes.

(b) "Solid waste" does not include any of the following wastes:

(1) Hazardous waste, as defined in *Public Resources Code* Section 40141.

(2) Radioactive waste regulated pursuant to the Radiation Control Law (Chapter 8, commencing with Section 114960, of Part 9 of Division 104 of the *Health and Safety Code*).

(3) Medical waste regulated pursuant to the Medical Waste Management Act (Part 14 commencing with Section 117600) of Division 104 of the *Health and Safety Code*). Untreated medical waste shall not be disposed of in a solid waste landfill, as defined in *Public Resources Code* Section 40195.1. Medical waste that has been treated and deemed to be solid waste shall be regulated pursuant to this division.

STANDARD DISHWASHER. A dishwasher that has a capacity equal to or greater than eight place settings plus six serving pieces as specified in ANSI/AHAM DW-1.

SUBMETER. A meter installed subordinate to a site meter. Usually used to measure water intended for one purpose, such as landscape irrigation. For the purposes of *CALGreen*, a dedicated meter may be considered a submeter.

SUPERMARKET. For the purposes of Section 5.508.2, a supermarket is any retail food facility with 8,000 square feet or more conditioned area, and that utilizes either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units.

TENANT-OCCUPANTS. Building occupants who inhabit a building during its normal hours of operation as permanent occupants, such as employees, as distinguished from customers and other transient visitors.

TEST. A procedure to determine quantitative performance of a system or equipment.

THERMAL EMITTANCE. The relative ability of a surface to radiate absorbed heat (measured on a scale of 0 to 1).

TIME DEPENDENT VALUATION (TDV) ENERGY. The time varying energy caused to be used by the building to provide space conditioning and water heating and for specified buildings lighting. TDV energy accounts for the energy used at the building site and consumed in producing and in delivering energy to a site, including, but not limited to, power generation, transmission and distribution losses.

ULTRA-LOW EMITTING FORMALDEHYDE (ULEF) RESINS. Resins formulated such that average formaldehyde emissions are consistently below the Phase 2 emission standards in Section 93120.2, as provided in Section 93120.3(d) of Title 17, California Code of Regulations. [**BSC**] See CCR, Title 17, Section 93120.1(a).

VANPOOL VEHICLE. Eligible vehicles are limited to any motor vehicle, other than a motortruck or truck tractor, designed for carrying more than 10 but not more than 15 persons including the driver, which is maintained and used primarily for the nonprofit work-related transportation of adults for the purposes of ridesharing.

Note: Source: Vehicle Code, Division 1, Section 668.

VAPOR BARRIER. Material that has a permeance of one perm or less and that provides resistance to the transmission of water vapor.

VEGETATED SPACE. Vegetated spaces include, but are not limited to, native, undisturbed areas; rehabilitation of previously disturbed areas with landscaping; green belts; and recreation facilities that include landscaping, such as golf courses.

VOC. A volatile organic compound (VOC) broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94508(a).

Note: Where specific regulations are cited from different agencies, such as South Coast Air Quality Management District (SCAQMD), California Air Resources Board (ARB or CARB), etc., the VOC definition included in that specific regulation is the one that prevails for the specific measure in question.

WATER BUDGET. Is the estimated total landscape irrigation water use which shall not exceed the maximum applied water allowance calculated in accordance with the Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO).

WATTLES. Wattles are used to reduce sediment in runoff. Wattles are often constructed of natural plant materials such as hay, straw or similar material shaped in the form of tubes and placed on a downflow slope. Wattles are also used for perimeter and inlet controls.

ZEV. Any vehicle certified to zero-emission standards.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 3 – GREEN BUILDING

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below	X		X				X	X	X	X									
Chapter/Section																			
301	X		X				X	X	X	X									
301.1			X																
301.1.1			X																
301.2			X																
301.3	X																		
302	X		X				X	X	X	X									
303	X		X				X	X	X	X									
304	X		X					X	X	X									
304.1.1 (2nd paragraph)			X																
305								X											
306							X												

CHAPTER 3
GREEN BUILDING

SECTION 301
GENERAL

301.1 Scope. Buildings shall be designed to include the green building measures specified as mandatory in the application checklists contained in this code. Voluntary green building measures are also included in the application checklists and may be included in the design and construction of structures covered by this code, but are not required unless adopted by a city, county, or city and county as specified in Section 101.7.

301.1.1 Additions and alterations. [HCD] The mandatory provisions of Chapter 4 shall be applied to additions or alterations of existing residential buildings where the addition or alteration increases the building's conditioned area, volume, or size. The requirements shall apply only to and/or within the specific area of the addition or alteration.

Note: On and after January 1, 2014, residential buildings undergoing permitted alterations, additions or improvements shall replace noncompliant plumbing fixtures with water-conserving plumbing fixtures. Plumbing fixture replacement is required prior to issuance of a certificate of final completion, certificate of occupancy or final permit approval by the local building department. See Civil Code Section 1101.1, et seq., for the definition of a noncompliant plumbing fixture, types of residential buildings affected and other important enactment dates.

301.2 Low-rise and high-rise residential buildings. [HCD] The provisions of individual sections of *CALGreen* may apply to either low-rise residential buildings, high-rise residential buildings, or both. Individual sections will be designated by banners to indicate where the section applies specifically to low-rise only (LR) or high-rise only (HR). When the section applies to both low-rise and high-rise buildings, no banner will be used.

301.3 Nonresidential additions and alterations. [BSC] The provisions of individual sections of Chapter 5 apply to newly constructed buildings, building additions of 1,000 square feet or greater, and/or building alterations with a permit valuation of $200,000 or above (for occupancies within the authority of California Building Standards Commission). Code sections relevant to additions and alterations shall only apply to the portions of the building being added or altered within the scope of the permitted work.

A code section will be designated by a banner to indicate where the code section only applies to newly constructed buildings [N] or to additions and alterations [AA]. When the code section applies to both, no banner will be used.

SECTION 302
MIXED OCCUPANCY BUILDINGS

302.1 Mixed occupancy buildings. In mixed occupancy buildings, each portion of a building shall comply with the specific green building measures applicable to each specific occupancy.

SECTION 303
PHASED PROJECTS

303.1 Phased projects. For shell buildings and others constructed for future tenant improvements, only those code measures relevant to the building components and systems considered to be new construction (or newly constructed) shall apply.

303.1.1 Tenant improvements. The provisions of this code shall apply only to the initial tenant or occupant improvements to a project.

SECTION 304
VOLUNTARY TIERS

304.1 Purpose. Voluntary tiers are intended to further encourage building practices that improve public health, safety and general welfare by promoting the use of building concepts which minimize the building's impact on the environment and promote a more sustainable design.

304.1.1 Tiers. The provisions of Divisions A4.6 and A5.6 outline means, in the form of voluntary tiers, for achieving enhanced construction levels by incorporating additional measures for residential and nonresidential new construction. Voluntary tiers may be adopted by local governments and, when adopted, enforced by local enforcing agencies. Buildings complying with tiers specified for each occupancy contain additional prerequisite and elective green building measures necessary to meet the threshold of each tier. See Section 101.7 of this code for procedures and requirements related to local amendments, additions or deletions, including changes to energy standards.

[BSC & HCD] Where there are practical difficulties involved in complying with the threshold levels of a tier, the enforcing agency may grant modifications for individual cases. The enforcing agency shall first find that a special individual reason makes the strict letter of the tier impractical and that modification is in conformance with the intent and purpose of the measure. The details of any action granting modification shall be recorded and entered in the files of the enforcing agency.

SECTION 305 [OSHPD 1]
CALGreen TIER 1 AND CALGreen TIER 2

305.1 *CALGreen* Tier 1 and *CALGreen* Tier 2 buildings contain voluntary green building measures necessary to meet the threshold of each level.

305.1.1 *CALGreen* Tier 1. To achieve *CALGreen* Tier 1, buildings must comply with the latest edition of "Savings By Design, Healthcare Modeling Procedures" found online at http://www.energysoft.com/main/page_downloads_sbd_healthcare.html.

305.1.2 *CALGreen* Tier 2. To achieve *CALGreen* Tier 2, buildings must exceed the latest edition of "Savings By Design, Healthcare Modeling Procedures" by a minimum of 15 percent.

SECTION 306 [DSA-SS]
VOLUNTARY MEASURES

306.1 Purpose. For public schools and community colleges, Appendix A5, Nonresidential Voluntary Measures, is provided as a guideline to further encourage building practices that improve public health, safety and general welfare by promoting the use of building concepts which minimize the building's impact on the environment, promote a more sustainable design and high-performance educational facilities.

306.1.1 The optional provisions of Appendix A5, Divisions A5.1 through A5.5, outline means of achieving enhanced construction levels by incorporating additional measures that exceed the mandatory code.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 4 – RESIDENTIAL MANDATORY MEASURES

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below			X																
Chapter/Section																			
4.1			X																
4.2			†																
4.3			X																
4.4			X																
4.5			X																

The state agency does not adopt sections identified by the following symbol: †.

CHAPTER 4
RESIDENTIAL MANDATORY MEASURES

Division 4.1 – PLANNING AND DESIGN

SECTION 4.101
GENERAL

4.101.1 Scope. The provisions of this division outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore and enhance the environmental quality of the site and respect the integrity of adjacent properties.

SECTION 4.102
DEFINITIONS

4.102.1 Definitions. The following terms are defined in Chapter 2.

FRENCH DRAIN.

WATTLES.

SECTION 4.103
SITE SELECTION
(Reserved)

SECTION 4.104
SITE PRESERVATION
(Reserved)

SECTION 4.105
DECONSTRUCTION AND REUSE OF EXISTING STRUCTURES
(Reserved)

SECTION 4.106
SITE DEVELOPMENT

4.106.1 General. Preservation and use of available natural resources shall be accomplished through evaluation and careful planning to minimize negative effects on the site and adjacent areas. Preservation of slopes, management of storm water drainage and erosion controls shall comply with this section.

4.106.2 Storm water drainage and retention during construction. Projects which disturb less than one acre of soil and are not part of a larger common plan of development which in total disturbs one acre or more, shall manage storm water drainage during construction. In order to manage storm water drainage during construction, one or more of the following measures shall be implemented to prevent flooding of adjacent property, prevent erosion and retain soil runoff on the site.

1. Retention basins of sufficient size shall be utilized to retain storm water on the site.
2. Where storm water is conveyed to a public drainage system, collection point, gutter or similar disposal method, water shall be filtered by use of a barrier system, wattle or other method approved by the enforcing agency.
3. Compliance with a lawfully enacted storm water management ordinance.

4.106.3 Grading and paving. Construction plans shall indicate how the site grading or drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following:

1. Swales
2. Water collection and disposal systems
3. French drains
4. Water retention gardens
5. Other water measures which keep surface water away from buildings and aid in groundwater recharge.

Exception: Additions and alterations not altering the drainage path.

CHAPTER 4
RESIDENTIAL MANDATORY MEASURES

Division 4.2 – ENERGY EFFICIENCY

SECTION 4.201
GENERAL

> **4.201.1 Scope.** For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory standards.

CHAPTER 4

RESIDENTIAL MANDATORY MEASURES

Division 4.3 – WATER EFFICIENCY AND CONSERVATION

SECTION 4.301 GENERAL

4.301.1 Scope. The provisions of this chapter shall establish the means of conserving water used indoors, outdoors and in wastewater conveyance.

SECTION 4.302 DEFINITIONS

4.302.1 Definitions. Reserved.

SECTION 4.303 INDOOR WATER USE

4.303.1 Water conserving plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:

4.303.1.1 Water closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-type Toilets.

Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.

4.303.1.2 Urinals. The effective flush volume of urinals shall not exceed 0.5 gallons per flush.

4.303.1.3 Showerheads.

4.303.1.3.1 Single showerhead. Showerheads shall have a maximum flow rate of not more than 2.0 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Showerheads.

4.303.1.3.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 2.0 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time.

Note: A hand-held shower shall be considered a showerhead.

4.303.1.4 Faucets.

4.303.1.4.1 Residential lavatory faucets. The maximum flow rate of residential lavatory faucets shall not exceed 1.5 gallons per minute at 60 psi. The minimum flow rate of residential lavatory faucets shall not be less than 0.8 gallons per minute at 20 psi.

4.303.1.4.2 Lavatory faucets in common and public use areas. The maximum flow rate of lavatory faucets installed in common and public use areas (outside of dwellings or sleeping units) in residential buildings shall not exceed 0.5 gallons per minute at 60 psi.

4.303.1.4.3 Metering faucets. Metering faucets when installed in residential buildings shall not deliver more than 0.25 gallons per cycle.

4.303.1.4.4 Kitchen faucets. The maximum flow rate of kitchen faucets shall not exceed 1.8 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons per minute at 60 psi.

Note: Where complying faucets are unavailable, aerators or other means may be used to achieve reduction.

4.303.2 Standards for plumbing fixtures and fittings. Plumbing fixtures and fittings shall be installed in accordance with the *California Plumbing Code*, and shall meet the applicable standards referenced in Table 1401.1 of the *California Plumbing Code.*

SECTION 4.304 OUTDOOR WATER USE

4.304.1 Irrigation controllers. Automatic irrigation system controllers for landscaping provided by the builder and installed at the time of final inspection shall comply with the following:

1. Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' needs as weather conditions change.
2. Weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based controllers are not required to have rain sensor input.

Note: More information regarding irrigation controller function and specifications is available from the Irrigation Association.

SECTION 4.305 WATER REUSE SYSTEMS (Reserved)

CHAPTER 4
RESIDENTIAL MANDATORY MEASURES

Division 4.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION 4.401
GENERAL

4.401.1 Scope. The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through protection of buildings from exterior moisture; construction waste diversion; employment of techniques to reduce pollution through recycling of materials; and building commissioning or testing, adjusting and balancing.

SECTION 4.402
DEFINITIONS

4.402.1 Definitions. Reserved.

SECTION 4.403
FOUNDATION SYSTEMS
(Reserved)

SECTION 4.404
EFFICIENT FRAMING TECHNIQUES
(Reserved)

SECTION 4.405
MATERIAL SOURCES
(Reserved)

SECTION 4.406
ENHANCED DURABILITY AND REDUCED MAINTENANCE

4.406.1 Rodent proofing. Annular spaces around pipes, electric cables, conduits or other openings in sole/bottom plates at exterior walls shall be protected against the passage of rodents by closing such openings with cement mortar, concrete masonry or a similar method acceptable to the enforcing agency.

SECTION 4.407
WATER RESISTANCE AND MOISTURE MANAGEMENT
(Reserved)

SECTION 4.408
CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

4.408.1 Construction waste management. Recycle and/or salvage for reuse a minimum of 50 percent of the nonhazardous construction and demolition waste in accordance with either Section 4.408.2, 4.408.3 or 4.408.4, or meet a more stringent local construction and demolition waste management ordinance.

Exceptions:

1. Excavated soil and land-clearing debris.
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist or are not located reasonably close to the jobsite.
3. The enforcing agency may make exceptions to the requirements of this section when isolated jobsites are located in areas beyond the haul boundaries of the diversion facility.

4.408.2 Construction waste management plan. Submit a construction waste management plan in conformance with Items 1 through 5. The construction waste management plan shall be updated as necessary and shall be available during construction for examination by the enforcing agency.

1. Identify the construction and demolition waste materials to be diverted from disposal by recycling, reuse on the project or salvage for future use or sale.
2. Specify if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
3. Identify diversion facilities where the construction and demolition waste material will be taken.
4. Identify construction methods employed to reduce the amount of construction and demolition waste generated.
5. Specify that the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.

4.408.3 Waste management company. Utilize a waste management company, approved by the enforcing agency, which can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with Section 4.408.1.

Note: The owner or contractor may make the determination if the construction and demolition waste materials will be diverted by a waste management company.

4.408.4 Waste stream reduction alternative. Projects that generate a total combined weight of construction and demolition waste disposed of in landfills, which do not exceed four (4) lbs./sq. ft. of the building area shall meet the minimum 50 percent construction waste reduction requirement in Section 4.408.1.

4.408.4.1 Waste stream reduction alternative. [HR] Projects that generate a total combined weight of construction and demolition waste disposed of in landfills, which do not exceed two (2) pounds per square foot of the building area, shall meet the minimum 50-percent construction waste reduction requirement in Section 4.408.1.

4.408.5 Documentation. Documentation shall be provided to the enforcing agency which demonstrates compliance with Section 4.408.2, Items 1 through 5, Section 4.408.3 or Section 4.408.4.

Notes:

1. Sample forms found in "A Guide to the California Green Building Standards Code (Residential)" located at www.hcd.ca.gov/CALGreen.html may be used to assist in documenting compliance with this section.
2. Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

SECTION 4.409
LIFE CYCLE ASSESSMENT
(Reserved)

SECTION 4.410
BUILDING MAINTENANCE AND OPERATION

4.410.1 Operation and maintenance manual. At the time of final inspection, a manual, compact disc, web-based reference or other media acceptable to the enforcing agency which includes all of the following shall be placed in the building:

1. Directions to the owner or occupant that the manual shall remain with the building throughout the life cycle of the structure.
2. Operation and maintenance instructions for the following:
   a. Equipment and appliances, including water-saving devices and systems, HVAC systems, water-heating systems and other major appliances and equipment.
   b. Roof and yard drainage, including gutters and downspouts.
   c. Space conditioning systems, including condensers and air filters.
   d. Landscape irrigation systems.
   e. Water reuse systems.
3. Information from local utility, water and waste recovery providers on methods to further reduce resource consumption, including recycle programs and locations.
4. Public transportation and/or carpool options available in the area.
5. Educational material on the positive impacts of an interior relative humidity between 30–60 percent and what methods an occupant may use to maintain the relative humidity level in that range.
6. Information about water-conserving landscape and irrigation design and controllers which conserve water.
7. Instructions for maintaining gutters and downspouts and the importance of diverting water at least 5 feet away from the foundation.
8. Information on required routine maintenance measures, including, but not limited to, caulking, painting, grading around the building, etc.
9. Information about state solar energy and incentive programs available.
10. A copy of all special inspection verifications required by the enforcing agency or this code.

CHAPTER 4
RESIDENTIAL MANDATORY MEASURES

Division 4.5 – ENVIRONMENTAL QUALITY

SECTION 4.501
GENERAL

4.501.1 Scope. The provisions of this chapter shall outline means of reducing the quantity of air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of a building's installers, occupants and neighbors.

SECTION 4.502
DEFINITIONS

4.502.1 Definitions. The following terms are defined in Chapter 2.

AGRIFIBER PRODUCTS.

COMPOSITE WOOD PRODUCTS.

DIRECT-VENT APPLIANCE.

MAXIMUM INCREMENTAL REACTIVITY (MIR).

MOISTURE CONTENT.

PRODUCT-WEIGHTED MIR (PWMIR).

REACTIVE ORGANIC COMPOUND (ROC).

VOC.

SECTION 4.503
FIREPLACES

4.503.1 General. Any installed gas fireplace shall be a direct-vent sealed-combustion type. Any installed woodstove or pellet stove shall comply with U.S. EPA Phase II emission limits where applicable. Woodstoves, pellet stoves and fireplaces shall also comply with applicable local ordinances.

SECTION 4.504
POLLUTANT CONTROL

4.504.1 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation, during storage on the construction site and until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of water, dust and debris, which may enter the system.

4.504.2 Finish material pollutant control. Finish materials shall comply with this section.

4.504.2.1 Adhesives, sealants and caulks. Adhesives, sealants and caulks used on the project shall meet the requirements of the following standards unless more stringent local or regional air pollution or air quality management district rules apply:

1. Adhesives, adhesive bonding primers, adhesive 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, as shown in Table 4.504.1 or 4.504.2, as applicable. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products, as specified in Subsection 2 below.
2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than 1 pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations*, Title 17, commencing with Section 94507.

4.504.2.2 Paints and coatings. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Suggested Control Measure, as shown in Table 4.504.3, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table 4.504.3 shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-high Gloss coating, based on its gloss, as defined in subsections 4.21, 4.36, and 4.37 of the 2007 California Air Resources Board, Suggested Control Measure, and the corresponding Flat, Nonflat or Nonflat-high Gloss VOC limit in Table 4.504.3 shall apply.

4.504.2.3 Aerosol paints and coatings. Aerosol paints and coatings shall meet the Product-weighted MIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of *California Code of Regulations*, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8, Rule 49.

4.504.2.4 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:

1. Manufacturer's product specification.
2. Field verification of on-site product containers.

TABLE 4.504.1
ADHESIVE VOC LIMIT[1,2]
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 adhesives not specifically listed	50
SPECIALTY APPLICATIONS	
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
SUBSTRATE SPECIFIC APPLICATIONS	
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.

TABLE 4.504.2
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
SEALANT PRIMERS	
Architectural Nonporous Porous	 250 775
Modified bituminous	500
Marine deck	760
Other	750

TABLE 4.504.3
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS[2,3]
Grams of VOC per Liter of Coating,
Less Water and Less Exempt Compounds

COATING CATEGORY	EFFECTIVE 1/1/2010	EFFECTIVE 1/1/2012
Flat coatings	50	
Nonflat coatings	100	
Nonflat-high gloss coatings	150	
SPECIALTY COATINGS		
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[1]	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	400	250
Shellacs Clear Opaque	 730 550	
Specialty primers, sealers and undercoaters	350	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.

4.504.3 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the following:

1. Carpet and Rug Institute's Green Label Plus Program.
2. California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.1, February 2010 (also known as Specification 01350.)
3. NSF/ANSI 140 at the Gold level.
4. Scientific Certifications Systems Indoor Advantage™ Gold.

4.504.3.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.

4.504.3.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 4.504.1.

4.504.4 Resilient flooring systems. Where resilient flooring is installed, at least 80 percent of floor area receiving resilient flooring shall comply with one or more of the following:

1. VOC emission limits defined in the Collaborative for High Performance Schools (CHPS) High Performance Products Database.
2. Products compliant with CHPS criteria certified under the Greenguard Children & Schools program.
3. Certification under the Resilient Floor Covering Institute (RFCI) FloorScore program.
4. Meet 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 1.1, February 2010 (also known as Specification 01350).

4.504.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections, as shown in Table 4.504.5.

TABLE 4.504.5
FORMALDEHYDE LIMITS[1]
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[2]	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 E 1333. 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 $^5/_{16}$ inch (8 mm).

4.504.5.1 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:

1. Product certifications and specifications.
2. Chain of custody certifications.
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, *et seq.*).
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.
5. Other methods acceptable to the enforcing agency.

SECTION 4.505
INTERIOR MOISTURE CONTROL

4.505.1 General. Buildings shall meet or exceed the provisions of the *California Building Standards Code*.

4.505.2 Concrete slab foundations. Concrete slab foundations required to have a vapor retarder by the *California Building Code*, Chapter 19 or concrete slab-on-ground floors required to have a vapor retarder by the *California Residential Code*, Chapter 5, shall also comply with this section.

4.505.2.1 Capillary break. A capillary break shall be installed in compliance with at least one of the following:

1. A 4-inch-thick (101.6 mm) base of $^1/_2$ inch (12.7 mm) or larger clean aggregate shall be provided with a vapor retarder in direct contact with concrete and a concrete mix design, which will address bleeding, shrinkage, and curling, shall be used. For additional information, see American Concrete Institute, ACI 302.2R-06.
2. Other equivalent methods approved by the enforcing agency.
3. A slab design specified by a licensed design professional.

4.505.3 Moisture content of building materials. Building materials with visible signs of water damage shall not be installed. Wall and floor framing shall not be enclosed when the framing members exceed 19-percent moisture content. Moisture content shall be verified in compliance with the following:

1. Moisture content shall be determined with either a probe-type or contact-type moisture meter. Equivalent moisture verification methods may be approved by the enforcing agency and shall satisfy requirements found in Section 101.8 of this code.
2. Moisture readings shall be taken at a point 2 feet (610 mm) to 4 feet (1219 mm) from the grade stamped end of each piece to be verified.
3. At least three random moisture readings shall be performed on wall and floor framing with documentation acceptable to the enforcing agency provided at the time of approval to enclose the wall and floor framing.

Insulation products which are visibly wet or have a high moisture content shall be replaced or allowed to dry prior to enclosure in wall or floor cavities. Wet-applied insulation products shall follow the manufacturers' drying recommendations prior to enclosure.

SECTION 4.506
INDOOR AIR QUALITY AND EXHAUST

4.506.1 Bathroom exhaust fans. Each bathroom shall be mechanically ventilated and shall comply with the following:

1. Fans shall be ENERGY STAR compliant and be ducted to terminate outside the building.
2. Unless functioning as a component of a whole house ventilation system, fans must be controlled by a humidity control.
    a. Humidity controls shall be capable of adjustment between a relative humidity range of ≤ 50 percent to a maximum of 80 percent. A humidity control may utilize manual or automatic means of adjustment.
    b. A humidity control may be a separate component to the exhaust fan and is not required to be integral (i.e., built-in).

Notes:

1. For the purposes of this section, a bathroom is a room which contains a bathtub, shower, or tub/shower combination.
2. Lighting integral to bathroom exhaust fans shall comply with the *California Energy Code*.

SECTION 4.507
ENVIRONMENTAL COMFORT

4.507.1 Reserved.

4.507.2 Heating and air-conditioning system design. Heating and air-conditioning systems shall be sized, designed and have their equipment selected using the following methods:

1. The heat loss and heat gain is established according to ANSI/ACCA 2 Manual J—2004 (Residential Load Calculation), ASHRAE handbooks or other equivalent design software or methods.
2. Duct systems are sized according to ANSI/ACCA 1 Manual D—2009 (*Residential Duct Systems*), ASHRAE handbooks or other equivalent design software or methods.
3. Select heating and cooling equipment according to ANSI/ACCA 3 Manual S—2004 (*Residential Equipment Selection*) or other equivalent design software or methods.

Exception: Use of alternate design temperatures necessary to ensure the systems function are acceptable.

SECTION 4.508
OUTDOOR AIR QUALITY
(Reserved)

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.1 – PLANNING AND DESIGN

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter	X																		
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below							X												
Chapter/Section																			
5.101							X												
5.102 Definitions							X												
5.106.4.2 and subsections							X												
5.106.8							X												
5.106.10							X												

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.1 – PLANNING AND DESIGN

SECTION 5.101
GENERAL

5.101.1 Scope. The provisions of this chapter outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore and enhance the environmental quality of the site and respect the integrity of adjacent properties.

SECTION 5.102
DEFINITIONS

5.102.1 Definitions. The following terms are defined in Chapter 2.

CUTOFF LUMINAIRES.

LOW-EMITTING AND FUEL EFFICIENT VEHICLES.

NEIGHBORHOOD ELECTRIC VEHICLE (NEV).

TENANT-OCCUPANTS.

VANPOOL VEHICLE.

ZEV.

SECTION 5.103
SITE SELECTION
(Reserved)

SECTION 5.104
SITE PRESERVATION
(Reserved)

SECTION 5.105
DECONSTRUCTION AND REUSE OF EXISTING STRUCTURES
(Reserved)

SECTION 5.106
SITE DEVELOPMENT

5.106.1 Storm water pollution prevention. Newly constructed projects which disturb less than one acre of land shall prevent the pollution of stormwater runoff from the construction activities through one or more of the following measures:

5.106.1.1 Local ordinance. Comply with a lawfully enacted stormwater management and/or erosion control ordinance.

5.106.1.2 Best management practices (BMP). Prevent the loss of soil through wind or water erosion by implementing an effective combination of erosion and sediment control and good housekeeping BMP.

1. Soil loss BMP that should be considered for implementation as appropriate for each project include, but are not limited to, the following:
   a. Scheduling construction activity.

b. Preservation of natural features, vegetation and soil.

c. Drainage swales or lined ditches to control stormwater flow.

d. Mulching or hydroseeding to stabilize disturbed soils.

e. Erosion control to protect slopes.

f. Protection of storm drain inlets (gravel bags or catch basin inserts).

g. Perimeter sediment control (perimeter silt fence, fiber rolls).

h. Sediment trap or sediment basin to retain sediment on site.

i. Stabilized construction exits.

j. Wind erosion control.

k. Other soil loss BMP acceptable to the enforcing agency.

2. Good housekeeping BMP to manage construction equipment, materials and wastes that should be considered for implementation as appropriate for each project include, but are not limited to, the following:

a. Material handling and waste management.

b. Building materials stockpile management.

c. Management of washout areas (concrete, paints, stucco, etc.).

d. Control of vehicle/equipment fueling to contractor's staging area.

e. Vehicle and equipment cleaning performed off site.

f. Spill prevention and control.

g. Other housekeeping BMP acceptable to the enforcing agency.

5.106.4 Bicycle parking. For buildings within the authority of California Building Standards Commission as specified in Section 103, comply with Section 5.106.4.1. For buildings within the authority of the Division of the State Architect pursuant to Section 105, comply with Section 5.106.4.2.

5.106.4.1 Bicycle parking. [BSC] Comply with Sections 5.106.4.1.1 and 5.106.4.1.2; or meet the applicable local ordinance, whichever is stricter.

5.106.4.1.1 Short-term bicycle parking. [BSC] If the new project or an addition or alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of new visitor motorized vehicle parking spaces being added, with a minimum of one two-bike capacity rack.

Exception: Additions or alterations which add nine or less visitor vehicular parking spaces.

5.106.4.1.2 Long-term bicycle parking. For new buildings with over 10 tenant-occupants or for additions or alterations that add 10 or more tenant vehicular parking spaces, provide secure bicycle parking for 5 percent of the tenant vehicular parking spaces being added, with a minimum of one space. Acceptable parking facilities shall be convenient from the street and shall meet the following:

1. Covered, lockable enclosures with permanently anchored racks for bicycles;
2. Lockable bicycle rooms with permanently anchored racks; or
3. Lockable, permanently anchored bicycle lockers.

Note: Additional information on recommended bicycle accommodations may be obtained from Sacramento Area Bicycle Advocates.

5.106.4.2 Bicycle parking. [DSA-SS] For public schools and community colleges, comply with Sections 5.106.4.2.1 and 5.106.4.2.2.

5.106.4.2.1 Short-term bicycle parking. Provide permanently anchored bicycle racks within 200 feet of the student entrance, readily visible to passers-by, for 5 percent of the student population based on the total occupant load of the campus with a minimum of one two-bike capacity rack.

5.106.4.2.2 Long-term bicycle parking. Provide secure bicycle parking for 5 percent of employees, based on the total number of motorized vehicle parking capacity in the staff parking lot, with a minimum of one space. Acceptable bicycle parking facilities shall be convenient from the street or staff parking area and shall meet one of the following:

1. Covered, lockable enclosures with permanently anchored racks for bicycles;
2. Lockable bicycle rooms with permanently anchored racks; or
3. Lockable, permanently anchored bicycle lockers.

5.106.5.2 Designated parking. In new projects or additions or alterations that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as follows:

TABLE 5.106.5.2

TOTAL NUMBER OF PARKING SPACES	NUMBER OF REQUIRED SPACES
0–9	0
10–25	1
26–50	3
51–75	6
76–100	8
101–150	11
151–200	16
201 and over	At least 8 percent of total

5.106.5.2.1 Parking stall marking. Paint, in the paint used for stall striping, the following characters such that

the lower edge of the last word aligns with the end of the stall striping and is visible beneath a parked vehicle:

CLEAN AIR/
VANPOOL/EV

Note: Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces.

5.106.8 Light pollution reduction. [N] Outdoor lighting systems shall be designed and installed to comply with the following:

1. The minimum requirements in the *California Energy Code* for Lighting Zones 1-4 as defined in Chapter 10 of the California Administrative Code; and
2. Backlight, Uplight and Glare (BUG) ratings as defined in IES TM-15-11; and
3. Allowable BUG ratings not exceeding those shown in Table 5.106.8, or

Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.

Exceptions: [N]

1. Luminaires that qualify as exceptions in Section 147 of the *California Energy Code*.
2. Emergency lighting.

Note: [N] See also *California Building Code*, Chapter 12, Section 1205.6 for college campus lighting requirements for parking facilities and walkways.

5.106.10 Grading and paving. Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following:

1. Swales.
2. Water collection and disposal systems.
3. French drains.
4. Water retention gardens.
5. Other water measures which keep surface water away from buildings and aid in groundwater recharge.

Exception: Additions and alterations not altering the drainage path.

TABLE 5.106.8 [N]
MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLARE (BUG) RATINGS[1,2]

ALLOWABLE RATING	LIGHTING ZONE 1	LIGHTING ZONE 2	LIGHTING ZONE 3	LIGHTING ZONE 4
Maximum Allowable Backlight Rating[3]				
Luminaire greater than 2 mounting heights (MH) from property line	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1 – 2 MH from property line	B2	B3	B4	B4
Luminaire back hemisphere is 0.5 – 1 MH from property line	B1	B2	B3	B3
Luminaire back hemisphere is less than 0.5 MH from property line	B0	B0	B1	B2
Maximum Allowable Uplight Rating				
For area lighting[4]	U0	U0	U0	U0
For all other outdoor lighting, including decorative luminaires	U1	U2	U3	U4
Maximum Allowable Glare Rating[5]				
Luminaire greater than 2 MH from property line	G1	G2	G3	G4
Luminaire front hemisphere is 1 – 2 MH from property line	G0	G1	G1	G2
Luminaire front hemisphere is 0.5 – 1 MH from property line	G0	G0	G1	G1
Luminaire back hemisphere is less than 0.5 MH from property line	G0	G0	G0	G1

1. IESNA Lighting Zones 0 and 5 are not applicable; refer to Lighting Zones as defined in the *California Energy Code* and Chapter 10 of the *California Administrative Code.*
2. For property lines that abut public walkways, bikeways, plazas and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section.
3. If the nearest property line is less than or equal to two mounting heights from the back hemisphere of the luminaire distribution, the applicable reduced Backlight rating shall be met.
4. General lighting luminaires in areas such as outdoor parking, sales or storage lots shall meet these reduced ratings. Decorative luminaires located in these areas shall meet *U*-value limits for "all other outdoor lighting."
5. If the nearest property line is less than or equal to two mounting heights from the front hemisphere of the luminaire distribution, the applicable reduced Glare rating shall be met.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.2 – ENERGY EFFICIENCY

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter	X						X												
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below																			
Chapter/Section																			

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.2 – ENERGY EFFICIENCY

SECTION 5.201
GENERAL

5.201.1 Scope [BSC]. ***California Energy Code*** **[DSA-SS].** For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory building standards.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.3 – WATER EFFICIENCY AND CONSERVATION

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter	X																		
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below							X												
Chapter/Section																			
5.301.1							X												
5.302.1 Definitions							X												
5.303.2							X												
Table 5.303.2.2							X												
Table 5.303.2.3							X												
5.303.3 and subsections							X												
5.303.4, Item 1 only							X												
5.303.6							X												

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.3 – WATER EFFICIENCY AND CONSERVATION

SECTION 5.301
GENERAL

5.301.1 Scope. The provisions of this chapter shall establish the means of conserving water used indoors, outdoors and in wastewater conveyance.

SECTION 5.302
DEFINITIONS

5.302.1 Definitions. The following terms are defined in Chapter 2.

GRAYWATER.

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO).

POTABLE WATER.

RECYCLED WATER.

SUBMETER.

WATER BUDGET.

SECTION 5.303
INDOOR WATER USE

5.303.1 Meters. Separate submeters or metering devices shall be installed for the uses described in Sections 5303.1.1 and 5303.1.2.

5.303.1.1 New buildings or additions in excess of 50,000 square feet. Separate submeters shall be installed as follows:

1. For each individual leased, rented, or other tenant space within the building projected to consume more than 100 gal/day (380 L/day), including, but not limited to, spaces used for laundry or cleaners, restaurant or food service, medical or dental office, laboratory, or beauty salon or barber shop.
2. Where separate submeters for individual building tenants are unfeasible, for water supplied to the following subsystems:
   a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s).
   b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s).
   c. Steam and hot-water boilers with energy input more than 500,000 Btu/h (147 kW).

5.303.1.2 Excess consumption. A separate submeter or metering device shall be provided for any tenant within a new building or within an addition that is projected to consume more than 1,000 gal/day.

5.303.2 Water reduction. Plumbing fixtures shall meet the maximum flow rate values shown in Table 5.303.2.3.

Exception: Buildings that demonstrate 20-percent overall water use reduction. In this case, a calculation demonstrating a 20-percent reduction in the building "water use baseline," as established in Table 5.303.2.2, shall be provided.

5.303.2.1 Areas of addition or alteration. For those occupancies within the authority of the California Building Standards Commission as specified in Section 103, the provisions of Section 5.303.2 and Section 5.303.3 shall apply to new fixtures in additions or areas of alteration to the building.

5.303.3 Water conserving plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:

5.303.3.1 Water closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-Type Toilets.

Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.

5.303.3.2 Urinals. The effective flush volume of urinals shall not exceed 0.5 gallons per flush.

5.303.3.3 Showerheads.

5.303.3.3.1 Single showerhead. Showerheads shall have a maximum flow rate of not more than 2.0 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Showerheads.

5.303.3.3.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 2.0 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time.

Note: A hand-held shower shall be considered a showerhead.

TABLE 5.303.2.3
WATER REDUCTION FIXTURE FLOW RATES

FIXTURE TYPE	MAXIMUM FLOW RATE
Kitchen faucets	1.8 gpm @ 60 psi
Wash fountains	1.8 [rim space (in.)/20 gpm @ 60 psi]
Metering faucets	0.20 gallons/cycle
Metering faucets for wash fountains	.20 [rim space (in.)/20 gpm @ 60 psi]

TABLE 5.303.2.2
WATER USE BASELINE[3]

FIXTURE TYPE	BASELINE FLOW RATE	DURATION	DAILY USES	OCCUPANTS[2]
Showerheads	2.0 gpm @ 80 psi	5 min.	1	X[2a]
Lavatory faucets, nonresidential	0.5 gpm @ 60 psi	.25 min.	3	X
Kitchen faucets	2.2 gpm @ 60 psi	4 min.	1	X[2b]
Replacement aerators	2.2 gpm @ 60 psi			X
Wash fountains	2.2 [rim space (in.)/20 gpm @ 60 psi]			X
Metering faucets	0.25 gallons/cycle	.25 min.	3	X
Metering faucets for wash fountains	.25 [rim space (in.)/20 gpm @ 60 psi]	.25 min.		X
Gravity tank-type water closets	1.28 gallons/flush	1 flush	1 male[1] 3 female	X
Flushometer tank water closets	1.28 gallons/flush	1 flush	1 male[1] 3 female	X
Flushometer valve water closets	1.28 gallons/flush	1 flush	1 male[1] 3 female	X
Electromechanical hydraulic water closets	1.28 gallons/flush	1 flush	1 male[1] 3 female	X
Urinals	0.5 gallons/flush	1 flush	2 male	X

Fixture "Water Use" = Flow rate × Duration × Occupants × Daily uses

1. The daily use number shall be increased to three if urinals are not installed in the room.
2. Refer to Table A, Chapter 4, *California Plumbing Code*, for occupant load factors.
   a. Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.
   b. Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
3. Use Worksheet WS-1 to calculate baseline water use.

5.303.4 Wastewater reduction. [N] Each building shall reduce by 20 percent wastewater by one of the following methods:

1. [BSC, DSA-SS] The installation of water-conserving fixtures (water closets, urinals) meeting the criteria established in Section 5.303.2 or 5.303.3.
2. [BSC] Utilizing nonpotable water systems [captured rainwater, graywater, and municipally treated wastewater (recycled water) complying with the current edition of the *California Plumbing Code* or other methods described in Section A5.304.8].

5.303.6 Standards for plumbing fixtures and fittings. Plumbing fixtures and fittings shall be installed in accordance with the *California Plumbing Code*, and shall meet the applicable standards referenced in Table 1401.1 of the *California Plumbing Code* and in Chapter 6 of this code.

SECTION 5.304
OUTDOOR WATER USE

5.304.1 Water budget. A water budget shall be developed for landscape irrigation use that installed in conjunction with a new building or an addition or alteration conforms to the local water efficient landscape ordinance or to the California Department of Water Resources Model Water Efficient Landscape Ordinance where no local ordinance is applicable.

Note: Prescriptive measures to assist in compliance with the water budget are listed in Sections 492.5 through 492.8, 492.10 and 492.11 of the ordinance, which may be found at: http://www.water.ca.gov/wateruseefficiency/docs/WaterOrdSec492.cfm.

5.304.2 Outdoor potable water use. For new water service or for addition or alteration requiring upgraded water service for landscaped areas of at least 1,000 square feet but not more than 5,000 square feet (the level at which *Water Code* §535 applies), separate submeters or metering devices shall be installed for outdoor potable water use.

5.304.3 Irrigation design. In new nonresidential construction or building addition or alteration with at least 1,000 but not more than 2,500 square feet of cumulative landscaped area (the level at which the MWELO applies), install irrigation controllers and sensors which include the following criteria, and meet manufacturer's recommendations.

5.304.3.1 Irrigation controllers. Automatic irrigation system controllers installed at the time of final inspection shall comply with the following:

1. Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' needs as weather conditions change.
2. Weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based controllers are not required to have rain sensor input.

Note: More information regarding irrigation controller function and specifications is available from the Irrigation Association.

SECTION 5.305
WATER REUSE SYSTEMS
(Reserved)

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter	X																		
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below							X												
Chapter/Section																			
5.401.1							X												
5.402.1 Definitions							X												
5.407 and subsections							X												
5.408.1–5.408.3							X												
5.410.1							X												
5.410.1.2							X												

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION 5.401
GENERAL

5.401.1 Scope. The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through protection of buildings from exterior moisture, construction waste diversion, employment of techniques to reduce pollution through recycling of materials, and building commissioning or testing and adjusting.

SECTION 5.402
Definitions

5.402.1 Definitions. The following terms are defined in Chapter 2.

ADJUST.

BALANCE.

BUILDING COMMISSIONING.

TEST.

SECTION 5.403
FOUNDATION SYSTEMS
(Reserved)

SECTION 5.404
EFFICIENT FRAMING TECHNIQUES
(Reserved)

SECTION 5.405
MATERIAL SOURCES
(Reserved)

SECTION 5.406
ENHANCED DURABILITY AND REDUCED MAINTENANCE
(Reserved)

SECTION 5.407
WATER RESISTANCE AND MOISTURE MANAGEMENT

5.407.1 Weather protection. Provide a weather-resistant exterior wall and foundation envelope as required by *California Building Code* Section 1403.2 (Weather Protection) and *California Energy Code* Section 150, (Mandatory Features and Devices), manufacturer's installation instructions or local ordinance, whichever is more stringent.

5.407.2 Moisture control. Employ moisture control measures by the following methods.

5.407.2.1 Sprinklers. Design and maintain landscape irrigation systems to prevent spray on structures.

5.407.2.2 Entries and openings. Design exterior entries and/or openings subject to foot traffic or wind-driven rain to prevent water intrusion into buildings as follows:

5.407.2.2.1 Exterior door protection. 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 plus at least one of the following:

1. An installed awning at least 4 feet in depth.
2. The door is protected by a roof overhang at least 4 feet in depth.
3. The door is recessed at least 4 feet.
4. Other methods which provide equivalent protection.

5.407.2.2.2 Flashing. Install flashings integrated with a drainage plane.

SECTION 5.408
CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

5.408.1 Construction waste management. Recycle and/or salvage for reuse a minimum of 50 percent of the nonhazardous construction and demolition waste in accordance with Section 5.408.1.1, 5.408.1.2 or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.

5.408.1.1 Construction waste management plan. Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, submit a construction waste management plan that

1. Identifies the construction and demolition waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project or salvage for future use or sale.
2. Determines if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
3. Identifies diversion facilities where construction and demolition waste material collected will be taken.
4. Specifies that the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.

5.408.1.2 Waste management company. Utilize a waste management company that can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with this section.

Note: The owner or contractor shall make the determination if the construction and demolition waste material will be diverted by a waste management company.

Exceptions to Sections 5.408.1.1 and 5.408.1.2:

1. Excavated soil and land-clearing debris.
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets.

5.408.1.3 Waste stream reduction alternative. The combined weight of new construction disposal that does not exceed two pounds per square foot of building area may be deemed to meet the 50 percent minimum requirement as approved by the enforcing agency.

5.408.1.4 Documentation. Documentation shall be provided to the enforcing agency which demonstrates compliance with Sections 5.408.1.1 through 5.408.1.3. The waste management plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.

Notes:

1. Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" located at http://www.bsc.ca.gov/Home/CALGreen.aspx may be used to assist in documenting compliance with the waste management plan.
2. Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

5.408.3 Excavated soil and land clearing debris. [BSC] 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed.

Exception: Reuse, either on-or off-site, of vegetation or soil contaminated by disease or pest infestation.

Notes:

1. If contamination by disease or pest infestation is suspected, contact the County Agricultural Commissioner and follow its direction for recycling or disposal of the material. (www.cdfa.ca.gov/exec/county/county_contacts.html)

2. For a map of known pest and/or disease quarantine zones, consult with the California Department of Food and Agriculture. (www.cdfa.ca.gov)

SECTION 5.409
LIFE CYCLE ASSESSMENT
(Reserved)

SECTION 5.410
BUILDING MAINTENANCE AND OPERATION

5.410.1 Recycling by occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics and metals or meet a lawfully enacted local recycling ordinance, if more restrictive.

5.410.1.1 Additions. [A] All additions conducted within a 12-month period under single or multiple permits, resulting in an increase of 30 percent or more in floor area, shall provide recycling areas on site.

Exception: Additions within a tenant space resulting in less than a 30-percent increase in the tenant space floor area.

5.410.1.2 Sample ordinance. Space allocation for recycling areas shall comply with Chapter 18, Part 3, Division 30 of the *Public Resources Code.* Chapter 18 is known as the California Solid Waste Reuse and Recycling Access Act of 1991 (Act).

Note: A sample ordinance for use by local agencies may be found in Appendix A of the document at the CalRecycle's web site.

5.410.2 Commissioning. [N] For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements. Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity. Commissioning requirements shall include:

1. Owner's or owner representative's project requirements.
2. Basis of design.
3. Commissioning measures shown in the construction documents.
4. Commissioning plan.
5. Functional performance testing.
6. Documentation and training.
7. Commissioning report.

Exceptions:

1. Dry storage warehouses of any size.
2. Areas under 10,000 square feet used for offices or other conditioned accessory spaces within dry storage warehouses.
3. Tenant improvements under 10,000 square feet as described in Section 303.1.1.
4. Commissioning requirements for energy systems covered by the 2013 *California Energy Code.*

All building operating systems covered by Title 24, Part 6, as well as process equipment and controls, and renewable energy systems shall be included in the scope of the commissioning requirements.

5.410.2.1 Owner's or Owner representative's Project Requirements (OPR). [N] The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins. This documentation shall include the following:

1. Environmental and sustainability goals.
2. Energy efficiency goals [Refer to 2013 *California Energy Code*, Section 120.8(b)].
3. Indoor environmental quality requirements.
4. Project program, including facility functions and hours of operation, and need for after hours operation.
5. Equipment and systems expectations.
6. Building occupant and operation and maintenance (O&M) personnel expectations.

5.410.2.2 Basis of Design (BOD). [N] A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project. The Basis of Design document shall cover the following systems:

1. Heating, ventilation, air conditioning [HVAC) systems and controls. (Refer to 2013 *California Energy Code*, Section 120.8(c)].
2. Indoor lighting system and controls [Refer to 2013 *California Energy Code* Section 120.8(c)].
3. Water heating system [Refer to 2013 *California Energy Code* Section 120.8(c)].
4. Renewable energy systems.
5. Landscape irrigation systems.
6. Water reuse systems.

5.410.2.3 Commissioning plan. [N] Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned. The commissioning plan shall include the following:

1. General project information.
2. Commissioning goals.
3. Systems to be commissioned. Plans to test systems and components shall include:
   a. An explanation of the original design intent.
   b. Equipment and systems to be tested, including the extent of tests.

c. Functions to be tested.

d. Conditions under which the test shall be performed.

e. Measurable criteria for acceptable performance.

4. Commissioning team information.

5. Commissioning process activities, schedules and responsibilities. Plans for the completion of commissioning shall be included.

5.410.2.4 Functional performance testing. [N] Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized, and include any readings and adjustments made.

5.410.2.5 Documentation and training. [N] A systems manual and systems operations training are required, including Occupational Safety and Health Act (OSHA) requirements in *California Code of Regulations* (CCR), Title 8, Section 5142, and other related regulations.

5.410.2.5.1 Systems manual. [N] Documentation of the operational aspects of the building shall be completed within the systems manual and delivered to the building owner or representative. The systems manual shall include the following:

1. Site information, including facility description, history and current requirements.
2. Site contact information.
3. Basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, site events log.
4. Major systems.
5. Site equipment inventory and maintenance notes.
6. A copy of verifications required by the enforcing agency or this code.
7. Other resources and documentation, if applicable.

5.410.2.5.2 Systems operations training. [N] A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and documented in the commissioning report and shall include the following:

1. System/equipment overview (what it is, what it does and with what other systems and/or equipment it interfaces).
2. Review and demonstration of servicing/preventive maintenance.
3. Review of the information in the systems manual.
4. Review of the record drawings on the system/equipment.

5.410.2.6 Commissioning report. [N] A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or representative.

Note: Guidance on implementation and enforcement of commissioning requirements, including sample compliance forms and templates, may be found in Appendix A6, Division A6.1, of this code.

5.410.4 Testing and adjusting. Testing and adjusting of systems shall be required for new buildings less than 10,000 square feet or new systems to serve an addition or alteration subject to Section 303.1.

5.410.4.1 (Reserved)

5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include, as applicable to the project:

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.

5.410.4.3 Procedures. Perform testing and adjusting procedures in accordance with manufacturer's specifications and applicable standards on each system.

5.410.4.3.1 HVAC balancing. In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, balance the system 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.

5.410.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.

5.410.4.5 Operation and maintenance (O & M) manual. Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/warranties for each system. O & M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142, and other related regulations.

5.410.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.5 – ENVIRONMENTAL QUALITY

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter	X																		
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below							X												
Chapter/Section																			
5.501.1							X												
5.502.1 Definitions							X												
5.504.3							X												
5.504.4							X												
5.504.4.1							X												
Table 5.504.4.1							X												
Table 5.504.4.2							X												
5.504.4.3							X												
5.504.4.3.1							X												
Table 5.504.4.3							X												
5.504.4.3.2							X												
5.504.4.4 and subsections							X												
5.504.4.5							X												
Table 5.504.4.5							X												
5.504.4.6							X												
5.504.5.3							X												
5.505							X												
5.506.1							X												
5.507.4							X												
5.508.1 and subsections							X												

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.5 – ENVIRONMENTAL QUALITY

SECTION 5.501
GENERAL

5.501.1 Scope. The provisions of this chapter shall outline means of reducing the quantity of air contaminants that are odorous, irritating, and/or harmful to the comfort and well-being of a building's installers, occupants and neighbors.

SECTION 5.502
DEFINITIONS

5.502.1 Definitions. The following terms are defined in Chapter 2.

ARTERIAL HIGHWAY.

A-WEIGHTED SOUND LEVEL (dBA).

1 BTU/HOUR.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL).

COMPOSITE WOOD PRODUCTS.

DAY-NIGHT AVERAGE SOUND LEVEL (Ldn).

DECIBEL (dB).

ENERGY EQUIVALENT (NOISE) LEVEL (L_{eq}).

EXPRESSWAY.

FREEWAY.

GLOBAL WARMING POTENTIAL (GWP).

GLOBAL WARMING POTENTIAL VALUE (GWP VALUE).

HIGH-GWP REFRIGERANT.

LONG RADIUS ELBOW.

LOW-GWP REFRIGERANT.

MERV.

MAXIMUM INCREMENTAL REACTIVITY (MIR).

PRODUCT-WEIGHTED MIR (PWMIR).

PSIG.

REACTIVE ORGANIC COMPOUND (ROC).

SCHRADER ACCESS VALVES.

SHORT RADIUS ELBOW.

SUPERMARKET.

VOC.

SECTION 5.503
FIREPLACES

5.503.1 General. Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace, or a sealed woodstove or pellet stove, and refer to residential requirements in the *California Energy Code*, Title 24, Part 6, Subchapter 7, Section 150. Woodstoves, pellet stoves and fireplaces shall comply with applicable local ordinances.

5.503.1.1 Woodstoves. Woodstoves and pellet stoves shall comply with U.S. EPA Phase II emission limits where applicable.

SECTION 5.504
POLLUTANT CONTROL

5.504.1.3 Temporary ventilation. The permanent HVAC system shall only be used during construction if necessary to condition the building or areas of addition or alteration within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30 percent based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy, or, if the building is occupied during alteration, at the conclusion of construction.

5.504.3 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation and during storage on the construction site until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which may enter the system.

5.504.4 Finish material pollutant control. Finish materials shall comply with Sections 5.504.4.1 through 5.504.4.4.

TABLE 5.504.4.1
ADHESIVE VOC LIMIT[1,2]
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
SPECIALTY APPLICATIONS	
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
SUBSTRATE SPECIFIC APPLICATIONS	
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.

5.504.4.1 Adhesives, sealants and caulks. Adhesives, sealants, and caulks used on the project shall meet the requirements of the following standards:

1. Adhesives, adhesive bonding primers, adhesive 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, as shown in Tables 5.504.4.1 and 5.504.4.2. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products as specified in subsection 2, below.
2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations*, Title 17, commencing with Section 94507.

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
SEALANT PRIMERS	
Architectural Nonporous Porous	 250 775
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. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in Table 5.504.4.3, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table 5.504.4.3 shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 of the 2007 California Air Resources Board Suggested Control Measure, and the corresponding Flat, Nonflat or Nonflat-High Gloss VOC limit in Table 5.504.4.3 shall apply.

TABLE 5.504.4.3
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS[2,3]
Grams of VOC Per Liter of Coating,
Less Water and Less Exempt Compounds

COATING CATEGORY	CURENT LIMIT
Flat coatings	50
Nonflat coatings	100
Nonflat high gloss coatings	150
Specialty Coatings	
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[1]	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 Opaque	 730 550
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.

5.504.4.3.1 Aerosol paints and coatings. Aerosol paints and coatings shall meet the PWMIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of *California Code of Regulations*, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49.

5.504.4.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:

1. Manufacturer's product specification
2. Field verification of on-site product containers

5.504.4.4 Carpet systems. All carpet installed in the building interior shall meet at least one of the following testing and product requirements:

1. Carpet and Rug Institute's Green Label Plus Program;
2. Compliant with 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 1.1, February 2010 (also known as CDPH Standard Method V1.1 or *Specification 01350)*;
3. NSF/ANSI 140 at the Gold level or higher;
4. Scientific Certifications Systems Sustainable Choice; or
5. Compliant with the California Collaborative for High Performance Schools (CA-CHPS) Criteria Interpretation for EQ 2.2 dated July 2012 and listed in the CHPS High Performance Product Database.

5.504.4.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.

5.504.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1.

5.504.4.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure (ATCM) for Composite Wood (17 CCR 93120 et seq.) Those materials not exempted under the ATCM must meet the specified emission limits, as shown in Table 5.504.4.5.

5.504.4.5.1 Early compliance. Reserved.

5.504.4.5.3 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:

1. Product certifications and specifications.
2. Chain of custody certifications.
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, *et seq.*).
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.
5. Other methods acceptable to the enforcing agency.

TABLE 5.504.4.5
FORMALDEHYDE LIMITS[1]
Maximum Formaldehyde Emissions in Parts per Million.

PRODUCT	CURRENT LIMIT
Hardwood plywood veneer core	0.05
Hardwood plywood composite core	0.05
Particle board	0.09
Medium density fiberboard	0.11
Thin medium density fiberboard[2]	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 E 1333. 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 $^{5}/_{16}$ inches (8 mm).

5.504.4.6 Resilient flooring systems. For 80 percent of floor area receiving resilient flooring, installed resilient flooring shall meet at least one of the following:

1. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program;
2. Compliant with the 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 1.1, February 2010;
3. Compliant with the California Collaborative for High Performance Schools (CA-CHPS) Criteria Interpretation for EQ 2.2 dated July 2012 and listed in the CHPS High Performance Product Database; or
4. Compliant with CDPH criteria as certified under the Greenguard Children's & Schools Program.

5.504.4.6.1 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.

5.504.5.3 Filters. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provides at least a Minimum Efficiency Reporting Value (MERV) of 8. MERV 8 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.

Exceptions:

1. An ASHRAE 10-percent to 15-percent efficiency filter shall be permitted for an HVAC unit meeting the 2013 *California Energy Code* having 60,000 Btu/h or less capacity per fan coil, if the energy use of the air delivery system is 0.4 W/cfm or less at design air flow.
2. Existing mechanical equipment.

5.504.5.3.1 Labeling. Installed filters shall be clearly labeled by the manufacturer indicating the MERV rating.

5.504.7 Environmental tobacco smoke (ETS) control. Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and within the building as already prohibited by other laws or regulations; or as enforced by ordinances, regulations or policies of any city, county, city and county, California Community College, campus of the California State University, or campus of the University of California, whichever are more stringent. When ordinances, regulations or policies are not in place, post signage to inform building occupants of the prohibitions.

SECTION 5.505
INDOOR MOISTURE CONTROL

5.505.1 Indoor moisture control. Buildings shall meet or exceed the provisions of *California Building Code*, CCR, Title 24, Part 2, Sections 1203 (Ventilation) and Chapter 14 (Exterior Walls). For additional measures not applicable to low-rise residential occupancies, see Section 5.407.2 of this code.

SECTION 5.506
INDOOR AIR QUALITY

5.506.1 Outside air delivery. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 121 (Requirements For Ventilation) of the 2010 *California Energy Code*, or the applicable local code, whichever is more stringent, and Division 1, Chapter 4 of CCR, Title 8.

5.506.2 Carbon dioxide (CO_2) monitoring. For buildings or additions equipped with demand control ventilation, CO_2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the 2013 *California Energy Code*, Section 120(c)(4).

SECTION 5.507
ENVIRONMENTAL COMFORT

5.507.4 Acoustical control. Employ building assemblies and components with Sound Transmission Class (STC) values determined in accordance with ASTM E 90 and ASTM E 413 or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E 1332,using either the prescriptive or performance method in Section 5.507.4.1 or 5.507.4.2.

Exception: Buildings with few or no occupants or where occupants are not likely to be affected by exterior noise, as determined by the enforcement authority, such as factories, stadiums, storage, enclosed parking structures and utility buildings.

Exception: [DSA-SS] For public schools and community colleges, the requirements of this section and all subsections apply only to new construction.

5.507.4.1 Exterior noise transmission, prescriptive method. Wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 in the following locations:

1. Within the 65 CNEL noise contour of an airport.

   Exceptions:

   1. L_{dn} or CNEL for military airports shall be determined by the facility Air Installation Compatible Land Use Zone (AICUZ) plan.
   2. L_{dn} or CNEL for other airports and heliports for which a land use plan has not been developed shall be determined by the local general plan noise element.

2. Within the 65 CNEL or L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway source as determined by the Noise Element of the General Plan.

5.507.4.1.1 Noise exposure where noise contours are not readily available. Buildings exposed to a noise level of 65 dB L_{eq}-1-hr during any hour of operation shall have building, addition or alteration exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).

5.507.4.2 Performance method. For buildings located as defined in Section 5.507.4.1 or 5.507.4.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (L_{eq}-1Hr) of 50 dBA in occupied areas during any hour of operation.

5.507.4.2.1 Site features. Exterior features such as sound walls or earth berms may be utilized as appropriate to the building, addition or alteration project to mitigate sound migration to the interior.

5.507.4.2.2 Documentation of compliance. An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.

5.507.4.3 Interior sound transmission. Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.

Note: Examples of assemblies and their various STC ratings may be found at the California Office of Noise Control: http://www.toolbase.org/PDF/CaseStudies/stc_icc_ratings.pdf.

SECTION 5.508
OUTDOOR AIR QUALITY

5.508.1 Ozone depletion and greenhouse gas reductions. Installations of HVAC, refrigeration and fire suppression equipment shall comply with Sections 5.508.1.1 and 5.508.1.2.

5.508.1.1 Chlorofluorocarbons (CFCs). Install HVAC, refrigeration and fire suppression equipment that do not contain CFCs.

5.508.1.2 Halons. Install HVAC, refrigeration and fire suppression equipment that do not contain Halons.

5.508.2 Supermarket refrigerant leak reduction. New commercial refrigeration systems shall comply with the provisions of this section when installed in retail food stores 8,000 square feet or more conditioned area, and that utilize either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units. The leak reduction measures apply to refrigeration systems containing high-global-warming potential (high-GWP) refrigerants with a GWP of 150 or greater. New refrigeration systems include both new facilities and the replacement of existing refrigeration systems in existing facilities.

Exception: Refrigeration systems containing low-global warming potential (low-GWP) refrigerant with a GWP value less than 150 are not subject to this section. Low-GWP refrigerants are nonozone-depleting refrigerants that include ammonia, carbon dioxide (CO_2), and potentially other refrigerants.

5.508.2.1 Refrigerant piping. Piping compliant with the *California Mechanical Code* shall be installed to be accessible for leak protection and repairs. Piping runs using threaded pipe, copper tubing with an outside diameter (OD) less than $^1/_4$ inch, flared tubing connections and short radius elbows shall not be used in refrigerant systems except as noted below.

5.508.2.1.1 Threaded pipe. Threaded connections are permitted at the compressor rack.

5.508.2.1.2 Copper pipe. Copper tubing with an OD less than $^1/_4$ inch may be used in systems with a refrigerant charge of 5 pounds or less.

5.508.2.1.2.1 Anchorage. One-fourth-inch OD tubing shall be securely clamped to a rigid base to keep vibration levels below 8 mils.

5.508.2.1.3 Flared tubing connections. Double-flared tubing connections may be used for pressure controls, valve pilot lines and oil.

Exception: Single-flared tubing connections may be used with a multiring seal coated with industrial sealant suitable for use with refrigerants and tightened in accordance with manufacturer's recommendations.

5.508.2.1.4 Elbows. Short radius elbows are only permitted where space limitations prohibit use of long radius elbows.

5.508.2.2 Valves. Valves and fittings shall comply with the *California Mechanical Code* and as follows.

5.508.2.2.1 Pressure relief valves. For vessels containing high-GWP refrigerant, a rupture disc shall be installed between the outlet of the vessel and the inlet of the pressure relief valve.

5.508.2.2.1.1 Pressure detection. A pressure gauge, pressure transducer or other device shall be installed in the space between the rupture disc and the relief valve inlet to indicate a disc rupture or discharge of the relief valve.

5.508.2.2.2 Access valves. Only Schrader access valves with a brass or steel body are permitted for use.

5.508.2.2.2.1 Valve caps. For systems with a refrigerant charge of 5 pounds or more, valve caps shall be brass or steel and not plastic.

5.508.2.2.2.2 Seal caps. If designed for it, the cap shall have a neoprene O-ring in place.

5.508.2.2.2.2.1 Chain tethers. Chain tethers to fit over the stem are required for valves designed to have seal caps.

Exception: Valves with seal caps that are not removed from the valve during stem operation.

5.508.2.3 Refrigerated service cases. Refrigerated service cases holding food products containing vinegar and salt shall have evaporator coils of corrosion-resistant material, such as stainless steel; or be coated to prevent corrosion from these substances.

5.508.2.3.1 Coil coating. Consideration shall be given to the heat transfer efficiency of coil coating to maximize energy efficiency.

5.508.2.4 Refrigerant receivers. Refrigerant receivers with capacities greater than 200 pounds shall be fitted with a device that indicates the level of refrigerant in the receiver.

5.508.2.5 Pressure testing. The system shall be pressure tested during installation prior to evacuation and charging.

5.508.2.5.1 Minimum pressure. The system shall be charged with regulated dry nitrogen and appropriate tracer gas to bring system pressure up to 300 psig minimum.

5.508.2.5.2 Leaks. Check the system for leaks, repair any leaks, and retest for pressure using the same gauge.

5.508.2.5.3 Allowable pressure change. The system shall stand, unaltered, for 24 hours with no more than a +/- one pound pressure change from 300 psig, measured with the same gauge.

5.508.2.6 Evacuation. The system shall be evacuated after pressure testing and prior to charging.

5.508.2.6.1 First vacuum. Pull a system vacuum down to at least 1000 microns (+/- 50 microns), and hold for 30 minutes.

5.508.2.6.2 Second vacuum. Pull a second system vacuum to a minimum of 500 microns and hold for 30 minutes.

5.508.2.6.3 Third vacuum. Pull a third vacuum down to a minimum of 300 microns, and hold for 24 hours with a maximum drift of 100 microns over a 24-hour period.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 6 – REFERENCED ORGANIZATIONS AND STANDARDS

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter	X		X				X	X	X		X								
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below																			
Chapter/Section																			

CHAPTER 6

REFERENCED ORGANIZATIONS AND STANDARDS

SECTION 601
GENERAL

601.1 This chapter lists the organizations and standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard.

ORGANIZATION	STANDARD	REFERENCED SECTION
AHAM Association of Home Appliance Manufacturers		
1119 19th Street NW, Suite 402 Washington, D.C. 20026-3627 http://www.aham.org	ANSI/AHAM DW-1-2010	202
AABC Associated Air Balance Council		
1518 K St NW Washington, DC 20005 www.aabc.com	National Standards, 1989	5.410.4.3.1 A5.410.5.3.1
ACCA Air Conditioning Contractors of America		
2800 Shirlington Road, Suite 300 Arlington, VA 22206 www.acca.org	ANSI/ACCA 2 Manual J–2004 ANSI/ACCA 1 Manual D–2009 ANSI/ACCA 3 Manual S–2004	4.507.2 4.507.2 4.507.2
ANSI American National Standards Institute		
Operations Office 25 West 43rd Street, Fourth Floor New York, NY 10036 www.ansi.org	ANSI/AHAM DW-1 NSF/ANSI 140-2007 ANSI/ACCA 2 Manual J–2004 ANSI/ACCA 1 Manual D–2009 ANSI/ACCA 3 Manual S–2004	202 4.504.3, 5.504.4.4 4.507.2 4.507.2 4.507.2
ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.		
1791 Tullie Circle, NE Atlanta, GA 30329 www.ashrae.org	52.1-92 52.2-2007 62.2 90.1	A5.504.1 202 A5.504.1 5.108.8
ASME American Society of Mechanical Engineers		
Three Park Avenue New York, NY 10016-5990 www.asme.org	ASME A112.18.1 ASME A112.19 ASME A112.19.2 ASME A112.19.14	5.303.6 5.303.6 5.303.2 5.303.6
ASTM ASTM International		
100 Barr Harbor Drive West Conshohocken, PA 19428-2859 www.astm.org	ASTM C 33 ASTM C 150 ASTM C 595 ASTM C 618 ASTM C 989 ASTM C 1157 ASTM C 1240 ASTM C 1371-98 ASTM C 1549 ASTM C 1602 ASTM C 1697 ASTM E 90 ASTM E 408-02 ASTM E 413 ASTM E 1332 ASTM E 1333-02 ASTM E 1903-97 ASTM E 1918 ASTM E 1980-01	A 5.405.5.3.2 A 5.405.5.1 A 5.405.5.1 A 5.405.5.2.1 A 5.405.5.2.1 A 5.405.5.1 A 5.405.5.2.1 A5.106.11.2.2 A4.106.7, A5.106.11.1 A5.405.5.3.2.3 A5.405.5.2.1 5.507.4 A5.10, 6.11.2.2 5.507.4 5.507.4 Table 4.504.5, 5.504.4.5 A 5.103.4 A4.106.7, A5.106.11.1 A4.106.5.3, A5.106.11.2.3
CSA Canadian Standards Association		
5060 Spectrum Way, Suite 100 Mississauga, Ontario, Canada L4W 5N6 www.csa.ca	CSA B125.1	
IAPMO International Association of Plumbing and Mechanical Officials		
5001 E. Philadelphia St. Ontario, CA 91761 iapmo@iapmo.org	IAPMO Z124.9	5.303.6
IESNA Illuminating Engineering Society of North America		
170 Wall St., Floor 17 New York, NY 10005-4001 http://www.ies.org	IES TM-15-11	5.10 6.6 A4.106.10
NEBB National Environmental Balancing Bureau		
8575 Grovemont Cir Gaithersburg, MD 20877 http://nebb.org/index.php	Procedural Standards, 1983	5.410.4.3.1 A5.410.5.3.1

NSF International		
789 Dixboro Rd. Ann Arbor, MI 48113-0140 http://www.nsf.org/	NSF/ANSI 140-2007	4.504.3, 5.504.4.4
TABB Testing, Adjusting and Balancing Bureau		
601 N Fairfax St, Ste 250 Alexandria, VA 22314 http://www.tabbcertified.org/contact.html	National Standards, 2003	5.410.3.3.1 A5.410.5.3.1
US EPA United States Environmental Protection Agency		
Office of Wastewater Management (4204M) 1200 Pennsylvania Avenue Washington, D.C. 20460 http://www.epa.gov/watersense/	WaterSense	4.303.1

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 7 – INSTALLER AND SPECIAL INSPECTOR QUALIFICATIONS

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below	X		X																
Chapter/Section																			
702.1			X																
702.2	X		X																
703.1	X		X																

CHAPTER 7

INSTALLER AND SPECIAL INSPECTOR QUALIFICATIONS

SECTION 701
GENERAL
(Reserved)

SECTION 702
QUALIFICATIONS

702.1 Installer training. HVAC system installers shall be trained and certified in the proper installation of HVAC systems including ducts and equipment by a nationally or regionally recognized training or certification program. Uncertified persons may perform HVAC installations when under the direct supervision and responsibility of a person trained and certified to install HVAC systems or contractor licensed to install HVAC systems. Examples of acceptable HVAC training and certification programs include but are not limited to the following:

1. State certified apprenticeship programs.
2. Public utility training programs.
3. Training programs sponsored by trade, labor or statewide energy consulting or verification organizations.
4. Programs sponsored by manufacturing organizations.
5. Other programs acceptable to the enforcing agency.

702.2 Special inspection. [HCD] When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition to other certifications or qualifications acceptable to the enforcing agency, the following certifications or education may be considered by the enforcing agency when evaluating the qualifications of a special inspector:

1. Certification by a national or regional green building program or standard publisher.
2. Certification by a statewide energy consulting or verification organization, such as HERS raters, building performance contractors, and home energy auditors.
3. Successful completion of a third party apprentice training program in the appropriate trade.
4. Other programs acceptable to the enforcing agency.

Notes:

1. Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.
2. HERS raters are special inspectors certified by the California Energy Commission (CEC) to rate homes in California according to the Home Energy Rating System (HERS).

[BSC] When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition, the special inspector shall have a certification from a recognized state, national or international association, as determined by the local agency. The area of certification shall be closely related to the primary job function, as determined by the local agency.

Note: Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.

SECTION 703
VERIFICATIONS

703.1 Documentation. Documentation used to show compliance with this code shall include but is not limited to, construction documents, plans, specifications, builder or installer certification, inspection reports, or other methods acceptable to the enforcing agency which demonstrate substantial conformance. When specific documentation or special inspection is necessary to verify compliance, that method of compliance will be specified in the appropriate section or identified in the application checklist.

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CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 8 – COMPLIANCE FORMS AND WORKSHEETS

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter	X						X												
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below																			
Chapter/Section																			
WS 1 – BASELINE WATER USE																			
WS 2 – 20% REDUCTION WATER USE CALCULATION TABLE																			
WS 3 – 30, 35 or 40% REDUCTION WATER USE CALCULATION TABLE																			

CHAPTER 8

COMPLIANCE FORMS AND WORKSHEETS

[BSC] Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" located at http://www.bsc.ca.gov/Home/CALGreen.aspx may be used to assist in documenting compliance with the waste management plan and other provisions of this code.

[HCD 1] Sample forms found in "A Guide to the California Green Building Standards Code (Residential)" located at www.hcd.ca.gov/CALGreen.html may be used to assist in documenting compliance with *CALGreen*.

WORKSHEET (WS-1)
BASELINE WATER USE

BASELINE WATER USE CALCULATION TABLE									
FIXTURE TYPE	FLOW RATE		DURATION		DAILY USES		OCCUPANTS[1,2]		GALLONS PER DAY
Showerheads	2.0 gpm	×	5 min.	×	1	×	Note 2a	=	
Showerheads residential	2.5 gpm	×	8 min.	×	1	×		=	
Lavatory faucets residential	2.2 gpm	×	.25 min.	×	3	×		=	
Lavatory faucets nonresidential	0.5 gpm	×	.25 min.	×	3			=	
Kitchen faucets	2.2 gpm	×	4 min.	×	1	×	Note 2b	=	
Replacement aerators	2.2 gpm	×		×		×		=	
Wash fountains	2.2 gpm	×		×		×		=	
Metering faucets	0.25 gal/cycle	×		×	3	×		=	
Metering faucets for wash fountains	2.2 gpm	×	.25 min.	×		×		=	
Gravity tank-type water closets	1.28 gal/flush	×	1 flush	×	1 male[3] 3 female	×		=	
Flushometer tank water closets	1.28 gal/flush	×	1 flush	×	1 male[3] 3 female	×		=	
Flushometer valve water closets	1.28 gal/flush	×	1 flush	×	1 male[3] 3 female	×		=	
Electromechanical hydraulic water closets	1.28 gal/flush	×	1 flush	×	1 male[3] 3 female	×		=	
Urinals	0.5 gal/flush	×	1 flush	×	2 male	×		=	
Total daily baseline water use (BWU)								=	
_____ (BWU) × .80 = _____ Allowable water use									

1. For residential occupancies, the number of occupants shall be based on two persons for the first bedroom, plus one additional person for each additional bedroom.
2. For nonresidential occupancies, refer to Table A, Chapter 4, 2013 *California Plumbing Code*, for occupant load factors.
   a. Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.
   b. Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
3. The daily use number shall be increased to three if urinals are not installed in the room.

WORKSHEET (WS-2)
WATER USE REDUCTION

20-PERCENT REDUCTION WATER USE CALCULATION TABLE									
FIXTURE TYPE	FLOW RATE[2]		DURATION		DAILY USES		OCCUPANTS[2,3]		GALLONS PER DAY
Showerheads		×	5 min.	×	1	×	Note 3a	=	
Showerheads residential		×	8 min.	×	1	×		=	
Lavatory faucets residential		×	.25 min.	×	3	×		=	
Lavatory faucets nonresidential[6]		×	.25 min.	×	3	×		=	
Kitchen faucets		×	4 min.	×	1	×	Note 3b	=	
Replacement aerators		×		×		×		=	
Wash fountains		×		×		×		=	
Metering faucets		×	.25 min.	×	3	×		=	
Metering faucets for wash fountains		×	.25 min.	×		×		=	
Gravity tank-type water closets		×	1 flush	×	1 male[5] 3 female	×		=	
HET[4] High-efficiency toilet	1.28 gal/flush	×	1 flush	×	1 male[5] 3 female	×		=	
Flushometer tank water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Flushometer valve water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Electromechanical hydraulic water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Urinals		×	1 flush	×	2 male	×		=	
Urinals Nonwater supplied	0.0 gal/flush	×	1 flush	×	2 male	×		=	
Proposed water use								=	
_____ (BWU from WS-1) × .80 = _____ Allowable water use									

1. The flow rate values shall not exceed the baseline flow rates from the *California Code of Regulations*, Title 20, 2010 Appliance Efficiency Regulations (See Table 4.303.2.)
2. For residential occupancies, the number of occupants shall be based on two persons for the first bedroom, plus one additional person for each additional bedroom.
3. For nonresidential occupancies, refer to Table A, Chapter 4, 2013 *California Plumbing Code*, for occupant load factors.
   a. Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.
   b. Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
4. Includes single and dual flush water closets with an effective flush of 1.28 gallons or less.
   Single flush toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is the average flush volume when tested in accordance with ASME A 112.19.2.
   Dual flush toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is defined as the composite, average flush volume of two reduced flushes and one full flush. Flush volumes will be tested in accordance with ASME A 112.19.2 and ASME A 112.19.14.
5. The daily use number shall be increased to three if urinals are not installed in the room.
6. Where complying faucets are unavailable, aerators rated at .35 gpm or other means may be used to achieve reduction.

WORKSHEET (WS-3)
WATER USE REDUCTION

30-, 35- OR 40-PERCENT REDUCTION WATER USE CALCULATION TABLE

FIXTURE TYPE	FLOW RATE[2]		DURATION		DAILY USES		OCCUPANTS[2,3]		GALLONS PER DAY
Showerheads		×	5 min.	×	1	×	Note 3a	=	
Showerheads residential		×	8 min.	×	1	×		=	
Lavatory faucets residential		×	.25 min.	×	3	×		=	
Lavatory faucets nonresidential[6]		×	.25 min.	×	3	×		=	
Kitchen faucets		×	4 min.	×	1	×	Note 3b	=	
Replacement aerators		×		×		×		=	
Wash fountains		×		×		×		=	
Metering faucets		×	.25 min.	×	3	×		=	
Metering faucets for wash fountains		×	.25 min.	×		×		=	
Gravity tank type water closets		×	1 flush	×	1 male[5] 3 female	×		=	
HET[4] High-efficiency toilet	1.12 gal/flush	×	1 flush	×	1 male[5] 3 female	×		=	
Flushometer tank water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Flushometer valve water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Electromechanical hydraulic water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Urinals		×	1 flush	×	2 male	×		=	
Urinals Nonwater supplied	0.0 gal/flush	×	1 flush	×	2 male	×		=	
Proposed water use								=	

30% Reduction_____ (BWU from WS-1) × .70 = _____ Allowable water use
35% Reduction_____ (BWU from WS-1) × .65 = _____ Allowable water use
40% Reduction_____ (BWU from WS-1) × .60 = _____ Allowable water use

1. The flow rate values shall not exceed the baseline flow rates from the 2013 *California Code of Regulations*, Title 20, Appliance Efficiency Regulations (See Table 4.303.2.)
2. For residential occupancies, the number of occupants shall be based on two persons for the first bedroom, plus one additional person for each additional bedroom.
3. For nonresidential occupancies, refer to Table A, Chapter 4, 2013 *California Plumbing Code*, for occupant load factors.
   a. Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.
   b. Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
4. Includes single and dual flush water closets with an effective flush of 1.28 gallons or less.
   Single flush toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is the average flush volume when tested in accordance with ASME A112.19.233.2.
   Dual flush toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is defined as the composite, average flush volume of two reduced flushes and one full flush. Flush volumes will be tested in accordance with ASME A112.19.2 and ASME A112.19.14.
5. The daily use number shall be increased to three if urinals are not installed in the room.
6. Where complying faucets are unavailable, aerators rated at .35 gpm or other means may be used to achieve reduction.

Construction Waste Management (CWM) Plan

Note: This sample form may be used to assist in documenting compliance with the waste management plan.

Project Name: _____

Job #: _____

Project Manager: _____

Waste Hauling Company: _____

Contact Name: _____

All Subcontractors shall comply with the project's Construction Waste Management Plan.
All Subcontractor foremen shall sign the CWM Plan Acknowledgment Sheet.

Subcontractors who fail to comply with the Waste Management Plan will be subject to backcharges or withholding of payment, as deemed appropriate. For instance, Subcontractors who contaminate debris boxes that have been designated for a single material type will be subject to backcharge or withheld payment, as deemed appropriate.

1. The project's overall rate of waste diversion will be ____ %.
2. This project shall generate the least amount of waste possible by planning and ordering carefully, following all proper storage and handling procedures to reduce broken and damaged materials and reusing materials whenever possible. The majority of the waste that is generated on this jobsite will be diverted from the landfill and recycled for other use.
3. Spreadsheet 1, enclosed, identifies the waste materials that will be generated on this project, the diversion strategy for each waste type and the anticipated diversion rate.
4. Waste prevention and recycling activities will be discussed at the beginning of weekly subcontractor meetings. As each new subcontractor comes on-site, the WMP Coordinator will present him/her with a copy of the CWM Plan and provide a tour of the jobsite to identify materials to be salvaged and the procedures for handling jobsite debris. All Subcontractor foremen will acknowledge in writing that they have read and will abide by the CWM Plan. Subcontractor Acknowledgment Sheet enclosed. The CWM Plan will be posted at the jobsite trailer.
5. Salvage: Excess materials that cannot be used in the project, nor returned to the vendor, will be offered to site workers, the owner, or donated to charity if feasible.
6. [HAULING COMPANY] will provide a commingled drop box at the jobsite for most of the construction waste. These commingled drop boxes will be taken to [Sorting Facility Name and Location]. The average diversion rate for commingled waste will be ____%. As site conditions permit, additional drop boxes will be used for particular phases of construction (e.g., concrete and wood waste) to ensure the highest waste diversion rate possible.
7. In the event that the waste diversion rate achievable via the strategy described in (6) above, is projected to be lower than what is required, then a strategy of source-separated waste diversion and/or waste stream reduction will be implemented. Source separated waste refers to jobsite waste that is not commingled but is instead allocated to a debris box designated for a single material type, such as clean wood or metal.

   Notes:

   1. Waste stream reduction refers to efforts taken by the builder to reduce the amount of waste generated by the project to below four (4) pounds per square foot of building area.
   2. When using waste stream reduction measures, the gross weight of the product is subtracted from a base weight of four (4) pounds per square foot of building area. This reduction is considered additional diversion and can be used in the waste reduction percentage calculations.
8. [HAULING COMPANY] will track and calculate the quantity (in tons) of all waste leaving the project and calculate the waste diversion rate for the project. [HAULING COMPANY] will provide Project Manager with an updated monthly report on gross weight hauled and the waste diversion rate being achieved on the project. [HAULING COMPANY's] monthly report will track separately the gross weights and diversion rates for commingled debris and for each source-separated waste stream leaving the project. In the event that [HAULING COMPANY] does not service any or all of the debris boxes on the project, the [HAULING COMPANY] will work with the responsible parties to track the material type and weight (in tons) in such debris boxes in order to determine waste diversion rates for these materials.
9. In the event that Subcontractors furnish their own debris boxes as part of their scope of work, such Subcontractors shall not be excluded from complying with the CWM Plan and will provide [HAULING COMPANY] weight and waste diversion data for their debris boxes.
10. In the event that site use constraints (such as limited space) restrict the number of debris boxes that can be used for collection of designated waste the project Superintendent will, as deemed appropriate, allocate specific areas onsite where individual material types are to be consolidated. These collection points are not to be contaminated with non-designated waste types.
11. Debris from jobsite office and meeting rooms will be collected by [DISPOSAL SERVICE COMPANY]. [DISPOSAL SERVICE COMPANY] will, at a minimum, recycle office paper, plastic, metal and cardboard.

Construction Waste Management (CWM) Worksheet

Note: This sample form may be used to assist in documenting compliance with the waste management plan.

Project Name: _____

Job Number: _____

Project Manager: _____

Waste Hauling Company: _____

Construction Waste Management (CWM) Plan

WASTE MATERIAL TYPE	DIVERSION METHOD:		PROJECTED DIVERSION RATE
	COMMINGLED AND SORTED OFF SITE	SOURCE SEPARATED ON SITE	
Asphalt			
Concrete			
Shotcrete			
Metals			
Wood			
Rigid insulation			
Fiberglass insulation			
Acoustic ceiling tile			
Gypsum drywall			
Carpet/carpet pad			
Plastic pipe			
Plastic buckets			
Plastic			
Hardiplank siding and boards			
Glass			
Cardboard			
Pallets			
Job office trash, paper, glass & plastic bottles, cans, plastic			
Alkaline and rechargeable batteries, toner cartridges, and electronic devices			
Other:			
Other:			
Other:			
Other:			

Construction Waste Management (CWM) Acknowledgment

Note: This sample form may be used to assist in documenting compliance with the waste management plan.

Project Name: _____

Job Number: _____

Project Manager: _____

Waste Hauling Company: _____

CWM Plan Acknowledgment

The Foreman for each new Subcontractor that comes on site is to receive a copy of the Construction Waste Management Plan and complete this Acknowledgment Form.

I have read the Waste Management Plan for the project; I understand the goals of this plan and agree to follow the procedures described in this plan.

DATE	SUBCONTRACTOR COMPANY NAME	FOREMAN NAME	SIGNATURE

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A4 – RESIDENTIAL VOLUNTARY MEASURES

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter			X																
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below																			
Chapter/Section																			

APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

Some of the measures contained in this appendix are not mandatory unless adopted by a city, county, or city and county as specified in Section 101.7 and provide additional measures that designers, builders and property owners may wish to consider during the planning, design and construction process.

Division A4.1 – PLANNING AND DESIGN

PREFACE

Given that land use and planning are largely regulated locally, cities, counties, and cities and counties should consider reducing greenhouse gas emissions associated with development through local land-use practices in conjunction with enforcing the provisions of this code. Specific land use strategies a city, county, or city and county may wish to consider include but are not limited to the following:

Site selection. Develop sites for buildings, hardscape, roads or parking areas consistent with the local general plan and regional transportation plan pursuant to SB 375 (Stats 2008, Ch. 728).

Regional sustainable communities strategy. Site selection and building design and use shall conform the project with the prevailing regional sustainable communities strategy or alternative planning strategy, whichever meets the greenhouse gas target established by the California Air Resources Board pursuant to SB 375 (Stats. 2008, Ch. 728), including the general location of uses, residential densities and building intensities.

Transit priority projects. To qualify as a transit priority project, the project shall meet three criteria:

(1) (a) contain at least 50 percent residential use, based on total building square footage and, if the project contains between 26 and 50 percent nonresidential uses, a floor area ratio of not less than 0.75; (b) provide a minimum net density of at least 20 dwelling units per acre; and (c) be within one-half mile of a major transit stop or high-quality transit corridor included in a regional transportation plan as described in Section 21155 of Stats. 2008, Ch. 728;

(2) be consistent with the prevailing sustainable communities strategy or alternative planning strategy, whichever meets the greenhouse gas target established by the California Air Resources Board, including the general location of uses, residential densities and building intensities; and

(3) have all necessary entitlements required by the applicable local government.

Note: For additional information, see *Government Code* Sections 65080, 65080.1, 65400, and 65470, and *Public Resources Code* Sections 21061.3 and 21155.

SECTION A4.101
GENERAL

A4.101.1 Scope. The provisions of this division outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore and enhance the environmental quality of the site and respect the integrity of adjacent properties.

SECTION A4.102
DEFINITIONS

A4.102.1 Definitions. The following terms are defined in Chapter 2.

BROWNFIELD SITE.

DEVELOPMENT FOOTPRINT.

GREENFIELDS.

GREYFIELD SITE.

INFILL SITE.

PERMEABLE PAVING.

SECTION A4.103
SITE SELECTION

A4.103.1 Selection. A site which complies with at least one of the following characteristics is selected:

1. An infill site is selected.
2. A greyfield site is selected.
3. An EPA-recognized and remediated Brownfield site is selected.

A4.103.2 Community connectivity. Facilitate community connectivity by one of the following methods:

1. Locate project within a $^1/_4$-mile true walking distance of at least four basic services, readily accessible by pedestrians.
2. Locate project within a $^1/_2$-mile true walking distance of at least seven basic services, readily accessible by pedestrians.
3. Other methods increasing access to additional resources.

Note: Examples of services include, but are not limited to, bank, place of worship, convenience grocery, day care, cleaners, fire station, barber shop, beauty shop, hardware store, laundry, library, medical clinic, dental clinic, senior care facility, park, pharmacy, post office, restaurant, school, supermarket, theater, community center, fitness center, museum or farmers market. Other services may be considered on a case-by-case basis.

SECTION A4.104
SITE PRESERVATION

A4.104.1 Supervision and education. Individuals with oversight authority on the project who have been trained in areas related to environmentally friendly development can teach green concepts to other members of the development staff and ensure that training is provided to all parties associated with the development of the project.

Prior to beginning the construction activities, all parties involved with the development process shall receive a written guideline and instruction specifying the green goals of the project.

Note: Lack of adequate supervision and dissemination of the project goals can result in negative effects on green building projects. If the theme of green building is not carried throughout the project, the overall benefit can be substantially reduced by the lack of knowledge and information provided to the various entities involved with the construction of the project.

SECTION A4.105
DECONSTRUCTION AND REUSE OF EXISTING MATERIALS

A4.105.1 General. Existing buildings on the site are deconstructed and the salvaged materials are reused. Reused materials or products must comply with current building standards requirements or be an accepted alternate method or material.

A4.105.2 Reuse of materials. Materials which can be easily reused include but are not limited to the following:

1. Light fixtures.
2. Plumbing fixtures.
3. Doors and trim.
4. Masonry.
5. Electrical devices.
6. Appliances.
7. Foundations or portions of foundations.

Note: Reused material must be in compliance with the appropriate Title 24 requirements.

SECTION A4.106
SITE DEVELOPMENT

A4.106.1 Reserved.

A4.106.2 Soil analysis and protection. The soils at the building site are analyzed and protected as specified in this section.

A4.106.2.1 Soil analysis. Soil analysis is performed by a licensed design professional and the findings utilized in the structural design of the building.

A4.106.2.2 Soil protection. The effect of development on building sites is evaluated and the soil is protected by one or more of the following:

1. Natural drainage patterns are evaluated and erosion controls are implemented to minimize erosion during construction and after occupancy.
2. Site access is accomplished by minimizing the amount of cut and fill needed to install access roads and driveways.
3. As allowed by other parts of the *California Building Standards Code* underground construction activities are coordinated to utilize the same trench, minimize the amount of time the disturbed soil is exposed and the soil is replaced using accepted compaction methods.

A4.106.2.3 Topsoil protection. Topsoil shall be protected or saved for reuse as specified in this section.

Tier 1. Displaced topsoil shall be stockpiled for reuse in a designated area and covered or protected from erosion.

Note: Protection from erosion includes covering with tarps, straw, mulch, chipped wood, vegetative cover, or other means acceptable to the enforcing agency to protect the topsoil for later use.

Tier 2. The construction area shall be identified and delineated by fencing or flagging to limit construction activity to the construction area. Heavy equipment or vehicle traffic and material storage outside the construction area shall be limited to areas that are planned to be paved.

A4.106.3 Landscape design. Postconstruction landscape designs shall accomplish one or more of the following:

1. Areas disrupted during construction are restored to be consistent with native vegetation species and patterns.
2. Limit turf areas to the greatest extent possible.

   Tier 1 not more than 50 percent of the total landscaped area.

   Tier 2 not more than 25 percent of the total landscaped area.
3. Utilize at least 75 percent native California or drought tolerant plant and tree species appropriate for the climate zone region.
4. Hydrozoning irrigation techniques are incorporated into the landscape design.

A4.106.4 Water permeable surfaces. Permeable paving is utilized for the parking, walking or patio surfaces in compliance with the following.

Tier 1. Not less than 20 percent of the total parking, walking or patio surfaces shall be permeable.

Tier 2. Not less than 30 percent of the total parking, walking or patio surfaces shall be permeable.

Exceptions:

1. The primary driveway, primary entry walkway and entry porch or landing shall not be included when calculating the area required to be a permeable surface.
2. Required accessible routes for persons with disabilities as required by *California Code of Regulations*, Title 24, Part 2, Chapter 11A and/or Chapter 11B as applicable.

A4.106.5 Cool roof for reduction of heat island effect. Roofing materials for Tier 1 and Tier 2 buildings shall comply with this section:

Exceptions:

1. Roof constructions that have a thermal mass over the roof membrane including areas of vegetated (green) roofs, weighing at least 25 pounds per square foot.
2. Roof areas covered by building integrated solar photovoltaic panels and building integrated solar thermal panels.

A4.106.5.1 Solar reflectance. Roofing materials shall have a minimum 3-year aged solar reflectance equal to or greater than the values specified in Tables A4.106.5.1(1) and A4.106.5.1(3) for Tier 1 and Tables A4.106.5.1(2) and A4.105.5.1(4) for Tier 2.

If CRRC testing for aged solar reflectance is not available for any roofing products, the aged value shall be determined using the Cool Roof Rating Council (CRRC) certified initial value using the equation $\rho_{aged} = [0.2+ß[_{rinitial}-0.2]$, where $\rho_{ini-tial}$ = the initial Solar Reflectance and soiling resistance, ß, is listed by product type in Table A4.106.5.1.

Solar reflectance may also be certified by other supervisory entities approved by the Energy Commission pursuant to Title 24, Part 1, Section 10-113.

TABLE A4.106.5.1
VALUES OF SOILING RESISTANCE (ß) BY PRODUCT TYPE

PRODUCT TYPE	CCRC PRODUCT CATEGORY	ß
Field-applied coating	Field-applied coating	0.65
Other	Not a field-applied coating	0.70

A4.106.5.2 Thermal emittance. Roofing materials shall have a CRRC initial or aged thermal emittance equal to or greater than those specified in Tables A4.106.5.1(1) and A4.106.5.1(3) for Tier 1 and Tables A4.106.5.1(2) and A4.106.5.1(4) for Tier 2.

Thermal emittance may also be certified by other supervisory entities approved by the Energy Commission pursuant to Title 24, Part 1, *California Administrative Code*.

A4.106.5.3 Solar reflectance index alternative. Solar Reflectance Index (SRI) equal to or greater than the values specified in Tables A4.106.5.1(1) and A4.106.5.1(3) for Tier 1 and Tables A4.106.5.1(2) and A4.106.5.1(4) for Tier 2 may be used as an alternative to compliance with the 3-year aged solar reflectance values and thermal emittance.

SRI values used to comply with this section shall be calculated using the Solar Reflectance Index (SRI) Calculation Worksheet (SRI-WS) developed by the California Energy Commission or in compliance with ASTM E1980-01 as specified in the 2013 *California Energy Code*. Solar reflectance values used in the SRI-WS shall be based on the aged reflectance value of the roofing product or the equation in Section A4.106.5.1 if the CRRC certified aged solar reflectance are not available. Certified thermal emittance used in the SRI-WS may be either the initial value or the aged value listed by the CRRC.

Solar reflectance and thermal emittance may also be certified by other supervisory entities approved by the Commission pursuant to Title 24, Part 1, *California Administrative Code*.

Note: The Solar Reflectance Index Calculation Worksheet (SRI-WS) is available by contacting the Energy Standards Hotline at 1-800-772-3300, website at www.energy.ca.gov or by email at Title24@energy.state.ca.us.

TABLE A4.106.5.1(1)
TIER 1 – LOW-RISE RESIDENTIAL

ROOF SLOPE	CLIMATE ZONE	MINIMUM 3-YEAR AGED SOLAR REFLECTANCE	THERMAL EMITTANCE	SRI
≤ 2:12	13 & 15	0.55	0.75	64
> 2:12	10-15	0.20	0.75	16

TABLE A4.106.5.1(2)
TIER 2 – LOW-RISE RESIDENTIAL

ROOF SLOPE	CLIMATE ZONE	MINIMUM 3-YEAR AGED SOLAR REFLECTANCE	THERMAL EMITTANCE	SRI
≤ 2:12	2, 4, 6 – 15	0.65	0.85	78
> 2:12	2, 4, 6 – 15	0.23	0.85	20

TABLE A4.106.5.1(3)
TIER 1 – HIGH-RISE RESIDENTIAL BUILDINGS, HOTELS AND MOTELS

ROOF SLOPE	CLIMATE ZONE	MINIMUM 3-YEAR AGED SOLAR REFLECTANCE	THERMAL EMITTANCE	SRI
≤ 2:12	10 & 11, 13 – 15	0.55	0.75	64
> 2:12	2 – 15	0.20	0.75	16

TABLE A4.106.5.1(4)
TIER 2 – HIGH-RISE RESIDENTIAL BUILDINGS, HOTELS AND MOTELS

ROOF SLOPE	CLIMATE ZONE	MINIMUM 3-YEAR AGED SOLAR REFLECTANCE	THERMAL EMITTANCE	SRI
≤ 2:12	2 – 15	0.65	0.75	78
> 2:12	2 – 15	0.23	0.75	20

A4.106.5.4 Verification. Inspection shall be conducted to ensure roofing materials meet cool roof aged solar reflectance and thermal emittance or SRI values.

A4.106.6 Vegetated roof. Install a vegetated roof for at least 50 percent of the roof area. Vegetated roofs shall comply with requirements for roof gardens and landscaped roofs in the *California Building Code*, Chapter 15 and Chapter 16.

A4.106.7 Reduction of heat island effect for nonroof areas. Reduce nonroof heat islands for 50 percent of sidewalks, patios, driveways or other paved areas by using one or more of the methods listed.

1. Trees or other plantings to provide shade and that mature within 15 years of planting. Trees should be native or adaptive to the region and climate zones and noninvasive; hardy and resistant to drought, insects and disease; easy to maintain (no frequent shedding of twigs, branches, unwanted fruit or seed pods); and suitable in mature size and environmental requirements for the site. Tree selection and placement should consider location and size of areas to be shaded, location of utilities, views from the structure, distance to sidewalks and foundations, overhangs onto adjacent properties and streets; other infrastructure and adjacent to landscaping. In addition, shading shall not cast a shadow, as specified, on any neighboring solar collectors pursuant to *Public Resources Code* Section 25981, et seq. (Solar Shade Control Act).
2. Use high albedo materials with an initial solar reflectance value of at least 0.30 as determined in accordance with American Society for Testing and Materials (ASTM) Standards E 1918 or C 1549.
3. Use open grid pavement system or pervious or permeable pavement system.
4. Locate 50 percent of parking underground or use multilevel parking.
5. Other methods of reducing heat island effects acceptable to the enforcing agency.

Note: Local agencies may have ordinances requiring mitigation of heat island effects through building or parking lot shading, tree plantings, landscaping, use of pervious pavements and other approved methods.

A4.106.8 Electric vehicle (EV) charging. Dwellings shall comply with the following requirements for the future installation of electric vehicle supply equipment (EVSE).

A4.106.8.1 One-and two-family dwellings. Install a listed raceway to accommodate a dedicated branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall be securely fastened at the main service or subpanel and shall terminate in close proximity to the proposed location of the charging system into a listed cabinet, box or enclosure. Raceways are required to be continuous at enclosed or concealed areas and spaces. A raceway may terminate in an attic or other approved location when it can be demonstrated that the area is accessible and no removal of materials is necessary to complete the final installation.

Exception: Other pre-installation methods approved by the local enforcing agency that provide sufficient conductor sizing and service capacity to install Level 2 EVSE.

Note: Utilities and local enforcing agencies may have additional requirements for metering and EVSE installation, and should be consulted during the project design and installation.

A4.106.8.1.1 Labeling requirement. A label stating "EV CAPABLE" shall be posted in a conspicuous place at the service panel or subpanel and next to the raceway termination point.

A4.106.8.2 Multifamily dwellings. At least 3 percent of the total parking spaces, but not less than one, shall be capable of supporting future electric vehicle supply equipment (EVSE).

A4.106.8.2.1 Single charging space required. When only a single charging space is required, install a listed raceway capable of accommodating a dedicated branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall be securely fastened at the main service or subpanel and shall terminate in close proximity to the proposed location of the charging system into a listed cabinet, box or enclosure.

Exception: Other pre-installation methods approved by the local enforcing agency that provide sufficient conductor sizing and service capacity to install Level 2 EVSE.

A4.106.8.2.2 Multiple charging spaces required. When multiple charging spaces are required, plans shall include the location(s) and type of the EVSE, raceway method(s), wiring schematics and electrical calculations to verify that the electrical system has sufficient capacity to simultaneously charge all the electrical vehicles at all designated EV charging spaces at their full rated amperage. Plan design shall be based upon Level 2 EVSE at its maximum operating ampacity. Only underground raceways and related underground equipment are required to be installed at the time of construction.

Note: Utilities and local enforcing agencies may have additional requirements for metering and EVSE installation, and should be consulted during the project design and installation.

A4.106.8.2.3 Labeling requirement. A label stating "EV CAPABLE" shall be posted in a conspicuous place at the service panel or subpanel and the EV charging space.

A4.106.9 Bicycle parking. Comply with Sections A4.106.9.1 through A4.106.9.3 or meet a local ordinance, whichever is more stringent.

Exception: Number of bicycle parking spaces shall be permitted to be reduced, as approved by the enforcing agency, due to building site characteristics, including but not limited to, isolation from other development.

A4.106.9.1 Short-term bicycle parking. Provide permanently anchored bicycle racks within 100 feet of the visitor's entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity with a minimum of one two-bike capacity rack.

A4.106.9.2 Long-term bicycle parking for multifamily buildings. Provide on-site bicycle parking for at least one bicycle per every two dwelling units. Acceptable parking facilities shall be conveniently reached from the street and may include, but not be limited to:

1. Covered, lockable enclosures with permanently anchored racks for bicycles.
2. Lockable bicycle rooms with permanently anchored racks.
3. Lockable, permanently anchored bicycle lockers.

A4.106.9.3 Long-term bicycle parking for hotel and motel buildings. Provide one on-site bicycle parking space for every 25,000 square feet, but not less than two. Acceptable parking facilities shall be conveniently reached from the street and may include, but not be limited to:

1. Covered, lockable enclosures with permanently anchored racks for bicycles.
2. Lockable bicycle rooms with permanently anchored racks.
3. Lockable, permanently anchored bicycle lockers.

A4.106.10 Light pollution reduction. [HR] Outdoor lighting systems shall be designed and installed to comply with the following:

1. The minimum requirements in the *California Energy Code* for Lighting Zones 1-4 as defined in Chapter 10 of the *California Administrative Code*; and
2. Backlight, Uplight and Glare (BUG) ratings as defined in IES TM-15-11; and
3. Allowable BUG ratings not exceeding those shown in Table A4.106.10; or

Comply with a local ordinance lawfully enacted pursuant to Section 101.7 of this code, whichever is more stringent.

Exceptions:

1. Luminaires that qualify as exceptions in the *California Energy Code*.
2. Emergency lighting.
3. One- and two-family dwellings.

Note: The International Dark-Sky Association (IDA) and the Illuminating Engineering Society of North America (IESNA) have developed a Model Lighting Ordinance (MLO). The MLO was designed to help municipalities develop outdoor lighting standards that reduce glare, light trespass, and skyglow. The model ordinance and user guides for the ordinance may be accessed at the International Dark-Sky Association web site.

SECTION A4.107
INNOVATIVE CONCEPTS AND LOCAL ENVIRONMENTAL CONDITIONS

A4.107.1 Innovative concepts and local environmental conditions. The provisions of this code are not intended to prevent the use of any alternate material, appliance, installation, device, arrangement, method, design or method of construction not specifically prescribed by this code. This code does not limit the authority of city, county, or city and county government to make necessary changes to the provisions contained in this code pursuant to Section 101.7.1.

TABLE A4.106.10
MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLARE (BUG) RATINGS[1, 2]

ALLOWABLE RATING	LIGHTING ZONE 1	LIGHTING ZONE 2	LIGHTING ZONE 3	LIGHTING ZONE 4
Maximum Allowable Backlight Rating[3]				
Luminaire greater than 2 mounting heights (MH) from property line	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1 – 2 MH from property line	B2	B3	B4	B4
Luminaire back hemisphere is 0.5 – 1 MH from property line	B1	B2	B3	B3
Luminaire back hemisphere is less than 0.5 MH from property line	B0	B0	B1	B2
Maximum Allowable Uplight Rating				
For area lighting[4]	U0	U0	U0	U0
For all other outdoor light, including decorative luminaires	U1	U2	U3	U4
Maximum Allowable Glare Rating[5]				
Luminaire greater than 2 MH from property line	G1	G2	G3	G4
Luminaire front hemisphere is 1 – 2 MH from property line	G0	G1	G1	G2
Luminaire front hemisphere is 0.5 – 1 MH from property line	G0	G0	G1	G1
Luminaire back hemisphere is less than 0.5 MH from property line	G0	G0	G0	G1

1. IESNA Lighting Zones 0 and 5 are not applicable; refer to Lighting Zones as defined in the *California Energy Code* and Chapter 10 of the *California Administrative Code*.
2. For property lines that abut public walkways, bikeways, plazas, and parking lots, the property line may be considered to be 5 feet beyond the actual property line for the purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section.
3. If the nearest property line is less than or equal to two mounting heights from the back hemisphere of the luminaire distribution, the applicable reduced Backlight rating shall be met.
4. General lighting luminaires in areas such as outdoor parking, sales or storage lots shall meet these reduced ratings. Decorative luminaires located in these areas shall meet U value limits for "all other outdoor lighting."
5. If the nearest property line is less than or equal to two mounting heights from the front hemisphere of the luminaire distribution, the applicable reduced Glare rating shall be met.

APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

Division A4.2 – ENERGY EFFICIENCY

SECTION A4.201 GENERAL

4.201.1 Scope. For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory standards.

A4.201.1 Scope. For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory standards. It is the intent of these voluntary standards to encourage buildings to achieve exemplary performance in the area of energy efficiency.

SECTION A4.202 DEFINITIONS

A4.202.1. Definitions. The following terms are defined in Chapter 2.

ENERGY BUDGET.

ENERGY DESIGN RATING.

TIME DEPENDENT VALUATION (TDV) ENERGY.

SECTION A4.203 PERFORMANCE APPROACH FOR NEWLY CONSTRUCTED BUILDINGS

A4.203.1 Energy efficiency. Newly constructed low-rise residential buildings shall comply with Sections A4.203.1.1 and either A4.203.1.2.1 or A4.203.1.2.2.

A4.203.1.1 Tier 1 and Tier 2 prerequisites. Each of the following efficiency measures is required for all applicable components of the building project.

A4.203.1.1.1 Energy design rating. An energy design rating for the Proposed Design Building shall be computed by Compliance Software certified by the Energy Commission and this rating shall be included in the Certificate of Compliance documentation.

A4.203.1.1.2 Quality Insulation Installation (QII). The QII procedures specified in the Building Energy Efficiency Standards Reference Residential Appendix RA3.5 shall be completed.

A4.203.1.1.3 Lighting. Comply with all applicable requirements of Title 24, Part 6, Section 150.0(k). In addition:

1. All permanently installed lighting shall be high efficacy. Permanently installed lighting shall be installed in kitchens, bathrooms, utility rooms, and private garages at a minimum.

   Exceptions:

   1. Night lights which comply with Title 24, Part 6, Section 150.0(k)1E.
   2. Lighting integral to exhaust fans which comply with Title 24, Part 6, Section 150.0(k)1F.

2. All permanently installed lighting in bathrooms shall be controlled by a vacancy sensor.

   Exception: One high efficacy luminaire with total lamp wattage rated to consume no greater than 26 watts of power.

3. Every room greater than 70 square feet, which does not have permanently installed lighting and has receptacles installed, shall have at least one switched receptacle installed.

4. For single-family residences, all permanently installed outdoor lighting shall have controls complying with Title 24, Part 6, Sections 150.0(k)9Ai and iii. For multifamily residential buildings, all permanently installed outdoor lighting controlled from within a dwelling unit shall have controls complying with Title 24, Part 6, Sections 150.0(k)9Ai and 150.(k)9Aiii. For multifamily residential buildings, all permanently installed outdoor lighting which is not controlled from within a dwelling unit shall have controls complying with Title 24, Part 6, Section 150.0(k)9Bii.

A4.203.1.2 Performance standard. Comply with one of the advanced efficiency levels indicated below.

A4.203.1.2.1 Tier 1. Buildings complying with the first level of advanced energy efficiency shall have an Energy Budget that is no greater than 85 percent of the Title 24, Part 6 Energy Budget for the Proposed Design Building as calculated by Compliance Software certified by the Energy Commission.

A4.203.1.2.2 Tier 2. Buildings complying with the second level of advanced energy efficiency shall have an Energy Budget that is no greater than 70 percent of the Title 24, Part 6 Energy Budget for the Proposed Design Building as calculated by Compliance Software certified by the Energy Commission.

Note: For Energy Budget calculations, high-rise residential and hotel/motel buildings are considered nonresidential buildings.

Authority: *Public Resources Code* Sections 25218, subd. (e), 25402, 25402.1, 25402.4, 25402.5, 25402.5.4, 25402.8, 25910 and 25943, and *Health and Safety Code* Sections 18930.5 and 18941.5.

Reference: *Public Resources Code* Sections 25402, subd. (a)-(c), 25402.1, 25402.4, 25402.5, 25402.5.4, 25402.8, 25910 and 25943, and *Health and Safety Code* Sections 18930.5 and 18941.5.

SECTION A4.204 PERFORMANCE APPROACH FOR ADDITIONS AND ALTERATIONS

A4.204.1 Energy efficiency. Additions and alterations to low-rise residential buildings shall comply with Sections A4.204.1.1 and either A4.204.1.2.1 or A4.204.1.2.2.

A4.204.1.1 Tier 1 and Tier 2 prerequisites. Each of the following efficiency measures is required if applicable to the addition or alteration building project:

A4.204.1.1.1 Lighting. Comply with all applicable requirements of Title 24, Part 6, Section 150.0(k). In addition:

1. All newly installed, permanently installed lighting shall be high efficacy.

   Exceptions:

   1. Night lights complying with Title 24, Part 6, Section 150.0(k)1E.
   2. Lighting integral to exhaust fans complying with Title 24, Part 6, Section 150.0(k)1F.

2. All newly installed, permanently installed lighting in bathrooms shall be controlled by a vacancy sensor.

   Exception: One high efficacy luminaire with total lamp wattage rated to consume no greater than 26 watts of power.

3. Every new room greater than 70 square feet which does not have newly installed, permanently installed lighting and has newly installed receptacles shall have at least one switched receptacle installed.

4. For single-family residences, all newly installed, permanently installed outdoor lighting shall have controls complying with Title 24, Part 6, Sections 150.0(k)9Ai and 150.0(k)9Aiii. For multifamily residential buildings, all newly installed, permanently installed outdoor lighting controlled from within a dwelling unit shall have controls complying with Title 24, Part 6, Sections 150.0(k)9Ai and 150.0(k)9Aiii. For multifamily residential buildings, all newly installed, permanently installed outdoor lighting which is not controlled from within a dwelling unit shall have controls complying with Title 24, Part 6, Section 150.0(k)9Bii.

A4.204.1.2 Performance standard. Comply with one of the advanced efficiency levels indicated below.

A4.204.1.2.1 Tier 1. Buildings complying with the first level of advanced energy efficiency shall have an Energy Budget that is no greater than indicated below, depending on the number of mechanical systems added or modified. Space heating systems, space cooling systems and water heating systems are each separate mechanical systems for the purpose of complying with this requirement. If the addition or alteration changes only the envelope with no change to any mechanical system, then no additional performance requirements above Title 24, Part 6 are required.

1. For one and only one mechanical system: No greater than 95 percent of the Title 24, Part 6 Energy Budget for the Proposed Design Building as calculated by Compliance Software certified by the Energy Commission.
2. For two or more mechanical systems: No greater than 90 percent of the Title 24, Part 6 Energy Budget for the Proposed Design Building as calculated by Compliance Software certified by the Energy Commission.

A4.204.1.2.2 Tier 2. Buildings complying with the second level of advanced energy efficiency shall have an Energy Budget that is no greater than indicated below, depending on the number of mechanical systems added or modified. Space heating systems, space cooling systems and water heating systems are each separate mechanical systems for the purpose of complying with this requirement. If the addition or alteration changes only the envelope with no change to any mechanical system, then no additional performance requirements above Title 24, Part 6 are required.

1. For one and only one mechanical system: No greater than 90 percent of the Title 24, Part 6 Energy Budget for the Proposed Design Building as calculated by Compliance Software certified by the Energy Commission.
2. For two or more mechanical systems: No greater than 85 percent of the Title 24, Part 6 Energy Budget for the Proposed Design Building as calculated by Compliance Software certified by the Energy Commission.

Note: For Energy Budget calculations, high-rise residential and hotel/motel buildings are considered nonresidential buildings.

APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

Division A4.3 – WATER EFFICIENCY AND CONSERVATION

SECTION A4.301 GENERAL (Reserved)

SECTION A4.302 DEFINITIONS

A4.302.1 Definition. The following term is defined in Chapter 2.

REFERENCE EVAPOTRANSPIRATION (*ETo*).

SECTION A4.303 INDOOR WATER USE

A4.303.1 Kitchen faucets. The maximum flow rate of kitchen faucets shall not exceed 1.5 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.5 gallons per minute at 60 psi.

Note: Where complying faucets are unavailable, aerators or other means may be used to achieve reduction.

A4.303.2 Alternate water sources for nonpotable applications. Alternate nonpotable water sources are used for indoor potable water reduction. Alternate nonpotable water sources shall be installed in accordance with the *California Plumbing Code*.

A4.303.3 Appliances. Dishwashers and clothes washers in residential buildings shall comply with the following:

Install at least one qualified ENERGY STAR appliance with maximum water use as follows:

1. Standard Dishwashers – 4.25 gallons per cycle.
2. Compact Dishwashers – 3.5 gallons per cycle.
3. Clothes Washers – water factor of 6 gallons per cubic feet of drum capacity.

Note: See Section A5.303.3 for nonresidential dishwashers and clothes washers.

A4.303.4 Nonwater supplied urinals and waterless toilets. Nonwater supplied urinals or composting toilets are installed.

SECTION A4.304 OUTDOOR WATER USE

A4.304.1 Low-water consumption irrigation system. Install a low-water consumption irrigation system which minimizes the use of spray type heads. Spray type irrigation may only be used at turf areas. The remaining irrigation systems shall use only the following types of low-volume irrigation systems:

1. Drip irrigation.
2. Bubblers.
3. Drip emitters.
4. Soaker hose.
5. Stream-rotator spray heads.
6. Other systems acceptable to the enforcing agency.

A4.304.2 Rainwater catchment systems. An approved rainwater catchment system is designed and installed to use rainwater generated by at least 65 percent of the available roof area. Rainwater catchment systems shall be designed and installed in accordance with the *California Plumbing Code*.

A4.304.3 Water budget. When landscaping is provided by the builder, a water budget shall be developed for landscape irrigation use that conforms to the local water efficient landscape ordinance or to the California Department of Water Resources Model Water Efficient Landscape Ordinance where no local ordinance is applicable.

A4.304.4 Potable water reduction. When landscaping is provided by the builder, a water efficient landscape irrigation system shall be installed that reduces potable water use. The potable water use reduction shall be calculated beyond the initial requirements for plant installation and establishment. Calculations for the reduction shall be based on the water budget developed pursuant to Section A4.304.3.

Tier 1. Reduce the use of potable water to a quantity that does not exceed 65 percent of *ETo* times the landscape area.

Tier 2. Reduce the use of potable water to a quantity that does not exceed 60 percent of *ETo* times the landscape area.

Note: Methods used to comply with this section must be designed to the meet the requirements of the other parts of the *California Building Standards Code* and may include, but are not limited to, the following:

1. Plant coefficient.
2. Irrigation efficiency and distribution uniformity.
3. Use of captured rainwater.
4. Use of recycled water.
5. Water treated for irrigation purposes and conveyed by a water district or public entity.
6. Use of graywater.

A4.304.6 Irrigation metering device. For new water service connections, landscaped irrigated areas more than 2,500 square feet shall be provided with separate submeters or metering devices for outdoor potable water use.

A4.304.5 Potable water elimination. When landscaping is provided by the builder and as allowed by local ordinance, a water efficient landscape irrigation design that eliminates the use of potable water beyond the initial requirements for plant installation and establishment. Methods used to accomplish the requirements of this section must be designed to the require-

ments of the *California Building Standards Code* and shall include, but not be limited to, the following:

1. Plant coefficient.
2. Irrigation efficiency and distribution uniformity.
3. Use of captured rainwater.
4. Use of recycled water.
5. Water treated for irrigation purposes and conveyed by a water district or public entity.
6. Use of graywater.

SECTION A4.305
WATER REUSE SYSTEMS

A4.305.1 Graywater. Alternative plumbing piping is installed to permit the discharge from the clothes washer or other fixtures to be used for an irrigation system in compliance with the > *California Plumbing Code.*

A4.305.2 Recycled water piping. Based on projected availability, dual water piping is installed for future use of recycled water at the following locations:

1. Interior piping for the use of recycled water is installed to serve all water closets, urinals and floor drains.
2. Exterior piping is installed to transport recycled water from the point of connection to the structure. Recycled water systems shall be designed and installed in accordance with the *California Plumbing Code.*

A4.305.3 Recycled water for landscape irrigation. Recycled water is used for landscape irrigation.

SECTION A4.306
INNOVATIVE CONCEPTS AND LOCAL ENVIRONMENTAL CONDITIONS

A4.306.1 Innovative concepts and local environmental conditions. The provisions of this code are not intended to prevent the use of any alternate material, appliance, installation, device, arrangement, method, design or method of construction not specifically prescribed by this code. This code does not limit the authority of city, county, or city and county government to make necessary changes to the provisions contained in this code pursuant to Section 101.7.1.

APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

Division A4.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION A4.401 GENERAL (Reserved)

SECTION A4.402 DEFINITIONS

A4.402.1 Definitions. The following terms are defined in Chapter 2.

ASSEMBLY (ASSEMBLY PRODUCT).

POSTCONSUMER CONTENT.

PRECONSUMER (OR POSTINDUSTRIAL) CONTENT.

PROPORTIONAL RECYCLED CONTENT (PRC_M).

RECYCLED CONTENT (RC).

RECYCLED CONTENT VALUE (RCV).

Assembly products (RCV_A).

Materials (RCV_M).

SECTION A4.403 FOUNDATION SYSTEMS

A4.403.1 Frost protected foundation systems. As allowed by local conditions, utilize a Frost-Protected Shallow Foundation (FPSF) in compliance with the *California Residential Code* (CRC). When an FPSF foundation system is installed, the manual required by Section 4.410.1 shall include instructions to the owner or occupant regarding the necessity for heating the structure as required in Section R403.3 of the *California Residential Code.*

A4.403.2 Reduction in cement use. As allowed by the enforcing agency, cement used in foundation mix design shall be reduced as follows:

Tier 1. Not less than a 20 percent reduction in cement use.

Tier 2. Not less than a 25 percent reduction in cement use.

Note: Products commonly used to replace cement in concrete mix designs include, but are not limited to:

1. Fly ash.
2. Slag.
3. Silica fume.
4. Rice hull ash.

SECTION A4.404 EFFICIENT FRAMING TECHNIQUES

A4.404.1 Lumber size. Beams and headers and trimmers are sized and installed as specified in CRC Tables R502.5(1) and R502.5(2). Other calculations acceptable to the enforcing agency which use the minimum size member for the tributary load shall be acceptable.

A4.404.2 Building dimensions and layouts are designed to minimize waste by one or more of the following measures in at least 80 percent of the structure:

1. Building design dimensions in 2-foot increments are used.
2. Windows and doors are located at regular 16″ or 24″ stud positions.
3. Other methods acceptable to the enforcing agency.

A4.404.3 Building systems. Use premanufactured building systems to eliminate solid sawn lumber whenever possible. One or more of the following premanufactured building systems is used:

1. Composite floor joist or premanufactured floor framing system.
2. Composite roof rafters or premanufactured roof framing system.
3. Panelized (SIPS, ICF or similar) framing systems.
4. Other methods approved by the enforcing agency.

A4.404.4 Pre-cut materials and details. Material lists are included in the plans which specify the material quantity and provide direction for on-site cuts to be made from the material provided. Material lists and direction shall be provided for the following systems:

1. Floor framing.
2. Wall framing.
3. Ceiling and roof framing.
4. Structural panels and roof sheathing.

SECTION A4.405 MATERIAL SOURCES

A4.405.1 Prefinished building materials. Utilize prefinished building materials which do not require additional painting or staining when possible. One or more of the following building materials that do not require additional resources for finishing are used:

1. Exterior trim not requiring paint or stain.
2. Windows not requiring paint or stain.
3. Siding or exterior wall coverings which do not require paint or stain.

A4.405.2 Concrete floors. Floors that do not require additional coverings are used including but not limited to stained, natural or stamped concrete floors.

A4.405.3 Recycled content. Comply with the requirements for recycled content in Section A4.405.3.1.

A4.405.3.1 Recycled content. Use materials, equivalent in performance to virgin materials with a total (combined) recycled content value (RCV) of:

Tier 1. The RCV shall not be less than 10 percent of the total material cost of the project.

Required Total RCV (dollars) = Total Material Cost (dollars) × 10 percent **(Equation A4. 4-1)**

Tier 2. The RCV shall not be less than 15 percent of the total material cost of the project.

Required Total RCV (dollars) = Total Material Cost (dollars) × 15 percent **(Equation A4. 4-2)**

For the purposes of this section, materials used as components of the structural frame shall not be used to calculate recycled content. The structural frame includes the load bearing structural elements, such as wall studs, plates, sills, columns, beams, girders, joists, rafters and trusses.

Notes:

1. Sample forms which allow user input and automatic calculation are located at www.hcd.ca.gov/CALGreen.html and may be used to simplify documenting compliance with this section and for calculating recycled content value of materials or assembly products.
2. Sources and recycled content of some recycled materials can be obtained from CalRecycle if not provided by the manufacturer.

A4.405.3.1.1 Total material cost. Total material cost is the total estimated or actual cost of materials and assembly products used in the project. The required total recycled content value for the project (in dollars) shall be determined by Equation A4.4-1 or Equation A4.4-2.

Total material cost shall be calculated by using one of the methods specified below:

1. **Simplified method.** To obtain the total cost of the project, multiply the square footage of the residential structure by the square foot valuation established pursuant to Table A4.405.3 or as established by the enforcing agency. The total material cost is 45 percent of the total cost of the project. Use Equations A4.4-3A or A4.4-3B to determine total material costs using the simplified method.

   Total material costs = Project square footage × square foot valuation × 45 percent **(Equation A4.4-3A)**

   Total estimated or actual cost of project × 45 percent **(Equation A4.4-3B)**

TABLE A4.405.3
SQUARE FOOT VALUATION

TYPE OF STRUCTURE	SQUARE FOOT CONSTRUCTION COSTS
Residential, one- and two-family	$101.90
Residential, multiple family	$92.94

Note: Minimum square foot construction costs for residential one- and two-family and multiple family dwellings are from the International Code Council's (ICC) *Building Valuation Data (BVD)—February 2011.*

2. **Detailed method.** To obtain the total cost of the project, add the estimated and/or actual costs of materials used for the project, including the structure (steel, concrete, wood or masonry); the enclosure (roof, windows, doors and exterior walls); the interior walls, ceilings and finishes (gypsum board, ceiling tiles, etc.). The total estimated and/or actual costs shall not include fees, labor and installation costs, overhead, appliances, equipment, furniture or furnishings.

A4.405.3.1.2 Determination of total recycled content value (RCV). Total RCV may be determined either by dollars or percentage as noted below.

1. **Total recycled content value for the project (in dollars).** This is the sum of the recycled content value of the materials and/or assemblies considered and shall be determined by Equation A4.4-4. The result of this calculation may be directly compared to Equations A4.4-1 and A4.4-2 to determine compliance with Tier 1 or Tier 2 prerequisites.

   Total Recycled Content Value (dollars) = $(RCV_M + RCV_A)$ **(Equation A4.4-4)**

2. **Total recycled content value for the project (by percentage).** This is expressed as a percentage of the total material cost and shall be determined by Equation A4.4-4 and Equation A4.4-5. The result of this calculation may be directly compared for compliance with Tier 1 (10 percent) or Tier 2 (15 percent) prerequisites.

   Total Recycled Content Value (percent) = [Total Recycled Content Value (dollars) ÷ Total Material Cost (dollars)] × 100 **(Equation A4.4-5)**

A4.405.3.1.3 Determination of recycled content value of materials (RCV_M). The recycled content value of each material (RCV_M) is calculated by multiplying the cost of material, as defined by the recycled content. See Equations A4.4-6 and A4.4-7.

RCV_M (dollars) = Material cost (dollars) × RC_M (percent) **(Equation A4.4-6)**

RC_M (percent) = Postconsumer content percentage + ($^1/_2$) Preconsumer content percentage **(Equation A4.4-7)**

Notes:

1. If the postconsumer and preconsumer recycled content is provided in pounds, Equation A4.4-7 may be used, but the final result (in pounds) must be multiplied by 100 to show RC_M as a percentage.
2. If the manufacturer reports total recycled content of a material as one percentage in lieu of separately reporting preconsumer and postconsumer values, one-half of the total shall be considered preconsumer recycled material and one-half of the total shall be considered post consumer recycled material.

A4.405.3.1.4 Determination of recycled content value of assemblies – (RCV_A). Recycled content value of assemblies is calculated by multiplying the total cost of the assembly by the total recycled content of the assembly (RC_A), and shall be determined by Equation A4.4-8.

RCV_A (dollars) = Assembly cost (dollars) × Total RC_A (percent) **(Equation A4.4-8)**

If not provided by the manufacturer, Total RC_A (percent) is the sum (Σ) of the Proportional Recycled Content (PRC_M) of each material in the assembly. RC_A shall be determined by Equation A4.4-9.

$RC_A = \Sigma PRC_M$ **(Equation A4.4-9)**

PRC_M of each material may be calculated by one of two methods using the following formulas:

Method 1: Recycled content (postconsumer and preconsumer) of each material provided in percentages

PRC_M (percent) = Weight of material (percent) × RC_M (percent) **(Equation A4.4-10)**

Weight of material (percent) = [Weight of material (lbs) ÷ Weight of assembly (lbs)] × 100 **(Equation A4.4-11)**

RC_M (percent) = Postconsumer content percentage + ($^1/_2$) Preconsumer content percentage **(See Equation A4.4-7)**

Method 2: Recycled content (postconsumer and preconsumer) provided in pounds

PRC_M (percent) = [RC_M (lbs) ÷ Weight of material (lbs)] × 100 **(Equation A4.4-12)**

RC_M (lbs) = Postconsumer content (lbs) + ($^1/_2$) Preconsumer content (lbs) **(Equation A4.4-13)**

Note: If the manufacturer reports total recycled content of a material as one percentage in lieu of separately reporting preconsumer and postconsumer values, one-half of the total shall be considered preconsumer recycled material and one-half of the total shall be considered postconsumer recycled material.

A4.405.3.1.5 Alternate method for concrete. When Supplementary Cementitious Materials (SCMs), such as fly ash or ground blast furnace slag cement, are used in concrete, an alternate method of calculating and reporting recycled content in concrete products shall be permitted. When determining the recycled content value, the percent recycled content shall be multiplied by the cost of the cementitious materials only, not the total cost of the concrete.

A4.405.4 Use of building materials from rapidly renewable sources. One or more of the following materials manufactured from rapidly renewable sources or agricultural by-products is used:

1. Insulation.
2. Bamboo or cork.
3. Engineered products.
4. Agricultural based products.
5. Other products acceptable to the enforcing agency.

Note: The intent of this section is to utilize building materials and products which are typically harvested within a 10-year or shorter cycle.

SECTION A4.406 ENHANCED DURABILITY AND REDUCED MAINTENANCE (Reserved)

SECTION A4.407 WATER RESISTANCE AND MOISTURE MANAGEMENT

A4.407.1 Drainage around foundations. Install foundation and landscape drains which discharge to a dry well, sump, bioswale or other approved on-site location.

A4.407.2 Roof drainage. Install gutter and downspout systems to route water at least 5 feet away from the foundation or connect to landscape drains which discharge to a dry well, sump, bioswale, rainwater capture system or other approved on-site location.

A4.407.3 Flashing details. Provide flashing details on the building plans which comply with accepted industry standards or manufacturer's instructions. Details are shown on house plans at all of the following locations:

1. Around windows and doors.
2. Roof valleys.
3. Deck connections to the structure.
4. Roof-to-wall intersections.
5. Chimneys to roof intersections.
6. Drip caps above windows and doors with architectural projections.

Note: Reference details may be found in the *Residential Sheet Metal Guidelines* published by the Sheet Metal and Air Conditioning Contractors' National Association Inc.

A4.407.4 Material protection. Protect building materials delivered to the construction site from rain and other sources of moisture.

A4.407.5 Ice and water barriers. In Climate Zone 16, an ice and water barrier is installed at valley, eaves and wall to roof intersections. The ice and water barrier shall extend at least 24 inches inside the exterior wall line or as specified by the manufacturer's installation instructions.

A4.407.6 Door protection. Exterior doors to the dwelling are covered to prevent water intrusion by one or more of the following:

1. An awning at least 4 feet in depth is installed.
2. The door is protected by a roof overhang at least 4 feet in depth.
3. The door is recessed at least 4 feet.
4. Other methods which provide equivalent protection.

A4.407.7 Roof overhangs. A permanent overhang or awning at least 2 feet in depth is provided at all exterior walls.

SECTION A4.408
CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

A4.408.1 Enhanced construction waste reduction. Nonhazardous construction and demolition debris generated at the site is diverted to recycle or salvage in compliance with one of the following:

Tier 1. At least a 65-percent reduction.

Tier 2. At least a 75-percent reduction.

Exceptions:

1. Equivalent or alternative waste reduction methods are developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
2. The enforcing agency may make exceptions to the requirements of this section when jobsites are located in areas beyond the haul boundaries of the diversion facility.

A4.408.1.1 Documentation. Documentation shall be provided to the enforcing agency which demonstrates compliance with this section. Documentation shall be in compliance with Section 4.408.5.

SECTION A4.409
LIFE CYCLE ASSESSMENT
(Reserved)

SECTION A4.410
BUILDING MAINTENANCE AND OPERATION
(Reserved)

SECTION A4.411
INNOVATIVE CONCEPTS AND LOCAL ENVIRONMENTAL CONDITIONS

A4.411.1 Innovative concepts and local environmental conditions. The provisions of this code are not intended to prevent the use of any alternate material, appliance, installation, device, arrangement, method, design or method of construction not specifically prescribed by this code. This code does not limit the authority of city, county, or city and county government to make necessary changes to the provisions contained in this code pursuant to Section 101.7.1.

APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

Division A4.5 – ENVIRONMENTAL QUALITY

SECTION A4.501
GENERAL
(Reserved)

SECTION A4.502
DEFINITIONS

A4.502.1 Definitions. The following terms are defined in Chapter 2.

MERV.

NO ADDED FORMALDEHYDE (NAF) BASED RESINS.

ULTRA-LOW EMITTING FORMALDEHYDE (ULEF) RESINS.

SECTION A4.503
FIREPLACES
(Reserved)

SECTION A4.504
POLLUTANT CONTROL

A4.504.1 Compliance with formaldehyde limits. Use composite wood products made with either California Air Resources Board approved no-added formaldehyde (NAF) resins or ultra-low emitting formaldehyde (ULEF) resins.

Note: Documentation must be provided that verifies that finish materials are certified to meet the pollutant emission limits.

A4.504.2 Resilient flooring systems. Resilient flooring systems installed in the building shall meet the percentages specified in this section and comply with the VOC-emission limits defined in at least one of the following:

1. VOC emission limits defined in the Collaborative for High Performance Schools (CHPS) High Performance Products Database.
2. Products compliant with CHPS criteria certified under the Greenguard Children & Schools program.
3. Certification under the Resilient Floor Covering Institute (RFCI) FloorScore program.
4. Meet 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 1.1, February 2010 (also known as Specification 01350.)

Tier 1. At least 90 percent of the total area of resilient flooring installed shall comply.

Tier 2. At least 100 percent of the total area of resilient flooring installed shall comply.

Exception for Tier 2: An allowance for up to 5-percent specialty purpose flooring may be permitted.

Note: Documentation must be provided that verifies that finish materials are certified to meet the pollutant emission limits in this section.

A4.504.3 Thermal insulation. Thermal insulation installed in the building shall meet the following requirements:

Tier 1. Install thermal insulation in compliance with the VOC-emission limits defined in Collaborative for High Performance Schools (CHPS) High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; or meet California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.1, February 2010 (also known as Specification 01350).

Tier 2. Install insulation which complies with Tier 1 plus does not contain any added formaldehyde.

Note: Documentation must be provided that verifies the materials are certified to meet the pollutant emission limits in this section.

SECTION A4.505
INTERIOR MOISTURE CONTROL
(Reserved)

SECTION A4.506
INDOOR AIR QUALITY AND EXHAUST

A4.506.1 Filters. Return air filters with a value greater than MERV 6 shall be installed on HVAC systems. Pressure drop across the filter shall not exceed 0.1 inches water column.

A4.506.2 Construction filter. [HR] Provide filters on return air openings rated at MERV 6 or higher during construction.

A4.506.3 Direct-vent appliances. Direct-vent heating and cooling equipment shall be utilized if the equipment will be located in the conditioned space or install the space heating and water heating equipment in an isolated mechanical room.

SECTION A4.507
ENVIRONMENTAL COMFORT
(Reserved)

SECTION A4.508
OUTDOOR AIR QUALITY
(Reserved)

SECTION A4.509
INNOVATIVE CONCEPTS AND LOCAL ENVIRONMENTAL CONDITIONS

A4.509.1 Innovative concepts and local environmental conditions. The provisions of this code are not intended to prevent the use of any alternate material, appliance, installation, device, arrangement, method, design or method of construction not specifically prescribed by this code. This code does not limit the authority of city, county, or city and county government to make necessary changes to the provisions contained in this code pursuant to Section 101.7.1.

APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

Division A4.6 – TIER I AND TIER 2

SECTION A4.601 GENERAL

A4.601.1 Scope. The measures contained in this appendix are not mandatory unless adopted by a city, county, or city and county as specified in Section 101.7. The provisions of this section outline means of achieving enhanced construction or reach levels by incorporating additional green building measures. In order to meet one of the tier levels designers, builders or property owners are required to incorporate additional green building measures necessary to meet the threshold of each level.

A4.601.2 Prerequisite measures. Tier 1 and Tier 2 thresholds require compliance with the mandatory provisions of this code and incorporation of the required prerequisite measures listed in Section A4.601.4.2 for Tier 1 and A4.601.5.2 for Tier 2. Prerequisite measures are also identified in the Residential Occupancies Application Checklist in Section A4.602.

As specified in Section 101.7, additional prerequisite measures may be included by the enforcing agency to address specific local environmental conditions and may be listed in the Innovative Concepts and Local Environmental Conditions portions of the checklist.

A4.601.3 Elective measures. In addition to the required measures, Tier 1 and Tier 2 buildings must incorporate at least the number of elective measures specified in Sections A4.601.4.2 and A4.601.5.2.

A4.601.4 Tier 1. To achieve Tier 1 status a project must comply with the following:

A4.601.4.1 Mandatory measures for Tier 1. The project shall meet or exceed all of the mandatory measures in Chapter 4, Divisions 4.1 through 4.5 and Chapter 7 as applicable.

A4.601.4.2 Prerequisite and elective measures for Tier 1. In addition to the mandatory measures, compliance with the following prerequisite and elective measures from Appendix A4 is also required to achieve Tier 1 status:

1. From Division A4.1, Planning and Design.
   - 1.1. Comply with the topsoil protection requirements in Section A4.106.2.3.
   - 1.2. Comply with the 20 percent permeable paving requirements in Section A4.106.4.
   - 1.3. Comply with the cool roof requirements in Section A4.106.5.
   - 1.4. Comply with at least two elective measures selected from Division A4.1.
2. From Division A4.2, Energy Efficiency.
   - 2.1. For newly constructed low-rise residential buildings, comply with the energy efficiency requirements in Section A4.203.1.1 and Section A4.203.1.2.1.
   - 2.2. For additions and alterations to low-rise residential buildings, comply with the energy efficiency requirements in Section A4.204.1.1 and Section A4.204.1.2.1.
3. From Division A4.3, Water Efficiency and Conservation.
   - 3.1. Comply with the landscape irrigation water budget requirement in Section A4.304.3.
   - 3.2. Comply with the Tier 1 potable water use reduction for landscape irrigation design in Section A4.304.4.
   - 3.3. Comply with at least two elective measures selected from Division A4.3.
4. From Division A4.4, Material Conservation and Resource Efficiency.
   - 4.1. Comply with the 20 percent cement reduction requirements in Section A4.403.2.
   - 4.2. Comply with the 10 percent recycled content requirements in Section A4.405.3.1.
   - 4.3. Comply with the 65 percent reduction in construction waste in Section A4.408.1.
   - 4.4. Comply with at least two elective measures selected from Division A4.4.
5. From Division A4.5, Environmental Quality.
   - 5.1. Comply with the 90-percent resilient flooring systems requirements in Section A4.504.2.
   - 5.2. Comply with the thermal insulation requirements for Tier 1 in Section A4.504.3.
   - 5.3. Comply with at least one elective measure selected from Division A4.5.

Note: The Residential Occupancies Application Checklist contained in Section A4.602 may be used to show which elective measures are selected.

A4.601.5 Tier 2. To achieve Tier 2 status a project must comply with the following.

Note: The measures necessary to achieve Tier 2 status are very stringent. Cities, counties, and cities and counties considering adoption of Tier 2 as mandatory should carefully consider the stringency of each measure and ensure that the measures are achievable in their location.

A4.601.5.1 Mandatory measures for Tier 2. The project shall meet or exceed all of the mandatory measures in Chapter 4, Divisions 4.1 through 4.5 and Chapter 7 as applicable.

A4.601.5.2 Prerequisite and elective measures for Tier 2. In addition to the mandatory measures, compliance with the following prerequisite and elective measures from Appendix A4 is also required to achieve Tier 2 status.

1. From Division A4.1, Planning and Design.
   - 1.1 Comply with the topsoil protection requirements for Tier 1 and Tier 2 in Section A4.106.2.3.
   - 1.2 Comply with the 30 percent permeable paving requirements in Section A4.106.4.
   - 1.3 Comply with the cool roof requirements in Section A4.106.5.
   - 1.4 Comply with at least four elective measures selected from Division A4.1.
2. From Division A4.2, Energy Efficiency.
   - 2.1 For newly constructed low-rise residential buildings, comply with the energy efficiency requirements in Section A4.203.1.1 and Section A4.203.1.2.2.
   - 2.2 For additions and alterations to low-rise residential buildings, comply with the energy efficiency requirements in Section A4.204.1.1 and Section A4.204.1.2.2.
3. From Division A4.3, Water Efficiency and Conservation.
   - 3.1 Comply with the landscape irrigation water budget requirement in Section A4.304.3.
   - 3.2 Comply with the Tier 2 potable water use reduction for landscape irrigation design in Section A4.304.4.
   - 3.3 Comply with at least three elective measures selected from Division A4.3.
4. From Division A4.4, Material Conservation and Resource Efficiency.
   - 4.1 Comply with the 25 percent cement reduction requirements in Section A4.403.2.
   - 4.2 Comply with the 15 percent recycled content requirements in Section A4.405.3.1.
   - 4.3 Comply with the 75 percent reduction in construction waste in Section A4.408.1.
   - 4.4 Comply with at least four elective measures selected from Division A4.4.
5. From Division A4.5, Environmental Quality.
   - 5.1 Comply with the 100-percent resilient flooring systems requirements in Section A4.504.2.
   - 5.2 Comply with the thermal insulation requirements for Tier 1 and Tier 2 in Section A4.504.3.
   - 5.3 Comply with at least one elective measure selected from Division A4.5.

Note: The Residential Occupancies Application Checklist contained in Section A4.602 may be used to show which elective measures are selected.

DIVISION A4.6 – TIER 1 AND TIER 2—continued

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
PLANNING AND DESIGN						
Site Selection						
A4.103.1 A site which complies with at least one of the following characteristics is selected: 1. An infill site is selected. 2. A greyfield site is selected. 3. An EPA-recognized Brownfield site is selected.		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
A4.103.2 Facilitate community connectivity by one of the following methods: 1. Locate project within a $^1/_4$-mile true walking distance of at least 4 basic services; 2. Locate project within $^1/_2$-mile true walking distance of at least 7 basic services; 3. Other methods increasing access to additional resources.		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
Site Preservation						
A4.104.1 An individual with oversight responsibility for the project has participated in an educational program promoting environmentally friendly design or development and has provided training or instruction to appropriate entities.		☐	☐	☐	☐	☐
Deconstruction and Reuse of Existing Materials						
A4.105.2 Existing buildings are disassembled for reuse or recycling of building materials. The proposed structure utilizes at least one of the following materials which can be easily reused: 1. Light fixtures 2. Plumbing fixtures 3. Doors and trim 4. Masonry 5. Electrical devices 6. Appliances 7. Foundations or portions of foundations		☐	☐	☐	☐	☐
Site Development						
4.106.2 A plan is developed and implemented to manage storm water drainage during construction.	☒					
4.106.3 Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings.	☒					
A4.106.1 Reserved.		☐	☐	☐	☐	☐
A4.106.2.1 Soil analysis is performed by a licensed design professional and the findings utilized in the structural design of the building.		☐	☐	☐	☐	☐

(continued)

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
A4.106.2.2 Soil disturbance and erosion are minimized by at least one of the following:						
1. Natural drainage patterns are evaluated and erosion controls are implemented to minimize erosion during construction and after occupancy.		☐	☐	☐	☐	☐
2. Site access is accomplished by minimizing the amount of cut and fill needed to install access roads and driveways.		☐	☐	☐	☐	☐
3. Underground construction activities are coordinated to utilize the same trench, minimize the amount of time the disturbed soil is exposed and the soil is replaced using accepted compaction methods.		☐	☐	☐	☐	☐
A4.106.2.3 Topsoil shall be protected or saved for reuse as specified in this section.				☐	☐	☐
Tier 1. Displaced topsoil shall be stockpiled for reuse in a designated area and covered or protected from erosion.		☒[2]	☒[2]			
Tier 2. The construction area shall be identified and delineated by fencing or flagging to limit construction activity to the construction area.			☒[2]			
A4.106.3 Postconstruction landscape designs accomplish one or more of the following:						
1. Areas disrupted during construction are restored to be consistent with native vegetation species and patterns.		☐	☐	☐	☐	☐
2. Limit turf areas to the greatest extent possible.						
a. Not more than 50 percent for Tier 1.		☐		☐	☐	☐
b. Not more than 25 percent for Tier 2.			☐	☐	☐	☐
3. Utilize at least 75 percent native California or drought tolerant plant and tree species appropriate for the climate zone region.		☐	☐	☐	☐	☐
4. Hydrozoning irrigation techniques are incorporated into the landscape design.		☐	☐	☐	☐	☐
A4.106.4 Permeable paving is utilized for the parking, walking or patio surfaces in compliance with the following:						
Tier 1. Not less than 20 percent of the total parking, walking or patio surfaces shall be permeable.		☒[2]		☐	☐	☐
Tier 2. Not less than 30 percent of the total parking, walking or patio surfaces shall be permeable.			☒[2]	☐	☐	☐
A4.106.5 Roofing materials shall have a minimum 3-year aged solar reflectance and thermal emittance or a minimum Solar Reflectance Index (SRI) equal to or greater than the values specified in Tables A4.106.5.1(1) and A4.106.5.1(2) for low-rise residential buildings and Tables A4.106.5.1(3) and A4.106.5.1(4) for high rise residential buildings.						
Low-rise Residential						
Tier 1 roof covering shall meet or exceed the values contained in Table A4.106.5.1(1).		☒[2]				
Tier 2 roof covering shall meet or exceed the values contained in Table A4.106.5.1(2).			☒[2]			
High-rise Residential, Hotels and Motels						
Tier 1 roof covering shall meet or exceed the values contained in Table A4.106.5.1(3).		☒[2]				
Tier 2 roof covering shall meet or exceed the values contained in Table A4.106.5.1(4).			☒[2]			

(continued)

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
A4.106.6 Install a vegetated roof for at least 50 percent of the roof area. Vegetated roofs shall comply with requirements for roof gardens and landscaped roofs in the *California Building Code*, Chapters 15 and 16.		☐	☐	☐	☐	☐
A4.106.7 Reduce nonroof heat islands for 50 percent of sidewalks, patios, driveways or other paved areas by using one or more of the methods listed.		☐	☐	☐	☐	☐
A4.106.8 Provide capability for the installation of electrical vehicle supply equipment in single-family and multifamily structures.		☐	☐	☐	☐	☐
A4.106.9 Provide bicycle parking facilities as noted below or meet a local ordinance, whichever is more stringent. Number of bicycle parking spaces may be reduced, as approved by the enforcing agency, due to building site characteristics, including but not limited to, isolation from other development.				☐	☐	☐
1. Provide short-term bicycle parking, per Section A4.106.9.1.		☐	☐	☐	☐	☐
2. Provide long-term bicycle parking for multifamly buildings, per Section A4.106.9.2.		☐	☐	☐	☐	☐
3. Provide long-term bicycle parking for hotel and motel buildings, per Section A4.106.9.3.		☐	☐	☐	☐	☐
A4.106.10 [HR] Outdoor lighting systems shall be designed and installed to comply with:						
1. The minimum requirements in the *California Energy Code* for Lighting Zones 1-4; and						
2. Backlight, Uplight and Glare (BUG) ratings as defined in IES TM-15-11; and		☐	☐	☐	☐	☐
3. Allowable BUG ratings not exceeding those shown in Table A4.106.10; or						
Comply with a lawfully enacted local ordinance, whichever is more stringent.		☐	☐	☐	☐	☐

(continued)

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
Innovative Concepts and Local Environmental Conditions						
A4.107.1 Items in this section are necessary to address innovative concepts or local environmental conditions.						
Item 1	☐	☐	☐	☐	☐	☐
Item 2	☐	☐	☐	☐	☐	☐
Item 3	☐	☐	☐	☐	☐	☐
Energy Efficiency						
General						
4.201.1 Building meets or exceeds the requirements of the *California Building Energy Efficiency Standards*[3].	☒	☒[2]	☒[2]	☐	☐	☐
Performance Approach for Newly Constructed Buildings						
A4.203.1.1.1 An Energy Design Rating for the Proposed Design Building is included in the Certificate of Compliance documentation.		☒[2]	☒[2]	☐	☐	☐
A4.203.1.1.2 QII procedures specified in the Building Energy Efficiency Standards Reference Residential Appendix RA3.5 are completed.		☒[2]	☒[2]	☐	☐	☐
A4.203.1.1.3 All permanently installed lighting is high efficiency and has required controls.		☒[2]	☒[2]	☐	☐	☐
A4.203.1.2.1 The Energy Budget is no greater than 85 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building.		☒[2]		☐	☐	☐
A4.203.1.2.2 The Energy Budget is no greater than 70 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building.			☒[2]	☐	☐	☐
Performance Approach for Additions and Alterations						
A4.204.1.1.1 All newly installed, permanently installed lighting is high efficacy and has required controls.		☒[2]	☒[2]	☐	☐	☐
A4.204.1.2.1 When one and only one mechanical system is added or modified, the Energy Budget is no greater than 95 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building. When two or more mechanical systems are added or modified, the Energy Budget is no greater than 90 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building.		☒[2]		☐	☐	☐
A4.204.1.2.2 When one and only one mechanical system is added or modified, the Energy Budget is no greater than 90 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building. When two or more mechanical systems are added or modified, the Energy Budget is no greater than 85 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building.			☒[2]	☐	☐	☐

(continued)

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
WATER EFFICIENCY AND CONSERVATION						
Indoor Water Use						
4.303.1 Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) installed in residential buildings shall comply with the prescriptive requirements of Sections 4.303.1.1 through 4.303.1.4.4.	☒			☐	☐	☐
4.303.2 Plumbing fixtures and fittings required in Section 4.303.1 shall be installed in accordance with the *California Plumbing Code,* and shall meet the applicable referenced standards.	☒			☐	☐	☐
A4.303.1 Kitchen faucets. The maximum flow rate of kitchen faucets shall not exceed 1.5 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.5 gallons per minute at 60 psi. **Note:** Where complying faucets are available, aerators or other means may be used to achieve reduction.		☐	☐	☐	☐	☐
A4.303.2 Alternate water source for nonpotable applications. Alternate nonpotable water sources are used for indoor potable water reduction. Alternate nonpotable water sources shall be installed in accordance with the *California Plumbing Code.*		☐	☐	☐	☐	☐
A4.303.3 Appliances. Dishwashers and clothes washers in residential buildings shall comply with the following: Install at least one qualified ENERGY STAR appliance with maximum water use as follows: 1. Standard Dishwashers - 4.25 gallons per cycle. 2. Compact Dishwashers - 3.5 gallons per cycle. 3. Clothes Washers - water factor of 6 gallons per cubic feet of drum capacity.		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
A4.303.4 Nonwater supplied urinals or waterless toilets are installed.		☐	☐	☐	☐	☐
Outdoor Water Use						
4.304.1 Automatic irrigation systems controllers installed at the time of final inspection shall be weather or soil moisture-based.	☒			☐	☐	☐
A4.304.1 Install a low-water consumption irrigation system which minimizes the use of spray type heads.		☐	☐	☐	☐	☐
A4.304.2 A rainwater capture, storage and re-use system is designed and installed.		☐	☐	☐	☐	☐
A4.304.3 A water budget shall be developed for landscape irrigation.		☒[2]	☒[2]	☐	☐	☐

(continued)

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
A4.304.4 Provide water efficient landscape irrigation design that reduces the use of potable water. Tier 1. Does not exceed 65 percent of *ETo* times the landscape area. Tier 2. Does not exceed 60 percent of *ETo* times the landscape area.		☒[2]	☒[2]	☐	☐	☐
A4.304.5 A landscape design is installed which does not utilize potable water.		☐	☐	☐	☐	☐
A304.6 For new water service connections, landscaped irrigated areas more than 2,500 square feet shall be provided with separate submeters or metering devices for outdoor potable water use.		☐	☐	☐	☐	☐
WATER REUSE SYSTEMS						
A4.305.1 Piping is installed to permit future use of a graywater irrigation system served by the clothes washer or other fixtures.		☐	☐	☐	☐	☐
A4.305.2 Recycled water piping is installed.		☐	☐	☐	☐	☐
A4.305.3 Recycled water is used for landscape irrigation.		☐	☐	☐	☐	☐
Innovative Concepts and Local Environmental Conditions						
A4.306.1 Items in this section are necessary to address innovative concepts or local environmental conditions.						
Item 1	☐	☐	☐	☐	☐	☐
Item 2	☐	☐	☐	☐	☐	☐
Item 3	☐	☐	☐	☐	☐	☐
MATERIAL CONSERVATION AND RESOURCE EFFICIENCY						
Foundation Systems						
A4.403.1 A Frost-protected Shallow Foundation (FPSF) is designed and constructed.		☐	☐	☐	☐	☐
A4.403.2 Cement use in foundation mix design is reduced. Tier 1. Not less than a 20 percent reduction in cement use. Tier 2. Not less than a 25 percent reduction in cement use.		☒[2]	☒[2]	☐	☐	☐
Efficient Framing Techniques						
A4.404.1 Beams and headers and trimmers are the minimum size to adequately support the load.		☐	☐	☐	☐	☐
A4.404.2 Building dimensions and layouts are designed to minimize waste.		☐	☐	☐	☐	☐
A4.404.3 Use premanufactured building systems to eliminate solid sawn lumber whenever possible.		☐	☐	☐	☐	☐
A4.404.4 Material lists are included in the plans which specify material quantity and provide direction for on-site cuts.		☐	☐	☐	☐	☐

(continued)

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
Material Sources						
A4.405.1 One or more of the following building materials, that do not require additional resources for finishing are used: 1. Exterior trim not requiring paint or stain 2. Windows not requiring paint or stain 3. Siding or exterior wall coverings which do not require paint or stain		☐	☐	☐	☐	☐
A4.405.2 Floors that do not require additional coverings are used including but not limited to stained, natural or stamped concrete floors.		☐	☐	☐	☐	☐
A4.405.3 Postconsumer or preconsumer recycled content value (RCV) materials are used on the project. Tier 1. Not less than a 10-percent recycled content value. Tier 2. Not less than a 15-percent recycled content value.		☒[2]	☒[2]	☐	☐	☐
A4.405.4 Renewable source building products are used.		☐	☐	☐	☐	☐
Enhanced Durability and Reduced Maintenance						
4.406.1 Annular spaces around pipes, electric cables, conduits or other openings in plates at exterior walls shall be protected against the passage of rodents by closing such openings with cement mortar, concrete masonry or similar method acceptable to the enforcing agency.	☒			☐	☐	☐
Water Resistance and Moisture Management						
A4.407.1 Install foundation and landscape drains.		☐	☐	☐	☐	☐
A4.407.2 Install gutter and downspout systems to route water at least 5 feet away from the foundation or connect to landscape drains which discharge to a dry well, sump, bioswale, rainwater capture system or other approved on-site location.		☐	☐	☐	☐	☐
A4.407.3 Provide flashing details on the building plans and comply with accepted industry standards or manufacturer's instructions.		☐	☐	☐	☐	☐
A4.407.4 Protect building materials delivered to the construction site from rain and other sources of moisture.		☐	☐	☐	☐	☐
A4.407.5 In Climate Zone 16 an ice/water barrier is installed at roof valleys, eaves and wall to roof intersections.		☐	☐	☐	☐	☐
A4.407.6 Exterior doors to the dwelling are protected to prevent water intrusion.		☐	☐	☐	☐	☐
A4.407.7 A permanent overhang or awning at least 2 feet in depth is provided.		☐	☐	☐	☐	☐

(continued)

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
Construction Waste Reduction, Disposal and Recycling						
4.408.1 Recycle and/or salvage for reuse a minimum of 50 percent of the nonhazardous construction and demolition waste in accordance with one of the following: 1. Comply with a more stringent local construction and demolition waste management ordinance; or 2. A construction waste management plan, per Section 4.408.2; or 3. A waste management company, per Section 4.408.3; or 4.The waste stream reduction alternative, per Section 4.408.4.	☒			☐	☐	☐
A4.408.1 Construction waste generated at the site is diverted to recycle or salvage in compliance with one of the following: 1. Tier 1 at least a 65 percent reduction. 2. Tier 2 at least a 75 percent reduction. **Exception:** Equivalent waste reduction methods are developed by working with local agencies.		☒[2]	☒[2]	☐ ☐	☐ ☐	☐ ☐
Building Maintenance and Operation						
4.410.1 An operation and maintenance manual shall be provided to the building occupant or owner.	☒			☐	☐	☐
Innovative Concepts and Local Environmental Conditions						
A4.411.1 Items in this section are necessary to address innovative concepts or local environmental conditions.						
Item 1	☐	☐	☐	☐	☐	☐
Item 2	☐	☐	☐	☐	☐	☐
Item 3	☐	☐	☐	☐	☐	☐
ENVIRONMENTAL QUALITY						
Fireplaces						
4.503.1 Any installed gas fireplace shall be a direct-vent sealed-combustion type. Any installed woodstove or pellet stove shall comply with US EPA Phase II emission limits where applicable. Woodstoves, pellet stoves and fireplaces shall also comply with applicable local ordinances.	☒			☐	☐	☐
Pollutant Control						
4.504.1 Duct openings and other related air distribution component openings shall be covered during construction.	☒			☐	☐	☐
4.504.2.1 Adhesives, sealants and caulks shall be compliant with VOC and other toxic compound limits.	☒			☐	☐	☐
4.504.2.2 Paints, stains and other coatings shall be compliant with VOC limits.	☒			☐	☐	☐
4.504.2.3 Aerosol paints and coatings shall be compliant with product weighted MIR limits for ROC and other toxic compounds.	☒			☐	☐	☐
4.504.2.4 Documentation shall be provided to verify that compliant VOC limit finish materials have been used.	☒			☐	☐	☐

(continued)

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
4.504.3 Carpet and carpet systems shall be compliant with VOC limits.	☒			☐	☐	☐
4.504.4 80 percent of floor area receiving resilient flooring shall comply with the VOC-emission limits defined in the Collaborative for High Performance Schools (CHPS) High Performance Products Database or be certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or meet California Dept. of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers", Version 1.1, February 2010 (also known as Specification 01350.)	☒					
4.504.5 Particleboard, medium density fiberboard (MDF) and hardwood plywood used in interior finish systems shall comply with low formaldehyde emission standards.	☒			☐	☐	☐
A4.504.1 Use composite wood products made with either California Air Resources Board approved no-added formaldehyde (NAF) resins or ultra-low emitting formaldehyde (ULEF) resins.		☐	☐	☐	☐	☐
A4.504.2 Install VOC compliant resilient flooring systems. Tier 1. At least 90 percent of the resilient flooring installed shall comply. Tier 2. At least 100 percent of the resilient flooring installed shall comply.		☒[2]	☒[2]	☐	☐	☐
A4.504.3 Thermal insulation installed in the building shall meet the following requirements: Tier 1. Install thermal insulation in compliance with the VOC-emission limits defined in Collaborative for High Performance Schools (CHPS) Low-emitting Materials List. Tier 2. Install insulation which contains No-Added Formaldehyde (NAF) and is in compliance with the VOC-emission limits defined in Collaborative for High Performance Schools (CHPS) Low-emitting Materials List.		☒[2]	☒[2]	☐	☐	☐
Interior Moisture Control						
4.505.2 Vapor retarder and capillary break is installed at slab-on-grade foundations.	☒			☐	☐	☐
4.505.3 Moisture content of building materials used in wall and floor framing is checked before enclosure.	☒			☐	☐	☐
Indoor Air Quality and Exhaust						
4.506.1 Return air filters with a value greater than MERV 6 shall be installed on HVAC systems. Pressure drop across the filter shall not exceed 0.1 inches water column.		☐	☐	☐	☐	☐
A4.506.2 [HR] Provide filters on return air openings rated MERV 6 or higher during construction when it is necessary to use HVAC equipment.		☐	☐	☐	☐	☐
A4.506.3 Direct-vent appliances shall be used when equipment is located in conditioned space; or the equipment must be installed in an isolated mechanical room.		☐	☐	☐	☐	☐

(continued)

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
Environmental Comfort						
4.507.1 Reserved.						
4.507.2. Duct systems are sized, designed, and equipment is selected using the following methods: 1. Establish heat loss and heat gain values according to ANSI/ACCA 2 Manual J-2004 or equivalent. 2. Size duct systems according to ANSI/ACCA 1 Manual D-2009 or equivalent. 3. Select heating and cooling equipment according to ANSI/ACCA 3 Manual S-2004 or equivalent.	☒			☐	☐	☐
Outdoor Air Quality Reserved						
Innovative Concepts and Local Environmental Conditions						
A4.509.1 Items in this section are necessary to address innovative concepts or local environmental conditions.						
Item 1		☐	☐	☐	☐	☐
Item 2		☐	☐	☐	☐	☐
Item 3		☐	☐	☐	☐	☐
Installer and Special Inspector Qualifications						
Qualifications						
702.1 HVAC system installers are trained and certified in the proper installation of HVAC systems.	☒			☐	☐	☐
702.2 Special inspectors employed by the enforcing agency must be qualified and able to demonstrate competence in the discipline they are inspecting.	☒			☐	☐	☐
Verifications						
703.1 Verification of compliance with this code may include construction documents, plans, specifications builder or installer certification, inspection reports, or other methods acceptable to the enforcing agency which show substantial conformance.	☒			☐	☐	☐

1. Green building measures listed in this table may be mandatory if adopted by a city, county, or city and county as specified in Section 101.7.
2. Required prerequisite for this Tier.
3. These measures are currently required elsewhere in statute or in regulation.

Division A4.7– RESIDENTIAL MODEL ORDINANCE

A4.701.1 General. The voluntary measures of this code are designed and promulgated to be adopted by reference and made mandatory by local ordinance pursuant to Section 101.7. Jurisdictions wishing to adopt the voluntary provisions of this code as an enforceable regulation governing structures and premises should ensure that certain factual information is included in the adopting ordinance and that the measures are appropriate and achievable and are considered to be suitable as mandatory by the city, county, or city and county. The following sample adoption ordinance addresses several key elements of a code adoption ordinance, including the information required for insertion into the code text.

This code does not limit the authority of city, county, or city and county government to make necessary changes to the provisions contained in this code.

SAMPLE RESOLUTION FOR ADOPTION OF THE TIER 1 OR TIER 2 PROVISIONS OF THE CALIFORNIA GREEN BUILDING STANDARDS CODE WITH OR WITHOUT ADDITIONAL ITEMS NECESSARY TO ADDRESS INNOVATIVE CONCEPTS OR LOCAL ENVIRONMENTAL CONDITIONS.

ATTACHMENT___.

SAMPLE RESOLUTION ADOPTING THE CALIFORNIA GREEN BUILDING STANDARDS CODE APPENDICES AS A MANDATORY REFERENCE STANDARD

CITY OF _____

RESOLUTION # _____

RESOLUTION ADOPTING ENHANCED GREEN BUILDING MEASURES FOR NEW AND EXISTING RESIDENTIAL CONSTRUCTION.

WHEREAS, the City/County of _____ 's (City or County) General Plan sets forth goals for preserving and improving the natural and built environment of the City/County, protecting the health of its residents and visitors, and fostering its economy; and

WHEREAS, green building is a holistic approach to design, construction, and demolition that minimizes the building's impact on the environment, the occupants, and the community; and

WHEREAS, green buildings benefit building industry professionals, residents, and communities by improving construction quality; increasing building durability; reducing utility, maintenance, water and energy costs; creating healthier homes; and enhancing comfort and livability; and

WHEREAS, the *California Green Building Standards Code* appendices have included voluntary tiers to provide a city, county, or city and county, building professionals, and the general public with a range of voluntary green building measures for builders to choose from when constructing homes in California; and

WHEREAS, the *California Green Building Standards Code* appendices benefited from extensive input from a city, county, or city and county, building professionals, State agencies, and recognized green building professionals and the practices contained in these guidelines were selected for their viability in today's market and their ability to promote sustainable buildings and communities; and

WHEREAS, adoption of the *California Green Building Standards Code* appendices promotes statewide consistency and predictability for building professionals; and

NOW THEREFORE, BE IT RESOLVED, that the City/County hereby finds that green building design, construction and operation furthers the goals set forth in the City/County General Plan, including land use, conservation, open space and (include others, if applicable.)

NOW THEREFORE, BE IT RESOLVED, that newly constructed residential buildings, alterations or additions to residential buildings shall meet the _____ (Tier 1 or Tier 2) measures contained in the *California Green Building Standards Code* appendices and the green building design, construction, and operation innovative concepts or additions or amendment thereto contained in Attachment _____ to address local environmental conditions; and;

NOW THEREFORE, BE IT FURTHER RESOLVED, that the City Council or County Board of Supervisors of the City/County of _____ adopts the *California Green Building Standards Code* appendices, as they may be amended from time to time, as a City/County mandatory reference document and directs City/County staff to enforce these green building measures as mandatory standards within the City/County.

ADOPTED BY THE FOLLOWING VOTE:

AYES:

NOES:

ABSENT:

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.1 – PLANNING AND DESIGN

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)	X																		
Adopt only those sections that are listed below																			
Chapter/Section																			

APPENDIX A5

NONRESIDENTIAL VOLUNTARY MEASURES

The measures contained in this appendix are not mandatory unless adopted by a city, county, or city and county as specified in Section 101.7 and provide additional measures that designers, builders and property owners may wish to consider during the planning, design and construction process.

Division A5.1 – PLANNING AND DESIGN

PREFACE

Given that land use and planning are largely regulated locally, cities, counties and cities and counties should consider reducing greenhouse gas emissions associated with development through local land-use practices in conjunction with enforcing the provisions of this code. Specific land use strategies a city, county or city and county may wish to consider include but are not limited to the following:

Site selection. Develop sites for buildings, hardscape, roads or parking areas consistent with the local general plan and regional transportation plan pursuant to SB 375 (Stats. 2008, Ch. 728).

Regional sustainable communities strategy. Site selection and building design and use shall conform the project with the prevailing regional sustainable communities strategy or alternative planning strategy, whichever meets the greenhouse gas target established by the California Air Resources Board pursuant to SB375 (Stats. 2008, Ch. 728), including the general location of uses, residential densities and building intensities.

Transit priority projects. To qualify as a transit priority project, the project shall meet three criteria:

(1) (a) contain at least 50 percent residential use, based on total building square footage and, if the project contains between 26 and 50 percent nonresidential uses, a floor area ratio of not less than 0.75; (b) provide a minimum net density of at least 20 dwelling units per acre; and (c) be within one-half mile of a major transit stop or high-quality transit corridor included in a regional transportation plan as described in Section 21155 of Stats. 2008, Ch. 728;

(2) be consistent with the prevailing sustainable communities strategy or alternative planning strategy, whichever meets the greenhouse gas target established by the California Air Resources Board, including the general location of uses, residential densities and building intensities; and

(3) have all necessary entitlements required by the applicable local government.

Note: For additional information, see Government Code Sections 65080, 65080.1 and 65400 and Public Resources Code Sections 21061.3 and 21155.

SECTION A5.101
GENERAL

A5.101.1 General. The provisions of this chapter outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore and enhance the environmental quality of the site and respect the integrity of adjacent properties.

SECTION A5.102
DEFINITIONS

A5.102.1 Definitions. The following terms are defined in Chapter 2.

ALBEDO.

BIORETENTION.

BROWNFIELD SITE.

DEVELOPMENT FOOTPRINT.

FLOOR AREA RATIO.

GREENFIELDS.

GREYFIELD SITE.

INFILL SITE.

LOW-EMITTING AND FUEL EFFICIENT VEHICLES.

LOW IMPACT DEVELOPMENT (LID).

NEIGHBORHOOD ELECTRIC VEHICLE (NEV).

PERMEABLE PAVING.

SOLAR REFLECTANCE.

SOLAR REFLECTANCE INDEX (SRI).

THERMAL EMITTANCE.

VANPOOL VEHICLE.

VEGETATED SPACE.

ZEV.

SECTION A5.103
SITE SELECTION

A5.103.1 Community connectivity. Where feasible, locate project on a previously developed site within a $^1/_2$ mile radius of at least ten basic services, readily accessible by pedestrians, including, but not limited, to one each of bank, place of worship, convenience grocery, day care, cleaners, fire station, barber shop, beauty shop, hardware store, laundry, library, medical

clinic, dental clinic, senior care facility, park, pharmacy, post office, restaurant (two may be counted), school, supermarket, theater, community center, fitness center, museum or farmers market. Other services may be considered on a case-by-case basis.

A5.103.2 Brownfield or greyfield site redevelopment or infill area development. If feasible, select for development a brownfield in accordance with Section A5.103.2.1 or on a greyfield or infill site as defined in Section A5.102.

A5.103.2.1 Brownfield redevelopment. Develop a site documented as contaminated by means of an ASTM E 1903-97 Phase II Environmental Site Assessment or on a site defined as a brownfield by a local, state or federal government agency. The site must be fully remediated in accordance with EPA regulations to the level required of the anticipated land use.

SECTION A5.104
SITE PRESERVATION

A5.104.1 Reduce development footprint and optimize open space. Optimize open space on the project site in accordance with Sections A5.104.1.1, A5.104.1.2 or A5.104.1.3.

A5.104.1.1 Local zoning requirement in place. Exceed the zoning's open space requirement for vegetated open space on the site by 25 percent.

A5.104.1.2 No local zoning requirement in place. Provide vegetated open space area adjacent to the building equal to the building footprint area.

A5.104.1.3 No open space required in zoning ordinance. Provide vegetated open space equal to 20 percent of the total project site area.

SECTION A5.105
DECONSTRUCTION AND REUSE OF EXISTING STRUCTURES

A5.105.1 If feasible, disassemble existing buildings instead of demolishing to allow reuse or recycling of building materials.

A5.105.1.1 Existing building structure. Maintain at least 75 percent of existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing) based on surface area.

Exceptions:

1. Window assemblies and nonstructural roofing material.
2. Hazardous materials that are remediated as a part of the project.
3. A project with an addition of more than two times the square footage of the existing building.

A5.105.1.2 Existing nonstructural elements. Reuse existing interior nonstructural elements (interior walls, doors, floor coverings and ceiling systems) in at least 50 percent of the area of the completed building (including additions).

Exception: A project with an addition of more than two times the square footage of the existing building.

A5.105.1.3 Salvage. Salvage additional items in good condition such as light fixtures, plumbing fixtures and doors as follows. Document the weight or number of the items salvaged.

1. Salvage for reuse on the project items that conform to other provisions of Title 24 in an on-site storage area.
2. Nonconforming items may be salvaged in dedicated collection bins for exempt projects or other uses.

SECTION A5.106
SITE DEVELOPMENT

A5.106.2 Storm water design. Design storm water runoff rate and quantity in conformance with Section A5.106.2.1 and storm water runoff quality by Section A5.106.3.2 or by local requirements, whichever are stricter.

A5.106.2.1 Storm water runoff rate and quantity. Implement a storm water management plan resulting in no net increase in rate and quantity of storm water runoff from existing to developed conditions.

Exception: If the site is already greater than 50 percent impervious, implement a storm water management plan resulting in a 25 percent decrease in rate and quantity.

A5.106.2.2 Storm water runoff quality. Use postconstruction treatment control best management practices (BMPs) to mitigate (infiltrate, filter or treat) storm water runoff from the 85th percentile 24-hour runoff event (for volume-based BMPs) or the runoff produced by a rain event equal to two times the 85th percentile hourly intensity (for flow-based BMPs).

A5.106.3 Low impact development (LID). Reduce peak runoff in compliance with Section 5.106.1. Employ at least two of the following methods or other best management practices to allow rainwater to soak into the ground, evaporate into the air or collect in storage receptacles for irrigation or other beneficial uses. LID strategies include, but are not limited to:

1. Bioretention (rain gardens);
2. Cisterns and rain barrels;
3. Green roofs meeting the structural requirements of the building code;
4. Roof leader disconnection;
5. Permeable and porous paving;
6. Vegetative swales and filter strips; tree preservation; and
7. Volume retention suitable for previously developed sites.

A5.106.3.1 Implementation. If applicable, coordinate LID projects with the local Regional Water Quality Control Board, which may issue a permit or otherwise require LID.

Note: Further information on design of specific control measures may be found on U.S. EPA's website, on SWRCB's website and from local boards that require LID.

A5.106.3.2 Greyfield or infill site. Manage 40 percent of the average annual rainfall on the site's impervious surfaces through infiltration, reuse or evaportranspiration.

A5.106.4 Reserved.

A5.106.4.1 Reserved.

A5.106.4.2 Reserved.

A5.106.4.3 Changing rooms. For buildings with over 10 tenant-occupants, provide changing/shower facilities for tenant-occupants only in accordance with Table A5.106.4.3 or document arrangements with nearby changing/shower facilities.

TABLE A5.106.4.3

NUMBER OF TENANT-OCCUPANTS	SHOWER/CHANGING FACILITIES REQUIRED[2]	2-TIER (12" X 15" X 72") PERSONAL EFFECTS LOCKERS[1,2] REQUIRED
0–10	0	0
11–50	1 unisex shower	2
51–100	1 unisex shower	3
101–200	1 shower stall per gender	4
Over 200	1 shower stall per gender for each 200 additional tenant-occupants	One 2-tier locker for each 50 additional tenant-occupants

1. One 2-tier locker serves two people. Lockers shall be lockable with either padlock or combination lock.
2. Tenant spaces housing more than 10 tenant-occupants within buildings sharing common toilet facilities need not comply; however, such common shower facilities shall accommodate the total number of tenant-occupants served by the toilets and include a minimum of one unisex shower and two 2-tier lockers.

Note: Additional information on recommended bicycle accommodations may be obtained from Sacramento Area Bicycle Advocates.

A5.106.5.1 Designated parking for fuel-efficient vehicles. Provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table A5.106.5.1.1 or A5.106.5.1.2.

A5.106.5.1.1 Tier 1. Ten percent of total spaces. [BSC] Provide 10 percent of total designated parking spaces for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as follows:

TABLE A5.106.5.1.1

TOTAL NUMBER OF PARKING SPACES	NUMBER OF REQUIRED SPACES
0–9	0
10–25	2
26–50	4
51–75	6
76–100	9
101–150	11
151–200	18
201 and over	At least 10 percent of total

A5.106.5.1.2 Tier 2. Provide 12 percent of total designated parking spaces for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles as follows:

TABLE A5.106.5.1.2

TOTAL NUMBER OF PARKING SPACES	NUMBER OF REQUIRED SPACES
0–9	1
10–25	2
26–50	5
51–75	7
76–100	9
101–150	13
151–200	19
201 and over	At least 12 percent of total

A5.106.5.1.3 Parking stall marking. Paint, in the paint used for stall striping, the following characters such that the lower edge of the last word aligns with the end of the stall striping and is visible beneath a parked vehicle:

CLEAN AIR/
VANPOOL/EV

Note: Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces.

A5.106.5.1.4 Vehicle designations. Building managers may consult with local community Transit Management Associations (TMAs) for methods of designating qualifying vehicles, such as issuing parking stickers.

Notes:

1. Information on qualifying vehicles, car labeling regulations and DMV SOV stickers may be obtained from the following sources:
   a. California DriveClean.
   b. California Air Resources Board.
   c. U.S. EPA fuel efficiency standards.
   d. DMV Registration Operations, (916) 657-6678 and ARB Public Information, (626) 575-6858.
2. Purchasing policy and refueling sites for low emitting vehicles for state employees use can be found at the Department of General Services.

A5.106.5.3 Electric vehicle charging. Provide facilities meeting Section 406.9 (Electric Vehicle) of the *California Building Code* and as follows:

A5.106.5.3.1 Single charging space requirements. When only a single charging space is required, install a listed raceway capable of accommodating a dedicated branch circuit. The raceway shall not be less than trade size 1. The raceway shall be securely fastened at the main

service or subpanel and shall terminate in close proximity to the proposed location of the charging system into a listed cabinet, box or enclosure.

Exception: Other preinstallation methods approved by the local enforcing agency that provide sufficient conductor sizing and service capacity to install Level 2 electric vehicle supply equipment (EVSE).

A5.106.5.3.2 Multiple charging spaces required. When multiple charging spaces are required, plans shall include the location(s) and type of the EVSE, raceway method(s), wiring schematics and electrical calculations to verify that the electrical system has sufficient capacity to charge simultaneously all the electrical vehicles (EV) at all designated EV charging spaces at their full rated amperage. Plan design shall be based on Level 2 EVSE at its maximum operating ampacity. Provide raceways from the electrical service panel to the designated parking areas which are required to be installed at the time of construction.

Note: Utilities and local enforcing agencies may have additional requirements for metering and EVSE installation, and should be consulted during the project design and installation.

A5.106.5.3.3 Tier 1. At least 3 percent of the total parking spaces, but not less than one, shall be capable of supporting installation of future electric vehicle supply equipment (EVSE).

A5.106.5.3.4 Tier 2. At least 5 percent of the total parking spaces, but not less than two, shall be capable of supporting installation of future EVSE.

A5.106.5.3.5 Labeling requirement. A label stating "EV CHARGE CAPABLE" shall be posted in a conspicuous place at the service panel or subpanel and the EV charging space.

A5.106.6 Parking capacity. Design parking capacity to meet but not exceed minimum local zoning requirements.

A5.106.6.1 Reduce parking capacity. With the approval of the enforcement authority, employ strategies to reduce on-site parking area by

1. Use of on street parking or compact spaces, illustrated on the site plan or
2. Implementation and documentation of programs that encourage occupants to carpool, ride share or use alternate transportation.

Note: Strategies for programs may be obtained from local TMAs.

A5.106.7 Exterior wall shading. Meet requirements in the current edition of the *California Energy Code* and comply with either Section A5.106.7.1 or A5.106.7.2 for wall surfaces. If using vegetative shade, plant species documented to reach desired coverage within 5 years of building occupancy.

A5.106.7.1 Fenestration. Provide vegetative or man-made shading devices for all fenestration on east-, south-, and west-facing walls.

A5.106.7.1.1 East and west walls. Shading devices shall have 30-percent coverage to a height of 20 feet or to the top of the exterior wall, whichever is less. Calculate shade coverage on the summer solstice at 10 AM for east-facing walls and at 3 PM for west-facing walls.

A5.106.7.1.2 South walls. Shading devices shall have 60-percent coverage to a height of 20 feet or to the top of the exterior wall, whichever is less.

A5.106.7.2 Opaque wall areas. Use wall surfacing with minimum SRI 25 (aged), for 75 percent of opaque wall areas.

Exception: Use of vegetated shade in Wildland-Urban Interface Areas as defined in Chapter 7A (Materials and Construction Methods for Exterior Wildfire Exposure) of the *California Building Code* shall meet the requirements of that chapter.

Note: If not available from the manufacturer, aged SRI value calculations may be found at the California Energy Commission's web site at www.energy.ca.gov.

A5.106.11 Heat island effect. Reduce nonroof heat islands by Section A5.106.11.1 and roof heat islands by Section A5.106.11.2.

A5.106.11.1 Hardscape alternatives. Use one or a combination of strategies 1 through 3 for 50 percent of site hardscape or put 50 percent of parking underground.

1. Use light colored materials with an initial solar reflectance value of at least .30 as determined in accordance with American Society for Testing and Materials (ASTM) Standards E 1918 or C 1549.
2. Use open-grid pavement system or pervious or permeable pavement system.

A5.106.11.2 Cool roof for reduction of heat island effect. Use roofing materials having a minimum aged solar reflectance and thermal emittance complying with Sections A5.106.11.2.1 and A5.106.11.2.2 or a minimum aged Solar Reflectance Index (SRI) complying with Section A5.106.11.2.3 and as shown in Table A5.106.11.2.2 for Tier 1 or Table A5.106.11.2.3 for Tier 2.

Exceptions:

1. Roof constructions that have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25 pounds per square foot.
2. Roof area covered by building integrated solar photovoltaic and building integrated solar thermal panels.

A5.106.11.2.1 Solar reflectance. Roofing materials shall have a minimum aged solar reflectance equal to or

greater than the values specified in Table A5.106.11.2.2 for Tier 1 and Table A5.106.11.2.3 for Tier 2.

If Cool Roof Rating Council (CRRC) testing for aged reflectance is not available for any roofing products, the aged value shall be determined using the CRRC certified initial value using the equation $\rho_{aged} = [0.2 + ß\ [\rho_{initial} - 0.2]$, where $\rho_{initial}$ = the initial solar reflectance and soiling resistance, ß, listed by product type in Table A5.106.11.2.1.

Solar reflectance may also be certified by other supervisory entities approved by the Energy Commission pursuant to Title 24, Part 1, *California Administrative Code.*

A5.106.11.2.2 Thermal emittance. Roofing materials shall have a CRRC initial or aged thermal emittance as determined in accordance with ASTM E 408 or C 1371 equal to or greater than those specified in Table A5.106.11.2.2 for Tier 1 and Table A5.106.11.2.*3* for Tier 2.

Thermal emittance may also be certified by other supervisory entities approved by the Energy Commission pursuant to Title 24, Part 1, *California Administrative Code.*

A5.106.11.2.3 Solar reflectance index alternative. Solar Reflectance Index (SRI) equal to or greater than the values specified in Table A5.106.11.2.2 for Tier 1 and Table A5.106.11.2.3 for Tier 2 may be used as an alternative to compliance with the aged solar reflectance values and thermal emittance.

SRI values used to comply with this section shall be calculated using the Solar Reflectance Index (SRI) Calculation Worksheet (SRI-WS) developed by the California Energy Commission or in compliance with ASTM E 1980-01 as specified in the *California Energy Code*, Section 118(i)3. Solar reflectance values used in the SRI-WS shall be based on the aged reflectance value of the roofing product or the equation in section A5.106.11.2.1 if the CRRC certified aged solar reflectance are not available. Certified Thermal emittance used in the SRI-WS may be either the initial value or the aged value listed by the CRRC.

Solar reflectance and thermal emittance may also be certified by other supervisory entities approved by the Commission pursuant to Title 24, Part 1, *California Administrative Code.*

Note: The Solar Reflectance Index Calculation Worksheet (SRI-WS) is available by contacting the Energy Standard Hotline at 1-800-772-3300, website at www.energy.ca.gov or by email at Title24@energy.state.ca.us.

A5.106.11.3 Verification of compliance. If no documentation is available, an inspection shall be conducted to ensure roofing materials meet cool roof aged solar reflectance and thermal emittance or SRI values.

TABLE A5.106.11.2.1
VALUES OF SOILING RESISTANCE, ß, BY PRODUCT TYPE

PRODUCT TYPE	CRRC PRODUCT CATEGORY	ß
Field-applied coating	Field-applied coating	0.65
Other	Not a field-applied coating	0.70

TABLE A5.106.11.2.2 [BSC]
TIER 1

ROOF SLOPE	CLIMATE ZONE	Minimum Aged Solar Reflectance	Thermal Emittance	SRI
≤ 2:12	1–16	0.55	0.75	64
> 2:12	1–16	0.20	0.75	16

TABLE A5.106.11.2.3
TIER 2

ROOF SLOPE	CLIMATE ZONE	Minimum Aged Solar Reflectance	Thermal Emittance	SRI
≤ 2:12	1–16	0.65	0.85	78
> 2:12	1–16	0.30	0.85	30

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.2 – ENERGY EFFICIENCY

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below	X																		
Chapter/Section																			
A5.201.1	X																		
A5.202.1 Definitions	X																		
A5.203.1	X																		
A5.203.1.1	X																		
A5.203.1.1.1	X																		
A5.203.1.1.2	X																		
A5.203.1.1.3	X																		
A5.203.1.2	X																		
A5.203.1.2.1	X																		
A5.203.1.2.2	X																		
A5.211.1	X																		
A5.211.1.1	X																		
A5.211.1.2 and subsections																			
A5.211.3	X																		
A5.212.1	X																		
A5.212.1.1 and subsection	X																		
A5.212.1.2	X																		
A5.212.1.3																			
A5.212.1.4	X																		
A5.213	X																		

APPENDIX A5
NONRESIDENTIAL VOLUNTARY MEASURES

Division A5.2 – ENERGY EFFICIENCY

SECTION A5.201
GENERAL

A5.201.1 Scope. For the purposes of energy efficiency standards in this appendix, the California Energy Commission will continue to adopt mandatory standards. It is the intent of these voluntary standards to encourage buildings to achieve exemplary performance in the area of energy efficiency.

SECTION A5.202
DEFINITIONS

A5.202.1 Definitions. The following terms are defined in Chapter 2.

ENERGY BUDGET.

GEOTHERMAL.

PROCESS.

SOLAR ACCESS.

TIME DEPENDENT VALUATION (TDV) ENERGY.

SECTION A5.203
PERFORMANCE APPROACH

A5.203.1 Energy efficiency. Nonresidential, high-rise residential and hotel/motel buildings that include lighting and/or mechanical systems shall comply with Sections A5.203.1.1 and either A5.203.1.2.1 or A5.203.1.2.2. Newly constructed buildings, as well as additions and alterations, are included in the scope of these sections. Buildings permitted without lighting or mechanical systems shall comply with Section A5.203.1.1 but are not required to comply with Sections A5.203.1.1.2 or A5.203.1.2.

A5.203.1.1 Tier 1 and Tier 2 prerequisites. Each of the following efficiency measures is required for all applicable components of the building project.

A5.203.1.1.1 Outdoor lighting. Newly installed outdoor lighting power shall be no greater than 90 percent of the Title 24, Part 6 calculated value of allowed outdoor lighting power.

A5.203.1.1.2 Service water heating in restaurants. Newly constructed restaurants 8,000 square feet or greater and with service water heaters rated 75,000 Btu/h or greater shall install a solar water-heating system with a minimum solar savings fraction of 0.15.

Exceptions:

1. Buildings with a natural gas service water heater with a minimum of 95-percent thermal efficiency.
2. Buildings where greater than 75 percent of the total roof area has annual solar access that is less than 70 percent. Solar access is the ratio of solar insolation, including shade, to the solar insolation without shade. Shading from obstructions located on the roof or any other part of the building shall not be included in the determination of annual solar access.

A5.203.1.1.3 Functional areas where compliance with residential lighting standards is required. For newly constructed high-rise residential dwelling units and hotel and motel guest rooms, indoor lighting shall comply with the applicable requirements in Appendix A4 Residential Voluntary Measures, Division A4.2 – Energy Efficiency, Section A4.203.1.1.3. For additions and alterations to high-rise residential dwelling units and hotel and motel guest rooms, indoor lighting shall comply with the applicable requirements in Appendix A4 Residential Voluntary Measures, Division A4.2 – Energy Efficiency, Section A4.204.1.1.1.

A5.203.1.2 Performance standard. Comply with one of the advanced efficiency levels indicated below.

A5.203.1.2.1 Tier 1. Buildings complying with the first level of advanced energy efficiency shall have an Energy Budget that is no greater than indicated below, depending on the type of energy systems included in the building project. If the newly constructed building, addition or alteration does not include indoor lighting or mechanical systems, then no additional performance requirements above Title 24, Part 6 are required.

1. For building projects that include indoor lighting or mechanical systems, but not both: No greater than 95 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building as calculated by compliance software certified by the Energy Commission.
2. For building projects that include indoor lighting and mechanical systems: No greater than 90 percent of the Title 24, Part 6 Energy Budget for the Proposed Design Building as calculated by compliance software certified by the Energy Commission.

A5.203.1.2.2 Tier 2. Buildings complying with the second level of advanced energy efficiency shall have an Energy Budget that is no greater than indicated below, depending on the type of energy systems included in the building project. If the newly constructed building, addition or alteration does not include indoor lighting or mechanical systems, then no additional performance requirements above Title 24, Part 6 are required.

1. For building projects that include indoor lighting or mechanical systems, but not both: No greater

than 90 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building as calculated by compliance software certified by the Energy Commission.

2. For building projects that include indoor lighting and mechanical systems: No greater than 85 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building as calculated by compliance software certified by the Energy Commission.

Note: For Energy Budget calculations, high-rise residential and hotel/motel buildings are considered nonresidential buildings.

SECTION A5.211
RENEWABLE ENERGY

A5.211.1 On-site renewable energy. Use on-site renewable energy sources such as solar, wind, geothermal, low-impact hydro, biomass and bio-gas for at least 1 percent of the electric power calculated as the product of the building service voltage and the amperage specified by the electrical service overcurrent protection device rating or 1kW, (whichever is greater), in addition to the electrical demand required to meet 1 percent of the natural gas and propane use. The building project's electrical service overcurrent protection device rating shall be calculated in accordance with the 2013 *California Electrical Code*. Natural gas or propane use is calculated in accordance with the 2013 *California Plumbing Code*.

A5.211.1.1 Documentation. Using a calculation method approved by the California Energy Commission, calculate the renewable on-site energy system to meet the requirements of Section A5.211.1, expressed in kW. Factor in net-metering, if offered by local utility, on an annual basis.

A5.211.1.2 Grid neutral. Using the proposed annual electrical energy budget (kWh) as set forth by the Title 24, Part 6 of the *California Energy Code* and adding the additional annual energy consumption estimated for the appliances and equipment not covered by Title 24, Part 6 (e.g., kitchen and laundry equipment and appliances, swimming pool heaters and circulation pumps, industrial and art equipment, computers, etc.) calculate the site's annual electrical production and consumption ratio by dividing the proposed annual renewable electrical energy production (kWh) by the proposed annual electrical energy budget (kWh). The estimated plug loads shall be included in the annual electrical energy budget (kWh).

Exceptions:

1. Existing buildings with one year of occupancy or greater shall use actual data of the annual electrical energy consumption of the facilities. Using the data logged for the facilities, calculate the site's annual electrical production and consumption ration by dividing the proposed annual renewable electrical energy production (kWh) by the actual annual electrical energy consumption (kWh).
2. The annual renewable electrical energy can be renewable energy produced off-site on a remote property owned by the applicant.

A5.211.1.2.1 35 percent grid neutral. A site's annual electrical production and consumption ratio is equal or greater than 0.35.

A5.211.1.2.2 75 percent grid neutral. A site's annual electrical production and consumption ratio is equal or greater than 0.75.

A5.211.1.2.3 Grid neutral. A site's annual electrical production and consumption ratio is equal or greater than 1.

A5.211.3 Green power. If offered by local utility provider, participate in a renewable energy portfolio program that provides a minimum of 50-percent electrical power from renewable sources. Maintain documentation through utility billings.

SECTION A5.212
ELEVATORS, ESCALATORS AND OTHER EQUIPMENT

A5.212.1 Elevators and escalators. In buildings with more than one elevator or two escalators, provide systems and controls to reduce the energy demand of elevators and escalators as follows. Document systems operation and controls in the project specifications and commissioning plan.

A5.212.1.1 Elevators. Traction elevators shall have a regenerative drive system that feeds electrical power back into the building grid when the elevator is in motion.

A5.212.1.1.1 Car lights and fan. A parked elevator shall turn off its car lights and fan automatically until the elevator is called for use.

A5.212.1.2 Escalators. An escalator shall have a VVVF motor drive system that is fully regenerative when the escalator is in motion.

A5.212.1.4 Controls. Controls that reduce energy demand shall meet requirements of CCR, Title 8, Chapter 4, Subchapter 6 and shall not interrupt emergency operations for elevators required in CCR, Title 24, Part 2, California Building Code.

SECTION A5.213
ENERGY EFFICIENT STEEL FRAMING

A5.213.1 Steel framing. Design steel framing for maximum energy efficiency. Techniques for avoiding thermal bridging in the envelope include:

1. Exterior rigid insulation;
2. Punching large holes in the stud web without affecting the structural integrity of the stud;
3. Spacing the studs as far as possible while maintaining the structural integrity of the structure; and
4. Detailed design of intersections of wall openings and building intersections of floors, walls and roofs.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.3 – WATER EFFICIENCY AND CONSERVATION

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)	X																		
Adopt only those sections that are listed below																			
Chapter/Section																			
COMPACT DISHWASHER	X																		
STANDARD DISHWASER	X																		
A5.303.2.3.4	X																		
A5.305.1	X																		
A5.305.2	X																		

APPENDIX A5

NONRESIDENTIAL VOLUNTARY MEASURES

Division A5.3 – WATER EFFICIENCY AND CONSERVATION

SECTION A5.301 GENERAL

A5.301.1 Scope.

SECTION A5.302 DEFINITIONS

A5.302.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

COMPACT DISHWASHER.

HYDROZONE.

LANDSCAPE (PLANT) COEFFICIENT [*KL*].

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE.

PLANTS.

POTABLE WATER.

RECYCLED WATER.

REFERENCE EVAPOTRANSPIRATION (ET_0).

STANDARD DISHWASHER.

SUBMETER.

SECTION A5.303 INDOOR WATER USE

A5.303.2.3.1 Tier 1 – 30-percent savings. [BSC] A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 30 percent shall be provided. The reduction shall be based on the maximum allowable water use per plumbing fixture and fitting as required by the *California Building Standards Code*. The 30-percent reduction in potable water use shall be demonstrated by one of the following methods:

1. Prescriptive method. Each plumbing fixture and fitting shall not exceed the maximum flow rate at greater than or equal to 30-percent reduction as specified in Table A5.303.2.1, or
2. Performance method. A calculation demonstrating a 30-percent reduction in the building "water use baseline" as established in Table A5.303.2.2 shall be provided.

A5.303.2.3.2 Tier 2 – 35-percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 35 percent shall be provided. A calculation demonstrating a 35-percent reduction in the building "water use baseline" as established in Table A5.303.2.2 shall be provided.

TABLE A5.303.2.2
WATER USE BASELINE[3]

FIXTURE TYPE	BASELINE FLOW RATE	DURATION	DAILY USES	OCCUPANTS[2]
Showerheads	2.0 gpm @ 80 psi	5 min.	1	X[2a]
Lavatory faucets nonresidential	.5 gpm @ 60 psi	.25 min.	3	X
Kitchen faucets	2.6 gpm @ 60 psi	4 min.	1	X[2b]
Replacement aerators	2.6 gpm @ 60 psi			X
Wash fountains	2.2 [rim space (in.)/20 gpm @ 60 psi]			X
Metering faucets	0.25 gallons/cycle	.25 min.	3	X
Metering faucets for wash fountains	.25 [rim space (in.)/20 gpm @ 60 psi]	.25 min.	1 male[1] 3 female	X
Gravity tank type water closets	1.28 gallons/flush	1 flush	1 male[1] 3 female	X
Flushometer tank water closets	1.28 gallons/flush	1 flush	1 male[1] 3 female	X
Flushometer valve water closets	1.28 gallons/flush	1 flush	1 male[1] 3 female	X
Electromechanical hydraulic water closets	1.28 gallons/flush	1 flush	1 male[1] 3 female	X
Urinals	0.5 gallons/flush	1 flush	2 male	X

1. The daily use number shall be increased to three if urinals are not installed in the room.
2. Refer to Table A, Chapter 4, 2013 *California Plumbing Code*, for occupant load factors.
   a. Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.
   b. Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
3. Use worksheet WS-1 to calculate baseline water use.

A5.303.2.3.3 40-percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 40 percent shall be provided. A calculation demonstrating a 40 percent reduction in the building "water use baseline" as established in Table A5.303.2.2 shall be provided.

A5.303.2.3.4 Nonpotable water systems for indoor use. Utilizing nonpotable water systems (such as captured rainwater, treated graywater and recycled water) intended to supply water closets, urinals, and other allowed uses, may be used in the calculations demonstrating the 30-, 35- or 40-percent reduction. The nonpotable water systems shall comply with the current edition of the *California Plumbing Code.*

A5.303.3 Appliances and fixtures for commercial application. Appliances and fixtures shall meet the following:

1. Clothes washers shall have a maximum Water Factor (WF) that will reduce the use of water by 10 percent below the California Energy Commissions' WF standards for commercial clothes washers located in Title 20 of the *California Code of Regulations.*
2. Dishwashers shall meet the following water use standards:
   a. Residential—ENERGY STAR.
      i. Standard Dishwashers – 4.25 gallons per cycle.
      ii. Compact Dishwashers – 3.5 gallons per cycle.
   b. Commercial—refer to Table A5.303.3.
3. Ice makers shall be air cooled.
4. Food steamers shall be connectionless or boilerless.
5. [BSC] The use and installation of water softeners that discharge to the community sewer system may be limited or prohibited by local agencies if certain conditions are met.
6. Combination ovens shall not consume more than 10 gph (38 L/h) in the full operational mode.
7. Commercial pre-rinse spray valves manufactured on or after January 1, 2006 shall function at equal to or less than 1.6 gpm (0.10 L/s) at 60 psi (414 kPa) and
   a. Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate.
   b. Be equipped with an integral automatic shutoff.
   c. Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gpm (0.08 L/s) or less.

TABLE A5.303.3
COMMERCIAL DISHWASHER WATER USE

TYPE	HIGH-TEMPERATURE—MAXIMUM GALLONS PER RACK	CHEMICAL—MAXIMUM GALLONS PER RACK
Conveyer	0.70 (2.6 L)	0.62 (4.4 L)
Door	0.95 (3.6 L)	1.16 (2.6 L) [BSC] 2.26 (8.6 L) [DSA-SS]
Undercounter	0.90 (3.4 L)	0.98 (3.7 L)

A5.303.5 Dual plumbing. New buildings and facilities shall be dual plumbed for potable and recycled water systems for toilet flushing when recycled water is available as determined by the enforcement authority.

SECTION A5.304
OUTDOOR WATER USE

A5.304.1.1 Reserved.

A5.304.2.1 Outdoor potable water use. For new water service not subject to the provisions of *Water Code* Section 535, separate meters or submeters shall be installed for indoor and outdoor potable water use for landscaped areas

TABLE A5.303.2.3.1
FIXTURE FLOW RATES

FIXTURE TYPE	BASELINE FLOW-RATE[2]	MAXIMUM FLOW RATE AT 30 PERCENT REDUCTION
Showerheads	2.0 gpm @ 80 psi	1.8 gpm @ 80 psi
Lavatory faucets nonresidential	0.5 gpm @ 60 psi	0.35 gpm @ 60 psi
Kitchen faucets	2.2 gpm @ 60 psi	1.6 gpm @ 60 psi
Wash fountains	2.2 [rim space(in.)/20 gpm @ 60 psi]	1.6 [rim space(in.)/20 gpm @ 60 psi]
Metering faucets	0.25 gallon/cycle	0.18 gallons/cycle
Metering faucets for wash fountains	0.25 [rim space(in.)/20 gpm @ 60 psi]	0.18 [rim space(in.)/20 gpm @ 60 psi]
Gravity tank type water closets	1.28 gallons/flush	1.12 gallons/flush[1]
Flushometer tank water closets	1.28 gallons/flush	1.12 gallons/flush[1]
Flushometer valve water closets	1.28 gallons/flush	1.12 gallons/flush[1]
Electromechanical hydraulic water closets	1.28 gallons/flush	1.12 gallons/flush[1]
Urinals	0.5 gallons/flush	0.5 gallons/flush

1. Includes water closets with an effective flush rate of 1.12 gallons or less when tested per ASME A 112.19.2 and ASME A 112.19.14.
2. See Table 5.503.2.3 for additional notes and references.
3. Where complying faucets are unavailable, aerators rated at 0.35 gpm or other means may be used to achieve reduction.

of at least 500 square feet but not more than 1,000 square feet (the level at which Section 5.304.2 applies).

A5.304.4 Potable water reduction. Provide water efficient landscape irrigation design that reduces the use of potable water beyond the initial requirements for plant installation and establishment in accordance with Section A5.304.4.1 or A5.304.4.2. Calculations for the reduction shall be based on the water budget developed pursuant to Section 5.304.1.

A5.304.4.1 Tier 1. Reduce the use of potable water to a quantity that does not exceed 60 percent of ETo times the landscape area.

A5.304.4.2 Tier 2. Reduce the use of potable water to a quantity that does not exceed 55 percent of ETo times the landscape area.

Note: Methods used to accomplish the requirements of this section must be designed to the requirements of the *California Building Standards Code* and shall include, but not be limited to, the following:

1. Plant coefficient.
2. Irrigation efficiency and distribution uniformity.
3. Use of captured rainwater.
4. Use of recycled water.
5. Water treated for irrigation purposes and conveyed by a water district or public entity.
6. Use of graywater.

A5.304.4.3 Verification of compliance. A calculation demonstrating the applicable potable water use reduction required by this section shall be provided.

A5.304.5 Potable water elimination. Provide a water efficient landscape irrigation design that eliminates the use of potable water beyond the initial requirements for plant installation and establishment. Methods used to accomplish the requirements of this section must be designed to the requirements of the *California Building Standards Code* and shall include, but not be limited to, the following:

1. Plant coefficient.
2. Irrigation efficiency and distribution uniformity.
3. Use of captured rainwater.
4. Use of recycled water.
5. Water treated for irrigation purposes and conveyed by a water district or public entity.
6. Use of graywater.

A5.304.6 Restoration of areas disturbed by construction. Restore all landscape areas disturbed during construction by planting with local adaptive and/or noninvasive vegetation.

A5.304.7 Previously developed sites. On previously developed or graded sites, restore or protect at least 50 percent of the site area with adaptive and/or noninvasive vegetation. Projects complying with Section A5.106.3, Item 3 may apply vegetated roof surface to this calculation if the roof plants meet the definition of adaptive and noninvasive.

Exception: Area of the building footprint is excluded from the calculation.

A5.304.8 Graywater irrigation system. Install a graywater collection system for onsite subsurface irrigation using graywater collected from bathtubs, showers, bathroom wash basins and laundry water. See *California Plumbing Code*.

SECTION A5.305
WATER REUSE

A5.305.1 Nonpotable water systems. Nonpotable water systems for indoor and outdoor use shall comply with the current edition of the *California Plumbing Code*.

A5.305.2 Irrigation systems. Irrigation systems regulated by a local water efficient landscape ordinance or by the California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO) shall use recycled water.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below	X																		
Chapter/Section																			
A5.401.1	X																		
A5.402.1 Definitions	X																		
A5.402.1 EMBODIED ENERGY	X																		
A5.402.1 LIFE CYCLE ASSESSMENT	X																		
A5.402.1 OVE	X																		
A5.402.1 POSTCONSUMER CONTENT	X																		
A5.402.1 PRECONSUMER (or POSTINDUSTRIAL) CONTENT	X																		
A5.402.1 RECYCLED CONTENT	X																		
A5.402.1 RECYCLED CONTENT VALUE (RCV)	X																		
A5.404 and subsections	X																		
A5.405 and subsections	X																		
A5.406.1	X																		
A5.406.1.1	X																		
A5.406.1.2	X																		
A5.406.1.3	X																		
A5.408.3.1	X																		
A5.408.3.1.1	X																		
A5.408.3.1.2	X																		
A5.409 and subsections	X																		
A5.410.3 and subsections							X												
A5.410.4 and subsections							X												

APPENDIX A5

NONRESIDENTIAL VOLUNTARY MEASURES

Division A5.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION A5.401 GENERAL

A5.401.1 Scope. The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through reuse of existing building stock and materials; use of recycled, regional, rapidly renewable and certified wood materials; and employment of techniques to reduce pollution through recycling of materials.

SECTION A5.402 DEFINITIONS

A5.402.1 Definitions. The following terms are defined in Chapter 2.

BUILDING COMMISSIONING.

EMBODIED ENERGY.

EUTROPHICATION.

LIFE CYCLE ASSESSMENT (LCA).

LIFE CYCLE INVENTORY (LCI).

OVE.

POSTCONSUMER CONTENT.

PRECONSUMER (or POSTINDUSTRIAL) CONTENT.

RECYCLED CONTENT.

RECYCLED CONTENT VALUE (RCV).

SECTION A5.403 FOUNDATION SYSTEMS (Reserved)

SECTION A5.404 EFFICIENT FRAMING TECHNIQUES

A5.404.1 Wood framing. Employ advanced wood framing techniques or OVE, as recommended by the U.S. Department of Energy's Office of Building Technology, State and Community Programs and as permitted by the enforcing agency.

A5.404.1.1 Structural or fire-resistance integrity. The OVE selected shall not conflict with structural framing methods or fire-rated assemblies required by the *California Building Code.*

A5.404.1.2 Framing specifications. Advanced framing techniques include the following:

1. Building design using 2-foot modules;
2. Spacing wall studs up to 24 inches on center;
3. Spacing floor and roof framing members up to 24 inches on center;
4. Using 2-stud corner framing and drywall clips or scrap lumber for drywall backing;
5. Eliminating solid headers in non-load-bearing walls;
6. Using in-line framing, aligning floor, wall and roof framing members vertically for direct transfer of loads; and
7. Using single lumber headers and top plates where appropriate.

Note: Additional information can be obtained from the U.S. DOE Energy Efficiency and Renewable Energy (EERE) website.

SECTION A5.405 MATERIAL SOURCES

A5.405.1 Regional materials. Compared to other products in a given product category, select building materials or products for permanent installation on the project that have been harvested or manufactured in California or within 500 miles of the project site.

1. For those materials locally manufactured, select materials manufactured using low embodied energy or those that will result in net energy savings over their useful life.
2. Regional materials shall make up at least 10 percent, based on cost, of total materials value.
3. If regional materials make up only part of a product, their values are calculated as percentages based on weight.
4. Provide documentation of the origin, net projected energy savings and value of regional materials.

A5.405.2 Bio-based materials. Select bio-based building materials and products made from solid wood, engineered wood, bamboo, wool, cotton, cork, straw, natural fibers, products made from crops (soy-based, corn-based) and other bio-based materials with at least 50-percent bio-based content.

A5.405.2.1 Certified wood. Certified wood is an important component of green building strategies and the California Building Standards Commission will continue to develop a standard through the next code cycle.

A5.405.2.2 Rapidly renewable materials. Use materials made from plants harvested within a ten-year cycle for at least 2.5 percent of total materials value, based on estimated cost.

A5.405.3 Reused materials. Use salvaged, refurbished, refinished or reused materials for a minimum of 5 percent of the

total value, based on estimated cost of materials on the project. Provide documentation as to the respective values.

Note: Sources of some reused materials can be found at CalRecycle. See also Appendix A5, Division A5.1, Section A5.105.1 for on-site materials reuse.

> **A5.405.4 Recycled content.** Use materials, equivalent in performance to virgin materials with a total (combined) recycled content value (RCV) of:

Tier 1 [BSC]. Recycled content. The RCV shall not be less than 10 percent of the total material cost of the project.

Required Total RCV (dollars) =
Total Material Cost (dollars) × 10 percent **(Equation A5.4-1)**

Tier 2 [BSC]. The RCV shall not be less than 15 percent of the total material cost of the project.

Required Total RCV (dollars) =
Total Material Cost (dollars) × 15 percent **(Equation A5.4-2)**

For the purposes of this section, materials used as components of the structural frame shall not be used to calculate recycled content. The structural frame includes the load bearing structural elements such as wall studs, plates, sills, columns, beams, girders, joists, rafters and trusses.

Notes:

1. Sample forms which allow user input and automatic calculation are located at www.hcd.ca.gov/CALGreen.html and may be used to simplify documenting compliance with this section and for calculating recycled content value of materials or assembly products.
2. Sources and recycled content of some recycled materials can be obtained from CalRecycle if not provided by the manufacturer.

A5.405.4.1 Total material cost. Total material cost is the total estimated or actual cost of materials and assembly products used in the project. The required total recycled content value for the project (in dollars) shall be determined by Equation A5.4-1 or A5.4-2.

Total material cost shall be calculated by using one of the methods specified below:

1. **Simplified method.** To obtain the total cost of the project multiply the square footage of the structure by the square foot valuation established by the enforcing agency. The total material cost is 45 percent of the total cost of the project. Use Equations A5.4-3A or A5.4-3B to determine total material costs using the simplified method.

   Total material costs =

   Project square footage × square foot valuation × 45 percent **(Equation A5.4-3A)**

   Total estimated or actual cost of project × 45 percent **(Equation A5.4-3B)**

2. **Detailed method.** To obtain the total cost of the project, add the estimated and/or actual costs of materials used for the project including the structure (steel, concrete, wood or masonry); the enclosure (roof, windows, doors and exterior walls); the interior walls, ceilings and finishes (gypsum board, ceiling tiles, etc.). The total estimated and/or actual costs shall not include fees, labor and installation costs, overhead, appliances, equipment, furniture or furnishings.

A5.405.4.2 Determination of total recycled content value (RCV). Total RCV may be determined either by dollars or percentage as noted below.

1. **Total recycled content value for the project (in dollars).** This is the sum of the recycled content value of the materials and/or assemblies considered and shall be determined by Equation A5.4-4. The result of this calculation may be directly compared to Equations A5.4-1 and A5.4-2 to determine compliance with Tier 1 or Tier 2 prerequisites.

   Total Recycled Content Value (dollars) =
   $(RCV_M + RCV_A)$ **(Equation A5.4-4)**

2. **Total recycled content value for the project (by percentage).** This is expressed as a percentage of the total material cost and shall be determined by Equations A5.4-4 and A5.4-5. The result of this calculation may be directly compared for compliance with Tier 1 (10 percent) or Tier 2 (15 percent) prerequisites.

   Total Recycled Content Value (percent) =

   [Total Recycled Content Value (dollars) ÷ Total Material Cost (dollars)] × 100 **(Equation A5.4-5)**

A5.405.4.3 Determination of recycled content value of materials (RCV_M). The recycled content value of each material (RCV_M) is calculated by multiplying the cost of material, as defined by the recycled content. See Equations A5.4-6 and A5.4-7.

RCV_M (dollars) =
Material cost (dollars) × RC_M (percent) **(Equation A5.4-6)**

RC_M (percent) = Postconsumer content percentage + ($^1/_2$) Preconsumer content percentage **(Equation A5.4-7)**

Notes:

1. If the postconsumer and preconsumer recycled content is provided in pounds, Equation A5.4-7 may be used, but the final result (in pounds) must be multiplied by 100 to show RC_M as a percentage.
2. If the manufacturer does not separately identify the pre-consumer and post-consumer recycled content of a material but reports it as a total single percentage, one half of the total shall be considered preconsumer and one half shall be considered postconsumer recycled material.

A5.405.4.4 Determination of recycled content value of assemblies – (RCV_A). Recycled content value of assemblies is calculated by multiplying the total cost of assembly by the total recycled content of the assembly (RC_A), and shall be determined by Equation A5.4-8.

RCV_A (dollars) = Assembly cost (dollars) × Total RC_A (percent) **(Equation A5.4.8)**

If not provided by the manufacturer, Total RC_A (percent) is the sum (Σ) of the Proportional Recycled Content (PRC_M) of each material in the assembly. RC_A shall be determined by Equation A4.4-9.

$$RC_A = \Sigma PRC_M \quad \textbf{(Equation A5.4-9)}$$

PRC_M of each material may be calculated by one of two methods using the following formulas:

Method 1: Recycled content (Postconsumer and Preconsumer) of each material provided in percentages

PRC_M (percent) = Weight of material (percent) × RC_M (percent) **(Equation A5.4-10)**

Weight of material (percent) = [Weight of material (lbs) ÷ Weight of assembly (lbs)] × 100 **(Equation A5.4-11)**

RC_M (percent) = Postconsumer content percentage + ($^1/_2$) Preconsumer content percentage **(See Equation A5.4-7)**

Method 2: Recycled content (Postconsumer and Preconsumer) provided in pounds

PRC_M (percent) = [RC_M (lbs) Weight of material (lbs)] × 100 **(Equation A5.4-12)**

RC_M (lbs) = Postconsumer content (lbs) + ($^1/_2$) Preconsumer content (lbs) **(Equation A5.4-13)**

Note: If the manufacturer does not separately identify the preconsumer and postconsumer recycled content of a material but reports it as a total single percentage, one half of the total shall be considered preconsumer and one half shall be considered postconsumer recycled material.

A5.405.4.5 Alternate method for concrete. When Supplementary Cementitious Materials (SCMs), such as fly ash or ground blast furnace slag cement, are used in concrete, an alternate method of calculating and reporting recycled content in concrete products shall be permitted. When determining the recycled content value, the percent recycled content shall be multiplied by the cost of the cementitious materials only, not the total cost of the concrete.

A5.405.5 Cement and concrete. Use cement and concrete made with recycled products and complying with the following sections.

A5.405.5.1 Cement. Cement shall comply with one of the following standards:

1. Portland cement shall meet ASTM C 150, *Standard Specification for Portland Cement.*
2. Blended cement shall meet ASTM C 595, Standard Specification for Blended Hydraulic Cement or ASTM C 1157, *Standard Performance Specification for Hydraulic Cement.*
3. Other Hydraulic Cements shall meet ASTM C 1157, *Standard Performance Specification for Hydraulic Cement.*

A5.405.5.2 Concrete. Unless otherwise directed by the Engineer of Record, use concrete manufactured with cementitious materials in accordance with Sections A5.405.5.2.1 and A5.405.5.2.1.1, as approved by the enforcing agency.

A5.405.5.2.1 Supplementary cementitious materials (SCM). Use concrete made with one or more supplementary cementitious materials (SCM) conforming to the following standards:

1. Fly ash conforming to ASTM C 618, *Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.*
2. Slag cement (GGBFS) conforming to ASTM C 989, *Specification for Use in Concrete and Mortars.*
3. Silica fume conforming to ASTM C 1240, *Specification for Silica Fume Used in Cementitious Mixtures.*
4. Natural pozzolan conforming to ASTM C 618, *Specification for Coal Fly Ash* and Raw or Calcined Natural Pozzolan for Use in Concrete.
5. Blended supplementary cementitious materials conforming to ASTM C 1697, Standard Specification for Blended Supplementary Cementitious Materials. The amount of each SCM in the blend will be used separately in calculating Equation A5.4-1. If Class C fly ash is used in the blend, it will be considered to be "SL" for the purposes of satisfying the equation.
6. Ultra-fine fly ash (UFFA) conforming to ASTM C 618, *Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete* and the following chemical and physical requirements:

Chemical Requirements	Percent
Sulfur Trioxide (SO_3)	1.5 max.
Loss on ignition	1.2 max.
Available Alkalies (as Na_2O) equivalent	1.5 max.
Physical Requirements	**Percent**
Particle size distribution	
Less than 3.5 microns	50
Less than 9.0 microns	90
Strength Activity Index with portland cement	
7 days	95 (minimum % of control)
28 days	110 (minimum % of control)
Expansion at 16 days when testing job materials in conformance with ASTM C 1567*	0.10 max.

* In the test mix, cement shall be replaced with at least 12% UFFA by weight.

7. Metakaolin conforming to ASTM C 618, *Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete, the following chemical and physical requirements:*

Chemical Requirements	Percent
Silicon Dioxide (SiO_2) + Aluminum Oxide (Al_2O_3)	92.0 min.
Calcium Oxide (CaO)	1.0 max.
Sulfur Trioxide (SO_3)	1.0 max.
Loss on ignition	1.2 max.
Available Alkalies (as Na_2O) equivalent	1.0 max.
Physical Requirements	**Percent**
Particle size distribution Less than 45 microns	95
Strength Activity Index with portland cement 7 days 28 days	100 (minimum % of control) 100 (minimum % of control)

8. Other materials with comparable or superior environmental benefits, as approved by the Engineer of Record and enforcing authority.

A5.405.5.2.1.1 Mix design equation. Use any combination of one or more SCM, satisfying Equation A5.4-14. When ASTM C 595 or ASTM C 1157 cement is used, the amount of SCM in these cements shall be used in calculating Equation A5.4-14.

Exception: Minimums in mix designs approved by the Engineer of Record may be lower where high early strength is needed for concrete products or to meet an accelerated project schedule.

$$F/25 + SL/50 + UF/12 \geq 1 \qquad \textbf{(Equation A5.4-14)}$$

where:

F = Fly ash, natural pozzolan or other approved SCM as a percent of total cementitious material for concrete on the project.

SL = GGBFS, as a percent of total cementitious material for concrete on the project.

UF = Silica fume, metakaolin or UFFA, as a percent of total cementitious material for concrete on the project.

A5.405.5.3 Additional means of compliance. Any of the following measures shall be permitted to be employed for the production of cement or concrete, depending on their availability and suitability, in conjunction with Section A5.405.5.2.

A5.405.5.3.1 Cement. The following measures shall be permitted to be used in the manufacture of cement.

A5.405.5.3.1.1 Alternative fuels. The use of alternative fuels where permitted by state or local air quality standards.

A5.405.5.3.1.2 Alternative power. Alternate electric power generated at the cement plant and/or green power purchased from the utility meeting the requirements of Section A5.211.

A5.405.5.3.2 Concrete. The following measures shall be permitted to be used in the manufacture of concrete.

A5.405.5.3.2.1 Alternative energy. Renewable or alternative energy meeting the requirements of Section A5.211.

A5.405.5.3.2.2 Recycled aggregates. Concrete made with one or more of the following materials:

1. Blast furnace slag as a lightweight aggregate in unreinforced concrete.
2. Recycled concrete that meets grading requirements of ASTM C 33, *Standard Specification for Concrete Aggregates.*
3. Other materials with comparable or superior environmental benefits, as approved by the engineer and enforcing authority.

A5.405.5.3.2.3 Mixing water. Water recycled by the local water purveyor or water reclaimed from manufacturing processes and conforming to ASTM C 1602, Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.

A5.405.5.3.2.4 High strength concrete. Concrete elements designed to reduce their total size compared to standard 3,000 psi concrete, thereby reducing the total volume of cement, aggregate and water used on the project, as approved by the Engineer of Record.

SECTION A5.406
ENHANCED DURABILITY AND REDUCED MAINTENANCE

A5.406.1 Choice of materials. Compared to other products in a given product category, choose materials proven to be characterized by one or more of the following.

A5.406.1.1 Service life. Select materials for longevity and minimal deterioration under conditions of use.

A5.406.1.2 Reduced maintenance. Select materials that require little, if any, finishing. For those with surface protection, choose materials that do not require frequent applications of toxic or malodorous finishes.

A5.406.1.3 Recyclability. Select materials that can be reused or recycled at the end of their service life in the project. <

SECTION A5.408
CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

A5.408.3.1 Enhanced construction waste reduction – Tier 1. Divert to recycle or salvage at least 65 percent of nonhazardous construction and demolition waste generated at the site.

A5.408.3.1.1 Enhanced construction waste reduction – Tier 2 [BSC]. Divert to recycle or salvage at least 80 <

percent of nonhazardous construction and demolition waste generated at the site.

A5.408.3.1.2 Verification of compliance. A copy of the completed waste management report or documentation of certification of the waste management company utilized shall be provided.

Exceptions:

1. Excavated soil and land-clearing debris.
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets.

SECTION A5.409
LIFE CYCLE ASSESSMENT

A4.409.1 General. Life cycle assessment shall be ISO 14044 compliant. The service life of the building and materials assemblies shall not be less than 60 years unless designated in the construction documents as having a shorter service life as approved by the enforcing agency.

A5.409.2 Whole building life cycle assessment. Conduct a whole building life assessment, including operating energy, showing that the building project achieves at least a 10 percent improvement for at least three of the impacts listed in Section A5.409.2.2, one of which shall be climate change, compared to a reference building of similar size, function, complexity and operating energy performance, and meeting the 2013 *California Energy Code* at a minimum.

A5.409.2.1 Building components. The building envelope, structural elements, including footings and foundations, interior ceilings, walls, and floors; and exterior finishes shall be considered in the assessment.

Exceptions:

1. Plumbing, mechanical and electrical systems and controls; fire and smoke detection and alarm systems and controls; and conveying systems.
2. Interior finishes are not required to be included.

Notes:

1. Software for calculating whole building life cycle assessments includes those found at the Athena Institute website (Impact Estimator software), the PE International website (GaBi software), and the PRe Consultants website (SimaPro software).
2. Interior finishes, if included, may be assessed using the NIST BEES tool.

A5.409.2.2 Impacts to be considered. Select from the following impacts in the assessment:

1. Climate change (greenhouse gases).
2. Fossil fuel depletion.
3. Stratospheric ozone depletion.
4. Acidification of land and water sources.
5. Eutrophication.
6. Photochemical oxidants (smog).

A5.409.3 Materials and system assemblies. If whole building analysis of the project is not elected, select a minimum of 50 percent of materials or assemblies based on life cycle assessment of at least three of the impacts listed in Section A5.409.2.2, one of which shall be climate change.

Note: Software for calculating life cycle assessments for assemblies and materials may be found at the Athena Institute web site and the NIST BEES web site.

A5.409.4 Substitution for prescriptive standards. Performance of a life cycle assessment completed in accordance with Section A5.409.2 may be substituted for other prescriptive Material Conservation and Resource Efficiency provisions of Division A5.4, including those made mandatory through local adoption of Tier 1 or Tier 2 in Division A5.6.

A5.409.5 Verification of compliance. Documentation of compliance shall be provided as follows:

1. The assessment is performed in accordance with ISO 14044.
2. The project meets the requirements of other parts of Title 24.
3. A copy of the analysis shall be made available to the enforcement authority.
4. A copy of the analysis and any maintenance or training recommendations shall be included in the operation and maintenance manual.

SECTION A5.410
BUILDING MAINTENANCE AND OPERATION

A5.410.3 Commissioning [DSA-SS]. For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements. Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity. Commissioning requirements shall include:

1. Owner's or owner repesentative's project requirements.
2. Basis of design.
3. Commissioning measures shown in the construction documents.
4. Commissioning plan.
5. Functional performance testing.
6. Documentation and training.
7. Commissioning report.

Exceptions:

1. Dry storage warehouses of any size.

2. Areas under 10,000 square feet used for offices or other conditioned accessory spaces within dry storage warehouses.
3. Tenant improvements under 10,000 square feet as described in Section 303.1.1.

All building operating systems covered by Title 24, Part 6, as well as process equipment and controls and renewable energy systems shall be included in the scope of the commissioning requirements.

A5.410.3.1 Owner's or owner representative's Project Requirements (OPR). The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins. This documentation shall include the following:

1. Environmental and sustainability goals.
2. Energy efficiency goals.
3. Indoor environmental quality requirements.
4. Project program, including facility functions and hours of operation, and need for after hours operation.
5. Equipment and systems expectations.
6. Building occupant and operation and maintenance O&M personnel expectations.

A5.410.3.2 Basis of Design (BOD). A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project. The Basis of Design document shall cover the following systems:

1. Heating, ventilation, air conditioning (hvac) systems and controls.
2. Indoor lighting system and controls.
3. Water heating system.
4. Renewable energy systems.
5. Landscape irrigation systems.

A5.410.3.3 Commissioning plan. Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned. The commissioning plan shall include the following:

1. General project information.
2. Commissioning goals.
3. Systems to be commissioned. Plans to test systems and components shall include:
    a. An explanation of the original design intent.
    b. Equipment and systems to be tested, including the extent of tests.
    c. Functions to be tested.
    d. Conditions under which the test shall be performed.
    e. Measurable criteria for acceptable performance.
4. Commissioning team information.
5. Commissioning process activities, schedules and responsibilities. Plans for the completion of commissioning shall be included.

A5.410.3.4 Functional performance testing. Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized and include any readings and adjustments made.

A5.410.3.5 Documentation and training. A systems manual and systems operations training are required, including Occupational Safety and Health Act (OSHA) requirements in California Code of Regulations (CCR), Title 8, Section 5142, and other related regulations.

A5.410.3.5.1 Systems manual. Documentation of the operational aspects of the building shall be completed within the systems manual and delivered to the building owner or representative. The systems manual shall include the following:

1. Site information, including facility description, history and current requirements.
2. Site contact information.
3. Basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, site events log.
4. Major systems.
5. Site equipment inventory and maintenance notes.
6. A copy of all special inspection verifications required by the enforcing agency or this code.
7. Other resources and documentation, if applicable.

A5.410.3.5.2 Systems operations training. A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and documented in the commissioning report and shall include the following:

1. System/equipment overview (what it is, what it does and what other systems and/or equipment it interfaces).
2. Review and demonstration of servicing/preventive maintenance.
3. Review of the information in the systems manual.
4. Review of the record drawings on the system/equipment.

A5.410.3.6 Commissioning report. A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or representative.

A5.410.4 Testing and adjusting [DSA-SS]. Testing and adjusting of systems shall be required for buildings less than 10,000 square feet.

A5.410.4.1 Reserved.

A5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting and balancing shall include the following, as applicable to the project:

1. HVAC systems and controls.
2. Indoor and outdoor lighting and controls.
3. Water heating systems.
4. Renewable energy systems.
5. Landscape irrigation systems.

A5.410.4.3 Procedures. Perform testing and adjusting procedures in accordance with manufacturer's specifications and applicable national standards on each system.

A5.410.4.3.1 HVAC balancing. In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, balance the system in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards, the National Environmental Balancing Bureau Procedural Standards or Associated Air Balance Council National Standards or as approved by the enforcing agency.

A5.410.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.

A5.410.4.5 Operation and maintenance (O & M) manual. Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/warranties for each system. O & M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142 and other related regulations.

A5.410.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.

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CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.5 – ENVIRONMENTAL QUALITY

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency			HCD			DSA		OSHPD											
	BSC	SFM	1	2	1-AC	AC	SS	1	2	3	4	BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below	X																		
Chapter/Section																			
A5.501.1	X																		
A5.502.1 Definitions	X																		
A5.504.1	X																		
A5.504.1.1, Items 1 & 2	X																		
A5.504.1.2	X																		
A5.504.2	X																		
A5.504.2.1 and subsections	X																		
A5.504.4.5.1	X																		
A5.504.4.7	X																		
A5.504.4.7.1	X																		
A5.504.4.7.2	X																		
A5.504.4.8	X																		
A5.504.4.8.1	X																		
A5.504.4.8.2	X																		
A5.504.4.9	X																		
A5.504.4.9.1	X																		
A5.504.5	X																		
A5.504.5.1	X																		
A5.504.5.2	X																		
A5.504.5.3.1	X																		
A5.504.5.3.1.1	X																		
Table A5.504.8.5	X																		
A5.507.1 and subsections	X																		
A5.507.2	X																		
A5.507.3 and subsections	X																		
A5.507.5							X												
A5.508	X																		

APPENDIX A5

NONRESIDENTIAL VOLUNTARY MEASURES

Division A5.5 – ENVIRONMENTAL QUALITY

SECTION A5.501
GENERAL

A5.501.1 Scope. The provisions of this chapter shall outline means of reducing the quantity of air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of a building's installers, occupants and neighbors.

SECTION A5.502
DEFINITIONS

A5.502.1 Definitions. The following terms are defined in Chapter 2.

INTERIOR, BUILDING.

MERV. [BSC]

MULTI-OCCUPANT SPACES.

NO ADDED FORMALDEHYDE (NAF) BASED RESINS.

SINGLE OCCUPANT SPACES.

ULTRA-LOW EMITTING FORMALDEHYDE (ULEF) RESINS.

SECTION A5.504
POLLUTANT CONTROL

A5.504.1 Indoor air quality (IAQ) during construction. Maintain IAQ as provided in Sections A5.504.1.1 and A5.504.1.2.

A5.504.1.1 Temporary ventilation. Provide temporary ventilation during construction in accordance with Section 121 (Requirements for Ventilation) of the *California Energy Code*, CCR, Title 24, Part 6 and Chapter 4 of CCR, Title 8 and as follows:

1. Ventilation during construction shall be achieved through openings in the building shell using fans to produce a minimum of three air changes per hour.
2. If the building is occupied during demolition or construction, meet or exceed the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3.
3. The permanent HVAC system shall only be used during construction if necessary to condition the building within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30 percent based on ASHRAE 52.1- 1992. Replace all filters immediately prior to occupancy.
4. During dust-producing operations, protect supply and return HVAC system openings from dust.

A5.504.1.2 Additional IAQ measures. Employ additional measures as follows:

1. When using generators to generate temporary power, use generators meeting the requirements of CCR, Title 13, Chapter 9 or local ordinance, whichever is more stringent.
2. Protect on-site absorbent materials from moisture. Remove and replace any materials with evidence of mold, mildew or moisture infiltration.
3. Store odorous and high VOC-emitting materials off-site, without packaging, for a sufficient period to allow odors and VOCs to disperse.
4. When possible, once materials are on the jobsite, install odorous and high VOC-emitting materials prior to those that are porous or fibrous.
5. Clean oil and dust from ducts prior to use.

A5.504.2 IAQ postconstruction. After all interior finishes have been installed, flush out the building by supplying continuous ventilation with all air handling units at their maximum outdoor air rate and all supply fans at their maximum position and rate for at least 14 days.

1. During this time, maintain an internal temperature of at least 60°F and relative humidity no higher than 60 percent. If extenuating circumstances make these temperature and humidity limits unachievable, the flush-out may be conducted under conditions as close as possible to these limits, provided that documentation of the extenuating circumstances is provided in writing.
2. Occupancy may start after 4 days, provided flush-out continues for the full 14 days. During occupied times, the thermal comfort conditions of Title 24 must be met.
3. For buildings that rely on natural ventilation, exhaust fans and floor fans must be used to improve air mixing and removal during the 14-day flush-out and windows should remain open.
4. Do not "bake out" the building by increasing the temperature of the space.
5. If continuous ventilation is not possible, flush-out air must total the equivalent of 14 days of maximum outdoor air. The equivalent of 14 days of maximum outdoor air (the target air volume) shall be calculated by multiplying the maximum feasible air flow rate (in ft^3/m) by 14 days (20,160 minutes). The air volumes for each period of ventilation are then calculated and summed and the flush-out continues until the total equals the target air volume.

A5.504.2.1 IAQ testing. If the engineer determines that building flush-out pursuant to Section A5.504.2 is not feasible, a testing alternative may be employed after all interior finishes have been installed, using testing protocols recognized by the United States Environmental Protection Agency (U.S. EPA).

A5.504.2.1.1 Maximum levels of contaminants. Allowable levels of contaminant concentrations measured by testing shall not exceed the following:

1. Carbon Monoxide (CO): 9 parts per million, not to exceed outdoor levels by 2 parts per million;
2. Formaldehyde: 27 parts per billion;
3. Particulates (PM10): 50 micrograms per cubic meter;
4. 4-Phenylcyclohexene (4-PCH), if fabrics and carpets with styrene butadiene rubber (SBR) latex backing, are installed: 6.5 micrograms per cubic meter; and
5. Total Volatile Organic Compounds (TVOC): 300 micrograms per cubic meter.

A5.504.2.1.2 Test protocols. Testing of indoor air quality should include the following elements:

1. The contaminant sampling and averaging times and the measurement methods should be sufficient to achieve a Limit of Detection that is below the maximum allowable concentrations.
2. Testing should be conducted with the HVAC system operated at the minimum design outdoor air ventilation rate.
3. Air samplers and monitors should be located near likely sources of formaldehyde and other volatile organic compounds, at a height of 3 to 6 feet from the floor and well away from walls and air diffusers.
4. The test protocols should be justified with documentation to show that appropriate sampling methods and times were used.

A5.504.2.1.3 Noncomplying building areas. For each sampling area of the building exceeding the maximum concentrations specified in Section A5.504.2.1.1, flush out with outside air and retest samples taken from the same area. Repeat the procedures until testing demonstrates compliance.

Note: U.S. EPA-recognized testing protocols may be found on the Air Resources Board web site.

A5.504.4.5.1 No added formaldehyde. Use composite wood products approved by the California Air Resources Board (ARB) as no-added formaldehyde (NAF) based resins or ultra-low emitting formaldehyde (ULEF) resins.

Notes:

1. See Title 17, Section 93120.3(c) and (d), respectively.
2. Documentation must be provided verifying that materials are certified to meet the pollutant emission limits. A list of manufacturers and their NAF and ULEF certified materials is provided at: http://www.arb.ca.gov/toxics/compwood/naf_ulef/listofnaf_ulef.htm.

A5.504.4.7 Resilient flooring systems, Tier 1. [BSC] For 90 percent of floor area receiving resilient flooring, install resilient flooring that is:

1. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program;
2. Compliant with the 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 1.1, February 2010;
3. Defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on its High Performance Database; or
4. Compliant with CDPH criteria as certified under the Greenguard Children's & Schools Program.

A5.504.4.7.1 Resilient flooring systems, Tier 2. For 100 percent of floor area receiving resilient flooring, install resilient flooring that is:

1. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program;
2. Compliant with the 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 1.1, February 2010;
3. Defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on is High Performance Database; or
4. Compliant with CDPH criteria as certified under the Greenguard Children's & Schools Program.

Exception: Allowance may be permitted in Tier 2 for up to 5-percent specialty purpose flooring.

A5.504.4.7.2 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.

A5.504.4.8 Thermal insulation, Tier 1. [BSC] Comply with the following standards:

1. Chapters 12-13 (Standards for Insulating Material) in Title 24, Part 12, the *California Referenced Standards Code*,
2. The VOC-emission limits defined in 2009 CHPS criteria and listed on its High Performance Products Database.
3. California Department of Public Health 2010 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010 (also known as Specification 01350.)

A5.504.4.8.1 Thermal insulation, Tier 2 [BSC]. Thermal insulation, No-added Formaldehyde. Install thermal insulation which complies with Tier 1 plus does not contain any added formaldehyde.

A5.504.4.8.2 Verification of compliance. Documentation shall be provided verifying that thermal insulation materials meet the pollutant emission limits.

A5.504.4.9 Acoustical ceilings and wall panels. Comply with Chapter 8 in Title 24, Part 2, the *California Building Code* and with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database.

A5.504.4.9.1 Verification of compliance. Documentation shall be provided verifying that acoustical finish materials meet the pollutant emission limits.

Note: Products compliant with CHPS criteria certified under the Greenguard Children & Schools program may also be used.

A5.504.5 Hazardous particulates and chemical pollutants. Minimize and control pollutant entry into buildings and cross-contamination of regularly occupied areas.

A5.504.5.1 Entryway systems. Install permanent entryway systems measuring at least six feet in the primary direction of travel to capture dirt and particulates at entryways directly connected to the outdoors.

1. Qualifying entryways are those that serve as regular entry points for building users.
2. Acceptable entryway systems include, but are not limited to, permanently installed grates, grilles or slotted systems that allow cleaning underneath.
3. Roll-out mats are acceptable only when maintained regularly by janitorial contractors as documented in service contract or by in-house staff as documented by written policies and procedures.

A5.504.5.2 Isolation of pollutant sources. In rooms where activities produce hazardous fumes or chemicals, such as garages, janitorial or laundry rooms and copy or printing rooms, exhaust them and isolate them from their adjacent rooms.

1. Exhaust each space with no air recirculation in accordance with ASHRAE 62.1, Table 6-4 to create negative pressure with respect to adjacent spaces with the doors to the room closed.
2. For each space, provide self-closing doors and deck to deck partitions or a hard ceiling.
3. Install low-noise, vented range hoods for all cooking appliances and in laboratory or other chemical mixing areas.

A5.504.5.3.1 Filters, Tier 1. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air prior to occupancy that provides at least a Minimum Efficiency Reporting Value (MERV) of 11.

A5.504.5.3.1.1 Filters, Tier 2. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air prior to occupancy that provides at least a Minimum Efficiency Reporting Value (MERV) of 13.

SECTION A5.507
ENVIRONMENTAL COMFORT

A5.507.1 Lighting and thermal comfort controls. Provide controls in the workplace as described in Sections A5.507.1.1 and A5.507.1.2.

A5.507.1.1 Single-occupant spaces. Provide individual controls that meet energy use requirements in the *California Energy Code* in accordance with Sections A5.507.1.1.1 and A5.507.1.1.2.

A5.507.1.1.1 Lighting. Provide individual task lighting and/or daylighting controls for at least 90 percent of the building occupants.

A5.507.1.1.2 Thermal comfort. Provide individual thermal comfort controls for at least 50 percent of the building occupants.

1. Occupants shall have control over at least one of the factors of air temperature, radiant temperature, air speed and humidity as described in ASHRAE 55-2004.
2. Occupants inside 20 feet of the plane of and within 10 feet either side of operable windows can substitute windows to control thermal comfort. The areas of operable window must meet the requirements of Section 121 (Requirement for Ventilation) of the *California Energy Code.*

A5.507.1.2 Multi-occupant spaces. Provide lighting and thermal comfort system controls for all shared multi-occupant spaces, such as classrooms and conference rooms.

A5.507.2 Daylight. Provide daylit spaces as required for toplighting and sidelighting in the *California Energy Code.* In constructing a design, consider the following:

1. Use of light shelves and reflective room surfaces to maximize daylight penetrating the rooms
2. Means to eliminate glare and direct sun light, including through skylights
3. Use of photosensors to turn off electric lighting when daylight is sufficient
4. Not using diffuse daylighting glazing where views are desired

A5.507.3 Views. Achieve direct line of sight to the outdoor environment via vision glazing between 2 feet 6 inches and 7 feet 6 inches above finish floor for building occupants in 90 percent of all regularly occupied areas as demonstrated by plan view and section cut diagrams.

A5.507.3.1 Interior office spaces. Entire areas of interior office spaces may be included in the calculation if at least 75 percent of each area has direct line of sight to perimeter vision glazing.

A5.507.3.2 Multi-occupant spaces. Include in the calculation the square footage with direct line of sight to perimeter vision glazing.

Exceptions to Sections A5.507.2 and A5.507.3. Copy/printing rooms, storage areas, mechanical spaces, restrooms, auditoria and other intermittently or infrequently occupied spaces or spaces where daylight would interfere with use of the space.

A5.507.5 Acoustical control [DSA-SS]. Public Schools and Community Colleges: Unoccupied, furnished classrooms must have a maximum background noise level of no more than 45 dBA LAeq and a maximum (unoccupied, furnished) reverberation of 0.6-second time for classrooms with less than 10,000 cubic feet and a maximum (unoccupied, furnished) reverberation of 0.7-second time for classroom volumes with between 10,000 cubic feet and 20,000 cubic feet.

SECTION A5.508
OUTDOOR AIR QUALITY

A5.508.1.3 Hydrochlorofluorocarbons (HCFCs). Install HVAC and refrigeration equipment that do not contain HCFCs.

A5.508.1.4 Hydrofluorocarbons (HFCs). Install HVAC complying with either of the following:

1. Install HVAC, refrigeration and fire suppression equipment that do not contain HFCs or that do not contain HFCs with a global warming potential greater than 150.
2. Install HVAC and refrigeration equipment that limit the use of HFC refrigerant through the use of a secondary heat transfer fluid with a global warming potential no greater than 1.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.6 – VOLUNTARY TIERS

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter	X																		
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below																			
Chapter/Section																			

APPENDIX A5
NONRESIDENTIAL VOLUNTARY MEASURES

Division A5.6 – VOLUNTARY TIERS

SECTION A5.601
CALGreen TIER 1 AND TIER 2

A5.601.1 Scope. The measures contained in this appendix are not mandatory unless adopted by local government as specified in Section 101.7. The provisions of this section outline means of achieving enhanced construction or reach levels by incorporating additional green building measures for newly constructed nonresidential buildings as well as additions. In order to meet one of the tier levels designers, builders or property owners are required to incorporate additional green building measures necessary to meet the threshold of each level.

A5.601.2 *CALGreen* Tier 1

A5.601.2.1 Prerequisites. To achieve *CALGreen* tier status, a project must meet all of the mandatory measures in Chapter 5 and, in addition, meet the provisions of this section.

A5.601.2.2 Energy performance. For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory standards.

A5.601.2.3 Tier 1. Comply with the energy efficiency requirements in Section A5.203.1.1 and Section A5.203.1.2.1.

A5.601.2.4 Voluntary measures for *CALGreen* Tier 1. In addition to the provisions of Sections A5.601.2.1 and A5.601.2.3 above, compliance with the following voluntary measures from Appendix A5 is required for Tier 1:

1. From Division A5.1,
   a. Comply with the designated parking requirements for fuel efficient vehicles for a minimum of 10 percent of parking capacity per Section A5.106.5.1 and Table A5.106.5.1.1.
   b. Comply with thermal emittance, solar reflectance or SRI values for cool roofs in Section A5.106.11.2 and Table A5.106.11.2.1.[1]
   c. Comply with one elective measure selected from this division.
2. From Division A5.3,
   a. Comply with the 30-percent reduction for indoor potable water use in Section A5.303.2.3.1.
   b. Comply with Section A5.304.4.1 for outdoor potable water use not to exceed 60 percent of ETo.
   c. Comply with one elective measure selected from this division.
3. From Division A5.4,[2]
   a. Comply with recycled content of 10 percent of materials based on estimated total cost in Section A5.405.4.
   b. Comply with the 65-percent reduction in construction and demolition waste in Section A5.408.3.1.
   c. Comply with one elective measure selected from this division.
4. From Division A5.5,
   a. Comply with resilient flooring systems for 90 percent of resilient flooring in Section A5.504.4.7.
   b. Comply with thermal insulation meeting 2009 CHPS low-emitting materials list in Section A5.504.4.8.

c. Comply with one elective measure selected from this division.

5. Comply with one additional elective measure selected from any division.

[1] Cool roof is required for compliance with Tiers 1 and 2 and may be used to meet energy standards in Part 6, exceed energy standards and to mitigate heat island effect.

[2] Life cycle assessment compliant with Section A5.409.4 in this code may be substituted for prescriptive measures from Division A5.4.

A5.601.3 *CALGreen* Tier 2.

A5.601.3.2 Energy performance. For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory standards.

A5.601.3.3 Tier 2. Comply with the energy efficiency requirements in Section A5.203.1.1 and Section A5.203.1.2.2.

A5.601.3.4 Voluntary measures for Tier 2. In addition to the provisions of Sections A5.601.3.1 and A5.601.3.3 above, compliance with the following voluntary measures from Appendix A5 and additional elective measures shown in Table A5.601.3.4 is required for Tier 2:

1. From Division A5.1,
   a. Comply with the designated parking requirements for fuel efficient vehicles for a minimum of 12 percent of parking capacity per Section A5.106.5.1 and Table A5.106.5.1.2.
   b. Comply with thermal emittance, solar reflectance or SRI values for cool roofs in Section A5.106.11.2 and Table A5.106.11.2.2.[1]
   c. Comply with three elective measures selected from this division.
2. From Division A5.3,
   a. Comply with the 35-percent reduction for indoor potable water use in Section A5.303.2.3.1.
   b. Comply with Section A5.304.4.1 for outdoor potable water use not to exceed 55 percent of ETo.
   c. Comply with three elective measures selected from this division.
3. From Division A5.4,[2]
   a. Comply with recycled content of 15 percent of materials based on estimated total cost in Section A5.405.4.1.
   b. Comply with the 80-percent reduction in construction and demolition waste in Section A5.408.3.1.
   c. Comply with three elective measures selected from this division.
4. From Division A5.5,
   a. Comply with resilient flooring systems for 100 percent of resilient flooring in Section A5.504.4.7.1.

      Exception: Allowance may be permitted in Tier 2 for up to 5-percent specialty purpose flooring.
   b. Comply with thermal insulation meeting 2009 CHPS low-emitting materials list and no added formaldehyde in Section A5.504.4.8.1.
   c. Comply with three elective measures selected from this division.
5. Comply with three additional elective measures selected from any division.

[1] Cool roof is required for compliance with Tiers 1 and 2 and may be used to meet energy standards in Part 6, exceed energy standards and to mitigate heat island effect.

[2] Life cycle assessment compliant with Section A5.409.4 in this code may be substituted for prescriptive measures from Division A5.4.

A5.601.4 Compliance verification. Compliance with Section A5.601.2 or A5.601.3 shall be as required in Chapter 7 of this code. Compliance documentation shall be made part of the project record as required in Section 5.410.2 or 5.410.3.

TABLE A5.601 NONRESIDENTIAL BUILDINGS:
Green Building Standards Code Proposed Performance Approach

Note: This table is intended only as an aid in illustrating the nonresidential tier structure

CATEGORY	ENVIRONMENTAL PERFORMANCE GOAL	TIER 1	TIER 2
All	Minimum Mandatory	Meet all of the provisions of Chapter 5	Meet all of the provision of Chapter 5
Planning and Design	Designated Parking for Fuel Efficient Vehicles	10% of total spaces	12% of total spaces
	Cool Roof to Reduce Heat Island Effect	Roof Slope < 2:12 SRI 64 Roof Slope > 2:12 SRI 16	Roof Slope < 2:12 SRI 78 Roof Slope > 2:12 SRI 30
		1 additional Elective from Division A5.1	3 additional Electives from Division A5.1
Energy Efficiency	Energy Performance[2, 3]	Outdoor lighting power 90% of Part 6 allowance	Outdoor lighting power 90% of Part 6 allowance
		If applicable, solar water-heating system with minimum solar savings fraction of 0.15	If applicable, solar water-heating system with minimum solar savings fraction of 0.15
		If applicable, certain functional areas comply with residential indoor lighting requirements	If applicable, certain functional areas comply with residential indoor lighting requirements
		Energy Budget 95% or 90% of Part 6 calculated value of allowance	Energy Budget 90% or 85% of Part 6 calculated value of allowance
Water Efficiency and Conservation	Indoor Water Use	30% Savings	35% Savings
	Outdoor Water Use	Not to exceed 60% of ETo times the landscape area	Not to exceed 55% of ETo times the landscape area
		1 additional Elective from Division A5.3	3 additional Electives from Division A5.3
Material Conservation and Resource Efficiency[4]	Construction Waste Reduction	At least 65% reduction	At least 80% reduction
	Recycled Content	Utilize recycled content materials for 10% of total material cost	Utilize recycled content materials for 15% of total material cost
		1 additional Elective from Division A5.4	3 additional Electives from Division A5.4
Environmental Quality	Low-VOC Resilient Flooring	90% of flooring meets VOC limits	100% of flooring meets VOC limits[1]
	Low-VOC Thermal Insulation	Comply with VOC limits	Install no-added formaldehyde insulation and comply with VOC limits
		1 additional Elective from Division A5.5	3 additional Electives from Division A5.5
Additional Measures	Added measures shall be achieved across at least 3 categories	1 Additional Elective	3 Additional Electives
Approximate Total Measures		14	24

1. Exception: Allowance may be permitted in Tier 2 for up to 5-percent specialty purpose flooring.

Exceptions for solar water-heating system requirement:

2. Buildings with a natural gas service water heater with a minimum of 95-percent thermal efficiency.
3. Buildings where greater than 75 percent of the total roof area has annual solar access that is less than 70 percent. Solar access is the ratio of solar insolation including shade to the solar insolation without shade. Shading from obstructions located on the roof or any other part of the building shall not be included in the determination of annual solar access.
4. Life cycle assessment compliant with Section A5.409.4 in this code may be substituted for prescriptive measures from Division A5.4.

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
Requirements			
Project meets all of the requirements of Divisions 5.1 through 5.5.	☒	☐	☐
Planning and Design			
Site Selection			
A5.103.1 Community connectivity. Locate project on a previously developed site within a $^1/_2$-mile radius of at least ten basic services, listed in Section A5.103.1.		☐	☐
A5.103.2 Brownfield or greyfield site redevelopment or infill area development. Select for development a brownfield in accordance with Section A5.103.2.1 or on a greyfield or infill site as defined in Section A5.102. **A5.103.3.1 Brownfield redevelopment.** Develop a site documented as contaminated and fully remediated or on a site defined as a brownfield.		☐	☐
Site Preservation			
A5.104.1.1 Local zoning requirement in place. Exceed the zoning's open space requirement for vegetated open space on the site by 25 percent.		☐	☐
A5.104.1.2 No local zoning requirement in place. Provide vegetated open space area adjacent to the building equal to the building footprint area.		☐	☐
A5.104.1.3 No open space required in zoning ordinance. Provide vegetated open space equal to 20 percent of the total project site area.		☐	☐
Deconstruction and Reuse of Existing Structures			
A5.105.1.1 Existing building structure. Maintain at least 75 percent of existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing) based on surface area. **Exceptions:** 1. Window assemblies and nonstructural roofing material. 2. Hazardous materials that are remediated as a part of the project. 3. A project with an addition of more than two times the square footage of the existing building.		☐ ☐	☐
A5.105.1.2 Existing nonstructural elements. Reuse existing interior nonstructural elements (interior walls, doors, floor coverings and ceiling systems) in at least 50 percent of the area of the completed building (including additions). **Exception:** A project with an addition of more than two times the square footage of the existing building.		 ☐	☐
A5.105.1.3 Salvage. Salvage additional items in good condition such as light fixtures, plumbing fixtures and doors for reuse on this project in an onsite storage area or for salvage in dedicated collection bins. Document the weight or number of the items salvaged.			☐
Site Development			
5.106.1 Storm water pollution prevention. Newly constructed projects which disturb less than one acre of land shall prevent the pollution of stormwater runoff from the construction activities through local ordinance in Section 5.106.1.1 or Best management practices (BMP) in Section 5.106.1.2.	☒ or ☒		
A5.106.2 Storm water design. Design storm water runoff rate and quantity in conformance with Section A5.106.3.1 and storm water runoff quality by Section A5.106.3.2 or by local requirements, whichever are stricter. **A5.106.2.1 Storm water runoff rate and quantity.** Implement a storm water management plan resulting in no net increase in rate and quantity of storm water runoff from existing to developed conditions. **Exception:** If the site is already greater than 50 percent impervious, implement a storm water management plan resulting in a 25-percent decrease in rate and quantity. **A5.106.2.2 Storm water runoff quality.** Use post construction treatment control best management practices (BMPs) to mitigate (infiltrate, filter or treat) storm water runoff from the 85th percentile 24-hour runoff event (for volume-based BMPs) or the runoff produced by a rain event equal to two times the 85th percentile hourly intensity (for flow-based BMPs).		 ☐ ☐	 ☐ ☐
A5.106.3 Low impact development (LID). Reduce peak runoff in compliance with Section 5.106.3.1. Employ at least two of the following methods or other best management practices to allow rainwater to soak into the ground, evaporate into the air or collect in storage receptacles for irrigation or other beneficial uses. LID strategies include, but are not limited to those listed in Section A5.106.4.		☐	☐

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
5.106.4 Bicycle parking. Comply with Sections 5.106.4.1, 4.106.4.1 and 5.106.4.1.2; or meet local ordinance, whichever is stricter.	☒		
5.106.4.1.1 Short-term bicycle parking. If the new project or addition or alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of new visitor motorized vehicle parking spaces being added, with a minimum of one two-bike capacity rack.	☒		
5.106.4.1.2 Long-term bicycle parking. For buildings with over 10 tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupied motorized vehicle parking spaces being added, with a minimum of one space. See exception for addition or alterations.	☒		
A5.106.4.3 Changing rooms. For buildings with over 10 tenant-occupants, provide changing/shower facilities in accordance with Table A5.106.4.3 or document arrangements with nearby changing/shower facilities.		☐	☐
A5.106.5.1 Designated parking for fuel-efficient vehicles. Provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in:			
A5.106.5.1.1. Tier 1 10% of total spaces per Table A5.106.5.1.1.		☒	
A5.106.5.1.2. Tier 2 12% of total spaces per Table A5.106.5.1.2.			☒
5.106.5.2 Designated parking. Provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2.	☒		
A5.106.5.3.1 Single charging space requirements. When only a single charging space is required, install a listed raceway capable of accommodating a dedicated branch circuit. The raceway shall not be less than trade size 1. The raceway shall be securely fastened at the main service or subpanel and shall terminate in close proximity to the proposed location of the charging system into a listed cabinet, box or enclosure.		☐	☐
Exception: Other pre-installation methods approved by the local enforcing agency that provide sufficient conductor sizing and service capacity to install Level 2 EVSE.			
A5.106.5.3.2 Multiple charging spaces required. When multiple charging spaces are required, plans shall include the location(s) and type of the EVSE, raceway method(s), wiring schematics and electrical calculations to verify that the electrical system has sufficient capacity to charge simultaneously all the electrical vehicles at all designated EV charging spaces at their full rated amperage. Plan design shall be based upon Level 2 EVSE at its maximum operating ampacity. Provide raceways from the electrical service panel to the designated parking areas which are required to be installed at the time of construction.		☐	☐
Note: Utilities and local enforcing agencies may have additional requirements for metering and EVSE installation, and should be consulted during the project design and installation.			
A5.106.5.3.3 Tier 1. At least 3 percent of the total parking spaces, but not less than one, shall be capable of supporting installation of future electric vehicle supply equipment (EVSE).		☐	
A5.106.5.3.4 Tier 2. At least 5 percent of the total parking spaces, but not less than two, shall be capable of supporting installation of future EVSE.			☐
A5.106.5.3.5 Labeling requirement. A label stating "EV CHARGE CAPABLE" shall be posted in a conspicuous place at the service panel or subpanel and the EV charging space.		☐	☐
A5.106.6 Parking capacity. Design parking capacity to meet but not exceed minimum local zoning requirements.			
A5.106.6.1 Reduce parking capacity. With the approval of the enforcement authority, employ strategies to reduce on-site parking area by			
1. Use of on street parking or compact spaces, illustrated on the site plan or		☐	☐
2. Implementation and documentation of programs that encourage occupants to carpool, ride share or use alternate transportation.		☐	☐
A5.106.7 Exterior walls. Meet requirements in the current edition of the *California Energy Code* and comply with either Section A5.106.7.1 or A5.106.7.2 for wall surfaces:			
A5.106.7.1 Fenestration. Provide vegetative or man-made shading devices for all fenestration on east-, south- and west-facing walls.			
A5.106.7.1.1 East and west walls. Shading devices shall have 30% coverage to a height of 20 feet or to the top of the exterior wall, whichever is less.		☐	☐
A5.106.7.1.2 South walls. Shading devices shall have 60% coverage to a height of 20 feet or to the top of the exterior wall, whichever is less.		☐	☐
A5.106.7.2 Opaque wall areas. Use wall surfacing with SRI 25 (aged), for 75% of opaque wall areas.		☐	☐

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
5.106.8 Light pollution reduction. [N] Outdoor lighting systems shall be designed and installed to comply with the following:			
1. The minimum requirements in the *California Energy Code* for Lighting Zones 1–4 as defined in Chapter 10 of the *California Administrative Code*; and			
2. Backlight, Uplight and Glare (BUG) ratings as defined in IESNA TM-15-11; and	☒		
3. Allowable BUG ratings not exceeding those shown in Table 5.106.8, or	or		
Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.	☒		
Exceptions: [N]			
1. Luminaires that qualify as exceptions in Section 147 of the *California Energy Code*			
2. Emergency lighting			
5.106.10 Grading and paving. Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include those shown in Items 1–5. See exception for additions or alterations.	☒		
A5.106.11 Heat island effect. Reduce nonroof heat islands and roof heat islands as follows:			
A5.106.11.1 Hardscape alternatives. Use one or a combination of strategies 1 through 3 for 50 percent of site hardscape or put 50 percent of parking underground.		☐	☐
1. Use light colored materials with an initial solar reflectance value of at least .30 as determined in accordance with ASTM Standards E 1918 or C 1549.		☐	☐
2. Use open-grid pavement system or pervious or permeable pavement system.		☐	☐
A5.106.11.2 Cool roof for reduction of heat island effect. Use roofing materials having a minimum aged solar reflectance, thermal emittance complying with Sections A5.106.11.2.2 and A5.106.11.2.3 or a minimum aged or Solar Reflectance Index (SRI)3 equal to or greater than the values shown in:		☐	☐
Table A5.106.11.2.2 – Tier 1 or		☒	
Table A5.106.11.2.3 – Tier 2			☒
Exceptions:			
1. Roof constructions that have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25 lb/sf.			
2. Roof area covered by building integrated solar photovoltaic and building integrated solar thermal panels.			

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SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
Energy Efficiency			
Performance Requirements			
5.201.1 Scope. Building meets or exceeds the requirements of the California Building Energy Efficiency Standards.3	☒	☒[2]	☒[2]
A5.203.1 Energy efficiency. Nonresidential, high-rise residential and hotel/motel buildings that include lighting and/or mechanical systems shall comply with Sections A5.203.1.1 and either A5.203.1.2.1 or A5.203.1.2.2. Newly constructed buildings, as well as additions and alterations, are included in the scope of these sections. Buildings permitted without lighting or mechanical systems shall comply with Section A5.203.1.1 but are not required to comply with Sections A5.203.1.1.2 or A5.203.1.2.		☐	☐
A5.203.1.1.1 Outdoor lighting. Newly installed outdoor lighting power is no greater than 90 percent of the Title 24, Part 6 calculated value of allowed outdoor lighting power.		☒[2]	☒[2]
A5.203.1.1.2 Service water heating in restaurants. Newly constructed restaurants 8,000 square feet or greater and with service water heaters rated 75,000 Btu/h or greater installed a solar water-heating system with a minimum solar savings fraction of 0.15 or meet one of the exceptions.		☒[2]	☒[2]
A5.203.1.1.3 Functional areas where compliance with residential lighting standards is required. For newly constructed high-rise residential dwelling units and hotel and motel guest rooms, indoor lighting complies with the applicable requirements in Appendix A4 Residential Voluntary Measures, Division A4.2 – Energy Efficiency, Section A4.203.1.1.3. For additions and alterations to high-rise residential dwelling units and hotel and motel guest rooms, indoor lighting complies with the applicable requirements in Appendix A4 Residential Voluntary Measures, Division A4.2 – Energy Efficiency, Section A4.204.1.1.1.		☒[2]	☒[2]
A5.203.1.2.1 Tier 1. For building projects that include indoor lighting or mechanical systems, but not both, the Energy Budget is no greater than 95 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building. For building projects that include indoor lighting and mechanical systems, the Energy Budget is no greater than 90 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building.		☒[2]	
A5.203.1.2.2 Tier 2. For building projects that include indoor lighting or mechanical systems, but not both, the Energy Budget is no greater than 90 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building. For building projects that include indoor lighting and mechanical systems, the Energy Budget is no greater than 85 percent of the Title 24, Part 6, Energy Budget for the Proposed Design Building.			☒[2]
Renewable Energy			
A5.211.1 On-site renewable energy. Use on-site renewable energy for at least 1 percent of the electrical service overcurrent protection device rating calculated in accordance with the 2013 *California Electrical Code* or 1KW, whichever is greater, in addition to the electrical demand required to meet 1 percent of natural gas and propane use calculated in accordance with the 2013 *California Plumbing Code.* **A5.211.1.1 Documentation.** Calculate renewable on-site system to meet the requirements of Section A5.211.1. Factor in net-metering, if offered by local utility, on an annual basis. **A5.211.3 Green power.** Participate in the local utility's renewable energy portfolio program that provides a minimum of 50-percent electrical power from renewable sources. Maintain documentation through utility billings.		☐	☐
Elevators, Escalators and Other Equipment			
A5.212.1 Elevators and escalators. In buildings with more than one elevator or two escalators, provide systems and controls to reduce the energy demand of elevators and escalators as follows. Document systems operation and controls in the project specifications and commissioning plan. **A5.212.1.1 Elevators.** Traction elevators shall have a regenerative drive system that feeds electrical power back into the building grid when the elevator is in motion. **A5.212.1.1.1 Car lights and fan.** A parked elevator shall turn off its car lights and fan automatically until the elevator is called for use. **A5.212.1.2 Escalators.** An escalator shall have a variable voltage variable frequency (VVVF) motor drive system that is fully regenerative when the escalator is in motion. **A5.212.1.4 Controls.** Controls that reduce energy demand shall meet requirements of CCR, Title 8, Chapter 4, Subchapter 6 and shall not interrupt emergency operations for elevators required in CCR, Title 24, Part 2, *California Building Code.*		☐ ☐ ☐	☐ ☐ ☐

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
Energy Efficient Steel Framing			
A5.213.1 Steel framing. Design for and employ techniques to avoid thermal bridging.		☐	☐
Water Efficiency and Conservation			
Indoor Water Use			
5.303.1 Meters. Separate meters shall be installed for the uses described in Sections 5.303.1.1 and 5.303.1.2.			
5.303.1.1 New buildings or additions in excess of 50,000 square feet. Separate submeters shall be installed as follows:			
1. For each individual leased, rented or other tenant space within the building projected to consume more than 100 gal/day.	☒		
2. Where separate submeters for individual building tenants are unfeasible, for water supplied to the following subsystems:			
a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s)	☒		
b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s)	☒		
c. Steam and hot-water boilers with energy input more than 500,000 Btu/h (147 kW)	☒		
5.303.1.2 Excess consumption. Any tenant within a new building or an addition that is projected to consume more than 1,000 gal/day (3800 L/day).	☒		
5.303.2 Water reduction. Plumbing fixtures shall meet the maximum flow rate values shown in Table 5.303.2.3.	☒		
Exception: Buildings that demonstrate 20-percent overall water use reduction. In this case, a calculation demonstrating a 20-percent reduction in the building "water use baseline," as established in Table 5.303.2.2, shall be provided.	☒		
5.303.2.1 Areas of additions or alteration. For those occupancies within the authority of the California Building Standards Commission as specified in Section 103, the provisions of Section 5.303.2 and Section 5.303.3 shall apply to new fixtures in additions or areas of alterations to the building.			
A5.303.2.3.1 Tier 1 – 30-percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 30 percent shall be provided.		☒	
A5.303.2.3.2 Tier 2 – 35-percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 35 percent shall be provided.		☒	
A5.303.2.3.3 Forty-percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 40 percent shall be provided.			☒
(Calculate savings by Water Use Worksheets)		☐	
A5.303.2.3.4 Nonpotable water systems for indoor use. Utilizing nonpotable water systems (such as captured rainwater, treated graywater, and recycled water) intended to supply water closets, urinals, and other allowed uses, may be used in the calculations demonstrating the 30, 35 or 40 percent reduction. The nonpotable water systems shall comply with the current edition of the *California Plumbing Code*.			
5.303.3 Water conserving plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:	☒		
5.303.3.1 Water closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-Type Toilets.	☒		
Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.			
5.303.3.2 Urinals. The effective flush volume of urinals shall not exceed 0.5 gallons per flush.	☒		
5.303.3.3 Showerheads.	☒		
5.303.3.3.1 Single showerhead. Showerheads shall have a maximum flow rate of not more than 2.0 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Showerheads.	☒		
5.303.3.3.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 2.0 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time.	☒		
Note: A hand-held shower shall be considered a showerhead.			

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
A5.303.3 Appliances. 1. Clothes washers shall have a maximum Water Factor (WF) that will reduce the use of water. 2. Dishwashers shall meet the criteria in Section A5.303.3(2)(a) and (b). 3. Ice makers shall be air cooled. 4. Food steamers shall be connectionless or boilerless. 5. The use and installation of water softeners shall be limited or prohibited by local agencies. 6. Combination ovens shall not consume more than 10 gph (38 L/h) in the full operational mode. 7. Commercial pre-rinse spray valves manufactured on or after January 1, 2006 shall function at equal to or less than 1.6 gpm (0.10 L/s) at 60 psi (414 kPa) and a. Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate b. Be equipped with an integral automatic shutoff c. Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gpm (0.08 L/s) or less		☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐
5.303.4 Wastewater reduction. [N] Each building shall reduce the generation of wastewater by one of the following methods: 1. The installation of water-conserving fixtures or 2. Utilizing nonpotable water systems.	As applicable ☒ ☒		
A5.303.5 Dual plumbing. New buildings and facilities shall be dual plumbed for potable and recycled water systems.		☐	☐
5.303.6 Standards for plumbing fixtures and fittings. Plumbing fixtures and fittings shall be installed in accordance with the *California Plumbing Code*, and shall meet the applicable standards referenced in Table 1401.1 of the *California Plumbing Code* and in Chapter 6 of this code.	As applicable ☒		
Outdoor Water Use			
5.304.1 Water budget. A water budget shall be developed for landscape irrigation use.[3] Applies to additions or alterations.	☒		
5.304.2 Outdoor potable water use. For new water service, separate meters or submeters shall be installed for indoor and outdoor potable water use for landscaped areas of at least 1,000 square feet but not more than 5,000 square feet, separate submeters shall be installed for outdoor potable water use. Applies to additions or alterations. **A5.304.2.1 Outdoor potable water use.** For new water service not subject to the provisions of *Water Code* Section 535, separate meters or submeters shall be installed for outdoor potable water use for landscaped areas of at least 500 square feet but not more than 1,000 square feet (the level at which Section 5.304.2 applies).	☒	☐	☐
5.304.3 Irrigation design. In new nonresidential projects with at least 1,000 square feet but not more than 2,500 square feet of landscaped area (the level at which the MLO applies), install irrigation controllers and sensors which include the following criteria and meet manufacturer's recommendations. Applies to additions or alterations. **5.304.3.1 Irrigation controllers.** Automatic irrigation system controllers installed at the time of final inspection shall comply with the following: 1. Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' needs as weather conditions change. 2. Weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based controllers are not required to have rain sensor input.	☒ As applicable ☒		
A5.304.4 Potable water reduction. Provide water efficient landscape irrigation design that reduces by the use of potable water. **A5.304.4.1 Tier 1** – Reduce the use of potable water to a quantity that does not exceed 60 percent of ETo times the landscape area. **A5.304.4.2 Tier 2** –Reduce the use of potable water to a quantity that does not exceed 55 percent of ETo times the landscape area. Methods used to accomplish the requirements of this section shall include, but not be limited to, the items listed in A5.304.4. **A5.304.4.3 Verification of compliance.** A calculation demonstrating the applicable potable water use reduction required by this section shall be provided.		☒ ☒	 ☒ ☒
A5.304.5 Potable water elimination. Provide a water efficient landscape irrigation design that eliminates the use of potable water beyond the initial requirements for plant installation and establishment. Methods used to accomplish the requirements of this section shall include, but not be limited to, the items listed in Section A5.304.4.		☐	☐

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
A5.304.6 Restoration of areas disturbed by construction. Restore all areas disturbed during construction by planting with local native and/or noninvasive vegetation.		☐	☐
A5.304.7 Previously developed sites. On previously developed or graded sites, restore or protect at least 50 percent of the site area with native and/or noninvasive vegetation.		☐	☐
A5.304.8 Graywater irrigation system. Install graywater collection system for onsite subsurface irrigation using graywater.		☐	☐
Water Reuse			
A5.305.1 Nonpotable water systems. Nonpotable water systems for indoor and outdoor use shall comply with the current edition of the *California Plumbing Code.*		☐	☐
A5.305.2 Irrigation systems. Irrigation systems regulated by a local water efficient landscape ordinance or by the California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO) shall use recycled water.		☐	☐
Material Conservation and Resource Efficiency			
Efficient Framing Systems			
A5.404.1 Wood framing. Employ advanced wood framing techniques or OVE, as permitted by the enforcing agency.		☐	☐
Material Sources			
A5.405.1 Regional materials. Select building materials or products for permanent installation on the project that have been harvested or manufactured in California or within 500 miles of the project site, meeting the criteria listed in Section A5.405.1.		☐	☐
A5.405.2 Bio-based materials. Select bio-based building materials per Section A5.405.2.1 or A5.405.2.2.			
A5.405.2.1 Certified wood products. Certified wood is an important component of green building strategies and the California Building Standards Commission will continue to develop a standard through the next code cycle.		☐	☐
A5.405.2.2 Rapidly renewable materials. Use materials made from plants harvested within a ten-year cycle for at least 2.5 percent of total materials value, based on estimated cost.		☐	☐
A5.405.3 Reused materials. Use salvaged, refurbished, refinished or reused materials for at least 5 percent of the total value, based on estimated cost of materials on the project.		☐	☐
A5.405.4 Recycled content. Use materials, equivalent in performance to virgin materials, with a total (combined) recycled content value (RCV) of:			
Tier 1. The RCV shall not be less than 10 percent of the total material cost of the project.		☒	
Tier 2. The RCV shall not be less than 15 percent of the total material cost of the project.			☒
Note: Use the equations in the subsections for calculating total materials cost, recycled content, RCV of materials and assemblies, and total RCV.		☐	☐
A5.405.5 Cement and concrete. Use cement and concrete made with recycled products and complying with the following sections:			
A5.405.5.1 Cement. Cement shall comply with one of the following standards: 1. Portland cement shall meet ASTM C 150. 2. Blended hydraulic cement shall meet ASTM C 595. 3. Other Hydraulic Cements shall meet ASTM C 1157.		☐	☐
A5.405.5.2 Concrete. Unless otherwise directed by the Engineer of Record, use concrete manufactured with cementitious materials in accordance with Sections A5.405.5.2.1 and A5.405.5.2.1.1, as approved by the enforcing agency.		☐	☐
A5.405.5.2.1 Supplementary cementitious materials (SCMs). Use concrete made with one or more of the SCMs listed in Section A5.405.5.2.1.		☐	☐
A5.405.5.2.1.1 Mix design equation. Use any combination of one or more SCMs, satisfying Equation A4.5-14.			
Exception: Minimums in mix designs approved by the Engineer of Record may be lower where high early strength is needed.			
A5.405.5.3 Additional means of compliance. Any of the following measures shall be permitted to be employed for the production of cement or concrete, depending on their availability and suitability, in conjunction with Section A5.405.5.2.			
A5.405.5.3.1 Cement. The following measures may be used in the manufacture of cement.			
A5.405.5.3.1.1 Alternative fuels. Where permitted by state or local air quality standards.		☐	☐
A5.405.5.3.1.2 Alternative power. Alternate electric power generated at the cement plant and/or green power purchased from the utility meeting the requirements of Section A5.211.			☐

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
A5.405.5.3.2 Concrete. The following measures may be used in the manufacture of concrete,			
A5.405.5.3.2.1 Alternative energy. Renewable or alternative energy meeting the requirements of Section A5.211.		☐	☐
A5.405.5.3.2.2 Recycled aggregates. Concrete made with one or more of the materials listed in Section A5.405.5.3.2.2.		☐	☐
A5.405.5.3.2.3 Mixing water. Water recycled by the local water purveyor or water reclaimed from manufacturing processes and conforming to ASTM C 1602.		☐	☐
A5.405.5.3.2.4 High strength concrete. Concrete elements designed to reduce their total size compared to standard 3,000 psi concrete, as approved by the Engineer of Record.		☐	☐
Enhanced Durability and Reduced Maintenance			
A5.406.1.1 Service life. Select materials for longevity and minimal deterioration under conditions of use.		☐	☐
A5.406.1.2 Reduced maintenance. Select materials that require little, if any, finishing.		☐	☐
A5.406.1.3 Recyclability. Select materials that can be re-used or recycled at the end of their service life.		☐	☐
Weather Resistance and Moisture Management			
5.407.1 Weather protection. Provide a weather-resistant exterior wall and foundation envelope as required by *California Building Code,* Section 1403.2 and *California Energy Code,* Section 150, manufacturer's installation instructions or local ordinance, whichever is more stringent.[3]	☒		
5.407.2 Moisture control. Employ moisture control measures by the following methods;			
5.407.2.1 Sprinklers. Prevent irrigation spray on structures.	☒		
5.407.2.2 Entries and openings. Design exterior entries and openings to prevent water intrusion into buildings.	☒		
Construction Waste Reduction, Disposal and Recycling			
5.408.1 Construction waste management. Recycle and/or salvage for reuse a minimum of 50% of the non- hazardous construction waste in accordance with Section 5.408.1.1, 5.408.1.2 or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.	☒ or		
5.408.1.1 Construction waste management plan. Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, submit a construction waste management plan that complies with Items 1 through 4 of this section.	☒		
5.408.1.2 Waste management company. Utilize a waste management company that can provide verifiable documentation that the percentage of construction waste material diverted from the landfill complies with this section.	☒		
Exceptions to Sections 5.408.1.1 and 5.408.1.2:			
1. Excavated soil and land-clearing debris			
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.			
3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets			
5.408.1.4 Documentation. Provide documentation of the waste management plan that meets the requirements listed in Sections 5.408.1.1 through 5.408.1.3, and the plan is accessible to the enforcement authority.	☒		
5.408.3 Excavated soil and land clearing debris. 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled.	☒		
Exception: Reuse, either on-or off-site, of vegetation or soil contaminated by disease or pest infestation.			

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1] CALGreen Tier 1	VOLUNTARY[1] CALGreen Tier 2
A5.408.3.1 Enhanced construction waste reduction–Tier 1. Divert to recycle or salvage at least 65% of nonhazardous construction and demolition waste generated at the site.		☒	
A5.408.3.1.1 Enhanced construction waste reduction–Tier 2. Divert to recycle or salvage at least 80% of nonhazardous construction waste generated at the site.			☒
A5.408.3.1.2 Verification of compliance. A copy of the completed waste management report or documentation of certification of the waste management company utilized shall be provided.		☒	☒
Exceptions: 1. Excavated soil and land-clearing debris 2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist 3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets.			
Life Cycle Assessment			
A5.409.1 General. Life cycle assessment shall be ISO 14044 compliant. The service life of the building and materials assemblies shall not be less than 60 years.		☐	☐
A5.409.2 Whole building life cycle assessment. Conduct a whole building life assessment, including operating energy, showing that the building project achieves at least a 10-percent improvement for at least three of the impacts listed in Section A5.409.2.2, one of which shall be climate change, compared to a reference building.		☐	☐
A5.409.3 Materials and system assemblies. If whole building analysis of the project is not elected, select a minimum of 50% of materials or assemblies based on life cycle assessment of at least three for the impacts listed in Section A5.409.2.2, one of which shall be climate change.		☐	☐
A5.409.4 Substitution for prescriptive standards. Performance of a life cycle assessment completed in accordance with Section A5.409.2 may be substituted for other prescriptive provisions of Division A5.4, including those made mandatory through local adoption of Tier 1 or Tier 2 in Division A5.6.		☐	☐
A5.409.5 Verification of compliance. Documentation of compliance shall be provided as follows:			
1. The assessment is performed in accordance with ISO 14044.		☐	☐
2. The project meets the requirements of other parts of Title 24.		☐	☐
3. A copy of the analysis shall be made available to the enforcement authority.		☐	☐
4. A copy of the analysis and any maintenance or training recommendations shall be included in the operation and maintenance manual.		☐	☐
See notes for available tools.			
Building Maintenance and Operation			
5.410.1 Recycling by occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling.[3]			
5.410.1.1 Additions. [A] All additions conducted within a 12-month period under single or multiple permits, resulting in an increase of 30 percent or more in floor area, shall provide recyling areas on site.	☒		
Exception: Additions within a tenant space resulting in less than a 30-percent increase in the tenant space floor area.			
5.410.2 Commissioning. [N] For new buildings 10,000 square feet and over, building commissioning for all building systems covered by Title 24, Part 6, process systems and renewable energy systems shall be included in the design and construction processes of the building project. Commissioning requirements shall include items listed in Section 5.410.2.	☒		
Exceptions: 1. Dry storage warehouses of any size 2. Areas under 10,000 square feet used for offices or other conditioned accessory spaces within dry storage warehouses 3. Tenant improvements under 10,000 square feet as described in Section 303.1.1.			
5.410.2.1 Owner's Project Requirements (OPR). [N] Documented before the design phase of the project begins the OPR shall include items listed in Section 5.410.4.	☒		
5.410.2.2 Basis of Design (BOD). [N] A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project to cover the systems listed in Section 5.410.2.2.	☒		
5.410.2.3 Commissioning plan. [N] A commissioning plan describing how the project will be commissioned shall include items listed in Section 5.410.2.3.	☒		
5.410.2.4 [N] Functional performance testing shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications.	☒		
5.410.2.5 Documentation and training. [N] A Systems manual and systems operations training are required.			
5.410.2.5.1 Systems manual. [N] The systems manual shall be delivered to the building owner or representative and facilities operator and shall include the items listed in Section 5.410.2.5.1.	☒		
5.410.2.5.2 Systems operations training. [N] A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and shall include items listed in Section 5.410.2.5.2.	☒		
5.410.2.6 Commissioning report. [N] A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or representative.	☒		

(continued)

SECTION A5.602
NONRESID IAL OCCUPANCIES APPLICATION CH CLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1] CALGreen Tier 1	VOLUNTARY[1] CALGreen Tier 2
5.410.4 Testing and adjusting. Testing and adjusting of systems shall be required for buildings less than 10,000 square feet. Applies to new systems serving additions or alterations.	☒		
5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include, as applicable to the project, the systems listed in Section 5.410.4.2.	☒		
5.410.4.3 Procedures. Perform testing and adjusting procedures in accordance with applicable standards on each system as determined by the enforcing agency.	☒		
5.410.4.3.1 HVAC balancing. Before a new space-conditioning system serving a building or space is operated for normal use, balance in accordance with the procedures defined by national standards listed in Section 5.410.4.3.1 or as approved by the enforcing agency.	☒		
5.410.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.	☒		
5.410.4.5 Operation and maintenance manual. Provide the building owner with detailed operating and maintenance instructions and copies of guaranties/warranties for each system prior to final inspection.	☒		
5.410.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.	☒		
Environmental Quality			
Fireplaces			
5.503.1 Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace or a sealed woodstove and refer to residential requirements in the *California Energy Code,* Title 24, Part 6, Subchapter 7, Section 150.	☒ As applicable		
5.503.1.1 Woodstoves. Woodstoves shall comply with US EPA Phase II emission limits, where applicable.	☒		
Pollutant Control			
A5.504.1 Indoor air quality (IAQ) during construction. Maintain IAQ as provided in Sections A5.504.1.1 and A5.504.1.2.			
A5.504.1.1 Temporary ventilation. Provide temporary ventilation during construction in accordance with Section 121 of the *California Energy Code,* CCR, Title 24, Part 6 and Chapter 4 of CCR, Title 8 and as listed in Items 1 and 2 in Section A5.504.1.2.		☐	☐
A5.504.1.2 Additional IAQ measures. Employ additional measures as listed in Items 1 through 5 in Section A5.504.1.3.		☐	☐
5.504.1.3 Temporary ventilation. If the HVAC system is used during construction, use return air filters with a MERV of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy. Applies to additions or alterations.	☒		
A5.504.2 IAQ postconstruction. Flush out the building per Section A5.504.2 prior to occupancy or if the building is occupied.		☐	☐
A5.504.2.1 IAQ Testing. A testing alternative may be employed after all interior finishes have been installed, using testing protocols recognized by the United State Environmental Protection Agency (U.S. EPA) and in accordance with Section A5.504.2.1.2. Retest as required in Section A5.504.2.1.3.		☐	☐
A5.504.2.1.1 Maximum levels of contaminants. Allowable levels of contaminant concentrations measured by testing shall not exceed the following:		As applicable	As applicable
1. Carbon Monoxide (CO): 9 parts per million, not to exceed outdoor levels by 2 parts per million;		☐	☐
2. Formaldehyde: 27 parts per billion;		☐	☐
3. Particulates (PM10): 50 micrograms per cubic meter;		☐	☐
4. 4-Phenylcyclohexene (4-PCH): 6.5 micrograms per cubic meter; and		☐	☐
5. Total Volatile Organic Compounds (TVOC): 300 micrograms per cubic meter.		☐	☐
A5.504.2.1.2 Test protocols. Testing of indoor air quality should include the elements listed in Items 1 through 4.		☐	☐
A5.504.2.1.3 Noncomplying building areas. For each sampling area of the building exceeding the maximum concentrations specified in Section A5.504.2.1.1, flush out with outside air and retest samples taken from the same area. Repeat the procedures until testing demonstrates compliance.		☐	☐

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1] CALGreen Tier 1	VOLUNTARY[1] CALGreen Tier 2
5.504.3 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation and during storage on the construction site and until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which may enter the system.	☒		
5.504.4 Finish material pollutant control. Finish materials shall comply with Sections 5.504.4.1 through 5.504.4.4.			
5.504.4.1 Adhesives, sealants, caulks. Adhesives and sealants used on the project shall meet the requirements of the following standards.			
1. Adhesives, adhesive bonding primers, adhesive 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, as shown in Tables 5.504.4.1 and 5.504.4.2.	☒		
2. Aerosol adhesives and smaller unit sizes of adhesives and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations*, Title 17, commencing with Section 94507.	☒		
5.504.4.3 Paints and coatings. Architectural paints and coatings shall comply with Table 5.504.4.3 unless more stringent local limits apply.	☒		
5.504.4.3.1 Aerosol paints and coatings. Aerosol paints and coatings shall meet the Product- Weighted MIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances (CCR, Title 17, Section 94520, et seq.).	☒		
5.504.4.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency.	☒		
5.504.4.4 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the standards listed in Section 5.504.4.4.	☒		
5.504.4.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.	☒		
5.504.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1.	☒		
5.504.4.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in Table 5.504.4.5.	☒		
A5.504.4.5.1 Early compliance with formaldehyde limits, Tier 1. Meet the requirements contained in Table A5.504.8.5 before the compliance dates.		☒	
A5.504.4.5.2 No added formaldehyde, Tier 2. Use composite wood products approved by the ARB as no-added formaldehyde (NAF) based resins or ultra-low emitting formaldehyde (ULEF) resins.			☒
5.504.4.5.3 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:	☒ As applicable	☐	☐
1. Product certifications and specifications.	☒		
2. Chain of custody certifications.	☒		
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.).	☒		
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.	☒		
5. Other methods acceptable to the enforcing agency.	☒		
5.504.4.6 Resilient flooring systems. Comply with the VOC-emission limits defined in the 2012 CHPS criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the FloorScore program of the Resilient Floor Covering Institute; or meet California Department of Public Health 2010 Specification.	☒		
A5.504.4.6.1 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.	☒		
A5.504.4.7 Resilient flooring systems, Tier 1. For 90 percent of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the FloorScore program of the Resilient Floor Covering Institute; or meet California Department of Public Health 2010 Specification 01350.		☒	
A5.504.4.7.1 Resilient flooring systems, Tier 2. For 100 percent of floor area to scheduled to receive resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the FloorScore program of the Resilient Floor Covering Institute; or meet California Department of Public Health 2010 Specification 01350.			☒
A5.504.4.7.2 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.		☒	☒
A5.504.4.8 Thermal insulation, Tier 1. Comply with the standards listed in Items 1 through 3.		☒	
A5.504.4.8.1 Thermal insulation, Tier 2. Install thermal insulation which complies with Tier 1 plus does not contain any added formaldehyde.			☒
A5.504.4.8.2 Verification of compliance. Documentation shall be provided verifying that thermal insulation materials meet the pollutant emission limits.		☒	☒

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
A5.504.4.9 Acoustical ceilings and wall panels. Comply with Chapter 8 in Title 24, Part 2 and with the VOC- emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database.		☐	☐
A5.504.4.9.1 Verification of compliance. Documentation shall be provided verifying that acoustical finish materials meet the pollutant emission limits.		☐	☐
A5.504.5 Hazardous particulates and chemical pollutants. Minimize and control pollutant entry into buildings and cross-contamination of regularly occupied areas.		☐	☐
A5.504.5.1 Entryway systems. Install permanent entryway systems measuring at least six feet in the primary direction of travel to capture dirt and particulates at entryways directly connected to the outdoors as listed in Items 1 through 3 in Section A5.504.5.1.		☐	☐
A5.504.5.2 Isolation of pollutant sources. In rooms where activities produce hazardous fumes or chemicals, exhaust them and isolate them from their adjacent rooms as listed in Items 1 through 3 in Section A5.504.5.2.			
5.504.5.3 Filters. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provides at least a MERV of 8. MERV 8 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.	☒		
Exceptions: 1.An ASHRAE 10-percent to 15-percent efficiency filter shall be permitted for an HVAC unit meeting the 2013 *California Energy Code* having 60,000 Btu/h or less capacity per fan coil, if the energy use of the air delivery system is 0.4 W/cfm or less at design air flow. 2.Existing mechanical equipment.		☐	☐
5.504.5.3.1 Labeling. Installed filters shall be clearly labeled by the manufacturer indicating the MERV rating.			
A5.504.5.3.1 Filters. In mechanically ventitlated buildings, provide regularly occupied areas of the building with air infiltration media for outside and return air prior to ocupancy that provides at least a MERV of 11.			
5.504.7 Environmental tobacco smoke (ETS) control. Prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows where outdoor areas are provided for smoking and within the building as already prohibited by other laws or regulations; or as enforced by ordinances, regulations or policies of any city, county, city and county, California Community College, campus of the California State University or campus of the University of California, whichever are more stringent.	☐		
Indoor Moisture and Radon Control			
5.505.1 Indoor moisture control. Buildings shall meet or exceed the provisions of *California Building Code*, CCR, Title 24, Part 2, Sections 1203 and Chapter 14.1.[3]	☒		
Air Quality and Exhaust			
5.506.1 Outside air delivery. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 121 of the *California Energy Code* and Chapter 4 of CCR, Title 8 or the applicable local code, whichever is more stringent.[3]	☒		
5.506.2 Carbon dioxide (CO_2) monitoring. For buildings or additions equipped with demand control ventilation, CO_2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the *California Energy Code*, CCR, Section 120(c)(4).[3]	☒		
Environmental Comfort			
A5.507.1 Lighting and thermal comfort controls. Provide controls in the workplace as described in Sections A5.507.1.1 and A5.507.1.2.			
A5.507.1.1 Single-occupant spaces. Provide individual controls that meet energy use requirements in the *California Energy Code* by Sections A5.507.1.1.1 and A5.507.1.1.2.		☐	☐
A5.507.1.1.1 Lighting. Provide individual task lighting and/or daylighting controls for at least 90 percent of the building occupants.		☐	☐
A5.507.1.1.2 Thermal comfort. Provide individual thermal comfort controls for at least 50 percent of the building occupants by Items 1 and 2 in Section A5.507.1.1.2.		☐	☐
A5.507.1.2 Multi-occupant spaces. Provide lighting and thermal comfort system controls for all shared multi-occupant spaces.		☐	☐
A5.507.2 Daylight. Provide daylit spaces as required for toplighting and sidelighting in the *California Energy Code*. In constructing a design, consider Items 1 through 4 in Section A5.507.3.		☐	☐

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
5.507.4 Acoustical control. Employ building assemblies and components with STC values determined in accordance with ASTM E 90 and ASTM E 413 or OITC determined in accordance with ASTM E 1332, using either the prescriptive or performance method in Section 5.507.4.1 or 5.507.4.2.	☒		
5.507.4.1 Exterior noise transmission, prescriptive method. Wall and floor-ceiling assemblies exposed to the noise source making up the building envelope shall have exterior wall and roof ceiling assemblies meeting a composite STC rating of at least 50 or a composite OITC rating of no less than 40 with exterior windows of a minimum STC of 40 or OITC of 30 in the locations described in Items 1 and 2. Also applies to addition envelope or altered envelope.	☒		
5.507.4.1.1 Noise exposure where noise contours are not readily available. Buildings exposed to a noise level of 65 dB L_{eq}-1Hr during any hour of operation shall have exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30). Also applies to addition or alteration exterior wall.	☒ or		
5.507.4.2 Performance method. For buildings located as defined in Sections A5.507.4.1 or A5.507.4.1.1, wall and roof-ceiling assemblies making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (L_{eq}-1Hr) of 50 dBA in occupied areas during any hour of operation. Also applies to addition envelope or altered envelope.	☒		
5.507.4.2.1 Site features. Exterior features such as sound walls or earth berms may be utilized as appropriate to the project to mitigate sound migration to the interior. Also applies to addition envelope or altered envelope.	☒		
5.507.4.2.1 Documentation of compliance. An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.	☒		
5.507.4.3 Interior sound transmission. Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.	☒		
Outdoor Air Quality			
5.508.1 Ozone depletion and global warming reductions. Installations of HVAC, refrigeration and fire suppression equipment shall comply with Sections 5.508.1.1 and 5.508.1.2.	As applicable		
5.508.1.1 CFCs. Install HVAC and refrigeration equipment that does not contain CFCs.[3]	☒		
5.508.1.2 Halons. Install fire suppression equipment that does not contain Halons.[1]	☒		
A5.508.1.3 Hydrochlorofluorocarbons (HCFCs). Install HVAC and refrigeration equipment that does not contain HCFCs.		☐	☐
A5.508.1.4 Hydrofluorocarbons (HFCs). Install HVAC complying with either of the following:			
1. Install HVAC, refrigeration and fire suppression equipment that do not contain HFCs or that do not contain HFCs with a global warming potential greater than 150.		☐	☐
2. Install HVAC and refrigeration equipment that limit the use of HFC refrigerant through the use of a secondary heat transfer fluid with a global warming potential no greater than 1.		☐	☐
5.508.2 Supermarket refrigerant leak reduction. New commercial refrigeration systems shall comply with the provisions of this section when installed in retail food stores 8,000 square feet or more conditioned area, and that utilize either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units. The leak reduction measures apply to refrigeration systems containing high-global-warming potential (high-GWP) refrigerants with a GWP of 150 or greater. New refrigeration systems include both new facilities and the replacement of existing refrigeration systems in existing facilities.	☒ As applicable		
Exception: Refrigeration systems containing low-global warming potential (low-GWP) refrigerant with a GWP value less than 150 are not subject to this section. Low-GWP refrigerants are nonozone-depleting refrigerants that include ammonia, carbon dioxide (CO_2), and potentially other refrigerants.			

(continued)

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS—continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY[1]	
		CALGreen Tier 1	*CALGreen* Tier 2
5.508.2.1 Refrigerant piping. Piping compliant with the *California Mechanical Code* shall be installed to be accessible for leak protection and repairs. Piping runs using threaded pipe, copper tubing with an outside diameter (OD) less than $^1/_4$ inch, flared tubing connections and short radius elbows shall not be used in refrigerant systems except as noted below.			
5.508.2.1.1 Threaded pipe. Threaded connections are permitted at the compressor rack.			
5.508.2.1.2 Copper pipe. Copper tubing with an OD less than $^1/_4$ inch may be used in systems with a refrigerant charge of 5 pounds or less.			
5.508.2.1.2.1 Anchorage. $^1/_4$ inch OD tubing shall be securely clamped to a rigid base to keep vibration levels below 8 mils.			
5.508.2.1.3 Flared tubing connections. Double-flared tubing connections may be used for pressure controls, valve pilot lines and oil.			
Exception: Single-flared tubing connections may be used with a multiring seal coated with industrial sealant suitable for use with refrigerants and tightened in accordance with manufacturer's recommendations.			
5.508.2.1.4 Elbows. Short radius elbows are only permitted where space limitations prohibit use of long radius elbows.			
5.508.2.2 Valves. Valves and fittings shall comply with the *California Mechanical Code* and as follows.			
5.508.2.2.1 Pressure relief valves. For vessels containing high-GWP refrigerant, a rupture disc shall be installed between the outlet of the vessel and the inlet of the pressure relief valve.			
5.508.2.2.1.1 Pressure detection. A pressure gauge, pressure transducer or other device shall be installed in the space between the rupture disc and the relief valve inlet to indicate a disc rupture or discharge of the relief valve.			
5.508.2.2.2 Access valves. Only Schrader access valves with a brass or steel body are permitted for use.			
5.508.2.2.2.1 Valve caps. For systems with a refrigerant charge of 5 pounds or more, valve caps shall be brass or steel and not plastic.			
5.508.2.2.2.2 Seal caps. If designed for it, the cap shall have a neoprene O-ring in place.			
5.508.2.2.2.2.1 Chain tethers. Chain tethers to fit over the stem are required for valves designed to have seal caps.			
Exception: Valves with seal caps that are not removed from the valve during stem operation.			
5.508.2.3 Refrigerated service cases. Refrigerated service cases holding food products containing vinegar and salt shall have evaporator coils of corrosion-resistant material, such as stainless steel; or be coated to prevent corrosion from these substances.			
5.508.2.3.1. Coil coating. Consideration shall be given the heat transfer efficiency of coil coating to maximize energy efficiency.			
5.508.2.4 Refrigerant receivers. Refrigerant receivers with capacities greater than 200 pounds shall be fitted with a device that indicates the level of refrigerant in the receiver.			
5.508.2.5 Pressure testing. The system shall be pressure tested during installation prior to evacuation and charging.			
5.508.2.5.1 Minimum pressure. The system shall be charged with regulated dry nitrogen and appropriate tracer gas to bring system pressure up to 300 psig minimum.			
5.508.2.5.2 Leaks. Check the system for leaks, repair any leaks, and retest for pressure using the same gauge.			
5.508.2.5.3 Allowable pressure change. The system shall stand, unaltered, for 24 hours with no more than a +/- one pound pressure change from 300 psig, measured with the same gauge.			
5.508.2.6 Evacuation. The system shall be evacuated after pressure testing and prior to charging.			
5.508.2.6.1 First vacuum. Pull a system vacuum down to at least 1000 microns (+/- 50 microns), and hold for 30 minutes.			
5.508.2.6.2 Second vacuum. Pull a second system vacuum to a minimum of 500 microns and hold for 30 minutes.			
5.508.2.6.3 Third vacuum. Pull a third vacuum down to a minimum of 300 microns, and hold for 24 hours with a maximum drift of 100 microns over a 24-hour period.			

1. Green building measures in this table may be mandatory if adopted by a city, county, or city and county as specified in Section 101.7.
2. Required prerequisite for this Tier.
3. These measures are currently required elsewhere in statute or in regulation.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE CHAPTER A6.1 – VOLUNTARY STANDARDS FOR HEALTH FACILITIES [OSHPD 1, 2 & 4]

The following sections are relocated from the voluntary appendices into one appendix to assist code users in the planning, design and construction of environmentally sustainable medical facilities under the authority of the Office of Statewide Health Planning and Development specified in Chapter 1 of this code.

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			1	2	1-AC	AC	SS	1	2	3	4								
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)								X	X		X								
Adopt only those sections that are listed below																			
Chapter/Section																			
A5.106.9								X	X		X								
A5.203								X											
A5.505.4.5.1								X	X		X								

CHAPTER A6.1 – VOLUNTARY STANDARDS FOR HEALTH FACILITIES [OSHPD 1, 2 & 4]

Division A5.1 – SITE PLANNING AND DESIGN

SECTION A5.106 SITE DEVELOPMENT

A5.106.9 Building orientation. Locate and orient the building as follows:

1. When site and location permit, orient the building with the long sides facing north and south.
2. Protect the building from thermal loss, drafts, and degradation of the building envelope caused by wind and wind-driven materials such as dust, sand, snow and leaves, with building orientation and landscape features.

Note: For information on sun angles and shading, visit: http://www2.aud.ucla.edu/energy-design-tools/.

Calculations may be made using the Solar-2 tool.

Division A5.2 – ENERGY EFFICIENCY

SECTION A5.202 DEFINITIONS

A5.202.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

ENERGY STAR. A joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy. ENERGY STAR is a voluntary program designed to identify and promote energy-efficient products and practices.

SECTION A5.203 PERFORMANCE APPROACH

A5.203.2 Energy performance. It is the intent of this code to encourage green buildings to achieve exemplary performance in the area of energy efficiency.

A5.203.2.1 *CALGreen* Tier 1. [OSHPD 1] To achieve *CALGreen* Tier 1, buildings must comply with the latest edition of "Savings By Design, Healthcare Modeling Procedures" found online at http://www.energysoft.com/ep/2007SBDHProcedures.pdf.

A5.203.2.2 *CALGreen* Tier 2. [OSHPD 1] To achieve *CALGreen* Tier 2, buildings must exceed the latest edition of "Savings By Design, Healthcare Modeling Procedures" by a minimum of 15 percent.

SECTION A5.204 PRESCRIPTIVE APPROACH

A5.204.1 ENERGY STAR equipment and appliances. All equipment and appliances provided by the builder shall be ENERGY STAR labeled if ENERGY STAR is applicable to that equipment or appliance.

A5.204.4 Commissioning. [OSHPD 1 & 4] Building commissioning shall be included in the design and construction processes of the building project to verify that the building's energy related systems are installed, calibrated and perform according to the owner's project requirements, basis of design and construction documents.

The owner and designer shall designate an individual as the Commissioning Authority (CxA) to lead, review and oversee the

completion of the commissioning process activities. The owner shall document the Owner's Project Requirements (OPR). The design team shall develop the Basis of Design (BOD). The CxA shall review these documents for clarity and completeness. The owner and design team shall be responsible for updates to their respective documents, develop and incorporate commissioning requirements into the construction documents and develop and implement a commissioning plan. The CxA shall verify the installation and performance of the systems to be commissioned, verify that training and operation and maintenance documentation have been provided to the owner's operations staff and complete a commissioning report.

Commissioning process activities shall be completed for the following energy-related systems, at a minimum:

1. Heating, ventilating, air conditioning and refrigeration (HVAC&R) systems (mechanical and passive) and associated controls.
2. Lighting and daylighting controls.
3. Domestic hot water systems.
4. Renewable energy systems (wind, solar, etc.).
5. Building envelope systems.

A5.204.4.1 Owner's Project Requirements (OPR). The expectations and requirements of the building shall be documented by the owner and the designer before the design phase of the project begins. This shall be reviewed by the CxA. At a minimum, this documentation shall include the following:

1. Environmental and sustainability goals.
2. Energy efficiency goals.
3. Indoor environmental quality requirements.
4. Equipment and systems expectations.
5. Building occupant and O&M personnel expectations.

A5.204.4.2 Basis of Design (BOD). A written explanation of how the design of the building systems meets the Owner's Project Requirements shall be completed at the design phase of the building project and updated as necessary during the design and construction phases. This shall be reviewed by the CxA. At a minimum, the Basis of Design document shall cover the following systems:

1. Heating, ventilation, air conditioning (hvac) systems and controls.
2. Indoor lighting system and controls.
3. Water heating system.
4. Renewable energy systems.

A5.204.4.3 Commissioning plan. A commissioning plan shall be completed to document the approach to how the project will be commissioned and shall be started during the design phase of the building project. This shall be reviewed by the CxA. The Commissioning Plan shall include the following at a minimum:

1. General project information.
2. Commissioning goals.
3. Systems to be commissioned. Plans to test systems and components shall include at a minimum:
   a. A detailed explanation of the original design intent;
   b. Equipment and systems to be tested, including the extent of tests;
   c. Functions to be tested;
   d. Conditions under which the test shall be performed; and
   e. Measurable criteria for acceptable performance.
4. Commissioning team information.
5. Commissioning process activities, schedules and responsibilities – plans for the completion of commissioning requirements listed in Sections A5.204.4.4 through A5.204.4.6 shall be included.

A5.204.4.4 Functional performance testing. Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized and include any readings and adjustments made. This shall be reviewed and verified by the CxA.

A5.204.4.5 Postconstruction documentation and training. A systems manual and systems operations training are required.

A5.204.4.5.1 Systems manual. Documentation of the operational aspects of the building shall be completed within the systems manual and delivered to the building owner and facilities operator. This shall be reviewed by the CxA. At a minimum, the systems manual shall include the following:

1. Site information, including facility description, history and current requirements.
2. Site contact information.
3. Basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, site events log.
4. Major systems.
5. Site equipment inventory and maintenance notes.
6. Other resources and documentation.

A5.204.4.5.2 Systems operations training. The CxA shall oversee the training of the appropriate maintenance staff for each equipment type and/or system. The training shall include, as a minimum, the following:

1. System/equipment overview (what it is, what it does and what other systems and/or equipment it interfaces with).
2. Review of the information in the systems manual.

3. Review of the record drawings on the system/ equipment.

A5.204.4.6 Commissioning report. The CxA shall create a complete report of commissioning process activities undertaken through the design, construction and postconstruction phases of the building project and provided to the owner.

A5.204.6 Building orientation and shading. Locate orient and shade the building as required in Section A5.106.9.

SECTION A5.205 [OSHPD 1 & 4] BUILDING ENVELOPE

A5.205.1 Fenestration products and exterior doors.

A5.205.1.1 Certification of fenestration products and exterior doors other than field-fabricated. Any fenestration product and exterior door, other than field-fabricated fenestration products and field-fabricated exterior doors, may be installed only if the manufacturer has certified to the California Energy Commission or if an independent certifying organization approved by the Commission has certified that the product complies with all of the applicable requirements of this subsection.

A5.205.1.1.1 Air leakage. Manufactured fenestration products and exterior doors shall have air infiltration rates not exceeding 0.3 cfm/ft² of window area, 0.3 cfm/ft² of door area for residential doors, 0.3 cfm/ft² of door area for nonresidential single doors (swinging and sliding) and 1.0 cfm/ft² for nonresidential double doors (swinging), when tested according to NFRC-400 or ASTM E 283 at a pressure differential of 75 pascals (or 1.57 pounds/ft²), incorporated herein by reference.

A5.205.1.1.2 *U*-factor. A fenestration product's *U*-factor shall be rated in accordance with NFRC 100 or the applicable default *U*-factor set forth in Table A.5.205.1-A.

Exception: If the fenestration product is a skylight or is site-built fenestration in a building covered by the nonresidential standards with less than 10,000 square feet of site-built fenestration, the default *U*-factor may be calculated as set forth in Reference Nonresidential Appendix NA6 of the California Energy Commission 2008 *Building Energy Efficiency Standards for Residential and Nonresidential Buildings*.

A5.205.1.1.3 SHGC. A fenestration product's SHGC shall be rated in accordance with NFRC 200 for site-built fenestration or use the applicable default SHGC set forth in Table A5.205.1-B.

Exception: If the fenestration product is a skylight or is site-built fenestration in a building covered by the nonresidential standards with less than 10,000 square feet of site-built fenestration, the default SHGC may be calculated as set forth in Reference Nonresidential Appendix NA6 of the California Energy Commission 2008 *Building Energy Efficiency Standards for Residential and Nonresidential Buildings*.

A5.205.1.1.4 Labeling. Fenestration products shall:

1. Have a temporary label (or label certificate for site-built fenestration) meeting the requirements of Section 10-111(a)1 of Title 24, Part 1 not to be removed before inspection by the enforcement agency, listing the certified *U*-factor and SHGC and certifying that the air leakage requirements of Section A5.205.1.1.1 are met for each product line; and
2. Have a permanent label (or label certificate for site-built fenestration) meeting the requirements of Section 10-111(a)2 of Title 24, Part 1 if the product is rated using NFRC procedures.

A5.205.1.1.5 Fenestration acceptance requirements. Before an occupancy permit is granted, site-built fenestration products in other than low-rise residential buildings shall be certified as meeting the Acceptance Requirements for Code Compliance, as specified by the Reference Nonresidential Appendix NA7 of the California Energy Commission 2008 *Building Energy Efficiency Standards for Residential and Nonresidential Buildings* to ensure that site-built fenestration meet Standards requirements, including a matching label certificate for each product installed and be readily accessible at the project location. A Certificate of Acceptance shall be submitted to the enforcement agency that certifies that the fenestration product meets the acceptance requirements.

Exception: Fenestration products removed and reinstalled as part of a building alteration or addition.

A5.205.1.2 Installation of field-fabricated fenestration and exterior doors. Field-fabricated fenestration and field-fabricated exterior doors may be installed only if the compliance documentation has demonstrated compliance for the installation using *U*-factors from Table A5.205.1-A and SHGC values from Table A5.205.1-B. Field-fabricated fenestration and field-fabricated exterior doors shall be caulked between the fenestration products or exterior door and the building and shall be weatherstripped.

Exception: Unframed glass doors and fire doors need not be weatherstripped or caulked.

A5.205.2 Joints and other openings. Joints and other openings in the building envelope that are potential sources of air leakage shall be caulked, gasketed, weatherstripped or otherwise sealed to limit infiltration and exfiltration.

A5.205.3 Insulation and roofing products.

A5.205.3.1 Certification by manufacturers. Any insulation shall be certified by Department of Consumer Affairs, Bureau of Home Furnishing and Thermal Insulation that the insulation conductive thermal performance is approved pursuant to the *California Code of Regulations*, Title 24, Part 12, Chapters 12-13, Article 3,"Standards for Insulating Material."

TABLE A.5.205.1-A
DEFAULT FENESTRATION PRODUCT *U*-FACTORS

FRAME	PRODUCT TYPE	SINGLE PANE *U*-FACTOR	DOUBLE PANE[1] *U*-FACTOR	GLASS BLOCK[2] *U*-FACTOR
Metal	Operable	1.28	0.79	0.87
	Fixed	1.19	0.71	0.72
	Greenhouse/garden window	2.26	1.40	N.A.
	Doors	1.25	0.77	N.A.
	Skylight	1.98	1.30	N.A.
Metal, thermal break	Operable	N.A.	0.66	N.A.
	Fixed	N.A.	0.55	N.A.
	Greenhouse/garden window	N.A.	1.12	N.A.
	Doors	N.A.	0.59	N.A.
	Skylight	N.A.	1.11	N.A.
Nonmetal	Operable	0.99	0.58	0.60
	Fixed	1.04	0.55	0.57
	Doors	0.99	0.53	N.A.
	Greenhouse/garden windows	1.94	1.06	N.A.
	Skylight	1.47	0.84	N.A.

N.A. = Not applicable.

1. For all dual-glazed fenestration products, adjust the listed *U*-factors as follows:
   a. Add 0.05 for products with dividers between panes if spacer is less than $^{7}/_{16}$ inch wide.
   b. Add 0.05 to any product with true divided lite (dividers through the panes).
2. Translucent or transparent panels shall use glass blocks.

TABLE A5.205.1-B
DEFAULT SOLAR HEAT GAIN COEFFICIENT (SHGC)

FRAME TYPE	PRODUCT	GLAZING	TOTAL WINDOW SHGC		
			Single Pane	Double Pane	Glass Block[1]
Metal	Operable	Clear	0.80	0.70	0.70
	Fixed	Clear	0.83	0.73	0.73
	Operable	Tinted	0.67	0.59	N.A.
	Fixed	Tinted	0.68	0.60	N.A.
Metal, thermal break	Operable	Clear	N.A.	0.63	N.A.
	Fixed	Clear	N.A.	0.69	N.A.
	Operable	Tinted	N.A.	0.53	N.A.
	Fixed	Tinted	N.A.	0.57	N.A.
Nonmetal	Operable	Clear	0.74	0.65	0.70
	Fixed	Clear	0.76	0.67	0.67
	Operable	Tinted	0.60	0.53	N.A.
	Fixed	Tinted	0.63	0.55	N.A.

N.A. = Not applicable.

1. Translucent or transparent panels shall use glass block values.

A5.205.3.2 Installation of urea formaldehyde foam insulation. Urea formaldehyde foam insulation may be applied or installed only if:

1. It is installed in exterior side walls; and
2. A four-mil-thick plastic polyethylene vapor barrier or equivalent plastic sheathing vapor barrier is installed between the urea formaldehyde foam insulation and the interior space in all applications.

A5.205.3.3 Flame spread rating. All insulating material shall be installed in compliance with the flame spread rating and smoke density requirements of the Title 24, Part 2, *California Building Code.*

A5.205.3.4 Installation of insulation in existing buildings. Insulation installed in an existing attic or on an existing duct or water heater, shall comply with the applicable requirements of Subsections A5.205.3.4.1, A5.205.3.4.2 and A5.205.3.4.3 below. If a contractor installs the insulation, the contractor shall certify to the customer, in writing, that the insulation meets the applicable requirements of Subsections A5.205.3.4.1, A5.205.3.4.2 and A5.205.3.4.3 below.

A5.205.3.4.1 Attics. If insulation is installed in the existing attic of a low-rise residential building, the *R*-value of the total amount of insulation (after addition of insulation to the amount, if any, already in the attic) shall be at least R-38 in climate zones 1 and 16; and R-30 in all other climate zones.

Exception: Where the accessible space in the attic is not large enough to accommodate the required *R*-value, the entire accessible space shall be filled with insulation provided such installation does not violate Section 1203.2 of Title 24, Part 2, *California Building Code.*

A5.205.3.4.2 Water heaters. If external insulation is installed on an existing unfired water storage tank or on an existing back-up tank for a solar water-heating system, it shall have an *R*-value of at least R-12 or the heat loss of the tank surface based on an 80°F water-air temperature difference shall be less than 6.5 Btu per hour per square foot.

A5.205.3.4.3 Ducts. If insulation is installed on an existing space-conditioning duct, it shall comply with Section 605 of the *California Mechanical Code* (CMC).

A5.205.3.5 Placement of roof/ceiling insulation. Insulation installed to limit heat loss and gain through the top of conditioned spaces shall comply with the following:

A5.205.3.5.1 Insulation shall be installed in direct contact with a continuous roof or ceiling which is sealed to limit infiltration and exfiltration as specified in Section A5.205.2, including but not limited to placing insulation either above or below the roof deck or on top of a drywall ceiling; and

A5.205.3.5.2 When insulation is installed at the roof in nonresidential buildings, fixed vents or openings to the outdoors or to unconditioned spaces shall not be installed and the space between the ceiling and the roof is either directly or indirectly conditioned space and shall not be considered an attic for the purposes of complying with CBC attic ventilation requirements; and

A5.205.3.5.3 Insulation placed on top of a suspended ceiling with removable ceiling panels shall be deemed to have no affect on envelope heat loss; and

Exception: When there are conditioned spaces with a combined floor area no greater than 2,000 square feet in an otherwise unconditioned building and when the average height of the space between the ceiling and the roof over these spaces is greater than 12 feet, insulation placed in direct contact with a suspended ceiling with removable ceiling panels shall be an acceptable method of reducing heat loss from a conditioned space and shall be accounted for in heat loss calculations.

A5.205.3.5.4 Insulation shall be installed below the roofing membrane or layer used to seal the roof from water penetration unless the insulation has a maximum water absorption of 0.3 percent by volume when tested according to ASTM C 272.

Note: Vents, which do not penetrate the roof deck, that are designed for wind resistance for roof membranes are not within the scope of Section A5.205.3.5.2.

A5.205.3.6 Demising walls in nonresidential buildings. The opaque portions of framed demising walls in nonresidential buildings shall be insulated with an installed *R*-value of no less than R-13 between framing members.

A5.205.3.7 Insulation requirements for heated slab floors. Heated slab-on-grade floors shall be insulated according to the requirements in Table A5.205.3-A.

A5.205.3.7.1 Insulation materials in ground contact must:

A5.205.3.7.1.1 Comply with the certification requirements of Section A5.205.3.1 and

A5.205.3.7.1.2 Have a water absorption rate for the insulation material alone without facings that is no greater than 0.3 percent when tested in accordance with Test Method A – 24 Hour-Immersion of ASTM C 272.

A5.205.3.7.2 Insulation installation must:

A5.205.3.7.2.1 Cover the insulation with a solid guard that protects against damage from ultraviolet radiation, moisture, landscaping operation, equipment maintenance and wind; and

A5.205.3.7.2.2 Include a rigid plate, which penetrates the slab and blocks the insulation from acting as a conduit for insects from the ground to the structure above the foundation.

A5.205.3.8 Wet insulation systems. When insulation is installed on roofs above the roofing membrane or layer used to seal the roof from water penetration, the effective *R*-value of the insulation shall be as specified in Reference Joint Appendix JA4 of the California Energy Commission 2008 *Building Energy Efficiency Standards for Residential and Nonresidential Buildings.*

A5.205.3.9 Roofing products solar reflectance and thermal emittance.

A5.205.3.9.1 In order to meet the requirements of Sections 141, 142, 143(a)1, 149(b)1B, 151(f)12, 152(b)1H or 152(b)2 of Title 24, Part 6, a roofing product's thermal emittance and 3-year aged solar reflectance shall be certified and labeled according to the requirements of Section 10-113 of Title 24, Part 1.

Exception: Roofing products that are not certified according to Section 10-113 of Title 24, Part 1 shall assume the following default aged reflectance/emittance values:

A5.205.3.9.1.1 For asphalt shingles, 0.08/0.75

A5.205.3.9.1.2 For all other roofing products, 0.10/0.75

A5.205.3.9.2 If CRRC testing for 3-year aged reflectance is not available for any roofing products, the 3-year aged value shall be derived from the CRRC initial value using the equation $R_{aged} = [0.2 + 0.7[\rho_{initial}–0.2]$, where $\rho_{initial}$ = the initial Solar Reflectance.

A5.205.3.9.3 Solar Reflectance Index (SRI), calculated as specified by ASTM E 1980-01, may be used as an alternative to thermal emittance and 3-year aged solar reflectance when complying with the requirements of Sections 141, 142, 143(a)1, 149(b)1B, 151(f)12, 152(b)1H or 152(b)2 of Title 24, Part 6. SRI calculations shall be based on moderate wind velocity of 2-6 meters per second. The SRI shall be calculated based on the 3-year aged reflectance value of the roofing products.

A5.205.3.9.4 Liquid applied roof coatings applied to low-sloped roofs in the field as the top surface of a roof covering shall:

A5.205.3.9.4.1 Be applied across the entire roof surface to meet the dry mil thickness or coverage recommended by the coating manufacturer, taking into consideration the substrate on which the coating is applied, and

A5.205.3.9.4.2 Meet the minimum performance requirements listed in Table A5.205.3-B or the minimum performance requirements of ASTM C 836, D 3468, D 6083 or D 6694, whichever are appropriate to the coating material.

Exceptions:

1. Aluminum-pigmented asphalt roof coatings shall meet the requirements of ASTM D 2824 or ASTM D 6848 and be installed as specified by ASTM D 3805.

TABLE A5.205.3-A
SLAB INSULATION REQUIREMENTS FOR HEATED SLAB-ON-GRADE

INSULATION LOCATION	INSULATION ORIENTATION	INSTALLATION REQUIREMENTS	CLIMATE ZONE	INSULATION R-FACTOR
Outside edge of heated slab, either inside or outside the foundation wall	Vertical	From the level of the top of the slab, down 16 inches or to the frost line, whichever is greater. Insulation may stop at the top of the footing where this is less than the required depth. For below grade slabs, vertical insulation shall be extended from the top of the foundation wall to the bottom of the foundation (or the top of the footing) or to the frost line, whichever is greater.	1 – 15	5
			16	10
Between heated slab and outside foundation wall	Vertical and Horizontal	Vertical insulation from top of slab at inside edge of outside wall down to the top of the horizontal insulation. Horizontal insulation from the outside edge of the vertical insulation extending 4 feet toward the center of the slab in a direction normal to the outside of the building in plan view.	1 – 15	5
			16	10 vertical and 7 horizontal

TABLE A5.205.3-B
MINIMUM PERFORMANCE REQUIREMENTS FOR LIQUID APPLIED ROOF COATINGS

PHYSICAL PROPERTY	ASTM TEST PROCEDURE	REQUIREMENT
Initial percent elongation (break)	D 2370	Minimum 200 percent 73°F (23°C)
Initial percent elongation (break) OR Initial flexibility	D 2370 D 522, Test B	Minimum 60 percent 0°F (-18°C) Minimum pass 1″ mandrel 0°F (-18°C)
Initial tensile strength (maximum stress)	D 2370	Minimum 100 psi (1.38 Mpa) 73°F (23°C)
Initial tensile strength (maximum stress) OR Initial flexibility	D 2370 D 522, Test B	Minimum 200 psi (2.76 Mpa) 0°F (-18°C) Minimum pass 1″ mandrel 0°F (-18°C)
Final percent elongation (break) after accelerated weathering 1000 h	D 2370	Minimum 100 percent 73°F (23°C)
Final percent elongation (break) after accelerated weathering 1000 h OR Flexibility after accelerated weathering 1000 h	D 2370	Minimum 40 percent 0°F (-18°C) Minimum pass 1″ mandrel 0°F (-18°C)
Permeance	D 1653	Maximum 50 perms
Accelerated weathering 1000 h	D 4798	No cracking or checking[1]

1. Any cracking or checking visible to the eye fails the test procedure.

2. Cement-based roof coatings shall contain a minimum of 20 percent cement and shall meet the requirements of ASTM C 1583, ASTM D 822 and ASTM D 5870.

SECTION A5.207 [OSHPD 1, 2 & 4] HVAC DESIGN, EQUIPMENT AND INSTALLATION

A5.207.1 Space-conditioning equipment certification by manufacturers. Any space-conditioning equipment listed in this section may be installed only if the manufacturer has certified that the equipment complies with all the applicable requirements of this section.

A5.207.1.1 Efficiency. Equipment shall meet the applicable requirements in Tables A5.207.1-A through A5.207.1-M, subject to the following:

1. If more than one standard is listed for any equipment in Tables A5.207.1-A through A5.207.1-M, the equipment shall meet all the applicable standards that are listed; and
2. If more than one test method is listed in Tables A5.207.1-A through A5.207.1-M, the equipment shall comply with the applicable standard when tested with each test method; and
3. Where equipment can serve more than one function, such as both heating and cooling or both space heating and water heating, it shall comply with all the requirements applicable to each function; and
4. Where a requirement is for equipment rated at its "maximum rated capacity" or "minimum rated capacity," the capacity shall be as provided for and allowed by the controls, during steady-state operation.

Exception: Water-cooled centrifugal water-chilling packages that are not designed for operation at ARI Standard 550 test conditions of 44°F leaving chilled water temperature and 85°F entering condenser water temperature shall have a minimum full load COP rating as shown in Tables A5.207.1-H, A5.207.1-I and A5.207.1-J and a minimum NPLV rating as shown in Tables A5.207.1-K, A5.207.1-L and A5.207.1-M. The table values are only applicable over the following full load design ranges:

Leaving Chiller Water Temperature	40 to 48°F
Entering Condenser Water Temperature	75 to 85°F
Condensing Water Temperature Rise	5 to 15°F

A5.207.1.2 Controls for heat pumps with supplementary electric resistance heaters. Heat pumps with supplementary electric resistance heaters shall have controls:

A5.207.1.2.1 That prevent supplementary heater operation when the heating load can be met by the heat pump alone; and

A5.207.1.2.2 In which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating and the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating.

Exceptions: The controls may allow supplementary heater operation during:

1. Defrost; and
2. Transient periods such as start-ups and following room thermostat setpoint advance, if the controls provide preferential rate control, intelligent recovery, staging, ramping or another control mechanism designed to preclude the unnecessary operation of supplementary heating.

A5.207.1.3 Thermostats. All unitary heating and/or cooling systems including heat pumps that are not controlled by a central energy management control system (EMCS) shall have a setback thermostat.

1. **Setback capabilities.** All thermostats shall have a clock mechanism that allows the building occupant to program the temperature set points for at least four periods within 24 hours. Thermostats for heat pumps shall meet the requirements of Section A5.207.1.2.

Exception: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, noncentral electric heaters, fireplaces or decorative gas appliances, wood stoves, room air conditioners and room air-conditioner heat pumps need not comply with this requirement. Additionally, room air-conditioner heat pumps need not comply with Section A5.207.1.2 Under performance method of compliance, the resulting increase in energy use due to elimination of the setback thermostat shall be factored into the compliance analysis in accordance with a method prescribed by the Executive Director.

A5.207.1.4 Gas- and oil-fired furnace standby loss controls. Gas-fired and oil-fired forced air furnaces with input ratings ≥ 225,000 Btu/h shall also have an intermittent ignition or interrupted device (IID) and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for furnaces where combustion air is drawn from the conditioned space. All furnaces with input ratings ≥ 225,000 Btu/h, including electric furnaces, that are not located within the conditioned space shall have jacket losses not exceeding 0.75 percent of the input rating.

TABLE A5.207.1-A
ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS—MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SIZE CATEGORY	EFFICIENCY[1]		TEST PROCEDURE
		Before 1/1/2010	After 1/1/2010	
Air conditioners, Air cooled	≥ 65,000 Btu/h and < 135,000 Btu/h	10.3 EER[2]	11.2 EER[2]	ARI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	9.7 EER[2]	11.0 EER[2]	ARI 340/360
	≥ 240,000 Btu/h and < 760,000 Btu/h	9.5 EER[2] and 9.7 IPLV[2]	10.0 EER[2] and 9.7 IPLV[2]	
	≥ 760,000 Btu/h	9.2 EER[2] and 9.4 IPLV[2]	9.7 EER[2] and 9.4 IPLV[2]	
Air conditioners, water and evaporatively cooled				ARI 210/240
	> 240,000 Btu/h	11.0 EER[2] and 10.3 IPLV[2]		ARI 340/360
Condensing Units, Air Cooled	≥ 135,000 Btu/h	10.1 EER and 11.2 IPLV		ARI 365
Condensing units, water or evaporatively cooled	≥ 135,000 Btu/h	13.1 EER and 13.1 IPLV		

1. IPLVs are only applicable to equipment with capacity modulation.
2. Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.

TABLE A5.207.1-B
UNITARY AND APPLIED HEAT PUMPS—MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SIZE CATEGORY	SUBCATEGORY OR RATING CONDITION	EFFICIENCY[1]		TEST PROCEDURE
			Before 1/1/2010	After 1/1/2010	
Air cooled (cooling mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	Split system and single package	10.1 EER[2]	11.0	ARI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h		9.3 EER[2]	10.6	
	≥ 240,000 Btu/h		9.0 EER[2] and 9.2 IPLV[2]	9.5 EER[2] and 9.2 IPLV[2]	
Air cooled (heating mode)	≥ 65,000 Btu/h and < 135,000 Btu/h (Cooling capacity)	47°F db/43°F wb outdoor air	3.2 COP	3.3 COP	ARI 210/240
	≥ 135,000 Btu/h (Cooling capacity)	47°F db/43°F wb outdoor air	3.1 COP	3.2 COP	ARI 340/360

1. IPLVs and Part load rating conditions are applicable only to equipment with capacity modulation.
2. Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.

TABLE A5.207.1-C
AIR-COOLED GAS-ENGINE HEAT PUMPS

EQUIPMENT TYPE	SIZE CATEGORY	SUBCATEGORY OR RATING CONDITION	EFFICIENCY	TEST PROCEDURE
Air-cooled gas engine heat pump (cooling mode)	All capacities	95°F db Outdoor air	0.60 COP	ANSI Z21.40.4
Air-cooled gas engine heat pump (heating mode)	All capacities	47°F db/43°F wb Outdoor air	0.72 COP	ANSI Z21.40.4

TABLE A5.207.1-D
WATER CHILLING PACKAGES—MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SIZE CATEGORY	EFFICIENCY	TEST PROCEDURE
Air cooled, with condenser	< 150 Tons	2.80 COP	ARI 550/590
Electrically operated	≥ 150 Tons	3.05 IPLV	
Air cooled, without condenser	All Capacities	3.10 COP	
Electrically operated		3.45 IPLV	
Water cooled, electrically operated, positive displacement	All Capacities	4.20 COP	ARI 550/590
(Reciprocating)		5.05 IPLV	
Water cooled,	< 150 Tons	4.45 COP	ARI 550/590
		5.20 IPLV	
Electrically operated,	≥ 150 Tons and	4.90 COP	
	< 300 Tons	5.60 IPLV	
Positive displacement	≥ 300 Tons	5.50 COP	
(Rotary screw and scroll)		6.15 IPLV	
Water cooled, electrically operated, centrifugal	< 150 Tons	5.00 COP	ARI 550/590
		5.25 IPLV	
	≥ 150 Tons and	5.55 COP	
	< 300 Tons	5.90 IPLV	
	≥ 300 Tons	6.10 COP	
		6.40 IPLV	
Air cooled absorption, single effect	All Capacities	0.60 COP	ARI 560
Water cooled absorption, single effect	All Capacities	0.70 COP	
Absorption double effect, indirect-fired	All Capacities	1.00 COP	
		1.05 IPLV	
Absorption double effect, direct-fired	All Capacities	1.00 COP	
		1.00 IPLV	
Water cooled gas engine driven chiller	All Capacities	1.2 COP 2.0 IPLV	ANSI Z21.40.4

TABLE A5.207.1-E
PACKAGED TERMINAL AIR CONDITIONERS AND PACKAGED TERMINAL HEAT PUMPS – MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SIZE CATEGORY (Input)	SUBCATEGORY OR RATING CONDITION	EFFICIENCY[1]	TEST PROCEDURE
PTAC (cooling mode) new construction	All Capacities	95°F db outdoor air	12.5 – (0.213 × Cap/1000)[1] EER	ARI 310/380
PTAC (cooling mode) replacements[2]			10.9 – (0.213 × Cap/1000)[1] EER	
PTHP (cooling mode) new construction			12.3 – (0.213 × Cap/1000)[1] EER	
PTHP (cooling mode) replacements[2]			10.8 – (0.213 × Cap/1000)[1] EER	
PTHP (heating mode) new construction			3.2 – (0.026 × Cap/1000)[1] COP	
PTHP (heating mode) replacements[2]			2.9 – (0.026 × Cap/1000)[1] COP	
SPVAC (cooling mode)	< 65,000 Btu/h	95°F db/75°F wb outdoor air	9.0 EER	ARI 390
	> = 65,000 Btu/h and < 135,000 Btu/h		8.9 EER	
	> =135,000 Btu/h and < 240,000 Btu/h		8.6 EER	
SPVHP (cooling mode)	< 65,000 Btu/h		9.0 EER	
	> = 65,000 Btu/h and < 135,000 Btu/h		8.9 EER	
	> =135,000 Btu/h and < 240,000 Btu/h		8.6 EER	
SPVHP (heating mode)	< 65,000 Btu/h	47°F db/43°F wb outdoor air	3.0 COP	
	> = 65,000 Btu/h and < 135,000 Btu/h		3.0 COP	
	> =135,000 Btu/h and < 240,000 Btu/h		2.9 COP	

1. Cap means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7,000 Btu/h, use 7,000 Btu/h in the calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculation.
2. Replacement units must be factory labeled as follows: MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEW CONSTRUCTION PROJECTS. Replacement efficiencies apply only to units with existing sleeves less than 16 inches high and less than 42 inches wide.

TABLE A5.207.1-G
PERFORMANCE REQUIREMENTS FOR HEAT REJECTION EQUIPMENT[4]

EQUIPMENT TYPE	TOTAL SYSTEM HEAT REJECTION CAPACITY AT RATED CONDITIONS	SUBCATEGORY OR RATING CONDITION	PERFORMANCE REQUIRED[1,2]	TEST PROCEDURE[3]
Propeller or axial fan open cooling towers	All	95°F entering water 85°F leaving water 75°F wb outdoor air	≥ 38.2 gpm/hp	CTI ATC-105 and CTI STD-201
Centrifugal fan open cooling towers	All	95°F entering water 85°F leaving water 75°F wb outdoor air	≥ 20.0 gpm/hp	CTI ATC-105 and CTI STD-201
Air cooled condensers	All	125°F condensing temperature R22 test fluid 190°F entering gas temperature 15°F subcooling 95°F entering drybulb	≥ 176,000 Btu/h·hp	ARI 460

1. For purposes of this table, open cooling tower performance is defined as the maximum flow rating of the tower divided by the fan nameplate rated motor power.
2. For purposes of this table air-cooled condenser performance is defined as the heat rejected from the refrigerant divided by the fan nameplate rated motor power.
3. Open cooling towers shall be tested using the test procedures in CTI ATC-105. Performance of factory assembled open cooling towers shall be either certified as base models as specified in CTI STD-201 or verified by testing in the field by a CTI approved testing agency. Open factory assembled cooling towers with custom options added to a CTI certified base model for the purpose of safe maintenance or to reduce environmental or noise impact shall be rated at 90 percent of the CTI certified performance of the associated base model or at the manufacturer's stated performance, whichever is less. Base models of open factory assembled cooling towers are open cooling towers configured in exact accordance with the Data of Record submitted to CTI as specified by CTI STD-201. There are no certification requirements for field erected cooling towers.
4. The efficiencies for open cooling towers listed in Table A5.207.1-G are not applicable for closed-circuit cooling towers.

TABLE A5.207.1-H
COPS FOR NONSTANDARD CENTRIFUGAL CHILLERS < 150 TONS

CENTRIFUGAL CHILLERS < 150 Tons COP_{std} = 5.0								
			CONDENSER FLOW RATE					
			2 gpm/ton	2.5 gpm/ton	3 gpm/ton	4 gpm/ton	5 gpm/ton	6 gpm/ton
Leaving Chilled Water Temperature (°F)	Entering Condenser Water Temperature (°F)	LIFT[1] (F)	Required COP					
46	75	29	5.58	5.83	6.03	6.32	6.54	6.70
45	75	30	5.50	5.74	5.92	6.19	6.38	6.53
44	75	31	5.42	5.65	5.82	6.07	6.24	6.37
43	75	32	5.35	5.57	5.72	5.95	6.11	6.23
42	75	33	5.27	5.49	5.64	5.85	6.00	6.11
41	75	34	5.19	5.41	5.56	5.75	5.89	5.99
46	80	34	5.19	5.41	5.56	5.75	5.89	5.99
40	75	35	5.11	5.33	5.48	5.67	5.79	5.88
45	80	35	5.11	5.33	5.48	5.67	5.79	5.88
44	80	36	5.03	5.26	5.40	5.58	5.70	5.79
43	80	37	4.94	5.18	5.32	5.50	5.62	5.70
42	80	38	4.84	5.10	5.25	5.43	5.53	5.61
41	80	39	4.73	5.01	5.17	5.35	5.46	5.53
46	85	39	4.73	5.01	5.17	5.35	5.46	5.53
40	80	40	4.62	4.92	5.09	5.27	5.38	5.45
45	85	40	4.62	4.92	5.09	5.27	5.38	5.45
44	85	41	4.49	4.82	5.00	5.20	5.30	5.38
43	85	42	4.35	4.71	4.91	5.12	5.23	5.30
42	85	43	4.19	4.59	4.81	5.03	5.15	5.22
41	85	44	4.02	4.46	4.70	4.94	5.06	5.14
40	85	45	3.84	4.32	4.58	4.84	4.98	5.06
Condenser DT[2]			14.04	11.23	9.36	7.02	5.62	4.68

1. LIFT = Entering Condenser Water Temperature (°F) – Leaving Chilled Water Temperature (°F)
2. Condenser DT = Leaving Condenser Water Temperature (°F) – Entering Condenser Water Temperature (°F)

$K_{adj} = 6.1507 - 0.30244(\times) + 0.0062692(\times)^2 - 0.000045595(\times)^3$

where × = Condenser DT + LIFT

$COP_{adj} = K_{adj} * COP_{std}$

TABLE A5.207.1-I
COPS FOR NONSTANDARD CENTRIFUGAL CHILLERS > 150 TONS, ≤ 300 TONS

CENTRIFUGAL CHILLERS > 150 Tons, ≤ 300 Tons COP_{std} = 5.55								
			CONDENSER FLOW RATE					
			2 gpm/ton	2.5 gpm/ton	3 gpm/ton	4 gpm/ton	5 gpm/ton	6 gpm/ton
Leaving Chilled Water Temperature (°F)	Entering Condenser Water Temperature (°F)	LIFT[1] (°F)	Required COP					
46	75	29	6.17	6.44	6.66	6.99	7.23	7.40
45	75	30	6.08	6.34	6.54	6.84	7.06	7.22
44	75	31	6.00	6.24	6.43	6.71	6.9	7.05
43	75	32	5.91	6.15	6.33	6.58	6.76	6.89
42	75	33	5.83	6.07	6.23	6.47	6.63	6.75
41	75	34	5.74	5.98	6.14	6.36	6.51	6.62
46	80	34	5.74	5.98	6.14	6.36	6.51	6.62
40	75	35	5.65	5.90	6.05	6.26	6.40	6.51
45	80	35	5.65	5.90	6.05	6.26	6.40	6.51
44	80	36	5.56	5.81	5.97	6.17	6.30	6.40
43	80	37	5.46	5.73	5.89	6.08	6.21	6.30
42	80	38	5.35	5.64	5.80	6.00	6.12	6.20
41	80	39	5.23	5.54	5.71	5.91	6.03	6.11
46	85	39	5.23	5.54	5.71	5.91	6.03	6.11
40	80	40	5.10	5.44	5.62	5.83	5.95	6.03
45	85	40	5.10	5.44	5.62	5.83	5.95	6.03
44	85	41	4.96	5.33	5.55	5.74	5.86	5.94
43	85	42	4.81	5.21	5.42	5.66	5.78	5.86
42	85	43	4.63	5.08	5.31	5.56	5.69	5.77
41	85	44	4.45	4.93	5.19	5.46	5.60	5.69
40	85	45	4.24	4.77	5.06	5.35	5.50	5.59
Condenser DT[2]			14.04	11.23	9.36	7.02	5.62	4.68

1. LIFT = Entering Condenser Water Temperature (°F) – Leaving Chilled Water Temperature (°F)
2. Condenser DT = Leaving Condenser Water Temperature (°F) – Entering Condenser Water Temperature (°F)

$K_{adj} = 6.1507 - 0.30244(x) + 0.0062692(x)^2 - 0.000045595(x)^3$

where x = Condenser DT + LIFT

$COP_{adj} = K_{adj} * COP_{std}$

TABLE A5.207.1-J
COPS FOR NONSTANDARD CENTRIFUGAL CHILLERS > 300 TONS

CENTRIFUGAL CHILLERS > 300 TONS COP_{std} = 6.1								
			CONDENSER FLOW RATE					
			2 gpm/ton	2.5 gpm/ton	3 gpm/ton	4 gpm/ton	5 gpm/ton	6 gpm/ton
Leaving Chilled Water Temperature (°F)	Entering Condenser Water Temperture (°F)	LIFT[1] (°F)	Required COP					
46	75	29	6.80	7.11	7.35	7.71	7.97	8.16
45	75	30	6.71	6.99	7.21	7.55	7.78	7.96
44	75	31	6.61	6.89	7.09	7.40	7.61	7.77
43	75	32	6.52	6.79	6.98	7.26	7.45	7.60
42	75	33	6.43	6.69	6.87	7.13	7.31	7.44
41	75	34	6.33	6.60	6.77	7.02	7.18	7.30
46	80	34	6.33	6.60	6.77	7.02	7.18	7.30
40	75	35	6.23	6.50	6.68	6.91	7.06	7.17
45	80	35	6.23	6.50	6.68	6.91	7.06	7.17
44	80	36	6.13	6.41	6.58	6.81	6.95	7.05
43	80	37	6.02	6.31	6.49	6.71	6.85	6.94
42	80	38	5.90	6.21	6.40	6.61	6.75	6.84
41	80	39	5.77	6.11	6.30	6.52	6.65	6.74
46	85	39	5.77	6.11	6.30	6.52	6.65	6.74
40	80	40	5.63	6.00	6.20	6.43	6.56	6.65
45	85	40	5.63	6.00	6.20	6.43	6.56	6.65
44	85	41	5.47	5.87	6.10	6.33	6.47	6.55
43	85	42	5.30	5.74	5.98	6.24	6.37	6.46
42	85	43	5.11	5.60	5.86	6.13	6.28	6.37
41	85	44	4.90	5.44	5.72	6.02	6.17	6.27
40	85	45	4.68	5.26	5.58	5.90	6.07	6.17
Condenser DT[2]			14.04	11.23	9.36	7.02	5.62	4.68

1. LIFT = Entering Condenser Water Temperature (°F) – Leaving Chilled Water Temperature (°F)
2. Condenser DT = Leaving Condenser Water Temperature (°F) – Entering Condenser Water Temperature (°F)

$K_{adj} = 6.1507 - 0.30244(x) + 0.0062692(x)^2 - 0.000045595(x)^3$

where x = Condenser DT + LIFT

$COP_{adj} = K_{adj} * COP_{std}$

TABLE A5.207.1-K
IPLV/NPLV FOR NONSTANDARD CENTRIFUGAL CHILLERS < 150 TONS

CENTRIFUGAL CHILLERS < 150 Tons $IPLV_{std} = 5.25$								
			Condenser Flow Rate					
			2 gpm/ton	2.5 gpm/ton	3 gpm/ton	4 gpm/ton	5 gpm/ton	6 gpm/ton
Leaving Chilled Water Temperature (°F)	Entering Condenser Water Temperature (°F)	LIFT[1] (°F)	Required IPLV/NPLV					
46	75	29	5.84	6.10	6.30	6.61	6.84	7.00
45	75	30	5.75	6.00	6.19	6.47	6.68	6.83
44	75	31	5.67	5.91	6.08	6.34	6.53	6.67
43	75	32	5.59	5.82	5.99	6.23	6.39	6.52
42	75	33	5.51	5.74	5.90	6.12	6.27	6.39
41	75	34	5.43	5.66	5.81	6.02	6.16	6.26
46	80	34	5.43	5.66	5.81	6.02	6.16	6.26
40	75	35	5.35	5.58	5.73	5.93	6.06	6.15
45	80	35	5.35	5.58	5.73	5.93	6.06	6.15
44	80	36	5.26	5.50	5.65	5.84	5.96	6.05
43	80	37	5.16	5.42	5.57	5.76	5.87	5.96
42	80	38	5.06	5.33	5.49	5.67	5.79	5.87
41	80	39	4.95	5.24	5.41	5.60	5.71	5.78
46	85	39	4.95	5.24	5.41	5.60	5.71	5.78
40	80	40	4.83	5.14	5.32	5.52	5.63	5.70
45	85	40	4.83	5.14	5.32	5.52	5.63	5.70
44	85	41	4.69	5.04	5.25[3]	5.43	5.55	5.62
43	85	42	4.55	4.93	5.13	5.35	5.47	5.54
42	85	43	4.38	4.80	5.03	5.26	5.38	5.46
41	85	44	4.21	4.67	4.91	5.17	5.30	5.38
40	85	45	4.01	4.52	4.79	5.06	5.20	5.29
Condenser DT[2]			14.04	11.23	9.36	7.02	5.62	4.68

1. LIFT = Entering Condenser Water Temperature (°F) – Leaving Chilled Water Temperature (°F)
2. Condenser DT = Leaving Condenser Water Temperature (°F) – Entering Condenser Water Temperature (°F)
3. All values shown are NPLV except at conditions of 3 gpm/ton and °F LIFT which is IPLV.

$K_{adj} = 6.1507 - 0.30244(\times) + 0.0062692(\times)^2 - 0.000045595(\times)^3$

where × = Condenser DT + LIFT

$COP_{adj} = K_{adj} * COP_{std}$

TABLE A5.207.1-L
IPLV/NPLV FOR NONSTANDARD CENTRIFUGAL CHILLERS > 150 TONS, < 300 TONS

CENTRIFUGAL CHILLERS > 150 TONS, < 300 TONS $IPLV_{std} = 5.9$								
			Condenser Flow Rate					
			2 gpm/ton	2.5 gpm/ton	3 gpm/ton	4 gpm/ton	5 gpm/ton	6 gpm/ton
Leaving Chilled Water Temperature (°F)	Entering Condenser Water Temperature (°F)	LIFT[1] (°F)	Required IPLV/NPLV					
46	75	29	6.58	6.87	7.11	7.46	7.71	7.90
45	75	30	6.49	6.76	6.98	7.30	7.53	7.70
44	75	31	6.40	6.66	6.86	7.15	7.36	7.52
43	75	32	6.31	6.56	6.75	7.02	7.21	7.35
42	75	33	6.22	6.47	6.65	6.90	7.07	7.20
41	75	34	6.13	6.38	6.55	6.79	6.95	7.06
46	80	34	6.13	6.38	6.55	6.79	6.95	7.06
40	75	35	6.03	6.29	6.46	6.68	6.83	6.94
45	80	35	6.03	6.29	6.46	6.68	6.83	6.94
44	80	36	5.93	6.20	6.37	6.58	6.72	6.82
43	80	37	5.82	6.11	6.28	6.49	6.62	6.72
42	80	38	5.71	6.01	6.19	6.40	6.53	6.62
41	80	39	5.58	5.91	6.10	6.31	6.44	6.52
46	85	39	5.58	5.91	6.10	6.31	6.44	6.52
40	80	40	5.44	5.80	6.00	6.22	6.35	6.43
45	85	40	5.44	5.80	6.00	6.22	6.35	6.43
44	85	41	5.29	5.68	5.90[3]	6.13	6.26	6.34
43	85	42	5.13	5.55	5.79	6.03	6.16	6.25
42	85	43	4.94	5.41	5.67	5.93	6.07	6.16
41	85	44	4.74	5.26	5.54	5.82	5.97	6.07
40	85	45	4.52	5.09	5.40	5.71	5.87	5.97
Condenser DT[2]			14.04	11.23	9.36	7.02	5.62	4.68

1. LIFT = Entering Condenser Water Temperature (°F) – Leaving Chilled Water Temperature (°F)
2. Condenser DT = Leaving Condenser Water Temperature (°F) – Entering Condenser Water Temperature (°F)
3. All values shown are NPLV except at conditions of 3 gpm/ton and °F LIFT which is IPLV.

$K_{adj} = 6.1507 - 0.30244(x) + 0.0062692(x)^2 - 0.000045595(x)^3$

where x = Condenser DT + LIFT

$COP_{adj} = K_{adj} * COP_{std}$

TABLE A5.207.1-M
IPLV/NPLV FOR NONSTANDARD CENTRIFUGAL CHILLERS > 300 TONS

CENTRIFUGAL CHILLERS > 300 TONS $IPLV_{std}$ = 6.4								
			CONDENSER FLOW RATE					
			2 gpm/ton	2.5 gpm/ton	3 gpm/ton	4 gpm/ton	5 gpm/ton	6 gpm/ton
Leaving Chilled Water Temperature (°F)	Entering Condenser Water Temperature (°F)	LIFT[1] (°F)	Required IPLV/NPLV					
46	75	29	7.15	7.47	7.72	8.10	8.37	8.58
45	75	30	7.05	7.35	7.58	7.93	8.18	8.36
44	75	31	6.95	7.23	7.45	7.77	8.00	8.16
43	75	32	6.85	7.13	7.33	7.63	7.83	7.98
42	75	33	6.75	7.03	7.22	7.49	7.68	7.82
41	75	34	6.65	6.93	7.12	7.37	7.55	7.67
46	80	34	6.65	6.93	7.12	7.37	7.55	7.67
40	75	35	6.55	6.83	7.01	7.26	7.42	7.54
45	80	35	6.55	6.83	7.01	7.26	7.42	7.54
44	80	36	6.44	6.73	6.92	7.15	7.30	7.41
43	80	37	6.32	6.63	6.82	7.05	7.19	7.30
42	80	38	6.20	6.53	6.72	6.95	7.09	7.19
41	80	39	6.06	6.42	6.62	6.85	6.99	7.08
46	85	39	6.06	6.42	6.62	6.85	6.99	7.08
40	80	40	5.91	6.30	6.52	6.76	6.89	6.98
45	85	40	5.91	6.30	6.52	6.76	6.89	6.98
44	85	41	5.75	6.17	6.40[3]	6.66	6.79	6.89
43	85	42	5.57	6.03	6.28	6.55	6.70	6.79
42	85	43	5.37	5.88	6.16	6.44	6.59	6.69
41	85	44	5.15	5.71	6.01	6.33	6.49	6.59
40	85	45	4.91	5.53	5.86	6.20	6.37	6.48
Condenser DT[2]			14.04	11.23	9.36	7.02	5.62	4.68

1. LIFT = Entering Condenser Water Temperature (°F) – Leaving Chilled Water Temperature (°F)
2. Condenser DT = Leaving Condenser Water Temperature (°F) – Entering Condenser Water Temperature (°F)
3. All values shown are NPLV except at conditions of 3 gpm/ton and °F LIFT which is IPLV.

$K_{adj} = 6.1507 - 0.30244(x) + 0.0062692(x)^2 - 0.000045595(x)^3$

where x = Condenser DT + LIFT

$COP_{adj} = K_{adj} * COP_{std}$

A5.207.2 Space conditioning systems. A building complies with this section by being designed with and having constructed and installed a space-conditioning system that meets the requirements of Subsections A5.207.2.1 through A5.207.2.6.

A5.207.2.1 Supply-air temperature reset controls. Mechanical space-conditioning systems supplying heated or cooled air to multiple zones shall include controls that automatically reset supply-air temperatures:

1. In response to representative building loads or to outdoor air temperature; and
2. By at least 25 percent of the difference between the design supply-air temperature and the design room air temperature.

Air distribution systems serving zones that are likely to have constant loads, such as interior zones, shall be designed for the air flows resulting from the fully reset supply-air temperature.

Exceptions:

1. Systems that meet the requirements of Section 144(d) of Title 24, Part 6, without using Exception 1 or 2 to that section.
2. Where supply-air temperature reset would increase overall building energy use.
3. Zones in which specific humidity levels are required to satisfy process needs.

A5.207.2.2 Electric resistance heating. Electric resistance heating systems shall not be used for space heating.

Exceptions:

1. Where an electric-resistance heating system supplements a heating system in which at least 60 percent of the annual energy requirement is supplied by site-solar or recovered energy.
2. Where the total capacity of all electric-resistance heating systems serving the entire building is less than 10 percent of the total design output capacity of all heating equipment serving the entire building.
3. Where an electric resistance heating system serves an entire building that is not a high-rise residential or hotel/motel building; and has a conditioned floor area no greater than 5,000 square feet; and has no mechanical cooling; and is in an area where natural gas is not currently available and an extension of a natural gas system is impractical, as determined by the natural gas utility.

A5.207.2.3 Heat rejection systems.

A5.207.2.3.1 General. Subsection A5.207.2.3 applies to heat rejection equipment used in comfort cooling systems such as air-cooled condensers, open cooling towers, closed-circuit cooling towers and evaporative condensers.

A5.207.2.3.2 Fan speed control. Each fan powered by a motor of 7.5 hp (5.6 kW) or larger shall have the capability to operate that fan at $^2/_3$ of full speed or less and shall have controls that automatically change the fan speed to control the leaving fluid temperature or condensing temperature/pressure of the heat rejection device.

Exceptions:

1. Heat rejection devices included as an integral part of the equipment listed in Tables A5.207.1-A through A5.207.1-E.
2. Condenser fans serving multiple refrigerant circuits.
3. Condenser fans serving flooded condensers.
4. Up to $^1/_3$ of the fans on a condenser or tower with multiple fans where the lead fans comply with the speed control requirement.

A5.207.2.3.3 Tower flow turndown. Open cooling towers configured with multiple condenser water pumps shall be designed so that all cells can be run in parallel with the larger of:

1. The flow that's produced by the smallest pump or
2. 33 percent of the design flow for the cell.

A5.207.2.3.4 Limitation on centrifugal fan cooling towers. Open cooling towers with a combined rated capacity of 900 gpm and greater at 95°F condenser water return, 85°F condenser water supply and 75°F outdoor wet-bulb temperature shall use propeller fans and shall not use centrifugal fans.

Exceptions:

1. Cooling towers that are ducted (inlet or discharge) or have an external sound trap that requires external static pressure capability.
2. Cooling towers that meet the energy efficiency requirement for propeller fan towers in Section A5.207.1, Table A5.207.1-G.

A5.207.2.4 Hydronic system measures.

A5.207.2.4.1 Hydronic variable flow systems. HVAC chilled and hot water pumping shall be designed for variable fluid flow and shall be capable of reducing pump flow rates to no more than the larger of: a) 50 percent or less of the design flow rate; or b) the minimum flow required by the equipment manufacturer for the proper operation of equipment served by the system.

Exceptions:

1. Systems that include no more than three control valves.
2. Systems having a total pump system power less than or equal to $1^1/_2$ HP.

A5.207.2.4.2 Chiller isolation. When a chilled water plant includes more than one chiller, provisions shall be made so that flow through any chiller is automatically shut off when that chiller is shut off while still maintaining flow through other operating chiller(s). Chillers that are piped in series for the purpose of increased temperature differential shall be considered as one chiller.

A5.207.2.4.3 Boiler isolation. When a hot water plant includes more than one boiler, provisions shall be made so that flow through any boiler is automatically shut off when that boiler is shut off while still maintaining flow through other operating boiler(s).

A5.207.2.4.4 Chilled and hot water temperature reset controls. Chilled and hot water systems with a design capacity exceeding 500,000 Btu/hr supplying chilled or heated water (or both) shall include controls that automatically reset supply water temperatures as a function of representative building loads or outside air temperature.

Exception: Hydronic systems that use variable flow to reduce pumping energy in accordance with Section A5.207.2.4.1.

A5.207.2.4.5 Water-cooled air conditioner and hydronic heat pump systems. Water circulation systems serving water-cooled air conditioners, hydronic heat pumps or both that have total pump system power exceeding 5 hp shall have flow controls that meet the requirements of Section A5.207.2.4.6. Each air conditioner or heat pump shall have a two-position automatic valve interlocked to shut off water flow when the compressor is off.

A5.207.2.4.6 Variable flow controls.

A5.207.2.4.6.1 Variable speed drives. Individual pumps serving variable flow systems and having a motor horsepower exceeding 5 hp shall have controls and/or devices (such as variable speed control) that will result in pump motor demand of no more than 30 percent of design wattage at 50 percent of design water flow. The pumps shall be controlled as a function of required differential pressure.

A5.207.2.4.6.2 Pressure sensor location and setpoint.

1. For systems without direct digital control of individual coils reporting to the central control panel, differential pressure shall be measured at or near the most remote heat exchanger or the heat exchanger requiring the greatest differential pressure.
2. For systems with direct digital control of individual coils with central control panel, the static pressure set point shall be reset based on the valve requiring the most pressure and the setpoint shall be no less than 80 percent open. The pressure sensor(s) may be mounted anywhere.

Exceptions:

1. Heating hot water systems.
2. Condenser water systems serving only water-cooled chillers.

A5.207.2.4.7 Hydronic heat pump (WLHP) controls. Hydronic heat pumps connected to a common heat pump water loop with central devices for heat rejection and heat addition shall have controls that are capable of providing a heat pump water supply temperature dead band of at least 20°F between initiation of heat rejection and heat addition by the central devices.

Exception: Where a system loop temperature optimization controller is used to determine the most efficient operating temperature based on real-time conditions of demand and capacity, dead bands of less than 20°F shall be allowed.

A5.207.2.5 Air distribution system duct leakage sealing. All duct systems shall be sealed to a leakage rate not to exceed 6 percent of the fan flow if the duct system:

A5.207.2.5.1 Is connected to a constant volume, single zone, air conditioners, heat pumps or furnaces; and

A5.207.2.5.2 Serves less than 5,000 square feet of floor area; and

A5.207.2.5.3 Has more than 25 percent duct surface area located in one or more of the following spaces:

1. Outdoors; or
2. In a space directly under a roof where the *U*-factor of the roof is greater than the *U*-factor of the ceiling; or

   Exception: Where the roof meets the requirements of Section 143(a)1C of Title 24, Part 6.
3. In a space directly under a roof with fixed vents or openings to the outside or unconditioned spaces; or
4. In an unconditioned crawlspace; or
5. In other unconditioned spaces.

The leakage rate shall be confirmed through field verification and diagnostic testing, in accordance with procedures set forth in the Reference Nonresidential Appendix NA1 of the California Energy Commission 2008 *Building Energy Efficiency Standards for Residential and Nonresidential Buildings*.

A5.207.2.6 Variable air volume control for single zone systems. Effective January 1, 2012, all unitary air conditioning equipment and air-handling units with mechanical cooling capacity at ARI conditions greater than or equal to 110,000 Btu/hr that serve single zones shall be designed for variable supply air volume with their supply fans controlled by two-speed motors, variable speed drives or equipment that has been demonstrated to the Executive Director to use no more energy. The supply fan controls shall modulate down to a minimum of $^2/_3$ of the full fan speed or lower at low cooling demand.

A5.207.3 Service water-heating systems and equipment.

A5.207.3.1 Certification by manufacturers. Any service water-heating system or equipment may be installed only if the manufacturer has certified that the system or equipment complies with all of the requirements of this subsection for that system or equipment.

A5.207.3.1.1 Temperature controls for service water-heating systems. Service water-heating systems shall be equipped with automatic temperature controls capable of adjustment from the lowest to the highest

acceptable temperature settings for the intended use as listed in Table 2, Chapter 9 of the ASHRAE Handbook, HVAC Applications Volume.

A5.207.3.2 Efficiency. Equipment shall meet the applicable requirements of the Appliance Efficiency Regulations as required by Section A5.210.1, subject to the following:

1. If more than one standard is listed in the Appliance Efficiency Regulations, the equipment shall meet all the standards listed; and
2. If more than one test method is listed in the Appliance Efficiency Regulations, the equipment shall comply with the applicable standard when tested with each test method; and
3. Where equipment can serve more than one function, such as both heating and cooling or both space heating and water heating, it shall comply with all the requirements applicable to each function; and
4. Where a requirement is for equipment rated at its "maximum rated capacity" or "minimum rated capacity," the capacity shall be as provided for and allowed by the controls, during steady-state operation.

A5.207.3.3 Installation. Any service water-heating system or equipment may be installed only if the system or equipment complies with all of the applicable requirements of this subsection for the system or equipment.

A5.207.3.3.1 Outlet temperature controls. On systems that have a total capacity greater than 167,000 Btu/hr, outlets that require higher than service water temperatures as listed in the ASHRAE Handbook, Applications Volume, shall have separate remote heaters, heat exchangers or boosters to supply the outlet with the higher temperature.

A5.207.3.3.2 Temperature controls for public lavatories. The controls shall limit the outlet temperature to 110°F.

A5.207.3.3.3 Insulation. Unfired service water heater storage tanks and backup tanks for solar water-heating systems shall have:

1. External insulation with an installed *R*-value of at least R-12; or
2. Internal and external insulation with a combined *R*-value of at least R-16; or
3. The heat loss of the tank surface based on an 80°F water-air temperature difference shall be less than 6.5 Btu per hour per square foot.

A5.207.3.3.4 Service water heaters in state buildings. Any newly constructed building constructed by the State shall derive its service water heating from a system that provides at least 60 percent of the energy needed for service water heating from site solar energy or recovered energy.

Exception: Buildings for which the state architect determines that service water heating from site solar energy or recovered energy is economically or physically infeasible.

A5.207.4 Natural gas central furnaces, cooking equipment and pool and spa heaters: Pilot lights prohibited.

Any natural gas system or equipment listed below may be installed only if it does not have a continuously burning pilot light:

1. Fan-type central furnaces.
2. Household cooking appliances.

   Exception: Household cooking appliances without an electrical supply voltage connection and in which each pilot consumes less than 150 Btu/hr.
3. Pool heaters.
4. Spa heaters.

A5.207.5 Controls for space-conditioning systems. Space-conditioning systems shall be installed with controls that comply with the applicable requirements of Subsections A5.207.5.1 through A5.207.5.5.

A5.207.5.1 Thermostatic controls for each zone. The supply of heating and cooling energy to each space-conditioning zone or dwelling unit shall be controlled by an individual thermostatic control that responds to temperature within the zone and that meets the applicable requirements of Section A5.207.5.2.

Exception: An independent perimeter heating or cooling system may serve more than one zone without individual thermostatic controls if:

1. All zones are also served by an interior cooling system;
2. The perimeter system is designed solely to offset envelope heat losses or gains;
3. The perimeter system has at least one thermostatic control for each building orientation of 50 feet or more; and
4. The perimeter system is controlled by at least one thermostat located in one of the zones served by the system.

A5.207.5.2 Criteria for zonal thermostatic controls. The individual thermostatic controls required by Section A5.207.5.1 shall meet the following requirements as applicable:

1. Where used to control comfort heating, the thermostatic controls shall be capable of being set, locally or remotely, down to 55°F or lower.
2. Where used to control comfort cooling, the thermostatic controls shall be capable of being set, locally or remotely, up to 85°F or higher.
3. Where used to control both comfort heating and comfort cooling, the thermostatic controls shall meet Items 1 and 2 and shall be capable of providing a temperature range or dead band of at least 5°F within which the supply of heating and cooling energy to the zone is shut off or reduced to a minimum.

   Exception: Systems with thermostats that require manual changeover between heating and cooling modes.

4. Thermostatic controls for all unitary single zone, air conditioners, heat pumps and furnaces, shall comply with the setback thermostat requirements of Section A5.207.1.3 or, if equipped with DDC to the Zone level, with the Automatic Demand Shed Controls of Section A5.207.5.5.

   Exception: Systems serving zones that must have constant temperatures to prevent degradation of materials, a process, plants or animals.

A5.207.5.3 Heat pump controls. All heat pumps with supplementary electric resistance heaters shall be installed with controls that comply with Section A5.207.1.2.

A5.207.5.4 Dampers for air supply and exhaust equipment. Outdoor air supply and exhaust equipment shall be installed with dampers that automatically close upon fan shutdown.

Exceptions:

1. Where it can be demonstrated to the satisfaction of the enforcing agency that the equipment serves an area that must operate continuously.
2. Gravity and other nonelectrical equipment that has readily accessible manual damper controls.
3. At combustion air intakes and shaft vents.
4. Where prohibited by other provisions of law.

A5.207.5.5 Automatic demand shed controls. HVAC systems with DDC to the Zone level shall be programmed to allow centralized demand shed for noncritical zones as follows:

1. The controls shall have a capability to remotely setup the operating cooling temperature set points by 4 degrees or more in all noncritical zones on signal from a centralized contact or software point within an Energy Management Control System (EMCS).
2. The controls shall remotely set down the operating heating temperature set points by 4 degrees or more in all noncritical zones on signal from a centralized contact or software point within an EMCS.
3. The controls shall have capabilities to remotely reset the temperatures in all noncritical zones to original operating levels on signal from a centralized contact or software point within an EMCS.
4. The controls shall be programmed to provide an adjustable rate of change for the temperature setup and reset.

A5.207.6 Pipe insulation. The piping for all space-conditioning and service water-heating systems with fluid temperatures listed in Table A5.207.6-A shall have the amount of insulation specified in Subsection A5.207.6.1 or A5.207.6.2. Insulation conductivity shall be determined in accordance with ASTM C 335 at the mean temperature listed in Table A5.207.6-A and shall be rounded to the nearest $^1/_{100}$ Btu-inch per hour per square foot per °F.

Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance and wind, including but not limited to, the following:

Insulation exposed to weather shall be suitable for outdoor service, e.g., protected by aluminum, sheet metal, painted canvas or plastic cover. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall include a vapor retardant located outside the insulation (unless the insulation is inherently vapor retardant), all penetrations and joints of which shall be sealed.

Exceptions:

1. Factory-installed piping within space-conditioning equipment certified under Section A5.210.1 or A5.207.1.
2. Piping that conveys fluids with a design operating temperature range between 60°F and 105°F.
3. Piping that serves process loads, gas piping, cold domestic water piping, condensate drains, roof drains, vents or waste piping.
4. Where the heat gain or heat loss to or from piping without insulation will not increase building source energy use.
5. Piping that penetrates framing members shall not be required to have pipe insulation for the distance of the framing penetration. Metal piping that penetrates metal framing shall use grommets, plugs, wrapping or other insulating material to assure that no contact is made with the metal framing.

A5.207.6.1 For insulation with a conductivity in the range shown in Table A5.207.6-A for the applicable fluid temperature range, the insulation shall have the applicable thickness shown in Table A5.207.6-A.

A5.207.6.2 For insulation with a conductivity outside the range shown in Table A5.207.6-A for the applicable fluid temperature range, the insulation shall have a minimum thickness as calculated with Equation A5.207.6-A below.

EQUATION A5.207.6-A
INSULATION THICKNESS EQUATION

$$T = PR\left[\left(1+\frac{t}{PR}\right)^{\frac{K}{k}} - 1\right]$$

where:

T = Minimum insulation thickness for material with conductivity K, inches.

PR = Pipe actual outside radius, inches.

t = Insulation thickness from Table A5.207.6-A, inches.

K = Conductivity of alternate material at the mean rating temperature indicated in Table A5.207.6-A, for the applicable fluid temperature range, in Btu-inch per hour per square foot per °F.

k = The lower value of the conductivity range listed in Table A5.207.6-A, for the applicable fluid temperature range, Btu-inch per hour per square foot per °F.

TABLE A5.207.6-A
PIPE INSULATION THICKNESS

FLUID TEMPERATURE RANGE (°F)	CONDUCTIVITY RANGE (in Btu-inch per hour per square foot per °F)	INSULATION MEAN RATING TEMPERATURE (°F)	NOMINAL PIPE DIAMETER (in inches)					
			Runouts up to 2	1 and less	1.25-2	2.50-4	5-6	8 and larger
			INSULATION THICKNESS REQUIRED (in inches)					
Space heating systems (steam, steam condensate and hot water)								
Above 350	0.32-0.34	250	1.5	2.5	2.5	3.0	3.5	3.5
251-350	0.29-0.31	200	1.5	2.0	2.5	2.5	3.5	3.5
201-250	0.27-0.30	150	1.0	1.5	1.5	2.0	2.0	3.5
141-200	0.25-0.29	125	0.5	1.5	1.5	1.5	1.5	1.5
105-140	0.24-0.28	100	0.5	1.0	1.0	1.0	1.5	1.5
Service water-heating systems (recirculating sections, all piping in electric trace tape systems and the first 8 feet of piping from the storage tank for nonrecirculating systems)								
Above 105	0.24-0.28	100	0.5	1.0	1.0	1.5	1.5	1.5
Space cooling systems (chilled water, refrigerant and brine)								
40-60	0.23-0.27	75	0.5	0.5	0.5	1.0	1.0	1.0
Below 40	0.23-0.27	75	1.0	1.0	1.5	1.5	1.5	1.5

A5.208
Not used

A5.209 [OSHPD 1, 2 & 4] LIGHTING

A5.209.1 Lighting control devices, ballasts and luminaires. Any lighting control device, ballast or luminaire subject to the requirements of Section A5.209 shall be installed only if the manufacturer has certified to the Commission that the device complies with all of the applicable requirements of Section A5.209.

Lighting control devices may be individual devices or systems consisting of two or more components. For control systems consisting of two or more components, such as an Energy Management Control System (EMCS), the manufacturer of the control system shall certify each of the components required for the system to comply with Section A5.209.

A5.209.1.1 All devices: Instructions for installation and calibration. The manufacturer shall provide step-by-step instructions for installation and start-up calibration of the device.

A5.209.1.2 Indicator lights. Indicator lights integral to lighting control devices shall consume no more than one watt of power per indicator light.

A5.209.1.3 Automatic time switch control devices. Automatic time switch control devices or system shall:

1. Be capable of programming different schedules for weekdays and weekends; and
2. Have program backup capabilities that prevent the loss of the device's schedules for at least 7 days and the device's time and date setting for at least 72 hours if power is interrupted.

A5.209.1.4 Occupant sensors, motion sensors and vacancy sensors. Occupant sensors, motion sensors and vacancy sensors shall be capable of automatically turning off all the lights in an area no more than 30 minutes after the area has been vacated and shall have a visible status signal that indicates that the device is operating properly or that it has failed or malfunctioned. The visible status signal may have an override switch that turns the signal off. In addition, ultrasonic and microwave devices shall have a built-in mechanism that allows calibration of the sensitivity of the device to room movement in order to reduce the false sensing of occupants and shall comply with either Subsection A5.209.1.4.1 or A5.209.1.4.2 below, as applicable:

A5.209.1.4.1 If the device emits ultrasonic radiation as a signal for sensing occupants within an area, the device shall:

1. Have had a Radiation Safety Abbreviated Report submitted to the Center for Devices and Radiological Health, Federal Food and Drug Administration, under 21 Code of Federal Regulations, Section 1002.12 (1996) and a copy of the report shall have been submitted to the California Energy Commission; and
2. Emit no audible sound; and
3. Not emit ultrasound in excess of the decibel (dB) values shown in Table A5.209.1-A, measured no more than 5 feet from the source, on axis.

A5.209.1.4.2 If the device emits microwave radiation as a signal for sensing occupants within the area, the device shall:

1. Comply with all applicable provisions in 47 *Code of Federal Regulations*, Parts 2 and 15 (1996) and have an approved Federal Communications Commission Identifier that appears on all units of the device and that has been submitted to the California Energy Commission; and
2. Not emit radiation in excess of 1 milliwatt per square centimeter measured at no more than 5 centimeters from the emission surface of the device; and
3. Have permanently affixed to it installation instructions recommending that it be installed at least 12 inches from any area normally used by room occupants.

A5.209.1.5 Multilevel occupant sensor. Multilevel occupant sensors shall have an automatic OFF function that turns off all the lights and either an automatic or a manually controlled ON function capable of meeting all the multilevel and uniformity requirements of Section A5.209.2.2 for the controlled lighting. The first stage shall be capable of activating between 30–70 percent of the lighting power in a room either through an automatic or manual action and may be a switching or dimming system. After that event occurs the device shall be capable of all of the following actions when manually called to do so by the occupant:

1. Activating the alternate set of lights.
2. Activating 100 percent of the lighting power.
3. Deactivating all lights.

A5.209.1.6 Automatic daylighting control devices. Automatic daylighting control devices used to control lights in daylit zones shall:

1. Be capable of reducing the power consumption of the general lighting in the controlled area by at least two thirds in response to the availability of daylight; and
2. If the device is a dimmer controlling incandescent or fluorescent lamps, provide electrical outputs to lamps for reduced flicker operation through the dimming range, so that the light output has an amplitude modulation of less than 30 percent for frequencies less than 200 Hz and without causing premature lamp failure; and
3. If the devices reduce lighting in control steps, incorporate time-delay circuits to prevent cycling of light level changes of less than 3 minutes and have a manual or automatic means of adjusting the deadband to provide separation of on and off points for each control step; and
4. If the device is placed in calibration mode, automatically restore its time delay settings to normal operation programmed time delays after no more than 60 minutes; and
5. Have a setpoint control that easily distinguishes settings to within 10 percent of full scale adjustment; and
6. Have a light sensor that has a linear response with 5 percent accuracy over the range of illuminance measured by the light sensor; and
7. Have a light sensor that is physically separated from where calibration adjustments are made or is capable of being calibrated in a manner that the person initiating calibration is remote from the sensor during calibration to avoid influencing calibration accuracy.

A5.209.1.7 Interior photosensors. Interior photosensor shall not have a mechanical slide cover or other device that permits easy unauthorized disabling of the control and shall not be incorporated into a wall-mounted occupant-sensor.

A5.209.1.8 Multilevel astronomical time-switch controls. Multilevel astronomical time-switch controls used to control lighting in daylit zones shall:

1. Contain at least two separately programmable steps per zone that reduces illuminance in a relatively uniform manner as specified in Section A5.209.2.2; and
2. Have a separate offset control for each step of 1 to 240 minutes; and
3. Have sunrise and sunset prediction accuracy within +/- 15 minutes and timekeeping accuracy within 5 minutes per year; and
4. Store astronomical time parameters (used to develop longitude, latitude, time zone) for at least 7 days if power is interrupted; and
5. Display date/time, sunrise and sunset and switching times for each step; and
6. Have an automatic daylight savings time adjustment; and
7. Have automatic time switch capabilities specified in Section A5.209.1.3.

A5.209.1.9 Outdoor astronomical time-switch controls. Outdoor astronomical time-switch controls used to control outdoor lighting as specified in Section A5.209.3.3 shall:

1. Contain at least two separately programmable steps per function area; and
2. Have the ability to independently offset the on and off times for each channel by 0 to 99 minutes before or after sunrise or sunset; and
3. Have sunrise and sunset prediction accuracy within +/- 15 minutes and timekeeping accuracy within 5 minutes per year; and
4. Store astronomical time parameters (used to develop longitude, latitude, time zone) for at least 7 days if power is interrupted; and
5. Display date/time, sunrise and sunset; and
6. Have an automatic daylight savings time adjustment; and
7. Have automatic time switch capabilities specified in Section A5.209.1.3.

A5.209.1.10 Dimmers. Dimmers used to control lighting shall:

1. Be capable of reducing power consumption by a minimum of 65 percent when the dimmer is at its lowest light level; and
2. If the device is a dimmer controlling incandescent or fluorescent lamps, provide electrical outputs to lamps for reduced flicker operation through the dimming range, so that the light output has an amplitude modulation of less than 30 percent for frequencies less than 200 Hz and without causing premature lamp failure; and
3. Be listed by a rating lab recognized by the International Code Council (ICC) as being in compliance with Underwriters Laboratories Standards; and
4. If the device is a wall box dimmer designed to be used in a three- or more-way circuit with nondimmable switches, the level set by the dimmer, shall not be overridden by any of the switches in the circuit. The dimmer and all of the switches in the circuit shall have the capability of turning lighting OFF if it is ON and turning lighting ON to the level set by the dimmer if the lighting is OFF. Any wall box dimmer that is connected to a system with an emergency override function shall be controlled by the emergency override.
5. If the device is a stepped dimmer, it shall include an off position to turn lights completely off.

TABLE A5.209.1-A
ULTRASOUND MAXIMUM DECIBEL VALUES

MIDFREQUENCY OF SOUND PRESSURE THIRD-OCTAVE BAND (in kHz)	MAXIMUM dB LEVEL WITHIN THIRD-OCTAVE BAND (in dB reference 20 micropascals)
Less than 20	80
20 or more to less than 25	105
25 or more to less than 31.5	110
31.5 or more	115

A5.209.2 Indoor lighting controls

A5.209.2.1 Area controls.

A5.209.2.1.1 Each area enclosed by ceiling-height partitions shall have an independent switching or control device. This switching or control device shall be:

1. Readily accessible; and
2. Located so that a person using the device can see the lights or area controlled by that switch or so that the area being lit is annunciated; and
3. Manually operated or automatically controlled by an occupant-sensor that meets the applicable requirements of Section A5.209.1.

A5.209.2.1.2 Other devices may be installed in conjunction with the switching or control device provided that they:

1. Permit the switching or control device to manually turn the lights off in each area enclosed by ceiling-height partitions; and
2. Reset the mode of any automatic system to normal operation without further action.

Exception 1 to Section A5.209.2.1: Up to 0.3 watts per square foot of lighting in any area within a building that must be continuously illuminated for reasons of building security or emergency egress, if:

1. The area is designated a security or emergency egress area on the plans and specifications submitted to the enforcement agency under Section 10-103(a)2 of Title 24, Part 1; and
2. The security or egress lighting is controlled by switches accessible only to authorized personnel.

Exception 2 to Section A5.209.2.1: Public areas with switches that are accessible only to authorized personnel.

A5.209.2.2 Multilevel lighting controls. The general lighting of any enclosed space 100 square feet or larger and has a connected lighting load that exceeds 0.8 watts per square foot, shall have multilevel lighting controls. Multilevel controls shall have at least one control step that is between 30 percent and 70 percent of design lighting power and allow the power of all lights to be manually turned off. A reasonably uniform level of illuminance shall be achieved by any of the following:

1. Continuous or stepped dimming of all lamps or luminaires; or
2. Switching alternate lamps in luminaires, alternate luminaires and alternate rows of luminaires.

Exceptions:

1. Lights in corridors.
2. A space that has only one luminaire with no more than two lamps.

A5.209.2.3 Daylight areas.

A5.209.2.3.1 Daylight areas shall be defined as follows:

A5.209.2.3.1.1 Daylight area. The total daylight area shall not double count overlapping areas with any primary sidelit daylight area, secondary sidelit daylight area or skylit daylight area.

A5.209.2.3.1.2 Daylight area, primary sidelit is the combined primary sidelit area without double counting overlapping areas. The floor area for each primary sidelit area is directly adjacent to vertical glazing below the ceiling with an area equal to the product of the sidelit width and the primary sidelit depth.

The primary sidelit width is the width of the window plus, on each side, the smallest of:

1. 2 feet; or
2. The distance to any 5 feet or higher permanent vertical obstruction.

The primary sidelit depth is the horizontal distance perpendicular to the glazing which is the smaller of:

1. One window head height; or
2. The distance to any 5 feet or higher permanent vertical obstruction.

A5.209.2.3.1.3 Daylight area, secondary sidelit is the combined secondary sidelit area without double counting overlapping areas. The floor area for each secondary sidelit area is directly adjacent to primary sidelit area with an area equal to the product of the sidelit width and the secondary sidelit depth.

The secondary sidelit width is the width of the window plus, on each side, the smallest of:

1. 2 feet; or
2. The distance to any 5 feet or higher permanent vertical obstruction; or
3. The distance to any skylit daylight area.

The secondary sidelit depth is the horizontal distance perpendicular to the glazing which begins from one window head height and ends at the smaller of:

1. Two window head heights;
2. The distance to any 5 feet or higher permanent vertical obstruction; or
3. The distance to any skylit daylight area.

A5.209.2.3.1.4 Daylight area, skylit is the combined daylight area under each skylight without double counting overlapping areas. The daylight area under each skylight is bounded by the rough opening of the skylight, plus horizontally in each direction the smallest of:

1. 70 percent of the floor-to-ceiling height; or
2. The distance to any primary sidelit area or the daylight area under rooftop monitors; or
3. The distance to any permanent partition or permanent rack which is farther away than 70 percent of the distance between the top of the permanent partition or permanent rack and the ceiling.

A5.209.2.3.2 Luminaires providing general lighting that are in or are partially in the skylit daylight area and/or the primary sidelit daylight area shall be controlled as follows:

A5.209.2.3.2.1 Primary sidelit and skylit daylight areas shall have at least one lighting control that:

1. Controls at least 50 percent of the general lighting power in the primary sidelit and skylit daylight areas separately from other lighting in the enclosed space.
2. Controls luminaires in primary sidelit areas separately from skylit areas.

Exception: Primary sidelit and skylit daylight areas that have a combined area totaling less than or equal to 250 square feet within any enclosed space.

A5.209.2.3.2.2 For all skylit daylight areas:

1. The skylit daylight area shall be shown on the plans.
2. All of the general lighting in the skylit area shall be controlled independently by an automatic daylighting control device that meets the applicable requirements of Section A5.209.1.
3. The automatic daylighting control shall be installed in accordance with Section A5.209.2.3.2.4.

Exceptions:

1. Where the total skylit daylight area in any enclosed space is less than or equal to 2,500 square feet.
2. Skylit daylight areas where existing adjacent structures obstruct direct beam sunlight for at least 6 hours per day during the equinox as calculated using computer or graphical methods.
3. When the skylight effective aperture is greater than 4.0 percent and all general lighting in the skylit area is controlled by a multilevel astronomical time switch that meets the requirements of Section A5.209.1.8 and that has an override switch that meets the requirements of Section A5.209.2.4.2.
4. Skylit daylight areas where the effective aperture is less than 0.006. The effective aperture for skylit daylight areas is specified in Section 146(a)2E of Title 24, Part 6.

A5.209.2.3.2.3 The primary sidelit area(s) shall be shown on the plans and the general lighting in the primary sidelit areas shall be controlled independently by an automatic daylighting control device that meets the applicable requirements of Section A5.209.1 and is installed in accordance with Section A5.209.2.3.2.4.

Exceptions:

1. Where the total primary sidelit daylight area in any enclosed space has an area less than or equal to 2,500 square feet.
2. Primary sidelit daylight areas where the effective aperture is less than 0.1. The effective aperture for primary sidelit daylight areas is specified in Section 146(a)2E of Title 24, Part 6.
3. Primary sidelit daylight areas where existing adjacent structures are twice as tall as their distance away from the windows.
4. Parking garages.

A5.209.2.3.2.4 Automatic daylighting control device installation and operation. Automatic daylighting control devices shall be installed and configured to operate according to all of the following requirements:

1. Automatic daylighting control devices shall have photosensors that are located so that they are not readily accessible in accordance with the designer's or manufacturer's instructions.

2. The location where calibration adjustments are made to the automatic daylighting control device shall be readily accessible to authorized personnel or located within 2 feet of a ceiling access panel that is no higher than 11 feet above floor level.
3. Automatic daylighting controls shall be multilevel, including continuous dimming and have at least one control step that is between 50 percent to 70 percent of rated power of the controlled lighting.

   Exceptions:

   1. Controlled lighting having a lighting power density less than 0.3 W/ft^2.
   2. When skylights are replaced or added to on an existing building with an existing general lighting system.
4. Under all daylight conditions in all areas served by the controlled lighting, the combined illuminance from the controlled lighting and daylight is not less than the illuminance from controlled lighting when no daylight is available.
5. When all areas served by the controlled lighting are receiving daylight illuminance levels greater than 150 percent of the illuminance from controlled lighting when no daylight is available, the controlled lighting power consumption shall be no greater than 35 percent of the rated power of the controlled lighting.

A5.209.2.4 Shut-off controls.

A5.209.2.4.1 In addition to the manual controls installed to comply with Sections A5.209.2.1 and A5.209.2.2 for every floor, all indoor lighting systems shall be equipped with separate automatic controls to shut off the lighting. These automatic controls shall meet the requirements of Section A5.209.1and may be an occupant sensor, automatic time switch or other device capable of automatically shutting off the lighting.

Exceptions:

1. Where the lighting system is serving an area that must be continuously lit, 24 hours per day/365 days per year.
2. Lighting in corridors, guestrooms, dwelling units of high-rise residential buildings and hotel/motels and parking garages.
3. Up to 0.3 watts per square foot of lighting in any area within a building that must be continuously illuminated for reasons of building security or emergency egress, provided that the area is designated a security or emergency egress area on the plans and specifications submitted to the enforcement agency under Section 10-103(a)2 of Title 24, Part 1.

A5.209.2.4.2 If an automatic control device is installed to comply with Section A5.209.2.4.1, it shall incorporate an override switching device that:

1. Is readily accessible; and
2. Is located so that a person using the device can see the lights or the area controlled by that switch or so that the area being lit is annunciated; and
3. Is manually operated; and
4. Allows the lighting to remain on for no more than 2 hours when an override is initiated; and

   Exception: In malls, auditoriums, single tenant retail spaces, industrial facilities and arenas, where captive-key override is utilized, override time may exceed 2 hours.
5. Controls an area enclosed by ceiling height partitions not exceeding 5,000 square feet.

   Exception: In malls, auditoriums, single tenant retail spaces, industrial facilities, convention centers and arenas, the area controlled may not exceed 20,000 square feet.

A5.209.2.4.3 If an automatic time switch control device is installed to comply with Section A5.209.2.4.1, it shall incorporate an automatic holiday "shut-off" feature that turns off all loads for at least 24 hours and then resumes the normally scheduled operation.

Exception: Retail stores and associated malls, restaurants, grocery stores, churches and theaters.

A5.209.2.4.4 Offices 250 square feet or smaller; multipurpose rooms of less than 1,000 square feet and classrooms and conference rooms of any size, shall be equipped with occupant sensor(s) to shut off the lighting. In addition, controls shall be provided that allow the lights to be manually shut off in accordance with Section A5.209.2.1 regardless of the sensor status.

A5.209.3 Outdoor lighting controls and equipment.

A5.209.3.1 Outdoor lighting. All permanently installed outdoor luminaires employing lamps rated over 100 watts shall either have a lamp efficacy of at least 60 lumens per watt or be controlled by a motion sensor.

Exceptions:

1. Lighting required by a health or life safety statute ordinance or regulation, including but not limited to, emergency lighting.
2. Lighting used in or around swimming pools, water features or other locations subject to Article 680 of Title 24, Part 3, *California Electrical Code*.
3. Searchlights.
4. Theme lighting for use in theme parks.
5. Lighting for film or live performances.

6. Temporary outdoor lighting.
7. Light emitting diode, light emitting capacitors, neon and cold cathode lighting.
8. Sign lighting.

A5.209.3.2 Luminaire cutoff requirements. All outdoor luminaires that use lamps rated greater than 175 watts in hardscape areas including parking lots, building entrances, sales and nonsales canopies and all outdoor sales areas shall be designated Cutoff for light distribution. To comply with this requirement, the luminaire shall be rated Cutoff in a photometric test report that includes any tilt or other nonlevel mounting condition of the installed luminaire. Cutoff is a luminaire light distribution classification where the candela per 1000 lamp lumens does not numerically exceed 25 at or above a vertical angle of 90 degrees above nadir and 100 at or above a vertical angle of 80 degrees above nadir. Nadir is in the direction of straight down, as would be indicated by a plumb line. 90 degrees above nadir is horizontal. 80 degrees above nadir is 10 degrees below horizontal.

Exceptions:

1. Signs.
2. Lighting for building facades, public monuments, statues and vertical surfaces of bridges.
3. Lighting required by a health or life safety statute ordinance or regulation, including but not limited to, emergency lighting.
4. Temporary outdoor lighting.
5. Lighting used in or around swimming pools, water features or other locations subject to Article 680 of the *California Electrical Code*.
6. Replacement of existing pole mounted luminaires in hardscape areas meeting all of the following conditions:
    1. Where the existing luminaire does not meet the luminaire cutoff requirements in A5.209.3.2; and
    2. Spacing between existing poles is greater than 6 times the mounting height of the existing luminaires; and
    3. Where no additional poles are being added to the site; and
    4. Where new wiring to the luminaires is not being installed; and
    5. Provided that the connected lighting power wattage is not increased.

A5.209.3.3 Controls for outdoor lighting.

A5.209.3.3.1 All permanently installed outdoor lighting shall be controlled by a photocontrol or astronomical time switch that automatically turns off the outdoor lighting when daylight is available.

Exception: Lighting in tunnels and large covered areas that require illumination during daylight hours.

A5.209.3.3.2 For lighting of building facades, parking lots, sales and nonsales canopies, all outdoor sales areas and student pick-up/drop-off zones where two or more luminaires are used, an automatic time switch shall be installed that is capable of (1) turning off the lighting when not needed and (2) reducing the lighting power (in watts) by at least 50 percent but not exceeding 80 percent or providing continuous dimming through a range that includes 50 percent through 80 percent reduction. This control shall meet the requirements of Section A5.209.1.3.

Exceptions:

1. Lighting required by a health or life safety statute ordinance or regulation, including but not limited to, emergency lighting.
2. Lighting for steps or stairs that require illumination during daylight hours.
3. Lighting that is controlled by a motion sensor and photocontrol.
4. Lighting for facilities that have equal lighting requirements at all hours and are designed to operate continuously.
5. Temporary outdoor lighting.
6. Signs.

A5.209.4 Outdoor lighting. This section applies to all outdoor lighting, whether attached to buildings, poles, structures or self-supporting, including but not limited to, hardscape areas including parking lots, lighting for building entrances, sales and nonsales canopies; lighting for all outdoor sales areas; and lighting for building facades.

Exceptions: When more than 50 percent of the light from a luminaire falls on one or more of the following applications, the lighting power for that luminaire shall be exempt from Section A5.209.4.2.

1. Temporary outdoor lighting.
2. Lighting required and regulated by the Federal Aviation Administration and the Coast Guard.
3. Lighting for public streets, roadways, highways and traffic signage lighting, including lighting for driveway entrances occurring in the public right-of-way.
4. Lighting for sports and athletic fields and children's playground.
5. Lighting for industrial sites, including but not limited to, rail yards, maritime shipyards and docks, piers and marinas, chemical and petroleum processing plants and aviation facilities.
6. Lighting specifically for automated teller machines as required by *California Financial Code* Section 13040 or required by law through a local ordinance.
7. Lighting of public monuments.
8. Signs shall meet the requirements of Section A5.209.5.

9. Lighting used in or around swimming pools, water features or other locations subject to Article 680 of Title 24, Part 3, *California Electrical Code.*
10. Lighting of tunnels, bridges, stairs, wheelchair elevator lifts for American with Disabilities Act (ADA) compliance and ramps that are other than parking garage ramps.
11. Landscape lighting.
12. In theme parks: outdoor lighting for themes and special effects.
13. Lighting for outdoor theatrical and other outdoor live performances, provided that these lighting systems are additions to area lighting systems and are controlled by a multiscene or theatrical cross-fade control station accessible only to authorized operators.
14. Outdoor lighting systems for qualified historic buildings, as defined in Title 24, Part 8, *California Historic Building Code*, if they consist solely of historic lighting components or replicas of historic lighting components. If lighting systems for qualified historic buildings contain some historic lighting components or replicas of historic components, combined with other lighting components, only those historic or historic replica components are exempt. All other outdoor lighting systems for qualified historic buildings shall comply with Section A5.209.4.

A.5.209.4.1 Outdoor lighting power trade-offs. Outdoor lighting power trade-offs shall be determined as follows:

1. Allowed lighting power determined according to Section A5.209.4.4.1 for general hardscape lighting allowance may be traded to specific applications in Section A5.209.4.4.2, provided the hardscape area from which the lighting power is traded continues to be illuminated in accordance with Section A5.209.4.4.1.1.
2. Allowed lighting power determined according to Section A5.209.4.4.2 for additional lighting power allowances for specific applications shall not be traded between specific applications or to hardscape lighting in Section A5.209.4.4.1.
3. Allowed lighting power determined according to Section A5.209.4.4.3 for additional lighting power allowances for local ordinance shall not be traded to specific applications in Section A5.209.4.4.2 or to hardscape areas not covered by the local ordinance.
4. Trading off lighting power allowances between outdoor and indoor areas shall not be permitted.

A5.209.4.2 Outdoor lighting power. An outdoor lighting installation complies with this section if the actual outdoor lighting power installed is no greater than the allowed outdoor lighting power calculated under Section A5.209.4.4 The allowed outdoor lighting shall be calculated by Lighting Zone as defined in Section 10-114 of Title 24, Part 1. Local governments may amend lighting zones in compliance with Section 10-114 of Title 24, Part 1.

A5.209.4.3 Calculation of actual lighting power. The wattage of outdoor luminaires shall be determined in accordance with Section 130(d) of Title 24, Part 6.

A5.209.4.4 Calculation of allowed lighting power. The allowed lighting power shall be the combined total of the sum of the general hardscape lighting allowance determined in accordance with Section A5.209.4.4.1, the sum of the additional lighting power allowance for specific applications determined in accordance with Section A5.209.4.4.2 and the sum of the additional lighting power allowances for local ordinance determined in accordance with Section A5.209.4.4.3.

A5.209.4.4.1 General hardscape lighting allowance. Determine the general hardscape lighting power allowances as follows:

A5.209.4.4.1.1 The general hardscape area of a site shall include parking lot(s), roadway(s), driveway(s), sidewalk(s), walkway(s), bikeway(s), plaza(s) and other improved area(s) that are illuminated. In plan view of the site, determine the illuminated hardscape area, which is defined as any hardscape area that is within a square pattern around each luminaire or pole that is ten times the luminaire mounting height with the luminaire in the middle of the pattern, less any areas that are within a building, beyond the hardscape area, beyond property lines or obstructed by a structure. The illuminated hardscape area shall include portions of planters and landscaped areas that are within the lighting application and are less than or equal to 10 feet wide in the short dimensions and are enclosed by hardscape or other improvement on at least three sides. Multiply the illuminated hardscape area by the Area Wattage Allowance (AWA) from Table A5.209.4-A for the appropriate Lighting Zone.

A5.209.4.4.1.2 Determine the perimeter length of the general hardscape area. The total perimeter shall not include portions of hardscape that is not illuminated according to Section A5.209.4.4.1.1 Multiply the hardscape perimeter by the Linear Wattage Allowance (LWA) for hardscape from Table A5.209.4-A for the appropriate lighting zone. The perimeter length for hardscape around landscaped areas and permanent planters shall be determined as follows:

1. Landscaped areas completely enclosed within the hardscape area and which have width or length less than 10 feet wide, shall not be added to the hardscape perimeter length.
2. Landscaped areas completely enclosed within the hardscape area and which width or length are a minimum of 10 feet wide, the perimeter of the landscaped areas or permanent planter shall be added to the hardscape perimeter length.
3. Landscaped edges that are not abutting the hardscape shall not be added to the hardscape perimeter length.

A5.209.4.4.1.3 Determine the Initial Wattage Allowance (IWA) for general hardscape lighting from Table A.209.4-A for the appropriate lighting zone. The hardscape area shall be permitted one IWA per site.

A5.209.4.4.1.4 The general hardscape lighting allowance shall be the sum of the allowed watts determined from Sections A5.209.4.4.1.1, A5.209.4.4.1.2 and A5.209.4.4.1.3 above.

A5.209.4.4.2 Additional lighting power allowance for specific applications. Additional lighting power for specific applications shall be the smaller of the additional lighting allowances for specific applications determined in accordance with Table A5.209.4-B for the appropriate lighting zone or the actual installed lighting power meeting the requirements for the allowance.

A5.209.4.4.3 Additional lighting power allowance for local ordinance requirements. For hardscape areas, including parking lots, site roadways, driveways, sidewalks, walkways or bikeways, when specific light levels are required by law through a local ordinance and provided the local ordinance meets Section 10-114 of Title 24, Part 1, additional lighting power for those hardscape areas covered by the local ordinance requirement shall be the smaller of the additional lighting allowances for local ordinance determined from Table A5.209.4-C for the appropriate lighting zone or the actual installed lighting power meeting the requirements for the allowance.

TABLE A5.209.4-A
GENERAL HARDSCAPE LIGHTING POWER ALLOWANCE

TYPE OF POWER ALLOWANCE	LIGHTING ZONE 1	LIGHTING ZONE 2	LIGHTING ZONE 3	LIGHTING ZONE 4
Area wattage allowance (AWA)	0.036 W/ft^2	0.045 W/ft^2	0.092 W/ft^2	0.115 W/ft^2
Linear wattage allowance (LWA)	0.36 W/lf	0.45 W/lf	0.92 W/lf	1.15 W/lf
Initial wattage allowance (IWA)	340 W	510 W	770 W	1030 W

TABLE A5.209.4-B
ADDITIONAL LIGHTING POWER ALLOWANCE FOR SPECIFIC APPLICATIONS
All area and distance measurements in plan view unless otherwise noted.

	LIGHTING APPLICATION	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
WATTAGE ALLOWANCE PER APPLICATION: Use all that apply as appropriate.					
	Building entrances or exits. Allowance per door. Luminaires qualifying for this allowance shall be within 20 feet of the door.	30 watts	75 watts	100 watts	120 watts
	Primary entrances to senior care facilities, police stations, hospitals, fire stations and emergency vehicle facilities. Allowance per primary entrance(s) only. Primary entrances shall provide access for the general public and shall not be used exclusively for staff or service personnel. This allowance shall be in addition to the building entrance or exit allowance above. Luminaires qualifying for this allowance shall be within 100 feet of the primary entrance.	45 watts	80 watts	120 watts	130 watts
	Drive up windows. Allowance per customer service location. Luminaires qualifying for this allowance shall be within two mounting heights of the sill of the window.	40 watts	75 watts	125 watts	200 watts
	Vehicle service station uncovered fuel dispenser. Allowance per fueling dispenser. Luminaires qualifying for this allowance shall be within two mounting heights of the dispenser.	120 watts	175 watts	185 watts	330 watts
WATTAGE ALLOWANCE PER UNIT LENGTH (w/linear ft). May be used for one or two frontage side(s) per site.					
	Outdoor sales frontage. Allowance for frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. Luminaires qualifying for this allowance shall be located between the principal viewing location and the frontage outdoor sales area.	No allowance	22.5 w/linear ft	36 w/linear ft	45 w/linear ft
WATTAGE ALLOWANCE PER HARDSCAPE AREA (W/ft^2). May be used for any illuminated hardscape area on the site.					
	Hardscape ornamental lighting. Allowance for the total site illuminated hardscape area. Luminaires qualifying for this allowance shall be rated for 100 watts or less as determined in accordance with Section 130(d) and shall be post-top luminaires, lanterns, pendant luminaires or chandeliers.	No allowance	0.02 w/ft^2	0.04 w/ft^2	0.06 w/ft^2
WATTAGE ALLOWANCE PER SPECIFIC AREA (W/ft^2). Use as appropriate provided that none of the following specific applications shall be used for the same area.					
	Building facades. Only areas of building façade that are illuminated shall qualify for this allowance. Luminaires qualifying for this allowance shall be aimed at the façade and shall be capable of illuminating it without obstruction or interference by permanent building features or other objects.	No allowance	0.18 w/ft^2	0.35 w/ft^2	0.50 w/ft^2
	Outdoor sales lots. Allowance for uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale. Driveways, parking lots or other nonsales areas shall be considered hardscape areas even if these areas are completely surrounded by sales lot on all sides. Luminaires qualifying for this allowance shall be within five mounting heights of the sales lot area.	0.164 w/ft^2	0.555 w/ft^2	0.758 w/ft^2	1.285 w/ft^2
	Vehicle service station hardscape. Allowance for the total illuminated hardscape area less area of buildings, under canopies, off property or obstructed by signs or structures. Luminaires qualifying for this allowance shall be illuminating the hardscape area and shall not be within a building, below a canopy, beyond property lines or obstructed by a sign or other structure.	0.014 w/ft^2	0.155 w/ft^2	0.308 w/ft^2	0.485 w/ft^2
	Vehicle service station canopies. Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	0.514 w/ft^2	1.005 w/ft^2	1.358 w/ft^2	2.285 w/ft^2
	Sales canopies allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	No allowance	0.655 w/ft^2	0.908 w/ft^2	1.135 w/ft^2
	Nonsales canopies. Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	0.084 w/ft^2	0.205 w/ft^2	0.408 w/ft^2	0.585 w/ft^2
	Guard stations. Allowance up to 1,000 square feet per vehicle lane. Guard stations provide access to secure areas controlled by security personnel who stop and may inspect vehicles and vehicle occupants, including identification, documentation, vehicle license plates and vehicle contents. Qualifying luminaires shall be within two mounting heights of a vehicle lane or the guardhouse.	0.154 w/ft^2	0.355 w/ft^2	0.708 w/ft^2	0.985 w/ft^2
	Student pick-up/drop-off zone. Allowance for the area of the student pick-up/drop-off zone, with or without canopy, for preschool through 12th grade school campuses. A student pick-up/drop off zone is a curbside, controlled traffic area on a school campus where students are picked up and dropped off from vehicles. The allowed area shall be the smaller of the actual width or 25 feet, times the smaller of the actual length or 250 feet. Qualifying luminaires shall be within two mounting heights of the student pick-up/drop-off zone.	No allowance	0.12 w/ft^2	0.45 w/ft^2	No allowance
	Outdoor dining. Allowance for the total illuminated hardscape of outdoor dining. Outdoor dining areas are hardscape areas used to serve and consume food and beverages. Qualifying luminaires shall be within 2 mounting heights of the hardscape area of outdoor dining.	0.014 w/ft^2	0.135 w/ft^2	0.258 w/ft^2	0.435 w/ft^2
	Special security lighting for retail parking and pedestrian hardscape. This additional allowance is for illuminated retail parking and pedestrian hardscape identified as having special security needs. This allowance shall be in addition to the building entrance or exit allowance.	0.007 w/ft^2	0.009 w/ft^2	0.019 w/ft^2	No allowance

TABLE A5.209.4-C
ADDITIONAL LIGHTING POWER ALLOWANCE FOR ORDINANCE REQUIREMENTS

ADDITIONAL LIGHTING POWER ALLOWANCE (W/ft²) WHEN AVERAGE LIGHT LEVELS ARE REQUIRED BY LOCAL ORDINANCE.				
Required (horizontal foot-candles, AVERAGE)	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
0.5	0	0	0	0
1.0	0.004	0	0	0
1.5	0.024	0.015	0	0
2.0	0.044	0.035	0	0
3.0	0.084	0.075	0.028	0.005
4.0 or greater	0.124	0.115	0.068	0.045
ADDITIONAL LIGHTING POWER ALLOWANCE (W/ft²) WHEN MINIMUM LIGHT LEVELS ARE REQUIRED BY LOCAL ORDINANCE.				
Required (horizontal foot-candles, MINIMUM)	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
0.5	0.004	0	0	0
1.0	0.044	0.035	0	0
1.5	0.124	0.115	0.068	0.045
2.0	0.164	0.155	0.108	0.085
3.0	0.164	0.155	0.108	0.085
4.0 or greater	0.164	0.155	0.108	0.085

A5.209.5 Signs. This section applies to all internally illuminated and externally illuminated signs, unfiltered light emitting diodes (LEDs) and unfiltered neon, both indoor and outdoor. Each sign shall comply with either Subsection A5.209.5.1 or A5.209.5.2, as applicable.

A5.209.5.1 Maximum allowed lighting power.

A5.209.5.1.1 For internally illuminated signs, the maximum allowed lighting power shall not exceed the product of the illuminated sign area and 12 watts per square foot. For double-faced signs, only the area of a single face shall be used to determine the allowed lighting power.

A5.209.5.1.2 For externally illuminated signs, the maximum allowed lighting power shall not exceed the product of the illuminated sign area and 2.3 watts per square foot. Only areas of an externally lighted sign that are illuminated without obstruction or interference, by one or more luminaires, shall be used.

A5.209.5.2 Alternate lighting sources. The sign shall comply if it is equipped only with one or more of the following light sources:

A5.209.5.2.1 High pressure sodium lamps; or

A5.209.5.2.2 Metal halide lamps that are:

1. Pulse start or ceramic served by a ballast that has a minimum efficiency of 88 percent or greater or
2. Pulse start that are 320 watts or smaller, are not 250 watt or 175 watt lamps and are served by a ballast that has a minimum efficiency of 80 percent.

Where ballast efficiency is the measured output wattage to the lamp divided by the measured operating input wattage when tested according to ANSI C82.6-2005; or

A5.209.5.2.3 Neon or cold cathode lamps with transformer or power supply efficiency greater than or equal to the following:

1. A minimum efficiency of 75 percent when the transformer or power supply rated output current is less than 50 mA; or
2. A minimum efficiency of 68 percent when the transformer or power supply rated output current is 50 mA or greater.

Where the ratio of the output wattage to the input wattage is at 100-percent tubing load; or

A5.209.5.2.4 Fluorescent lamps with a minimum color rendering index (CRI) of 80; or

A5.209.5.2.5 Light emitting diodes (LEDs) with a power supply having an efficiency of 80 percent or greater; or

Exception: Single voltage external power supplies that are designed to convert 120 volt AC input into lower voltage DC or AC output and have a nameplate output power less than or equal to 250 watts, shall comply with the applicable requirements of the *Appliance Efficiency Regulations*, Title 20.

A5.209.5.2.6 Compact fluorescent lamps that do not contain medium screw base sockets (E24/E26) ; or

A5.209.5.2.7 Electronic ballasts with a fundamental output frequency not less than 20 kHz;

Exception 1 to Section A5.209.5: Unfiltered incandescent lamps that are not part of an electronic message center (EMC), an internally illuminated sign or an externally illuminated sign.

Exception 2 to Section A5.209.5: Exit signs. Exit signs shall meet the requirements of the *Appliance Efficiency Regulations.*

Exception 3 to Section A5.209.5: Traffic Signs. Traffic signs shall meet the requirements of the *Appliance Efficiency Regulations.*

A5.209.6 Sign lighting controls. All signs with permanently connected lighting shall meet the requirements below:

1. Automatic time switch control. All signs with permanently connected lighting shall be controlled with an automatic time switch control that complies with the applicable requirements of Section A5.209.1.
2. Photocontrol or outdoor astronomical time switch control. All outdoor signs shall be controlled with a photocontrol or outdoor astronomical time switch control.

   Exception: Outdoor signs in tunnels and large covered areas that require illumination during daylight hours.
3. Dimming. All outdoor signs shall be controlled with a dimmer that provides the ability to automatically reduce sign power by a minimum of 65 percent during nighttime hours.

   Exceptions:

   1. Signs that are illuminated for less than 1 hour per day during daylight hours.
   2. Outdoor signs in tunnels and large covered areas that require illumination during daylight hours.
   3. Metal halide, high pressure sodium, cold cathode and neon lamps used to illuminated signs or parts of signs.
   4. Demand Responsive Electronic Message Center Control. An Electronic Message Center (EMC) having a new connected lighting power load greater than 15 kW shall have a control installed that is capable of reducing the lighting power by a minimum of 30 percent when receiving a demand response signal that is sent out by the local utility.
   5. EMCs required by a health or life safety statue ordinance or regulation, including but not limited to exit signs and traffic signs.

A5.209.7 Nonresidential lighting control acceptance. Before an occupancy permit is granted for a new building or space or a new lighting system serving a building, space or site is operated for normal use, all indoor and outdoor lighting controls serving the building, space or site shall be certified as meeting the Acceptance Requirements for Code Compliance. A Certificate of Acceptance shall be submitted to the enforcement agency under Section 10-103(a) of Title 24, Part 1, that:

1. Certifies that plans, specifications, installation certificates and operating and maintenance information meet the requirements of Title 24, Part 6.
2. Certifies that automatic daylighting controls meet the applicable requirements of Sections A5.209.1 and A5.209.2.3.2.4.
3. Certifies that when a multilevel astronomical time switch is used to meet Exception 3 to Section A5.209.2.3.2.2 all general lighting in the skylit area is controlled by a multilevel astronomical time switch that meets the applicable requirements of Section A5.209.1 and that has an override switch that meets the requirements of Section A209.2.4.2.
4. Certifies that lighting controls meet the requirements of Sections A5.209.2.1 through A5.209.2.3 and Title 24, Part 6, Sections 131(e) and (f) and 146(a)2, as applicable.
5. Certifies that automatic lighting controls meet the applicable requirements of Sections A5.209.1 and A5.209.2.4.
6. Certifies that occupant-sensors meet the applicable requirements of Sections A5.209.1 and A5.209.2.4.
7. Certified that outdoor lighting controls meet the applicable requirements of Sections A5.209.1 and A5.209.3.

SECTION A5.210 [OSHPD 1, 2 & 4] APPLIANCES

A5.210.1 Appliances regulated by the *Appliance Efficiency Regulations*. Any appliance for which there is a California standard established in the *Appliance Efficiency Regulations* may be installed only if the manufacturer has certified to the Commission, as specified in those regulations, that the appliance complies with the applicable standard for that appliance.

Note: For certified appliances, go to www.energy.ca.gov/appliances/database/.

Division A5.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION A5.401 GENERAL

A5.401.1 Scope. The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through reuse of existing building stock and materials; use of recycled, regional, rapidly renewable and certified wood materials; and employment of techniques to reduce pollution through recycling of materials.

SECTION A5.407 [OSHPD 1, 2 & 4] WATER RESISTANCE AND MOISTURE MANAGEMENT

A5.407.3 Weather protection. Provide a weather-resistant exterior wall and foundation envelope as required by *California Building Code* Section 1403.2 and *California Energy Code* Section 150, manufacturer's installation instructions or local ordinance, whichever is more stringent.

A5.407.4 Moisture control. Employ moisture control measures by the following methods.

A5.407.4.1 Sprinklers. Design and maintain landscape irrigation systems to prevent spray on structures.

A5.407.4.2 Entries and openings. Design exterior entries and/or openings subject to foot traffic or wind-driven rain to prevent water intrusion into buildings.

Notes:

1. Use features such as overhangs and recesses and flashings integrated with a drainage plane.
2. Use nonabsorbent floor and wall finishes within at least two feet around and perpendicular to such openings.

SECTION A5.408 CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

A5.408.5 Construction waste diversion. [OSHPD 1, 2 & 4] Establish a construction waste management plan for the diverted materials or meet local construction and demolition waste management ordinance, whichever is more stringent.

A5.408.6 Construction waste reduction of at least 50 percent. [OSHPD 1, 2 & 4] Recycle and/or salvage for reuse a minimum of 50 percent of the nonhazardous construction and demolition debris or meet a local construction and demolition waste management ordinance, whichever is more stringent. Calculate the amount of materials diverted by weight or volume, but not by both.

Exceptions:

1. Excavated soil and land-clearing debris.
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.

A5.408.7 Excavated soil and land clearing debris. [OSHPD 1, 2 & 4] 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed.

SECTION A5.410 BUILDING MAINTENANCE AND OPERATION

A5.410.6 Recycling by occupants. [OSHPD 1, 2 & 4] Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics and metals.

Division A5.5 – ENVIRONMENTAL QUALITY

SECTION A5.504 POLLUTANT CONTROL

A5.504.4.5.1 No-added formaldehyde. Use composite wood products approved by the California Air Resources Board (ARB) as no-added formaldehyde (NAF) based resins or ultra-low-emitting formaldehyde (ULEF) resins.

Notes:

1. See Title 17, Section 93120.3(c) and (d), respectively.
2. Documentation must be provided verifying that materials are certified to meet the pollutant emission limits. A list of manufacturers and their NAF and ULEF certified materials is provided at http://www.arb.ca.gov /toxics/compwood/naf_ulef/ listofnaf_ulef.htm.

A5.504.4.9 Acoustical ceilings and wall panels. Comply with Chapter 8 in Title 24, Part 2, the *California Building Code* and with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database.

A5.504.4.9.1 Verification of compliance. Documentation shall be provided verifying that acoustical finish materials meet the pollutant emission limits.

Note: Products compliant with CHPS criteria certified under the Greenguard Children & Schools program may also be used.

Note: [OSHPD 1, 2 &4] Documentation shall be provided that verifies that finish materials are certified to meet the pollutant emission limits.

A5.504.5 Hazardous particulates and chemical pollutants. Minimize and control pollutant entry into buildings and cross-contamination of regularly occupied areas.

A5.504.5.1 Entryway systems. Install permanent entryway systems measuring at least six feet in the primary direction of travel to capture dirt and particulates at entryways directly connected to the outdoors.

1. Qualifying entryways are those that serve as regular entry points for building users.
2. Acceptable entryway systems include, but are not limited to, permanently installed grates, grilles or slotted systems that allow cleaning underneath.
3. Roll-out mats are acceptable only when maintained regularly by janitorial contractors as documented in service contract or by in-house staff as documented by written policies and procedures.

A5.504.8 Finish material pollutant control. [OSHPD 1, 2 & 4] Finish materials shall comply with Sections A5.504.4.1 through A5.504.4.5.

A5.504.8.1 Adhesives, sealants and caulks. Adhesives, sealants and caulks used on the project shall meet the requirements of the following standards:

1. Adhesives, adhesive bonding primers, adhesive 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, as shown in Tables A5.504.8.1 and A5.504.8.2. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products as specified in Subsection 2, below.
2. Aerosol adhesives and smaller unit sizes of adhesives and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations,* Title 17, commencing with Section 94507.

Note: Title 17 may be found at http://ccr.oal.ca.gov/.

A5.504.8.3 Paints and coatings. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in Table A5.504.8.3, unless local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table A5.504.8.3, shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 of the 2007 California Air Resources Board, Suggested Control Measure and the corresponding Flat, Nonflat or Nonflat-High Gloss VOC limit in Table A5.504.8.3 shall apply.

A5.504.8.3.1 Aerosol paints and coatings. Aerosol paints and coatings shall meet the Product-Weighted MIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of *California Code of Regulations*, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49.

A5.504.8.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:

1. Manufacturers product specification.
2. Field verification of on-site product containers.

TABLE A5.504.8.1
ADHESIVE VOC LIMIT[1,2]
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
SPECIALTY APPLICATIONS	
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
SUBSTRATE SPECIFIC APPLICATIONS	
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 A5.504.8.2
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
SEALANT PRIMERS	
Architectural Nonporous Porous	 250 775
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: http://www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF.

TABLE A5.504.8.3
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS[2, 3]
Grams of VOC Per Liter of Coating, Less Water and Less Exempt Compounds

COATING CATEGORY	EFFECTIVE 1/1/2010	EFFECTIVE 1/1/2012
Flat coatings	50	
Nonflat coatings	100	
Nonflat-high gloss coatings	150	
Specialty coatings		
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[1]	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	400	250
Shellacs:		
Clear	730	
Opaque	550	
Specialty primers, sealers and undercoaters	350	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 at Air Resources Board.

A5.504.8.4 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the following:

1. Carpet and Rug Institute's Green Label Plus Program.
2. California Department of Public Health Standard Practice for the testing of VOCs (Specification 01350).
3. NSF/ANSI 140 at the Gold level.
4. Scientific Certifications Systems Sustainable Choice.

A5.504.8.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute Green Label program.

A5.504.8.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table A5.504.8.1.

A5.504.8.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections, as shown in Table A5.504.8.5

TABLE A5.504.8.5
FORMALDEHYDE LIMITS[1]
Maximum formaldehyde emissions in parts per million

Product	Current Limit	Jan 1, 2012	July 1, 2012
Hardwood plywood veneer core	0.05		
Hardwood plywood composite core	0.08		0.05
Particle board	0.09		
Medium density fiberboard	0.11		
Thin medium density fiberboard[2]	0.21	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 E 1333-96 (2002). 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 eight millimeters.

A5.504.8.5.2 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:

1. Product certifications and specifications.
2. Chain of custody certifications.
3. Other methods acceptable to the enforcing agency.

A5.504.9 Environmental tobacco smoke (ETS) control. [OSHPD 1, 2 & 4] Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and within the building, if not already prohibited by other laws or regulations, or as enforced by ordinances, regulations or policies of any city, county, city and county, California Community College, campus of the California State University or campus of the University of California, whichever are more stringent.

When ordinances, regulations or policies are not in place, post signage to inform building occupants of the prohibitions.

SECTION A5.505 [OSHPD 1, 2 & 4] INDOOR MOISTURE CONTROL

A5.505.2 Indoor moisture control. Buildings shall meet or exceed the provisions of *California Building Code*, CCR, Title 24, Part 2, Sections 1203 and Chapter 14.

NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST [OSHPD 1, 2 and 4]				
	COMPLIANCE LEVELS			
		VOLUNTARY *CALGreen*		
FEATURE OR MEASURE	MANDATORY *CALGreen*	Tier 1	Tier 2	NOTES
DIVISION A5.1 – PLANNING AND DESIGN				
SECTION Site Development				
A5.106.9 Building orientation. Locate and orient the building as follows: 1. When site and location permit, orient the building with the long sides facing north and south. 2. Protect the building from thermal loss, drafts and degradation of the building envelope caused by wind and wind-driven materials such as dust.		☐	☐	
DIVISION A5.2 – ENERGY EFFICIENCY				
SECTION A5.203 Performance Measures				
A5.203.1 Energy performance. [OSHPD 1] **A5.203.1.1 CALGreen Tier 1. [OSHPD 1]** Buildings must comply with the latest edition of "Savings By Design, Healthcare Modeling Procedures." **A.5.203.1.2 CALGreen Tier 2. [OSHPD 1]** Buildings must exceed the latest edition of "Savings By Design, Healthcare Modeling Procedures" by 15 percent.		☐	☐	
SECTION A5.204 Prescriptive Measures				
A5.204.1 ENERGY STAR equipment and appliances. All equipment and appliances provided by the builder shall be ENERGY STAR labeled if ENERGY STAR is applicable to that equipment or appliance.		☐	☐	
A5.204.4 Commissioning. Building commissioning for all building systems covered by T24, Part 6, process systems and renewable energy systems shall be included in the design and construction processes of the building project. Commissioning requirements shall include as a minimum items listed in Section A5.204.4.		☐	☐	
A5.204.4.1 Owner's Project Requirements (OPR). Documented before the design phase of the project begins the OPR shall include items listed in Section A5.204.4.		☐	☐	
A5.204.4.2 Basis of Design (BOD). A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project and updated periodically to cover the systems listed in Section A5.204.4.2.		☐	☐	
A5.204.4.3 Commissioning plan. A commissioning plan describing how the project will be commissioned shall be started during the design phase of the building project and shall include as a minimum items listed in Section A5.204.4.3.		☐	☐	
A5.204.4.4 Functional performance testing shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications.		☐	☐	
A5.204.4.5 Post construction documentation and training. A systems manual and systems operations training are required.		☐	☐	
A5.204.4.5.1 Systems manual. The systems manual shall be delivered to the building owner and facilities operator and shall include the items listed in Section A5.204.4.5.1.		☐	☐	
A5.204.4.5.2 Systems operations training. The training of the appropriate maintenance staff for each equipment type and/or system shall include as a minimum items listed in Section A5.204.4.5.2.		☐	☐	
A5.204.4.6 Commissioning report. A complete report of commissioning process activities undertaken through the design, construction and postconstruction phases of the building project shall be completed and provided to the owner.		☐	☐	
A5.204.6 Building orientation and shading. Locate orient and shade the building as required in Section A5.106.11.		☐	☐	
SECTION A5.205 Building Envelope				
A5.205.1 Fenestration products and exterior doors. **A5.205.1.1 Certification of fenestration products and exterior door other than field-fabricated.**		☐	☐	
A5.205.1.2 Installation of field-fabricated fenestration and exterior doors.		☐	☐	
A5.205.2 Joints and other openings.		☐	☐	
A5.205.3 Installation and roofing products.		☐	☐	

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NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST [OSHPD 1, 2 and 4]—continued				
	COMPLIANCE LEVELS			
		VOLUNTARY *CALGreen*		
FEATURE OR MEASURE	MANDATORY *CALGreen*	Tier 1	Tier 2	NOTES
SECTION A5.207 HVAC Design, Equipment and Installation				
A5.207.1 Space-conditioning equipment certification by manufacturers.		☐	☐	
A5.207.1.1 Efficiency.		☐	☐	
A5.207.1.2 Controls for heat pumps with supplementary electric resistance heaters.		☐	☐	
A5.207.1.3 Thermostats.		☐	☐	
A5.207.1.4 Gas-and oil-fired furnace standby loss controls.		☐	☐	
A5.207.2 Space conditioning systems.		☐	☐	
A5.207.2.1 Supply air temperature reset controls.		☐	☐	
A5.207.2.2 Electric resistance heating.		☐	☐	
A5.207.2.3 Heat rejection systems.		☐	☐	
A5.207.2.4 Hydronic system measures.		☐	☐	
A5.207.2.5 Air distribution system duct leakage sealing.		☐	☐	
A5.207:2.6 Variable air volume control for single zone systems.		☐	☐	
A5.207.3 Service water-heating systems and equipment.		☐	☐	
A5.207.3.1 Certification by manufacturers.		☐	☐	
A5.207.3.2 Efficiency.		☐	☐	
A5.207.3.3 Installation.		☐	☐	
A5.207.4 Natural gas central furnaces, cooking equipment and pool and spa heaters. Pilot lights prohibited.		☐	☐	
A5.207.5 Controls for space-conditioning systems.		☐	☐	
A5.207.5.1 Thermostatic controls for each zone.		☐	☐	
A5.207.5.2 Criteria for zonal thermostatic controls.		☐	☐	
A5.207.5.3 Heat pump controls.		☐	☐	
A5.207.5.4 Dampers for air supply and exhaust equipment.		☐	☐	
A5.207.5.5 Automatic demand shed controls.		☐	☐	
A5.207.6 Pipe insulation.		☐	☐	
SECTION A5.209 Lighting				
A5.209.1 Lighting control devices, ballasts and luminaires.		☐	☐	
A5.209.1.1 All devices: Instructions and calibration.		☐	☐	
A5.209.1.2 Indicator lights.		☐	☐	
A5.209.1.3 Automatic time switch control devices.		☐	☐	
A5.209.1.4 Occupant sensors, motion sensors and vacancy sensors.		☐	☐	
A5.209.1.5 Multilevel occupant sensor.		☐	☐	
A5.209.1.6 Automatic daylighting control devices.		☐	☐	
A5.209.1.7 Interior Photosensors.		☐	☐	
A5.209.1.8 Multilevel astronomical time-switch controls.		☐	☐	
A5.209.1.9 Outdoor astromomical time-switch controls.		☐	☐	
A5.209.1.10 Dimmers.		☐	☐	
A5.209.2 Indoor lighting controls.		☐	☐	
A5.209.2.1 Area controls.		☐	☐	
A5.209.2.2 Multilevel lighting controls.		☐	☐	
A5.209.2.3 Daylight areas.		☐	☐	
A5.209.2.3.1 Daylight area.		☐	☐	
A5.209.2.3.1.2 Daylight area, primary sidelit.		☐	☐	
A5.209.2.3.1.3 Daylight area, secondary sidelit.		☐	☐	
A5.209.2.3.1.4 Daylight area, skylit.		☐	☐	
A5.209.2.3.2 Controls for luminaires providing general lighting that are in or are partially in the skylit daylight area and or the primary sidelit daylight area.		☐	☐	
A5.209.2.4 Shut-off controls.		☐	☐	
A5.209.3 Outdoor lighting controls and equipment.		☐	☐	
A5.209.3.1 Outdoor lighting.		☐	☐	
A5.209.3.2 Luminaire cutoff requirements.		☐	☐	
A5.209.3.3 Controls for outdoor lighting.		☐	☐	

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NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST [OSHPD 1, 2 and 4]—continued				
	COMPLIANCE LEVELS			
FEATURE OR MEASURE	MANDATORY *CALGreen*	VOLUNTARY *CALGreen* Tier 1	VOLUNTARY *CALGreen* Tier 2	NOTES
A5.209.4 Outdoor lighting.		☐	☐	
A5.209.4.1 Outdoor lighting power trade-offs.		☐	☐	
A5.209.4.2 Outdoor lighting power.		☐	☐	
A5.209.4.3 Calculation of actual lighting power.		☐	☐	
A5.209.4.4 Calculation of allowed lighting power.		☐	☐	
A5.209.4.4.1 General hardscape lighting allowance.		☐	☐	
A5.209.4.4.2 Additional lighting power allowance for specific applications.		☐	☐	
A5.209.4.4.3 Additional lighting power allowance for local ordinance requirements.		☐	☐	
A5.209.5 Signs.		☐	☐	
A5.209.5.1 Maximum allowed lighting power.		☐	☐	
A5.209.5.2 Alternate lighting sources.		☐	☐	
A5.209.6 Sign lighting controls.		☐	☐	
A5.209.7 Nonresidential lighting control acceptance.		☐	☐	
SECTION A5.210 Appliances				
A5.210.1 Appliances regulated by the appliance efficiency regulations.		☐	☐	
DIVISION A5.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY				
SECTION A5.407 Water Resistance and Moisture Management				
A5.407.3 Weather Protection.		☐	☐	
A5.407.4.1 Moisture control.		☐	☐	
A5.407.4.2 Sprinklers.		☐	☐	
A5.407.4.3 Entries and openings.		☐	☐	
SECTION A5.408 Construction Waste Reduction, Disposal and Recycling				
A5.408.5 Construction waste diversion. Establish a construction waste management plan or meet local ordinance, whichever is more stringent.		☐	☐	
A5.408.6 Construction waste. Recycle and/or salvage for reuse a minimum of 50 percent of nonhazardous construction and demolition debris or meet local ordinance, whichever is more stringent. **Exceptions:** 1. Excavated soil and land-clearing debris. 2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.		☐	☐	
A5.408.7 Excavated soil and land clearing debris. 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled.		☐	☐	
SECTION A5.410 Building Maintenance and Operation				
A5.410.6 Recycling by occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling.		☐	☐	
DIVISION A5.5 – ENVIRONMENTAL QUALITY				
SECTION A5.504 Pollutant Control				
A5.504.4.5.1 No-added formaldehyde. Use composite wood products approved by the California Air Resources Board (ARB) as no-added formaldehyde (NAF) based resins or ultra-low-emitting formaldehyde (ULEF) resins. **Notes:** 1. See Title 17, Section93120.3(c) and (d), respectively. 2. Documentation must be provided verifying that materials are certified to meet the pollutant emission limits. A list of manufacturers and their NAF and ULEF certified materials is provided at http://www.arb.ca.gov/toxics/ compwood/naf_ulef/ listofnaf_ulef.htm.		☐ ☐	☐ ☐	
A5.504.8 Finish material pollutant control. Finish materials shall comply with Sections A5.504.8.1 through A5.504.8.4.		☐	☐	
A5.504.8.1 Adhesives, sealants and caulks. Adhesives, sealants and caulks used on the project shall meet the requirements of the following standards. 1. Adhesives, adhesive bonding primers and adhesive primers, sealants and sealant primers shall comply with Table A5.504.8.1. 2. Aerosol adhesives shall meet the requirements of *California Code of Regulations*, Title 17, commencing with Section 94507, http://ccr.oal.ca.gov/.		☐ ☐	☐ ☐	

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NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST [OSHPD 1, 2 and 4]—continued				
	COMPLIANCE LEVELS			
FEATURE OR MEASURE	MANDATORY *CALGreen*	VOLUNTARY *CALGreen* Tier 1	VOLUNTARY *CALGreen* Tier 2	NOTES
A5.504.8.3 Paints and coatings. Architectural paints and coatings shall comply with Table A5.504.8.3.		☐	☐	
A5.504.8.3.2 Verification.		☐	☐	
A5.504.8.4 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the standards listed in Section A5.504.8.3.		☐	☐	
A5.504.8.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute Green Label program.		☐	☐	
A5.504.8.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table A5.504.8.1.		☐	☐	
A5.504.8.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in Table A5.504.8.		☐	☐	
A5.504.8.5.2 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following. 1. Product certifications and specifications 2. Chain of custody certifications 3. Other methods acceptable to the enforcing agency		☐	☐	
A5.504.4.9 Acoustical ceilings and wall panels. Comply with Chapter 8 in Title 24, Part 2 and with the VOC-emission limits defined in the CHPS Low-emitting Materials List.		☐	☐	
A5.504.5 Hazardous particulates and chemical pollutants. Minimize and control pollutant entry into buildings and cross-contamination of regularly occupied areas.		☐	☐	
A5.504.5.1 Entryway systems. Install permanent entryway systems measuring at least six feet in the primary direction of travel to capture dirt and particulates at entryways directly connected to the outdoors as listed in Items 1 through 3 in Section A5.504.5.1.		☐	☐	
A5.504.9 Environmental tobacco smoke (ETS) control. Prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and in buildings; or as enforced by ordinances, regulations or policies of any city, county, city and county, California Community College, campus of the California State University or campus of the University of California, whichever are more stringent.		☐	☐	
SECTION A5.505 Indoor Moisture Control				
A5.505.2 Indoor moisture control. Buildings shall meet or exceed the provisions of *California Building Code*, CCR, Title 24, Part 2, Section 1203 and Chapter 14.		☐	☐	
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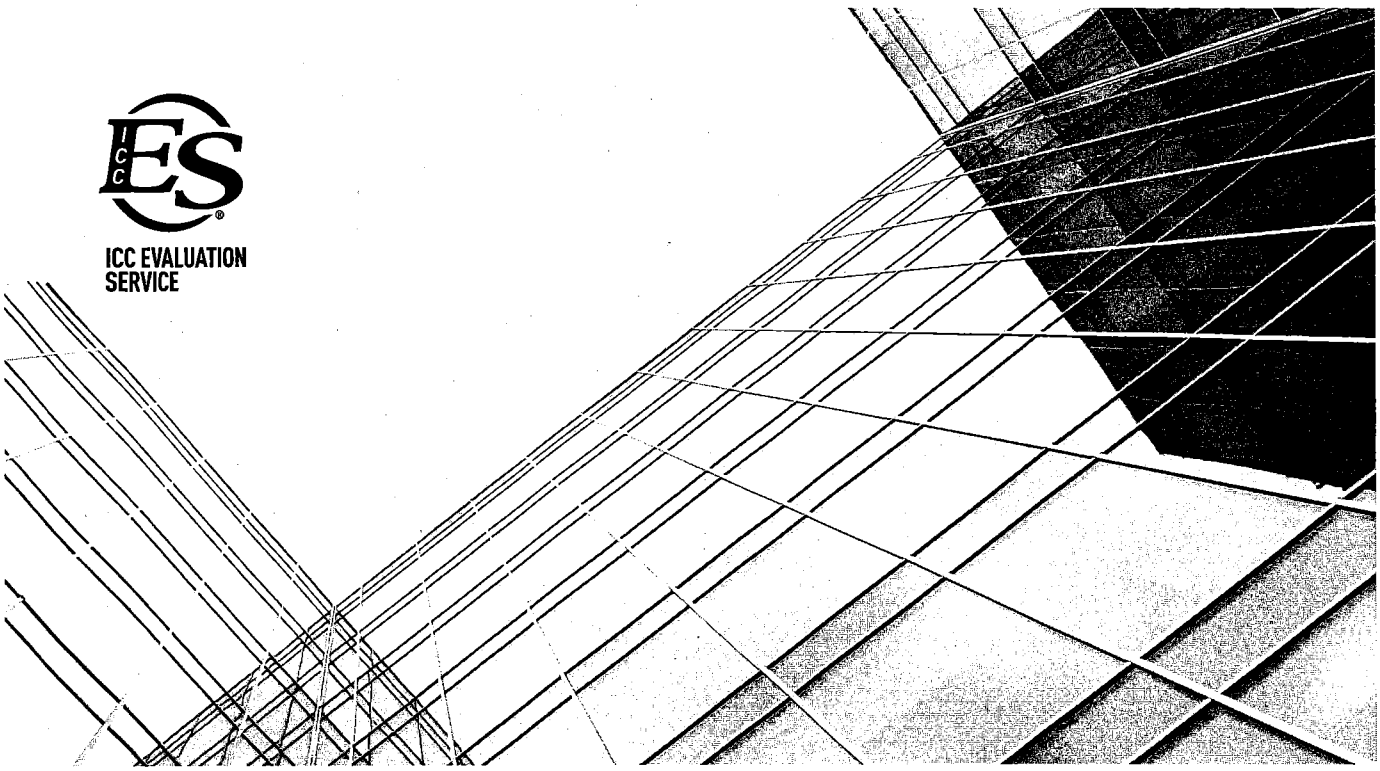
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HISTORY NOTE APPENDIX
CALIFORNIA GREEN BUILDING STANDARDS CODE

(Title 24, Part 11, California Code of Regulations)

For prior history, see the History Note Appendix to the *California Green Building Standards Code*, 2010 Edition, effective January 1, 2011.

1. (BSC 07/12, HCD 04/12, DSA-SS 06/12, CEC 01/12) Repeal, amend and add provisions in the 2013 *California Green Building Standards Code* for residential, nonresidential and public school buildings. Effective on January 1, 2014.



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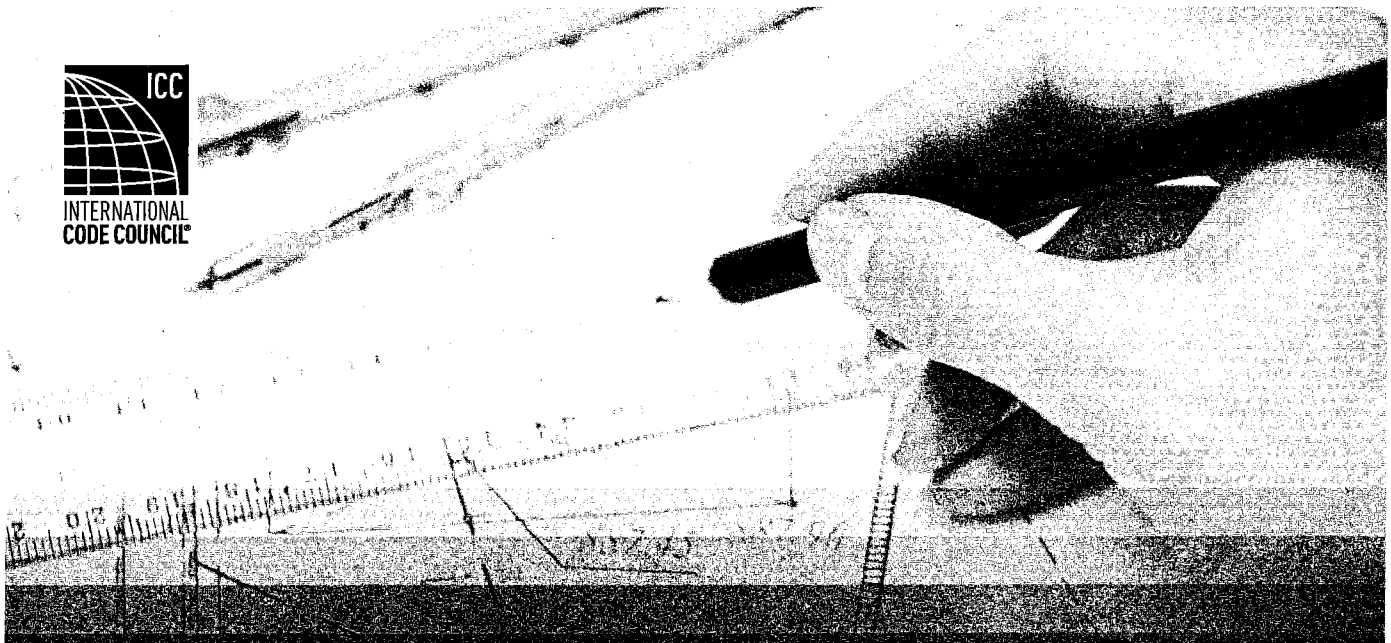
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