INITIAL STATEMENT OF REASONS
FOR
PROPOSED BUILDING STANDARDS
OF THE
CALIFORNIA BUILDING STANDARDS COMMISSION (CBSC)

REGARDING ADOPTION OF AMENDMENTS TO THE 2007 CALIFORNIA BUILDING STANDARDS CODE, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR), PARTS 2, 3, 4, 5 and 6 in TITLE 24, CCR, PART 11, CALIFORNIA GREEN BUILDING STANDARDS CODE

The Administrative Procedure Act (APA) requires that an Initial Statement of Reasons be available to the public upon request when rulemaking action is being undertaken. The following information required by the APA pertains to this particular rulemaking action:

STATEMENT OF SPECIFIC PURPOSE AND RATIONALE:
This proposed action by CBSC adopts voluntary green building standards for occupancies within its authority to provide a statewide framework of measures available to builders to (1) reduce greenhouse gas (GHG) emissions from buildings; (2) promote environmentally responsible, cost-effective, healthier places to live and work; and (3) respond to the directives in the Governor's recent legislative veto messages.

(1) GHG reduction has been mandated in recent years by the Governor through executive orders and in his signing into law AB 32 in 2006. AB 32 requires a cap on GHG emissions by 2020, mandatory emissions reporting, and an ongoing market-based compliance program.
Nonresidential green building can make a significant reduction in GHG for the following reasons:

- Nonresidential buildings are projected to account for 37% of electricity and 16% of natural gas consumed in California in the next ten years[1];
- Over the next 25 years, GHG emissions from nonresidential buildings are predicted to grow faster than from any other sector, at 1.8% per year through 2030[1];
- Construction investment in nonresidential buildings in California totaled over $21 billion in 2006[2];
- Buildings have a long lifespan of 50 to 100 years over which they consume energy and produce GHG[1]; and
- Technology, construction techniques, and various green building points-based programs, utility incentives, local ordinances, and state agency programs already exist to make substantial reductions in GHG.

(2) Furthermore, GHG emissions reduction and environmental sensitivity by buildings may prove to save builders money, though initial costs may be higher.

- An October, 2003 report to California's Sustainable Building Task Force stated that a 2% increase in upfront costs for green building features would result in savings of 20% of construction costs in 20 years.[3]
- Studies have shown that improved air quality and thermal comfort results in occupant satisfaction and improved worker productivity, and that giving occupants some control over lighting and acoustics may improve them further.[4]

(3) Recent proposed green building legislation (AB 35 concerning state-owned buildings, AB 888 concerning commercial B-occupancy buildings, and AB 1035 concerning residential construction) was vetoed by the Governor. In his veto messages, the Governor expressed his support for development of green building standards, but that they should not be statutory, conflict with current safety standards, and rely on private entities to set standards. He directed CBSC to work with state agencies to develop standards, gleaned from nationally recognized programs[5], ensuring an open public adoption process.

The proposed standards are amendments to Parts 2, 3, 4, 5, and 6 of Title 24 and are being placed into Title 24, Part 11, the California Green Building Standards Code, to provide clarity to users designing or constructing to the green building standards. It is the intent of CBSC to integrate these standards into their respective parts at a future date.

The proposed changes to the building standards with statewide application will lead to substantial environmental benefits through reduction in the use of energy, water, and raw materials; improved public and building occupant health due to improved indoor air quality; and overall reduced detrimental environmental impacts.

Specific Proposed Regulatory Actions: CBSC proposes to adopt the 2007 California Green Building Standards Code (CGBC). The rationale for each adoption by chapter and section is listed below.

CHAPTER 1. ADMINISTRATION
CBSC is proposing adoption of this new California chapter, **Sections: 101.1, 101.2, 101.3, 101.3.1, 101.4, 101.5, 101.5.1, 101.5.2, 101.5.3, 101.5.4, 101.5.5, 101.5.6, 101.6, 101.6.1, 101.6.2, 101.6.3, 101.7, 101.7.1, 101.8, 101.9, 101.10, 101.11, 102, 102.1, 102.2, 102.3, and 103.1.**
CBSC is proposing the adoption of a newly developed Chapter 1 for the California Green Building Standards Code with sections specific to the needs of California and each state agency. This new chapter will promote uniform enforcement throughout the state and ensure local enforcement agencies are provided accurate statutory information regarding the enforcement of building standards in the State of California.

The proposed new California Chapter 1 is consistent with the standards and format used in other parts of the California Building Standards Codes.

CHAPTER 2. DEFINITIONS
Sections 201.2, 201.3, and 201.4
CBSC is proposing the adoption of these new California sections to provide clarity to the code user regarding the use of definitions in this Code. The code user needs guidance on how to interpret words used in plural, past or present tense and other variations. The code user also needs guidance to correlate this code with other codes contained in Title 24 of the California Code of Regulations. Through adoption of these sections, CBSC is providing the code user with clarity on proper use of terms that are both defined in the proposed adoption and on terms or words that are not included in the CGBC.

Section 202
CBSC proposes to adopt definitions for the terms in this new California section into Title 24, Part 11, CGBC. A uniform definition will provide clarity for the code user and consistency in the code application. The proposed terms contained in this section are used within the text of the CGBC and need to have the meanings assigned to them for proper interpretation and understanding.

CHAPTER 3. GREEN BUILDING, Section 301.1
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding the measures contained in the CGBC. It provides guidance and general understanding of the different measures proposed and directs code users to Chapter 11 state agency application checklists and worksheets.

Section 302.1
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding mixed occupancy buildings. The CGBC covers several types of occupancies which do not share common concerns. This section clarifies that different types of occupancies shall comply only with features that are appropriate and intended to apply to the specific occupancy.

CHAPTER 4. PLANNING AND DESIGN
406.1 General and **406.2 Storm water drainage and retention during construction.** The Green Building Code Advisory Council (GB CAC) recommended that CBSC coordinate storm water pollution protection plan provisions with those of other state agencies. CBSC has complied and has adopted provisions of the Department of Housing and Community Development, which require storm water protection for all projects, including those under one acre.

Section 403.1 Site selection – Withdrawn by CBSC
Section 403.2 Development density and community connectivity – Withdrawn by CBSC
Sections 404.1 Public transportation access – Withdrawn by CBSC
Section 404.2 Plan to protect and restore habitat – Withdrawn by CBSC
Section 404.3 Reduce development footprint and optimize open space – Withdrawn by CBSC
Section 404.3 Brownfield or greyfield site redevelopment or infill area development – Withdrawn by CBSC
Section 406.7 Heat island effect – Withdrawn by CBSC
Section 406.8 Light pollution reduction – Withdrawn by CBSC

At the recommendation of GB CAC, remaining sections of Chapter 4 were relocated to an appendix to avoid conflict with local planning and zoning authority.

CHAPTER 5. ENERGY EFFICIENCY
The provisions of this chapter were developed in discussion with staff from the California Energy Commission and are designed to provide greater energy savings consistent with the statements in specific purpose and rationale of this document.

The potential to reduce the energy consumed to heat, cool, ventilate, and light buildings provides the largest opportunity within a green building program to reduce greenhouse gas emissions. Reducing the energy consumed by the appliances and equipment in these building is another significant step to reducing greenhouse gas emissions.

Because electric power generation, transmission, and distribution are planned to meet the highest expected levels of electricity demand, reducing the electricity needs in buildings during peak periods provides benefits to the state in resource conservation, energy cost reductions, electrical grid reliability, and greenhouse gas emission reductions. Greenhouse gas emissions from power generation are disproportionately higher during the highest levels of electricity demand because less efficient power plants are brought on line solely to generate electricity during these periods of critical need. “Automated demand response” in commercial buildings is a term used to describe a building’s ability to receive a price or emergency signal from an electric utility and automatically shed loads during periods of high electricity demand. Automated demand response in California has been proven to reduce building demand up to 30% without loss of occupant comfort or productivity. (http://drrc.lbl.gov/newsletter/3-06/autoDR.html)

Commissioning new buildings is a cost-effective process to ensure that the building is performing as efficiently as the building owner expects and verifies that the owner and staff receive training and assistance to maintain efficient building energy system operations. In a large commissioning meta-analysis conducted by Lawrence Berkeley

National Laboratory (http://eetd.lbl.gov/emills/PUBS/Cx-Costs-Benefits.html), the researchers found that for new construction, median commissioning costs were $1.00 per square foot, representing 0.6 percent of total construction costs. The energy-savings alone yielded a median payback time on the commissioning costs of 4.8 years. (http://energydesignresources.com/docs/end-48.pdf)

Energy monitoring in commercial buildings facilitates the commissioning process and allows ongoing building energy system efficiency. The California Institute for Energy and the Environment has documented that the combination of energy monitoring and commissioning can improve energy efficiency more than just by commissioning alone. (http://www.ucop.edu/ciee/mbcx/documents/MBCx_ACEEE_2006_revised_9jan07.pdf)

The energy efficiency measures included in this chapter of the Green Building Standards provide cost-effective approaches to contribute to California's climate change policy goals. If every new commercial building implemented these voluntary energy efficiency measures, the resulting energy savings would meet over 20% of the AB32 greenhouse gas emission reduction target for the entire commercial building sector.

Section 503.1 Energy performance
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding reduction of energy use and GHG emissions in two tiers of efficiency above the requirements in the 2007 California Energy Code. GB CAC recommended amending the section to clarify what is calculated, and CBSC, with assistance from energy commission staff, modified the language and added a definition for time dependent valuation (TDV) energy.

Section 504.1 ENERGY STAR equipment and appliances
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding a prescriptive measure to save energy with builder-installed units.

Section 504.2 Energy monitoring CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding recording building energy use to track consumption and increase energy efficiency.

Section 504.3 Demand response CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding automated demand response strategies to reduce peak HVAC demand and total lighting load.

Section 504.4 Commissioning CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding guidance for design, installation, testing, training, and ongoing maintenance of building systems to ensure they are appropriate for their use and function at maximum efficiency for their useful lives. GB CAC recommended amending the section to include third party certification, and CBSC and the energy commission included language to require personnel performing commissioning to be trained and certified in commissioning by a nationally recognized organization.

Section 504.5 Building orientation and shading
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding energy-saving design strategies for passive heating and cooling of a building. GB CAC recommended CBSC further study the section and refine it for the public comment period. CBSC, assisted by the energy commission, further clarified shading specifics.

Section 511.1 On-site renewable energy
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding means of providing clean energy from sources other than power plants, either on- or off the grid. GB CAC recommended CBSC further study the section and refine it for the public comment period. CBSC, assisted by the energy commission, further clarified the basis for calculating the percentage of renewable energy to be achieved.

Section 511.2 Green power
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding encouraging utility customers to participate in local utilities' renewable energy programs, if offered.

Section 512.1 Elevators and escalators
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding controls to reduce the electrical demand of these systems during non-peak usage. GB CAC recommended CBSC further study the section and refine it for the public comment period. CBSC, assisted by the energy commission, amended the control for escalators to avoid conflict with ASME A17.1.

Section 513 Energy efficient steel framing
In response to comments from the GB CAC, CBSC moved this section from Chapter 7 to Chapter 5, because it addressed avoiding thermal bridging in steel framing more than it addressed efficient use of steel, which is a widely recycled material. Further, references to energy commission calculators were removed, because they are no longer offered by the energy commission.

CHAPTER 6. WATER EFFICIENCY AND CONSERVATION
The provisions of this chapter were developed in discussion with staff from the Department of Water Resources and are designed to provide greater water savings consistent with the statements in specific purpose and rationale of this document.

The California economy, and indeed the well-being of all of California's citizens, depends on an adequate, safe, and environmentally-sound supply of water. The dwindling supply of water in the United States has created increasing

concern at all levels of government. Since 1950, the United States population increased nearly 90 percent. In that same period, public demand for water increased 209 percent. Americans now use an average of 100 gallons of water per person each day. This increased demand has put additional stress on water supplies and distribution systems, threatening both human health and the environment.
Furthermore, many scientists' predict hotter temperatures the Earth's climate, which will only increase the demand on water supplies for cooling, irrigation and other uses. Meanwhile, climate change will adversely impact water supplies in some areas of California, especially those that rely heavily on melted snow runoff for their freshwater supply. And according to the U.S. Government Accountability Office (GAO) (www.gao.gov), California, which is already stretching available water supplies, expects to see a population increase that tops 50 percent by 2025 from 1995 levels.

The drought gripping the West is considered by some experts to be the worst in 500 years, with effects in the Colorado River basin that have been considerably more damaging than during the Dust Bowl years, according to scientists at the U.S. Geological Survey. Compounding the problem, the Colorado River had its highest flow of the 20th century from 1905 to 1922, the years used as the basis for allocating the River's water between the Upper and Lower Colorado Basin states under the Colorado River Compact.

The Intergovernmental Panel on Climate Change's (IPCC) 2007 assessment states that water stored in glaciers and snow cover is projected to decline, reducing water availability to one-sixth of the world's population that relies upon melt water from major mountain ranges including California. The IPCC also predicts droughts will become more severe and longer lasting in a number of regions.

We are facing a potential water crisis in California that could risk endangering the future of our way of life, our economy, and our unique environment. In addition, there are natural calamities that can strike at any time in California, and local water officials are working hard to find enough water to meet the needs of their communities now and in the future.

Taken together, all of this combines to create a strong case for the immediate need for water conservation standards and efficiency measures. Water conservation is the most cost-effective and environmentally sound way to reduce our demand for water. Water efficiency is the planned management of water to prevent waste, overuse, and exploitation of the resource. Effective water efficiency planning seeks to "do more with less" without sacrificing comfort or performance. And although some water efficiency strategies require an initial capital investment, in the long run, conserving water provides significant cost savings for water and wastewater systems. Water efficiency and re-use programs help systems avoid or delay expensive infrastructure projects, by developing new water supplies. Utilizing water conservation standards will help protect the future of California's water supply by promoting water efficiency and enhancing the market for water-efficient products, programs, and practices. A wide range of technologies and measures can be employed to meet the proposed standards within each of these strategies to save water and associated energy consumption. These include:

- Water-efficient plumbing fixtures (ultra low-flow toilets and urinals, waterless urinals, low-flow and sensored sinks, low-flow showerheads, and water-efficient dishwashers and washing machines)
- Irrigation and landscaping measures (water-efficient irrigation systems, irrigation control systems, low-flow sprinkler heads, water-efficient scheduling practices, and Xeriscape)
- Water recycling or reuse measures, and
- Methods to reduce water use in HVAC systems.

Saving water also saves energy. It is estimated that 6.5% of the energy used in the state of California is for pumping and treating water. For energy bills, using less hot water saves on water heating. On the flip side, saving energy and using alternative energy saves water--electricity production from fossil fuels and nuclear energy is responsible for 39% of all freshwater withdrawals in the nation.

US Environmental Protection Agency (www.epa.gov/watersense/)has determined that if a bathroom is given a high-efficiency upgrade by installing a WaterSense labeled high-efficiency toilet (HET) and faucet or faucet accessories, the change can save more than 11,000 gallons annually. With reduced water bills, the upgrade could pay for itself in a few short years and continue to save water and money for years to come.

The building standards proposed in this chapter attempt to address a number of the health, safety, and environmental concerns through efficiency and conservation measures. The measures utilized in the proposed standards are consistent with statute and regulations and are generally excepted measures that focus on several key areas to improve the water efficiency of new buildings. Furthermore, the proposed standards are measures that can apply to all occupancies under the authority of the CBSC.

Section 601.1 Scope
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the application of the measures contained in the chapter. This section provides the code user with necessary general knowledge regarding the goals and items covered by this chapter.

Section 601.1 Definitions
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the use of definitions. These definitions provide guidance to the user on the meaning of words used within this chapter. Through adoption of these sections CBSC is providing the code user with clarity on proper use of terms that are used in the CGBC.

Section 603.1 Meters
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the use of meters and submeters. When installed, the building operator will have the ability to establish a water use baseline within various sections of the potable water system. This will provide the building operator to isolate and identify areas within the potable water system that have significant increases in water use due to leaks, overuse, etc.

Section 603.2 20% savings, Table 603.1, and **Table 603.2**
CBSC is proposing the adoption of these new sections and tables to provide clarity to the code user regarding indoor water use conservation. Currently the California Energy Commission (CEC) adopts regulations to establish the minimum water flow rates for specified fixtures and fixture fittings in Title 20 of the California Code of Regulations. The CEC includes shower heads, faucets and other plumbing fixtures and fittings in its definition of appliance and flow rates adopted by the CEC mirror those set by the U.S. Department of Energy. CBSC is proposing to reduce the indoor water use by 20% to meet the goals of the CGBC. These sections specify two methods to meet the 20% reduction: 1) a prescriptive 20% reduction in the flow rate of each fixture from what is currently allowed and; 2) a method to calculate base line water compared to the proposed water use.

Section 603.3 Appliances
CBSC is proposing the adoption of this new section and table to provide clarity to the code user regarding indoor water use conservation of appliances. Currently the California Energy Commission (CEC) adopts regulations to establish the minimum water factor rates for specified appliances in Title 20 of the California Code of Regulations. Dishwasher water factor utilized is a specification

Section 603.4 Wastewater reduction
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding achieving reduction in overall indoor potable water use and impact on municipal water supply and wastewater treatment.

Section 604.1 Water budget
CBSC is proposing the adoption of this section to provide clarity to the code user regarding water use conservation in irrigation systems. This section is consistent with DWR's statutory authority to develop a model ordinance regarding water use.

Section 604.2 Potable water reduction and **604.3 Potable water**
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding a target reduction of 50% (604.2) and 100% (604.3) in water use conservation in irrigation systems to meet the goals of the CGBC.

Section 604.4 Graywater irrigation system and **604.5 Rainwater or stormwater collection systems**
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding methods to assist in the target reduction water use conservation measures.

CHAPTER 7. MATERIAL CONSERVATION AND RESOURCE EFFICIENCY
The California Integrated Waste Management Board of the California Environmental Protection Agency cites research by D. M. Roodman and N. Lessen indicating that building and construction activities worldwide consume three billion tons of raw materials annually, which is 40% of total global use. In the United States, these activities culminate in dumping 28% of total waste in over-stressed landfills. Manufacturing processes and transportation of virgin construction materials to local dealers and jobsites consume energy and contribute to GHG. Other societal costs associated with production, such as toxics in the workplace affecting worker health and productivity, may represent embodied energy in the final product. These features of conventional construction will prove to be unsustainable over time and will be aggravated by the adoption of the Western life style in developing countries throughout the world.

Chapter 7 provisions offer means of mitigating these effects by recommending the employment of green building methods, materials, products that are sustainable over time as noted below. With one of the ten largest economies in the world with significant foreign markets, California is also in a position to influence the world economy towards GHG reduction, sustainable resources, habitat protection, and workplace health and safety.

Section 701.1 Scope.
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the application of the measures contained in the chapter. This section provides the code user with necessary general knowledge regarding the goals and items covered by this chapter.

Section: 702.1 Definitions.
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the use of definitions. These definitions provide guidance to the user on the meaning of key words used within this chapter. Through adoption of these sections CBSC is providing the code user with clarity on proper use of terms that are used in the CGBC. GB CAC recommended approval of the section, with the addition of definitions for "embodied energy" and "life cycle assessment", which CBSC added.

Section 704.1 Wood framing systems
CBSC is proposing the adoption of this new section to provide clarity to the code user regarding conservation of materials and labor in wood construction.

Section 704.1.1 Structural Integrity

CBSC is proposing the adoption of this section to provide clarity to the code user to maintain the safety of the structure while utilizing the advanced framing methods of conservation of wood in construction.

Section 704.1.2 Framing Specifications
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the location of resources. GB CAC recommended CBSC further study the section and refine it for the public comment period. CBSC expanded the language to list techniques recognized as advanced framing. CBSC also clarified language to indicate a usable web site reference.

Section 704.2 Steel framing
CBSC is proposing moving this section to Chapter 5, in response to a GB CAC recommendation that it more accurately addresses energy savings than material savings. See Section 513.

Section 705.1 Regional materials,
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding conservation of material through utilization of locally produced materials. GB CAC recommended amending the section to include materials from within all of California, which is bigger than the 500 mile radius called for in this section, and CBSC has complied. GB CAC also recommended estimated, not actual cost, be used as the calculator, since materials are selected early on in the design process. CBSC has complied, in this section and following sections where the material percentage calculations are based on cost.

Sections 705.2 Bio-based materials.
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding conservation of material through utilization of renewable building materials. GB CAC recommended that rapidly renewable materials be recognized here, and that provision for third party certification of certified wood products be omitted. CBSC has made both modifications.

Sections 705.3 and **705.4, reused and recycled materials** \
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding conservation of material through utilization of recycled materials and use of existing or salvaged materials with decreased embodied energy. GB CAC recommended amending the sections to Indicate one minimum level of compliance, not two, for each category. CBSC has complied and has renumbered the items to reflect the simplified language.

Section 705.5 Cement and Concrete (was Section 705.11)
CBSC is proposing the adoption of this section to provide clarity to the code user regarding conservation of material through utilization of industrial byproducts and recycled materials in the manufacture of cement and concrete. GB CAC recommended CBSC further study the section and refine it for the public comment period. CBSC, assisted by the Division of the State Architect, Structural Safety, clarified the language to include referenced standards and environmental quality standards particular to California.

Section 706.1 Choice of materials, 706.1.1 Service life, 706.1.2 Reduced maintenance, and **706.1.3 Recyclability**
CBSC is proposing the adoption of these new sections to provide clarity to the code user regarding selective use of materials utilizing specific criteria, saving cost, indoor air quality, and raw materials.

Section 707.1 Weather protection
CBSC is proposing the adoption of this new section to provide clarity to the code user regarding weather protection, preventing damage to the structure and mold contamination.

Section 707.2 Moisture control, 707.2.1 Sprinklers, and **707.2.2 Entries and openings**
CBSC is proposing the adoption of these new sections to provide clarity to the code user regarding moisture control as it applies to structures, preventing mold contamination and damage to the structure and interior finishes. GB CAC recommended amending the section to omit site drainage away from structures, which is already required in California, and CBSC has complied.

Section 708.1 Construction waste diversion
CBSC is proposing the adoption of this new section to provide clarity to the code user regarding the diversion of construction waste. GB CAC recommended amending the section to recognize local ordinances for diversion that may be more stringent and supplant the need for individual project waste management plans. CBSC has complied.

Section 708.2 Construction waste management plan
CBSC is proposing the adoption of this new section to provide clarity to the code user regarding the use of a waste management plan intended to save raw materials and preserve landfill space, where local regulations do not apply.

Section 708.3 Construction waste
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the diversion of at least 50% of the construction waste generated from a landfill. Landfills produce significant amounts of methane gas, a direct greenhouse gas. Since CBSC originally proposed two levels of compliance, 50% and 75%, GB CAC recommended amending the section to indicate one minimum level of compliance, not two, and CBSC has complied.

Recycled materials typically require less energy than producing goods from virgin materials. CBSC is also proposing to allow alternate waste reduction methods if local diversion or recycle facilities are not capable of compliance with the

reduction mandate.

Section 708.4 Excavated soil and land clearing debris
CBSC is proposing the adoption of this new section to provide clarity to the code user regarding soil and land debris, reducing the amount of material going to the landfill.

Section 709.1 Materials and system assemblies, 709.1.1 Materials and system assemblies and 709.1.2 Additional resources
CBSC is proposing the adoption of these new sections to provide clarity to the code user regarding life cycle analysis. They provide references to software and information about life cycle assessment of materials to select those with the lowest embodied energy and GHG potentials.

Section 710.1 Recycling by occupants
CBSC is proposing the adoption of this new section to provide clarity to the code user regarding the establishment of recycling areas for occupants.

Section 710.1.1 Sample Ordinance
CBSC is proposing the adoption of this section to provide direction to the code user regarding Space allocation for recycling areas. This section references the regulations developed by CIWMB. It also reference the statutory authority which is known as the California Solid Waste Reuse and Recycling Access Act of 1991.

CHAPTER 8. ENVIRONMENTAL QUALITY
Indoor air quality (IAQ) is important to human health because individuals spend a large fraction of their time indoors at their residences, schools and workplaces.

The California Air Resources Board (ARB) conducted a statewide survey of activity patterns of individuals over 11 years of age. The results showed that Californians spent, on average, 87% of their time indoors. The U.S. EPA conducted the probability-based National Human Activity Pattern Survey (NHAPS). Telephone interviews were conducted with over 9,000 respondents across the ten EPA regions in 48 states. The national results were generally consistent with the California study. Again, the mean percentage of time spent indoors was 87%.

A growing body of scientific evidence indicates that the air within homes and other buildings can be more seriously polluted than outdoor air. There are numerous sources of airborne toxic pollutants in these indoor environments where outdoor air ventilation provides the only primary means to dilute pollutant concentrations. Thus, for many people, the risks to health may be greater due to exposure to air pollution indoors than outdoors.

There are many potential indoor sources of exposure to airborne VOCs. These sources include many classes of consumer products used for building maintenance and office work. Many of the materials that are used to finish interiors of buildings emit VOCs to air when they are new. These include all of the common materials such as carpets and carpet cushions, composite wood products used in cabinetry, resilient flooring, and architectural finishes for walls, ceilings, and woodwork. Attached garages in houses and other buildings are a potential source of fuel and vehicle related emissions. Environmental tobacco smoke (ETS), which contains numerous vapor-phase organic compounds, may be present various environments.

Since there are so many potential indoor sources of VOCs, people are routinely exposed via the inhalation pathway to complex mixtures of compounds. Individually, many of the compounds comprising these mixtures are considered to be harmful to human health and comfort at some level. People who may be exposed to volatile organic compounds (VOCs) and other indoor air pollutants for the longest periods of time are often those most susceptible to the effects of indoor air pollution. Such groups include the young, the elderly, and the chronically ill, especially those suffering from respiratory or cardiovascular disease.

Many of the carcinogens and reproductive toxins (as well as other chemicals) may have acute and chronic systemic effects. Guideline concentrations have been developed for industrial chemicals to protect workers from acute and chronic toxicity. The potential of many of these chemicals to produce sensory irritancy (i.e., irritation of the eyes and upper respiratory tract) serves as the basis for more than one-half of the workplace guideline concentrations. In California, many jurisdictions adopt the regulations of the South Coast Air Quality Management District. Rules #1113 for paints and coatings and #1168 for adhesives limit the allowable amount of VOCs emitted from those materials.

In addition to IAQ, the physical comfort is critical to work effectiveness, satisfaction, and physical and psychological well-being (www.wbdg.org/resources/) Uncomfortable conditions in the workplace—too hot, too cold, too noisy, too dark, too light, too much glare—restrict the ability of workers to function to full capacity and can lead to lowered job satisfaction and increases in illness symptoms. Objectionable odors generated by certain airborne chemicals adversely affect people's satisfaction with indoor air quality and frequently lead to complaints.

Allowing workers control, within the limits of energy efficiency regulated by the California Energy Commission, over their immediate environment's thermal comfort and lighting and providing them connectivity with the outdoors through daylight and views, can decrease absenteeism by as much as 33% and increase productivity by 4%. A 4% increase in productivity equates to paying for the entire building within one year.

Section 801.1
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the measures contained

in the CGBC. This section provides the code user with necessary general knowledge regarding the goals and items covered by this chapter.

Section 802.1 Definitions
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the use of definitions. These definitions provide guidance to the user on the meaning of key words used within this chapter. Through adoption of these sections CBSC is providing the code user with clarity on proper use of terms that are used in the CGBC. GB CAC recommended amending the section to include a definition of "MERV" to describe air filters, and CBSC has complied.

Section 803.1 Fireplaces
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the use of wood burning appliances listed in this section. The regulations are consistent with the requirements currently in Title 24, Part 6. GB CAC recommended amending the section to omit reference to space heating and to clarify that fireplaces are wood-burning, not constructed of wood; CBSC has complied.

Section 804.1 and 804.2 Indoor air quality (IAQ) during construction and post-construction
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding the use of temporary ventilation during construction. The regulations in Section 804.1.2 are consistent with the requirements currently in Title 24, Part 6 and Title 24, Part 8. The regulations of Section 804.1.3 item 1, is consistent with the provisions California Code of Regulations, Title 19. The additional items of this section are consistent with best practices for health safety measures relating to IAQ during construction and post-construction. GB CAC recommended CBSC further study the section and refine it for the public comment period, and consider an air testing protocol. CBSC, assisted by the energy commission and Air Resources Board, further clarified the provisions, but declined to reference a testing protocol. The Air Resources Board advises building flush-out after construction in all cases, with a need for air testing only if an IAQ problem arises or when mitigation efforts need to be measured for their effectiveness. Also, scientific consensus has not been achieved for testing methodology and acceptable pollutant levels.

Section 804.4 Finish material pollutant control 804.4.1 Adhesives and sealants, 804.4.2 Paints and coatings, Table 804.4.1 and Table 804.4.2
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding indoor air quality. Most indoor air pollution comes from sources inside the building. Paints, stains, adhesives, carpeting, upholstery, manufactured wood products, pesticides, and cleaning agents may emit volatile organic compounds (VOCs), including formaldehyde. Research shows that some VOCs can cause chronic and acute health effects at high concentrations, and some are known carcinogens. Low to moderate levels of multiple VOCs may also produce acute reactions. CBSC is proposing adoption of VOC limits developed by the South Coast Air Quality Management District (SCAQMD) and is including tables to assist the code user in identification of the VOC limits for adhesives, sealants, paints and other coatings.

Sections: 804.4.3 Carpet systems, 804.4.3.1 Carpet cushion and 804.4.3.2 Carpet adhesive.
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding indoor air quality. Most indoor air pollution comes from sources inside the building. Paints, stains, adhesives, carpeting, upholstery, manufactured wood products, pesticides, and cleaning agents may emit volatile organic compounds (VOCs), including formaldehyde. Research shows that some VOCs can cause chronic and acute health effects at high concentrations, and some are known carcinogens. Low to moderate levels of multiple VOCs may also produce acute reactions. CBSC is proposing carpet systems be labeled or documented to meet the Carpet and Rug Institute's (CRI) Green Label or Green Label Plus program.

Sections: 804.4.4 Composite wood, 804.4.4.1 Agrifiber products and 804.4.4.2 Adhesives.
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding the use of formaldehyde in interior finish materials. In buildings, the most significant sources of formaldehyde are likely to be pressed wood products made using adhesives that contain urea-formaldehyde (UF) resins. Formaldehyde exposure at elevated levels (above 0.1 parts per million) may cause a wide range of health related issues. Pressed wood products made for indoor use include: particleboard (used as sub-flooring and shelving and in cabinetry and furniture); hardwood plywood paneling (used for decorative wall covering and used in cabinets and furniture); and medium density fiberboard (used for drawer fronts, cabinets, and furniture tops). Medium density fiberboard contains a higher resin-to-wood ratio than other UF pressed wood product and is generally recognized as being the highest formaldehyde-emitting pressed wood product. Recent regulations promulgated by the Air Resources Board were brought to CBSC's attention after GB CAC review and are cited for these composite wood products.

804.4.5 Resilient flooring systems
CBSC is proposing the adoption of this section to provide clarity to the code user regarding VOC emissions of interior flooring systems. Most indoor air pollution comes from sources inside the building including manufactured wood products that may emit volatile organic compounds (VOCs), including formaldehyde. Emission limits are based on the Collaborative for High Performance Schools (CHPS) Low-emitting Materials List.

Section 804.4.6 Thermal Insulation
CBSC is proposing the adoption of this section to provide clarity to the code user regarding VOC emissions in thermal insulation. Most indoor air pollution comes from sources inside the building including thermal insulation products that

may emit volatile organic compounds (VOCs), including formaldehyde. Emission limits are based on the Collaborative for High Performance Schools (CHPS) Low-emitting Materials List and on standards for compliance located in Chapter 12-13 in Title 24, Part 12, the California Referenced Standards Code.

Section 804.4.7 Acoustical ceilings and wall panels
CBSC is proposing the adoption of this section to provide clarity to the code user regarding VOC emissions of interior acoustical ceiling and wall panels. Most indoor air pollution comes from sources inside the building including manufactured wood products that may emit volatile organic compounds (VOCs), including formaldehyde. Emission limits are based on the Collaborative for High Performance Schools (CHPS) Low-emitting Materials List.

Section 804.5 Hazardous particulates and chemical pollutants; Sections: 804.5.1 Entryway systems, 804.5.2 Isolation of pollutant sources, and 804.5.3 Filters
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding outdoor air contaminants that enter the building and the containment of contaminants produced on site.

Section 804.6 Ozone depletion and global warming reductions; Sections 804.6.1 CFCs, and **804.6.2 HCFCs and Halons**
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the elimination of systems that use chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) and halons. The provisions of these sections will eliminate, with one exception, the use of the listed chemicals. The reduction of GHG emission from structures is one of the primary goals of the CGBC and will have a significant positive impact climate change and the environment as a whole.

Section 804.7 Environmental tobacco smoke (ETS) control
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the elimination of environmental tobacco smoke and its impact on indoor air quality.

Section 805.1 Indoor moisture control
CBSC is proposing the adoption of this section to provide clarity to the code user regarding moisture control. CBSC is proposing to include references to direct the code user to the California Building Code for general ventilation and moisture control requirements. CBSC is including these requirements to address moisture and mold issues that can affect indoor air quality.

Section 806.1 Outside air delivery
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the mechanical or natural delivery of outdoor air to buildings. CBSC is proposing to include references to direct the code user to the California Energy Code, Title 24, Part 6 and Title 8, Chapter 4 for requirements.

Section 806.2 Carbon dioxide (CO_2) monitoring
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the installation of carbon dioxide monitoring systems to protect occupant health and minimize GHG emissions. It specifies system response for under-ventilation leading to unhealthful air and for over-ventilation needlessly wasting energy cost.

Section 807.1 Lighting and thermal comfort controls, **807.1.1 Single-occupant spaces, 807.1.1.1 Lighting, 807.1.1.2 Thermal comfort, and 807.1.2 Multi-occupant spaces**
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding the use of individual environmental controls, within the parameters of the California Energy Code, that would provide a positive health and psychological impact on persons utilizing the provisions of these sections. The provisions potentially save employers, the state, and health insurers money through healthy work attendance and increased productivity. GB CAC recommended CBSC further study the section and refine it for the public comment period. CBSC further clarified that these provisions are appropriate to the workplace and that individual lighting control is for task lighting or daylighting.

807.2 Verification of indoor environmental quality
CBSC is proposing the adoption of this section to provide clarity to the code user regarding the use of occupant surveys that would provide a positive health and psychological impact on persons utilizing the provisions of this section. The provisions potentially save employers, the state, and health insurers money through healthy work attendance and increased productivity.

807.3 Daylight, **807.4 Views, 807.4.1 Interior office spaces, and 807.4.2 Multi-occupant spaces**
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding connectivity to the outdoor environment that, within the parameters of the California Energy Code, would provide a positive health and psychological impact on persons utilizing the provisions of these sections. The provisions potentially save employers, the state, and health insurers money through healthy work attendance and increased productivity.

807.5 Acoustical control, **807.5.1 Exterior noise transmission, and 807.5.2 Interior sound**
CBSC is proposing the adoption of these sections to provide clarity to the code user regarding environmental acoustics that would provide a positive health and psychological impact on persons utilizing the provisions of these sections. The provisions potentially save employers, the state, and health insurers money through healthy work attendance and increased productivity.

CHAPTER 9. REFERENCED STANDARDS
CBSC is proposing adoption of this new California chapter. GB CAC approved with the addition of web site links and

the inclusion of the International Association of Plumbing Officials and National Fire Protection Association.

Section: 901.1
CBSC is proposing the adoption of this section to provide clarity to the code user regarding standards referenced in the CGBC. This section provides the code user with contact information for organizations that have developed standards referenced or used in the CGBC.

CHAPTER 10. INSTALLER AND THIRD PARTY QUALIFICATIONS
CBSC is proposing adoption of section headings of this new California chapter.

Sections: 1001, 1002 and 1003
CBSC is proposing the adoption of the section headings of this new California chapter to eliminate uncertainty and provide clarity to the code user. Currently, CBSC is not proposing to adopt any new requirements for installers or third party inspectors. In future adoption packages CBSC may develop training or certification requirement for persons involved with the verification of some technical installations contained in the CGBC.

CHAPTER 11. APPLICATION CHECKLISTS AND WORKSHEETS
CBSC is proposing adoption of application checklist and worksheets in this new California chapter.

APPENDIX A. COMMENTARY OF ADDITIONAL DESIGN CONSIDERATIONS
It was the GB CAC's recommendation to relocate measures from Chapter 4 to an Appendix, because it was felt that the provisions in this chapter, though voluntary, may conflict with local planning and zoning authority.

The contributions to greenhouse gas emissions in California which are mitigated by site planning and design measures in Appendix A are several.
(1) The Air Resources Board reports that fossil fuels contribute to 98% of carbon dioxide emissions, more than one-half of which are transportation related. Provisions in this chapter will:
- Promote biking, walking, carpooling, and fuel efficient vehicles to reduce significantly smog, inhalable particulates, and carbon monoxide.

(2) Greenhouse gas and particulate pollution is generated by the manufacture and transportation of building materials and by diesel-powered earth movers during construction. Provisions in Chapter 4 promote demolition practices that will:
- Encourage the reuse of existing building structural and non-structural elements in new buildings;
- Stimulate the salvage and circulation of reusable building items, encouraging a local market for recyclable goods.

(3) Construction preparation of previously undisturbed sites (greenfields) results in loss of soil through erosion, contributing to air and watershed pollution. In Chapter 4, standards will:
- Provide for storm water pollution prevention terms of the Clean Water Act as implemented by the State Water Resources Control Board to be applied to all building projects, including those under one acre which are currently outside the scope of the SWRCB;
- Guide the site designer with strategies to maintain pre-project quality of storm water runoff and restrict sedimentation from reaching storm water drainage systems and receiving streams or rivers.

Section A401.1 Purpose
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding the measures contained in the CGBC. This section provides the code user with necessary general knowledge regarding the intent of this chapter.

Section A402.1 Definitions
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding the use of definitions. These definitions provide guidance to the user on the meaning of words used within this chapter. Through adoption of these sections CBSC is providing the code user with clarity on proper use of terms that are used in the CGBC. GB CAC recommended a definition of low-emitting and fuel-efficient vehicles (see 406.1.5 below), and CBSC has complied.

Sections A405.1.2 Existing building structure and **A405.1.3 Existing non-structural elements**
CBSC is proposing the adoption of these new California sections to provide clarity to the code user regarding measures to conserve resources and reduce waste and transportation impacts.

Section A406.1.3 Storm water design
CBSC is proposing the adoption of this new California section to provide clarity to the code user regarding means to achieve pre-project hydrology and pollutant loading.

Sections A406.1.4 Bicycle storage and changing rooms, A406.1.5 Fuel efficient vehicles, and **A406.1.6 Parking capacity**
CBSC is proposing the adoption of these new California sections to provide clarity to the code user regarding reduction of single occupant automobile use and its impacts on development and pollution. GB CAC recommended clarification of parking ratios for fuel-efficient and pool vehicles, and CBSC, with assistance from the Air Resources Board, has modified the proposals to accommodate the recommendation.

TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS:

[1] California Energy Demand 2008-1018 Staff Revised Forecast, California Energy Commission, November 2007, CEC-200-2007-015-sf2

[2] California Construction Review, August 27, 2007; reports almost $21 billion in private nonresidential construction (does not include public sector).

[3] Third-year report of progress of California's Sustainable Building Task Force in response to Governor Gray Davis' Executive Order D-16-00.

[4] S. Abbaszadeh, L. Zagreus, D. Lehrer, and C. Huizenga (Center for the Built Environment, U.C. Berkeley), Occupant Satisfaction with Indoor Environmental Quality in Green Buildings, 2006

[5] Including LEED NC 2.2, Green Globes, the Collaborative for High Performance Schools, Global Green, draft ASHRAE 189P, NAHB/ICC.

CONSIDERATION OF REASONABLE ALTERNATIVES

CBSC considered whether or not to consider mandatory measures for all or part of the proposals as an alternative to voluntary guidelines. Given that the measures are establishing a framework for future green building standards to be developed for the 2009 code adoption cycle, it was agreed to move forward with voluntary measures at this time. This will allow designers, builders, and building inspectors and officials a learning period and flexibility of application.

REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS.

No alternatives were identified to lessen the adverse impact on small businesses, because the guidelines are voluntary and can be selected to meets the needs of individual businesses.

FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS.

- The third-year report of progress of California's Sustainable Building Task Force in response to Governor Gray Davis' Executive Order D-16-00 indicates that an increase in upfront construction costs for green features, especially in the energy sector, will be paid back during the life of a building.
- The standards are voluntary and can be selected to meets the needs of individual businesses.

DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS

Federal regulations may be adopted for use in California by those state and local agencies with authority for clean air, clean water, water conservation, energy conservation, and waste management. Those regulations may be cited in the proposed guidelines as they are applied in California.