

MEETING DATE

3/27/06

AGENDA ITEM

Discussion to Direct Staff to Work with the California Building Standards Commission to Develop a Local Initiative and Direction on Whether to Pursue Funding for Solar Improvements for City Hall

ATTACHMENTS

	<u>Pages</u>
1) Green Building Discussion Item Staff Report from February, 2005	1-60
2) Diagram of a 1 Kilowatt Grid-Intertie Solar System	61

City of Culver City, California
City Council Agenda Item Report

Meeting Date February 14, 2005		Item Number <u>A-7</u>	
AGENDA ITEM Discussion of Options for Future Green Building Standards in Culver City			
Contact Person/Dept Craig Johnson		Phone Number 253-5802	
Fiscal Impact Yes ☒ No ☐		General Fund Yes ☒ No ☐	
Public Hearing ☐		Action Item ☒ Attachments ☒	
Public Notification Legal Notification Not Required Non Legal Notification Publication in the Culver City News on February 3 rd and 10 th , Master Notification List on February 10, 2005 and a mailing of 495 postcards to all City licensed design professionals (architects and engineers) and all City licensed general contractors and City licensed realtors			
Department Approval Susan Evans 2-2-05		CAO Approval Jerry Fulwood 2/9/05	
City Controller Approval Jim Lavery 2/9/05			
 <u>RECOMMENDATION</u> That the City Council discuss its options for a future Green Building Program and provide direction to staff <u>BACKGROUND</u> A Green Building is described as one using an integrated framework of design, construction, operations and demolition practices that encompasses the environmental and economic impacts of buildings Green Building practices recognize the interdependence of the natural and built environments and seek to minimize the use of energy water, and other natural resources and provide a healthy productive indoor environment by providing more natural light, cleaner air improved health comfort and productivity In recent years several municipalities throughout California have adopted a Green Building program (Attachment 1) These programs have been implemented by cities seeking ways to be more energy efficient, reduce solid waste during construction, reduce environmental pollution, and conserve natural resources Several cities have found that integrating Green Building practices into the construction of city buildings has proved to be a sound financial decision as these buildings require lower energy, waste disposal and water costs Most municipalities tailor their programs to their specific community needs and goals However, all Green Building programs address one or both of the following 1 Energy efficiency measures, and			

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2 Water, materials, and interior environment measures

A building's energy use is particularly significant because buildings in the United States consume 39% of the nation's primary energy and 71% of the nation's electricity. The remainder of energy is consumed by transportation and industry.

Based on the impact of energy use, this staff report will focus more on the concept of a Green Building program that addresses energy efficiency measures instead of one that focuses on water, materials, and interior environment measures.

Currently, Culver City's development and construction standards are no more restrictive in terms of Green Building standards than what is mandated by California State Code. Despite this fact, the City's Building Safety Division has two (2) educational handouts available to the public concerning Green Buildings (Attachment 2), which has led to Green Building measures being voluntarily taken by residents resulting in an average of three (3) new solar photovoltaic installations in the City per year. In addition, the City's Sanitation Division has adopted various recycling measures which are also a part of a Green Building program. Through these efforts, the Sanitation Division has surpassed, by 7%, the California Integrated Waste Management Board's requirement that 50% of all solid waste be diverted to recycling.

Energy use of new buildings is regulated nationwide, with California currently having the most restrictive requirements. In California, building energy efficiency is regulated by Title 24, Part 6, of the California Code of Regulations. California's Energy Efficiency Standards for Residential and Nonresidential Buildings. The 2001 Title 24 Standards are scheduled to be made more restrictive in October 2005 per the California Building Standards Commission.

The adopted standards are mandatory for all new and remodeled construction in California with several minor exceptions. The standards may be met through either a prescriptive approach, specifying building features' energy performance, or a performance approach meeting a maximum energy usage allowed. The standards are enforced by all jurisdictions in California through standardized forms and computer analysis that is submitted with the construction drawings as part of a construction permit application. The construction is inspected in the field to verify compliance with the approved plans. As a result of this process, California ranks 48th in energy consumption per capita.

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DISCUSSION

When determining the parameters of a Green Building program for the City, there are numerous policy questions that should be addressed

- 1 What level of upgraded standards should be mandatory?
- 2 Should there be tougher standards for City and Redevelopment Agency projects than private construction?
- 3 If upgraded standards are instituted, should they apply to all construction or only projects of a certain size and scope?
- 4 What are the estimated additional costs of construction for various standards?
- 5 What are the estimated energy savings and reduced pollution that may be realized?
- 6 What will be the cost to the City general fund to institute new standards?

1 What level of upgraded standards should be mandatory?

The following are four (4) different potential programs that could be implemented in Culver City All of the following options are more restrictive than the current California Title 24 requirements Option 1 is the least restrictive program while Option 4 is the most restrictive program

Option 1 Current Culver City Building Safety Voluntary Measures Model

- No change to current Code
- Voluntary adoption of Green Building Measures
- Staff would continue providing educational handouts at the Building Safety counter on energy efficiency measures and sustainable building measures

Option 2 California Department of General Services/ Real Estate Services Division Model

- The goals of the State of California are to site, design, deconstruct construct, renovate operate and maintain State buildings that are models of energy, water and materials efficiency through mandating that all projects are designed in accordance with Title 24 and Government Code Sections 15814 30-31

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- This involves a requirement that all projects be designed to exceed the applicable Title 24 Energy Efficiency Regulations, Whole Building Appropriate, at initiation of preliminary plans by a minimum of 10%, unless documented by a consultant to the satisfaction of the State that it would not be cost effective. In such case, the project shall be designed and constructed within the initial project budget to exceed the energy efficiency requirements of Title 24 Part 6, California Energy Code by the maximum amount that is determined by the consultant to be cost effective.
- Consultant shall perform analyses of the US Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) criteria as it applies to the design and construction of a project. While it is not required that an official USGBC certification and rating be obtained, the equivalent score of a certified rating, or better, is required for a project.

Option 3 City of Santa Monica Green Building Model

- Excluding single family dwelling units and duplexes, Santa Monica's ordinances related to Green Building standards require all projects (public and private development) to achieve better than Title 24 efficiency and use a minimum of four (4) major building materials with recycled content along with a series of other requirements regarding:
 - 1 Siting and form
 - 2 Landscape
 - 3 Transportation
 - 4 Envelope
 - 5 Materials
 - 6 Water systems
 - 7 Construction management
 - 8 Energy requirements

Option 4 Leadership in Energy and Environmental Design Green Building Model (LEED)

- The USGBC has developed the LEED Green Building Rating System which is a voluntary, consensus-based national standard for developing high-performance sustainable buildings. LEED promotes green building through a comprehensive system offering project certification, professional accreditation, training and practical resources.

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- The current LEED Rating System can be made applicable to new commercial construction and major renovation projects, existing building operations, commercial interiors projects, core and shell projects, homes and neighborhood development
- The LEED Rating system addresses location, site design, landscape features, construction materials energy systems and performance, recycling, emissions, water reduction and other development features
- Under the LEED rating system, a project is awarded points based on the incorporation and implementation of green building elements Projects can be awarded one of four levels of status 'certified,' silver, gold or "platinum, depending on the number of points achieved

Option 5 Hybrid Model

- A combination of different aspects of each model

2 Should there be tougher standards for City and Redevelopment Agency projects than private construction?

The following are four (4) different options regarding standards Option number 1 is the least restrictive while option number 4 is the most restrictive

Option 1

- Current Culver City voluntary measures be made mandatory for public construction

Option 2

- Current Culver City voluntary measures be made mandatory for private construction and all public projects meet a LEED standard

Option 3

- Private construction meet the State Real Estate Services Division guidelines and public construction meet a LEED certified standard

Option 4

- Private construction meet a LEED certified standard and public construction meet a LEED gold standard

3 Should upgraded standards apply to all construction or only projects of a certain size and scope?

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The following are three (3) different options regarding size and scope Option number 1 is the least restrictive while option number 4 is the most restrictive

Option 1

- Upgraded standards would apply to all new commercial buildings over 10,000 square feet, all multifamily projects with eleven units or greater, and new single family home development
- Standards would not apply to commercial buildings 10,000 square feet or less, commercial addition or renovation projects, multifamily projects of three (3) units or less or single family homes

Option 2

- Upgraded standards would apply to all new commercial buildings and all multifamily projects

Option 3

- Upgraded standards would apply to all new commercial buildings, major additions or major renovations and to all multi-family buildings

Option 4

- Upgraded standards would apply to all new commercial buildings major additions or renovations, and to all single-family buildings

4 What are the additional costs of construction for mandating various standards?

The following are three (3) different options relating to costs and standards Option number 1 is the least restrictive while option number 4 is the most restrictive

Option 1 10% energy efficiency improvement

- This option would add an estimated 2% to the total cost of construction
- Examples of items that would be impacted by these standards include lighting, insulation, heating, ventilating, and air conditioning equipment
- A new 8 000 square foot commercial building may cost \$140/ s f = \$1 120 000 million
- To improve the energy efficiency by 10% may increase the building cost by 2% \$22 400

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Option 2 15% energy efficiency improvement

- This option would add an estimated 2.5% to the total cost of construction
- To use the example above this would increase the building cost by 2.5%, \$28,000

Option 3 A LEED Gold Certification

- This option would add an estimated 4% to the total cost of construction
- LEED certification, as noted previously would involve much more than improving energy efficiency
- To use the example above this would increase the building cost by 4%, \$44,800

5 What are the estimated energy savings and reduced pollution that may be realized?

The following is based on the same three examples presented in policy question number 4 above

	Annual Thermal British Units ("btu")	Annual Energy Cost	Annual Carbon Emissions
Base 8,000 sq ft office building	680 800,000 btu	\$9 680	15 tons
10% energy efficiency improvement	612 720,000 btu	\$8,712	13.5 tons
15% energy efficiency improvement	578,680,000 btu	\$8,228	12.7 tons
20% energy efficiency improvement	544 640 000 btu	\$7 744	12 tons

6 What will be the cost to the City's general fund to institute various standards?

City costs may be divided into a one-time program set-up cost, annual costs or costs per individual project. See elaborated discussion under financial impact.

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SUMMARY

Green Building energy efficiency measures are generally much more objective and simpler to establish and measure than building materials and interior environment measures. Efforts to minimize electricity use in particular is very important to the environment. Two thirds of all electricity produced is wasted through generation or transmission losses. One watt of electricity saved at the point of use corresponds to a savings of the raw materials required and pollution produced by the generation of 3 watts of electricity. Buildings themselves (and the equipment/appliances within them) consume 71% of the annual electricity production, the remainder goes to business and industry functions.

In determining what types of projects should be included in a Green Building program it is important to take into consideration that currently no jurisdiction applies mandatory Green Building standards to single or two family renovations or new construction. Applying mandatory standards to residential renovations would be very difficult, and applying mandatory standards to new one or two family homes would not create a significant environmental improvement in Culver City as only a few such homes are built here annually.

The majority of construction projects in Culver City are renovations of some type. Applying mandatory Green Building standards to renovation projects in general either multi-family residential or commercial, is possible but would be very involved and may be very costly because it would involve hiring a full time staff person who would be responsible for monitoring all renovation projects based on their full understanding of the mandatory standards.

It would be feasible to apply mandatory Green Building standards to new multi-family and commercial construction. They are new generally freestanding buildings and Green Building upgrades could be incorporated into the design from the beginning. All new multi-family and commercial construction in Culver City must complete a Planning discretionary review process prior to applying for a construction permit. The applicant could be advised of the mandatory Green Building standards at this early stage in the design process.

In determining what type of program is right for Culver City it is important to take into consideration staffing abilities.

A custom designed program, such as the City of Santa Monica program, would require a consultant and increased community involvement to establish, and would require highly qualified City staff members to monitor and enforce such a program.

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Adopting a LEED standard could be implemented by utilizing outside LEED consultants. Any project intending to meet a LEED standard would initially hire a LEED accredited architect, or would add a LEED accredited consultant to the project. The LEED consultant would follow the project from start to finish, monitoring and advising on every aspect of the project. The LEED consultant would also coordinate the "building commissioning" after the project is finished (fine tuning and verifying performance and instructing the building managers in the operation of the building), and would also submit the applications to the USGBC requesting LEED certification. The USGBC is the final determiner of whether a project meets a LEED standard.

Any Green Building program that the City adopts must be integrated into the City's current Planning discretionary review, construction permit review, construction permitting, construction inspection, and certificate of occupancy processes.

FISCAL ANALYSIS

The following are cost comparisons of several potential program models and additional costs associated with a Green Building program.

	One time set-up cost	Annual cost (to the City or Agency)	Cost per project (to the City or Agency)
A 10% energy efficiency improvement for all major <u>private</u> construction	\$50,000 consultant	\$120,000 for one permanent contract plan reviewer/ inspector	None
A full Green Building program for all major <u>private</u> construction (The City of Santa Monica Model)	\$300,000	\$360,000 for three permanent or contract plan reviewers/inspectors	None
A full Green Building program for all major <u>City</u> construction (The City of Santa Monica Model)	\$300,000 consultant (note this would not be in addition to the \$300,000 listed above for private construction)	\$120,000 for one permanent contract plan reviewer/inspector	Would vary per project, probably a minimum of 2.5% additional construction cost per project
A LEED Gold standards for all	None	None	Would vary per project, probably

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major <u>City</u> construction			a minimum of 4% additional construction cost per project
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Additional costs associated with a Green Building program involve the following

Workshops and Training Workshops and training could be provided for staff, Planning Commissioners and City Council members by an outside consultant. The estimated cost for these workshops is approximately \$1,000 each for a total cost of \$3,000 for an estimated need of three workshops.

Community Outreach To encourage green private sector development in a voluntary program or if the program is mandatory for the private sector, workshops should be provided for community members. A non-profit organization can provide these workshops to the public at an estimated cost of \$1,000, for a total cost of \$2,000 for an estimated need of two workshops.

Additionally, a brochure and handouts would be developed to explain the program to the public at an estimated cost of \$1,000 for development and printing.

Incentives Some jurisdictions offer partial fee rebates, expedited permit processing, or recognition by the City Council to encourage private construction projects to meet voluntary Green Building standards.

ATTACHMENTS

- 1 Other Municipality Green Building Comparison
- 2 Culver City Green Building Handouts
- 3 State of California Real Estate Division Energy Efficiency Checklist
- 4 LEED Description
- 5 Santa Monica Green Building Program Introduction and Required and Suggested Practices
- 6 Potential Culver City Green Building Model

MOTION

That the City Council

Discuss its options for a future Green Building Program and provide direction to staff

MEETING DATE

2/14/05

AGENDA ITEM

Discussion of Option for Future Green Building
Standards in Culver City

ATTACHMENTS

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1) Other Municipality Green Building Comparison	1
2) Culver City Green Building Handouts	2-9
3) State of California Real Estate Division Energy Efficiency Checklist	10-27
4) LEED Description	28-32
5) Santa Monica Green Building Program Introduction and Required and Suggested Practices	33-47
6) Potential Culver City Green Building Model	48-49

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Other Cities Comparison

	City of Calabasas	Alameda County	City of Pleasanton	City of San Jose	City of Santa Monica	City of Los Angeles
Name of program	Green Building Ordinance	Construction Debris Management and Green Building Practices	Commercial and Civic Green Building Ordinances	Green Building Program	Sustainable Development Guidelines	Sustainable Development Guidelines
Lead Agency	Planning and Environmental Programs Division	General Services Agency and Public Works	Planning Department	Environmental Services Department	Environmental Programs Division	Bureau of Engineering Architectural Division
Evaluation Standards	Modified LEED	LEED	Modified LEED/ ACWMA	Modified LEED	Green Building Design and Construction Guidelines	
Any LEED requirements	Eligibility evaluated by staff development up to 5k s f to qualify for Calabasas/ LEED certified rating over 5k s f to qualify for Calabasas/ LEED silver rating no formal certification required	Required to achieve LEED silver rating	Eligibility evaluated by staff development over 20k s f must qualify for LEED certified rating no formal certification required	Eligibility evaluated by staff public sector development over 10k s f must qualify for San Jose/ LEED certified rating no formal certification required	not required	City projects 7 500 s f or larger evaluated by LEED certified designers in the Bureau of Engineering
Public Sector application	Mandatory for development over 500 s f	Mandatory for development to achieve LEED silver	Mandatory for development over 20k s f	Mandatory for development over 10k s f	Mandatory minimums more green when cost effective	City projects 7 500 s f or larger
Private Sector application	Mandatory for development over 500 s f	Voluntary	Mandatory for development over 20k s f	Voluntary	Mandatory energy and recycling further measures voluntary	Voluntary
Application to Commercial projects	Yes	Voluntary	Yes	Voluntary	Yes	Voluntary
Application to Residential projects	No	Voluntary	No unless the project is a PUD (planned Unit Development)	Voluntary	Multifamily only	Voluntary
Staff training requirements	Workshop with outside consultant	(No information)	Building/ City Engineering staff have attended two training workshops	(No information)	A series of workshops	A series of workshops
Staff LEED Accreditation	Several members intend to complete accreditation process	One staff member currently accredited	One Planner currently accredited	Several Public Works staff members currently accredited	Eight City engineers currently accredited	Four City designers in Bureau of Engineering currently accredited
Program staffing requirements	Allocation of existing staff time	Allocation of existing staff time	Allocation of existing staff time	(No information)	One full time staff member allocation of other existing staff time	(No information)
Outside consultants	Hired for staff workshop	Attorney hired to write ordinance	Hired for staff workshops	(No information)	Hired for staff and community workshops	(No information)
Length of program development	(No information)	6 months	(No information)	2 years 7 months	7 years	6 years
Additional comments		Alameda County Waste Management Authority has developed own Guideline (www stopwaste org)		City received \$60k grant to create a position to oversee development of program	City helps fund Green Building Resource Center run by Global Green	(No information)
Website	www cityofcalabasas org	www acgov org/admin/ admincode/Alameda_County_ Administrative _Code/Title_4/38/	www ci pleasanton ca us/ planning_ commdev html	www ci san jose ca use/esd/ GB HOME HTM	http //greenbuildings santa monica org/ index html	



Attachment
No. 1

Top 20 no or low cost Green Building Strategies

From Global Green USA Globalgreen.org

Energy

Culver CITY

1 Orient building to maximize natural daylighting

Description natural daylighting is usually available to the east, south and west facades

Benefits maximizing natural daylighting reduces the need for artificial light, thus reducing energy consumption and utility bills. Dwellings that have good natural daylighting are also more pleasant for the residents

2 Place windows to provide good natural ventilation

Description natural ventilation systems take advantage of prevailing winds and thermal convection to ventilate living spaces

Benefits placing windows to take advantage of natural ventilation reduces the need for air conditioning, saves money on energy bills, and can make homes without air conditioning more comfortable

3 Select a light colored "cool roof"

Description dark roofing materials absorb heat, making the house warmer in summer months, whereas light colored roofing reflects heat away from the building

Benefits light colored roofing reduces heat build-up through the roof, thus increasing occupancy comfort and decreasing air conditioning bills. Light colored roofing can also last longer because it does not thermally expand and contract as much as darker colors

4 Provide overhangs on south facing windows

Description overhangs or screens on south facing windows are one component of a natural cooling system

Benefits shading south facing windows reduces heat gain by screening the summer sun during the hottest periods of the day

5 Install whole-house fans or ceiling fans

Description whole-house and ceiling fans improve interior comfort by circulating cold and warm air. They can be adjusted to either draw warm air upward during summer months or push it downward during the winter

Benefits fans can reduce the need for air conditioning and heating by circulating air effectively and on average uses one tenth the electricity of an air conditioning unit

6 Eliminate air conditioning

Description after the refrigerator, air conditioning is the second biggest consumer of electricity in an average household

Benefits eliminating air conditioning will significantly reduce a

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household's electricity bill

7 Provide combined-hydronic heating

Description combined-hydronic heating uses hot water stored in the water heater to operate radiators typically installed in baseboards

Benefits combined-hydronic heating saves energy by using hot water already produced and stored in the water heater, and eliminating the need for a separate furnace

(note may not always apply to Southern California, consult a mechanical engineer for further information)

8 Install fluorescent lights with electronic ballasts

Description interior fluorescent bulbs and fixtures produce light quantity and quality that is comparable to incandescents, while expending less energy Electronic ballasts also improve efficiency and reduce flickering

Benefits energy efficient light reduces energy consumption and lowers utility bills One compact fluorescent bulb will pay itself back over ten times over the course of its life through reduced energy use

9 Install high R-value insulation

Description insulation provides a continuous thermal barrier to minimize heat flow through the walls floor, and ceiling The higher the R-value, the greater the material's ability to insulate

Benefits installing higher R-value insulation improves comfort, decreases demand for air conditioning and heating, saves money, and makes the home quieter

10 Select Energy Star Appliances

Description refrigerators and freezers are among the largest largest users of electricity in most homes They can account for up to 25% of household energy use Energy Star appliances use 10-15% less energy and water than standard models

Benefits Energy Star refrigerators can save over 10% of the total annual electrical bill in a home Check with the local utility company for rebate programs

Water

11 Design water-efficient landscapes

Description low-water landscape designs (such as xeriscape) reduce water use by emphasizing native and/ or drought tolerant plants, eliminating turf areas, and minimizing maintenance Efficient irrigation systems such as drip and micro irrigation place the correct amount of water directly at the base of each plant thus reducing water use and waste from over watering

Benefits water efficient landscape and irrigation systems help plant growth and overall health by eliminating over watering or excessive drying They also lower water bills and reduce impacts on water supply infrastructure

12 Install water-efficient toilets and fixtures

Description new toilets use 1.6 gallons per flush compared with the old toilets that require 5-7 gallons per flush Flow reducers fit into the aerator at the tip of the faucet and reduce

the rate of water flow through the faucet Low-flow showerheads replace standard showerheads

Benefits low-flow toilets can save 22,000 gallons of water per year for a family of four Flow reducers can cut water usage of faucets and showers by as much as 40% with little noticeable effect

13 Use permeable paving materials

Description permeable paving allows stormwater to percolate into the soil

Benefits permeable paving allows on-site percolation, thus reducing the volume of polluted water that flows into rivers or bays, while replenishing soil moisture and local aquifers

Additional benefits include reduction in irrigation requirements and a lower risk of flooding

Materials

14 Use 30%-50% flyash in concrete

Description flyash is a byproduct of coal burning power plants and can be an inexpensive substitute for 15%-40% of the Portland cement used in concrete

Benefits flyash increases the strength and durability of the concrete Using flyash also reduces the amount of cement needed, thereby decreasing the overall environmental impacts of cement production (mining and energy consumption)

(consult a structural engineer for further information)

15 Use engineered wood for header, joists, and sheathing

Description solid sawn lumber in sizes of 2x10 or greater typically comes from old growth forests Engineered lumber products, however, come from small diameter and fast growing plantation trees Large size lumber can often be replaced with engineered lumber Wood I-joists are an alternative to 2x members used as floor and roof joists

Benefits reducing demand for large dimensional lumber decreases pressure to cut down old growth forests Engineered lumber uses wood fiber more efficiently than conventional lumber

(consult a structural engineer for further information)

16 Use recycled content insulation, drywall, and carpet

Description recycled content insulation, drywall, and carpets are made from recycled paper, plastic and glass bottles, recycled wool or cotton They don't differ in appearance or performance and the prices are comparable to conventional products

Benefits recycled content materials save resources and divert waste from landfills

Approximately 40 two liter soda bottles may be recycled into a square yard of carpeting

Recycled content insulation may contain up to 30% recycled glass

Indoor Air Quality

17 Use low or no-VOC paint

Description No-VOC paint does not emit odors related to volatile organic compounds (VOC's) Organic chemicals are widely used as ingredients in household products like paint adhesives cleaning supplies etc No-VOC paint is used exactly like conventional paint No-VOC paints are most suitable for indoor use

Benefits use of low or no-VOC paint can eliminate eye, nose, and throat irritation

18 Use formaldehyde-free or fully sealed materials for cabinets and counters

Description particleboard typically contains formaldehyde, which can offgas for 10-15 years EPA ranks formaldehyde as a probable human carcinogen

Benefits elimination of formaldehyde based materials reduces exposure to residents, particularly children who are most susceptible Sealing with a flat latex based primer or other suitable material can prevent the offgassing of formaldehyde

19 Vent the rangehood to the outside

Description steam gases, smoke, and other combustion by-products (such as unburned hydrocarbons) can result from cooking Stovetop range hoods expel these by-products to the outside

Benefits range hoods improve indoor air quality, prevent overheating, and reduce moisture build-up

20 Install carbon monoxide detector

Description carbon monoxide detectors monitor the level of this gas in individual dwelling units

Benefits carbon monoxide detectors can reduce harmful health effects of carbon monoxide, a common indoor air pollutant created by the combustion of natural gas from stoves and heaters

2003 Global Green USA globalgreen.org

Recommended Sustainable Building Measures

Voluntary Energy Efficiency Measures

Energy Efficiency Performance

- Project shall be designed to exceed the applicable Title 24 Whole Building Approach, in effect at time of permit application, by 5%

Space conditioning and ventilation

Motors

- All motors shall be NEMA rated premium motors

Cooling Towers

- Degree of approach at 8 d F or less at design temp
- Multiple or variable speed tower fan motor

Boilers

- Boiler and Furnace units to have a min combustion efficiency of 90%
- Automated staging of multiple boilers

Chilled Water System

- Chillers to exceed applicable T 24 Energy Efficiency Stds by at least 10%
- Plate and frame heat exchanger
- Automated staging of multiple chillers

Air Conditioners and Heat Pumps

- Must exceed applicable T 24 Energy Efficiency Stds by at least 10%
- Evaporative pre-cooled condensers on all roof-top package units over 20 tons
- No direct evaporative cooling

Distribution Systems

- Mastic or UL approved sealant for all joints of all air distribution systems (no cloth backed tape)
- Duct leakage shall be 3% or unless the ducts are contained 100% within the conditioned

Culver **CITY**

	space (duct testing required) ■ Variable speed pumping on chilled and hot water loops over 300 gpm (variable speed on either primary or secondary is acceptable)
Ventilation	■ Carbon Monoxide (CO) controlled exhaust ventilation for enclosed garages requiring ventilation ■ Demand control variable exhaust ventilation with CO₂ sensors on units serving spaces with an occupant load of 100 or greater and where the occupant density is intermittent ■ Constant air volume conversion to variable air volume (subject to health stds / outside air)
Lighting	■ Power density (watts/ sf) for office spaces greater than 250 s f must be lower than the applicable T 24 Std by at least 10% ■ Exit lights, input rating of 5 watts or less per illuminated face ■ Light colored interior finishes ■ linear fluorescent lamps, min system efficiency of 76 lumens per watt ■ compact fluorescent systems, min system efficiency of 50 lumens per watt ■ Daylighting must be provided in all rooms adjacent to exterior walls or roofs
Point use controls	■ 365 day digital time clocks with battery backup ■ Programmable thermostats ■ Occupancy sensors for lights in all spaces with intermittent use
Energy Management System	■ Energy Management System (EMS) to include programming, commissioning, and training to optimize energy usage ■ Provide real-time energy metering
Load Shifting or Shedding	■ Provide thermal energy storage for facilities on time-of-use rates with chillers ■ Provide building load cycling - remote metering and controls for demand responsiveness ■ Install control options that allow the building energy using systems to shed load (onsite) ■ Provide on demand water heating
Envelope	■ Windows with metal frames shall have a thermal break or use non-metal frames

- Roof, wall, and floor insulation shall exceed applicable T 24 Energy Efficiency Stds by 10%
- All low slope roofs must use cool roofing materials that meet either of the following requirements
 - a An initial reflectivity of at least 65% and an emissivity of at least 80%, or
 - b a min solar reflectance index (SRI) of 75%, calculated using ASTM E-1980 for moderate wind conditions

**Misc Energy Efficiency
Alternative Transportation**

- All appliances must be energy star rated
- Provide suitable means for securing bicycles, with convenient changing/ shower facilities, for min 5% of total building occupant load

**Voluntary Sustainable Building Measures,
Water, Materials, Interior Environment**

Landscaping/ Exterior

- All landscaping must be low-water/ drought tolerant
- Irrigation system must be designed for water efficiency high distribution uniformity, zero runoff
- Automatic irrigation controllers shall be programmed in coordination with rain sensors
- Specify urban or locally derived compost and mulch
- All benches or site furnishings must be recycled content/ plastic lumber

Interior

- All toilets shall be low-flow 1.6 gallon per flush, all shall be low-flow 1 gallon per flush (or waterless)
- All lavatory faucets shall not exceed .5 gallons per minute flow
- All lavatory faucets must be automatic shut off type
- All showerheads shall not exceed 1.5 gallons per minute flow
- All hot water pipes between water heater and faucets shall be insulated
- All hoses for maintenance or dishwashing shall be automatic shut-off

Commercial Kitchens

- Dishwasher final rinse cycle water shall be recycled to pre-wash cycle
- Garbage disposal water must be auto-shut off
- Spray rinses at sinks shall have a manual control "dead man" shut-off

Recycling

- All dishwasher pre-rinse nozzles shall be low-flow
- Provide dedicated space in and outside the building(s)

for the collection, storage, and loading of recyclable materials

- Construction waste, min 50% shall be diverted to recycling centers vs landfills

Materials selection

- All parking area wheel stops shall be 100% recycled content
- All pressed wood products shall be low-formaldehyde emitting
- All thermal and/ or acoustical insulation shall be zero or low-formaldehyde emitting
- All acoustical ceiling tiles shall be min 50% recycled content
- All carpet and padding shall be low VOC emitting, and/ or 25% recycled or refurbished content
- All toilet partitions shall be min 25% recycled content
- All interior latex paint shall be low or zero VOC, zero formaldehyde, water based
- All fabric wall panels shall have at least a partial recycled content
- All (non-ceramic) floor tiles shall be low-VOC emitting and/ or recycled or refurbished or renewable content
- All interior sealers (including concrete sealers), adhesives, finishes, coatings, and fire-proofing shall be low-VOC emitting

Interior Environmental Quality

- All exterior windows shall have an operable section
- All outside air intakes shall be located min 10' from potential sources of contamination
- All air distribution filters shall be high efficiency 85% flow per ASHRAE Std 52.1-1992
- Insulation at the interior of ducts is not permitted
- Provide proper slope at condensate pans to avoid accumulation of water

For further information please consult

U S Green Building Council
Energy Star

California Integrated Waste Management Board

Development Center for Appropriate Technology
National Association of Homebuilders - Energy
Efficiency, Green Building, & the Environment

Building Industry Institute California Green
Builder Program

usgbc.org

energystar.gov

[ciwmb.ca.gov/greenbuilding/Design/
costissues.htm](http://ciwmb.ca.gov/greenbuilding/Design/costissues.htm)

dcat.net

[nahb.org/reference_list.aspx?sectionID
=222](http://nahb.org/reference_list.aspx?sectionID=222)

thebii.org/cgbp.asp

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ENERGY EFFICIENCY AND SUSTAINABLE BUILDING MEASURES

The goals of the State of California are ' *to site design deconstruct construct, renovate operate and maintain state buildings that are models of energy water and materials efficiency while providing healthy productive and comfortable indoor environments and long-term benefits to Californians*

The objectives are to implement the sustainable building goal in a cost effective manner while considering externalities identify economic and environmental performance measures determine cost savings use extended life cycle costing and adopt an integrated systems approach Such an approach treats the entire building as one system and recognizes that individual building features such as lighting windows heating and cooling systems or control systems are not standalone systems

(Governor s Executive Order D-16-00 in part)

It is further ordered that sound and smart growth patterns shall receive maximum support consistent with the foregoing state priorities including the following considerations

- *Proximity to public transit and other needed infrastructure*
- *Proximity to affordable and available housing*
- *Pedestrian access to retail and commercial facilities and exploiting opportunities for mixed use*
- *Communication with residents property owners and businesses regarding local concerns*
- *Advice and recommendations of local elected officials and their staff with consideration to any incentives offered by local government*

(Governor s Executive Order D 46-01 in part)

DESIGN WORK

A Project shall be designed in accordance with all applicable laws and regulations including but not limited to the following

- 1 California Code of Regulations Title 24 Part 6 *California Energy Code* – Current Edition
- 2 Government Code Section 15814 30 31

B The State has developed and attached the following lists of possible energy efficiency and sustainable building measures

- 1 Energy Efficiency Measures – Tier 1 List
- 2 Energy Efficiency Measures – Tier 2 List
- 3 Sustainable Building Measures – Tier 1 List
- 4 Sustainable Building Measures – Tier 2 List

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C Inclusion of Tier 1 items in project design

- 1 It is anticipated that all applicable items from both Tier 1 lists should be included in the project within the established project scope design budget construction budget and schedule

D Inclusion of Tier 2 items in project design

- 1 Items from both Tier 2 lists shall be considered by the Consultant for inclusion in the project. If any of these items appear to be feasible, the Consultant shall notify the State in writing of any additional design and/or construction costs and benefits of incorporating each such item into the project.

E Consultant shall submit the following at the completion of Preliminary Plan (PP) phase and Working Drawing (WD) phase as indicated

- 1 Completed Tier 1 and 2 Energy Efficiency Measures checklist (PP and WD)
- 2 Completed Tier 1 and 2 Sustainable Building Measures checklist (PP and WD)
- 3 Written report including drawings, sketches, charts, calculations, life cycle cost analysis, etc. that describes and documents any included Tier 2 item justification (PP and WD)
- 4 Summary Report from the Title 24 compliance software run (WD)
- 5 Compliance forms as required by Title 24 (WD)
- 6 Additional submittal information
 - a) These submittals are in addition to any other requirements for submittals indicated elsewhere in this contract
 - b) Complete and submit the Tier checklists at the internet address provided by the State. If the Consultant is not able to access the on-line versions of the documents, contact the State.
 - c) Once a checklist has been submitted, subsequent update submittals shall be made using the previously submitted checklist as a basis. Go to the internet address, insert the project number, and the previously completed checklist will open. Update this checklist and resubmit.
 - d) The electronic version of the lists contain internet links to reference materials that are for informational purposes only and do not represent endorsement by the State, either actual or implied, of the products contained therein. The links should appear as highlighted text, depending upon the configuration of the Consultant's computer.

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TIER 1				
ENERGY EFFICIENCY MEASURES				
ITEM		INCLUDED IN DESIGN?		IF "No", INDICATE REASON(S)
		Yes	No	
ENERGY EFFICIENCY PERFORMANCE				
1	This project shall be designed within the project budget, to exceed the applicable Title 24 Energy Efficiency Regulations, Whole Building Approach, in effect at initiation of Preliminary Plans, by a minimum of 10%			To be completed by designer This project is designed to exceed Title 24 Energy [] Edition (insert year) by a minimum of []%
<i>NOTE For projects that include whole building energy modeling to determine the level of Title 24 compliance only complete item #1 of Tier 1 Energy Efficiency Measures (EEM) along with all of Tier 2 EEM and Tiers 1 & 2 Sustainable Building Measures (SBM) All other projects shall complete all of Tiers 1 & 2 of EEM and SBM These lists have items that may pertain to new construction renovations or both Not all items may be applicable to a project For all Tier 1 items the individual completing the form must indicate the reason(s) why a particular item is not included</i>				
SPACE CONDITIONING AND VENTILATION				
Motors				
2	National Electrical Manufacturers Association rated premium motors			
Cooling Towers				
3	Degree of approach at 8° F or less at design temperature			
4	Multiple or variable speed tower fan motor			
Boilers				
5	Efficient boiler and furnace units with a minimum combustion efficiency of 80%			
6	Automated staging of multiple boilers			
Chilled Water System				
7	Chillers to exceed applicable Title 24 Energy Efficiency Standards by at least 10%			
8	Plate and frame heat exchanger			
9	Automated staging of multiple chillers			
Air Conditioners and Heat Pumps				
10	Must exceed applicable Title 24 Energy Efficiency Standards by at least 10%			
11	Evaporative pre cooled condensers on all Rooftop Package Units over 20 tons in Climate Zones 11 15 where applicable			
12	Avoid direct evaporative cooling			

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TIER 1				
ENERGY EFFICIENCY MEASURES				
ITEM		INCLUDED IN DESIGN?		IF "No", INDICATE REASON(S)
		Yes	No	
Distribution Systems				
13	Leak repair Use mastic or UL approved sealant for air distribution system (1998 CMC Section 601 604 & std 6 3) Cloth backed tape shall not be used Duct leakage shall be 3% or less at 25 Pascal for both supply and return ducts (ASHRAE std 152P)			
14	Variable speed pumping on chilled and hot water loops over 300 GPM (Variable speed on either primary or secondary is acceptable)			
Ventilation				
15	Carbon monoxide (CO) controlled exhaust ventilation for enclosed garage applications			
16	Demand control variable exhaust ventilation with CO ₂ sensors on units serving spaces with at least 100 people and where the occupant density is intermittent ¹			
17	Constant air volume conversion to variable air volume (subject to health standard requirements/outside air)			
LIGHTING				
General				
18	Power density (watts/s f) for office spaces greater than 250 square feet must be lower than the applicable Title 24 Energy Efficiency Standards by at least 10%			
19	Exit lights Input rating of 5 watts or less per illuminated face			
20	Light colored interior finishes			
Fluorescent				
21	Linear fluorescent lamps Minimum system efficacy of 76 lumens per watt			

¹ Demand Control Ventilation is defined in Title 24 Energy Efficiency Standards Section 121 (c) 3 & 4

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TIER 1				
ENERGY EFFICIENCY MEASURES				
ITEM		INCLUDED IN DESIGN?		IF "No", INDICATE REASON(S)
		Yes	No	
22	Compact fluorescent systems Minimum system efficacy of 50 lumens per watt			
Daylighting				
23	Shading systems to reduce solar glare utilize daylighting and minimize solar heat gain			
24	Building orientation aspects for utilization of daylighting and minimizing solar heat gain			
OTHER MEASURES				
Point Use Controls				
25	365 day digital time clocks with battery backup			
26	Programmable thermostats			
27	Occupancy sensors for lights in spaces with intermittent use			
Energy Management System				
28	Energy Management System (EMS) – include programming commissioning and training to optimize energy usage			
Envelope				
29	Windows with metal frames shall have a thermal break or use non metal frames			
30	Increase roof wall and floor insulation so that it exceeds applicable Title 24 Energy Efficiency Standards by at least 10% where feasible			
31	Except in Climate Zone 1 for low slope and flat roofs use cool roofing materials on the <u>Energy Star</u> Cool Roofs list that meet either of the following requirements a) an initial reflectivity of at least 65% (ability to reflect sunlight) and an emissivity of at least 80% (ability to shed heat) or b) a minimum solar reflectance index (SRI) of 75% (calculated using ASTM E 1980 for moderate wind conditions)			
Miscellaneous				
32	Energy Star equipment and appliances			
33	Gas appliances			

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TIER 1				
ENERGY EFFICIENCY MEASURES				
ITEM		INCLUDED IN DESIGN?		IF "No", INDICATE REASON(S)
		Yes	No	
34	Variable frequency drive fume hood interlocked with sash operation (in laboratories)			
35	To be completed by designer Target interior design temperatures shall be ☐ degrees for cooling and ☐ degrees for heating			
36	Investigate existing financial incentive programs such as utility sponsored programs (e.g. Savings by Design) rebates etc			
LIST OTHER ENERGY EFFICIENCY MEASURES INCLUDED IN DESIGN THAT MEET TIER 1 CRITERIA				
37				
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49				
50				

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TIER 2				
ENERGY EFFICIENCY MEASURES				
ITEM		INCLUDED IN DESIGN?		IF "Yes", SEE EXHIBIT C - E 3
		Yes	No	
SPACE CONDITIONING AND VENTILATION				
1	Boiler NOx emissions 9 ppm NOx at 3% O2 for commercial and institutional gas fired boilers in areas where air quality minimums are higher			
2	Heat recovery from chillers			
3	Variable speed chillers			
4	Ground source and/or Geo thermal heat pumps			
LIGHTING				
5	Indirect lighting options			
6	Skylights and/or solar tubes with lighting controls			
7	Full cutoff luminaires for exterior lighting			
OTHER MEASURES				
Controls				
8	CO2 monitors for high occupancy areas exceeding one person per 10 ft2 Maintain a maximum CO2 concentration of 800 ppm as per Title 24			
Energy Management System				
9	Real time energy metering			
Load Shifting or Shedding				
10	Thermal energy storage for facilities on time of use rates with chillers			
11	Building load cycling – remote metering and controls for demand responsiveness			
12	Install control options that allow the building energy using systems to shed load (onsite)			
13	On demand water heaters			
Energy Sources				
14	Cogeneration/generation systems consider for facilities that have constant year round electrical and thermal loads			
15	Utility distribution upgrades			
16	Passive solar space & water heating			
17	Photovoltaics			
18	Other renewable energy			

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<u>TIER 2</u> ENERGY EFFICIENCY MEASURES				
ITEM		INCLUDED IN DESIGN?		IF "Yes", SEE EXHIBIT C - E 3
		Yes	No	
Miscellaneous				
19	Substation purchase and rate change			
20	Electrical supply and account aggregation			
21	Performance verification Whole building and indoor air quality commissioning			
Alternative Transportation				
22	Provide suitable means for securing bicycles with convenient changing/shower facilities for cyclists for 5% or more of building occupants (Also see State Administrative Manual section 4189)			
23	Install alternative fuel refueling station(s) for 3% of the total vehicle parking capacity of the site (includes zero emission vehicles) Liquid or gaseous fueling facilities must be separately ventilated or located outdoors			
LIST OTHER ENERGY EFFICIENCY MEASURES INCLUDED IN DESIGN THAT MEET TIER 2 CRITERIA				
24				
25				
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27				
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29				
30				
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35				
DESIGN ADVISORIES FOR CONSIDERATION BY DESIGNER				
1	Distribution systems Reduced headloss and/or friction designs for water pipes and air ducts			
2	Energy Management Systems and other controls Sequence equipment operation to minimize demand charges			

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TIER 1				
SUSTAINABLE BUILDING MEASURES				
(WATER, MATERIALS, INDOOR ENVIRONMENTAL QUALITY)				
ITEM		INCLUDED IN DESIGN?		IF "No", INDICATE REASON(S) (Designer to fill in blanks as applicable)
		Yes	No	
WATER				
Landscaping/Exterior				
1	Dedicated, State-owned sub meter(s) for landscape water budgeting and leak detection			
2	Performance Goal Design and install landscapes at no more than 80 percent of ETo (reference evapotranspiration) (Local permits not required)			Landscape is designed for ___% of ETo (reference evapotranspiration)
3	Landscape and ornamental water use conform to local Water Efficient Landscape Ordinance (Local permits not required)			
4	Irrigation systems for water efficiency include hydrozones high distribution uniformity and zero runoff (Local permits not required)			
5	Appropriate plant selection and placement (considering mature plant size and building locations) design by hydrozones			
6	Specify urban or locally derived compost and mulch in landscape areas			
7	Automatic irrigation controllers programmed in coordination with local historical evapotranspiration records (Local permits not required)			
Interior				
8	Ultra low flush toilets and low flush urinals 1 6 gal per flush toilets 1 gal per flush urinals or as required by local ordinance (Local permits not required)			
9	Lavatory faucets not to exceed 0 5 gallons per minute and use laminar flow restrictors to retrofit old fixture			
10	Automatic shut off lavatory faucets			
11	Showerheads using 1 5 gallons per minute or as required by local ordinance (Local permits not required)			

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(WATER, MATERIALS, INDOOR ENVIRONMENTAL QUALITY)				
ITEM		INCLUDED IN DESIGN?		IF "No", INDICATE REASON(S) (Designer to fill in blanks as applicable)
		Yes	No	
12	Insulated water pipes between hot water supply and faucets			
13	Water and energy efficient clothes washers (Energy Star or better)			
14	Automatic shutoff nozzles on hoses for maintenance and dishwashing			
15	Use water softener only where needed such as water heater feed water			
Kitchens				
16	Recycle dishwasher final rinse water to pre wash cycle			
17	Install manual controls on garbage disposal water so it does not run when not being used			
18	Spray rinses at sinks should have manual control "dead man" shut off			
19	Install low flow pre rinse nozzles			
20	Use appropriate nozzles to direct rinse and cleaning sprays accurately			
Cooling Towers				
21	Control cooling tower to bleed off water (sump filters etc) and make up water with conductivity meters or other water quality measurement			
MATERIALS				
Design Features				
22	Provide for dedicated space in and outside building for the collection storage and loading of recyclable materials per Public Resources Code Section 42924 (c) Check for <u>local ordinance</u> about recycling space			
Recycling				
23	Construction waste recycling plan/program 50% or better diversion of demolition and construction materials from landfills			Specified requirement for diversion of materials from landfills is ____%

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TIER 1				
SUSTAINABLE BUILDING MEASURES				
(WATER, MATERIALS, INDOOR ENVIRONMENTAL QUALITY)				
ITEM		INCLUDED IN DESIGN?		IF "No", INDICATE REASON(S) (Designer to fill in blanks as applicable) PC = postconsumer content² PI = postindustrial content³
		Yes	No	
Materials Selection for Materials Efficiency⁴ and Indoor Environmental Quality				
24	Specified products can be maintained with non toxic cleaning products (i.e. cleaning /maintenance products on DGS Environmentally Preferred Products list)			
25	Aggregate base Class II recycled content recycled and reused onsite			___% PC ___% PI
26	Wheel stops recycled content			___% PC ___% PI
27	Steel and aluminum products with high recycled content			___% PC ___% PI
28	Pressed wood products low formaldehyde emitting			
29	Partitions low VOC emitting and refurbished or bio harvested renewable material content			___% PC ___% PI
30	Thermal and acoustical insulation zero or low formaldehyde emissions			
31	Acoustical ceiling tiles calculated formaldehyde building concentrations from acoustical ceiling tiles should not exceed current statewide ambient levels (4.0 ug/m3) low VOC (other than formaldehyde) emitting recycled content or bio harvested renewable material content			___% PC ___% PI
32	Carpet and carpet padding low VOC emitting recycled or refurbished content			___% PC ___% PI
33	Latex paint interior applications low or zero VOC zero formaldehyde water based paints			
34	Latex paint reprocessed latex paint made from post consumer paint (Exterior applications or non enclosed spaces when medium grade is acceptable)			___% PC ___% PI

² Postconsumer (PC) material that has been previously used by consumers and is then recycled

³ Postindustrial (PI) material fragments or by products of the manufacturing process that are then recycled

⁴ To qualify as a recycled content product under the State Agency Buy Recycled Campaign (SABRC) a product must have a minimum of 50% recycled content 10% postconsumer except tire derived products which must have 50% postconsumer content and steel which must have 25% recycled content For a product to count toward the recycled content requirements for both LEED[™] and SABRC seek at least 20% postconsumer content except tire derived products which must have 50% postconsumer content for SABRC

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<u>TIER 1</u> SUSTAINABLE BUILDING MEASURES (WATER, MATERIALS, INDOOR ENVIRONMENTAL QUALITY)				
ITEM		INCLUDED IN DESIGN?		IF "No", INDICATE REASON(S) (Designer to fill in blanks as applicable) PC = postconsumer content ⁵ PI = postindustrial content ⁶
		Yes	No	
35	Wall panel fabrics with recycled content			___% PC ___% PI
36	Floor tiles low VOC emitting and refurbished or bio harvested renewable material content			___% PC ___% PI
37	Sealants (including concrete sealers) adhesives finishes coatings and fireproofing that are low VOC emitting			
INDOOR ENVIRONMENTAL QUALITY				
Design Features				
38	Ventilation Operable windows (consider for smaller buildings)			
39	Locate outside air intakes upwind and away (>25 feet) from sources of contamination			
40	Provide local exhaust ventilation to areas where indoor air pollutant build up could be a problem such as copier rooms shops etc			
41	Installed exterior duct work other than that for dedicated exhaust systems shall be protected from the weather by an architectural weathertight cover/enclosure that maintains duct access for maintenance/repair			
42	Specify high efficiency filters (at least 85% according to ASHRAE Standard 52.1 1992)			
43	Use exterior wrap for duct installation			
44	Avoid interior insulation in ducts unless required for acoustical attenuation Consider non fibrous liners in areas where insulation is required for acoustical attenuation Use materials that do not promote mold growth			
45	Provide convenient maintenance accessibility to all HVAC components including critical areas of the ductwork			
46	Specify proper slope for condensate pans to avoid accumulation of standing water			

⁵ Postconsumer (PC) material that has been previously used by consumers and is then recycled

⁶ Postindustrial (PI) material fragments or by products of the manufacturing process that are then recycled

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<u>TIER 1</u> SUSTAINABLE BUILDING MEASURES (WATER, MATERIALS, INDOOR ENVIRONMENTAL QUALITY)				
ITEM	INCLUDED IN DESIGN?	IF "No", INDICATE REASON(S) (Designer to fill in blanks as applicable)		
Materials Selection (See Materials Selection section in <i>MATERIALS</i>)				
Construction Practices				
47	Specify to remove all debris and oily residue from air ducts after manufacturing and prior to installation			
48	Specify that all openings in duct work shall be covered and sealed during transportation storage and installation			
49	Specify moisture content testing of concrete floors prior to installation of new flooring to verify compliance with flooring manufacturer requirements			
Installation Practices				
50	Specify that the contractor sequence installation of finishing materials to avoid absorption of VOCs by porous materials such as carpets fabrics insulation spray on fireproofing materials etc			
51	Specify outside air ventilation is required during application of wet systems in the building to reduce absorption by porous materials			
52	Specify to flush out buildings continuously at maximum feasible outdoor airflow rates for 30 days or as many days as possible before occupancy Install new filtration media after completion of flush out Length of flush out can be adjusted based on building air sampling (Building bake outs are not advised)			Number of days specified for flush out prior to occupancy = XXXX
LIST OTHER SUSTAINABLE BUILDING MEASURES INCLUDED IN DESIGN THAT MEET TIER 1 CRITERIA				
53				
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TIER 2 SUSTAINABLE BUILDING MEASURES (WATER, MATERIALS, INDOOR ENVIRONMENTAL QUALITY)				
ITEM		INCLUDED IN DESIGN?		IF "Yes", SEE EXHIBIT C - E 3
		Yes	No	
WATER				
Recycling				
1	Recycled water used in landscaping toilet flushing or cooling towers			
2	On site water treatment and reuse			
Landscaping/Exterior				
3	Rain shut-off device			
4	Diagnostic circuitry to notify user when a station is shorted or a power failure has occurred			
5	Pool covers			
6	Site irrigation using reclaimed (recycled) water			
7	Use of evapotranspiration based irrigation controllers that are regularly updated electronically through an automated management system			
Interior				
8	Exceed water efficient standards for plumbing fixtures and fittings within code			
9	Vacuum aided toilets			
10	Dual flush toilets which allow user to select one of two different quantities of water (low rise buildings)			
11	No water urinals			
Kitchens				
12	High efficiency dishwashers			
13	Connectionless food steamers instead of steam generator			
Space Conditioning and Distribution				
14	Evaluate closed loop cooling systems			
Storm Water				
15	On site rainwater collection systems for stormwater control and non potable water uses			
16	Filtering storm water runoff via holding ponds and natural wetlands			
17	Green roof			
18	Storm water filters and debris separators			

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TIER 2				
SUSTAINABLE BUILDING MEASURES				
(WATER, MATERIALS, INDOOR ENVIRONMENTAL QUALITY)				
ITEM		INCLUDED IN DESIGN?		IF "Yes", SEE EXHIBIT C - E 3 (Designer to fill in blanks as applicable) PC = postconsumer content ⁷ PI = postindustrial content ⁸
		Yes	No	
MATERIALS				
Recycling/Reuse				
19	Construction waste recycling plan/program 75% or better diversion of demolition and construction materials from landfills			Specified required diversion of materials from landfills is ____%
20	Reuse large portions of existing structures during renovation or rehabilitation projects			
Materials Selection for Materials Efficiency⁹ and Indoor Environmental Quality				
21	Agreement that manufacturer will take product back at end of its useful life (e.g. carpet, ceiling tile, etc.)			Products with take back agreement
22	HCFC free and CFC-free chillers			
23	Specify building materials manufactured within 500 mile radius of project site			
24	Rubberized asphalt concrete			____% PC ____% PI
25	Aggregate base with recycled content			____% PC ____% PI
26	Porous paving (also consider recycled content)			____% PC ____% PI
27	Outdoor benches or furnishings made with recycled content plastic lumber			____% PC ____% PI
28	Playground surfaces made from tire derived materials			____% PC ____% PI
29	Corrugated plastic drainpipe			____% PC ____% PI
30	Concrete containing high volume of fly ash or other pozzolanic material			____% PC ____% PI
31	Stained concrete floor slab as alternate to floor covering			
32	Mineral oxide pigments			
33	Zero VOC form release agents			

⁷ Postconsumer (PC) material that has been previously used by consumers and is then recycled

⁸ Postindustrial (PI) material fragments or by products of the manufacturing process that are then recycled

⁹ To qualify as a recycled content product under the State Agency Buy Recycled Campaign (SABRC) a product must have a minimum of 50% recycled content 10% postconsumer except tire derived products which must have 50% postconsumer content and steel which must have 25% recycled content. For a product to count toward the recycled content requirements for both LEED[™] and SABRC seek at least 20% postconsumer content except tire derived products which must have 50% postconsumer content for SABRC.

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TIER 2				
SUSTAINABLE BUILDING MEASURES				
(WATER, MATERIALS, INDOOR ENVIRONMENTAL QUALITY)				
ITEM		INCLUDED IN DESIGN?		IF "Yes", SEE EXHIBIT C - E 3 (Designer to fill in blanks as applicable) PC = postconsumer content ¹⁰ PI = postindustrial content ¹¹
		Yes	No	
34	Reuse salvaged brick and/or stone			
35	Formaldehyde free Medium Density Fiberboard (MDF)			
36	Toilet partitions Solid plastic model made with post consumer HDPE plastic			___% PC ___% PI
37	Light transmitting panels			
38	Pre finished panels recycled content			___% PC ___% PI
39	Use of polyethylene plastic piping in lieu of PVC piping			
40	Use of certified sustainable wood products in accordance with the Forest Stewardship Council			
41	Roofing materials containing recycled rubber or other recycled content materials			___% PC ___% PI
42	Fiberglass batt insulation formaldehyde free 30% recycled content or Blow in/sprayed cellulose or cotton batt insulation formaldehyde free 85% recycled content			___% PC ___% PI
43	Acoustical ceiling tile High performance formaldehyde free more than 75% recycled content			___% PC ___% PI
44	Carpet tiles instead of roll carpeting low VOC emitting			___% PC ___% PI
45	Wood flooring made from salvaged wood			
46	Resilient flooring low emitting bamboo cork natural linoleum tire derived or other recycled content or rapidly renewable flooring material			___% PC ___% PI ___Life expectancy (yrs)
47	Ceramic tile at least 10% postconsumer glass			___% PC ___% PI
48	Signage Recycled content			___% PC ___% PI
49	Auditorium seating refurbished			___% PC ___% PI
50	Entry Mats with recycled content			___% PC ___% PI

¹⁰ Postconsumer (PC) material that has been previously used by consumers and is then recycled

¹¹ Postindustrial (PI) material fragments or by products of the manufacturing process that are then recycled

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 Completed by
 Date Completed

TIER 2 SUSTAINABLE BUILDING MEASURES (WATER, MATERIALS, INDOOR ENVIRONMENTAL QUALITY)				
ITEM		INCLUDED IN DESIGN?		IF "Yes", SEE EXHIBIT C - E 3 (Designer to fill in blanks as applicable) PC = postconsumer content ¹² PI = postindustrial content ¹³
		Yes	No	
51	List all other products not previously addressed in Materials section included in design that have recycled content or contain rapidly renewable materials			
(a)				___% PC ___% PI
(b)				___% PC ___% PI
(c)				___% PC ___% PI
(d)				___% PC ___% PI
(e)				___% PC ___% PI
(f)				___% PC ___% PI
(g)				___% PC ___% PI
(h)				___% PC ___% PI
(i)				___% PC ___% PI
(j)				___% PC ___% PI
INDOOR ENVIRONMENTAL QUALITY				
Design Features				
52	Built in entry way mats with drop pans and adequate drains to catch dirt off shoes			
53	Consider design to accommodate future needs such as space for equipment and conduits to facilitate technology upgrades alternative uses for spaces higher occupancy and facility expansion etc			
54	Provide a separate minimum outdoor airflow measuring station for each HVAC system to ensure that design minimum outdoor airflow is supplied under all operating conditions			
LIST OTHER SUSTAINABLE BUILDING MEASURES INCLUDED IN DESIGN, (EXCEPT THOSE LISTED IN #51), THAT MEET TIER 2 CRITERIA				
55				
56				
57				
58				
59				
60				
61				

¹² Postconsumer (PC) material that has been previously used by consumers and is then recycled

¹³ Postindustrial (PI) material fragments or by products of the manufacturing process that are then recycled

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Real Estate Services Division
Tier 1 and Tier 2 Energy Efficiency and Sustainable Building Measures Checklists
July 1, 2002

Resources (for informational purposes only)

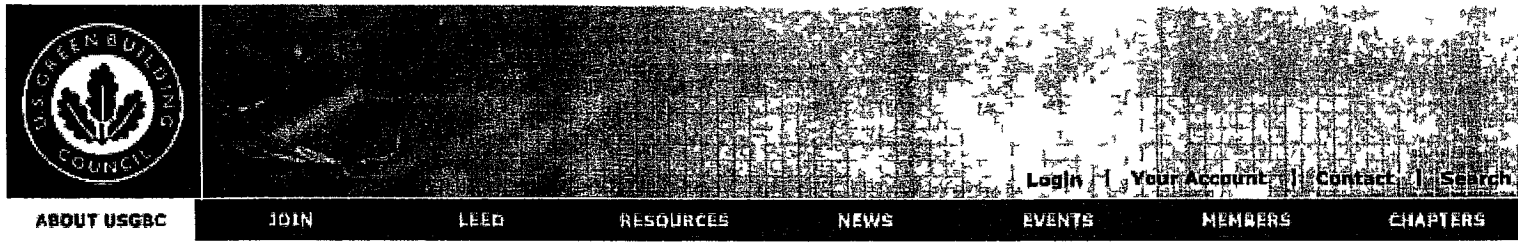
Reference Specifications for Energy and Resource Efficiency a sample specification prepared under the auspices of the California Energy Commission Public Interest Energy Research (PIER) 2001 downloadable at <http://www.eley.com/specs/index.htm> See section 1350 for materials and installation practices

Matrix Overview of Recycled Content Levels and Product Availability by the California Integrated Waste Management Board 2001, provides examples of recycled content products used on other California construction projects and has information on availability <http://www.ciwmb.ca.gov/GreenBuilding/Materials/Matrix.htm>

LEED Supplement for California State Facilities based on US Green Building Council LEED 2.0 <http://www.ciwmb.ca.gov/greenbuilding/Design/LEEDforCA.doc>
http://www.usgbc.org/LEED/LEED_main.asp

Sustainable Building Tool Kit <http://www.ciwmb.ca.gov/greenbuilding/Toolkit.htm>

Tier 1 A New Energy Standard for State Buildings prepared by Eley Associates for the California Energy Commission March 2000 This document provides context for the Energy Efficiency items



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Programs

LEED® Green Building Rating System

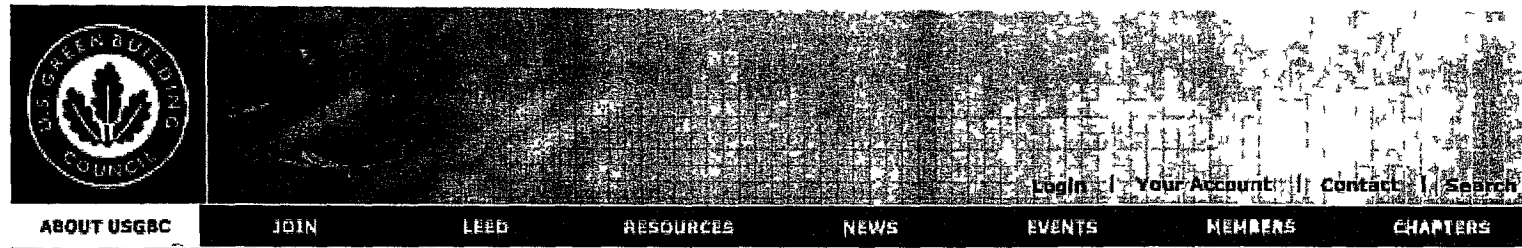
Developed by the USGBC membership, the Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a national consensus-based, market-driven building rating system designed to accelerate the development and implementation of green building practices. In short, it is a leading-edge system for designing, constructing and certifying the world's greenest and best buildings. The full program offers training workshops, professional accreditation, resource support and third-party certification of building performance. LEED for New Construction and Major Renovations (LEED-NC), was launched in March 2000 following review by the entire USGBC membership and a national pilot testing program. LEED-NC is designed for rating new and existing commercial and institutional buildings. LEED for Existing Buildings (LEED-EB), was launched in November 2004 following ballot approval by the entire USGBC membership and a national pilot testing program. LEED-EB is designed for rating the operations, maintenance and systems retrofits of buildings. LEED for Commercial Interiors (LEED-CI) was launched in November 2004 following ballot approval by the entire USGBC membership and a national pilot testing program. LEED-CI is designed for rating tenant improvement projects. Detailed information about building certification and resources is available on the [LEED Homepage](#). See below for information about LEED development committees.

Outreach

Greenbuild

Attachment
No. 4

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Meet the USGBC

Mission Statement

The U S Green Building Council is the nation's foremost coalition of leaders from across the building industry working to promote buildings that are environmentally responsible, profitable and healthy places to live and work

What is the U S Green Building Council?

- The U S Green Building Council (USGBC) is leading a national consensus for producing a new generation of buildings that deliver high performance inside and out
- Council members work together to develop LEED® products and resources, the Greenbuild annual International Conference and Expo, policy guidance, and educational and marketing tools that support the adoption of sustainable building
- Members also forge strategic alliances with key industry and research organizations and federal, state and local government agencies to transform the built environment

Council programs are Committee-Based, Member-Driven and Consensus Focused

As the leading organization representing the entire industry on environmental building matters, our unique perspective and collective power provides our members with enormous opportunity to effect change in the way buildings

are designed, built and maintained

Who We Are?

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[Meet the Management Team](#)



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LEED

LEED-NC Version 2.1 Registered Project Checklist

<< enter project name >>

<< enter city state, other details >>

Yes ? No

Sustainable Sites

☐	☐	☐	Prereq 1	Erosion & Sedimentation Control	Required
☐	☐	☐	Credit 1	Site Selection	1
☐	☐	☐	Credit 2	Development Density	1
☐	☐	☐	Credit 3	Brownfield Redevelopment	1
☐	☐	☐	Credit 4.1	Alternative Transportation Public Transportation Access	1
☐	☐	☐	Credit 4.2	Alternative Transportation Bicycle Storage & Changing Rooms	1
☐	☐	☐	Credit 4.3	Alternative Transportation Alternative Fuel Vehicles	1
☐	☐	☐	Credit 4.4	Alternative Transportation Parking Capacity and Carpooling	1
☐	☐	☐	Credit 5.1	Reduced Site Disturbance Protect or Restore Open Space	1
☐	☐	☐	Credit 5.2	Reduced Site Disturbance Development Footprint	1
☐	☐	☐	Credit 6.1	Stormwater Management Rate and Quantity	1
☐	☐	☐	Credit 6.2	Stormwater Management Treatment	1
☐	☐	☐	Credit 7.1	Landscape & Exterior Design to Reduce Heat Islands Non Roof	1
☐	☐	☐	Credit 7.2	Landscape & Exterior Design to Reduce Heat Islands Roof	1
☐	☐	☐	Credit 8	Light Pollution Reduction	1

Yes ? No

Water Efficiency

☐	☐	☐	Credit 1.1	Water Efficient Landscaping Reduce by 50%	1
☐	☐	☐	Credit 1.2	Water Efficient Landscaping No Potable Use or No Irrigation	1
☐	☐	☐	Credit 2	Innovative Wastewater Technologies	1
☐	☐	☐	Credit 3.1	Water Use Reduction 20% Reduction	1
☐	☐	☐	Credit 3.2	Water Use Reduction 30% Reduction	1

Yes ? No

Energy & Atmosphere

☐	☐	☐	Prereq 1	Fundamental Building Systems Commissioning	Required
☐	☐	☐	Prereq 2	Minimum Energy Performance	Required
☐	☐	☐	Prereq 3	CFC Reduction in HVAC&R Equipment	Required
☐	☐	☐	Credit 1	Optimize Energy Performance	1 to 10
☐	☐	☐	Credit 2.1	Renewable Energy 5%	1
☐	☐	☐	Credit 2.2	Renewable Energy 10%	1
☐	☐	☐	Credit 2.3	Renewable Energy 20%	1
☐	☐	☐	Credit 3	Additional Commissioning	1
☐	☐	☐	Credit 4	Ozone Depletion	1
☐	☐	☐	Credit 5	Measurement & Verification	1
☐	☐	☐	Credit 6	Green Power	1

continued

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Yes ? No

Materials & Resources 11 Points

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Yes ? No

Prereq 1	Storage & Collection of Recyclables	Required
Credit 1 1	Building Reuse Maintain 75% of Existing Shell	1
Credit 1 2	Building Reuse Maintain 100% of Shell	1
Credit 1 3	Building Reuse Maintain 100% Shell & 50% Non Shell	1
Credit 2 1	Construction Waste Management Divert 50%	1
Credit 2 2	Construction Waste Management Divert 75%	1
Credit 3 1	Resource Reuse Specify 5%	1
Credit 3 2	Resource Reuse Specify 10%	1
Credit 4 1	Recycled Content Specify 5% (post consumer + ½ post industrial)	1
Credit 4 2	Recycled Content Specify 10% (post consumer + ½ post industrial)	1
Credit 5 1	Local/Regional Materials 20% Manufactured Locally	1
Credit 5 2	Local/Regional Materials of 20% Above 50% Harvested Locally	1
Credit 6	Rapidly Renewable Materials	1
Credit 7	Certified Wood	1

Indoor Environmental Quality 15 Points

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Yes ? No

Prereq 1	Minimum IAQ Performance	Required
Prereq 2	Environmental Tobacco Smoke (ETS) Control	Required
Credit 1	Carbon Dioxide (CO₂) Monitoring	1
Credit 2	Ventilation Effectiveness	1
Credit 3 1	Construction IAQ Management Plan During Construction	1
Credit 3 2	Construction IAQ Management Plan Before Occupancy	1
Credit 4 1	Low Emitting Materials Adhesives & Sealants	1
Credit 4 2	Low Emitting Materials Paints	1
Credit 4 3	Low Emitting Materials Carpet	1
Credit 4 4	Low Emitting Materials Composite Wood & Agrifiber	1
Credit 5	Indoor Chemical & Pollutant Source Control	1
Credit 6 1	Controllability of Systems Perimeter	1
Credit 6 2	Controllability of Systems Non Perimeter	1
Credit 7 1	Thermal Comfort Comply with ASHRAE 55 1992	1
Credit 7 2	Thermal Comfort Permanent Monitoring System	1
Credit 8 1	Daylight & Views Daylight 75% of Spaces	1
Credit 8 2	Daylight & Views Views for 90% of Spaces	1

Innovation & Design Process 6 Points

☐	☐	☐
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☐	☐	☐

Yes ? No

Credit 1 1	Innovation in Design Provide Specific Title	1
Credit 1 2	Innovation in Design Provide Specific Title	1
Credit 1 3	Innovation in Design Provide Specific Title	1
Credit 1 4	Innovation in Design Provide Specific Title	1
Credit 2	LEED™ Accredited Professional	1

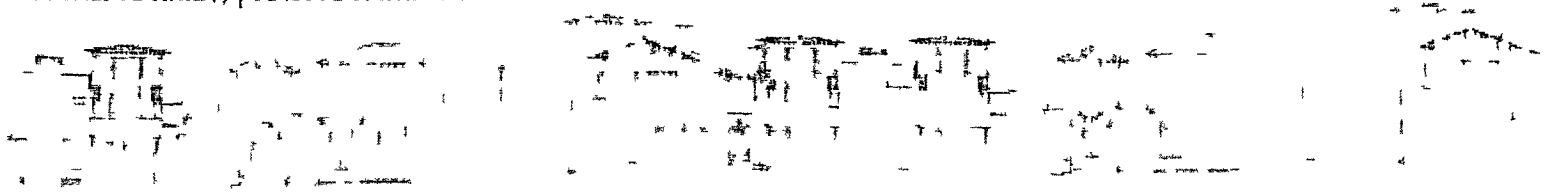
Project Totals (pre-certification estimates) 69 Points

Certified 26 32 points Silver 33 38 points Gold 39 51 points Platinum 52 69 points

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Santa Monica Green Building Program

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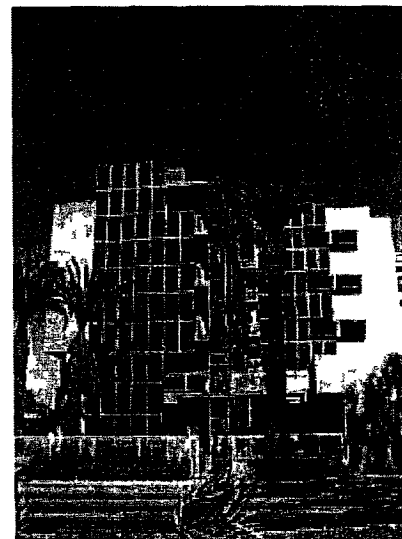
[Site Map](#)

Santa Monica Green Building Program

The City of Santa Monica has a commitment to protecting the environment improving quality of life and promoting sustainability. In order to fulfill this commitment, the City has adopted a set of requirements and recommendations to encourage the development of green buildings without forcing excessive costs or other burdens upon developers, building owners or occupants. The City has also developed Green Building Guidelines to explain possible ways of achieving green building goals.

This site contains information both on what you must do and what you might consider doing in order to achieve Santa Monica's standards of excellence in green building design and construction.

For information on green techniques in general and strategies for both Required and Suggested practices, see the [Green Building Design and Construction Guidelines](#) link. The Introduction to the Guidelines contains background information on Santa Monica's Green Building Program, as well as explanations of the green building design process.



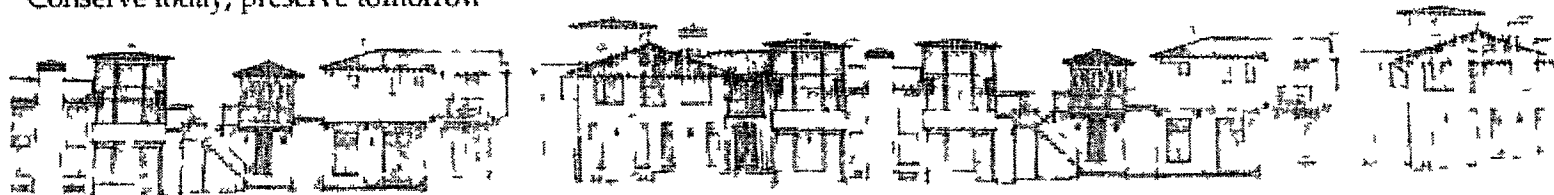
For information on city requirements for all building projects in Santa Monica, see the [Green Building Program Requirements](#).

Attachment 1001

BB-LS

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Suggested Practices	Environment	Ease of Use	Benefits	Capital Cost
Siting & Form				
SF1 - Use Narrow Floor Plates for Access to Daylight Views & Natural Cooling	✓✓✓	✓✓✓	✓✓✓	\$\$
SF2 - Locate & Orient the Building to Control Solar Cooling Loads	✓✓✓	✓	✓✓✓	\$
SF3 - Locate & Orient the Building for Passive Solar Heat in Winter	✓✓✓	✓	✓✓✓	\$
SF4 - Shape Orient the Building for Exposure to	✓✓✓	✓	✓✓✓	\$\$

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Prevailing Winds				
SF5 - Shape the Building to Induce Buoyancy Airflow Into & Out of Interior Spaces	✓✓✓	✓	✓✓✓	\$\$
SF6 - Shape the Building for Solar Energy Collection	✓✓✓	✓	✓✓	\$\$
Landscape				
LA1 - Locate Landscaping & Landscape Structures to Shade Buildings	✓✓	✓✓✓	✓✓✓	\$
LA2 - Use Landscape Design to Modify Wind Patterns & Enhance Building Ventilation	✓✓	✓✓✓	✓✓	\$
LA3 - Apply Environmental Landscape Design Principles	✓✓✓	✓✓✓	✓✓	\$
LA4 - Incorporate Areas for Urban Agriculture & Rooftop/Balcony Gardens	✓✓✓	✓✓	✓✓	\$\$
LA5 - Provide Shelter & Habitat for Urban Wildlife Through Landscape Design	✓✓✓	✓✓✓	✓✓	\$
LA6 - Provide On-Site Composting Facilities	✓✓	✓✓	✓✓✓	\$
LA7 - Use Recycled Landscape Products & Materials	✓✓	✓✓✓	✓✓✓	\$
Transportation				
TR1 - Match the Area & Type of Paved Surfaces to their use	✓✓✓	✓✓	✓✓	\$

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 7

TR2 - Create a Safe & Comfortable Environment for Pedestrians	✓✓	✓✓	✓✓✓	\$
TR3 - Provide Changing Rooms Lockers & Showers for Cyclists & Joggers	✓✓	✓✓	✓✓	\$
TR4 - Place Automobile Parking Fully or Partially Underground	✓	✓✓	✓✓✓	\$\$
TR5 - Share Parking Between Occupancies in Mixed-Use Projects	✓	✓	✓✓	\$
TR6 - Provide Convenient Parking & Charging Facilities for Electric Vehicles	✓	✓✓	✓	\$
Envelope				
EN1 - Design Windows to Maximize Daylighting & Views	✓✓✓	✓✓	✓✓✓	\$\$
EN2 - Shade Windows During Cooling Periods	✓✓✓	✓✓	✓✓	\$\$
EN3 - Use Roof Monitors for Daylighting Upper Floors	✓✓✓	✓✓	✓✓✓	\$\$
EN4 - Design Windows to Maximize Natural Ventilation	✓✓	✓✓	✓✓	\$\$\$
EN5 - Shape & Plan the Interior to Enhance Daylight & Natural Airflow Distribution	✓✓	✓✓	✓✓✓	\$\$
EN6 - Incorporate Thermal Mass Into Building Structure	✓✓	✓✓	✓✓✓	\$

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EN7 - Select Light Colors for Exterior Finishes	✓✓	✓✓✓	✓✓	\$
Materials				
MA1 - Restore & Incorporate Portions or Entire Existing Buildings in New Designs	✓✓✓	✓	✓✓	\$\$
MA2 - Specify Reuse of Salvaged Building & Landscape Materials	✓✓✓	✓	✓✓	\$
MA3 - Design with Panel Precut & Engineered Construction Products to Minimize Waste	✓✓	✓✓✓	✓	\$
MA4 - Specify Durable Exterior & Interior Finishes	✓✓✓	✓✓	✓	\$\$\$
MA5 - Design Interior Building Components for Future Disassembly Reuse & Recycling	✓✓	✓✓	✓✓✓	\$\$
MA6 - Specify Wood from Sustainably Managed Sources	✓✓✓	✓✓	✓✓✓	\$
MA7 - Use Low-Emission Finishes & Interior Materials to Reduce Indoor & Environmental Pollution	✓✓✓	✓✓	✓✓	\$\$
Water Systems				
WS1 - Specify & Install Water- & Energy-Conserving Appliances	✓✓	✓✓	✓✓✓	\$\$\$
WS2 - Reuse Graywater for Outdoor Landscaping Irrigation	✓✓✓	✓	✓	\$\$

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WS3 - Collect Rainwater for Outdoor Landscaping Irrigation	✓✓✓	✓✓✓	✓	\$
WS4 - Select High-Efficiency Service Hot Water Heaters & Boilers	✓✓	✓✓✓	✓	\$\$
WS5 - Install Heat-Recovery Systems on Wastewater Plumbing	✓✓	✓✓	✓✓	\$
WS6 - Use Solar Collectors for Service Hot Water Heating	✓✓✓	✓✓	✓✓	\$\$
Electrical Systems				
ES1 - Select Electrical Equipment for Reduced Energy Demand & Consumption	✓✓✓	✓✓✓	✓✓	\$\$\$
ES2 - Select Lighting Equipment for Reduced Energy Demand & Consumption	✓✓✓	✓✓	✓✓✓	\$
ES3 - Integrate Daylighting & Electric Lighting in Task Oriented Spaces for Productivity & Comfort	✓✓	✓✓	✓✓✓	\$\$
ES4 - Integrate Daylighting & Electric Lighting in Task-Oriented Spaces for Productivity & Comfort	✓✓✓	✓✓	✓✓	\$
ES5 - Maximize Impact in Sales Area with Efficient Lighting Strategies	✓✓✓	✓✓	✓✓✓	\$
ES6 - Integrate Daylighting & Electric Light in High-Bay Manufacturing & Color-Critical Areas	✓✓✓	✓✓✓	✓✓	\$\$

ES7 - Incorporate Photovoltaic Electricity Systems into the Building Fabric	✓✓✓	✓	✓✓	\$\$\$
ES8 - Provide for Future Electric Vehicle Charging Stations	✓✓	✓✓✓	✓	\$
HVAC Systems				
HS1 - Eliminate Mechanical System Sources of Indoor Air Pollution	✓✓✓	✓✓✓	✓✓✓	\$\$
HS2 - Isolate & Exhaust Indoor Point Sources of Air Pollution	✓✓✓	✓✓✓	✓✓✓	\$\$
HS3 - Separate Outdoor Intakes from Air Pollutant Sources	✓✓✓	✓✓	✓✓✓	\$
HS4 - Provide for Additional Outdoor Air Supply Quantities in the Future	✓✓	✓✓✓	✓✓	\$
HS5 - Filter or Treat Ventilation Air Supplies	✓	✓✓	✓	\$
HS6 - Provide Effective Ventilation Air Distribution	✓	✓✓	✓✓	\$\$
HS7 - Reduce or Eliminate the Use of CFCs & HCFCs in Cooling Equipment	✓✓✓	✓✓	✓✓	\$
HS8 - Select High-Efficiency Heating & Cooling Equipment to Reduce Energy Consumption & Demand	✓✓✓	✓✓✓	✓✓✓	\$\$

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~~OTA~~

Control Systems				
CS1 - Use Digital Electronic Control of Lighting & HVAC Systems for Energy & Demand Savings	✓✓✓	✓✓	✓✓	\$\$
CS2 - Incorporate Daylighting Controls in Architecturally Daylit spaces	✓✓✓	✓✓	✓✓	\$\$
CS3 - Incorporate Occupancy Controls in Zones with Intermittent Use	✓✓✓	✓✓✓	✓	\$\$
CS4 - Use Variable-Speed Motor Controllers for Fans & Pumps with Modulating Flows	✓✓	✓✓✓	✓✓✓	\$\$
CS5 - Cool Building Mass at Night for Energy & Demand Savings	✓✓✓	✓✓✓	✓✓	\$
Construction Management				
CM1 - Crush Waste Concrete & Masonry for Reuse	✓✓✓	✓✓✓	✓	\$
CM2 - Use Material-Conserving Construction Practices	✓	✓✓✓	✓✓	\$
CM3 - Select Safe Materials for Use On-Site	✓✓	✓✓	✓✓	\$\$
CM4 - Use Integrated Pest Management (IPM) to Minimize Pesticide Use in Construction	✓✓✓	✓	✓✓✓	\$\$
CM5 - Use Energy-Efficient				

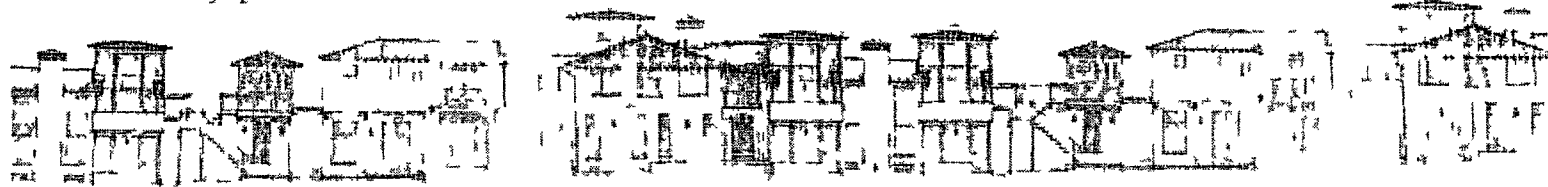
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Site Lighting & Controls & Low-Pollution Equipment	✓	✓✓✓	✓✓	\$\$
CM6 - Isolate Construction in Occupied Buildings to Protect Occupants	✓✓✓	✓✓	✓✓	\$
CM7 - Schedule Potential Air-Polluting Operations to Reduce Occupant & Worker Exposure	✓✓	✓✓	✓✓✓	\$\$
CM8 - Flush with Full Outdoor Air for Seven Days Prior to Occupancy to Protect Occupants	✓✓	✓✓	✓	\$\$
CM9 - Thoroughly Clean Interiors Building Cavities & HVAC Systems Prior to Furniture Installation & Occupancy	✓	✓✓✓	✓✓✓	\$
Commissioning				
CO1 - Prepare & Follow a Formal Commissioning Plan	✓✓✓	✓✓✓	✓✓✓	\$\$
CO2 - Pretest & Functionally Test All Equipment to be Commissioned & Correct Deficiencies	✓✓	✓✓✓	✓	\$
CO3 - Provide Operation & Maintenance Training for Staff	✓✓✓	✓✓	✓✓✓	\$\$
CO4 - Provide a Complete Final Commissioning Report to the Owner & Building Management	✓✓	✓✓	✓✓	\$

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Required Practices	Environment	Ease of Use	Benefits	Capital Cost
Siting & Form				
SFa - (SMMC 7 10 050) Submit an Urban Runoff Mitigation Plan to the Engineering Division	✓✓✓	✓✓✓	✓✓✓	\$\$
Landscape	Environment	Ease of Use	Benefits	Capital Cost
LAa - (SMMC 7 10 050) Minimize stormwater runoff to impermeable areas	✓✓✓	✓✓✓	✓	\$
LAB - (SMMC 7 16 020) Specify & Install Water-Efficient Irrigation Systems	✓✓✓	✓✓✓	✓✓✓	\$

Electrical Systems
HVAC Systems
Control Systems
Construction Management
Commissioning
Appendices
Case Studies
Additional Resources
Site Map

LAc - (SMMC 7 16 020) Restrict the Use of Water Features & Fountains	✓	✓	✓	\$
Transportation	Environment	Ease of Use	Benefits	Capital Cost
TRa - (SMMC 5 20 080(c) (2).) Install Clarifiers or Oil/Water Separators on Drains from Service Bays & Parking Areas	✓✓✓	✓✓✓	✓	\$
TRb - (SMMC 9 04 10 08 050) Provide Secure & Accessible Bicycle Storage for Visitors & Occupants	✓✓✓	✓✓✓	✓✓✓	\$
TRc - (SMMC 9 04 10 08 050) Provide Facilities for Shared Vehicle Transportation	✓✓✓	✓✓✓	✓✓✓	\$
Envelope	Environment	Ease of Use	Benefits	Capital Cost
ENa - (SMMC 9 04 10 02 150-151) Provide Space for Recycled Material Storage & Handling Systems	✓✓✓	✓✓✓	✓✓✓	\$
Materials				
MAa - (SMMC 7 60) Require Recycling of Demolition & Construction Waste in Construction Contracts	✓✓✓	✓✓✓	✓	\$
MAb - (SMMC 8 108 050) Specify Recycled Products				

SS
10/17

per EPA purchasing guidelines	✓✓✓	✓✓✓	✓✓✓	\$
Water Systems	Environment	Ease of Use	Benefits	Capital Cost
<u>WSa - (SMMC 7 18 070)</u> Specify & Install Water-Conserving Plumbing Fixtures & Fittings	✓	✓	✓	\$
<u>WSb - (SMMC 8 108 060)</u> Reduce Hot Water Heat Loss with Insulation & Heat Traps	✓✓✓	✓✓✓	✓	\$\$
<u>WSc - (SMMC 8 108 060)</u> Heat Swimming Pools & Preheat Process Hot Water with Unglazed Solar Collectors	✓✓✓	✓✓✓	✓✓✓	\$
<u>WSd - (SMMC 5 20 080(c))</u> (1) Eliminate Lint from Sanitary Sewers in Professional Cleaning Facilities	✓✓✓	✓✓✓	✓	\$
<u>WSe - (SMMC 5 20 080(c))</u> (1) & (c)(4)) Eliminate Grease from Sanitary Sewers in Food Preparation & Meat Retailing Facilities	✓✓✓	✓✓✓	✓	\$
<u>WSf - (SMMC 5 20 080(c))</u> (5)) Eliminate Silver from Sanitary Sewers in Photo-Finishing Facilities	✓✓✓	✓✓✓	✓	\$
Construction Management	Environment	Ease of Use	Benefits	Capital Cost
<u>CMa - (SMMC 7.60)</u> Prepare a Demolition &				

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Site Protection Plan	✓✓✓	✓✓✓	✓✓✓	\$
CMb - (SMMC 7 60) Salvage Reusable Materials & Separate Recyclables from Demolition (Recommended as part of Demolition and Site Protection Plan Not Required)	✓✓✓	✓✓✓	✓✓✓	\$
CMc - (SMMC 7 60) Inventory Mark & Protect Topsoil Trees & Vegetation to be Retained (Recommended as part of Demolition and Site Protection Plan Not Required)	✓✓✓	✓✓✓	✓✓✓	\$
CMd - (SMMC 7 10 060) Prepare a Stormwater Control Program for the Construction Site	✓✓✓	✓✓✓	✓✓✓	\$
CMe - (SMMC 7 60) Recycle Construction Waste & Designate a Site Waste-Management Person	✓✓✓	✓✓✓	✓✓✓	\$
CMf - (SMMC 5 08 150(b), 7 10 040) Provide Safe Storage Worker Training & Spill Cleanup Procedures for Hazardous Materials	✓✓✓	✓✓✓	✓✓✓	\$
Energy Requirements	Environment	Ease of Use	Benefits	Capital Cost
SMMC 8 108 Improved energy performance above California Title 24	✓✓✓	✓✓✓	✓✓✓	\$

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PA

requirements					
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Legend

Environment how well a Practice addresses environmental health and resource conservation issues

Low ✓

Moderate ✓✓

High ✓✓✓

(Slightly beneficial Beneficial Best practice)

Ease of Use how easily a given Practice can be implemented in design and construction

Low ✓

Moderate ✓✓

High ✓✓✓

(Easy Moderate Difficult)

Benefits benefits of a Practice besides reduced environmental health or resource impacts e.g. social and livability benefits of pedestrian amenities

Low ✓

Moderate ✓✓

High ✓✓✓

(Slightly beneficial Beneficial, Best practice)

Capital Cost the effect of a Practice on total construction cost relative to current Southern California practice

Low ✓

Moderate ✓✓

High ✓✓✓

(Low cost Moderate cost High cost)

85
LF

Potential Green Building Model for City Construction

Note program illustrates a LEED Gold Standard

	New buildings	Major Remodels
What types of projects the program would apply to	All new City buildings	All major remodels (project cost over 50% of the value of the existing structure)
Estimated annual number of buildings the program would apply to	1 to 2	1 to 2
Example project square footage	8 000 sq ft	8 000 sq ft
Estimated average building cost per project	\$1 304 000 (\$163/ sq ft)	\$720 000 (\$90/ sq ft)
Estimated average cost increase for a <u>20% energy efficiency increase</u> (4% cost increase over base building)	\$52 160 (construction cost increase LEED certified consultant cost and commissioning cost)	\$28 800
Estimated annual energy consumed per base building	680 800 000 btu s (85 100 btu s/ sq ft)	680 800 000 btu s (85 100 btu s/ sq ft)
Estimated annual energy cost per base building	\$9 680 (\$1 21/ sq ft)	\$9 680 (\$1 21/ sq ft)
Estimated annual energy savings with a 20% efficiency increase (per project)	136 160 000 btu s \$1 936	136 160 000 btu s \$1 936
Estimated annual carbon emission reduction with a 10% energy efficiency increase (per project)	3 tons (1 ton of coal= 24 000 000 btu s= 53 ton carbon emissions)	3 tons
Estimated one time cost to <u>the City</u> to set up such a program.	\$0 (costs would be borne by each City project)	
Estimated annual cost to the <u>City general fund</u> to continue such a program	\$26k (if the City builds one 8 000 s f building every other year)	

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Sq



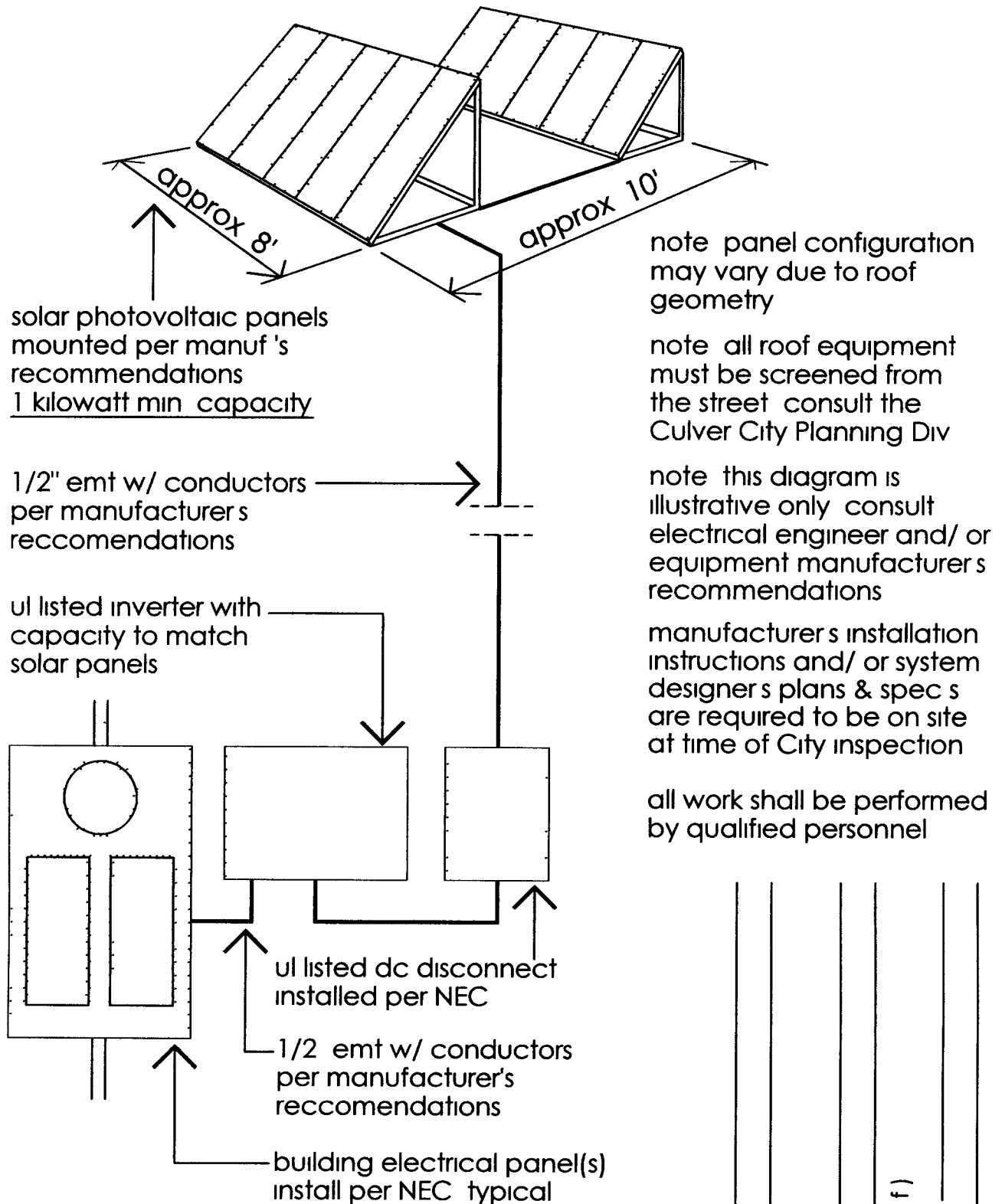
BUILDING SAFETY DIVISION

Potential Green Building Model for Private Construction

Note program illustrates a 10% energy improvement

	Multifamily buildings	Commercial buildings
What types of projects the program would apply to	All new multifamily buildings with three units or greater	All new commercial buildings
Estimated annual number of buildings the program would apply to	1 to 3	1 to 3
Estimated average square footage per project	8 000 sq ft (+ garages) (4 unit building)	4 000 sq ft
Estimated average building cost per project	\$1 120 000 (\$140/ sq ft)	\$652 000 (\$163/ sq ft)
Estimated average cost increase for a <u>10% energy efficiency increase</u> (2% cost increase over base building)	\$22 400	\$13 040
Estimated annual energy consumed per base building	373 600 000 btu s (46 700 btu s/ sq ft)	340 400 000 btu s (85 100 btu s/ sq ft)
Estimated annual energy cost per base building	\$6 080 (\$ 76/ sq ft)	\$4 840 (\$1 21/ sq ft)
Estimated annual energy savings with a 10% efficiency increase (per project)	37 360 000 btu s \$608	34 040 000 btu s \$484
Estimated carbon emission reduction with a 10% energy efficiency increase (per project)	825 tons (1 ton of coal= 24 000 000 btu s= 53 ton carbon emissions)	751 tons
Estimated one time cost to the <u>City</u> to set up such a program.	\$50k (consultant)	(Note all Green Building plan reviews and construction inspections would be integrated with all existing City permitting processes)
Estimated annual cost to the <u>City general fund</u> to continue such a program	\$120k (one contract/ permanent plan reviewer/ inspector)	

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60



min 1 kilowatt solar photovoltaic
grid-intertie system diagram

project address	_____
permit number	_____
new habitable	_____
square footage	_____
kw solar req'd	_____
(1 kw per new 10 000 s f)	_____
permit applicant's sig	_____
date	_____