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**Mayor**  
Steve Allen

**Vice Mayor**  
Debora Fudge

**Councilmembers**  
Robin Goble  
Sam Salmon  
Cheryl Scholar

**Town Manager**  
J. Matthew Mullan

March 28, 2011

California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814-5514

**Re: Town of Windsor Amendments to CALGreen and the Building Energy Efficiency Standards**

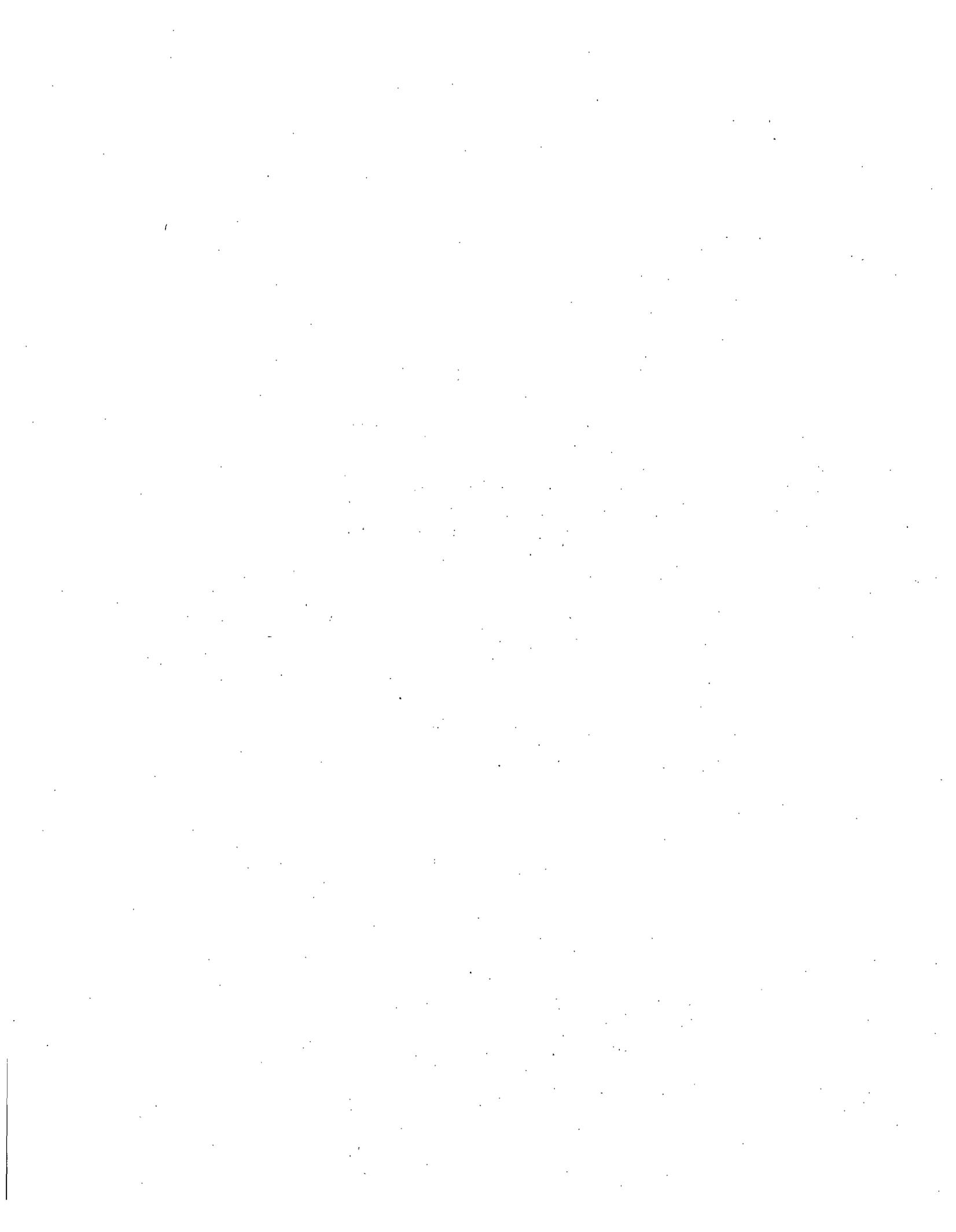
Dear Commissioners,

Per the request of Commission Staff, we express to you our firm commitment to have the Town of Windsor enforce the current Title 24 Building Energy Efficiency Standards as part of the implementation of our local energy ordinance. As the Chief Building Official, I will work with my staff involved in energy plan review and field inspection to improve their working knowledge of the energy standards. This includes special training as needed which focuses on enforcement of the energy standards and the special requirements of the Ordinance.

On October 20, 2010, a public hearing was held by the Windsor Town Council whereby I presented the Energy Cost Effective Study and ordinance proposing amendments to the 2010 California Green Building Standards Code, thereby requiring enhanced energy efficiency compliance measures for newly constructed buildings. The Council recognized the study analysis showing energy saving, and cost effectiveness., and subsequently adopted the proposed ordinance on the November 3, 2010 regular calendar business meeting. The Ordinance was approved unanimously by the Council.

Respectfully,

Steve Pantazes  
Building Official



Application for Locally Adopted Energy Standards by the  
Town of Windsor In Accordance With Section 10-106  
of the California Code of Regulations, Title 24, Part 1

March 28, 2011

From:

Steve Pantazes, Building Official  
Department of Planning & Building  
Town of Windsor  
9291 Old Redwood Hwy, Bldg 400  
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Report prepared by:

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Executive Summary

On October 20, 2010, the Windsor Town Council approved the introduction to the California Code of Regulations, Title 24, Part 11 Green Building Standards Code also known as CALGreen with the Tier 1 Appendices A4 and A5 as mandatory. The measures are intended to conserve natural resources through sustainable design and construction practices. The new ordinance takes effect under the state's 2008 Building Energy Efficiency Standards and requires permit applicants to exceed the state's energy efficiency requirements by 15% under provisions which take effect January 1, 2011.

Gabel Associates has researched and reviewed the feasibility and energy cost effectiveness of permit applicants exceeding the 2008 Standards in order to meet the minimum energy efficiency requirements of the proposed ordinance.

This application to the California Energy Commission follows the requirements pursuant to Public Resource Code Section 25402.1(h)(2) and Title 24, Part 1, Section 10-106.

Overall Scope of the Ordinance

New ordinance or revision to previous ordinance?	New ordinance
Projected Effective Date:	January 1, 2011
Green building or stand-alone energy ordinance?	Green Building Ordinance
Do minimum energy requirements increase after initial effective date?	No
Occupancies covered?	Residential & Nonresidential Buildings
Energy requirements apply to new construction, additions, and alterations?	New Construction
Special or unusual energy requirements?	No
Third party verification?	No
Implementation details in the ordinance or in a separate document?	Within the Ordinance

Key Features by Occupancy Type

Occupancy Type	General Requirements	Minimum Energy Requirements Effective January 1, 2011
<b>Low-rise Residential Buildings:</b>		
New Construction	CALGreen Tier 1	15% Better-than Title 24
Additions & Alterations	CALGreen Mandatory Requirements	15% Better-than Title 24
<b>Nonresidential &amp; High-rise Residential Buildings</b>		
New Construction	CALGreen Tier 1	15% Better-than Title 24
Additions & Alterations	CALGreen Mandatory Requirements	15% Better-than Title 24

## Cost Impacts and Cost-Effectiveness of the Ordinance

The energy performance impacts of the Ordinance have been evaluated in Climate Zone 2 based on the September 30, 2010 study entitled "*Climate Zone 2, Energy Cost Effectiveness Study using the 2008 Title 24 Building Energy Efficiency Standards*" written by Gabel Associates LLC and prepared for Pacific Gas and Electric Company's Codes and Standards Program.

## ORDINANCE NO. 2010-269

AN ORDINANCE OF THE TOWN OF WINDSOR ADOPTING BY REFERENCE THE 2010 EDITION OF THE CALIFORNIA CODE OF REGULATIONS, TITLE 24, PARTS 1, 2, 2.5, 3, 4, 5, 6, 8, 9, 10, 11, AND 12 AS PUBLISHED BY THE CALIFORNIA BUILDING STANDARDS COMMISSION, THE CALIFORNIA ADMINISTRATIVE CODE PART 1, CALIFORNIA BUILDING CODE PART 2, VOLUMES 1 & 2, CALIFORNIA RESIDENTIAL CODE PART 2.5, CALIFORNIA ELECTRICAL CODE PART 3, CALIFORNIA MECHANICAL CODE PART 4, CALIFORNIA PLUMBING CODE PART 5, CALIFORNIA ENERGY CODE PART 6, CALIFORNIA HISTORICAL BUILDING CODE PART 8, CALIFORNIA FIRE CODE PART 9, CALIFORNIA EXISTING BUILDING CODE PART 10, CALIFORNIA GREEN BUILDING STANDARDS CODE PART 11, AND THE CALIFORNIA REFERENCED STANDARDS CODE PART 12, REGULATING AND GOVERNING THE CONDITIONS AND MAINTENANCE OF ALL PROPERTY, BUILDINGS AND STRUCTURES; PROVIDING FOR THE ISSUANCE OF PERMITS AND THE COLLECTION OF FEES TOGETHER WITH LOCAL AMENDMENTS AND ADDITIONS TO THE VARIOUS CODES THEREOF; REPEALING ORDINANCES NO. 2007-224, 2007-223, AND 2007-215, OF THE TOWN OF WINDSOR AND ALL OTHER ORDINANCES AND PARTS OF THE ORDINANCES IN CONFLICT THEREWITH.

THE TOWN COUNCIL OF THE TOWN OF WINDSOR DOES HEREBY ORDAIN AS FOLLOWS:

### SECTION 1

That a certain document, one (1) copy of which is on file with the office of the Division of Building Inspection, of the Town of Windsor, being marked and designated as the 2010 edition of the California Code of Regulations, Title 24, including all appendices, as published by the California Building Standards Commission, be and is hereby adopted as Title VII Building and Housing Code of the Town of Windsor, in the State of California for regulating and governing the conditions and maintenance of all property, buildings and structures; by providing the standards for supplied utilities and facilities and other physical things and conditions essential to ensure that structures are safe, sanitary and fit for occupation and use; and the condemnation of buildings and structures unfit for human occupancy and use and the demolition of such structures as herein provided; providing for the issuance of permits and collection of fees thereof; and each and all of the regulations, provisions, penalties, conditions, and terms of said Building and Housing Code on file in the office of the Building Official are hereby referred to, adopted, and made a part hereof, as if fully set out in this ordinance, with the additions, insertions, deletions and changes, if any, prescribed in Chapter 1 of this ordinance.

### SECTION 2

That if any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The Town Council of the Town of Windsor hereby declares that it would have passed this ordinance, and each section, subsection, clause or phrase thereof, irrespective of the

fact that any one or more sections, subsections, sentences, clauses and phrases be declared unconstitutional.

### SECTION 3

That nothing in this ordinance or in the Building Code hereby adopted shall be construed to affect any suit or proceeding impending in any court, or any rights acquired, or liability incurred, or any clause or causes of action acquired or existing, under any act or ordinance hereby repealed as cited in Section 3 of this ordinance; nor shall any just or legal right or remedy of any character be lost, impaired or affected by this ordinance.

### SECTION 4

That this ordinance and the rules, regulations, provisions, requirements, orders and matters established and adopted hereby shall take effect and be in full force and effect January 1, 2011. The Town Clerk of the Town of Windsor shall cause this Ordinance to be published or to be posted in at least three (3) public places in the Town of Windsor in accordance with Section 36933 of the Government Code of the State of California. Provided however, all building permits and related permits issued on or after January 1, 2011, shall be subject to the terms and conditions of this ordinance. Council authorizes the posting of the full text of the ordinance or publication of a summary of the ordinance pursuant to Government Code Section 36933 (c).

### SECTION 5

That Ordinances No. 2007-224, 2007-223, and 2007-215, of the Town of Windsor entitled Title VII, Building and Housing and all other ordinances or parts of ordinances in conflict herewith are hereby repealed and Title VII, Building and Housing Code is hereby added to the Town of Windsor Code to read as follows:

### SECTION 6

#### FINDING OF FACT & LOCAL CONDITIONS

The Town Council finds that the standards for buildings within the Town should comply with the California Code of Regulations, Title 24, 2010 Edition, Parts 1, 2, 2.5, 3, 4, 5, 6, 8, 9, 10, 11, and 12 as published by the California Building Standards Commission, including tables and appendices as amended and adopted by the State of California and as further amended by this Ordinance. Based on the materials presented by the Building Official of the Town of Windsor, the Town Council finds that it is necessary to make procedural and administrative modifications and changes to the model codes as amended and adopted by the State of California and specifically adopted and amended in this Ordinance. Such standards are needed for efficient, economical and expeditious enforcement of the Building and Safety Code of the Town. The Town Council further finds and determines, based on the materials and reports presented, that the substantive amendments to the model codes, which are identified by and adopted in this Ordinance, are hereby determined to be reasonable and necessary because of local conditions and do not lessen, diminish or change the standards set forth within the model codes except as authorized by law. If any non-administrative or non-procedural model code provision or applicable State of California amendment is in conflict with this ordinance, it is the intent of this ordinance to amend or delete such provision when findings of local conditions are stated as required by §17958.5 and §17958.7 of the Health and Safety Code.

Said local conditions are:

A. **Climate.** The Town on an average experiences an approximate rainfall of 40 inches. This rainfall can normally be expected between October and May. During the winter months, one can anticipate periods of heavy rain, which causes local flooding, erosion and contributes to slope instability. Winter storms are many times accompanied by high winds, which have uprooted trees and damaged power lines. The Town has also experienced periods of heavy fog, which has delayed response of fire fighting apparatus, and prevented early discovery of structure fires.

During the dry period, temperatures range from 70 degrees to over 100 degrees. These temperatures are many times accompanied by a wildland-urban interface, creating a hazardous fire condition. With increased development spreading into the brush covered foothill area, wind driven fires could have severe consequences, as has been demonstrated on several occasions throughout the State.

B. **Geographical.** The Town is susceptible to seismic hazards resulting from movement along any one of several known faults in the area. The most serious direct earthquake hazard is damage or collapse of buildings or other structures due to ground movement. In addition to damage caused by earthquakes, there is a possibility of earthquake-induced landslides. Fire is often the major form of damage resulting from earthquakes. Most earthquake induced fires start because of damage to gas line, power lines, or heat producing appliances. In the event of a major earthquake or landslide, many areas of the Town may not be assessable to emergency equipment and if bridges or roads are damaged, the Town may be isolated from outside assistance.

C. **Topographical.** The Town borders include hilly terrain on the north and northeast portions of the Town. The water system is affected by the topographical layout. The water distribution system consists of different pressure zones, which carry water by gravity from various storage points. Water pressure can vary throughout the Town causing problems to development as well as to fire suppression forces. The Town is divided by Highway 101 and a railroad right-of-way. This creates barriers which obstruct traffic patterns and delay the response of fire equipment.

#### Summary

Because of conditions above, the Division of Building Inspection has determined that it is necessary to mitigate potential damage caused by earthquakes, erosion, lot to lot drainage and slope instability to protect the life and safety of the citizens and to ensure the structural stability of new development.

As a result of the findings, as set forth in this section, which identify various climatic, geographical and topographical elements, those additional requirements as specified in the amendments to the adopting ordinance supplementing and amending the code herein, are considered necessary and reasonable modifications and do not lessen, diminish or change the standards set forth within the uniform codes except as authorized by law.

While it is clearly understood that the adoption of such regulations may not prevent the incidence of fire, earthquake, erosion, and slope instability, the implementation of these amendments to the Code may reduce the severity and potential of loss of life and property.

## CHAPTER 1 GENERAL

### Article 1 PURPOSE; ADMINISTRATION

#### Section 7-1-100 Purpose

This chapter is enacted as a result of requirements of State law and the determination that within the Town, certain regulations for construction, maintenance, use and occupancy are required to provide the minimum standards to safeguard the life, limb and property and protect the public health, safety and general welfare and to provide regulations and control of those factors in a physical environment which exercise or may exercise a deleterious effect on his/her physical development, health and survival. The Town Council has determined that the adoption of this chapter will assure local control of the mandatory building and inspection requirements of the State of California.

#### Section 7-1-105 Division of Building Inspection

There is hereby established in this Town the Division of Building Inspection. The Town Council shall budget and appropriate such funds for the Division, as it may deem necessary for the operation of the Division.

Section 7-1-110 Building Official; Duties There is hereby established the office of Building Official. He/she shall manage and be responsible for all inspection work required for the proper enforcement of regulations imposed by this chapter except those duties specifically delegated herein to the Public Health Officer. He/she shall perform related duties as directed by the Town Council. The Building Official shall appoint such deputies and assistants as may be authorized by the Town Council.

The Building Official or his/her duly authorized representative shall act as the Secretary of the Board of Building Appeals and, notwithstanding any provisions in any Code adopted hereby to the contrary, he/she shall not be a member thereof. Upon presentation of proper credentials and pursuant to the law, the Building Official or his/her duly authorized representative may enter buildings, structures, or premises in the Town to perform any duty imposed upon him/her by these regulations.

#### Section 7-1-115 Appeals

Appeal may be made by any applicant or owner of property contiguous to the property to be regulated. For purposes of determining contiguity, property lines shall be projected to the center of public streets or highways. The appeal may be made from any decision of the Building Official; provided, however, that such appeal may not be made more than thirty (30) days after the decision from which appeal is being made has been rendered. All applicants and appellants shall be given reasonable opportunity to be heard and present evidence. Decisions of the Board of Appeals shall be in writing and shall be delivered to the appellant either in person or by

mailing to the address stated on the appeal or application. Decisions of the Board of Building Appeals are final. Should no decision be rendered within twenty (20) days after the filing of the appeal, the appeal is denied unless time is extended by action of the Board of Building Appeals. The board of appeals shall have no authority relative to interpretation of the administrative provisions of this code or the administrative provisions of the technical codes nor shall the board be empowered to waive requirements of either this code or the technical codes.

Section 7-1-120 Building Permit; Required

No person, firm or corporation shall erect, construct, enlarge, alter, repair, move, improve, convert or demolish any building or structure in the Town, or cause the same to be done, without first obtaining a separate building permit for each such building or structure as required by this chapter. Permits shall be issued and fees shall be collected by the Division of Building Inspection.

Section 7-1-125 Permits Not to Be Issued

Permits shall not be issued by the Division of Building Inspection for work which includes any of the following, unless and until the Public Health Officer has given his/her written approval:

- a. The construction, alteration or modification of any on-site disposal system; any water supply system which under State law or County ordinance is required to have a permit from the Health Officer, any establishment selling or preparing any food or food products; any public or semipublic swimming pool.
- b. The construction, alteration or modification of any structure which will result in the structure being connected to an on-site disposal system or water system requiring a permit from the Health Officer.
- c. The alteration or modification of any existing structure which is connected to an on-site disposal system or water system requiring a permit from the health officer where the alteration or modification may impose additional burdens upon the existing system, such as, but not limited to, the addition of rooms or the modification of floor plans for potential additional occupancy. This section shall not apply to repairs, such as replacement of roofing or siding. Where the permit is for modification or alteration of an existing structure, no permit will be issued where, in the determination of the Health Officer, such modification is likely to result in exceeding the capacity of the system.
- d. The construction, alteration or modification of any structure which may result in the property being improved in excess of its capacity to absorb sewage effluent. This section is intended to cover any change in the property which might adversely affect sewage disposal such as, but not limited to, the construction of a barn or swimming pool which might infringe on the leach field.

Whenever approval of the Public Health Officer is required, it shall be based upon the requirements imposed by this chapter and any other State or local law or regulation which may be applicable, including basin plans and other standards promulgated by the North Coast Regional Water Quality Control Board and the San Francisco Bay Regional Water Quality Control Board.

#### Section 7-1-130 Clearing of Building and Grading Permits

Building and grading permits must be cleared as to zoning considerations by the Planning Department, and drainage and flood control clearance may be required from the Water Department. Building permits for projects regulated by the Uniform Fire Code and Fire Safety Standards may be subject to review and approval by appropriate fire service agencies. Where road encroachment is necessary, a permit for same shall be first secured from the Department of Public Works. A water and/or sewer clearance is first required in areas serviced by special districts and cities before building permits can be issued. A building permit authorizing grading and excavation shall not be issued until a disposal location for excavated material has been designated.

#### Section 7-1-135 Emergency Work

Notwithstanding any other provision of this chapter or the Codes adopted hereby, emergency maintenance work or repair of buildings and structures requiring a permit hereunder may be commenced before obtaining a permit without violating this chapter provided the Division of Building Inspection or the Public Health Officer, in the appropriate case, is notified prior to noon of the next following business day and the permit required is obtained within twenty-four (24) hours thereafter, and provided further that no work shall be covered before it has been duly inspected and approved. Compliance with the State Subdivision Map Act, the subdivision regulations, and the zoning regulations, including compliance with conditional permits issued thereunder, and compliance with all laws, is a condition precedent to the issuance of any permit required by this chapter for work to be done on any particular parcel of real property in the Town of Windsor.

#### Section 7-1-140 Disposal of Excavated Material

Within flood-prone urban areas as defined in Section 9-1-200, a building permit authorizing grading and excavation shall not be issued until a disposal location for excavated material has been designated. Acquisition of a building permit does not relieve the permittee of the responsibility for acquiring any other State and local permits required for the activity.

#### Section 7-1-145 Relocated Buildings

A relocated building shall comply with the provisions of this chapter for new buildings to the extent that is reasonable and practical as determined by the Building Official.

#### Section 7-1-150 Inspection by Public Health Officer

The Public Health Officer or his/her duly authorized representative shall inspect all premises ~~subject to operating regulations pursuant to this chapter at such time or times as he/she deems~~ necessary, and if he/she determines that a violation of the regulations imposed by this chapter has occurred or is occurring, which is endangering or may endanger the public health, he/she may serve a notice of violation upon the permittee under an operating permit in such manner as provided herein or in codes adopted hereby. A copy of the notice shall be delivered to the Division of Building Inspection concurrently with service upon the permittee. Should such action be initiated by the Public Health Officer, no final disposition shall be made in the matter by the Division of Building Inspection or the Board of Building Appeals unless such disposition is approved in writing by the Public Health Officer. The Public Health Officer or his/her duly appointed representative may enter, during reasonable times, and in accordance with law, upon

buildings, structures or premises in the Town to perform any duty imposed upon him/her by this chapter.

Whenever a property owner requests a certificate from the Health Officer, certifying that the premises comply with all existing laws and regulations enforced by the Health Officer in respect to sewage disposal systems and water supply, a fee shall be charged as set by resolution of the Council. No charge shall be made for a check of premises at the request of the owner thereof where no certificate is required.

#### Section 7-1-155 Refunds

The Building Official may authorize the refunding of not more than eighty (80%) percent of a permit fee when no work has been done under a permit issued in accordance with this Code.

#### Section 7-1-160 Valuation and Fees

Notwithstanding the fees set forth in the codes adopted by this chapter, the Town Council shall by resolution set all fees to be collected. All building valuation shall be determined by the Building Official based upon the Building valuation data published periodically by the International Code Council.

Where the value of the proposed work is not listed in the International Code Council publication, the valuation will be based upon the equivalent contract valuation or the cost of the inspection services, whichever is greater.

#### Section 7-1-165 Conflicting Regulations

The regulations and provisions contained in this chapter shall prevail over any inconsistent provision contained in primary or secondary codes adopted hereby; provided, that in the case of inconsistent regulations, regulation shall prevail which is less stringent than the regulations established by the State of California.

#### Section 7-1-170 Penalties

a. The Building Official and the Official's authorized agents and/or employees are authorized to issue citations for violation of any regulatory provision of this chapter.

b. Any person, firm or corporation or agency, or employee of any person, firm or corporation or agency who violates or knowingly permits violation of any regulatory provision of this chapter shall be guilty of a public offense subject to administrative enforcement as defined in Section 1-1-250. Each person, firm or corporation or agency or employee thereof shall be guilty of a separate offense for each day, or any portion thereof, during which any violation of this chapter is committed, continued, or permitted and shall be punished accordingly.

c. Every violation of any regulatory provision of this chapter is declared to be a public nuisance and the Town Attorney shall take such action as he/she may deem necessary to abate the same.

Section 7-1-175 Definitions

Whenever any of the following names or terms are used herein or in any of the Codes adopted by reference by this chapter, unless the context directs otherwise, such names or terms so used shall have the meaning ascribed thereto by this section as follows:

Building Official, Chief Building Official, Code Enforcement Administrator, Fire Code Official, Administrative Authority, and similar references to a chief administrative position shall mean the Building Official of the Town of Windsor, and is the designated authority authorized and directed to enforce the provisions of this code. The Building Official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code.

The Building Division shall mean the Building Inspection Division of the Town of Windsor.

City shall mean the Town of Windsor.

City Clerk shall mean Town Clerk and Ex Officio Clerk of the Town Council.

City Council or Mayor shall mean the Town Council or Mayor of the Town of Windsor.

Board of Appeals shall mean the Board of Building Appeals provided for in subsection 7-1-115.

Section 7-1-180 Examination of Codes

One (1) copy of the Codes adopted by reference in this chapter has heretofore been filed with the Building Official and shall be maintained for use and examination by the Division of Building Inspection.

Section 7-1-185 Fees

Any applicant for any permit, approval or other action pursuant to this Chapter shall pay to the Town such fees as established and/or revised from time to time by the Town Council. Miscellaneous services for which fees have not been established by the Town Council may be set by the Building Official.

Section 7-1-190 Construction Hours

Construction, alteration or repair activities which are authorized by a valid Town permit may be conducted between the hours of 7:00 A.M. and 7:00 P.M. Monday through Friday and between the hours of 8:00 A.M. and 7:00 P.M. on Saturday. No construction, alteration or repair activities shall be permitted on Sunday unless expressly authorized by the Town Council; but in no event shall such construction activity be permitted on Sunday before 9:00 A.M. or after 5:00 P.M. unless expressly authorized by the Town Council.

**CHAPTER 2**  
**CALIFORNIA CODE OF REGULATIONS**

Article 1

ADOPTION OF THE 2010 CALIFORNIA CODE OF REGULATIONS - TITLE 24

Section 7-2-100 Codes Adopted by Reference; Modifications

Pursuant to Section 50022.2 of the Government Code the following codes are adopted in this Article, as defined and modified herein.

Section 7-2-105 Adoption by Reference

There is hereby adopted by reference by the Town of Windsor those certain model codes as adopted and amended by the State of California and defined in the Health and Safety Code and contained in Title 24, 2010 CALIFORNIA CODE OF REGULATIONS parts 1, 2, 2.5, 3, 4, 5, 6, 8, 9, 10, 11, and 12 as published by the International Code Council including tables and appendices, the 2010 edition of the CALIFORNIA ADMINISTRATIVE CODE, Part 1 as published by the International Code Council, the 2010 CALIFORNIA BUILDING CODE, Part 2, Volumes 1 & 2, based on the 2009 International Building Code, as published by the International Code Council, the CALIFORNIA RESIDENTIAL CODE Part 2.5, based on the 2009 International Residential Code, as published by the International Code Council, the 2010 CALIFORNIA ELECTRICAL CODE, Part 3, based on the 2008 National Electrical Code, as published by the National Fire Protection Association, the 2010 edition of the CALIFORNIA PLUMBING AND MECHANICAL CODE, Part 4 & 5, based on the 2009 Uniform Plumbing and Mechanical Code, as published by the International Association of Plumbing and Mechanical Officials, the 2010 Edition of the CALIFORNIA ENERGY CODE, Part 6, as published by the International Code Council, the 2010 edition of the CALIFORNIA HISTORICAL BUILDING CODE, Part 8, as published by the International Code Council, the 2010 edition of the CALIFORNIA FIRE CODE, Part 9, based on the 2009 International Fire Code, the 2010 edition of the CALIFORNIA EXISTING BUILDING CODE, Part 10, as published by the International Code Council, the 2010 edition of the CALIFORNIA GREEN BUILDING STANDARDS CODE, Part 11, as published by the International Code Council, the 2010 edition of the CALIFORNIA REFERENCED STANDARDS CODE, Part 12, as published by the International Code Council, as applicable to various occupancies as depicted in the matrix adoption tables therein or the promulgating instruments thereof, which codes are known as Title VII Building and Housing.

Article 2

2010 CALIFORNIA ADMINISTRATIVE CODE - TITLE 24, PART 1

Section 7-2-200 Citation of sections

This article shall be known as the "CALIFORNIA ADMINISTRATIVE CODE," and may be cited as such. For purposes of citation, the CALIFORNIA ADMINISTRATIVE CODE, Part 1, 2010 Edition, published by the International Code Council, including tables and appendices as amended by the State of California and adopted by reference and amended by the Town of Windsor, are renumbered by adding "7-1-200" before each section.

Article 3  
2010 CALIFORNIA BUILDING CODE –TITLE 24, PART 2

Section 7-2-300 Citation of sections

This article shall be known as the "CALIFORNIA BUILDING CODE," and may be cited as such. For purposes of citation, the CALIFORNIA BUILDING CODE, Part 2, volume 1 & 2, 2010 Edition, published by the International Code Council, including tables and appendices as amended by the State of California and adopted by reference and amended by the Town of Windsor, are renumbered by adding "7-2-300" before each section.

Section 7-2-305, Chapter 2, Section 101.1 – Title

Section 101.1 of the California Building Code is amended to read as follows:

**Section 101.1 - Title**

These regulations shall be known as the California Building Code of the Town of Windsor, hereinafter referred to as "this code".

Section 7-2-310, Chapter 2, Section 105.5 - Expiration:

Section 105.5 of the California Building Code is amended to read as follows:

**Section 105.5 - Expiration**

Unless otherwise authorized, every permit issued by the Building Official under the provisions of this Code shall expire and become null and void two years from the date of issuance. The Building Official may issue a permit for a lesser time period when necessary to abate dangerous or sub-standard conditions. This lesser time period may be appealed by the owner. Any permittee holding an unexpired permit may apply for one extension of a current (2 year) permit for one additional year. The fee for extension shall be the estimated cost for the building code enforcement necessary to complete inspection of the permit.

Before any work can be recommenced on an expired permit, a new permit shall be obtained. The codes in effect at the time a new permit is issued shall be the codes which apply to that permit through the point of completion or expiration, whichever occurs first.

Section 7-2-315, Chapter 2, Section 114.4 – Violation Penalties

Section 114.4 of the California Building Code is amended to read as follows:

**Section 114.4 – Violation Penalties**

~~Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the approved construction documents or directive of the Building Official, or of a permit or certificate issued under the provisions of this code, shall be subject to penalties as prescribed by law. An investigation fee, in addition to the permit fee, shall be collected whether or not a permit is then or subsequently issued. The investigation fee shall be at least equal to and not to exceed three times the permit fee required by this code. The payment of such investigation fee shall not exempt any person from compliance with all other provisions of this code nor from any penalty prescribed by law.~~

Section 7-2-320, Chapter 2, Section 116 – Unsafe Structures and Equipment

Section 116 of the California Building Code is amended by the addition of Section 116.6 to read as follows:

**Section 116.6 - General**

For the purpose of this code, certain terms, phrases, words and their derivatives shall be construed as specified in either this chapter or as specified in the Building Code or the Housing Code. Where terms are not defined, they shall have their ordinary accepted meanings within the context with which they are used. *Webster's Third New International Dictionary of the English Language, Unabridged*, copyright 1986, shall be construed as providing ordinary accepted meanings. Words used in the singular include the plural and the plural the singular. Words used in the masculine gender include the feminine and the feminine the masculine.

**BUILDING CODE** is the California Building Code promulgated by the International Code Council, as adopted by this jurisdiction.

**DANGEROUS BUILDING** is any building or structure deemed to be dangerous under the provisions of Section 116.7 of this code.

Section 7-2-325, Chapter 2, Section 116 – Unsafe Structures and Equipment

Section 116 of the California Building Code is amended by the addition of Section 116.7 to read as follows:

**Section 116.7 – Dangerous Building**

For the purpose of this code, any building or structure which has any or all of the conditions or defects hereinafter described shall be deemed to be a dangerous building, provided that such conditions or defects exist that the life, health, property or safety of the public or its occupants are endangered.

1. Whenever any door, aisle, passageway, stairway or other means of exit is not of sufficient width or size or is not so arranged as to provide safe and adequate means of exit in case of fire or panic.
2. Whenever the walking surface of any aisle, passageway, stairway or other means of exit is so warped, worn, loose, torn or otherwise unsafe as to not provide safe and adequate means of exit in case of fire or panic.
3. Whenever the stress in any materials, member or portion thereof, due to all dead and live loads, is more than one and one half the working stress or stresses allowed in the Building Code for new buildings of similar structure, purpose or location.
4. Whenever any portion thereof has been damaged by fire, earthquake, wind, flood or any other cause, to such an extent that the structural strength or stability thereof is materially less than it was before such catastrophe and is less than the minimum requirements of the Building Code for new buildings of similar structure, purpose, or location.

5. Whenever any portion or member or appurtenance thereof is likely to fail, or to become detached or dislodged, or to collapse and thereby injure persons or damage property.
6. Whenever any portion of a building, or any member, appurtenance or ornamentation on the exterior thereof is not of sufficient strength or stability, or is not so anchored, attached or fastened in place so as to be capable of resisting a wind pressure of one half of that specified in the Building Code for new buildings of similar structure, purpose or location without exceeding the working stresses permitted in the Building Code for such buildings.
7. Whenever any portion thereof has wracked, warped, buckled or settled to such an extent that walls or other structural portions have materially less resistance to winds or earthquakes than is required in the case of similar new construction.
8. Whenever the building or structure, or any portion thereof, because of (i) dilapidation, deterioration or decay; (ii) faulty construction; (iii) the removal, movement or instability of any portion of the ground necessary for the purpose of supporting such building; (iv) the deterioration, decay or inadequacy of its foundation; or, (v) any other cause, is likely to partially or completely collapse.
9. Whenever, for any reason, the building or structure, or any portion thereof, is manifestly unsafe for the purpose for which it is being used.
10. Whenever the exterior walls or other vertical structural members list, lean or buckle to such an extent that a plumb line passing through the center of gravity does not fall inside the middle one third of the base.
11. Whenever the building or structure, exclusive of the foundation, shows 33 percent or more damage or deterioration of its supporting member or members, or 50 percent damage or deterioration of its non-supporting members, enclosing or outside walls or coverings.
12. Whenever the building or structure has been so damaged by fire, wind, earthquake or flood, or has become so dilapidated or deteriorated as to become (i) an attractive nuisance to children; (ii) a harbor for vagrants, criminals or immoral persons; or as to (iii) enable persons to resort thereto for the purpose of committing unlawful or immoral acts.
13. ~~Whenever any building or structure has been constructed, exists or is maintained in~~ violation of any specific requirement or prohibition applicable to such building or structure provided by the building regulations of this jurisdiction, as specified in the Building Code or Housing Code, or of any law or ordinance of this state or jurisdiction relating to the condition, location or structure of buildings.
14. Whenever any building or structure which, whether or not erected in accordance with all applicable laws and ordinances, has in any non-supporting part, member or portion less than 50 percent, or in any supporting part, member or portion less than 66 percent of the (i) strength, (ii) fire-resisting qualities or characteristics, or (iii) weather-resisting

qualities or characteristics required by law in the case of a newly constructed building of like area, height and occupancy in the same location.

15. Whenever a building or structure, used or intended to be used for dwelling purposes, because of inadequate maintenance, dilapidation, decay, damage, faulty construction or arrangement, inadequate light, air or sanitation facilities or otherwise, is determined by the health officer to be unsanitary, unfit for human habitation or in such a condition that is likely to cause sickness or disease.
16. Whenever any building or structure, because of obsolescence, dilapidated condition, deterioration, damage, inadequate exits, lack of sufficient fire-resistive construction, faulty electric wiring, gas connections or heating apparatus, or other cause, is determined by the fire marshal to be a fire hazard.
17. Whenever any building or structure is in such a condition as to constitute a public nuisance known to the common law or equity jurisprudence.
18. Whenever any portion of a building or structure remains on a site after the demolition or destruction of the building or structure or whenever any building or structure is abandoned for a period in excess of six months so as to constitute such building or portion thereof an attractive nuisance or hazard to the public.

Section 7-2-330, Chapter 2, Section 116 – Unsafe Structures and Equipment

Section 116 of the California Building Code is amended by the addition of Section 116.8 to read as follows:

**116.8 - Commencement of Proceedings**

When the Building Official has inspected or caused to be inspected a building and has found and determined that such building is a substandard building, the Building Official shall commence proceedings to cause the repair, rehabilitation, vacation or demolition of the building.

Section 7-2-335, Chapter 2, Section 116 – Unsafe Structures and Equipment

Section 116 of the California Building Code is amended by the addition of Section 116.9 to read as follows:

**116.9 - Notice and Order**

The Building Official shall issue a notice and order directed to the record owner of the building. The notice and order shall contain the following:

1. The street address and a legal description sufficient for identification of the premises upon which the building is located.
2. A statement that the building official has found the building to be substandard, with a brief and concise description of the conditions found to render the building dangerous under the provisions of Section 202 of this code.
3. A statement of the action required to be taken as determined by the Building Official.

4. If the Building Official has determined that the building or structure must be repaired, the order shall require that all required permits be secured therefore and the work physically commenced within such time (not to exceed 60 days from the date of the order) and completed within such time as the Building Official shall determine is reasonable under the circumstances.
5. If the Building Official has determined that the building or structure must be vacated, the order shall require that the building or structure shall be vacated within a certain time from the date of the order as determined by the Building Official to be reasonable.
6. If the Building Official has determined that the building or structure must be demolished, the order shall require that the building be vacated within such time as the Building Official shall determine reasonable (not to exceed 60 days from the date of the order), that all required permits be secured therefore within 60 days from the date of the order and that the demolition be completed within such time as the Building Official shall determine is reasonable.
7. Statements advising that if any required repair or demolition work (without vacation also being required) is not commenced within the time specified, the Building Official (i) will order the building vacated and posted to prevent further occupancy until the work is completed and (ii) may proceed to cause the work to be done and charge the costs thereof against the property or its owner.
8. Statements advertising (i) that any person having any record title or legal interest in the building may appeal from the notice and order or any action of the Building Official to the housing advisory and appeals board, provided the appeal is made in writing as provided in this code, and filed with the Building Official within 30 days from the date of service of such notice and order, and (ii) that failure to appeal will constitute a waiver of all right to an administrative hearing and determination of the matter.

Section 7-2-340, Chapter 2, Section 116 – Unsafe Structures and Equipment

Section 116 of the California Building Code is amended by the addition of Section 116.10 to read as follows:

**116.10 - Proof of Service**

Proof of service of the notice and order shall be certified to at the time of service by a written declaration under penalty of perjury executed by the person effecting service, declaring the time, date and manner in which service was made. The declaration, together with any receipt card returned in acknowledgement of receipt by certified mail, shall be affixed to the copy of the notice and order retained by the Building Official.

Section 7-2-345, Chapter 2, Section 116 – Unsafe Structures and Equipment

Section 116 of the California Building Code is amended by the addition of Section 116.11 to read as follows:

**116.11- Recordation of Notice and Order**

If compliance is not had with the order within the time specified therein, and no appeal has been properly and timely filed, the Building Official shall file in the office of the county recorder a certificate describing the property and certifying (i) that the building is a substandard building and (ii) that the owner has been so notified. Whenever the corrections ordered shall thereafter have been completed or the building demolished so that it no longer exists as a substandard building on the property described in the certificate, the Building Official shall file a new certificate with the County Recorder certifying that the building has been demolished or all required corrections have been made so that the building is no longer substandard, whichever is appropriate.

Section 7-2-350, Chapter 2, Section 116 – Unsafe Structures and Equipment

Section 116 of the California Building Code is amended by the addition of Section 116.12 to read as follows:

**116.12– Repair, Vacation and Demolition**

The following standards shall be followed by the Building Official (and by the Housing Advisory and Appeals Board if an appeal is taken) in ordering the repair, vacation or demolition of any substandard building or structure:

1. Any building declared a substandard building under this code shall be made to comply with one of the following:
2. The building shall be repaired in accordance with the current Building Code or other current code applicable to the type of substandard conditions requiring repair.
3. The building shall be demolished at the option of the building owner.
4. If the building does not constitute an immediate danger to the life, limb, property or safety of the public, it may be vacated, secured and maintained against entry.
5. If the building or structure is in such condition as to make it immediately dangerous to the life, limb, property or safety of the public or the occupants, it shall be ordered to be vacated.

Section 7-2-355, Chapter 2, Section 116 – Unsafe Structures and Equipment

Section 116 of the California Building Code is amended by the addition of Section 116.13 to read as follows:

**116.13- Notice to Vacate - Posting**

Every notice to vacate shall, in addition to being served as provided in Section 116.3, be posted at or upon each exit of the building, and shall be substantially the following form:

**DO NOT ENTER  
UNSAFE TO OCCUPY  
It is a misdemeanor to occupy this building or to remove or deface this notice.  
Building Official  
Town of Windsor**

Section 7-2-360, Chapter 2, Section 116 – Unsafe Structures and Equipment

Section 116 of the California Building Code is amended by the addition of Section 116.14 to read as follows:

**116.14 - Compliance.**

Whenever such notice is posted, the Building Official shall include a notification thereof in the notice and order issued under Section 116, reciting the emergency and specifying the conditions that necessitate the posting. No person shall remain in or enter any building that has been so posted, except that entry may be made to repair, demolish or remove such building under permit. No person shall remove or deface any such notice after it is posted until the required repairs, demolition or removal have been completed and a certificate of occupancy issued pursuant to the provisions of the Building Code. Any person violating this subsection shall be guilty of a misdemeanor.

Article 4

CALIFORNIA RESIDENTIAL CODE –TITLE 24, PART 2.5

Section 7-2-400 Citation of sections

This article shall be known as the "CALIFORNIA RESIDENTIAL CODE," and may be cited as such. For purposes of citation, the CALIFORNIA RESIDENTIAL CODE, Part 2.5, 2010 Edition, as published by the International Code Council, including tables and appendices thereto; amended by the State of California and adopted by reference and amended by the Town of Windsor, are renumbered by adding "7-2-400" before each section.

Article 5

2007 CALIFORNIA ELECTRICAL CODE –TITLE 24, PART 3

Section 7-2-500 Citation of sections

This article shall be known as the "CALIFORNIA ELECTRICAL CODE," and may be cited as such. For purposes of citation, the CALIFORNIA ELECTRICAL CODE, Part 3, 2010 Edition, published by the National Electrical Code, based on the 2008 edition, including tables and appendices as amended by the State of California and adopted by reference and amended by the Town of Windsor, are renumbered by adding "7-2-500" before each section.

Article 6

CALIFORNIA MECHANICAL CODE –TITLE 24, PART 4

Section 7-2-600 Citation of sections

This article shall be known as the "CALIFORNIA MECHANICAL CODE," and may be cited as such. For purposes of citation, the CALIFORNIA MECHANICAL CODE, Part 4, 2010 Edition, as published by the International Association of Plumbing and Mechanical Officials, including tables and appendices thereto; as amended by the State of California and adopted by reference and amended by the Town of Windsor, is renumbered by adding "7-2-600" before each section.

Article 7

CALIFORNIA PLUMBING CODE--TITLE 24, PART 5

Section 7-2-700 Citation of sections

This article shall be known as the "CALIFORNIA PLUMBING CODE," and may be cited as such. For purposes of citation, the CALIFORNIA PLUMBING CODE, Part 5, 2010 Edition, as published by the International Association of Plumbing and Mechanical Officials, including tables and appendices thereto and including the IAPMO Installation Standards; amended by the State of California and adopted by reference and amended by the Town of Windsor, are renumbered by adding "7-2-700" before each section.

Article 8

CALIFORNIA ENERGY CODE--TITLE 24, PART 6

Section 7-2-800 Citation of sections

This article shall be known as the "CALIFORNIA ENERGY CODE," and may be cited as such. For purposes of citation, the CALIFORNIA ENERGY CODE, Part 6, 2010 Edition, as published by the International Code Council, including tables and appendices thereto; amended by the State of California and adopted by reference and amended by the Town of Windsor, are renumbered by adding "7-2-800" before each section.

Article 9

CALIFORNIA HISTORICAL BUILDING CODE --TITLE 24, PART 8

Section 7-2-900 Citation of sections

This article shall be known as the "CALIFORNIA HISTORICAL BUILDING CODE," and may be cited as such. For purposes of citation, the CALIFORNIA HISTORICAL BUILDING CODE, Part 8, 2010 Edition, as published by the International Code Council, including tables and appendices thereto; amended by the State of California and adopted by reference and amended by the Town of Windsor, are renumbered by adding "7-2-900" before each section.

Article 10

CALIFORNIA FIRE CODE--TITLE 24, PART 9

Section 7-2-1000 Chapter 2, Citation of sections

This article shall be known as the "CALIFORNIA FIRE CODE" and may be cited as the "CALIFORNIA FIRE CODE". For purposes of citation, the CALIFORNIA FIRE CODE, Part 9, 2010 Edition, published by the National Fire Protection Association; as amended by the State of California and adopted by reference including Appendices Chapters 4, B, C, D, H, and amended by the Town of Windsor, is renumbered by adding "7-2-1000" before each section.

Section 7-2-1000, Chapter 2, Section 101.1 - Title

Section 101.1 of the California Fire Code is amended read as follows:

**Section 101.1 - Title**

These regulations shall be known as the Fire Code of the Town of Windsor, hereinafter referred to as "this code".

Section 7-2-1002, Chapter 2, Section 102.1 - Construction and Design Provisions

Section 102.1 of the California Fire Code is amended read as follows:

**Section 102.1 Construction and design provisions**

The construction and design provisions of this code shall apply to:

1. Structures, facilities and conditions arising after the adoption of this code.
2. Existing structures, facilities and conditions not legally in existence at the time of adoption of this code.
3. Existing structures, facilities and conditions when identified in specific sections of this code.
4. Existing structures, facilities and conditions, which, in the opinion of the fire code official, constitute a distinct hazard to life and property.
5. Existing structures to which additions, alterations or repairs are made that involve: the addition, removal or replacement of fire resistive construction related to property lines; additions, alterations or repairs to fire protection systems; additions or alterations made that impact emergency vehicle access; or additions or alterations made that impact the egress system.

**Exceptions:**

(a) Any road or bridge used exclusively for access to an agricultural operation, or an agricultural exempt structure,

(b) Any road or bridge used exclusively for the management and harvesting of wood products.

(c) Any existing road that provides year-round unobstructed access to conventional drive vehicles, including sedans and fire engines, which was constructed and serving a legal parcel prior to January 1, 1992, except that (1) the provisions of Division C of this article shall apply to all such roads, and (2) all of the other provisions of this article shall apply to any such road if it is extended, reconstructed or improved pursuant to a development approval, but only to the portion of the road that is extended, reconstructed or improved.

(d) Any road required as a condition of any development approval granted prior to January 1, 1992, except that (1) the provisions of Division C of this article shall apply to all such roads, and (2) all of the other provisions of this article shall apply to any such road if it is extended, reconstructed or improved pursuant to a new development approval, but only to the portion of the road that is extended, reconstructed or improved.

(e) Any driveway serving a legally constructed residential building prior to January 1, 1992, except that (1) the provisions of Division C of this article shall apply to all such roads, and (2) all of the other provisions of this article shall apply to any such driveway if it is extended,

reconstructed or improved pursuant to a new development approval, but only to the portion of the driveway that is extended, reconstructed or improved.

(f) Any legal or legal non-conforming building constructed prior to January 1, 1992, or any building for which a building permit was issued or an application for a building permit was accepted as complete for filing prior to January 1, 1992; except that the provisions of this article shall apply to any such building if the occupancy is changed; or if the building is altered, or otherwise converted to any Group R, Division 3 occupancy as defined in the building code.

Section 7-2-1004, Chapter 2, Section 102.3 – Change of Use or Occupancy  
Section 102.3 of the California Fire Code is amended read as follows:

**102.3 Change of use or occupancy.**

No change shall be made in the use or occupancy of any structure that would place the structure in a different division of the same group or occupancy or in a different group of occupancies, unless such structure is made to comply with the requirements of this code, the Town of Windsor Building code, and the International Building Code. Subject to the approval of the fire code official, the use or occupancy of an existing structure shall be allowed to be changed and the structure is allowed to be occupied for purposes in other groups without conforming to all the requirements of this code the Town of Windsor Building code, and the International Building Code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use.

Section 7-2-1006, Chapter 2, Section 103.3.1 – Authority to Issue Citations  
Section 103.3.1 of the California Fire Code is amended by adding the following:

**103.3.1 Authority to issue citations**

The Fire Chief, the fire code official and his or her deputies who have the discretionary duty to enforce a statute or ordinance may, pursuant to Section 836.5 of the California Penal Code and subject to the provisions thereof, arrest a person without a warrant whenever the Chief or member of the Fire Prevention Bureau has reasonable cause to believe that the person to be arrested has committed a violation in the presence of the Chief or member of the Fire Prevention Bureau which he or she has discretionary duty to enforce, and to issue a notice to appear and to release such person on his or her written promise to appear in court, pursuant to the provisions of Section 853.5 et seq. of the California Penal Code.”

Section 7-2-1008, Chapter 2, Section 202 - Definitions

~~Section 103.3.1 of the California Fire Code is amended by adding the following:~~

**202 Definitions:**

**BUILDING OFFICIAL.** Is the officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

**CENTRAL ALARM STATION.** Is a publicly or privately operated alarm-receiving center that is constantly attended by appropriately trained staff.

**CHIEF OR CHIEF OF THE FIRE DEPARTMENT.** Is the local fire chief or his or her authorized representative within the fire district of jurisdiction.

**FIRE DEPARTMENT.** Is the fire protection district having jurisdiction.

**FIRE PROTECTION DISTRICT.** Is the fire protection district of jurisdiction.

**JURISDICTION.** Is the Town of Windsor in the County of Sonoma in the State of California.

**JURISDICTIONAL AREA.** Is the Town of Windsor.

**NEW BUILDING.** Is any building for which a building permit is issued for the construction thereof after the effective date of this code.

**SHALL IS MANDATORY & MAY IS PERMISSIVE.** The use of the word "shall" in this code is not intended to, nor shall it be deemed to create a mandatory duty imposed by enactment within the meaning of Government Code section 815.6.

Section 7-2-1010, Chapter 2, Section 105.3.3.1 – Occupancy Permits

Section 105.3.3.1 of the California Fire Code is amended by adding the following:

**105.3.3.1 Occupancy permits.**

The chief may notify the building official not to authorize temporary or final occupancy of any building for which a permit is required by this code until the building has been inspected and found to be in compliance with this code. The building official shall not authorize temporary or final occupancy of any new commercial building for which a permit is required by this code until the contractor provides a fire flow availability certification to the chief. The fire flow availability certification shall include static pressure, residual pressure, and gallons per minute, as witnessed by or acceptable to the chief.

Section 7-2-1012, Chapter 2, Section 105.3.3.2 - Temporary Connection Approval

Section 105.3.3.2 of the California Fire Code is amended by adding the following:

**105.3.3.2 Temporary connection approval.**

Nothing in Section 105 shall prohibit the granting the approval of a temporary connection for gas or electricity to allow construction to occur.

Section 7-2-1014, Chapter 2, Section 105.5.1 – Revocation Procedure

Section 105.5.1 of the California Fire Code is amended by adding the following:

**105.5.1 Revocation procedure.**

Revocation of any permit issued under this code shall only occur after written notice of the violation has been given by the chief to the permittee at his or her last place of residence as shown on the permit or certificate, which notice shall order the permittee to either correct the violation within ten (10) days or appear before the local fire chief, unless the local fire protection district issues a written notice electing to have the county fire chief hear the matter, at a date and time certain to show cause why the permit or certificate should not be modified, revoked or

suspended. At the hearing before the chief, the permittee shall have an opportunity to appear and be heard on the question of whether the permit issued to him should be revoked or suspended. Upon conclusion of the hearing or as soon thereafter as practicable, the chief shall issue a decision in writing to the permittee determining whether to modify, revoke or suspend the permit. Any interested person may appeal the chief's decision to the board of appeals. All appeals shall be filed in writing with the chief within ten (10) calendar days of the date of the decision being appealed.

Section 7-2-1016, Chapter 2, Section 105.6.47 Additional Permits

Section 105.6.47.1 of the California Fire Code is amended to read the following:

**105.6.47 Additional operational permits.**

In addition to the operational permits required by Section 105.6, the following permits shall be obtained from the division of fire prevention prior to engaging in the following activities, operations, practices or functions:

1. **Production facilities.** To change use or occupancy, to allow the attendance of a live audience, or for wrap parties.
2. **Pyrotechnics and special effects.** To use pyrotechnic special effects, open flame, use of flammable or combustible liquids and gasses, welding, and the parking of motor vehicles for the purpose of motion picture, television and commercial production.
3. **Live audiences.** To install seating arrangements for live audiences in approved production facilities, production studios, and sound stages. See Chapter 48.
4. **Apartment, hotel, motel.** An operational permit is required to operate an apartment house, hotel, or motel.
5. **Bonfires or rubbish fires.** An operational permit is required to kindle or authorize the kindling or maintenance of bonfires or rubbish fires.
6. **Change of occupancy.** An operational permit is required for any change in the occupancy, business or tenancy of any building, facility, or structure.
7. **Day Care.** An operational permit is required to operate a day care occupancy with an occupant load over eight (8) persons.
8. **Emergency Responder Radio Coverage System.** An operational permit is required for buildings and/or facilities with emergency responder radio coverage systems and related equipment.
9. **Fire protection systems.** An operational permit is required for buildings and/or facilities with fire protection systems and related equipment such as fire pumps, fire hydrant systems, fire suppression systems, fire alarm systems, smoke management systems, and similar systems governed by this code.
10. **High-rise building.** An operational permit is required to operate a high rise building as defined in the Building Code.
11. **Institutional or residential occupancy (6 or less persons).** An operational permit is required to operate an institutional or residential occupancy for 6 or less persons, except day care and residential care facilities for the elderly.
12. **Institutional or residential occupancy (more than 6 persons).** An operational permit is required to operate an institutional or residential occupancy for more than 6 persons. Exception: A permit is not required for large family day care providing care for less than 9 children.

13. **Medical Gas Systems.** An operational permit is required for buildings and/or facilities with medical gas systems and related equipment, and similar systems governed by this code.
14. **Oil or natural gas well.** An operational permit is required to own, operate or maintain an oil or natural gas well.
15. **Organized Camps.** An operational permit is required to operate an organized camp (Group-C Occupancy).
16. **Public Christmas Tree Lot or Pumpkin Patch.** An operational permit is required to operate a Christmas tree lot or pumpkin patch, haunted house, or similar facility that is open to the public.
17. **Special Event Permit** An operational permit is required for any organized procession or assemblage of 50 or more people, which could significantly impact vehicular traffic or create a safety problem. Examples include but are not limited to: music festivals, outdoor markets, circus, walkathons, runs, marathons, trail rides, bicycle races, celebrations, parades and other similar activities.
18. **Winery Caves – Public Accessible.** An operational permit is required to operate a Type-2 or Type-3 winery cave that is accessible to the public.

Section 7-2-1018, Chapter 2, Section 105.7.15 – Additional Construction Permits  
 Section 105.7.15 of the California Fire Code is amended to read the following:

**105.7.15 Additional construction permits**

In addition to the permits required by Section 105.7, the following construction permits shall be obtained from the Bureau of Fire Prevention prior to starting construction:

1. Emergency vehicle access facilities. A construction permit is required for installation or modification of roadways and roadway structures used for emergency vehicle access.
2. Emergency responder radio systems. A construction permit is required for the installation, modification or improvements to emergency responder radio systems.
3. Excavation near flammable or combustible liquid pipeline. A construction permit is required to excavate or do any work below grade within ten (10) feet of any pipeline for the transportation of flammable or combustible liquid.
4. Fire-line underground utility piping. A construction permit is required to install, alter, or make improvements to fire-line underground utility piping. A separate utility permit from the building official is required prior to installing any private underground fire protection water piping and associated appliances.
5. Gates. A construction permit is required for the installation of security gates across a fire apparatus access road.
6. ~~Hazardous materials site disclosure (aboveground facility & underground tank).~~ A construction permit is required to permanently remove hazardous materials storage or use premises from service, including the permanent removal of a hazardous materials tank.
7. LP-gas. A construction permit is required for the installation of or modification to an LP gas tank in excess of 250 gallon capacity.
8. Medical gas system. A construction permit is required to install a medical gas system.
9. Oil or natural gas well. A construction permit is required to drill an oil or natural gas well.
10. Roof mounted solar photovoltaic power systems. A construction permit is required to install or modify a roof mounted solar photovoltaic power system.

Section 7-2-1020, Chapter 2, Section 109.3 – Violation Penalties

Section 109.3 of the California Fire Code is amended to read the following:

**109.3 Violation penalties.**

Persons who shall violate a provision of this code or shall fail to comply with any of the requirements thereof or who shall erect, install, alter, repair or do work in violation of the approved construction documents or directive of the fire code official, or of a permit or certificate used under provisions of this code, shall be guilty of a misdemeanor, punishable by a fine of not less than \$500.00, or by imprisonment not exceeding six months, or both such fine and imprisonment. Each day that a violation continues after due notice has been served shall be deemed a separate offense.

Section 7-2-1022, Chapter 2, Section 114.4 – Failure to Comply

Section 114.4 of the California Fire Code is amended to read the following:

**111.4 Failure to comply**

Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be liable to a fine of not less than \$100.00 dollars or more than \$500.00 dollars. A person shall be fined for each day he or she continues to work after having been served with a stop work order.

Section 7-2-1024, Chapter 2, Section 501.1 - Scope

Section 501.1 of the California Fire Code is amended to read the following:

**501.1 Scope.**

Fire service features for buildings, structures and premises shall comply with this chapter.

**Exception:** One and two-family residential dwellings; detached U Occupancy buildings less than 1000 square feet in area accessory to a one or two-family dwelling.

Section 7-2-1026, Chapter 2, Section 503.2.6 – Bridges and Elevated Surfaces

Section 103.2.6 of the California Fire Code is amended to read the following:

**503.2.6 Bridges and elevated surfaces.**

Where a bridge or an elevated surface is part of a fire apparatus access road, the bridge shall be constructed and maintained in accordance with the American Association of State Highway and Transportation Officials (AASHTO) HB-17. Bridges and elevated surfaces shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. Vehicle load limits shall be posted at both entrances to bridges. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces which are not designed for such use, approved barriers, approved signs or both shall be installed and maintained when required by the fire code official.

Section 7-2-1028, Chapter 2, Section 503.2.6–Bridges and Elevated Surfaces

Section 503.2.6 of the California Fire Code is amended by the addition of Section 503.2.6.1 and 503.2.6.2 to read as follows:

#### **503.2.6.1 Evaluation**

All existing private bridges and elevated surfaces shall be evaluated by a California licensed civil engineer experienced in structural engineering or a California licensed structural engineer, for the purposes of safety and weight rating, and the vehicle load limits shall be posted at both entrances to bridges. These evaluations shall be performed at the direction of the fire code official.

#### **503.2.6.2 Bridge maintenance.**

All new and existing bridges and elevated structures providing emergency access shall be routinely evaluated and maintained in accordance with the American Association of State Highway and Transportation Officials (AASHTO) Manual: "The Manual for Bridge Evaluation," First Edition, 2008, published by the American Association of State Highway and Transportation Officials; or other approved standard.

#### Section 7-2-1030, Chapter 2, Section 505.1 – Premises Identification

Section 505.1 of the California Fire Code is amended to read as follows:

#### **505.1 Address Identification**

New and existing buildings shall have approved illuminated or reflective address numbers, building numbers or approved building identification, placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabetical letters. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure.

#### Section 7-2-1032, Chapter 2, Section 505–Premises Identification

Section 505 of the California Fire Code is amended by the addition of Section 505.1.1 and 505.1.2 to read as follows:

#### **505.1.1 Numbers for one and two- family dwellings**

Numbers for one and two- family dwellings shall be a minimum of 4 inches (101.6mm) high with a minimum stroke width of 0.5 inches (12.7 mm). Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole, or other sign or means shall be used to identify the structure.

#### **505.1.2 Numbers for other than one and two- family dwellings**

Numbers for other than one and two- family dwellings shall be a minimum of 12 inches high with a minimum stroke width of 1 inch. Suite numbers for other than one and two-family dwellings shall be a minimum of six 6" inches high and 0.5 inches stroke.

**Exception:** These requirements may be modified with the approval of the fire code official.

#### Section 7-2-1040, Chapter 2, Section 507.5.1 – Where Required

Section 507.5.1 of the California Fire Code is amended to read as follows:

#### **507.5.1 Where required.**

Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet (22 m) from a hydrant on a fire apparatus access road as

measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the fire code official.

**Exceptions:** One and two-family residential dwellings; detached U Occupancy buildings less than 1000 square feet in area accessory to a one or two-family dwelling.

Section 7-2-1042, Chapter 2, Section 510.1 – Emergency Responder Radio Coverage  
Section 510.1 of the California Fire Code is amended to read as follows:

**510.1 Emergency responder radio coverage in buildings.**

All buildings, Type-2 winery caves and Type-3 winery caves shall have approved radio coverage for emergency responders within the building or winery cave based upon the existing coverage levels of the public safety communication systems of the jurisdiction, at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.

**Exceptions:**

1. Where approved by the building official and the fire code official, a wired communication system in accordance with Section 907.2.13.2 may be permitted to be installed in lieu of an approved radio coverage system.
2. Where it is determined by the fire code official that the radio coverage system is not necessary.

Section 7-2-1044, Chapter 2, Section 605–Electrical Equipment, Wiring and Hazards  
Section 605 of the California Fire Code is amended by the addition of Section 605.11 through 605.11.4 to read as follows:

**605.11 Solar Photovoltaic Power Systems**

Solar photovoltaic power systems shall be installed in accordance with this code, the California Building Code and the California Electric Code.

**Exception:**

Detached Group U non-habitable structures such as parking shade structures, carports, solar trellises, and similar type structures are not subject to the requirements of this section.

**605.11.1 Marking**

Marking is required on all interior and exterior DC conduit, enclosures, raceways, cable assemblies, junction boxes, combiner boxes, and disconnects.

**605.11.1.1 Materials**

The materials used for marking shall be reflective, weather resistant and suitable for the environment. Marking as required in sections 605.11.1.1 through 605.11.1.4 shall have all letters capitalized with a minimum height of 3/8 inch white on red background.

**605.11.1.2 Marking content**

The marking shall contain the words “WARNING: PHOTOVOLTAIC POWER SOURCE”.

**605.11.1.3 Main service disconnect**

The marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the disconnect is operated.

#### **605.11.1.4 Location of Marking.**

Marking shall be placed on all interior and exterior conduit, raceways, enclosures and cable assemblies every 10 feet and within 1 foot of all turns or bends, and within 1 foot of each side of penetrations.

#### **605.11.2 Locations of DC conductors.**

Conduit, wiring systems, and raceways for photovoltaic circuits shall be located as close as possible to the ridge or hip or valley and from the hip or valley as directly as possible to an outside wall to reduce trip hazards and maximize ventilation opportunities. Conduit runs between sub arrays and to DC combiner boxes shall be installed in a manner that minimizes total amount of conduit on the roof by taking the shortest path from the array to the DC combiner box. The DC combiner boxes shall be located such that conduit runs are minimized in the pathways between arrays. DC wiring shall be run in metallic conduit or raceways when located within enclosed spaces in a building. Conduit shall run along the bottom of load bearing members.

#### **605.11.3 Access and pathways.**

Roof access, pathways, and spacing requirements shall be provided in order to ensure access to the roof; provide pathways to specific areas of the roof; provide for smoke ventilation operations; and to provide emergency egress from the roof.

##### **Exceptions:**

1. Requirements relating to ridge, hip, and valleys do not apply to roofs slopes of two units vertical in twelve units horizontal (2:12) or less.
2. Residential structures shall be designed so that each array is no greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in either axis.
3. The fire chief may allow panels/modules to be located up to the ridge when an alternative ventilation method acceptable to the fire chief has been provided or where the fire chief has determined vertical ventilation techniques will not be employed.

##### **605.11.3.1 Roof access points.**

Roof access points shall be defined as an area that does not place ground ladders over openings such as windows or doors, and are located at strong points of building construction in locations where the access point does not conflict with overhead obstructions such as tree limbs, wires, or signs.

##### **605.11.3.2 Residential systems for one- and two-family residential dwellings.**

Access shall be provided in accordance with Sections 605.11.3.2.1 through 605.11.3.2.4

###### **605.11.3.2.1 Residential buildings with hip roof layouts.**

Panels /modules shall be located in a manner that provides a 3 foot (914 mm) wide clear access pathway from the eave to the ridge on each roof slope where panels/modules are located. The access pathway shall be located at a structurally strong location on the building capable of supporting the live load of fire fighters accessing the roof.

###### **605.11.3.2.2 Residential buildings with a single ridge.**

Panels/modules shall be located in a manner that provides two 3 foot (914 mm) wide access pathways from the eave to the ridge on each roof slope where panels/modules are located.

#### **605.11.3.2.3 Hips and Valleys:**

Panels/modules shall be located no closer than 18 inches (457 mm) to a hip or a valley if panels/modules are to be placed on both sides of a hip or valley. If the panels are to be located on only one side of a hip or valley that is of equal length then the panels shall be permitted to be placed directly adjacent to the hip or valley.

#### **605.11.3.2.4 Smoke Ventilation.**

Panels/modules shall be located no higher than 3 feet (914 mm) below the ridge in order to allow for fire department smoke ventilation operations.

#### **605.11.3.3 All other occupancies.**

Access shall be provided in accordance with Sections 605.11.3.3.1 through 605.11.3.3.3.

**Exception:** Where it is determined by the fire code official that the roof configuration is similar to a one- or two-family dwelling, the fire code official may approve the residential access and ventilation requirements provided in 605.11.3.2.1 through 605.11.3.2.4.

#### **605.11.3.3.1 Access.**

There shall be a minimum 6 foot (1829 mm) wide clear perimeter around the edges of the roof.

**Exception:** If either axis of the building is 250 feet (76 200 mm) or less, there shall be a minimum 4 foot (1290 mm) wide clear perimeter around the edges of the roof.

#### **605.11.3.3.2 Pathways.**

The solar installation shall be designed to provide designated pathways. The pathways shall meet the following requirements:

1. The pathway shall be over areas capable of supporting the live load of fire fighters accessing the roof.
2. The center line axis pathways shall be provided in both axis of the roof. Center line axis pathways shall run where the roof structure is capable of supporting the live load of firefighters accessing the roof.
3. Shall be straight line not less than 4 feet (1290 mm) clear to skylights and/or ventilation hatches.
4. Shall be straight line not less than 4 feet (1290 mm) clear to roof standpipes.
5. Shall provide not less than 4 feet (1290 mm) clear around roof access hatch with at least one not less than 4 feet (1290 mm) clear pathway to parapet or roof edge

#### **605.11.3.3.3 Smoke Ventilation.**

The solar installation shall be designed to meet the following requirements:

Arrays shall be no greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in distance in either axis in order to create opportunities for smoke ventilation operations.

1. Smoke ventilation options between array sections shall be one of the following:
2. A pathway 8 feet (2438 mm) or greater in width;
3. A 4 feet (1290 mm) or greater in width pathway and bordering roof skylights or smoke and heat vents.

4. A 4 feet (1290 mm) or greater in width pathway and bordering 4 foot (1290 mm) x 8 foot (2438 mm) "venting cutouts" every 20 feet (6096 mm) on alternating sides of the pathway

#### **605.11.4 Ground mounted photovoltaic arrays.**

Ground mounted photovoltaic arrays shall comply with Sections 605.11 through 605.11.2 and this section. Setback requirements do not apply to ground-mounted, free standing photovoltaic arrays. A clear brush area of 10 feet (3048 mm) is required for ground mounted photovoltaic arrays.

#### Section 7-2-1046, Chapter 2, Section 901—General

Section 901 of the California Fire Code is amended by the addition of Section 901.7.7 through 901.7.7.2 to read as follows:

#### **901.7.7 Notice of Nuisance Alarm.**

The officer in charge of fire units responding to a fire alarm signal shall determine whether a true emergency exists. If the officer determines that an emergency does not exist, the chief of the local fire agency may issue a written notice of nuisance alarm to the owner or person in charge or control of the facility where the alarm signal originated.

#### **901.7.7.1 Unreliable Fire Alarm Systems.**

The chief of the local fire agency or the County Fire Chief may determine that a fire alarm system is unreliable upon receipt of more than four (4) nuisance alarms within a twelve (12) month period. Upon finding that an alarm system is unreliable, the chief of the local fire agency or the County Fire Chief may order the following:

For any nuisance alarm where the system is not restored, the chief may require the system owner to provide standby personnel as defined by Section 2501.18 or take such other measures, as the chief deems appropriate. Persons or activities required by the chief shall remain in place until a fire department approved fire alarm maintenance firm certifies in writing to the chief that the alarm system has been restored to a reliable condition. The chief may require such tests, as he deems necessary to demonstrate the adequacy of the system.

1. Upon the fifth (5th) and sixth (6th) nuisance alarms from the alarm system within a twelve (12) month period, the system owner shall pay a mitigation fee to the fire department of \$150.00, plus the cost of fire engine response, for each occurrence.
2. Upon the seventh (7th) and eighth (8th) nuisance alarms from the alarm system within a twelve (12) month period, the system owner shall pay a mitigation fee to the fire department of \$300.00, plus the cost of fire engine response.
3. Upon the ninth (9th) and following nuisance alarms from the alarm system within a twelve (12) month period, the system owner shall pay a mitigation fee to the fire department of \$500.00, plus the cost of fire engine response, for each occurrence.

### **901.7.7.2 Hearing on Notice**

Any person receiving a notice of nuisance alarm who contends that the chief erroneously determined that the fire alarm system was not functioning as designed, may file a written request with the chief for a hearing on the determination within ten (10) days after receipt of the notice of nuisance alarm. The chief shall give the requesting party a hearing on the determination within thirty (30) days of receipt of the request. The request shall set forth: (1) that the system functioned as designed, or (2) that the nuisance alarm resulted from an act of God, flooding, or other violent natural condition without fault and beyond the control of the requesting party. Within ten (10) days following the hearing, the chief shall give written notice of his or her decision to the requesting party.

### Section 7-2-1048, Chapter 2, Section 902-Definitions

Section 902 of the California Fire Code is amended by adding the following definitions:

**EMERGENCY** is an occasion that reasonably calls for a response by the fire department. A response due to failure of an alarm system or to personnel error is not an emergency.

**FALSE ALARM** is an alarm signal activated by a properly functioning fire alarm system, necessitating response by the fire department when an emergency does not exist.

### Section 7-2-1050, Chapter 2, Section 903.2 – Where Required

Section 903.2 of the California Fire Code is amended to read as follows:

#### **903.2 Where required.**

An approved automatic sprinkler system shall be provided in new buildings and structures, and when additions are made to buildings or structures, as described in Sections 903.2.1 through 903.2.18

### Section 7-2-1052.00, Chapter 2, Section 903.2.1 – Group A

Section 903.2.1 of the California Fire Code is amended to read as follows:

#### **903.2.1 Group A.**

An automatic sprinkler system shall be provided throughout new buildings and portions thereof used as Group-A occupancies as provided in this section.

### Section 7-2-1054, Chapter 2, Section 903.2.11 – A-1

Section 903.2.1.1 of the California Fire Code is amended to read as follows:

#### **903.2.1.1 Group A-1**

An automatic fire sprinkler system shall be provided throughout Group A-1 occupancies.

### Section 7-2-1056, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.1.1.1 to read as follows:

#### **903.2.1.1.1 Additions or remodels – A-1 Occupancy**

An automatic fire sprinkler system shall be provided throughout Group A-1 occupancies where any of the following conditions is created as a result of a remodel or addition:

1. The fire area is increased beyond the areas specified in Table 903.2
2. The fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).
3. The fire area has an occupant load of 300 or more.
4. The fire area is located on a floor other than a level of exit discharge serving such occupancies.
5. The fire area contains a multi-theater complex.

Section 7-2-1058, Chapter 2, Section 903.2.1.2 – Group A-2  
Section 903.2.1.2 of the California Fire Code is amended to read:

**903.2.1.2 Group A-2**

An automatic fire sprinkler system shall be provided throughout Group A-2 occupancies.

Section 7-2-1060, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.1.2.1 to read as follows:

**903.2.1.2.1 Additions or remodels – A-2 Occupancy**

An automatic sprinkler system shall be provided for Group A-2 occupancies where any of the following conditions is created as a result of a remodel or addition:

1. The fire area is increased beyond the areas specified in Table 903.2
2. The fire area exceeds 5,000 square feet (464 m<sup>2</sup>).
3. The fire area has an occupant load of 100 or more.
4. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

Section 7-2-1062, Chapter 2, Section 903.2.1.3 – Group A-3  
Section 903.2.1.3 of the California Fire Code is amended to read:

**903.2.1.3 Group A-3**

An automatic fire sprinkler system shall be provided throughout Group A-3 occupancies.

Section 7-2-1064, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.1.3.1 to read as follows:

**903.2.1.3.1 Additions or remodels – A-3 Occupancy**

An automatic sprinkler system shall be provided throughout Group A-3 occupancies where any of the following conditions is created as a result of a remodel or addition:

1. The fire area is increased beyond the areas specified in Table 903.2
2. The fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).
3. The fire area has an occupant load of 300 or more.
4. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

Section 7-2-1066, Chapter 2, Section 903.2.1.4 – Group A-4

Section 903.2.1.4 of the California Fire Code is amended to read:

**903.2.1.4 Group A-4**

An automatic fire sprinkler system shall be provided throughout Group A-4 occupancies.

Section 7-2-1066, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.1.4.1 to read as follows:

**903.2.1.4.1 Additions or remodels – A-4 Occupancy**

An automatic sprinkler system shall be provided for Group A-4 occupancies where any of the following conditions is created as a result of a remodel or addition:

1. The fire area is increased beyond the areas specified in Table 903.2
2. The fire area exceeds 12,000 square feet (1115 m2).
3. The fire area has an occupant load of 300 or more.
4. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

Section 7-2-1068, Chapter 2, Section 903.2.2 – Group B – Ambulatory Health Care Facilities

Section 903.2.2 of the California Fire Code is amended to read:

**903.2.2 Group B - Ambulatory health care facilities**

An automatic sprinkler system shall be provided throughout new buildings and portions thereof used as Group B occupancies, and in remodels or additions affecting a Group-B occupancy as provided in this section.

Section 7-2-1070, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.2.1 to read as follows:

**903.2.2.1 Remodel or addition - Group B ambulatory health care facilities**

An automatic sprinkler system shall be provided when a Group B ambulatory health care occupancy is created and any of the following conditions result.

1. Four or more care recipients are incapable of self-preservation.
2. One or more care recipients who are incapable of self-preservation are located at other than the level of exit discharge serving such occupancy.

Section 7-2-1072, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.2.2 to read as follows:

**903.2.2.2 Additions or remodels – B Occupancy**

An automatic sprinkler system shall be provided for Group B occupancies where any of the following conditions is created as a result of a remodel or addition:

1. The fire area is increased beyond the areas specified in Table 903.2
2. The fire area exceeds 12,000 square feet (1115 m2).

3. The fire area has an occupant load of 300 or more.

Section 7-2-1074, Chapter 2, Section 903.2.3 – Group E

Section 903.2.3 of the California Fire Code is amended to read:

**903.2.3 Group E**

An automatic sprinkler system shall be provided throughout buildings and portions thereof used as Group E occupancies, and when an addition or remodel occurs affecting a Group E Occupancy as provided in this section.

Section 7-2-1076, Chapter 2, Section 903.2.3.1.1 New Public School Campus

Section 903.2.3.1.1 of the California Fire Code is amended to read:

**903.2.3.1.1 New Public School Campus.**

An approved automatic sprinkler system shall be provided in all buildings of a new public school campus as defined in Section 202 regardless of occupancy classification.

**Exceptions:**

1. Exempted portable buildings.
2. Ticket booths and athletic field storage buildings that are less than 500 square feet in floor area and located a minimum of 100 feet from all other buildings.
3. Shade or lunch shelters that are incapable of trapping heat, smoke or other by-products of combustion and located a minimum of 20 feet from all other buildings.
4. Shade or lunch shelters that are constructed of non-combustible materials and located a minimum of 20 feet from all other buildings.

Section 7-2-1078, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.3.2 to read as follows:

**903.2.3.2 Additions or remodels – E Occupancy**

An automatic sprinkler system shall be provided for Group E occupancies where any of the following conditions is created as a result of a remodel or an addition:

1. The fire area is increased beyond the areas specified in Table 903.2
2. The fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).
3. The fire area has an occupant load of 300 or more.

Section 7-2-1080, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.3.3 to read as follows:

**903.2.3.3 Additions or remodels – E Occupancy below the lowest level of exit discharge**

An automatic sprinkler system shall be provided throughout every portion of educational buildings below the lowest level of exit discharge serving that portion of the building where the condition is created as a result of an occupancy change, a remodel, or an addition.

**Exception:**

An automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area where every classroom throughout the building has at least one exterior exit door at ground level.

Section 7-2-1082, Chapter 2, Section 903.2.4 – Group F

Section 903.2.3.1.1 of the California Fire Code is amended to read:

**903.2.4 Group F**

An automatic sprinkler system shall be provided throughout all new buildings and portions thereof used as Group F occupancies, and when an addition or remodel occurs affecting a Group F Occupancy as provided in this section.

**Exceptions:**

1. Canopied winery crush pads less than 12,000 square feet in area, provided that all of the following conditions are met:
  - a. The canopy and supporting structure are constructed of non-combustible materials.
  - b. If attached, the crush pad is separated from other portions of the building by one-hour fire-resistive walls.
  - c. The crush pad is not used for storage of combustible materials.
  - d. The canopy and supporting structure is incapable of trapping heat, smoke or other byproducts of combustion.
2. Dairy milking facilities less than 12,000 feet in area.

Section 7-2-1084, Chapter 2, Section 903.2.4.1 – Group F-1 Woodworking Operations

Section 903.2.4.1 of the California Fire Code is amended to read:

**903.2.4.1 Woodworking operations**

An automatic sprinkler system shall be provided throughout all Group F-1 occupancy fire areas that contain woodworking operations in excess of 2,500 square feet in area (232 m<sup>2</sup>) which generate finely divided combustible waste or which use finely divided combustible materials. A fire wall of less than four-hour fire resistance rating without openings, or any fire wall with opening shall not be used to establish separate fire areas.

Section 7-2-1086, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.4.2 to read as follows:

**903.2.4.2 Additions or remodels – Group F**

An automatic sprinkler system shall be provided throughout all buildings containing a Group F occupancy where any of the following conditions is created as a result of a remodel or addition:

3. The fire area is increased beyond the areas specified in Table 903.2
4. The fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).
5. The fire area is located more than three stories, or more than 30 feet, above grade plane.
6. The combined area of all fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).

7. The fire area contains woodworking operations in excess of 2,500 square feet in area (232 m<sup>2</sup>) which generate finely divided combustible waste or which use finely divided combustible materials.

Section 7-2-1088, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.5.5 to read as follows:

**903.2.5.2 Additions or remodels – Group H**

An automatic sprinkler system shall be provided throughout all buildings containing a Group H occupancy, and where an H Occupancy is created as a result of a remodel or addition.

Section 7-2-1090, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.6.3 to read as follows:

**903.2.6.3 Additions or remodels – Group I**

An automatic sprinkler system shall be provided throughout all buildings containing a Group I occupancy, and where an I Occupancy is created as a result of a remodel or addition.

Section 7-2-1092, Chapter 2, Section 903.2.7 – Group M

Section 903.2.7 of the California Fire Code is amended to read:

**903.2.7 Group M**

An automatic sprinkler system shall be provided throughout new buildings and portions thereof used as Group M occupancies, and when an addition or remodel occurs affecting a Group M Occupancy as provided in this section.

**Exception:**

Detached non-combustible motor fuel-dispensing facility canopies classified as a Group M occupancy where the canopy and supporting structure is incapable of trapping heat, smoke or other byproducts of combustion.

Section 7-2-1092, Chapter 2, Section 903.2.7.1 – High Piled Storage

Section 903.2.7.1 of the California Fire Code is amended to read:

**903.2.7.1 High-piled storage.**

~~An automatic sprinkler system shall be provided as required in Chapter 23 in all buildings where~~ storage of merchandise is in high-piled or rack storage arrays.

Section 7-2-1094, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.7.2 to read as follows:

**903.2.7.2 Additions or remodels – Group M**

1. An automatic sprinkler system shall be provided for Group M occupancies where any of the following conditions is created as a result of a remodel or addition:

2. The fire area is increased beyond the areas specified in Table 903.2
3. A Group M fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).
4. A Group M fire area is located more than three stories above grade plane.
5. The combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).
6. A Group M occupancy is used for the display and sale of upholstered furniture.

The structure exceeds 24,000 square feet in area, contains more than one fire area containing a Group M occupancy, and is separated into two or more buildings by fire walls of less than 4-hour fire-resistance rating.

Section 7-2-1096, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.8.1 to read as follows:

**903.2.8.1 Additions – Group R**

An automatic sprinkler system shall be provided for Group R occupancies where the following condition is created as a result of a remodel or addition:

1. Additions to existing residential buildings that increase in area by 1000 square feet or more, calculated by the existing gross floor area shall meet the requirements for a newly constructed building.

**Exception:**

Attached carports of non-combustible construction classified as a Group-U Occupancy where there is no habitable space above, and which are accessory uses to a one- or two-family residential dwelling.

Section 7-2-1098, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.8.1 to read as follows:

**903.2.8.1 Alterations or Repairs – Group R**

An automatic sprinkler system shall be provided for Group R occupancies where the following condition is created as a result of a remodel or addition:

1. For alterations or repairs to existing building(s) involving demolition, removal, or repair including fire damage of more than 50% of the structure, calculated by the existing gross floor area shall meet the requirements for a newly constructed building:

**Exception:**

~~One time alterations or additions made solely for the purpose of complying with the Americans with Disabilities Act.~~

Section 7-2-1000, Chapter 2, Section 903.2.9 – Group S-1

Section 903.2.9 of the California Fire Code is amended to read:

**903.2.9 Group S 1**

An automatic sprinkler system shall be provided throughout new buildings and portions thereof used as Group S occupancies, and when an addition or remodel occurs affecting a Group S Occupancy as provided in this section.

Section 7-2-1000.02, Chapter 2, Section 903.2.9.1 – Repair Garages

Section 903.2.9.1 of the California Fire Code is amended to read:

**903.2.9.1 Repair garages**

An automatic sprinkler system shall be provided throughout all buildings used as repair garages in accordance with Section 406 of the California Building Code.

Section 7-2-1000.04, Chapter 2, Section 903.2.9.2 – Bulk Storage of Tires

Section 903.2.9.2 of the California Fire Code is amended to read:

**903.2.9.2 Bulk storage of tires**

Building, structures used for the storage of tires shall be equipped throughout with an automatic sprinkler system.

Section 7-2-1000.06, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.9.3 to read as follows:

**903.2.9.3 Additions or remodels – Group S**

An automatic sprinkler system shall be provided throughout all buildings containing a Group S occupancy where any of the following conditions is created as a result of a remodel or addition:

1. The fire area is increased beyond the areas specified in Table 903.2.
2. A Group S-1 fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).
3. A Group S-1 fire area is located more than three stories above grade plane.
4. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).
5. A Group S-1 fire area used for the storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m<sup>2</sup>).

Section 7-2-1000.08, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.11.7 to read as follows:

**903.2.11.7 Group U Occupancy special requirements**

An automatic sprinkler system shall be provided throughout new buildings and portions thereof used as Group U occupancies, and when an addition or remodel occurs affecting a Group U Occupancy as provided in this section.

Exceptions:

1. Detached Group U occupancies 3000 square feet or less in area
2. Agricultural exempt buildings and agricultural buildings as approved by the Fire Code Official.

Section 7-2-1000.10, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.11.7.1 to read as follows:

#### **903.2.11.7.1 Group U accessory areas**

For a U Occupancy less than 3000 square feet in area: In addition to the occupancy separations of California Building Code Chapter 5, an automatic fire sprinkler system shall be installed throughout all accessory areas of a U Occupancy regardless of the mixed-use ratio.

#### Section 7-2-1000.12, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.11.7.2 to read as follows:

#### **903.2.11.7.2 Changes of Occupancy.**

When any change of occupancy occurs where the proposed new occupancy classification is more hazardous, as determined by the Fire Code Official including the conversion of residential buildings to condominiums, the building shall meet the fire sprinkler requirements for a newly constructed building.

#### Section 7-2-1000.14, Chapter 2, Section 903 – Automatic Sprinkler Systems

Section 903 of the California Fire Code is amended by the addition of Section 903.2.11.8 to read as follows:

#### **903.2.11.8 Elevation of existing buildings**

An automatic fire extinguishing system shall be installed throughout all existing buildings when the building is elevated to: three or more stories, or more than 35 feet in height, from grade to the exposed roof.

#### **Exceptions:**

1. An automatic fire-extinguishing system need not be provided when the area above 35 feet is provided for aesthetic purposes only and is a non-*habitable space*.
2. An automatic fire-extinguishing system need not be provided when existing single-family and two-family dwellings are elevated to comply with the requirements of Chapter 7B of the Sonoma County Code, provided that all of the following conditions are met:
3. The elevation creates a building no more than three *stories* in height.
4. Two approved exits are provided for the highest floor, including a third story having less than 500 square feet of floor area.
5. Approved interconnected *smoke alarms* are installed at each floor level and in all sleeping rooms, and hallways adjacent to sleeping rooms.
6. There is no expansion or modification of use other than installation of the exits required by subparagraph (b) above and a utility room less than 100 square feet. The space created at ground level by the elevation shall be used only as a *private parking garage* or as unused vacant space.
7. Any addition to the building after the elevation shall require installation of an automatic fire-extinguishing system.

#### Section 7-2-1000.16, Chapter 2, Section 903.2.18 – Group U Private Garages

Section 903.2.18 of the California Fire Code is amended to read:

#### **903.2.18 Group U private garages and carports accessory to Group R-3 occupancies.**

Carports with habitable space above, attached garages, and detached Group U structures greater than 3000 square feet in area containing a use similar to a: B Occupancy, S Occupancy, or M Occupancy which is accessory to Group R-3 occupancies, shall be protected by residential fire sprinklers in accordance with this section. Residential fire sprinklers shall be connected to, and installed in accordance with, an automatic residential fire sprinkler system that complies with Section R313 of the California Residential Code or with NFPA 13D. Fire sprinklers shall be residential sprinklers or quick-response sprinklers; designed to provide a minimum density of 0.05 gpm per square foot over the area of the garage and/or carport, but not to exceed two sprinklers for hydraulic calculation purposes. Garage doors shall not be considered obstructions to sprinkler placement.

Section 7-2-1000.18, Chapter 2, Section 903.4.2 – Alarms

Section 903.2.18 of the California Fire Code is amended to read:

**903.4.2 Alarms.**

At least one exterior approved audible device activated by the water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system shall be connected to every automatic fire alarm system in an approved location, and approved audible devices shall be connected to every automatic sprinkler system for the purpose of occupant notification. Actuation of the automatic sprinkler system shall actuate the building fire alarm system in all normally occupied areas for the purpose of occupant notification.

Section 7-2-1000.20, Chapter 2, Section 905.3.1 – Height

Section 905.3.1 of the California Fire Code is amended to read:

**905.3.1 Height.**

In other than R-3 and R-3.1 occupancies, Class III standpipe systems shall be installed throughout at each floor level where any of the following occur:

1. Buildings where the floor level of the highest story is located more than 30 feet above the lowest level of fire department vehicle access.
2. Buildings that are three or more stories in height.
3. Buildings where the floor level of the lowest story is located more than 30 feet below the highest level of fire department vehicle access.
4. Buildings that are two or more stories below the highest level of fire department vehicle access.
5. On the roof of buildings three or more stories in height.

**Exceptions:**

1. Class I standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
2. Class I manual standpipes are allowed in open parking garages where the highest floor is located not more than 150 feet (45 720 mm) above the lowest level of fire department vehicle access.
3. Class I manual dry standpipes are allowed in open parking garages that are subject to freezing temperatures, provided that the hose connections are located as required for Class II standpipes in accordance with Section 905.5.

4. Class I standpipes are allowed in basements equipped throughout with an automatic sprinkler system.
5. In determining the lowest level of fire department vehicle access, it shall not be required to consider:
  - 5.1 Recessed loading docks for four vehicles or less, and;
  - 5.2 Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.

Section 7-2-1000.22, Chapter 2, Section 907.2.8.1 – Manual Fire Alarm System

Section 903.2.18 of the California Fire Code is amended to read:

**907.2.8.1 Manual fire alarm system**

**Exceptions:**

Manual fire alarm boxes are not required throughout the building when the following conditions are met:

- 2.1 The building is equipped throughout with an automatic fire sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
- 2.2 Notification devices will activate within each residential unit upon sprinkler water flow.
- 2.3 At least one manual fire alarm box is installed in an approved location.

Section 7-2-1000.24, Chapter 2, Section 1414 – Automatic Sprinkler System

Section 1414 of the California Fire Code is amended by the addition of Section 1414.3 to read as follows:

**1414.3 Buildings under construction.**

In buildings four or more stories in height required to have sprinklers, such sprinklers shall be installed and extended as construction progresses to within one floor of the highest point of construction having secured decking or flooring.

Section 7-2-1000.26, Chapter 2, Section 1414.4 – Automatic Sprinkler System

Section 1414.4 of the California Fire Code is amended by the addition of Section 1414.3 to read as follows:

**1414.4 Buildings being demolished.**

Where a building is being demolished and a sprinkler system exists within such a building, such sprinkler system shall be maintained in an operable condition so as to be available for use by the fire department. ~~Such sprinkler system may be demolished with the building but shall not be~~ demolished more than one floor below the floor being demolished.

Section 7-2-1000.28, Chapter 2, Section 2701 – General

Section 2701 of the California Fire Code is amended by the addition of Section 2701.5.3 to read as follows:

**2701.5.3 Electronic Reporting.**

All hazardous Material Management Plans (HMMP) and Hazardous Material Inventory Statements (HMIS) shall be submitted electronically as approved by the fire code official.

Section 7-2-1000.30, Chapter 2, Section 3404 – Storage

Section 3404 of the California Fire Code is amended by the addition of Section 3404.1.1 to read as follows:

**3404.1.1 Tanks Storage prohibited.**

No existing aboveground tanks for the storage of Class I and Class II liquids outside of buildings (except LPG-Propane) shall be permitted on mercantile, residential, and other congested parcels. Existing tanks on such parcels shall be removed within one (1) year after written notice from the fire code official.

Section 7-2-1000.32, Chapter 2, Section 3404 – Storage

Section 3404 of the California Fire Code is amended by the addition of Section 3404.1.2 to read as follows:

**3404.1.2 Tank Storage - Other locations.**

New aboveground tanks for storage of Class I and II liquids on parcels not covered under Section 3404.1.2 shall be enclosed in a flammable liquid storage vault constructed in accordance with the standards of the fire department. Existing tanks on such parcels shall conform to new within one (1) year after written notice from the fire code official.

Section 7-2-1000.34, Chapter 2, Section 3404 – Storage

Section 3404 of the California Fire Code is amended by the addition of Section 3404.1.3 to read as follows:

**3404.1.3 Existing Tank Storage.**

Existing Tank storage shall meet the requirements of new tank installations with in one year of notice from the fire code official.

Section 7-2-1000.36, Chapter 2, Section 3807 – Safety Precautions and Devices

Section 3807 of the California Fire Code is amended by the addition of Section 3807.5 to read as follows:

**3807.5 Seismic Anchoring.**

An approved seismic anchoring system shall be installed on all permanently installed propane/LPG gas containers.

Section 7-2-1000.38, Chapter 2, Section 4903 –Fire Hazard Severity Zones

Section 4903 of the California Fire Code is amended by the addition of Section 4903.1 to read as follows:

**4903.1 General.**

A fire protection plan shall be required for any new residential or commercial building within a wildland-urban interface fire area. The plan shall be prepared by a qualified professional and shall be approved by the fire code official. The plan shall include, at a minimum, defensible space zones, identification of vegetation types, replacement of non-native flammable vegetation with approved fire resistive vegetation, and a maintenance program for all vegetation. The

property owner shall record a covenant, in a form satisfactory to county counsel, which ensures that the approved plan will be implemented and maintained. When required by the code official, the property owner shall record a covenant, in a form satisfactory to fire code official, which ensures that the approved plan will be implemented and maintained.

Section 7-2-1000.40, Chapter 2, Section 4903 –Fire Hazard Severity Zones

Section 4903 of the California Fire Code is amended by the addition of Section 4903.2 to read as follows:

**4903.2 Content.**

The fire protection plan shall be based upon a site-specific wildfire risk assessment that includes considerations of location, topography, aspect, flammable vegetation, climatic conditions and fire history. The plan shall address water supply, access, building ignition and fire-resistance factors, fire protection systems and equipment, defensible space and vegetation management.

Section 7-2-1000.42, Chapter 2, Section 4903 –Fire Hazard Severity Zones

Section 4903 of the California Fire Code is amended by the addition of Section 4903.3 to read as follows:

**4903.3 Cost.**

The cost of fire protection plan preparation and review shall be the responsibility of the applicant.

Section 7-2-1000.44, Chapter 2, Section 4903 –Fire Hazard Severity Zones

Section 4903 of the California Fire Code is amended by the addition of Section 4903.4 to read as follows:

**4903.4 Plan retention.**

A copy of the fire protection plan shall be retained by the property owner.

Section 7-2-1000.46, Chapter 2, Appendix B, Section B102 - Definitions

Section B102.1 of the California Fire Code is amended to read as follows:

**FIRE-FLOW.** The flow rate of a water supply, measured at 20 pounds per square inch (psi) (138 kPa) residual pressure in the water main in the vicinity of the flowing hydrant, that is available for fire fighting.

Section 7-2-1000.48, Chapter 2, Appendix B, Section B103.- Modifications

Section B103.3 of the California Fire Code is amended to read as follows:

**B 103.3 Areas without water supply systems.**

For information regarding water supplies for firefighting purposes in rural and suburban areas in which adequate water supply systems do not exist, the fire code official is authorized to utilize the 2001 edition of NFPA 1142.

Section 7-2-1000.50, Chapter 2, Appendix B, Section B105.1 – Fire Flow Requirements for Buildings

Section B105.1 of the California Fire Code is amended to read as follows:

**B105.1 One- and two-family dwellings.**

The minimum fire-flow requirements for one- and two-family dwellings having a fire-flow calculation area which does not exceed 3,600 square feet (344.5 m<sup>2</sup>) shall be 1,000 gallons per minute for 30 min. Fire-flow and flow duration for dwellings having a fire-flow calculation area in excess of 3,600 square feet (344.5 m<sup>2</sup>) shall not be less than that specified in Table B 105.1.

**Exception:**

A reduction in required fire flow of 50 percent as approved, is allowed when the building is provided with an approved automatic fire sprinkler system.

Section 7-2-1000.52, Chapter 2, Appendix C, Section C101.1 - Scope

Section B101.1 of the California Fire Code is amended to read as follows:

**C101.1 Scope.**

Fire hydrants shall be provided in accordance with this appendix for the protection of buildings, or portions of buildings hereafter constructed.

**Exceptions:**

1. Group R, S-2 and U occupancies having a floor area not exceeding 1,000 square feet primarily constructed of noncombustible exterior walls with wood or steel roof framing, having a Class-A roof assembly, with uses limited to the following or similar uses.
2. California State Parks buildings of an accessory nature (restrooms)
3. Safety roadside rest areas. (SRRA), public restrooms, and vehicle inspection bays.
4. Truck inspection facilities, (TIF), CHP office space and vehicle inspection bays
5. Sand/Salt storage buildings, storage of sand and salt

2. One and two-family residential dwellings; detached U Occupancy buildings less than 1000 square feet in area accessory to a one or two-family dwelling; and agricultural exempt buildings less than 8,000 square feet in area within County unincorporated areas not served by a municipal water system may comply with the fire hydrant location requirements, and the California Residential Code as adopted and amended by Town of Windsor.

Section 7-2-1000.54, Chapter 2, Appendix C, Section C102.1 – Fire Hydrant Locations

Section C102.1 of the California Fire Code is amended to read as follows:

**C102.1 Fire hydrant locations.**

Where fire hydrants are required, fire hydrants shall be provided along required fire apparatus access roads and adjacent public streets, and a fire hydrant shall be located within 50 feet of the Fire Department Connection (FDC), or as approved by the Fire Code Official.

Section 7-2-1000.56, Chapter 2, Appendix D, Section D101.1 – Scope

Section D101.1 of the California Fire Code is amended to read as follows:

**D101.1 Scope.**

Fire apparatus access roads shall be in accordance with this appendix and all other applicable requirements of the International Fire Code.

**Exception:**

One and two-family residential dwellings; detached U Occupancy buildings less than 1000 square feet in area accessory to a one or two-family dwelling; and agricultural exempt buildings less than 8,000 square feet in area within County unincorporated areas may comply with the fire apparatus access road requirements of the Sonoma County Fire Safe Standards.

Section 7-2-1000.58, Chapter 2, Appendix D, Section D102.1 – Scope

Section D102.1 of the California Fire Code is amended to read as follows:

**D102.1 Access and loading.**

Facilities, buildings or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an approved fire apparatus access road with an asphalt, concrete or other approved driving surface capable of supporting the imposed load of fire apparatus weighing at least 75,000 pounds (34050 kg) or as approved by the Fire Code Official.

Section 7-2-1000.60, Chapter 2, Appendix D, Section D103.1 – Access Road Width with a Hydrant

Section D103.1 of the California Fire Code is amended to read as follows:

**D103.1 Access road width with a hydrant.**

The hydrant shall be no closer than 4 feet nor farther than 12 feet from a roadway, and in a location where fire apparatus using it will not block the roadway.

Section 7-2-1000.62, Chapter 2, Appendix D, Section D103.2 – Grade

Section D103.2 of the California Fire Code is amended to read as follows:

**D103.2 Grade.**

Fire apparatus access roads shall not exceed 15 percent in grade.

**Exception:**

Grades steeper than 15 percent and less than 20 percent as approved by the fire code official.

Section 7-2-1000.64, Chapter 2, Appendix D, Section D103.3 – Turning Radius

Section D103.3 of the California Fire Code is amended to read as follows:

**D103.3 Turning radius.**

The minimum turning radius shall be determined by the fire code official or as approved by local standards.

Section 7-2-1000.66, Chapter 2, Appendix D, Section D103.4 – Dead Ends

Section D103.4 of the California Fire Code is amended to read as follows:

**D103.4 Dead ends.**

D 103.4.1 Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) shall be provided with width and turnaround provisions in accordance with the local agency requirements for public streets or as approved by local standards.

Section 7-2-1000.68, Chapter 2, Appendix D, Section D103 – Minimum Specifications

Section D103 of the California Fire Code is amended by the addition of Section D103.4.2 to read as follows:

**D103.4.2 Dead end roads.**

The maximum length of a dead-end road, including all dead-end roads accessed from that dead-end road, shall not exceed the cumulative lengths according to Table D 103.4, regardless of the number of parcels served.

Table D102.4 is added to read:

**Table D103.4**

<b>Parcel Size</b>	<b>Max Allowable Length</b>
Parcels zoned for less than one acre	800 feet
Parcels zoned for 1 acre to 4.99 acres	1320 feet
Parcels zoned for 5 acres to 19.99 acres	2640 feet
Parcels zoned for 20 acres or larger	5280 feet

Section D104.2 Exception is deleted

Section 7-2-1000.70, Chapter 2, Appendix D, Section D106 – Multiple-Family Residential Development

Section D106 of the California Fire Code is amended by the addition of Section D106.3 to read as follows:

**D106.3 Multi-residential projects having more than 50 dwelling units.**

Hotels, motels, condominiums, apartments, townhouses and similar multi-residential projects having more than 50 dwelling units shall be provided with two separate and approved fire apparatus access roads.

Section D106.2 is deleted.

Section 7-2-1000.72, Chapter 2, Appendix D, Section D107.1 – One or Two Family Residential Developments

Section D107.1 of the California Fire Code is amended to read as follows:

**D107.1 One-or two-family dwelling residential developments.**

~~Developments of one- and two-family dwellings where the number of dwelling units exceeds 50~~ shall be provided with two separate and approved fire apparatus access roads and shall meet the requirements of Section D104.3.

Section 7-2-1000.74, Administration and Enforcement of the California Fire Code

The Fire Chiefs of the fire protection districts having jurisdiction within the Town shall be responsible for the administration and enforcement of the California Fire Code and amendments thereto within their respective jurisdictions; provided that if said Fire Chief is unable or refuses to do so, the Building Official may, but is not obligated to, administer and enforce the California Fire Code and amendments thereto within the Town of Windsor.

Article 11  
CALIFORNIA GREEN BUILDING CODE –TITLE 24, PART 11

Section 7-2-1100 Citation of sections

This article shall be known as the "CALIFORNIA GREEN BUILDING STANDARDS CODE," and may be cited as such. It is intended that it shall also be known as the CALGreen Code. For purposes of citation, the CALIFORNIA GREEN BUILDING STANDARDS CODE, Part 11, 2010 Edition, as published by the International Code Council, including tables and appendices thereto; amended by the State of California and adopted by reference and amended by the Town of Windsor, are renumbered by adding "7-2-1100" before each section.

Section 7-2-1100, Chapter 2, Appendix A4, Section A4.601.4.1– Mandatory Measures for Tier 1  
Section A4.601.4.1 of the California Green Building Standards Code is amended to read as follows:

**A4.601.4.1 Mandatory measures for Tier 1 - Residential.**

The project shall meet or exceed all of the mandatory measures in Chapter 4, Division 4.1 through 4.5 and Chapter 7 as applicable. The Tier 1 measures contained in this appendix are adopted as mandatory provisions.

Section 7-2-1110, Chapter 2, Appendix A5, Section A5.601.2– CALGreen Tier 1

Section A5.601.2 of the California Green Building Standards Code is amended by the addition of Section A5.601.2.5 to read as follows:

**A5.601.2.5 Mandatory measures for Tier 1 - Non Residential**

The Tier 1 measures contained in this appendix are adopted as mandatory provisions.

Article 12  
CALIFORNIA REFERENCED STANDARDS CODE –TITLE 24, PART 12

Section 7-2-1200 Citation of sections

This article shall be known as the "CALIFORNIA REFERENCED STANDARDS CODE," and may be cited as such. For purposes of citation, the CALIFORNIA REFERENCED STANDARDS CODE, Part 12, 2010 Edition, as published by the International Code Council, including tables and appendices thereto; amended by the State of California and adopted by reference and amended by the Town of Windsor, are renumbered by adding "7-2-1200" before each section.

**CHAPTER 3**  
**WOODBURNING APPLIANCES**

Article 1  
WOODBURNING APPLIANCES

Section 7-3-100 Purpose

The purpose of this Article is to reduce wood smoke pollution and enhance health and quality of life of citizens, as well as to contribute to improvements in regional air quality by reducing air pollutant emissions from woodburning appliances.

Section 7-3-110 Definitions

**"EPA."** Means the United States Environmental Protection Agency.

**"FIREPLACE."** Means any permanently installed masonry or factory-built woodburning appliance, including a pellet-fueled appliance, designed to be used with an air-to-fuel ratio greater than or equal to 35 to 1.

**"GARBAGE."** Means solid, semi-solid and liquid wastes generated from residential, commercial and industrial sources, including trash, refuse, rubbish, industrial wastes, asphalt products, manure, vegetable or animal solids and semisolid wastes, and other discarded solid and semisolid wastes.

**"GAS FIREPLACE."** Means any vented appliance whose primary function lies in the esthetic effect of the flames.

**"KITCHEN."** Means any room used or intended or designed to be used for cooking and preparing of food. Rooms that contain appliances or equipment such as microwaves, gas or electric ovens, gas or electric cooking surfaces, toaster ovens and similar appliances shall be considered a room or area intended or designed as a kitchen.

**"MASONRY FIREPLACE."** Means a hearth and fire chamber of solid masonry units such as bricks, stones, or masonry units or reinforced concrete provided with an approved chimney constructed on a foundation.

**"NEW CONSTRUCTION."** Means construction of new structures, including commercial structures, as well as any addition(s) to existing structures where the addition(s) effect current fireplace installations.

**"PAINT."** Means all exterior and interior house and trim paints, enamels, varnishes, lacquers, stains, primers, sealers, undercoating, roof coatings, wood preservatives, shellacs and other paints or paint-like products.

**"PAINT SOLVENT."** Means all original solvents sold or used to thin paints or to clean up painting equipment.

**"PELLET-FUELED APPLIANCE."** Means any heat generating appliance that burns wood pellets to generate heat.

~~**"SOLID FUEL."** Means wood or any other non-gaseous or non-liquid fuel.~~

**"TREATED WOOD."** Means wood of any species that has been chemically impregnated, painted or similarly modified to improve resistance to insects or weathering.

**"WASTE PETROLEUM PRODUCTS."** Means any petroleum product other than gaseous fuel that has been refined from crude oil and has been used, and as a result of use, has been contaminated with physical or chemical impurities.

"**WOODBURNING APPLIANCE.**" Means fireplace, wood heater, or pellet-fueled appliance or any similar device burning any solid fuel used for aesthetic or space-heating purposes.

Section 7-3-115 Fireplace; Woodburning Appliance

No new fireplace or new woodburning appliance shall be installed, constructed, or utilized except in accordance with this Article 13.

Section 7-3-120 Unauthorized Appliances Prohibited.

(a) It is unlawful to install or construct in any new construction a woodburning appliance that is not one of the following:

1. a masonry fireplace; or
2. a gas fireplace; or
3. a woodburning appliance designed primarily for food preparation; or
4. any EPA certified wood heater which shall mean any wood heater that meets the standards in Title 40, Part 60, Subpart AAA, Code of Federal Regulations in effect at the time of installation and is certified and labeled pursuant to those regulations; or
5. any fireplace certified by EPA should EPA develop fireplace certification standards, or meeting equivalent standards to those listed in #4 above.

(b) This section shall apply to the repairs requiring a building permit, reconstruction or replacement of any lawful, existing woodburning appliance.

(c) This section shall not apply to a gas fireplace. However, the conversion of a gas fireplace to burn wood shall constitute the installation of a woodburning appliance and shall be subject to the requirements of this chapter.

Section 7-3-125 Limitations on Fuel

(a) It is unlawful to burn the following in any fireplace or woodburning appliance:

1. coal;
2. garbage;
3. glossy or colored paper;
4. paint;
5. paint solvent;
6. particle board;
7. plastic or items made from plastic;
8. rubber or items made from rubber;
9. salt water driftwood;
10. treated wood; and
11. waste petroleum products.

Section 7-3-130 Compliance and Enforcement

Any person who plans to install a woodburning appliance must submit documentation to the Town Building Inspection Division demonstrating that the appliance is an EPA certified wood heater, or a fireplace certified by EPA.

Any person violating any of the provisions of this Ordinance shall be deemed guilty of a misdemeanor and upon conviction shall be punished as provided by law.

**CHAPTER 4  
KEY REQUIREMENTS**

Article 1  
NEW BUILDING KEY REQUIREMENTS

Section 7-4-100 Legislative Purpose

The purpose of this ordinance is to enhance the safety and security of owners and occupants of new residential and commercial buildings developed and built within the Town of Windsor.

Section 7-4-110 Obligation of Developer

The developer of all new residential and commercial buildings which are constructed under the same development plan shall assure that, upon occupancy of each individual residential or commercial unit, that each such unit has locks which use combinations which are interchangeable free from locks used or to be used in all other units which are developed as part of the same development plan; and that any "master key" or "builder key" will not work on such locks. As used herein "master key" and "builder key" mean any key used by the developer, its contractors, subcontractors, and agents during construction that allows access to all units.

Prior to sale, lease, or rental of any new residential or commercial building, the developer thereof shall certify under penalty of perjury, on a form provided by the Town Manager, that he has complied with the provisions of this ordinance with respect to the individual unit being sold, leased or rented.

Section 7-4-115 Enforcement and Violation

The Town Manager, or his or her designee, shall enforce the provisions of this ordinance. Violation of the provisions of this ordinance shall be an infraction.

**PASSED, APPROVED AND ADOPTED on this 3<sup>rd</sup> day of November 2010, by the following vote:**

**AYES: COUNCILMEMBERS ALLEN, FUDGE, GOBLE, SCHOLAR AND  
MAYOR SALMON**  
**NOES: NONE**  
**ABSTAIN: NONE**  
**ABSENT: NONE**

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**SAM SALMON, MAYOR**

**ATTEST:**

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**MARIA DE LA O, TOWN CLERK**

# Codes and Standards Title 24 Energy-Efficient Local Ordinances

## Title: Climate Zone 2 Energy Cost-Effectiveness Study

### Prepared for:

Pat Eilert  
Codes and Standards Program  
Pacific Gas and Electric Company

Maril Pitcock  
Government Partnership Program  
Pacific Gas and Electric Company

Prepared by:  
Gabel Associates, LLC

Last Modified: September 30, 2010



A Sempura Energy utility



A Sempura Energy utility



Pacific Gas and  
Electric Company

## Climate Zone 2 Energy Cost-Effectiveness Study

September 30, 2010

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## **LEGAL NOTICE**

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## **1.0 Executive Summary**

This report presents the results of Gabel Associates' research and review of the feasibility and energy cost-effectiveness of building permit applicants exceeding the 2008 Building Energy Efficiency Standards to meet the minimum energy-efficiency requirements of local energy efficiency standards covering **Climate Zone 2**. A local government may use this report as a basis for demonstrating energy cost-effectiveness of a proposed green building or energy ordinance. The study assumes that such an ordinance requires, for the building categories covered, that building energy performance exceeds the 2008 TDV energy standard budget by at least 15%.

The study is also contained in the local government's application to the California Energy Commission (CEC) which must meet all requirements specified in Section 10-106 of the California Code of Regulations, Title 24, Part 1, Article 1: Locally Adopted Energy Standards. An ordinance shall be legally enforceable (a) after the CEC has reviewed and approved the local energy standards as meeting all requirements of Section 10-106; and (b) the ordinance has been adopted by the local government and filed with the Building Standards Commission.

The 2008 Building Energy Efficiency Standards, which took effect on January 1, 2010, are the baseline used to calculate the cost-effectiveness data.

## 2.0 Methodology and Assumptions

The energy performance impacts of exceeding the performance requirements of the 2008 Title 24 Building Energy Efficiency Standards (2008 Standards) have been evaluated in **Climate Zone 2** using the following residential and nonresidential prototypical building types:

<b>Small Single Family House</b> 2-story 2,025 sf	<b>Large Single Family House</b> 2-story 4,500 sf
<b>Low-rise Multi-family Apartments</b> 8 dwelling units/2-story 8,442 sf	<b>High-rise Multi-family Apartments</b> 40 dwelling units/4-story 36,800 sf
<b>Low-rise Office Building</b> 1-story 10,580 sf	<b>High-rise Office Building</b> 5-story 52,900 sf

### Methodology

The methodology used in the case studies is based on a design process for each of the proposed prototypical building types that first meets the minimum requirements and then exceeds the 2008 Standards by 15%. The process includes the following major stages:

#### **Stage 1: Minimum Compliance with 2008 Standards:**

Each prototype building design is tested for minimum compliance with the 2008 Standards, and the mix of energy measures are adjusted using common construction options so the building first just meets the Standards. The set of energy measures chosen represent a reasonable combination which reflects how designers, builders and developers are likely to achieve a specified level of performance using a relatively low first incremental (additional) cost.

#### **Stage 2: Incremental Cost for Exceeding 2008 Standards by 15%:**

Starting with that set of measures which is minimally compliant with the 2008 Standards, various energy measures are upgraded so that the building just exceeds the 2008 Standards by 15%. The design choices by the consultant authoring this study are based on many years of experience with architects, builders, mechanical engineers; and general knowledge of the relative acceptance and preferences of many measures, as well as their incremental costs. This approach tends to reflect how building energy performance is typically evaluated for code compliance and how it's used to select design energy efficiency measures. Note that lowest simple payback with respect to building site energy is not the primary focus of selecting measures; but rather the requisite reduction of Title 24 Time Dependent Valuation(TDV) energy at a reasonable incremental cost consistent with other non-monetary but important design considerations. A minimum and

maximum range of incremental costs of added energy efficiency measures is established by a variety of research means. A construction cost estimator, Building Advisory LLC, was contracted to conduct research to obtain current measure cost information for many energy measures; and Gabel Associates performed its own additional research to establish first cost data.

### ***Stage 3: Cost Effectiveness Determination:***

Energy savings in kWh and therms is calculated from the Title 24 simulation results to establish the annual energy cost savings and CO<sub>2</sub>-equivalent reductions in greenhouse gases. A simple payback analysis in years is calculated by dividing the incremental cost for exceeding the 2008 Standards by the estimated annual energy cost savings.

### **Assumptions**

#### ***Annual Energy Cost Savings***

1. Annual site electricity (kWh) and natural gas (therms) saved are calculated using Micropas 8, state-approved energy compliance software for the 2008 Building Energy Efficiency Standards.
2. Average residential utility rates of \$0.18/kWh for electricity and \$1.15/therm for natural gas in current constant dollars; nonresidential rates are time-of-use rate schedules modeled explicitly in the DOE-2.1E computer simulation: PG&E A-6 schedule for electricity and PG&E G-NR1 schedule for natural gas.
3. No change (i.e., no inflation or deflation) of utility rates in constant dollars
4. No increase in summer temperatures from global climate change

#### ***Simple Payback Analysis***

1. No external cost of global climate change -- and corresponding value of additional investment in energy efficiency and CO<sub>2</sub> reduction -- is included
2. The cost of money (e.g., opportunity cost) invested in the incremental cost of energy efficiency measures is not included.

### **3.0 Minimum Compliance with 2008 Standards**

The following energy design descriptions of the following building prototypes just meet the 2008 Standards in Climate Zone 2.

#### **Small Single Family House**

- 2,025 square feet
- 2-story
- 20.2% glazing/floor area ratio

#### **Base Case Design With No Air Conditioner**

##### **Energy Efficiency Measures**

R-38 Roof w/ Radiant Barrier  
R-13 Walls  
R-19 Raised Floor over Garage/Open at 2nd Floor  
R-0 Slab on Grade  
Low E2 Vinyl Windows, U=0.36, SHGC=0.30  
Furnace: 80% AFUE  
Air Conditioner: None  
R-6 Attic Ducts  
50 Gallon Gas Water Heater: EF=0.62

#### **Base Case Design With Air Conditioner**

##### **Energy Efficiency Measures**

R-30 Roof w/ Radiant Barrier  
R-13 Walls  
R-19 Raised Floor over Garage/Open at 2nd Floor  
R-0 Slab on Grade  
Low E2 Vinyl Windows, U=0.36, SHGC=0.30  
Furnace: 80% AFUE  
Air Conditioner: 13 SEER, 11 EER (HERS)  
Air Conditioner: Refrigerant Charge (HERS)  
R-6 Attic Ducts  
50 Gallon Gas Water Heater: EF=0.62

**Large Single Family House**

- 4,500 square feet
- 2-story
- 22.0% glazing/floor area ratio

**Base Case Design With No Air Conditioner**

<b>Energy Efficiency Measures</b>
R-30 Roof w/ Radiant Barrier
R-13 Walls
R-19 Raised Floor
Low E2 Vinyl Windows, U=0.36, SHGC=0.30
(2) Furnaces: 80% AFUE
Air Conditioner: None
R-6 Attic Ducts
Reduced Duct Leakage/Testing (HERS)
(2) 50 Gallon Gas Water Heaters: EF=0.60

**Base Case Design With Air Conditioner**

<b>Energy Efficiency Measures</b>
R-38 Roof w/ Radiant Barrier
R-13 Walls
R-19 Raised Floor
Low E2 Vinyl Windows, U=0.36, SHGC=0.30
(2) Furnaces: 80% AFUE
(2) Air Conditioners: 13 SEER
R-6 Attic Ducts
Reduced Duct Leakage/Testing (HERS)
(2) 50 Gallon Gas Water Heaters: EF=0.62

**Low-rise Multi-family Apartments**

- 8,442 square feet
- 8 units/2-story
- 12.5% glazing/floor area ratio

**Base Case Design With No Air Conditioner**

<b>Energy Efficiency Measures</b>
R-30 Roof w/ Radiant Barrier
R-13 Walls
R-0 Slab on Grade
Low E2 Vinyl Windows, U=0.36, SHGC=0.30
(8) Furnaces: 80% AFUE
Air Conditioner: None
R-6 Attic Ducts
(8) 40 Gallon Gas Water Heaters: EF=0.63

**Base Case Design With Air Conditioner**

<b>Energy Efficiency Measures</b>
R-38 Roof w/ Radiant Barrier
R-13 Walls
R-0 Slab on Grade
Low E2 Vinyl Windows, U=0.36, SHGC=0.30
(8) Furnaces: 80% AFUE
(8) Air Conditioner: 13 SEER
R-8 Attic Ducts
(8) 40 Gallon Gas Water Heaters: EF=0.63

### **High-rise Multifamily Apartments**

- 36,800 sf,
- 40 units
- 4-story
- Window to Wall Ratio = 35.2%

<b>Energy Efficiency Measures to Meet Title 24</b>
R-19 Metal Roof w/ R-10 (2") rigid insulation; cool roof Reflectance = 0.55 Emittance = 0.75
R-19 in Metal Frame Walls
R-4 (1.25" K-13 spray-on) Raised Slab over parking garage
Dual Metal Windows: COG U-factor=0.30, COG SHGC= .54
2 ton 4-pipe fan coil, 84% AFUE boiler, 70-ton scroll air cooled chiller 0.72 KW/ton
Central DHW boiler, 84% AFUE and recirculating system w/ timer- temperature controls with variable speed pump

### **Low-rise Office Building**

- Single Story
- 10,580 sf,
- Window to Wall Ratio = 37.1%

<b>Energy Efficiency Measures to Meet Title 24</b>
R-19 under Metal Deck with 3" rigid (R-15) above
R-19 in Metal Frame Walls
R-0 (un-insulated) slab-on-grade 1st floor
Metal windows: COG U=0.30, COG SHGC=0.54
Lighting = 0.858 w/sf: Open Office Areas: (60) 2-lamp T8 fixtures @58w each; (24) 18w recessed CFLs no lighting controls. Small Offices: (48) 2-lamp T8 fixtures; (40) 18w recessed CFLs, on/off lighting controls. Support Areas: (32) 18w recessed CFLs; (48) 13w CFL wall sconces; no controls.
(3) 10-ton DX units EER=11.1; 82% AFUE furnaces; standard efficiency fan motors; fixed temp. integrated air economizers
R-6 duct insulation w/ducts on roof, HERS verified duct leakage
(1) Tank Gas Water Heaters EF=0.58

### **High-rise Office Building**

- 5-story
- 52,900 sf,
- Window to Wall Ratio = 34.5%

<b>Energy Efficiency Measures to Meet Title 24</b>
R-19 under Metal Deck with 2" rigid insulation above (R-10), Cool Roof Reflectance = 0.55, Emittance = 0.75
R-19 in Metal Frame Walls
R-0 (un-insulated) slab-on-grade 1st floor
Metal windows: Default glazing U=0.71, SHGC = .73
Lighting = 0.858 w/sf: Open Office Areas: (300) 2-lamp T8 fixtures @58w each; no lighting controls; (120) 18w recessed CFLs no lighting controls. Small Offices: (280) 2-lamp T8 58w fixtures on/off lighting controls; (200) 18w recessed CFLs no lighting on/off lighting controls. Support Areas: (160) 18w recessed CFLs no lighting controls; (240) 13w CFL wall sconces; no lighting controls.
(3) 70 ton Packaged VAV system 10.3 EER/80% TE, standard efficiency variable speed fan motors; 25% VAV boxes, hot water reheat on perimeter zones with 82% AFUE boiler, fixed temp, economizer
R-6 duct insulation w/ ducts in conditioned
(1) Boiler (combined with space heat) 82% AFUE

#### 4.0 Incremental Cost to Exceed 2008 Standards by 15%

The following tables list the energy features and/or equipment included in the 2008 Standards base design, the efficient measure options, and an estimate of the incremental cost for each measure included to improve the building performance to use 15% less TDV energy than the corresponding Title 24 base case design.

##### Small Single Family House

- 2,025 square feet
- 2-story
- 20.2% glazing/floor area ratio

##### Incremental Cost Estimate to Exceed Title 24 by 15%

Single Family Prototype: 2,025 SF, Option 1 - No AC

2025 sf

Climate Zone 2

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Roof w/ Radiant Barrier (from R-38 w/Radiant Barrier): 1,443 sf @ 0.30 to 0.45/sf	Downgrade	\$ (649)	\$ (433)	\$ (541)
R-19 Walls (from R-13): 2,550 sf @\$0.31 to \$0.54/sf	Upgrade	\$ 791	\$ 1,377	\$ 1,084
R-19 Raised Floor over Garage/Open at 2nd Floor	-	\$ -	\$ -	\$ -
R-0 Slab on Grade	-	\$ -	\$ -	\$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
Furnace: 80% AFUE	-	\$ -	\$ -	\$ -
Air Conditioner: None	-	\$ -	\$ -	\$ -
R-4.2 Attic Ducts (from R-6)	Downgrade	\$ (325)	\$ (225)	\$ (275)
Reduced Duct Leakage/Testing (HERS)	Upgrade	\$ 300	\$ 600	\$ 450
50 Gallon Gas Water Heater: EF=0.62	-	\$ -	\$ -	\$ -
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 116</b>	<b>\$ 1,319</b>	<b>\$ 718</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.06</b>	<b>\$ 0.65</b>	<b>\$ 0.35</b>

##### Incremental Cost Estimate to Exceed Title 24 by 15%

Single Family Prototype: 2,025 SF, Option 2 - No AC

2025 sf

Climate Zone 2

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-30 Roof w/ Radiant Barrier (from R-38 w/Radiant Barrier): 1,443 sf @ 0.15 to 0.20/sf	Downgrade	\$ (289)	\$ (216)	\$ (253)
R-13 Walls	-	\$ -	\$ -	\$ -
R-19 Raised Floor over Garage/Open at 2nd Floor	-	\$ -	\$ -	\$ -
R-0 Slab on Grade	-	\$ -	\$ -	\$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
Furnace: 92% AFUE (from 80% AFUE)	Upgrade	\$ 500	\$ 1,200	\$ 850
Air Conditioner: None	-	\$ -	\$ -	\$ -
R-8 Attic Ducts (from R-6)	Upgrade	\$ 225	\$ 325	\$ 275
Reduced Duct Leakage/Testing (HERS)	Upgrade	\$ 300	\$ 600	\$ 450
50 Gallon Gas Water Heater: EF=0.63 (from EF=0.62)	Upgrade	\$ -	\$ 50	\$ 25
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 736</b>	<b>\$ 1,959</b>	<b>\$ 1,347</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.36</b>	<b>\$ 0.97</b>	<b>\$ 0.67</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Single Family Prototype: 2,025 SF, Option 3 with AC**

2025 sf

Climate Zone 2

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Roof w/ Radiant Barrier (from R-30 w/Radiant Barrier): 1,443 sf @ 0.25 to 0.35/sf	Downgrade	\$ (505)	\$ (361)	\$ (433)
R-19 Walls (from R-13): 2,550 sf @\$0.31 to \$0.54/sf	Upgrade	\$ 791	\$ 1,377	\$ 1,084
R-19 Raised Floor over Garage/Open at 2nd Floor	-	\$ -	\$ -	\$ -
R-0 Slab on Grade	-	\$ -	\$ -	\$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
Furnace: 80% AFUE	-	\$ -	\$ -	\$ -
Air Conditioner: 13 SEER, 11 EER (HERS)	-	\$ -	\$ -	\$ -
Air Conditioner: Refrig. Charge (HERS)	-	\$ -	\$ -	\$ -
R-4.2 Attic Ducts (from R-6)	Downgrade	\$ (325)	\$ (225)	\$ (275)
Reduced Duct Leakage/Testing (HERS)	Upgrade	\$ 300	\$ 600	\$ 450
50 Gallon Gas Water Heater: EF=0.60 (from EF=0.62)	Downgrade	\$ (200)	\$ (100)	\$ (150)
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 60</b>	<b>\$ 1,291</b>	<b>\$ 676</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.03</b>	<b>\$ 0.64</b>	<b>\$ 0.33</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Single Family Prototype: 2,025 SF, Option 4 with AC**

2025 sf

Climate Zone 2

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-30 Roof w/ Radiant Barrier	-	\$ -	\$ -	\$ -
R-21 Walls (from R-13): 2,550 sf @\$0.45 to \$0.70/sf	Upgrade	\$ 1,148	\$ 1,785	\$ 1,466
R-19 Raised Floor over Garage/Open at 2nd Floor	-	\$ -	\$ -	\$ -
R-0 Slab on Grade	-	\$ -	\$ -	\$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
Furnace: 80% AFUE	-	\$ -	\$ -	\$ -
Air Conditioner: 13 SEER, 11 EER (HERS)	-	\$ -	\$ -	\$ -
Air Conditioner: Refrig. Charge (HERS)	-	\$ -	\$ -	\$ -
R-6 Attic Ducts	-	\$ -	\$ -	\$ -
50 Gallon Gas Water Heater: EF=0.63 (from EF=0.62)	Upgrade	\$ -	\$ 50	\$ 25
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 1,148</b>	<b>\$ 1,835</b>	<b>\$ 1,491</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.57</b>	<b>\$ 0.91</b>	<b>\$ 0.74</b>

**Large Single Family House**

- 4,500 square feet
- 2-story
- 22.0% glazing/floor area ratio

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Single Family Prototype: 4,500 SF, Option 1 - No AC**

4500 sf

Climate Zone 2

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-30 Roof w/ Radiant Barrier	-	\$ -	\$ -	\$ -
R-21 Walls (from R-13): 2,518 sf @ \$0.45 to \$0.70/sf	Upgrade	\$ 1,133	\$ 1,763	\$ 1,448
R-30 Raised Floor (from R-19): 2,700 sf @ \$0.25 to \$0.35	Upgrade	\$ 675	\$ 945	\$ 810
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
(2) Furnaces: 80% AFUE	-	\$ -	\$ -	\$ -
Air Conditioner: None	-	\$ -	\$ -	\$ -
R-8 Attic Ducts (from R-6)	Upgrade	\$ 450	\$ 650	\$ 550
Reduced Duct Leakage/Testing (HERS)	-	\$ -	\$ -	\$ -
(2) 50 Gallon Gas Water Heaters: EF=0.63 (from EF=0.60)	Upgrade	\$ 200	\$ 500	\$ 350
Pipe Insulation	Upgrade	\$ 300	\$ 400	\$ 350
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 2,758</b>	<b>\$ 4,258</b>	<b>\$ 3,508</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.61</b>	<b>\$ 0.95</b>	<b>\$ 0.78</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Single Family Prototype: 4,500 SF, Option 2 - No AC**

4500 sf

Climate Zone 2

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-30 Roof w/ Radiant Barrier	-	\$ -	\$ -	\$ -
R-19 Walls (from R-13): 2,518 sf @ \$0.31 to \$0.54/sf	Upgrade	\$ 781	\$ 1,360	\$ 1,070
R-19 Raised Floor	-	\$ -	\$ -	\$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
(2) Furnaces: 92% AFUE (from 80% AFUE)	Upgrade	\$ 1,000	\$ 2,400	\$ 1,700
Air Conditioner: None	-	\$ -	\$ -	\$ -
R-6 Attic Ducts	-	\$ -	\$ -	\$ -
Reduced Duct Leakage/Testing (HERS)	-	\$ -	\$ -	\$ -
(2) 50 Gallon Gas Water Heaters: EF=0.63 (from EF=0.60)	Upgrade	\$ 200	\$ 500	\$ 350
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 1,981</b>	<b>\$ 4,260</b>	<b>\$ 3,120</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.44</b>	<b>\$ 0.95</b>	<b>\$ 0.69</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Single Family Prototype: 4,500 SF, Option 3 with AC**

4500 sf

Climate Zone 2

Energy Efficiency Measures	Change	Incremental Cost Estimate		
R-38 Roof w/ Radiant Barrier	-	\$ -	\$ -	\$ -
R-19 Walls (from R-13): 2,518 sf @ \$0.31 to \$0.54/sf	Upgrade	\$ 781	\$ 1,360	\$ 1,070
R-19 Raised Floor	-	\$ -	\$ -	\$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
(2) Furnaces: 80% AFUE	-	\$ -	\$ -	\$ -
(2) Air Conditioners: 13 SEER, 11 EER (HERS)	Upgrade	\$ 50	\$ 150	\$ 100
(2) Air Conditioner: Refrig. Charge (HERS)	Upgrade	\$ 300	\$ 400	\$ 350
R-4.2 Attic Ducts (from R-6)	Downgrade	\$ (650)	\$ (450)	\$ (550)
Reduced Duct Leakage/Testing (HERS)	-	\$ -	\$ -	\$ -
(2) Instantaneous Gas Water Heaters: RE=0.80 (from 50 Gal Gas: EF=0.62)	Upgrade	\$ 1,800	\$ 3,000	\$ 2,400
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 2,281</b>	<b>\$ 4,460</b>	<b>\$ 3,370</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.51</b>	<b>\$ 0.99</b>	<b>\$ 0.75</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Single Family Prototype: 4,500 SF, Option 4 with AC**

4500 sf

Climate Zone 2

Energy Efficiency Measures	Change	Incremental Cost Estimate		
R-38 Roof w/ Radiant Barrier	-	\$ -	\$ -	\$ -
R-19 Walls (from R-13): 2,518 sf @ \$0.31 to \$0.54/sf	Upgrade	\$ 781	\$ 1,360	\$ 1,070
R-19 Raised Floor	-	\$ -	\$ -	\$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
(2) Furnaces: 92% AFUE (from 80% AFUE)	Upgrade	\$ 1,000	\$ 2,400	\$ 1,700
(2) Air Conditioners: 13 SEER, 11 EER (HERS)	Upgrade	\$ 50	\$ 150	\$ 100
(2) Air Conditioner: Refrig. Charge (HERS)	Upgrade	\$ 300	\$ 400	\$ 350
R-4.2 Attic Ducts (from R-6)	Downgrade	\$ (650)	\$ (450)	\$ (550)
Reduced Duct Leakage/Testing (HERS)	-	\$ -	\$ -	\$ -
(2) 50 Gallon Gas Water Heaters: EF=0.63 (from EF=0.62)	Upgrade	\$ -	\$ 100	\$ 50
Pipe Insulation	Upgrade	\$ 300	\$ 400	\$ 350
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 1,781</b>	<b>\$ 4,360</b>	<b>\$ 3,070</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.40</b>	<b>\$ 0.97</b>	<b>\$ 0.68</b>

**Low-rise Multi-family Apartments**

- 8,442 square feet
- 8 units/2-story
- 12.5% glazing/floor area ratio

**Incremental Cost Estimate to Exceed Title 24 by 15%**

**Multi-Family Prototype: 8,442 SF, Option 1 - No AC**

8442 sf

Climate Zone 2

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-30 Roof w/ Radiant Barrier	-	\$ -	\$ -	\$ -
R-21 Walls (from R-13 ): 10,146 sf @ \$0.45 to \$0.70/sf	Upgrade	\$ 4,566	\$ 7,102	\$ 5,834
R-0 Slab on Grade	-	\$ -	\$ -	\$ -
Low E2 Vinyl, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
(8) Furnaces: 80% AFUE	-	\$ -	\$ -	\$ -
Air Conditioner: None	-	\$ -	\$ -	\$ -
R-6 Attic Ducts	-	\$ -	\$ -	\$ -
(8) 40 Gallon Gas Water Heaters: EF=0.63	-	\$ -	\$ -	\$ -
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 4,566</b>	<b>\$ 7,102</b>	<b>\$ 5,834</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.54</b>	<b>\$ 0.84</b>	<b>\$ 0.69</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**

**Multi-Family Prototype: 8,442 SF, Option 2 - No AC**

8442 sf

Climate Zone 2

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Roof w/ Radiant Barrier (from R-30 w/Radiant Barrier): 4,221 sf @ 0.25 to 0.35/sf	Upgrade	\$ (1,477)	\$ (1,055)	\$ (1,266)
R-19 Walls (from R-13 ): 10,146 sf @ \$0.31 to \$0.54/sf	Upgrade	\$ 3,145	\$ 5,479	\$ 4,312
R-0 Slab on Grade	-	\$ -	\$ -	\$ -
Low E2 Vinyl, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
(8) Furnaces: 80% AFUE	-	\$ -	\$ -	\$ -
Air Conditioner: None	-	\$ -	\$ -	\$ -
R-4.2 Attic Ducts (from R-6)	Downgrade	\$ (1,600)	\$ (1,000)	\$ (1,300)
Reduced Duct Leakage/Testing (HERS)	Upgrade	\$ 2,400	\$ 4,800	\$ 3,600
(8) 40 Gallon Gas Water Heaters: EF=0.60 (from EF=0.63)	Downgrade	\$ (2,000)	\$ (800)	\$ (1,400)
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 468</b>	<b>\$ 7,424</b>	<b>\$ 3,946</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.06</b>	<b>\$ 0.88</b>	<b>\$ 0.47</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**

**Multi-Family Prototype: 8,442 SF, Option 3 with AC**

**8442 sf**

**Climate Zone 2**

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Roof w/ Radiant Barrier (from R-38 w/Radiant Barrier); 4,221 sf @ 0.30 to 0.45/sf	Downgrade	\$ (1,899)	\$ (1,266)	\$ (1,583)
R-21 Walls (from R-13 ): 10,146 sf @ \$0.45 to \$0.70/sf	Upgrade	\$ 4,566	\$ 7,102	\$ 5,834
R-0 Slab on Grade	-	\$ -	\$ -	\$ -
Low E2 Vinyl, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
(8) Furnaces: 80% AFUE	-	\$ -	\$ -	\$ -
(8) Air Conditioners: 13 SEER, 11 EER (HERS)	Upgrade	\$ 200	\$ 600	\$ 400
(8) Air Conditioner: Refrig. Charge (HERS)	Upgrade	\$ 1,200	\$ 1,600	\$ 1,400
R-8 Attic Ducts	-	\$ -	\$ -	\$ -
(8) 40 Gallon Gas Water Heaters: EF=0.63	-	\$ -	\$ -	\$ -
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 4,066</b>	<b>\$ 8,036</b>	<b>\$ 6,051</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.48</b>	<b>\$ 0.95</b>	<b>\$ 0.72</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**

**Multi-Family Prototype: 8,442 SF, Option 4 with AC**

**8442 sf**

**Climate Zone 2**

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-38 Roof w/ Radiant Barrier	-	\$ -	\$ -	\$ -
R-19 Walls (from R-13 ): 10,146 sf @ \$0.31 to \$0.54/sf	Upgrade	\$ 3,145	\$ 5,479	\$ 4,312
R-0 Slab on Grade	-	\$ -	\$ -	\$ -
Low E2 Vinyl, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
(8) Furnaces: 80% AFUE	-	\$ -	\$ -	\$ -
(8) Air Conditioners: 13 SEER, 11 EER (HERS)	Upgrade	\$ 200	\$ 600	\$ 400
(8) Air Conditioner: Refrig. Charge (HERS)	Upgrade	\$ 1,200	\$ 1,600	\$ 1,400
R-8 Attic Ducts	-	\$ -	\$ -	\$ -
(8) 40 Gallon Gas Water Heaters: EF=0.63	-	\$ -	\$ -	\$ -
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 4,545</b>	<b>\$ 7,679</b>	<b>\$ 6,112</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.54</b>	<b>\$ 0.91</b>	<b>\$ 0.72</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Multi-Family Prototype: 8,442 SF, Option 5 with AC**

8442 sf

Climate Zone 2

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Roof w/ Radiant Barrier (from R-38 w/Radiant Barrier); 4,221 sf @ 0.30 to 0.45/sf	Downgrade	\$ (1,899)	\$ (1,266)	\$ (1,583)
R-19 Walls (from R-13): 10,146 sf @ \$0.31 to \$0.54/sf	Upgrade	\$ 3,145	\$ 5,479	\$ 4,312
R-0 Slab on Grade	-	\$ -	\$ -	\$ -
Low E2 Vinyl, U=0.36, SHGC=0.30	-	\$ -	\$ -	\$ -
(8) Furnaces: 80% AFUE	-	\$ -	\$ -	\$ -
(8) Air Conditioners: 13 SEER	-	\$ -	\$ -	\$ -
(8) Air Conditioner: Refrig. Charge (HERS)	Upgrade	\$ 1,200	\$ 1,600	\$ 1,400
R-4.2 Attic Ducts (from R-8)	Downgrade	\$ (3,000)	\$ (2,000)	\$ (2,500)
Reduced Duct Leakage/Testing (HERS)	Upgrade	\$ 2,400	\$ 4,800	\$ 3,600
(8) 40 Gallon Gas Water Heaters: EF=0.60 (from EF=0.63)	Downgrade	\$ (2,000)	\$ (800)	\$ (1,400)
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ (154)</b>	<b>\$ 7,813</b>	<b>\$ 3,829</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ (0.02)</b>	<b>\$ 0.93</b>	<b>\$ 0.45</b>

**High-rise Multifamily Apartments**

- 36,800 sf,
- 40 units/4-story
- Window to Wall Ratio = 31.6%

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**High-rise Residential Prototype: 36,800 SF, Option 1**

Climate Zone 2

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Metal Roof w/ R-15 (3") rigid insulation; cool roof Reflectance = 0.55 Emittance = 0.75; 9,200 sf @ \$0.75 - \$1.00/sf	Upgrade	\$ 15,600	\$ 24,960	\$ 20,280
R-19 in Metal Frame Walls	-	-	-	-
R-6 (K-13 spray-on) Raised Slab over parking garage; 9,200 sf @ \$0.50 - \$0.75/sf	Upgrade	\$ 4,600	\$ 6,900	\$ 5,750
Dual Metal Windows: COG U-factor=0.3, <b>COG SHGC=0.27</b> 6,240 sf @ \$1.50 to \$2.50/sf	Upgrade	\$ 9,360	\$ 15,600	\$ 12,480
2 ton 4-pipe fan coil, <b>98% AFUE boiler</b> , 70-ton scroll air cooled chiller 0.72 KW/ton	Upgrade	\$ 2,500	\$ 4,000	\$ 3,250
Central DHW boiler: <b>98% AFUE</b> and recirculating system w/ timer- temperature controls with <b>premium</b> variable speed pump	Upgrade	\$ 2,500	\$ 4,000	\$ 3,250
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 34,560</b>	<b>\$ 55,460</b>	<b>\$ 45,010</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.94</b>	<b>\$ 1.51</b>	<b>\$ 1.22</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**High-rise Residential Prototype: 36,800 SF, Option 2**

**Climate Zone 2**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Metal Roof w/ R-10 (2") rigid insulation; cool roof Reflectance = 0.81 Emittance = 0.89; 9,200 sf @ \$0.45 - \$0.55/sf	Upgrade	\$ 4,140	\$ 5,060	\$ 4,600
R-19 in Metal Frame Walls	-	-	-	-
R-6 (K-13 spray-on) Raised Slab over parking garage; 9,200 sf @ \$0.50 - \$0.75/sf	Upgrade	\$ 4,600	\$ 6,900	\$ 5,750
Dual Metal Windows: COG U-factor=0.3, <b>COG SHGC=0.27</b> 6,240 sf @ \$1.50 to \$2.50/sf	Upgrade	\$ 9,360	\$ 15,600	\$ 12,480
2 ton 4-pipe fan coil, <b>98% AFUE boiler</b> , 70-ton scroll air cooled chiller 0.72 KW/ton	Upgrade	\$ 2,500	\$ 4,000	\$ 3,250
Central DHW boiler: <b>98% AFUE</b> and recirculating system w/ timer- temperature controls with <b>premium</b> variable speed pump	Upgrade	\$ 2,500	\$ 4,000	\$ 3,250
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 23,100</b>	<b>\$ 35,560</b>	<b>\$ 29,330</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.63</b>	<b>\$ 0.97</b>	<b>\$ 0.80</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**High-rise Residential Prototype: 36,800 SF, Option 3**

**Climate Zone 2**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Metal Roof w/ R-10 (2") rigid insulation; cool roof Reflectance = 0.55 Emittance = 0.75	-			
R-19 in Metal Frame Walls	-			
R-4 (1.25" K-13 spray-on) Raised Slab over parking garage	-			
Dual Metal Windows: COG U-factor=0.3, <b>COG SHGC=0.27</b> 6,240 sf @ \$1.50 to \$2.50/sf	Upgrade	\$ 9,360	\$ 15,600	\$ 12,480
2 ton 4-pipe fan coil, 84% AFUE boiler, 70-ton scroll air cooled chiller 0.72 KW/ton	-			
Central DHW boiler: 84% AFUE and recirculating system w/ timer- temperature controls with <b>20% solar for hot water and space heating @ \$900 - \$1,500 per dwelling unit</b>	Upgrade	\$ 36,000	\$ 60,000	\$ 48,000
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 45,360</b>	<b>\$ 75,600</b>	<b>\$ 60,480</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 1.23</b>	<b>\$ 2.05</b>	<b>\$ 1.64</b>

**Low-rise Office Building**

- Single Story
- 10,580 sf,
- Window to Wall Ratio = 37.1%

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Nonresidential Prototype: 10,580 SF, Option 1**

**Climate Zone 2**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck with 3" rigid (R-15) above; with Cool Roof Reflectance = 0.81, Emittance = 0.89; 10,580 sf @ \$0.45 - \$0.55/sf	Upgrade	\$ 4,761	\$ 5,819	\$ 5,290
R-19 in Metal Frame Walls	-	\$ -	\$ -	\$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	\$ -	\$ -	\$ -
Metal windows: COG U=0.30, COG SHGC=0.38; 3,200 sf @ \$1.00 to \$2.00/sf	Upgrade	\$ 3,200	\$ 6,400	\$ 4,800
Lighting = 0.783 w/sf: Open Office Areas: (60) 2-lamp T8 fixtures @58w each; no lighting controls; (24) 18w recessed CFLs. Small Offices: (56) 2-lamp T8 fixtures, (28) multi-level occupancy sensors @ \$75 to \$100 each; (40) 18w recessed CFLs. Support Areas: (32) 18w recessed CFLs; (48) 13w CFL wall sconces; no controls.	Upgrade	\$ 2,100	\$ 2,800	\$ 2,450
(3) 10-ton DX units EER=11.1; 82% AFUE furnaces; standard efficiency fan motors; fixed temp. integrated air economizers, DDC with DCV at spaces, cycle on at night	Upgrade	\$ 2,250	\$ 4,500	\$ 3,375
R-6 duct insulation w/ducts on roof, HERS verified duct leakage	-	\$ -	\$ -	\$ -
(1) Tank Gas Water Heaters EF=0.58	-	\$ -	\$ -	\$ -
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 12,311</b>	<b>\$ 19,519</b>	<b>\$ 15,915</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 1.16</b>	<b>\$ 1.84</b>	<b>\$ 1.50</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Nonresidential Prototype: 10,580 SF, Option 2**

Climate Zone 2

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck with 3" rigid (R-15) above; with Cool Roof Reflectance = 0.81, Emittance = 0.89; 10,580 sf @ \$0.45 - \$0.55/sf	Upgrade	\$ 4,761	\$ 5,819	\$ 5,290
R-19 in Metal Frame Walls	-	\$ -	\$ -	\$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	\$ -	\$ -	\$ -
Metal windows: COG U=0.30, COG SHGC=0.27; 3,200 sf @ \$1.50 to \$3.00/sf	Upgrade	\$ 4,800	\$ 9,600	\$ 7,200
Lighting = 0.678 w/sf: Open Office Areas: (32) 2-lamp T8 fixtures @74w each; no lighting controls; (24) 18w recessed CFLs. Small Offices: (56) 2-lamp T8 fixtures, (28) multi-level occupancy sensors on T8s @ \$75 to \$100 each; (40) 18w recessed CFLs Support Areas: (32) 18w recessed CFLs; (48) 13w CFL wall sconces; no controls.	Upgrade	\$ 820	\$ 1,648	\$ 1,234
(3) 10-ton DX units EER=11.1; 82% AFUE furnaces; standard efficiency fan motors; fixed temp. integrated air economizers, cycle on at night	Upgrade	\$ 450	\$ 750	\$ 600
R-6 duct insulation w/ducts on roof, HERS verified duct leakage	-	\$ -	\$ -	\$ -
(1) Tank Gas Water Heaters EF=0.58	-	\$ -	\$ -	\$ -
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 10,831</b>	<b>\$ 17,817</b>	<b>\$ 14,324</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 1.02</b>	<b>\$ 1.68</b>	<b>\$ 1.35</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%  
Nonresidential Prototype: 10,580 SF, Option 3**

**Climate Zone 2**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck with 3" rigid (R-15) above; with Cool Roof Reflectance = 0.81, Emittance = 0.89; 10,580-sf @ \$0.45 - \$0.55/sf	Upgrade	\$ 4,761	\$ 5,819	\$ 5,290
R-19 in Metal Frame Walls	-	\$ -	\$ -	\$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	\$ -	\$ -	\$ -
Metal windows: COG U=0.30, COG SHGC=0.31; 3,200 sf @ \$1.5 to \$2.50/sf	Upgrade	\$ 4,800	\$ 8,000	\$ 6,400
Lighting = 0.678 w/sf. Open Office Areas: (32) 2-lamp T8 fixtures @74w each; no lighting controls; (24) 18w recessed CFLs. Small Offices: (56) 2-lamp T8 fixtures, (28) multi-level occupancy sensors on T8s @ \$75 to \$100 each; (40) 18w recessed CFLs Support Areas: (32) 18w recessed CFLs; (48) 13w CFL wall sconces; no controls	Upgrade	\$ 820	\$ 1,648	\$ 1,234
(3) 10-ton DX units EER=11.1; 82% AFUE furnaces; standard efficiency fan motors; fixed temp. integrated air economizers, cycle on at night	Upgrade	\$ 450	\$ 750	\$ 600
R-8 duct insulation w/ducts on roof, HERS verified duct leakage.	Upgrade	\$ 450	\$ 900	\$ 675
(1) Tank Gas Water Heaters EF=0.65	Upgrade	\$ 250	\$ 500	\$ 375
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 11,531</b>	<b>\$ 17,617</b>	<b>\$ 14,574</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 1.09</b>	<b>\$ 1.67</b>	<b>\$ 1.38</b>

**High-rise Office Building**

- 5-story
- 52,900 sf,
- Window to Wall Ratio = 34.5%

**Incremental Cost Estimate to Exceed Title 24 by 15%  
Nonresidential Prototype: 52,900 SF, Option 1**

**Climate Zone 2**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck with 3" rigid insulation above (R-15), Cool Roof Reflectance = 0.55, Emittance = 0.75; 10580 sf @ \$0.75 - \$1.00/sf	Upgrade	\$ 7,935	\$ 10,580	\$ 9,258
R-19 in Metal Frame Walls	-	\$ -	\$ -	\$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	\$ -	\$ -	\$ -
Metal windows: COG U=0.30, COG SHGC=0.38; 16,000 sf @ \$1.50 to \$3.00/sf	Upgrade	\$ 24,000	\$ 48,000	\$ 36,000
Lighting = 0.858 w/sf: Open Office Areas: (300) 2-lamp T8 fixtures @58w each; no lighting controls; (120) 18w recessed CFLs no lighting controls. Small Offices: (280) 2-lamp T8 58w fixtures on/off lighting controls; (200) 18w recessed CFLs no lighting on/off lighting controls. Support Areas: (160) 18w recessed CFLs no lighting controls; (240) 13w CFL wall sconces; no lighting controls.	-	\$ -	\$ -	\$ -
(3) 70 ton Packaged VAV system 10.3 EER/80% TE, standard efficiency variable speed fan motors; 20% VAV boxes, hot water reheat on perimeter zones with 82% AFUE boiler, fixed temp. economizer	-	\$ -	\$ -	\$ -
R-6 duct insulation w/ ducts in conditioned	-	\$ -	\$ -	\$ -
(1) Boiler (combined with space heat) 82% AFUE	-	\$ -	\$ -	\$ -
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 31,935</b>	<b>\$ 58,580</b>	<b>\$ 45,258</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.60</b>	<b>\$ 1.11</b>	<b>\$ 0.86</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Nonresidential Prototype: 52,900 SF, Option 1**

Climate Zone 2

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck with 3" rigid insulation above (R-15), Cool Roof Reflectance = 0.55, Emittance = 0.75; 10580 sf @ \$0.75 - \$1.00/sf	Upgrade	\$ 7,935	\$ 10,580	\$ 9,258
R-19 in Metal Frame Walls	-	\$ -	\$ -	\$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	\$ -	\$ -	\$ -
Metal windows: COG U=0.30, COG SHGC=0.38; 16,000 sf @ \$1.50 to \$3.00/sf	Upgrade	\$ 24,000	\$ 48,000	\$ 36,000
Lighting = 0.858 w/sf: Open Office Areas: (300) 2-lamp T8 fixtures @58w each; no lighting controls; (120) 18w recessed CFLs no lighting controls. Small Offices: (280) 2-lamp T8 58w fixtures on/off lighting controls; (200) 18w recessed CFLs no lighting on/off lighting controls. Support Areas: (160) 18w recessed CFLs no lighting controls; (240) 13w CFL wall sconces; no lighting controls.	-	\$ -	\$ -	\$ -
(3) 70 ton Packaged VAV system 10.3 EER/80% TE, standard efficiency variable speed fan motors; 20% VAV boxes, hot water reheat on perimeter zones with 82% AFUE boiler, fixed temp. economizer	-	\$ -	\$ -	\$ -
R-6 duct insulation w/ ducts in conditioned	-	\$ -	\$ -	\$ -
(1) Boiler (combined with space heat) 82% AFUE	-	\$ -	\$ -	\$ -
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 31,935</b>	<b>\$ 58,580</b>	<b>\$ 45,258</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.60</b>	<b>\$ 1.11</b>	<b>\$ 0.86</b>

**Incremental Cost Estimate to Exceed Title 24 by 15%**  
**Nonresidential Prototype: 52,900 SF, Option 2**

**Climate Zone 2**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck with <b>3" rigid insulation above (R-15)</b> , Cool Roof Reflectance = 0.55, Emittance = 0.75; 10580 sf @ \$0.75 - \$1.00/sf	Upgrade	\$ 7,935	\$ 10,580	\$ 9,258
R-19 in Metal Frame Walls	-	\$ -	\$ -	\$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	\$ -	\$ -	\$ -
Metal windows: <b>COG U=0.30, COG SHGC=0.54</b> ; 16,000 sf @ \$1.00 to \$2.50/sf.	Upgrade	\$ 16,000	\$ 40,000	\$ 28,000
Lighting = 0.785 w/sf: Open Office Areas: (300) 2-lamp T8 fixtures @58w each; no lighting controls; (120) 18w recessed CFLs no lighting controls. Small Offices: (280) 2-lamp T8 58w fixtures w/ <b>140 multi-level occupancy sensors on T8s @ \$75 to \$100 each</b> ; (200) 18w recessed CFLs no lighting on/off lighting controls. Support Areas: (160) 18w recessed CFLs no lighting controls; (240) 13w CFL wall sconces; no lighting controls.	Upgrade	\$ 10,500	\$ 14,000	\$ 12,250
(3) 70 ton Packaged VAV system 10.3 EER/80% TE, standard efficiency variable speed fan motors; <b>20% VAV boxes</b> , hot water reheat on perimeter zones with 82% AFUE boiler, fixed temp. economizer, <b>cycle on at night</b>	Upgrade	\$ 11,600	\$ 16,225	\$ 13,913
R-6 duct insulation w/ ducts in conditioned	-	\$ -	\$ -	\$ -
(1) Boiler (combined with space heat) 82% AFUE	-	\$ -	\$ -	\$ -
<b>Total Incremental Cost of Energy Efficiency Measures:</b>		<b>\$ 46,035</b>	<b>\$ 80,805</b>	<b>\$ 63,420</b>
<b>Total Incremental Cost per Square Foot:</b>		<b>\$ 0.87</b>	<b>\$ 1.53</b>	<b>\$ 1.20</b>

## 5.0 Cost -Effectiveness Determination

Regardless of the building design, occupancy profile and number of stories, the incremental improvement in overall annual energy performance of buildings in exceeding the 2008 Standards is determined to be cost-effective. However, each building's overall design, occupancy type and specific design choices may allow for a large range of incremental costs for exceeding 2008 Standards, estimated annual energy cost savings, and subsequent payback period.

### Small Single Family

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost (\$)	Annual Energy Cost Savings (\$)	Simple Payback (Years)
2,025 sf (Option 1)	321	97	\$718	\$169	4.2
2,025 sf (Option 2)	172	125	\$1,348	\$175	7.7
2,025 sf (Option 3)	334	94	\$676	\$168	4.0
2,025 sf (Option 4)	336	95	\$1,492	\$170	8.8
Averages:	291	103	\$1,058	\$170	6.2

*Annual Reduction in CO2-equivalent: 0.66 lb./sq.ft.-year, 1,327 lb./building-year  
Increased Cost / lb. CO2-e reduction: \$0.80*

### Large Single Family

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost (\$)	Annual Energy Cost Savings (\$)	Simple Payback (Years)
4,500 sf (Option 1)	475	142	\$3,508	\$249	14.1
4,500 sf (Option 2)	321	168	\$3,121	\$251	12.4
4,500 sf (Option 3)	439	152	\$3,371	\$254	13.3
4,500 sf (Option 4)	439	137	\$3,071	\$237	13.0
Averages:	419	150	\$3,267	\$248	13.2

*Annual Reduction in CO2-equivalent: 0.43 lb./sq.ft.-year, 1,931 lb./building-year  
Increased Cost / lb. CO2-e reduction: \$1.69*

### Low-rise Multi-family Apartments

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost (\$)	Annual Energy Cost Savings (\$)	Simple Payback (Years)
8-Unit, 8,442 sf (Option 1)	1410	339	\$5,834	\$644	9.1
8-Unit, 8,442 sf (Option 2)	1476	310	\$3,946	\$622	6.3
8-Unit, 8,442 sf (Option 3)	1493	285	\$6,051	\$596	10.1
8-Unit, 8,442 sf (Option 4)	1526	287	\$6,112	\$605	10.1
8-Unit, 8,442 sf (Option 5)	1575	276	\$3,830	\$601	6.4
Averages:	1496	299	\$5,155	\$614	8.4

*Annual Reduction in CO2-equivalent: 0.49 lb./sq.ft.-year, 4,158 lb./building-year  
Increased Cost / lb. CO2-e reduction: \$1.24*

### High-rise Multi-family Apartments

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost (\$)	Annual Energy Cost Savings (\$)	Simple Payback (Years)
36,800 sf (Option 1)	17462	375	\$45,010	\$3,574	12.6
36,800 sf (Option 2)	18197	206	\$29,330	\$3,512	8.4
36,800 sf (Option 3)	17337	738	\$60,480	\$3,966	15.3
Averages:	17665	440	\$44,940	\$3,684	12.1

*Annual Reduction in CO2-equivalent: 0.36 lb./sq.ft.-year, 13,067 lb./building-year  
Increased Cost / lb. CO2-e reduction: \$3.44*

### Low-rise Office Building

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost (\$)	Annual Energy Cost Savings (\$)	Simple Payback (Years)
10,580 sf (Option 1)	11312	-152	\$15,915	\$2,875	5.5
10,580 sf (Option 2)	15304	-570	\$14,324	\$3,393	4.2
10,580 sf (Option 3)	13510	-415	\$14,574	\$3,081	4.7
Averages:	13375	-379	\$14,938	\$3,116	4.8

*Annual Reduction in CO2-equivalent: 0.15 lb./sq.ft.-year, 1,607 lb./building-year  
Increased Cost / lb. CO2-e reduction: \$9.29*

### High-rise Office Building

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost (\$)	Annual Energy Cost Savings (\$)	Simple Payback (Years)
52,900 sf (Option 1)	61230	1282	\$45,258	\$19,272	2.3
52,900 sf (Option 2)	16941	1655	\$63,420	\$6,185	10.3
52,900 sf (Option 3)	33841	5280	\$42,196	\$15,602	2.7
Averages:	37337	2739	\$50,291	\$13,686	5.1

*Annual Reduction in CO2-equivalent: 0.92 lb./sq.ft.-year, 36,513 lb./building-year  
Increased Cost / lb. CO2-e reduction: \$1.03*

## **Conclusions**

Regardless of the building design, occupancy profile and number of stories, the incremental improvement in overall annual energy performance of buildings which exceed the 2008 Title 24 Building Energy Efficiency Standards by 15% appears cost-effective. However, each building's overall design, occupancy type and specific design choices may allow for a large range of incremental first cost and payback. As with simply meeting the requirements of the Title 24 energy standards, a permit applicant complying with the energy requirements of a green building ordinance should carefully analyze building energy performance to reduce incremental first cost and the payback for the required additional energy efficiency measures.

