



**TOWN OF PORTOLA VALLEY
REGULAR PLANNING COMMISSION MEETING
Wednesday, June 1, 2016 – 7:00 p.m.
Council Chambers (Historic Schoolhouse)
765 Portola Road, Portola Valley, CA 94028**

7:00 PM – REGULAR AGENDA

1. Call to Order:
 2. Roll Call: Commissioners McKitterick, Targ, Von Feldt, Vice-Chair Gilbert, Chair Hasko
 3. Oral Communications:

Persons wishing to address the Commission on any subject, not on the agenda, may do so now. Please note, however, the Commission is not able to undertake extended discussion or action tonight on items not on the agenda.
 4. New Business:
 - a. Amendments to Title 15 (Buildings and Construction), Chapter 15.10 (Green Building) of the Portola Valley Municipal Code – Green Building Ordinance (Staff: B. de Garmeaux)
 5. Commission, Staff, Committee Reports and Recommendations:
 - a. Emergency Operations Center Back-Ups
 6. Approval of Minutes: [May 18, 2016](#)
 7. Adjournment:
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ASSISTANCE FOR PERSONS WITH DISABILITIES

In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the Assistant Planner at 650-851-1700 ext. 211. Notification 48 hours prior to the meeting will enable the Town to make reasonable arrangements to ensure accessibility to this meeting.

AVAILABILITY OF INFORMATION

Any writing or documents provided to a majority of the Town Council or Commissions regarding any item on this agenda will be made available for public inspection at Town Hall located 765 Portola Road, Portola Valley, CA during normal business hours.

Copies of all agenda reports and supporting data are available for viewing and inspection at Town Hall and at the Portola Valley branch of the San Mateo County Library located at Town Center.

PUBLIC HEARINGS

Public Hearings provide the general public and interested parties an opportunity to provide testimony on these items. If you challenge a proposed action(s) in court, you may be limited to raising only those issues you or someone else raised at the Public Hearing(s) described later in this agenda, or in written correspondence delivered to the Planning Commission at, or prior to, the Public Hearing(s).

This Notice is posted in compliance with the Government Code of the State of California.

Date: May 27, 2016

CheyAnne Brown
Planning Technician



MEMORANDUM

TOWN OF PORTOLA VALLEY

TO: Planning Commission

FROM: Brandi de Garneau, Sustainability & Special Projects Manager

DATE: June 1, 2016

RE: Proposed Revisions to the Green Building Ordinance

RECOMMENDATION

Staff recommends that the Planning Commission review the draft ordinance, make any modifications deemed necessary, and adopt the Resolution in Attachment 1 recommending that the Town Council adopt the Ordinance in Attachment 2 amending Chapter 15.10 (Green Building Ordinance) of the Portola Valley Municipal Code.

BACKGROUND

The Town of Portola Valley adopted a Green Building Ordinance in 2010 (Attachment 3), which required exceeding the 2010 California Energy Code by 15 percent. The State of California adopts new building standards every three years that are codified in Title 24 of the California Code of Regulations. The 2013 California Energy Code, which officially went into effect on July 1, 2014, contains mandatory energy efficiency measures that are more restrictive than the Town's current Ordinance. As a result of the higher levels of mandatory energy efficiency included in the new Energy Code, the Town's Ordinance became unenforceable. In addition to the Energy Code updates, the 2013 California Green Building Standards Code (CALGreen) also went into effect on January 1, 2014. CALGreen contains sustainable design requirements related to planning and design, energy efficiency, water efficiency and conservation, material construction and resource efficiency, and environmental quality.

Staff has reviewed the Town's existing Green Building Ordinance (Ordinance) and proposed amendments that would continue the Town's efforts in promoting sustainable building design, sustainable building construction, and resource conservation as well as begin preparing the Town to meet the State's goal of all new residential construction being net zero energy by 2020. The key revisions are outlined below and explained in further detail in the staff report to the ASCC (Attachment 4). Updating the Ordinance is a priority for the Town Council and they are looking to the Planning Commission to provide input and recommend any changes before staff brings it to them for final review.

COMMITTEE AND COMMISSION REVIEW

The Water Conservation Committee developed and reviewed the new water conservation requirements of the Ordinance through a sub-committee in the summer and fall of 2015. At their meeting on December 2, 2015, the Committee as a whole reviewed and approved the water conservation requirements.

On March 14, 2016, the ASCC voted 5-0 to recommend forwarding the updated Green Building Ordinance to the Planning Commission with the following suggested amendments:

- Offer an option to reduce the size of the solar zone if the project applicant can prove that less space is needed to cover the energy needs of the project.
- Explore increasing the size threshold of non-residential buildings for LEED certification requirements due to the cost of documentation and certification.

Staff has addressed these concerns in the revisions outlined below as well as in the attached, redlined Ordinance.

DISCUSSION

Key revisions to the Green Building Ordinance include the following:

For new, non-residential projects:

- **Removes LEED thresholds and adds third party verification of CALGreen mandatory requirements**
In response to the ASCC's comments, staff reviewed non-residential green building requirements in neighboring jurisdictions and concluded that in the absence of a cost-effectiveness study that compares the LEED energy efficiency requirements to the current Energy Code, the Town should defer to the CALGreen mandatory requirements for new, non-residential projects. However, to insure that the new buildings are constructed to the current building code requirements, staff recommends requiring third party verification.
- **Add an EV readiness requirement for new, non-residential**
Amends CALGreen to augment the electricity and conduit requirements to provide users greater flexibility with all electric vehicle types.

For new, single-family residential projects:

- **Modifies the point requirements to respond to the increased stringency of the Energy Code**
The stringency of the Energy Code, CALGreen and the new GreenPoint Rated checklist made the current point requirement of one additional point for every 30 square feet above the 3,000 square foot threshold difficult to achieve; however, adjusting the point requirements to one point for every 50 square feet over the 3,000 square foot threshold was found to be achievable for all of the projects that were reviewed.
- **Increase the "solar zone" size from 250 square feet to 500 square feet**
Amends the Energy Code to require a solar zone for all new single-family homes and increases the solar zone size from 250 square feet to 500 square feet in order to better accommodate larger solar system installations. In response to the ASCC's comments,

staff included a provision to allow the project applicant to request a reduced solar zone if they demonstrate how they will meet the entire energy needs of the project within the reduced space (because reducing the solar zone potentially reduced solar production depending on the efficiency of the panels).

- **Install solar “ready” infrastructure**
Requires providing conduit and plumbing to support the future installation of the solar systems.
- **Install electric vehicle “ready” infrastructure**
Amends CALGreen to augment the electricity and conduit requirements to provide users greater flexibility with all electric vehicle types.
- **Install graywater “ready” infrastructure**
Requires installing additional segregated plumbing piping to allow the discharge from all clothes washers and all applicable fixtures from bathrooms located above grade to be used for irrigation as well as identifying a location for discharge and supplying power to the identified location.
- **Install rainwater catchment systems for landscapes that use turf**
Requires installing a rainwater catchment system for new residential projects with landscapes that include the use of turf. The size of the system is based on the irrigation needs, which shall be calculated using a tool called the Applied Water for Turf Calculator.

NEXT STEPS

It is requested that the Planning Commission review and provide input on the proposed ordinance amendments. Staff will incorporate comments from the Planning Commission into the draft ordinance and forward it to the Town Council for adoption.

CEQA REVIEW

The Green Building Ordinance amendment is not subject to the California Environmental Quality Act pursuant to Section 15308 of the CEQA Guidelines because it is an action taken by a regulatory agency for the protection of the environment.

ATTACHMENTS

1. Resolution
2. Green Building Ordinance with proposed amendments redlined (ASCC amendments in green)
3. Original Green Building Ordinance adopted in 2010
4. Staff Report to the ASCC March 14, 2016
5. Build It Green’s GreenPoint Rated checklist for New Single-Family Homes Version 6.0.2
6. Cost Effectiveness Analysis Title 24 2013 Reach Code Single Family Residential
7. California Energy Code, Section 110.10 Mandatory Requirements for Solar Ready Buildings
8. California Green Building Standards Code, Section 4.106.4 Electric Vehicle Charging for New Construction
9. Applied Water for Turf Calculator Summary

Approved by: Debbie Pedro, Planning Director

RESOLUTION NO. 2016-

**RESOLUTION OF THE PLANNING COMMISSION OF THE TOWN OF PORTOLA VALLEY
RECOMMENDING APPROVAL OF AN ORDINANCE AMENDING CHAPTER 15.10 [GREEN
BUILDING] OF THE PORTOLA VALLEY MUNICIPAL CODE**

WHEREAS, on March 10, 2010, the Town Council of the Town of Portola Valley (“Town”) adopted its current Green Building Ordinance (Ordinance);

WHEREAS, the Sustainability Element of the General Plan includes provisions to encourage reducing greenhouse gas (GHG) emissions, conserving water and energy, encouraging green building, protecting the natural environment, and protecting the health of residents and visitors; and

WHEREAS, green building design, construction, restoration, operation and maintenance can have a significant positive effect on energy, water and resource conservation, waste management and pollution generation, and the health and productivity of a property’s residents, workers and visitors over the life of a building and/or site; and

WHEREAS, the State of California adopts new building standards every three years that are codified in Title 24 of the California Code of Regulations (Energy Code) and the California Green Building Standards Code (CALGreen); the 2013 Energy Code contains mandatory energy efficiency measures that are more restrictive than the Town’s current Ordinance rendering it unenforceable; and

WHEREAS, the 2013 CALGreen establishes mandatory minimum green building standards, and, that local government entities retain discretion, pursuant to Health and Safety Code Section 17958.5, to exceed the standards established by the code based on express findings relative to local climate, topographical or geological conditions.

WHEREAS, the proposed Ordinance amendments would continue the Town’s efforts in promoting green building design, construction, restoration, operation and maintenance as well as begin preparing the Town to meet the State’s goal of all new residential construction being net zero energy by 2020; and

WHEREAS, the Planning Commission held a duly noticed hearing on June 1, 2016 regarding the proposed ordinance amendments; and

WHEREAS, the proposed ordinance is exempt from the California Environmental Quality Act (CEQA) pursuant to Section 15308 of the CEQA Guidelines because it is an action taken by a regulatory agency for the protection of the environment.

NOW, THEREFORE, be it resolved that the Planning Commission of the Town of Portola Valley does hereby recommend that the Town Council approve the proposed ordinance amendments as set forth in Exhibit A.

PASSED AND ADOPTED at the regular meeting of the Planning Commission of the Town of Portola Valley on June 1, 2016.

Ayes:
Noes:
Absent:
Abstain:

By: _____
Judith Hasko, Chairperson

ATTEST: _____
Debbie Pedro, Planning Director

CHAPTER 15.10 - GREEN BUILDING

Sections:

- 15.10.010 Purpose
- 15.10.020 Applicability
- 15.10.030 Definitions
- 15.10.040 Standards for Compliance
- ~~15.10.050 Incentives for Compliance~~
- 15.10.060 Administrative Procedures and Implementing Regulations
- 15.10.070 Hardship or Infeasibility Exemption
- 15.10.080 Appeal
- ~~15.10.100 Environmental Review~~
- ~~15.10.110 Effective Date, Posting~~

15.10.010 - Purpose.

The purpose of this chapter is to enhance the public health and welfare by promoting the environmental health of the town through the incorporation of green building practices in the design, construction, maintenance, operation and deconstruction of buildings and other site development. The green building provisions in this chapter are designed to achieve the following goals:

- (a) Encourage the conservation of natural resources and reduction of greenhouse gas emissions;
- (b) Increase energy efficiency and lower energy usage;
- (c) Increase water efficiency and lower water usage;
- (ed) Reduce waste generated by construction projects;
- (de) Provide durable buildings that are efficient and economical to own and operate;
- (ef) Recognize and conserve the energy embodied in existing buildings; and
- (fg) Promote the health of residents, workers, and visitors to the town.

15.10.020 - Applicability.

This chapter applies to all projects defined as "covered projects," as defined in Section 15.10.030, except that it shall not apply to any project for which a planning entitlement application (except ~~for a~~ preliminary architectural review applications) or building permit application has been submitted prior to the effective date of this chapter.

15.10.030 - Definitions.

~~For purposes of this chapter, the following terms are defined as follows. The following terms shall have the ascribed definition for the purposes of applying the criteria of this chapter:~~

- (a) "Addition" means new construction square footage added to an existing structure.
- (b) "Applicant" means anyone that applies to the town for the applicable permits or approvals to undertake any covered project within the town, or any subsequent owner of the site.
- (c) "Applied Water for Turf Calculator" is a tool that uses data and methodology from the California Department of Water Resources to estimate the irrigation water requirements for turf minus any water supplied by effective rainfall and effective ground water seepage. The calculator uses the evapotranspiration of applied water (ETaw) for cool-season and warm-season turf that was calculated based on a six-year period of climate data specific to a 4x4 km grid spacing within the town.
- (d) "Build It Green" is a non-profit membership organization whose mission is to promote healthy, energy- and resource-efficient building practices in California. Build It Green created Green Building Guidelines that are a comprehensive resource of best practices for green building. The Build It Green Checklists are tools used to assess how environmentally friendly a proposed building project will be via the use of a point system.
- () "CALGreen" is the California Green Building Standards Code.
- (e) ~~"Compliance official" means the town planner or his/her designee.~~
- (de) "Compliance threshold" means the minimum number of points or rating level of a green building rating system that must be attained for a particular covered project, as outlined in the standards for compliance in Section 15.10.040.
- (ef) "Covered project" means any planning entitlement application(s) or building permit application(s) for ~~new~~ commercial ~~new~~ construction or ~~renovations~~ remodel, or for any ~~new~~ residential ~~new~~ construction or ~~renovation~~ remodel subject to the standards for compliance outlined in Section 15.10.040.
- (g) "Elements" means a project where a portion of the home is undergoing a remodel or addition (e.g., a kitchen remodel or master bedroom addition).

- (fh) "Good faith effort" means a project that has not met the required compliance threshold, but for extenuating reasons or reasons beyond the control of the applicant, the ~~compliance official~~ planning director or his/her designee has found in his/her sole discretion that the project meets the good faith effort provisions of Section 15.10.060.
- (i) "Graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers.
- (gj) "Green building" means a whole systems approach to the design, construction and operation of buildings that substantially mitigates the environmental, economic, and social impacts of buildings. Green building practices recognize the relationship between the natural and built environments and seek to minimize the use of energy, water and other natural resources and provide a healthy, productive indoor environment.
- (hk) "Green building project checklist" means a checklist or scorecard developed for the purpose of calculating a green building rating.
- (hl) "Green building rating system" means the rating system associated with specific green building criteria and used to determine compliance thresholds, as outlined in the standards ~~of for~~ compliance in Section 15.10.040 ~~adopted by town council resolution~~. Examples of rating systems include, but are not limited to, the LEED and GreenPoint Rated systems.
- (jm) "GreenPoint Rated" means a residential green building rating system developed by the "Build It Green" organization.
- (kn) "GreenPoint Rated verification" means verification of compliance by a certified GreenPoint Rater, resulting in green building certification by Build It Green.
- (lo) "LEED®" means the "Leadership in Energy and Environmental Design" green building rating system developed by the U.S. Green Building Council.
- (mp) "LEED®/USGBC verification" means verification to meet the standards of the U.S. Green Building Council ("USGBC") and resulting in LEED certification of the project by the USGBC.
- (nq) "Multi-family residential" means a building containing three or more attached dwelling units.
- ~~(o) "New building" means a new structure or a substantial addition/remodel to an existing structure where the remodel combined with any additions to the structure affects fifty percent or more of the exterior wall plane surface or affects fifty percent or more of the floor area as more particularly defined in section 15.04.010 of this Code.~~
- (pr) "New commercial construction, ~~commercial~~" means the construction of a new or replacement retail, office, institutional, semi-institutional or similar building(s), or additions to such building(s).

- (qs) "New residential construction, ~~residential~~" means the construction of a new or replacement single-family or two-family dwelling unit or of new or replacement multi-family residential building(s), or additions to such building(s).
- (rt) "Qualified green building professional" means a person trained through the USGBC as a LEED-accredited professional or through "Build It Green" as a certified green building professional, or similar qualifications if acceptable to the ~~compliance official~~ ~~planning director or his/her designee~~. For projects requiring "self-verification," the project architect or designer is considered a qualified green building professional.
- (u) "Rainwater catchment system" means the collected precipitation from rooftops and other above-ground impervious surfaces that is stored in catchment tanks for later use.
- (sv) "~~Renovation~~Remodel" means any rehabilitation, repair, ~~remodeling~~renovation, change, or modification to an existing building, where changes to floor area and the footprint of the building are negligible. ~~The valuation of renovation improvements shall be determined by the town planner, upon recommendation of the chief building official. The chief building official may exclude from such valuation the cost of (1) seismic upgrades, (2) accessibility upgrades, or (3) photovoltaic panels or other solar energy or similar devices exterior to the building. Renovation valuation thresholds identified in the standards for compliance shall be adjusted annually to reflect changes in the town's valuation per square foot for new construction in town, using valuations in effect as of July 1, 2008, as the base index.~~
- (tw) "Self verification" means verification by the project architect, designer or a qualified green building professional certifying that the project has met the standards and has attained the compliance threshold as indicated for the covered project type as set forth in the standards for compliance outlined in Section 15.10.040.
- (ux) "Single-family or two-family residential" means a single detached dwelling unit or two units in a single building or two separate buildings on a single parcel, such as a main residence and second unit.
- (y) "Solar zone" means an allocated space that is unshaded, un-penetrated, and free of obstructions. It serves as a suitable place that solar panels can be installed at a future date.
- (vz) "Square footage" means all new and replacement square footage, including basement areas (seven feet or greater in height) and garages, except that unconditioned garage space shall only count as fifty percent of that square footage. Areas demolished shall not be deducted from the total new construction square footage.
- (waa) "Threshold verification by LEED AP" means verification by a LEED-accredited professional certifying that each LEED checklist point listed was verified to meet the requirements to achieve that point. The LEED AP shall provide supporting information from qualified professionals (e.g., civil engineer, electrical engineer, Title 24 consultant, commissioning agent, etc.) to certify compliance with each point on the checklist. ~~Documentation of construction consistent with building plans calculated to achieve energy compliance is sufficient verification in lieu of post construction commissioning.~~

- (bb) “Turf” means a ground cover surface of mowed grass. All of the following qualify as turf: annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and tall fescue (cool-season grasses). Bermuda grass, Kikuyu grass, Seashore Paspalum, St. Augustine grass, Zoysia grass, and Buffalo (warm-season grasses).
- (cc) “Whole House” project means the homeowner is completing a gut remodel and replacing all of the systems. A gut remodel incorporates stripping less than 90% of the walls to the studs (leaving the foundation framing and exterior finish), which enables one to replace all systems and address the thermal envelope and insulate. If a home has removed significant framing and the exterior cladding, leaving very little of the original home, it shall apply under the new residential construction.

15.10.040 - Standards for Compliance.

~~The Town Council shall establish by resolution, and shall periodically review and update as necessary, green building standards for compliance. The standards for compliance shall include, but are not limited to, the following:~~

- ~~(a) The types of projects subject to regulation (covered projects);~~
- ~~(b) The green building rating system to be applied to the various types of projects;~~
- ~~(c) Minimum thresholds of compliance for various types of projects; and~~
- ~~(d) Timing and methods of verification of compliance with these regulations.~~

The standards for compliance are as follows:

1. New Residential Construction. New homes shall demonstrate GreenPoint Rated certification using certified professional raters. ~~The number of Build It Green points required pursuant to this section shall be calculated in accordance with the GreenPoint Rated Single Family Checklist, with the exception that if California Building Code Title 24, Part 6 is updated after the effective date of this chapter to be more stringent, item J.5. in the GreenPoint Rated Single Family Checklist shall not be included in calculating the number of points required until such time as the appropriate cost effectiveness study has been completed.~~
 - A. For projects up to and including 3,000 sf. A minimum threshold of 75 Build It Green points, with GreenPoint Rated certification prior to building permit sign-off/occupancy.
 - B. For projects over 3,000 sf. A minimum threshold of 75 Build It Green points with one additional point for each ~~30-sf~~ 50 sf over 3,000 sf, and with GreenPoint Rated certification prior to building permit sign-off/occupancy.
 - C. Basement floor area. Basement floor area must be included in the total floor area

for point calculations.

~~D. LEED option. At the option of an applicant, the LEED for homes program may be used with a minimum threshold of silver LEED certification. Because LEED certification typically takes more time than is associated with BIG certification, the planning manager or his/her designee may as appropriate and in his/her sole discretion allow for some interim certification for occupancy prior to formal completion of the LEED process.~~

D. Solar Photovoltaic and Solar Thermal “Ready” Infrastructure. “Section 110.10 Mandatory Requirements for Solar Ready Buildings” of the California Energy Code is added as mandatory and amended to read:

- (1) Solar zone. The solar zone shall be located on the roof or overhang of the building and have a total area of no less than 500 square feet. If the project applicant determines that the entire energy needs of the project can be met with a solar photovoltaic system that occupies less than 500 square feet, the project applicant can demonstrate this with the Title 24 Calculation and solar photovoltaic system plans.
- (2) Interconnection pathways. New residential construction projects shall provide conduit and plumbing to support the installation of future solar photovoltaic and solar thermal infrastructure. The pathway for conduit and plumbing shall be routed from the attic space (or equivalent) to the point of interconnection with the electrical service panel and the water-heating system.

E. Electric Vehicle “Ready” Infrastructure. “Section 4.106.4.1 Electric vehicle (EV) charging for new construction” of the California Green Building Standards Code is added as mandatory and amended with the additional requirements as outlined below.

- (1) Service panel and/or subpanel shall provide, at minimum, capacity to install a 208/240v, 50 amperes grounded AC outlet and dedicated branch circuit.
- (2) Raceway or wiring with capacity to accommodate a 100 ampere circuit; terminating in a listed cabinet box, enclosure, or NEMA receptacle.
- (3) The raceway shall be installed so that minimal removal of materials is necessary to complete the final installation.

F. Graywater “Ready” Infrastructure. Install graywater “ready” systems as outlined below. Additional plumbing piping is installed to permit the discharge from all clothes washers and all applicable fixtures from bathrooms located above grade to allow for future installation of a distributed irrigation system. All graywater “ready” systems must be installed in compliance with Chapter 16 of the California Plumbing Code.

- (1) Identify an appropriate location for future installation of a graywater treatment system, including storage tanks.
- (2) Include either a separate multiple pipe outlet or a diverter valve and an outside “stub-out” installation on clothes washing machine hook-ups, to allow separate discharge of graywater direct for irrigation.
- (3) Include a building drain(s) for lavatories, showers, and bathtubs, segregated from drains for all other plumbing fixtures, connected to the black water pipe a minimum of three (3) feet from the building foundation.
- (4) Provide power supply for future graywater treatment system.
- (5) The graywater system shall be comprised of purple piping. The diverter valve on the clothes washing machine system shall be labeled as “LAUNDRY-TO-LANDSCAPE CAPABLE.”

G. Reduction of Potable Water Use on Turf. For all projects with landscapes that include the use of turf, install rainwater catchment system. Irrigation needs of turf should be calculated using the Applied Water for Turf Calculator. All rainwater catchment systems must be installed in compliance with Chapter 17 of the California Plumbing Code.

- (1) Rainwater Catchment System Size. The rainwater catchment system size shall be determined by using the Applied Water for Turf Calculator. The rainwater catchment system will need to be sized in order to satisfy 50 percent of the estimated annual water demands for the first 500 square feet of turf installed on the project. The rainwater catchment system will need to be sized in order to satisfy 100 percent of the estimated annual water demands for installed turf that is greater than 500 square feet.
- (2) Alternative. A fully installed graywater system connected to an irrigation system that can satisfy all of the annual water demands of turf as identified in the Applied Water for Turf Calculator can be used as an alternative to installing a rainwater catchment system.

2. Substantial Residential construction additions and/or rebuilding remodel projects 400 square feet or greater. The number of Build It Green points required pursuant to this section shall be calculated in accordance with the GreenPoint Rated Existing Home Single Family Checklist. ~~For such projects make use of the BIG GreenPoint rated program for existing homes, with the threshold being the BIG minimum for a "whole house" project of 50 points and 25 points for a smaller "elements" project, both as defined by BIG. For a "whole house project" GreenPoint rated certification using certified professional raters shall be required and for an elements project, self-certification is allowed. In all cases, new basement area would be counted as provided for above for "new construction" projects.~~

A. For whole house projects. A minimum threshold of 50 Build It Green points,

with GreenPoint Rated certification prior to building permit sign-off/occupancy.

B. For elements projects. A minimum threshold of 25 Build It Green points, with self-certification allowed.

C. Basement floor area. Basement floor area must be included in the total floor area for point calculations.

3. Small residential additions or remodels. For ~~such~~ small residential addition or remodel projects, which are projects less than 400 square feet, completion of the **BIG Build It Green** existing home checklist shall be required as a working/learning document, but no minimum points are required and self-certification is permitted. ~~This would be for projects less than 400 sf in area, i.e. below the threshold for Architectural and Site Control Commission review.~~

4. Institutional and Non-residential projects. New, non-residential projects shall comply with all mandatory CALGreen measures. The mandatory measures shall be verified by a third party approved by the Town for which the applicant will pay for the review. ~~The threshold for institutional and non-residential projects shall be the appropriate LEED program and formal LEED certification. The minimum LEED levels shall be as follows:~~

~~A. For projects less than 2,000 sf the appropriate LEED or BIG checklist should be used and the points proposed verified through the self-certification process.~~

~~B. For new buildings between 2,000 sf and 3,000 sf LEED certification with no minimum level.~~

~~C. For new buildings between 3,000 and 5,000 sf, LEED silver certification.~~

~~D. For new buildings over 5,000 sf LEED gold certification.~~

A. Electric Vehicle “Ready” Infrastructure. “Section 5.106.5.3 Electric vehicle (EV) charging for new construction” of the California Green Building Standards Code is added as mandatory and amended with the additional requirements as outlined below.

- (1) Service panel and/or subpanel shall provide, at minimum, capacity to install a 208/240v, 50 amperes grounded AC outlet and dedicated branch circuit.
- (2) Raceway or wiring with capacity to accommodate a 100 ampere circuit; terminating in a listed cabinet box, enclosure, or NEMA receptacle.
- (3) The raceway shall be installed so that minimal removal of materials is necessary to complete the final installation.

~~15.10.050—Incentives for Compliance.~~

- ~~(a) In addition to the required standards for compliance, the town council may, through ordinance or resolution, enact financial, permit review process, or zoning incentives and/or award or recognition programs to further encourage higher levels of green building compliance for a project.~~
- ~~(b) For residential projects, the number of GreenPoint checklist points required shall be reduced by:~~
- ~~(1) Five points for maintaining a minimum of seventy five percent of existing walls, floors, and roof of a structure;~~
 - ~~(2) Five points (in addition to [subsection] (1) above) for maintaining a minimum of ninety five percent of existing walls, floors, and roof of a structure; and/or~~
 - ~~(3) Ten points (in addition to [subsections(s)] (1) and/or (2) above) when applied to a structure that is designated on the town's historic inventory or any contributing structure located within a designated historic district, subject to determination by the architectural and site control commission that such additions and/or renovations are consistent with the Secretary of the Interior's standards for rehabilitation.~~

15.10.060 - Administrative Procedures and Implementing Regulations.

- (a) The ~~town planner~~ **planning director** shall promulgate any rules and regulations necessary or appropriate to achieve compliance with the requirements of this chapter. The rules and regulations shall provide, at a minimum, for the incorporation of green building requirements of this chapter into checklist submittals with planning entitlement and building permit applications, and supporting design, construction, or development documents to demonstrate compliance with this chapter.
- (b) The procedures for compliance documentation shall include, but not be limited to, the following:
- (1) Preliminary documentation. Applicants for a covered project are encouraged, but not required, to meet with the ~~compliance official~~ **planning director** or his/her ~~designated staff~~ **designee**, in advance of submittal of an application, to determine required green building thresholds for compliance and to review the proposed green building program and details to achieve compliance.
 - (2) Discretionary planning entitlements. Upon submittal of an application for any discretionary planning entitlement for any covered project, including, but not limited to, architectural review, site development permit, conditional use permit, or variance requests, application materials shall include the appropriate completed checklists, as required by the standards for compliance specified in Section 15.10.040, accompanied by a text description of the proposed green building program and expected measures and milestones for compliance. ~~The compliance official may allow the use of alternative~~

~~checklists for historic buildings or for buildings that retain or re-use substantial portions of the existing structure.~~

- (3) Building plan check review. Upon submittal of an application for a building permit, building plans for any covered project shall include a checklist and green building program description, reflecting any changes proposed since the planning entitlement phase (if a planning entitlement was required). The checklist shall be incorporated onto a separate plan sheet included with the building plans. A qualified green building professional shall provide evidence of adequate green building compliance or documentation to the ~~compliance official~~ **planning director or his/her designee** to satisfy the requirements of the standards for compliance outlined in Section 15.10.040, prior to issuance of a building permit.
- (4) Final building inspection, verification, and occupancy. Prior to final building inspection and occupancy for any covered project, a qualified building professional shall provide evidence of adequate green building compliance or documentation to the ~~compliance official~~ **planning director or his/her designee** to satisfy the requirements of the standards for compliance outlined in Section 15.10.040. This information shall include, but is not limited to:
 - (i) Documentation that verifies incorporation of the design and construction related credits specified in the project approval for the covered project;
 - (ii) A letter from the qualified green building professional that certifies that the covered project has been constructed in accordance with the approved green building project checklist;
 - (iii) Any additional documentation that would be required ~~by the LEED reference guide for LEED certification (if required), or~~ by the GreenPoint rated manuals for GreenPoint rated certification (if required); and
 - (iv) Any additional information that the applicant believes is relevant to determining that a good faith effort has been made to comply with this chapter.
- (5) Final determination of compliance and good faith effort to comply. Prior to the scheduling of a final building inspection for a covered project, the ~~compliance official~~ **planning director or his/her designee** shall review the documentation submitted by the applicant, and determine whether the applicant has achieved the required compliance threshold as set forth in the standards for compliance outlined in Section 15.10.040 and/or demonstrate that measures are in place to assure compliance not later than one year after approval of final building inspection. If the ~~compliance official~~ **planning director or his/her designee** determines that the applicant has met the requirements of Section 15.10.040 for the project, the final building inspection may proceed, provided the covered project has received approval of all other inspections required by the chief building official. If the ~~compliance official~~ **planning director or his/her designee** determines that the required green building rating has not been achieved, the ~~compliance official~~ **planning director or his/her designee** shall find one of the following:
 - (i) Good faith effort to comply: When an applicant submits a request in writing to the ~~compliance official~~ **planning director or his/her designee** for approval of a good faith effort to comply, the ~~compliance official~~ **planning director or his/her designee**

shall determine **in his/her sole discretion** that the applicant has made a good faith effort to comply with this chapter when finding that either a) the cost for providing green building documentation or assuring compliance is disproportionate to the overall cost of the project, or b) the green building materials and technologies on the green building checklist are no longer available or not yet commercially available, or c) at least eighty percent of the required green point credits have been achieved, and measures are in place to assure full compliance not later than one year after approval of the final building inspection. Determination of a good faith effort to comply shall be made separately for each item on the green building project checklist. Granting of a good faith effort to comply for one item does not preclude the need for the applicant to comply with the other items on the green building checklist.

- (ii) Non-compliant project. If the ~~compliance official~~ **planning director or his/her designee** determines that the applicant has not made a good faith effort to comply with this chapter, or if the applicant fails to submit the documentation required within the required time period, then the project shall be determined to be non-compliant, and the final inspection and approval for the project shall be withheld. A final inspection shall not take place until the applicant has implemented equivalent alternate measures approved by the ~~compliance official~~ **planning director or his/her designee** ~~or unless an exemption is granted for the project.~~

~~(6) Post final inspection requirement. Not later than one year after approval of the final building inspection, the applicant or current owner shall submit to the compliance official documentation detailing compliance with the operation, efficiency, and conservation related credits from the approved checklist documentation for any covered project, if required by the compliance official. The applicant may also provide any additional information the applicant believes is relevant to determining its good faith efforts to comply with this chapter.~~

~~(7) Non-compliance. If, as a result of any upon inspection, the town building official or compliance officer~~ **planning director** determines that the covered project does not ~~or is unlikely to~~ comply with the approved plans or green building checklist, a stop order shall be issued if the ~~compliance official~~ **planning director or his/her designee** determines that continuation of construction activities will jeopardize the project's ability to meet the required compliance threshold. The stop order shall remain in effect until ~~the compliance official determines that the project will be~~ **has been** brought into compliance with the approved plans and/or checklist.

~~(8) Interim compliance effort. For residential projects initiating construction not later than two years after the effective date of this chapter, a good faith effort shall be deemed to have been made when at least seventy five percent of the required minimum green points have been achieved prior to final building inspection, and adequate remaining checklist points are outlined to demonstrate that at least ninety percent of the minimum points and GreenPoint certification will be achieved not later than one year after final inspection. For purposes of this subsection "initiating construction" shall mean the date when a building permit is issued. If seventy five percent of the required minimum green points are not achieved prior to the request for final building inspection, the final~~

~~inspection shall be withheld unless an exemption is granted by the compliance official. Residential projects initiating construction more than two years after the effective date of this chapter shall comply in full with the requirements of this chapter.~~

~~(98) Lack of inspectors. If the compliance official determines that there is a lack of third-party or town inspectors available to perform green building inspections within a timely manner, the compliance official may allow self-verification of the project and determine that green building requirements have been met.~~

(c) The ~~compliance official~~ planning director or his/her designee shall have the responsibility to administer and monitor compliance with the green building requirements set forth in this chapter and with any rules and regulations promulgated ~~thereunder, and to grant exemptions from the requirements, where so authorized.~~

(d) Compliance with the provisions of this chapter shall be listed as a condition of approval on any architectural and site control review or other discretionary permit approval, and on the building plans for building permit approval, for any covered project.

15.10.070 - Hardship or Infeasibility Exemption.

~~(a) Exemption.~~ If an applicant for a covered project believes that circumstances exist that make it a hardship or infeasible to meet the requirements of this chapter, the applicant may request an exemption as set forth below. In applying for an exemption, the burden is on the applicant to show hardship or infeasibility.

~~(ba) Application. Any request If an applicant for a covered project believes such circumstances exist, the applicant may apply~~ for an exemption ~~must be included~~ at the time of application submittal. The applicant shall indicate the maximum threshold of compliance he or she believes is feasible for the covered project and the circumstances that he or she believes create a hardship or make it infeasible to fully comply with this chapter. Circumstances that constitute hardship or infeasibility include, but are not limited to, the following:

- (1) There is conflict with the compatibility of the green building rating system with other town goals, such as those requiring historic preservation;
- (2) There is conflict with the compatibility of the green building rating system and the California Building Standards Code;
- (3) There is conflict with the compatibility of the green building rating system and the town's zoning ordinance and/or architectural review criteria;
- (4) The green building compliance standards do not include enough green building measures that are compatible with the scope of the covered project; and/or
- (5) There is a lack of commercially available green building materials and technologies to comply with the green building rating system.

~~(eb) Review by Architectural and Site Control Commission (ASCC).~~ For any covered project for which an exemption is requested and architectural and site control review is required ~~by the~~

~~ASCC~~, the ~~ASCC~~—Architectural and Site Control Commission shall provide a recommendation to the ~~compliance official~~ planning director or his/her designee regarding whether the exemption shall be granted, conditionally granted or denied, along with its recommendation on the project. For any project for which an exemption is requested based on the historic character of the building or site, the town historian shall provide a recommendation to the ~~compliance official~~ planning director or his/her designee regarding whether the exemption shall be granted or denied and shall determine whether the project is consistent with the Secretary of the Interior's Standards for Historic Rehabilitation.

~~(dc) Granting of exemption~~ Decision by Planning Director (or his/her designee). The ~~If the compliance official~~ planning director or his/her designee shall make a determination ~~determines that it is a hardship or is infeasible for the applicant to fully meet the requirements of this chapter~~ based on the information provided. The ~~compliance official~~ planning director or his/her designee shall determine the maximum feasible threshold of compliance reasonably achievable for the project. The decision of the ~~compliance official~~ planning director or his/her designee shall be provided to the applicant in writing.

(1) If the ~~compliance official~~ planning director or his/her designee determines that it is a hardship or is infeasible for the applicant to meet the requirements of this chapter, the request shall be ~~an exemption is~~ granted. Notwithstanding, the applicant shall be required to comply with this chapter in all other respects and shall be required to achieve, in accordance with this chapter, the threshold of compliance determined to be achievable by ~~compliance official~~ planning director or his/her designee.

~~(e2) Denial of Exemption.~~ If the ~~compliance official~~ planning director or his/her designee determines that it is reasonably possible for the applicant to fully meet the requirements of this chapter, the request shall be denied ~~and the compliance official shall so notify the applicant in writing.~~ The project and compliance documentation shall be modified to comply with this chapter prior to further review of any pending planning or building application.

~~(f) Council Review of Exemption.~~ For any covered project that requires review and action by the town council, the council shall act to grant or deny the exemption, based on the criteria outlined above, after recommendation by the manager.

15.10.080 - Appeal.

(a) Any aggrieved applicant may appeal the determination of the ~~compliance official~~ planning director or his/her designee regarding: (1) the granting or denial of an exemption pursuant to Section 15.10.070; or (2) compliance with any other provision of this chapter.

(b) Any appeal must be filed in writing with the ~~planning manager~~ planning director or his/her designee not later than fourteen days after the date of the determination by the ~~compliance official~~ planning director or his/her designee. The appeal shall state the alleged error or reason for the appeal.

(c) The appeal shall be processed and considered by the ~~planning commission town council~~ de novo in accordance with the criteria outlined in this chapter.

~~3. Environmental Review. This ordinance is exempt from the provisions of the California Environmental Quality Act pursuant to Section 15309 because it is an action taken by a regulatory agency for the protection of the environment.~~

~~4. Effective Date; Posting. This ordinance shall become effective thirty (30) days after the date of its adoption and shall be posted within the Town of Portola Valley in three (3) public places.~~

demonstrated that exceeding State Building Energy Efficiency Standards as mandated by GreenPoint Rated checklist is achievable in a cost effective manner.

K. On March 10, 2010, at a publicly noticed meeting, the Town Council accepted the recommendations of the Planning Commission and Architectural and Site Control Commission subgroup for implementation of local Green Building Regulations as set forth in the March 4, 2010 report from the Deputy Town Planner.

L. On May 12, 2010, the Town Council held a duly noticed public hearing and heard testimony regarding the proposed Green Building Ordinance.

M. Because the design, restoration, construction and maintenance of buildings and structures within the Town can have a significant impact on the Town's environment, greenhouse gas emissions, resource usage, energy efficiency, waste management, and health and productivity of residents, workers, and visitors over the life of the building, requiring commercial, institutional and residential projects to incorporate green building measures is necessary and appropriate to achieve the public health and welfare benefits of green building.

2. Addition of Code. Chapter 15.10 [Green Building] is hereby added to Title 15 [Buildings and Construction] of the Portola Valley Municipal Code to read as follows:

**CHAPTER 15.10
GREEN BUILDING**

- 15.10.010 Purpose**
- 15.10.020 Applicability**
- 15.10.030 Definitions**
- 15.10.040 Standards for Compliance**
- 15.10.050 Incentives for Compliance**
- 15.10.060 Administrative Procedures and Implementing Regulations**
- 15.10.070 Hardship or Infeasibility Exemption**
- 15.10.080 Appeal**

15.10.010 Purpose.

The purpose of this chapter is to enhance the public health and welfare by promoting the environmental health of the town through the incorporation of green building practices in the design, construction, maintenance, operation and deconstruction of buildings and other site development. The green building provisions in this chapter are designed to achieve the following goals:

- (a) Encourage the conservation of natural resources and reduction of greenhouse gas emissions;
- (b) Increase energy efficiency and lower energy usage;
- (c) Reduce waste generated by construction projects;
- (d) Provide durable buildings that are efficient and economical to own and operate;
- (e) Recognize and conserve the energy embodied in existing buildings; and
- (e) Promote the health of residents, workers, and visitors to the town.

15.10.020 Applicability

This chapter applies to all projects defined as "covered projects," as defined in Section 15.10.030, except that it shall not apply to any project for which a planning entitlement application (except for a preliminary architectural review application) or building permit application has been submitted prior to the effective date of this chapter.

15.10.030 Definitions

The following terms shall have the ascribed definition for the purposes of applying the criteria of this chapter.

- (a) "Addition" means new construction square footage added to an existing structure.
- (b) "Applicant" means anyone that applies to the town for the applicable permits or approvals to undertake any covered project within the town, or any subsequent owner of the site.
- (c) "Compliance official" means the town planner or his/her designee.
- (d) "Compliance threshold" means the minimum number of points or rating level of a green building rating system that must be attained for a particular covered project, as outlined in the standards for compliance in Section 15.10.040.
- (e) "Covered project" means any planning entitlement application(s) or building permit application(s) for commercial new construction or renovations, or for any residential new construction or renovation subject to the standards for compliance outlined in Section 15.10.040.
- (f) "Good faith effort" means a project that has not met the required compliance threshold, but for extenuating reasons or reasons beyond the control of the applicant, the compliance official has found the project meets the good faith effort provisions of Section 15.10.060.

- (g) "Green building" means a whole systems approach to the design, construction and operation of buildings that substantially mitigates the environmental, economic, and social impacts of buildings. Green building practices recognize the relationship between the natural and built environments and seek to minimize the use of energy, water and other natural resources and provide a healthy, productive indoor environment.
- (h) "Green building project checklist" means a checklist or scorecard developed for the purpose of calculating a green building rating.
- (i) "Green building rating system" means the rating system associated with specific green building criteria and used to determine compliance thresholds, as outlined in the standards of compliance adopted by town council resolution. Examples of rating systems include, but are not limited to, the LEED and GreenPoint Rated systems.
- (j) "GreenPoint Rated" means a residential green building rating system developed by the Build It Green organization.
- (k) "GreenPoint Rated Verification" means verification of compliance by a certified GreenPoint Rater, resulting in green building certification by Build It Green.
- (l) "LEED®" means the "Leadership in Energy and Environmental Design" green building rating system developed by the U.S. Green Building Council.
- (m) "LEED®/USGBC Verification" means verification to meet the standards of the U.S. Green Building Council ("USGBC") and resulting in LEED certification of the project by the USGBC.
- (n) "Multi-family residential" means a building containing three or more attached dwelling units.
- (o) "New building" means a new structure or a substantial addition/remodel to an existing structure where the remodel combined with any additions to the structure affects 50% or more of the exterior wall plane surface or affects 50% or more of the floor area as more particularly defined in section 15.04.010 of this code.
- (p) "New construction, commercial" means the construction of a new or replacement retail, office, institutional, semi-institutional or similar building(s), or additions to such building(s).
- (q) "New construction, residential" means the construction of a new or replacement single-family or two-family dwelling unit or of new or replacement multi-family residential building(s), or additions to such building(s).
- (r) "Qualified green building professional" means a person trained through the USGBC as a LEED accredited professional or through Build It Green as a certified green

building professional, or similar qualifications if acceptable to the compliance official. For projects requiring "self-verification," the project architect or designer is considered a qualified green building professional.

(s) "Renovation" means any rehabilitation, repair, remodeling, change, or modification to an existing building, where changes to floor area and the footprint of the building are negligible. The valuation of renovation improvements shall be determined by the town planner, upon recommendation of the chief building official. The chief building official may exclude from such valuation the cost of (a) seismic upgrades, (b) accessibility upgrades, or (c) photovoltaic panels or other solar energy or similar devices exterior to the building. Renovation valuation thresholds identified in the standards for compliance shall be adjusted annually to reflect changes in the town's valuation per square foot for new construction in town, using valuations in effect as of July 1, 2008, as the base index.

(t) "Self verification" means verification by the project architect, designer or a qualified green building professional certifying that the project has met the standards and has attained the compliance threshold as indicated for the covered project type as set forth in the standards for compliance outlined in Section 15.10.040.

(u) "Single-family or two-family residential" means a single detached dwelling unit or two units in a single building or two separate buildings on a single parcel, such as a main residence and second unit.

(v) "Square footage" means all new and replacement square footage, including basement areas (seven feet or greater in height) and garages, except that unconditioned garage space shall only count as 50% of that square footage. Areas demolished shall not be deducted from the total new construction square footage.

(w) "Threshold verification by LEED AP" means verification by a LEED accredited professional certifying that each LEED checklist point listed was verified to meet the requirements to achieve that point. The LEED AP shall provide supporting information from qualified professionals (e.g. civil engineer, electrical engineer, Title 24 consultant, commissioning agent, etc.) to certify compliance with each point on the checklist. Documentation of construction consistent with building plans calculated to achieve energy compliance is sufficient verification in lieu of post-construction commissioning.

15.10.040 Standards for Compliance.

The town council shall establish by resolution, and shall periodically review and update as necessary, green building standards for compliance. The standards for compliance shall include, but are not limited to, the following:

- (a) The types of projects subject to regulation (covered projects);
- (b) The green building rating system to be applied to the various types of projects;
- (c) Minimum thresholds of compliance for various types of projects; and
- (d) Timing and methods of verification of compliance with these regulations.

The standards for compliance shall be approved after recommendation from the town planner, who shall refer the standards for recommendation by the architectural and site control commission, prior to council action.

15.10.050 Incentives for Compliance.

(a) In addition to the required standards for compliance, the town council may, through ordinance or resolution, enact financial, permit review process, or zoning incentives and/or award or recognition programs to further encourage higher levels of green building compliance for a project.

(b) For residential projects, the number of GreenPoint checklist points required shall be reduced by:

(1) Five points for maintaining a minimum of 75% of existing walls, floors, and roof of a structure;

(2) Five points (in addition to (1) above) for maintaining a minimum of 95% of existing walls, floors, and roof of a structure; and/or

(3) Ten points (in addition to (1) and/or (2) above) when applied to a structure that is designated on the town's historic inventory or any contributing structure located within a designated historic district, subject to determination by the architectural and site control commission that such additions and/or renovations are consistent with the Secretary of the Interior's Standards for Rehabilitation.

15.10.060 Administrative Procedures and Implementing Regulations.

(a) The town planner shall promulgate any rules and regulations necessary or appropriate to achieve compliance with the requirements of this chapter. The rules and regulations shall provide, at a minimum, for the incorporation of green building requirements of this chapter into checklist submittals with planning entitlement and building permit applications, and supporting design, construction, or development documents to demonstrate compliance with this chapter.

(b) The procedures for compliance documentation shall include, but not be limited to, the following:

(1) Preliminary documentation. Applicants for a covered project are encouraged, but not required, to meet with the compliance official or his/her designated staff, in advance of submittal of an application, to determine required green building thresholds for compliance and to review the proposed green building program and details to achieve compliance.

(2) Discretionary planning entitlements. Upon submittal of an application for any discretionary planning entitlement for any covered project, including, but not limited to, architectural review, site development permit, conditional use permit, or variance requests, application materials shall include the appropriate completed checklists, as required by the standards for compliance specified in Section 15.10.040, accompanied by a text description of the proposed green building program and expected measures and milestones for compliance. The compliance official may allow the use of alternative checklists for historic buildings or for buildings that retain or re-use substantial portions of the existing structure.

(3) Building plan check review. Upon submittal of an application for a building permit, building plans for any covered project shall include a checklist and green building program description, reflecting any changes proposed since the planning entitlement phase (if a planning entitlement was required). The checklist shall be incorporated onto a separate plan sheet included with the building plans. A qualified green building professional shall provide evidence of adequate green building compliance or documentation to the compliance official to satisfy the requirements of the standards for compliance outlined in Section 15.10.040, prior to issuance of a building permit.

(4) Final building inspection, verification, and occupancy. Prior to final building inspection and occupancy for any covered project, a qualified building professional shall provide evidence of adequate green building compliance or documentation to the compliance official to satisfy the requirements of the standards for compliance outlined in Section 15.10.040. This information shall include, but is not limited to:

i. Documentation that verifies incorporation of the design and construction related credits specified in the project approval for the covered project;

ii. A letter from the qualified green building professional that certifies that the covered project has been constructed in accordance with the approved green building project checklist;

iii. Any additional documentation that would be required by the LEED reference guide for LEED certification (if required), or by the GreenPoint Rated manuals for GreenPoint Rated certification (if required); and

iv. Any additional information that the applicant believes is relevant to determining that a good faith effort has been made to comply with this chapter.

(5) Final determination of compliance and good faith effort to comply. Prior to the scheduling of a final building inspection for a covered project, the compliance official shall review the documentation submitted by the applicant, and determine whether the applicant has achieved the required compliance threshold as set forth in the standards for compliance outlined in Section 15.10.040 and/or demonstrate that measures are in place to assure compliance not later than one year after approval of final building inspection. If the compliance official determines that the applicant has met the requirements of Section 15.10.040 for the project, the final building inspection may proceed, provided the covered project has received approval of all other inspections required by the chief building official. If the compliance official determines that the required green building rating has not been achieved, the compliance official shall find one of the following:

i. Good faith effort to comply: When an applicant submits a request in writing to the compliance official for approval of a good faith effort to comply, the compliance official shall determine that the applicant has made a good faith effort to comply with this chapter when finding that either a) the cost for providing green building documentation or assuring compliance is disproportionate to the overall cost of the project, or b) the green building materials and technologies on the green building checklist are no longer available or not yet commercially available, or c) at least 80% of the required green point credits have been achieved, and measures are in place to assure full compliance not later than one year after approval of the final building inspection. Determination of a good faith effort to comply shall be made separately for each item on the green building project checklist. Granting of a good faith effort to comply for one item does not preclude the need for the applicant to comply with the other items on the green building checklist.

ii. Non-compliant project. If the compliance official determines that the applicant has not made a good faith effort to comply with this chapter, or if the applicant fails to submit the documentation required within the required time period, then the project shall be determined to be non-compliant, and the final inspection and approval for the project shall be withheld. A final inspection shall not take place until the applicant has implemented equivalent alternate measures approved by the compliance official or unless an exemption is granted for the project.

(6) Post final inspection requirement. Not later than one year after approval of the final building inspection, the applicant or current owner shall submit to the

compliance official documentation detailing compliance with the operation, efficiency, and conservation related credits from the approved checklist documentation for any covered project, if required by the compliance official. The applicant may also provide any additional information the applicant believes is relevant to determining its good faith efforts to comply with this chapter.

(7) Non-compliance. If, as a result of any inspection, the town determines that the covered project does not or is unlikely to comply with the approved plans or green building checklist, a stop order shall be issued if the compliance official determines that continuation of construction activities will jeopardize the project's ability to meet the required compliance threshold. The stop order shall remain in effect until the compliance official determines that the project will be brought into compliance with the approved plans and/or checklist.

(8) Interim compliance effort. For residential projects initiating construction not later than two years after the effective date of this chapter, a good faith effort shall be deemed to have been made when at least 75% of the required minimum green points have been achieved prior to final building inspection, and adequate remaining checklist points are outlined to demonstrate that at least 90% of the minimum points and GreenPoint certification will be achieved not later than one year after final inspection. For purposes of this subsection "initiating construction" shall mean the date when a building permit is issued. If 75% of the required minimum green points are not achieved prior to the request for final building inspection, the final inspection shall be withheld unless an exemption is granted by the compliance official. Residential projects initiating construction more than two years after the effective date of this chapter shall comply in full with the requirements of this chapter.

(9) Lack of inspectors. If the compliance official determines that there is a lack of third party or town inspectors available to perform green building inspections within a timely manner, the compliance official may allow self-verification of the project and determine that green building requirements have been met.

(c) The compliance official shall have the responsibility to administer and monitor compliance with the green building requirements set forth in this chapter and with any rules and regulations promulgated thereunder, and to grant exemptions from the requirements, where so authorized.

(d) Compliance with the provisions of this chapter shall be listed as a condition of approval on any architectural and site control review or other discretionary permit approval, and on the building plans for building permit approval, for any covered project.

15.10.070 Hardship or Infeasibility Exemption.

(a) Exemption. If an applicant for a covered project believes that circumstances exist that make it a hardship or infeasible to meet the requirements of this chapter, the applicant may request an exemption as set forth below. In applying for an exemption, the burden is on the applicant to show hardship or infeasibility.

(b) Application. If an applicant for a covered project believes such circumstances exist, the applicant may apply for an exemption at the time of application submittal. The applicant shall indicate the maximum threshold of compliance he or she believes is feasible for the covered project and the circumstances that he or she believes create a hardship or make it infeasible to fully comply with this chapter. Circumstances that constitute hardship or infeasibility include, but are not limited to the following:

(1) There is conflict with the compatibility of the green building rating system with other town goals, such as those requiring historic preservation;

(2) There is conflict with the compatibility of the green building rating system and the California Building Standards Code;

(3) There is conflict with the compatibility of the green building rating system and the town's zoning ordinance and/or architectural review criteria;

(4) The green building compliance standards do not include enough green building measures that are compatible with the scope of the covered project; and/or

(5) There is a lack of commercially available green building materials and technologies to comply with the green building rating system.

(c) Review by Architectural & Site Control Commission (ASCC). For any covered project for which an exemption is requested and architectural and site control review is required by the ASCC, the ASCC shall provide a recommendation to the compliance official regarding whether the exemption shall be granted or denied, along with its recommendation on the project. For any project for which an exemption is requested based on the historic character of the building or site, the town historian shall provide a recommendation to the compliance official regarding whether the exemption shall be granted or denied and shall determine whether the project is consistent with the Secretary of the Interior's Standards for Historic Rehabilitation.

(d) Granting of Exemption. If the compliance official determines that it is a hardship or is infeasible for the applicant to fully meet the requirements of this chapter based on the information provided, the compliance official shall determine the maximum feasible threshold of compliance reasonably achievable for the project. The decision of the compliance official shall be provided to the applicant in writing. If an exemption is granted, the applicant shall be required to comply with this chapter in all other respects

and shall be required to achieve, in accordance with this chapter, the threshold of compliance determined to be achievable by the compliance official.

(e) Denial of Exemption. If the compliance official determines that it is reasonably possible for the applicant to fully meet the requirements of this chapter, the request shall be denied and the compliance official shall so notify the applicant in writing. The project and compliance documentation shall be modified to comply with this chapter prior to further review of any pending planning or building application.

(f) Council Review of Exemption. For any covered project that requires review and action by the town council, the council shall act to grant or deny the exemption, based on the criteria outlined above, after recommendation by the manager.

15.10.080 Appeal.

(a) Any aggrieved applicant may appeal the determination of the compliance official regarding: (1) the granting or denial of an exemption pursuant to section 15.10.070; or (2) compliance with any other provision of this chapter.

(b) Any appeal must be filed in writing with the planning manager not later than fourteen days after the date of the determination by the compliance official. The appeal shall state the alleged error or reason for the appeal.

(c) The appeal shall be processed and considered by the town council.

3. Environmental Review. This ordinance is exempt from the California Environmental Quality Act pursuant to Section 15309 because it is an action taken by a regulatory agency for the protection of the environment.

4. Effective Date; Posting. This ordinance shall become effective thirty (30) days after the date of its adoption and shall be posted within the Town of Portola Valley in three (3) public places.

INTRODUCED:

PASSED:

AYES:

NOES:

ABSTENTIONS:

ABSENT:

RESOLUTION NO. 2490 -2010

**A RESOLUTION OF THE TOWN COUNCIL OF THE TOWN OF
PORTOLA VALLEY ADOPTING GREEN BUILDING STANDARDS FOR
COMPLIANCE**

WHEREAS, the Town Council of the Town of Portola Valley adopted Ordinance No. 2010-____ adding Chapter 15.10 [Green Building] to Title 15 [Buildings and Construction] of the Portola Valley Municipal Code; and

WHEREAS, Section 15.10.040 requires the Town Council to establish by resolution, green building standards for compliance;

WHEREAS, the Town Council received and reviewed the recommendations of the Planning Commission and the Architectural & Site Control Commission subgroup regarding green building standards.

NOW THEREFORE, The Town Council of the Town of Portola Valley does hereby **RESOLVE** as follows:

The Town adopts the following green building standards for compliance:

1. New residential construction. New homes shall demonstrate GreenPoint rated certification using certified professional raters.
 - A. For projects up to and including 3,000 sf. A minimum threshold of 75 BIG points, with GreenPoint rated certification prior to building permit sign-off/occupancy.
 - B. For projects over 3,000 sf. A minimum threshold of 75 BIG points with one additional point for each 30 sf over 3,000 sf, and with GreenPoint rated certification prior to building permit sign-off/occupancy.
 - C. Basement floor area. Basement floor area must be included in the total floor area for point calculations.
 - D. LEED option. At the option of an applicant, the LEED for homes program may be used with a minimum threshold of silver LEED certification. Because LEED certification typically takes more time than is associated with BIG certification, the planning manager or his/her designee may as appropriate and in his/her sole discretion allow for some interim certification for occupancy prior to formal completion of the LEED process.
2. Substantial residential additions and/or rebuilding. For such projects make use of the BIG GreenPoint rated program for existing homes, with the threshold being the BIG minimum for a "whole house" project of 50 points and 25 points for a smaller "elements" project, both as defined by BIG. For a "whole house project" GreenPoint rated certification using certified professional raters shall be required and for an elements

project, self-certification is allowed. In all cases, new basement area would be counted as provided for above for "new construction" projects.

3. Small residential additions or remodels. For such projects completion of the BIG existing home checklist shall be required as a working/learning document, but no minimum points are required and self-certification is permitted. This would be for projects less than 400 sf in area, i.e. below the threshold for Architectural and Site Control Commission review.
4. Institutional and non-residential projects. The threshold for institutional and non-residential projects shall be the appropriate LEED program and formal LEED certification. The minimum LEED levels shall be as follows:
 - A. For projects less than 2,000 sf the appropriate LEED or BIG checklist should be used and the points proposed verified through the self-certification process.
 - B. For new buildings between 2,000 sf and 3,000 sf LEED certification with no minimum level.
 - C. For new buildings between 3,000 and 5,000 sf, LEED silver certification.
 - D. For new buildings over 5,000 sf LEED gold certification.

PASSED AND ADOPTED this ____ day of _____, 2010.

By: _____
Mayor

ATTEST:

Town Clerk



MEMORANDUM

TOWN OF PORTOLA VALLEY

TO: ASCC

FROM: Brandi de Garmeaux, Sustainability & Special Projects Manager
Greg Beverlin, Sustainability & Planning Intern

DATE: March 14, 2016

RE: Study Session on Proposed Revisions to the Green Building Ordinance

BACKGROUND

The Town of Portola Valley adopted a Green Building Ordinance in 2010, which required exceeding the 2010 California Energy Code by 15 percent. The State of California adopts new building standards every three years that are codified in Title 24 of the California Code of Regulations. The 2013 California Energy Code, which officially went into effect on July 1, 2014, contains mandatory energy efficiency measures that are more restrictive than the Town's current Ordinance. As a result of the higher levels of mandatory energy efficiency included in the new Energy Code, the Town's Ordinance became unenforceable. In addition to the Energy Code updates, the 2013 California Green Building Standards Code ("CALGreen") also went into effect on January 1, 2014. CALGreen contains sustainable design requirements related to planning and design, energy efficiency, water efficiency and conservation, material construction and resource efficiency, and environmental quality.

Staff has reviewed the existing Ordinance and proposed amendments that would continue the Town's efforts in promoting sustainable building design, sustainable building construction, and resource conservation as well as begin preparing the Town to meet the State's goal of all new residential construction being net zero energy by 2020 (Attachments 1 & 2). The proposed Ordinance amendment continues reliance on the Leadership in Energy and Environmental Design (LEED) green building rating system for non-residential projects and the Build It Green, GreenPoint Rated system for residential projects, with modifications to the existing point requirements that are outlined below. In addition, there are new proposed requirements for new single-family residential projects including:

- increasing the "solar zone" size from 250 square feet to 500 square feet
- installing solar "ready" infrastructure
- installing electric vehicle "ready" infrastructure
- installing graywater "ready" infrastructure
- installing rainwater catchment systems for landscapes that use turf

Updating the Town's Ordinance aligns with several key local and State goals. First, the Town has a long history of promoting sustainability through design and education in order to reduce the community's impact on the environment. On January 28, 2009, the Town's Sustainability Element was adopted, which establishes the following goals: reducing greenhouse gas

emissions; implementing green buildings for new and existing structures; protecting water resources; protecting the natural environment; and promoting community education and involvement throughout the process of implementing those goals. Furthermore, the Sustainability Element includes “overarching goals” to minimize the use of nonrenewable resources, to promote principles of green design, and to encourage resource efficiency and the use of sustainable materials in all building projects. Second, the Town is implementing policies that align with The Global Warming Solutions Act of 2006 (“AB 32”), which requires reducing greenhouse gas emissions by 80 percent below 1990 levels by 2050. Third, in accordance with Executive Order B-29-15, the Town is required to reduce community-wide water consumption by 36 percent below a 2013 baseline year. Fourth, based on 2009 goals established by the California Public Utilities Commission, the State will require all new residential construction projects to be net zero energy by 2020, which will require higher levels of energy efficiency and renewable energy systems that are sized large enough to meet each building’s annual energy demands. It is with all of these sustainability goals in mind that staff is proposing to adopt an amended Ordinance that surpasses the State’s minimum building standards.

DISCUSSION

A. New Single-Family Residential Projects

Green Building

With this Ordinance amendment, the Town would adopt the green building compliance methodology for the most current version of Build It Green’s GreenPoint Rated checklist for New Single Family (Attachment 3). Staff recommends using the current version of the GreenPoint Rated checklist for several reasons. 1) the checklist is fully compliant with all mandatory State building codes, including CALGreen; 2) the checklist is flexible by providing a wide range of green building measures for constructions projects to implement; 3) it places a high emphasis on energy, water and waste while looking at the building holistically, it supplements the State’s building codes and includes greater focus on indoor air quality and environmentally friendly building materials; 4) residents, developers, and architects in Portola Valley are already very familiar with the GreenPoint Rated checklist, which has been used in the Town since 2009. In addition, one of the main benefits of utilizing the Build It Green GreenPoint Rated checklist is third-party verification that all the green building measures are being implemented, including the current CALGreen mandatory measures.

The existing Ordinance, that is no longer enforceable, required 75 points from the GreenPoint Rated checklist for all new residential projects up to 3,000 square feet and one additional point for every 30 square feet over 3,000 square feet. After reviewing multiple new residential projects completed under the existing Ordinance (shown in Figure 1), staff discovered that continuing to require one additional point for every 30 square feet above a 3,000 square foot threshold would be difficult for many homes to achieve when using the current version of the GreenPoint Rated checklist. However, adjusting the point requirements to one point for every 50 square feet over a 3,000 square foot threshold was found to be achievable for all of the projects that were reviewed. Therefore, staff recommends requiring 75 points from the GreenPoint Rated checklist for all new single-family residential projects up to 3,000 square feet and one additional point for every 50 square feet over 3,000 square feet. This methodology was supported by Build It Green, which conducted an independent point analysis on the same projects.

Figure 1

GreenPoint Rated Comparison: > 3,000 sq ft						
		Version 4.2		Version 6.0.2 (1 pt/30 sq ft)		Version 6.0.2 (1 pt/50 sq ft)
Address	Square Footage	Points Required (30 sq ft)	Proposed Total Points	Points Required (30 sq ft)	Calculated Total Points	Points Required (50 sq ft)
50 Pine Ridge	6,571	194	201	194	156	147
9 Redberry	6,143	180	188	180	167	138
205 Cervantes	5,370	154	161	154	130	123
3 Thistle	4,098	112	173	112	134	97

Energy Efficiency

The amended Ordinance would require projects to exceed the California Energy Code by at least 10 percent for new single-family homes, as this is the requirement for certification under of Build It Green's GreenPoint Rated checklist for New Single Family. In accordance with guidelines established by the California Energy Commission, exceeding the minimum standards of the California Energy Code requires a cost-effectiveness study to be conducted for the specific climate zone where exceeding the Energy Code is being proposed. In December 2014, ARUP, a consulting firm, conducted a cost-effectiveness study for low-rise residential buildings in the San Francisco Bay Area, Climate Zone 3 under the Bay Area Regional Energy Network (BayREN) Codes and Standards Program (Attachment 4). The study demonstrates that exceeding the Energy Code by 10 percent is cost effective for new single-family homes. However, the cost-effectiveness study found that exceeding the Energy Code is not considered to be cost effective for multifamily homes in the same climate zone. Therefore, staff recommends relying on the current building code for multifamily projects.

Solar

The 2013 California Energy Code has mandatory requirements for solar "ready" buildings that currently apply only to residences in subdivisions of ten or more. These solar ready requirements include a minimum "solar zone," which is an unshaded and un-penetrated space on the roof for future solar system installations, a pathway for routing conduit and plumbing within construction documents, and a main service panel with a minimum busbar rating of 200 amps (Attachment 5).

The proposed Ordinance amendment would require installing solar “ready” infrastructure on all new residential projects in order to better facilitate the future installation of solar photovoltaic and solar thermal systems. Solar ready infrastructure includes providing conduit and plumbing to support the future installation of the solar systems. Also, the pathway for conduit and plumbing shall be routed from the attic space (or equivalent) to the point of interconnection with the electrical service panel and the water-heating system. Requiring solar ready infrastructure during initial construction process will reduce the cost of installing a solar system in the future.

Additionally, the proposed Ordinance amendment would require a solar zone for all new single-family homes and would also require increasing the solar zone size. Staff recommends amending the Energy Code and requiring the solar zone for all new single-family homes and increasing the solar zone size from 250 square feet to 500 square feet in order to better accommodate larger solar system installations. Staff does not recommend increasing the solar zone size for new multifamily projects as the California Energy Code already requires the solar zone to be 15 percent of the total roof area excluding skylights.

Electric Vehicles

As of July 1, 2015, the California Green Building Standards Code was amended to include mandatory standards for electric vehicle infrastructure for new residential projects (see Attachment 6). It requires installing a listed raceway (i.e., an enclosed conduit that forms a physical pathway for electrical wiring.) to accommodate a dedicated 208/240-volt branch circuit. Additionally, the service panel and/or subpanel shall provide capacity to install a 40-ampere minimum dedicated branch circuit.

In order to better facilitate the use of electric vehicles, staff recommends amending the Ordinance for all new single-family residential projects to include, at a minimum: (1) a panel capable of accommodating a dedicated branch circuit and service capacity to install a 208/240V, 50 amperes grounded AC outlet; and (2) raceway or wiring with capacity to accommodate a 100 ampere circuit; terminating in (3) a listed cabinet, box, enclosure, or NEMA receptacle. The raceway would need to be installed so that minimal removal of materials is necessary to complete the final installation. Staff’s recommendation to increase the amperes from 40 to 50 is due to recommendations from Tesla Motors, Inc. that 50 amperes will give users greater flexibility with all electric vehicle types. Additionally, Tesla Motors, Inc. stated that increased amperes will likely be necessary in the near future as all major electric vehicle manufacturers increase vehicle battery sizes to improve the vehicle’s range.

Water Efficiency

In order to mitigate the affects of California’s ongoing drought, and to better conserve natural resources, the Town has made decreasing potable water use a high priority. With the proposed Ordinance amendment, the Town would require installing graywater “ready” infrastructure that would allow for the future installation of a graywater treatment system and distributed irrigation.

The current regulations only allow for untreated graywater to be used for subsurface irrigation. To allow for the most flexibility in utilizing graywater, the proposed measures require identifying an appropriate location for a graywater treatment system, including storage tanks for the graywater before and after it is processed. Additional, segregated plumbing piping would be required to allow for the discharge from all clothes washers and all applicable fixtures from bathrooms located above grade. The discharge pipe would be connected to the black pipe outside of the building foundation, in the location identified for the treatment system, to better facilitate a future connection to the graywater treatment system and/or irrigation system. A power supply to this location would also be required. Only above grade bathrooms are

subjected to the requirements of this proposed Ordinance amendment to allow for the system to be gravity fed and negate the need for additional electrical or plumbing components.

The graywater ready infrastructure requirements would not require any new residential projects to utilize graywater for irrigation systems. The requirements are meant to reduce the cost for implementing the graywater systems by establishing requirements during a project's initial construction.

In addition to utilizing graywater, staff worked with the Town's Water Conservation Committee to find other innovative ways to reuse water in order to relieve the current high demand for water in outdoor irrigation. As a result, the proposed Ordinance amendment includes a requirement for installing rainwater catchment systems for new residential projects with landscapes that include turf. Staff developed a calculator with the State Department of Water Resources that uses local climate data to determine the annual water needs of various kinds of turf in Portola Valley, called the Applied Water for Turf Calculator (Attachment 7).

Using the Applied Water for Turf Calculator, the rainwater catchment system would vary in size depending on the total square footage of a landscape for turf (Figures 2 & 3). For the first 500 square feet of the turf, the rainwater catchment system would need to be sized in order to meet 50 percent of the calculated annual water needs. For turf landscapes over 500 square feet, the rainwater catchment system would need to be sized in order to meet 100 percent of the calculated annual water needs over 500 square feet. The reduced rainwater catchment system requirements for turf landscapes of 500 square or less is meant to better accommodate new residential projects that seek to have only a relatively small amount of turf.

As an alternative to installing a rainwater catchment system, new residential projects can install a fully operational graywater system that satisfies all of the annual water demands of the turf as identified in the Applied Water for Turf Calculator. This is complimentary to the newly adopted Water Efficient Landscape Ordinance, which allows for following prescriptive measures if the water needs of the landscape are met with graywater and/or rainwater.

Figure 2

Applied Water for Turf Calculator	
Choose the Type of Turf	Cool Season Turf
Enter the Landscape Area (500 square feet or less)	500
Enter the Landscape Area (more than 500 square feet)	43,060
Choose Irrigation Type	Spray Irrigation
Annual Watering Needs for Turf (gallons)	894,715

Common Types of Irrigated Turf
 Cool Season: Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue. Warm Season: Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass.

Figure 3

Applied Water for Turf Calculator	
Choose the Type of Turf	Cool Season Turf
Enter the Landscape Area (500 square feet or less)	500
Enter the Landscape Area (more than 500 square feet)	43,060
Choose Irrigation Type	Spray
Annual Watering Needs for Turf (gallons)	

For landscapes over 500 sq ft
 This cell is only for landscapes greater than 500 square feet. If your landscape is over 500 square feet, subtract the total minus 500 (e.g., 750 - 500 = 250). If your landscape is NOT larger than 500 square feet put "0."

B. Residential Construction Additions and/or Remodel Projects 400 Square Feet or Greater

The proposed Ordinance amendment would adopt the green building compliance methodology from the current version of Build It Green's GreenPoint Rated checklist for Existing Home Single Family. For additions and/or remodels over 400 square feet, the point threshold would be the Build It Green minimum for a "whole house" project of 50 points and 25 points for a smaller "elements" project, both as defined by Build It Green. Additionally, for a "whole house project" GreenPoint Rated certification using certified professional raters would be required and for an "elements project," self-certification is allowed.

C. Small Residential Additions and/or Remodels

The Town, with this Ordinance amendment would, adopt the green building compliance methodology from the current version of Build It Green's GreenPoint Rated checklist for Existing Home Single Family. However, for projects that are less than 400 square feet, the checklist would be required as a working/learning document only with no minimum point requires. Additionally, self-certification is permitted.

D. New Non-Residential Projects

For non-residential projects, the proposed Ordinance amendment continues the requirement to meet a certain level of LEED certification based on square footage. Staff compared the LEED green building rating system to the voluntary "tiers" offered options under the state's CALGreen code. Staff is recommending continuing the requirement for LEED certification as it offers greater flexibility, provides a wider range of green building measures and takes a holistic approach to sustainable design. As it places a high emphasis on energy, water, and water conservation, LEED also includes many measures that surpass the State's building codes and focus on using environmentally friendly building materials and improving indoor air quality. As with the Build It Green system for residential local developers and architects in Portola Valley are already familiar with LEED and often seek LEED certification to showcase their efforts in promoting sustainability.

Staff is recommending that new non-residential projects are also required to implement the additional electric vehicle readiness measures outlined for the new single-family construction.

NEXT STEPS

It is requested that the ASCC review and provide input on the proposed Ordinance amendment. Based on comments and direction from the ASCC, staff will make changes to the draft Ordinance and forward it to the Planning Commission for review. The draft Ordinance, along with comments from the ASCC and Planning Commission, will then be forwarded to the Town Council for their review and consideration.

ATTACHMENTS

1. Green Building Ordinance with proposed amendments redlined
2. Original Green Building Ordinance adopted in 2010
3. Build It Green's GreenPoint Rated checklist for New Single-Family Homes Version 6.0.2
4. Cost Effectiveness Analysis Title 24 2013 Reach Code Single Family Residential
5. California Energy Code, Section 110.10 Mandatory Requirements for Solar Ready Buildings
6. California Green Building Standards Code, Section 4.106.4 Electric Vehicle Charging for New Construction
7. Applied Water for Turf Calculator Summary

Approved by: Debbie Pedro, Planning Director



NEW HOME RATING SYSTEM, VERSION 6.0
SINGLE FAMILY CHECKLIST

The GreenPoint Rated checklist tracks green features incorporated into the home. GreenPoint Rated is administered by Build It Green, a non-profit whose mission is to promote healthy, energy and resource efficient buildings in California.

The minimum requirements of GreenPoint Rated are: verification of 50 or more points; Earn the following minimum points per category: Community (2), Energy (25), Indoor Air Quality/Health (6), Resources (6), and Water (6); and meet the prerequisites CALGreen Mandatory, H6.1, J5.1, O1, O7.

The criteria for the green building practices listed below are described in the GreenPoint Rated Single Family Rating Manual. For more information please visit www.builditgreen.org/greenpointrated. Build It Green is not a code enforcement agency.

Points Achieved: **0**

Certification Level: **None**

POINTS REQUIRED

■ Minimum Points
 ■ Achieved Points



A home is only GreenPoint Rated if all features are verified by a Certified GreenPoint Rater through Build It Green.

Single Family New Home Version 6.0.2

PROJECT NAME		Points Achieved	Possible Points					NOTES
MEASURES			Community	Energy	IAQ/Health	Resources	Water	
CALGreen								
TBD	CALGreen Res (REQUIRED)	0	1	1	1	1		
A. SITE								
TBD	A1. Construction Footprint				1			
TBD	A2. Job Site Construction Waste Diversion							
TBD	A2.1 65% C&D Waste Diversion (Including Alternative Daily Cover)				2			
TBD	A2.2 65% C&D Waste Diversion (Excluding Alternative Daily Cover)				2			
TBD	A2.3 Recycling Rates from Third-Party Verified Mixed-Use Waste Facility				1			
TBD	A3. Recycled Content Base Material				1			
TBD	A4. Heat Island Effect Reduction (Non-Roof)		1					
TBD	A5. Construction Environmental Quality Management Plan Including Flush-Out			1				
A6. Stormwater Control: Prescriptive Path								
TBD	A6.1 Permeable Paving Material					1		
TBD	A6.2 Filtration and/or Bio-Retention Features					1		
TBD	A6.3 Non-Leaching Roofing Materials					1		
TBD	A6.4 Smart Stormwater Street Design					1		
TBD	A7. Stormwater Control: Performance Path		1				3	
B. FOUNDATION								
TBD	B1. Fly Ash and/or Slag in Concrete				1			
TBD	B2. Radon-Resistant Construction			2				
TBD	B3. Foundation Drainage System				2			
TBD	B4. Moisture Controlled Crawlspace			1				
B5. Structural Pest Controls								
TBD	B5.1 Termite Shields and Separated Exterior Wood-to-Concrete Connections				1			
TBD	B5.2 Plant Trunks, Bases, or Stems at Least 36 Inches from the Foundation				1			
C. LANDSCAPE								
Enter the landscape area percentage								
TBD	C1. Plants Grouped by Water Needs (Hydrozoning)					1		
TBD	C2. Three Inches of Mulch in Planting Beds					1		
C3. Resource Efficient Landscapes								
TBD	C3.1 No Invasive Species Listed by Cal-IPC				1			
TBD	C3.2 Plants Chosen and Located to Grow to Natural Size				1			
TBD	C3.3 Drought Tolerant, California Native, Mediterranean Species, or Other Appropriate Species					3		
C4. Minimal Turf in Landscape								
TBD	C4.1 No Turf on Slopes Exceeding 10% and No Overhead Sprinklers Installed in Areas Less Than Eight Feet Wide					2		
TBD	C4.2 Turf on a Small Percentage of Landscaped Area					2		
TBD	C5. Trees to Moderate Building Temperature	1	1			1		
TBD	C6. High-Efficiency Irrigation System					2		
TBD	C7. One Inch of Compost in the Top Six to Twelve Inches of Soil					2		
TBD	C8. Rainwater Harvesting System					3		
TBD	C9. Recycled Wastewater Irrigation System					1		
TBD	C10. Submeter or Dedicated Meter for Landscape Irrigation					2		
TBD	C11. Landscape Meets Water Budget					2		
C12. Environmentally Preferable Materials for Site								
TBD	C12.1 Environmentally Preferable Materials for 70% of Non-Plant Landscape Elements and Fencing				1			
TBD	C13. Reduced Light Pollution	1						
TBD	C14. Large Stature Tree(s)	1						
TBD	C15. Third Party Landscape Program Certification					1		
TBD	C16. Maintenance Contract with Certified Professional					1		
D. STRUCTURAL FRAME AND BUILDING ENVELOPE								
D1. Optimal Value Engineering								
TBD	D1.1 Joists, Rafter, and Studs at 24 Inches on Center		1			2		
TBD	D1.2 Non-Load Bearing Door and Window Headers Sized for Load					1		
TBD	D1.3 Advanced Framing Measures					2		
TBD	D2. Construction Material Efficiencies					1		
D3. Engineered Lumber								
TBD	D3.1 Engineered Beams and Headers					1		
TBD	D3.2 Wood I-Joists or Web Trusses for Floors					1		
TBD	D3.3 Engineered Lumber for Roof Rafter					1		
TBD	D3.4 Engineered or Finger-Jointed Studs for Vertical Applications					1		
TBD	D3.5 OSB for Subfloor					0.5		
TBD	D3.6 OSB for Wall and Roof Sheathing					0.5		
TBD	D4. Insulated Headers		1					

Requirement	Compliance	1	2	3	4	5	6
D5. FSC-Certified Wood							
TBD	D5.1 Dimensional Lumber, Studs, and Timber						6
TBD	D5.2 Panel Products						3
D6. Solid Wall Systems							
TBD	D6.1 At Least 90% of Floors						1
TBD	D6.2 At Least 90% of Exterior Walls	1					1
TBD	D6.3 At Least 90% of Roofs	1					1
TBD	D7. Energy Heels on Roof Trusses	1					
TBD	D8. Overhangs and Gutters	1					1
D9. Reduced Pollution Entering the Home from the Garage							
TBD	D9.1 Detached Garage						2
TBD	D9.2 Mitigation Strategies for Attached Garage						1
D10. Structural Pest and Rot Controls							
TBD	D10.1 All Wood Located At Least 12 Inches Above the Soil						1
TBD	D10.2 Wood Framing Treated With Borates or Factory-Impregnated, or Wall Materials Other Than Wood						1
TBD	D11. Moisture-Resistant Materials in Wet Areas (such as Kitchen, Bathrooms, Utility Rooms, and Basements)						1
E. EXTERIOR							
TBD	E1. Environmentally Preferable Decking						1
TBD	E2. Flashing Installation Third-Party Verified						2
TBD	E3. Rain Screen Wall System						2
TBD	E4. Durable and Non-Combustible Cladding Materials						1
E5. Durable Roofing Materials							
TBD	E5.1 Durable and Fire Resistant Roofing Materials or Assembly						1
TBD	E6. Vegetated Roof	2	2				
F. INSULATION							
F1. Insulation with 30% Post-Consumer or 60% Post-Industrial Recycled Content							
TBD	F1.1 Walls and Floors						1
TBD	F1.2 Ceilings						1
F2. Insulation that Meets the CDPH Standard Method—Residential for Low Emissions							
TBD	F2.1 Walls and Floors						1
TBD	F2.2 Ceilings						1
F3. Insulation That Does Not Contain Fire Retardants							
TBD	F3.1 Cavity Walls and Floors						1
TBD	F3.2 Ceilings						1
TBD	F3.3 Interior and Exterior						1
G. PLUMBING							
G1. Efficient Distribution of Domestic Hot Water							
TBD	G1.1 Insulated Hot Water Pipes		1				
TBD	G1.2 WaterSense Volume Limit for Hot Water Distribution						1
TBD	G1.3 Increased Efficiency in Hot Water Distribution						2
G2. Install Water-Efficient Fixtures							
TBD	G2.1 WaterSense Showerheads with Matching Compensation Valve						2
TBD	G2.2 WaterSense Bathroom Faucets						1
TBD	G2.3 WaterSense Toilets with a Maximum Performance (MaP) Threshold of No Less Than 500 Grams						1
TBD	G3. Pre-Plumbing for Graywater System						1
TBD	G4. Operational Graywater System						3
H. HEATING, VENTILATION, AND AIR CONDITIONING							
H1. Sealed Combustion Units							
TBD	H1.1 Sealed Combustion Furnace						1
TBD	H1.2 Sealed Combustion Water Heater						2
TBD	H2. High Performing Zoned Hydronic Radiant Heating System	1	1				
H3. Effective Ductwork							
TBD	H3.1 Duct Mastic on Duct Joints and Seams		1				
TBD	H3.2 Pressure Balance the Ductwork System		1				
TBD	H4. ENERGY STAR® Bathroom Fans Per HVI Standards with Air Flow Verified						1
H5. Advanced Practices for Cooling							
TBD	H5.1 ENERGY STAR Ceiling Fans in Living Areas and Bedrooms						1
H6. Whole House Mechanical Ventilation Practices to Improve Indoor Air Quality							
TBD	H6.1 Meet ASHRAE 62.2-2010 Ventilation Residential Standards	N	R	R	R	R	R
TBD	H6.2 Advanced Ventilation Standards						1
TBD	H6.3 Outdoor Air Ducted to Bedroom and Living Areas						2
H7. Effective Range Hood Design and Installation							
TBD	H7.1 Effective Range Hood Ducting and Design						1
TBD	H7.2 Automatic Range Hood Control						1
TBD	H8. No Fireplace or Sealed Gas Fireplace						1
TBD	H9. Humidity Control Systems						1
TBD	H10. Register Design Per ACCA Manual T						1
TBD	H11. High Efficiency HVAC Filter (MERV 8+)						1
I. RENEWABLE ENERGY							
TBD	I1. Pre-Plumbing for Solar Water Heating						1
TBD	I2. Preparation for Future Photovoltaic Installation						1
TBD	I3. Onsite Renewable Generation (Solar PV, Solar Thermal, and Wind)						25
I4. Net Zero Energy Home							
TBD	I4.1 Near Zero Energy Home						2
TBD	I4.2 Net Zero Electric						4

J. BUILDING PERFORMANCE AND TESTING							
TBD	J1. Third-Party Verification of Quality of Insulation Installation				1		
TBD	J2. Supply and Return Air Flow Testing		1		1		
TBD	J3. Mechanical Ventilation Testing and Low Leakage				1		
TBD	J4. Combustion Appliance Safety Testing				1		
2008	J5. Building Performance Exceeds Title 24 Part 6						
0.00%	J5.1 Home Outperforms Title 24 Part 6	0		60			
TBD	J6. Title 24 Prepared and Signed by a CABEC Certified Energy Analyst				1		
TBD	J7. Participation in Utility Program with Third-Party Plan Review				1		
TBD	J8. ENERGY STAR for Homes				1		
No	J9. EPA Indoor airPlus Certification	0			1		
TBD	J10. Blower Door Testing				2		
K. FINISHES							
TBD	K1. Entryways Designed to Reduce Tracked-In Contaminants				1		
TBD	K1.1 Individual Entryways				1		
TBD	K2. Zero-VOC Interior Wall and Ceiling Paints				2		
TBD	K3. Low-VOC Caulks and Adhesives				1		
TBD	K4. Environmentally Preferable Materials for Interior Finish						
TBD	K4.1 Cabinets				2		
TBD	K4.2 Interior Trim				2		
TBD	K4.3 Shelving				2		
TBD	K4.4 Doors				2		
TBD	K4.5 Countertops				1		
TBD	K5. Formaldehyde Emissions in Interior Finish Exceed CARB						
TBD	K5.1 Doors				1		
TBD	K5.2 Cabinets and Countertops				2		
TBD	K5.3 Interior Trim and Shelving				2		
TBD	K6. Products That Comply With the Health Product Declaration Open Standard				2		
TBD	K7. Indoor Air Formaldehyde Level Less Than 27 Parts Per Billion				2		
No	K8. Comprehensive Inclusion of Low Emitting Finishes	0			1		
L. FLOORING							
TBD	L1. Environmentally Preferable Flooring					3	
TBD	L2. Low-Emitting Flooring Meets CDPH 2010 Standard Method—Residential				3		
TBD	L3. Durable Flooring					1	
TBD	L4. Thermal Mass Flooring		1				
M. APPLIANCES AND LIGHTING							
TBD	M1. ENERGY STAR® Dishwasher					1	
TBD	M2. CEE-Rated Clothes Washer		1			2	
TBD	M3. Size-Efficient ENERGY STAR Refrigerator		2				
TBD	M4. Permanent Centers for Waste Reduction Strategies					1	
TBD	M4.1 Built-In Recycling Center					1	
TBD	M4.2 Built-In Composting Center					1	
TBD	M5. Lighting Efficiency						
TBD	M5.1 High-Efficacy Lighting		2				
TBD	M5.2 Lighting System Designed to IESNA Footcandle Standards or Designed by Lighting Consultant		2				
N. COMMUNITY							
TBD	N1. Smart Development						
TBD	N1.1 Infill Site		1			1	
TBD	N1.2 Designated Brownfield Site		1		1		
TBD	N1.3 Conserve Resources by Increasing Density			2		2	
TBD	N1.4 Cluster Homes for Land Preservation		1			1	
TBD	N1.5 Home Size Efficiency					9	
	Enter the area of the home, in square feet						
	Enter the number of bedrooms						
TBD	N2. Home(s)/Development Located Within 1/2 Mile of a Major Transit Stop		2				
	N3. Pedestrian and Bicycle Access						
	N3.1 Pedestrian Access to Services Within 1/2 Mile of Community Services		2				
	Enter the number of Tier 1 services						
	Enter the number of Tier 2 services						
TBD	N3.2 Connection to Pedestrian Pathways		1				
TBD	N3.3 Traffic Calming Strategies		2				
	N4. Outdoor Gathering Places						
TBD	N4.1 Public or Semi-Public Outdoor Gathering Places for Residents		1				
TBD	N4.2 Public Outdoor Gathering Places with Direct Access to Tier 1 Community Services		1				
	N5. Social Interaction						
TBD	N5.1 Residence Entries with Views to Callers		1				
TBD	N5.2 Entrances Visible from Street and/or Other Front Doors		1				
TBD	N5.3 Porches Oriented to Street and Public Space		1				
TBD	N5.4 Social Gathering Space		1				
	N6. Passive Solar Design						
TBD	N6.1 Heating Load		2				
TBD	N6.2 Cooling Load		2				
	N7. Adaptable Building						
TBD	N7.1 Universal Design Principles in Units		1		1		
TBD	N7.2 Full-Function Independent Rental Unit		1				
O. OTHER							
TBD	O1. GreenPoint Rated Checklist in Blueprints	N	R	R	R	R	R
TBD	O2. Pre-Construction Kickoff Meeting with Rater and Subcontractors			0.5		1	0.5
TBD	O3. Orientation and Training to Occupants—Conduct Educational Walkthroughs			0.5	0.5	0.5	0.5
TBD	O4. Builder's or Developer's Management Staff are Certified Green Building Professionals			0.5	0.5	0.5	0.5
TBD	O5. Home System Monitors			1			1
TBD	O6. Green Building Education						
TBD	O6.1 Marketing Green Building		2				
TBD	O6.2 Green Building Signage			0.5			0.5
TBD	O7. Green Appraisal Addendum						
TBD	O8. Detailed Durability Plan and Third-Party Verification of Plan Implementation	N	R	R	R	R	R
						1	
Summary							
Total Available Points in Specific Categories		342	26	131	54	83	48
Minimum Points Required in Specific Categories		50	2	25	6	6	6
Total Points Achieved		0.0	0.0	0.0	0.0	0.0	0.0

Association of Bay Area
Governments: Bay Area Regional
Energy Network (BayREN)

Cost Effectiveness Analysis
Title 24 2013 Reach Code
Single Family Residential

Climate Zone 3

Final | December 20, 2014

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

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

Job number 238842

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1 Summary

This report presents the results of a supporting energy savings and cost-effectiveness analysis conducted for low-rise residential buildings in the San Francisco Bay Area, Climate Zone 3 under the Bay Area Regional Energy Network (BayREN) Codes and Standards Program.

For new single family residential projects in climate zone 3, 15% energy budget savings against the base code appears to be cost effective.

The purpose of this analysis is to demonstrate cost-effectiveness for single-family low-rise residential building permit applicants to exceed a performance level equivalent to the 2013 California Building Energy Efficiency Standards, also known as Title 24 Part 6 (“Title 24 2013”), by 15%. A 15% performance target aligns with Tier 1 of the Energy Efficiency Performance Standard for Residential Voluntary Measures for the 2013 California Green Building Standards Title 24 Part 11 (“CALGreen”) Section A4.203.

In addition to the performance target, the Tiers include a set of prerequisites, such as lighting measures and quality insulation installation (QII), that are required if a jurisdiction elects to keep them as prerequisites at the time of adoption. This report, therefore, includes those prescriptive requirements of the Tiers (found in section A4.203.1.1) as listed in the summary tables.

This report is for new construction only and is not applicable to additions and alterations building renovation projects, which are found under code section A4.204 of CALGreen.

The result of this analysis is a list of cost-effective energy savings and energy generation measures that can be implemented on a performance basis to achieve these targets. This list is not an endorsement of any particular energy efficiency measure, nor is it necessary that the list be followed prescriptively to achieve energy savings against the baseline.

This report is intended to be included in applications to the California Energy Commission (CEC) for a Local Energy Ordinance. It is intended to meet the requirements specified in Section 10-106 of the Title 24, Part 6: Locally Adopted Energy Standards, for “findings and supporting analyses on the energy savings and cost effectiveness of the proposed energy standards.”

2 Costs and Savings Analysis

2.1 Base Building Models

We performed a comparative analysis of energy savings and costs for measures using a representative single-family building energy prototype. The baseline prototype is compliant with Title 24 Part 6 2013. Values from this analysis are found in Table 1 under the section titled “Measures Analyzed for Code Compliance.” Key building characteristics are described in Appendix A1.

2.2 Methods and Assumptions

Energy savings data was developed using energy modeling with an adapted meta-analysis version of EnergyPlus, the IOU “ZNE Tool”, and the results in the report *The Technical Feasibility of Zero Net Energy Buildings in California* (the “ZNE Report”). ZNE Tool and Report results were cross-verified against results from Codes and Standards Enhancement (CASE) research done for the 2013 and 2016 code cycles. Energy savings were estimated for a set of sample measures for each model, in both real energy terms and in terms of the CEC approved 2013 Reach Time Dependent Value energy (Reach TDV)¹. Where energy savings results differed significantly between these sources, the lower result was chosen in order to provide a conservative approach; where results did not differ significantly the average results is reported. All energy and cost savings were scaled to a per-square-foot basis.

Incremental first cost data was developed from existing CASE reports done for the 2013 and 2016 code cycles, and from RS Means where CASE data was not available. Cost data was scaled to a per-square-foot basis.

Detailed measure descriptions, and source energy savings and cost data, are described in Appendix A2.

Key notes and assumptions are as follows:

- The following measures were either not analyzed or not totaled towards savings as they do not apply towards compliance under the Title 24 performance compliance path. They are presented in Table 1 (titled “Additional Measures Analyzed”) as possible prescriptive measures that can be implemented under a reach code path.
 - Plug load or electrical equipment measure upgrades, and water use upgrades, were analyzed but are not counted towards the performance compliance rating, as they are not regulated by the Title 24 performance compliance method (Alternative Calculation Method “ACM”) at this time.
 - Lighting upgrades were analyzed but are not counted towards the performance compliance rating, as they are not regulated by the Title 24 residential performance compliance method (ACM) at this time.
 - High efficacy lighting was analyzed in consideration of CALGreen Section A4.203.1.1.3 provision.
 - HVAC equipment rated efficiency improvements (for furnaces, packaged and split AC units, chillers, boilers, water heaters) were not analyzed, as they are regulated by the U.S. Department of Energy and Title 20 and preempted from local regulation.

¹ Reach TDV are a set of TDV scalars intended for use in reach code analysis specifically. Used as defined in http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/general_cec_documents/Title24_2013_TDV_Methodology_Report_23Feb2011.pdf

- Reach Time-dependent valuation of savings (Reach TDV) provided using the CEC approved 2013 Reach TDV numbers. All percent savings targets are based on Reach TDV.
- The cost-benefit calculation evaluated energy savings against incremental first costs of measures. Replacement costs and maintenance costs not considered.
- Savings provided in terms of standard TDV kBtu were translated to Reach TDV kBtu and reach TDV dollars (\$) via standard multipliers provided as a part of the TDV development. See Appendix A2.

3 Results

3.1 Single Family Residence

Table 1 shows the cost-effective and feasible energy savings measures beyond code that could be implemented for performance compliance in the single-family residence prototype in Climate Zone 3.

The table also lists, for interest, additional measures analyzed that were either found not cost-effective or are uncovered under performance code compliance.

Percent savings are based off of a building code compliance baseline energy consumption of 127,970 Reach TDV kbtu. The code compliance baseline excludes plug load and lighting energy, as these are not covered by performance compliance in the residential code. However they provide insight into the areas in which total energy use in buildings are expected to be reduced by designing with more energy conserving features in the building. This can help guide possible measure-specific reach codes.

Total whole building baseline energy consumption including all end-uses totaled 238,208 Reach TDV kbtu.

Baseline energy consumption is reported for the building prototype developed by the IOU ZNE Tool and presented in the report “The Technical Feasibility of Zero Net Energy Buildings in California”.

Table 1: Single-Family Residence Energy Results

Prescriptive Measure List Description	Lifecycle Savings			First Costs	Lifecycle Benefit : Cost Ratio
	Reach TDV kbtu	Reach TDV %	Reach TDV \$ / sq. ft.	\$ / sq. ft.	
Measures Analyzed for Code Compliance					
Improved Wall Insulation From R-15 w/R-4ci on 2x4, to R-21 w/R-4ci on 2x6 (w/o QII: 70% of maximum savings) ²	2,143	1.7%	\$0.18	\$0.19	0.9
DHW Heater Tankless 40 gal Gas Storage to Gas Tankless Instantaneous (Federal Minimum equivalent of 0.62 EF to 074 EF equivalent) ³	4,256	3.3%	\$0.32	\$0.29	1.1
HVAC Technology Change PTAC to Heat Pump (11.0 SEER, 9.5 EER, 2.9 COP)	6,942	5.4%	\$1.00	\$0.57	1.7
Ducts in conditioned space	1,522	1.2%	\$0.13	\$0.46	0.3
QII (Quality Insulation Inspection) ⁴ Brings savings from wall and ceiling insulation up to 100% ⁵	1,247	1.0%	\$0.10	\$0.35	0.3
Reduced Infiltration: 5 ACH50 to 3 ACH50	5,326	4.2%	\$0.44	\$0.32	1.4
Total Savings for Title 24 Part 6 Energy Budget Compliance	21,435	16.8%	\$2.16	\$2.18	1.0
Code Compliance Baseline	127,970	-	\$10.55	-	-
Additional Measures Analyzed					
Showerheads 2.5 to 1.8 GPM	1,486	-	\$0.12	\$0.01	9.8
Kitchen Sinks 2.2 to 1.8 GPM	2,676	-	\$0.22	\$0.48	0.5
All Building LED High-Efficacy Lighting ⁶ Equivalent to upgrade from 55 lm/W to 75 lm/W	3,629	-	\$0.30	\$0.02	16.9
Plug Load Controls One major home circuit on a timer to shut off major standby/vampire loads at night, midnight-6am, daily	3,511	-	\$0.29	\$0.27	1.1
Ceiling Insulation From R-30 to R-38 blown-in insulation w/Raised Heel Trusses (w/o QII: (96-0.347*R)% of maximum savings) ⁷	2,400	-	\$0.17	\$0.68	0.3
Solar Domestic Water Heating: Solar Savings Fraction 50%, Gas Water Heater	10,534	-	\$0.87	\$2.81	0.3
Whole Building Savings	45,672	-	\$4.13	\$6.45	-
Whole Building Baseline	238,208	-	\$19.65	-	-

² CASE report for *Residential High Performance Walls and QII*

³ Using updated Federal standards for small water heaters effective starting April 16, 2015.

⁴ Per CALGreen Section A4.203.1.1.2.

⁵ Title 24 Residential Reference ACM, section 2.2.6

⁶ Per CALGreen Section A4.203.1.1.3.

⁷ Title 24 Residential Reference ACM, section 2.2.6

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References

- Arup. The Technical Feasibility of Zero Net Energy Buildings in California. Prepared for Pacific Gas and Electric Company. December 31, 2012. http://www.energydataweb.com/cpucFiles/pdaDocs/904/California_ZNE_Technical_Feasibility_Report_Final.pdf
- California Energy Commission. Title 24 Residential Alternative Calculation Method (ACM) Reference Manual 2013. June 2013. <http://www.energy.ca.gov/2013publications/CEC-400-2013-003/CEC-400-2013-003-CMF-REV.pdf>
- Codes and Standards Enhancement Initiative (CASE). Residential Lighting: 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2011. http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/current/Reports/Residential/Lighting/2013_CASE_R_Residential_Lighting_Oct_2011.pdf
- Codes and Standards Enhancement Initiative (CASE). Multi-Head Showers and Lower-Flow Shower Heads: 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. September 2011. http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/current/Reports/Residential/Water_Heating/2013_CASE_R_Shower_Heads_Sept_2011.pdf
- Codes and Standards Enhancement Initiative (CASE). Residential High Performance Walls and QII: 2016 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. September 2014. <http://title24stakeholders.com/wp-content/uploads/2014/10/2016-T24-CASE-Report-High-Perf-Walls-Sep2014.pdf>
- Codes and Standards Enhancement Initiative (CASE). Residential Ducts in Conditioned Space / High Performance Attics: 2016 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2014. <http://title24stakeholders.com/wp-content/uploads/2014/10/2016-T24-CASE-Report-HPA-DCS-Oct2014.pdf>
- Codes and Standards Enhancement Initiative (CASE). Residential Instantaneous Water Heaters: 2016 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. September 2014. <http://title24stakeholders.com/wp-content/uploads/2014/10/2016-T24-CASE-Report-HPA-DCS-Oct2014.pdf>
- Codes and Standards Enhancement Initiative (CASE). Residential Plug-load Controls: 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2011. <http://www.energy.ca.gov/title24/2013standards/prerulemaking/docum>

[ents/current/Reports/Residential/Lighting/2013_CASE_PowerDist2_ResPlugLoads_10.7.2011.pdf](#)

Codes and Standards Enhancement Initiative (CASE). Residential Roof Envelope Measures: 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2011.

http://www.energy.ca.gov/title24/2013standards/prulemaking/documents/current/Reports/Residential/Envelope/2013_CASE_R_Roof_Measures_Oct_2011.pdf

Codes and Standards Enhancement Initiative (CASE). Solar Water Heating – Residential and Specialty Commercial. 2013 California Building Energy Efficiency Standards California Utilities Statewide Codes and Standards Team. October 2011.

http://www.energy.ca.gov/title24/2013standards/prulemaking/documents/current/Reports/Residential/Water_Heating/2013_CASE_Res_Comm_SolarHotWater_10.28.2011.pdf

Database for Energy Efficient Resources (DEER). California Public Utilities Commission. Accessed October 2014.

<http://www.deeresources.com/>

Energy + Environmental Economics (E3). Time Dependent Valuation of Energy for Developing Building Efficiency Standards 2013 Time Dependent Valuation (TDV) Data Sources and Inputs. February 2011.

http://www.energy.ca.gov/title24/2013standards/prulemaking/documents/general_cec_documents/Title24_2013_TDV_Methodology_Report_23Feb2011.pdf

National Renewable Energy Laboratory (NREL). National Residential Efficiency Measures Database. Accessed October 2014.

<http://www.nrel.gov/ap/retrofits/measures.cfm>

RS Means Online. Accessed October and November 2014.

www.rsmeansonline.com

A1 Baseline Building Models

Representative Baseline Building for Energy Reach Code Analysis.

Table 2: Prototype Building Characteristics

Representative Single-Family Baseline Building	
Conditioned Floor Area	2,100 sq. ft.
Number of Levels	1
Ceiling	2,100 sq. ft., vented attic R-30 insulation
Walls	2'x 4', 16" o.c., R-15 w/R-4 rigid c.i. U = 0.065
Windows	20 % WWR 0.32 U-factor
DHW System	Gas Water Heater w/ 40 gal tank 0.62 EF
Heating System	Gas-Fired Furnace, 0.80 EF
Cooling System	DX PTAC (11.0 SEER, 9.5 EER, 2.9 COP)
Interior Lighting Power Density (LPD)	High-efficacy lighting mandatory in many spaces per Title 24 Dimming or vacancy sensor mandatory in many spaces per Title24
Exterior Lighting Power Density (LPD)	None
Code Compliance Total EUI (kbtu / sq. ft.) (excl. plug loads & lighting)	18.9
Total EUI (kbtu / sq. ft.)	35.1

A2 Measure References and Data

The following tables contain the measure savings and costs references, and notes, to detail how measure results were developed.

Table 3: Measure Data References

Measure	Data Sources
Improved Wall Insulation From R-15 w/R-4ci on 2x4, to R-21 w/R-4ci on 2x6 (w/o QII: 70% of maximum savings)	<ul style="list-style-type: none"> Savings directly from the ZNE Report, and directly from the CASE report for <i>Residential High Performance Walls and QII</i> Costs directly from the same CASE report
DHW Heater Tankless 40 gal Gas Storage to Gas Tankless Instantaneous	<ul style="list-style-type: none"> Savings from the IOU ZNE Tool, and directly from the CASE report for <i>Residential Instantaneous Water Heaters</i> Costs directly from the same CASE reports

(Federal Minimum equivalent of 0.62 EF to 0.74 EF equivalent)	
HVAC Technology Change PTAC to Heat Pump (11.0 SEER, 9.5 EER, 2.9 COP)	<ul style="list-style-type: none"> • Savings from the IOU ZNE Tool • Costs developed from RS Means Online for 5 ton cooling unit
QII (Quality Insulation Inspection) Brings savings from wall and ceiling insulation up to 100%	<ul style="list-style-type: none"> • Savings from the IOU ZNE Tool, and calculated from wall and ceiling insulation savings calculations per Residential ACM method • Costs developed from the CASE report for <i>Residential High Performance Walls and QII</i>
Reduced Infiltration: 5 ACH50 to 3 ACH50	<ul style="list-style-type: none"> • Savings directly from the ZNE Report • Costs from NREL's National Residential Efficiency Measures Database
Showerheads 2.5 to 1.8 GPM	<ul style="list-style-type: none"> • Savings from the IOU ZNE Tool, and calculated from the CASE report for <i>Multi-Head Showers and Lower-Flow Shower Heads</i> (linear interpolation between GPMs provided from annual energy consumption data) • Costs from the DEER database
Kitchen Sinks 2.2 to 1.8 GPM	<ul style="list-style-type: none"> • Savings from the IOU ZNE Tool, and calculated from the CASE report for <i>Multi-Head Showers and Lower-Flow Shower Heads</i> (linear interpolation between GPMs provided from annual energy consumption data, assuming half the usage time of showerheads) • Costs from the DEER database
All Building LED High-Efficacy Lighting Equivalent to upgrade from 55 lm/W to 75 lm/W	<ul style="list-style-type: none"> • Savings from the IOU ZNE Tool, and calculated from the CASE report for <i>Residential Lighting</i> (CASE report reliant calculations developed based on CASE reported average daily hours of use, average room type quantities, average permanently installed Watts per room type, and typical lamp and fixture types and rated efficacies) • Costs directly from the same CASE report (assuming Pin-base CFL downlight as baseline and LED downlight as proposed lamp type)
Plug Load Controls One major home circuit on a timer to shut off major standby/vampire loads midnight-6am and 10am-1pm, on weekdays	<ul style="list-style-type: none"> • Savings from the ZNE Report, and directly from the CASE report for <i>Residential Plug-load Controls</i> (average savings scenario") • Costs directly from the same CASE report
Ceiling Insulation From R-30 to R-38 blown-in insulation w/Raised Heel Trusses	<ul style="list-style-type: none"> • Savings directly from the ZNE Report, and directly from the CASE report for <i>Residential Roof Envelope Measures</i>

(w/o QII: (96-0.347*R)% of maximum savings)	<ul style="list-style-type: none"> Costs directly from the same CASE report, checked against RS Means Online
Ducts in conditioned space	<ul style="list-style-type: none"> Savings from the IOU ZNE Tool and from the CASE report for <i>Residential Ducts in Conditioned Space / High Performance Attics</i> Costs directly from the same CASE report
Solar Water Heating: SSF 50%	<ul style="list-style-type: none"> Savings from the IOU ZNE Tool, and the CBECC-Residential 2013 software assuming a standard single-family default model and default gas storage water heater with 60% efficiency. CASE report <i>Solar Water Heating – Residential and Specialty Commercial</i> reviewed but not used due to CASE analysis use of electric water heat for analysis baseline. Costs directly from the same CASE report and checked against RS Means Online

Table 4: TDV PV Adjustment Factors

	(2013 \$/TDVkBtu)	(2008 \$/TDVkBtu)
Non-Res (15-yr)	\$ 0.089	\$ 0.084
Non-Res (30-yr)	\$0.154	\$ 0.146
Res (30-yr)	\$ 0.173	\$ 0.164

Convert TDV kBtu to TDV \$.

Table 5: Average TDV Scalars

	2013 Reach	2013	2008
TDV kbtu/therm	203.09	159.51	148.12
TDV kbtu/kWh	27.3	21.26	13.95

Approximately convert standard therms and kWh to TDV kBtu; averages of the annual 8760 scalar values.

Table 6: Reach TDV Multipliers

	Electricity	Gas	Propane
Non-Res (15-yr)	1.253	1.375	1.197
Non-Res (30-yr)	1.27	1.354	1.182
Res (30-yr)	1.259	1.331	1.152

Convert standard TDV to reach TDV.

ALL OCCUPANCIES—MANDATORY REQUIREMENTS

LED luminaire or LED light engine shall be certified to the Energy Commission according to Reference Joint Appendix JA-8. LED lighting not certified to the Energy Commission shall be classified as low efficacy for compliance with Section 150.0(k). Nonresidential LED lighting is not required to be certified to the Energy Commission.

(f) **Ballasts for residential recessed luminaires.** To qualify as high efficacy for compliance with Section 150.0(k), any compact fluorescent lamp ballast in a residential recessed luminaire shall meet all of the following conditions:

1. Be rated by the ballast manufacturer to have a minimum rated life of 30,000 hours when operated at or below a specified maximum case temperature. This maximum ballast case temperature specified by the ballast manufacturer shall not be exceeded when tested in accordance to UL 1598 Section 19.15; and
2. Have a ballast factor of not less than 0.90 for nondimming ballasts and a ballast factor of not less than 0.85 for dimming ballasts.

SECTION 110.10
MANDATORY REQUIREMENTS
FOR SOLAR READY BUILDINGS

(a) **Covered occupancies.**

1. **Single-family residences.** Single-family residences located in subdivisions with ten or more single-family residences and where the application for a tentative subdivision map for the residences has been deemed complete, by the enforcement agency, on or after January 1, 2014, shall comply with the requirements of Sections 110.10(b) through 110.10(e)
2. **Low-rise multifamily buildings.** Low-rise multifamily buildings shall comply with the requirements of Sections 110.10(b) through 110.10(d).
3. **Hotel/motel occupancies and high-rise multifamily buildings.** Hotel/motel occupancies and high-rise multifamily buildings with ten stories or fewer shall comply with the requirements of Sections 110.10(b) through 110.10(d).
4. **All other nonresidential buildings.** All other nonresidential buildings with three stories or fewer shall comply with the requirements of Sections 110.10(b) through 110.10(d).

(b) **Solar zone.**

1. **Minimum area.** The solar zone shall have a minimum total area as described below. The solar zone shall comply with access, pathway, smoke ventilation and spacing requirements as specified in Title 24, Part 9 or other Parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area shall be comprised of areas that have no dimension less than five feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet.

A. **Single-family residences.** The solar zone shall be located on the roof or overhang of the building and have a total area no less than 250 square feet.

Exception 1 to Section 110.10(b)1A: Single-family residences with a permanently installed solar electric system having a nameplate DC power rating, measured under Standard Test Conditions, of no less than 1000 watts.

Exception 2 to Section 110.10(b)1A: Single-family residences with a permanently installed domestic solar water-heating system meeting the installation criteria specified in the Reference Residential Appendix RA4 and with a minimum solar savings fraction of 0.50.

Exception 3 to Section 110.10(b)1A: Single-family residences with three stories or more and with a total floor area less than or equal to 2000 square feet and having a solar zone total area no less than 150 square feet.

Exception 4 to Section 110.10(b)1A: Single-family residences located in climate zones 8-14 and the Wildland-Urban Interface Fire Area as defined in Title 24, Part 2 and having a whole house fan and having a solar zone total area no less than 150 square feet.

Exception 5 to Section 110.10(b)1A: Buildings with a designated solar zone area that is no less than 50 percent of the potential solar zone area. The potential solar zone area is the total area of any low-sloped roofs where the annual solar access is 70 percent or greater and any steep-sloped roofs oriented between 110 degrees and 270 degrees of true north where the annual solar access is 70 percent or greater. Solar access is the ratio of solar insolation including shade to the solar insolation without shade. Shading from obstructions located on the roof or any other part of the building shall not be included in the determination of annual solar access.

Exception 6 to Section 110.10(b)1A: Single-family residences having a solar zone total area no less than 150 square feet and where all thermostats comply with Reference Joint Appendix JA5 and are capable of receiving and responding to Demand Response Signals prior to granting of an occupancy permit by the enforcing agency.

Exception 7 to Section 110.10(b)1A: Single-family residences meeting the following conditions:

- A. All thermostats comply with Reference Joint Appendix JA5 and are capable of receiving and responding to Demand Response Signals prior to granting of an occupancy permit by the enforcing agency.
- B. All applicable requirements of Section 150.0(k), except as required below:
 - i. All permanently installed indoor lighting is high efficacy as defined in Table 150.0-A or

150.0-B and is installed in kitchens, bathrooms, utility rooms and garages at a minimum.

- ii. All permanently installed lighting in bathrooms is controlled by a vacancy sensor.

Exception to Exception 7Bii: One high-efficacy luminaire as defined in Table 150.0-A or 150.0-B with total lamp wattage rated to consume no greater than 26 watts of power is not required to be controlled by a vacancy sensor.

- iii. Every room which does not have permanently installed lighting has at least one switched receptacle installed.
- iv. Permanently installed night lights complying with Section 150.0(k)1E are allowed.
- v. Lighting integral to exhaust fans complying with Section 150.0(k)1F is allowed. All permanently installed outdoor lighting is high efficacy as defined in Table 150.0-A or 150.0-B and is
- vi. Controlled as required in Section 150.0(k)9Ai and iii.

B. Low-rise and high-rise multifamily buildings, hotel/motel occupancies and nonresidential buildings. The solar zone shall be located on the roof or overhang of the building or on the roof or overhang of another structure located within 250 feet of the building or on covered parking installed with the building project and have a total area no less than 15 percent of the total roof area of the building excluding any skylight area.

Exception 1 to Section 110.10(b)1B: Buildings with a permanently installed solar electric system having a nameplate DC power rating, measured under Standard Test Conditions, of no less than one watt per square foot of roof area.

Exception 2 to Section 110.10(b)1B: Buildings with a permanently installed domestic solar water-heating system complying with Section 150.1(c)8Ciii.

Exception 3 to Section 110.10(b)1B: Buildings with a designated solar zone area that is no less than 50 percent of the potential solar zone area. The potential solar zone area is the total area of any low-sloped roofs where the annual solar access is 70 percent or greater and any steep-sloped roofs oriented between 110 degrees and 270 degrees of true north where the annual solar access is 70 percent or greater. Solar access is the ratio of solar insolation including shade to the solar insolation without shade. Shading from obstructions located on the roof or any other part of the building shall not be included in the determination of annual solar access.

Exception 4 to Section 110.10(b)1B: Low-rise and high-rise multifamily buildings meeting the following conditions:

- A. All thermostats in each dwelling unit comply with Reference Joint Appendix JA5 and are capable of receiving and responding to Demand Response Signals prior to granting of an occupancy permit by the enforcing agency.
- B. All applicable requirements of Section 150.0(k), except as required below:

- i. All permanently installed indoor lighting in each dwelling unit is high efficacy as defined in Table 150.0-A or 150.0-B and is installed in kitchens, bathrooms, utility rooms and private garages at a minimum.

- ii. All permanently installed lighting in bathrooms is controlled by a vacancy sensor.

Exception to Exception 4Bii: One high-efficacy luminaire as defined in Table 150.0-A or 150.0-B with total lamp wattage rated to consume no greater than 26 watts of power is not required to be controlled by a vacancy sensor.

- iii. Every room which does not have permanently installed lighting has at least one switched receptacle installed.

- iv. Permanently installed night lights complying with Section 150.0(k)1E are allowed.

- v. Lighting integral to exhaust fans complying with Section 150.0(k)1F is allowed. All permanently installed outdoor lighting for private patios, entrances, balconies and porches is high efficacy as defined in Table 150.0-A or 150.0-B; and

- vi. Is controlled as required in Section 150.0(k)9Ai and iii.

Exception 5 to Section 110.10(b)1B: Buildings where the roof is designed and approved to be used for vehicular traffic or parking or for a heliport.

2. **Orientation.** All sections of the solar zone located on steep-sloped roofs shall be oriented between 110 degrees and 270 degrees of true north.

3. **Shading.**

- A. No obstructions, including but not limited to, vents, chimneys, architectural features and roof mounted equipment, shall be located in the solar zone.

- B. Any obstruction, located on the roof or any other part of the building that projects above a solar zone shall be located at least twice the distance, measured in the horizontal plane, of the height difference between the highest point of the obstruction and the

horizontal projection of the nearest point of the solar zone, measured in the vertical plane.

Exception to Section 110.10(b)3: Any roof obstruction, located on the roof or any other part of the building, that is oriented north of all points on the solar zone.

4. Structural design loads on construction documents.

For areas of the roof designated as solar zone, the structural design loads for roof dead load and roof live load shall be clearly indicated on the construction documents.

Note: Section 110.10(b)4 does not require the inclusion of any collateral loads for future solar energy systems.

(c) Interconnection pathways.

1. The construction documents shall indicate a location for inverters and metering equipment and a pathway for routing of conduit from the solar zone to the point of interconnection with the electrical service. For single-family residences the point of interconnection will be the main service panel.
2. The construction documents shall indicate a pathway for routing of plumbing from the solar zone to the water-heating system.

(d) Documentation. A copy of the construction documents or a comparable document indicating the information from Sections 110.10(b) through 110.10(c) shall be provided to the occupant.

(e) Main electrical service panel.

1. The main electrical service panel shall have a minimum busbar rating of 200 amps.
2. The main electrical service panel shall have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation.

A. Location. The reserved space shall be positioned at the opposite (load) end from the input feeder location or main circuit location.

B. Marking. The reserved space shall be permanently marked as "For Future Solar Electric."

RESIDENTIAL MANDATORY MEASURES

3. French drains
4. Water retention gardens
5. Other water measures which keep surface water away from buildings and aid in groundwater recharge.

Exception: Additions and alterations not altering the drainage path.

4.106.4. Electric vehicle (EV) charging for new construction. New construction shall comply with Sections 4.106.4.1 and 4.106.4.2 to facilitate future installation and use of EV chargers. Electric vehicle supply equipment (EVSE) shall be installed in accordance with the *California Electrical Code*, Article 625.

Exceptions: On a case-by-case basis, where the local enforcing agency has determined EV charging and infrastructure are not feasible based upon one or more of the following conditions:

1. Where there is no commercial power supply.
2. Where there is evidence substantiating that meeting the requirements will alter the local utility infrastructure design requirements on the utility side of the meter so as to increase the utility side cost to the homeowner or the developer by more than \$400.00 per dwelling unit.

4.106.4.1 New one- and two-family dwellings and townhouses with attached private garages. For each dwelling unit, install a listed raceway to accommodate a dedicated 208/240-volt branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall originate at the main service or subpanel and shall terminate into a listed cabinet, box or other enclosure in close proximity to the proposed location of an EV charger. Raceways are required to be continuous at enclosed, inaccessible or concealed areas and spaces. The service panel and/or subpanel shall provide capacity to install a 40-ampere minimum dedicated branch circuit and space(s) reserved to permit installation of a branch circuit overcurrent protective device.

4.106.4.1.1 Identification. The service panel or subpanel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging as "EV CAPABLE". The raceway termination location shall be permanently and visibly marked as "EV CAPABLE".

4.106.4.2 New multifamily dwellings. Where 17 or more multifamily dwelling units are constructed on a building site, 3 percent of the total number of parking spaces provided for all types of parking facilities, but in no case less than one, shall be electric vehicle charging stations (EVCS) capable of supporting future EVSE and shall be identified on construction documents. Calculations for the number of EVCS shall be rounded up to the nearest whole number.

Note: Construction documents are intended to demonstrate the project's capability and capacity for facilitating future EV charging. There is no requirement for EVCS to be constructed or available until EV chargers are installed for use.

4.106.4.2.1 Electric vehicle charging station (EVCS) locations. Construction documents shall indicate the location of proposed EVCS. At least one EVCS shall be

located in common use areas and available for use by all residents.

When EV chargers are installed, EVCS required by Section 4.106.2.2, Item 3, shall comply with at least one of the following options:

1. The EVCS shall be located adjacent to an accessible parking space meeting the requirements of the *California Building Code*, Chapter 11A, to allow use of the EV charger from the accessible parking space.
2. The EVCS shall be located on an accessible route, as defined in the *California Building Code*, Chapter 2, to the building.

4.106.4.2.2 Electric vehicle charging station (EVCS) dimensions and slope. The EVCS shall be designed to comply with the following:

1. The minimum length of each EVCS shall be 18 feet (5486 mm).
2. The minimum width of each EVCS shall be 9 feet (2743 mm).
3. One in every 25 EVCS, but not less than one EVCS, shall also have an 8-foot (2438 mm) wide minimum aisle. A 5-foot (1524 mm) wide minimum aisle shall be permitted provided the minimum width of the EVCS is 12 feet (3658 mm).
 - a. Surface slope for this EVCS and the aisle shall not exceed 1 unit vertical in 48 units horizontal (2.083 percent slope) in any direction.

4.106.4.2.3 Single EVCS required. Install a listed raceway capable of accommodating a 208/240-volt dedicated branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall originate at the main service or subpanel and shall terminate into a listed cabinet, box or enclosure in close proximity to the proposed location of the EVCS. Construction documents shall identify the raceway termination point. The service panel and/or subpanel shall provide capacity to install a 40-ampere minimum dedicated branch circuit and space(s) reserved to permit installation of a branch circuit overcurrent protective device.

4.106.4.2.4 Multiple EVCS required. Construction documents shall indicate the raceway termination point and proposed location of future EVCS and EV chargers. Construction documents shall also provide information on amperage of future EVSE, raceway method(s), wiring schematics and electrical load calculations to verify that the electrical panel service capacity and electrical system, including any on-site distribution transformer(s), have sufficient capacity to simultaneously charge all EVs at all required EVCS at the full rated amperage of the EVSE. Plan design shall be based upon a 40-ampere minimum branch circuit. Raceways and related components that are planned to be installed underground, enclosed, inaccessible or in concealed areas and spaces shall be installed at the time of original construction.

4.106.4.2.5 Identification. The service panel or subpanel circuit directory shall identify the overcurrent

protective device space(s) reserved for future EV charging purposes as “EV CAPABLE” in accordance with the *California Electrical Code*.

Notes:

1. The California Department of Transportation adopts and publishes the “California Manual on Uniform Traffic Control Devices (California MUTCD)” to provide uniform standards and specifications for all official traffic control devices in California. Zero Emission Vehicle Signs and Pavement Markings can be found in the New Policies & Directives Number 13-01. Website: www.dot.ca.gov/hq/traffops/signtech/signdel/policy.htm.
2. See Vehicle Code Section 22511 for EV charging space signage in off-street parking facilities and for use of EV charging spaces.
3. The Governor’s Office of Planning and Research (OPR) published a “Zero-Emission Vehicle Community Readiness Guidebook” which provides helpful information for local governments, residents and businesses. Website: http://opr.ca.gov/docs/ZEV_Guidebook.pdf.
4. The Governor’s Office of Planning and Research (OPR) has developed draft guidelines, “Plug-In Electric Vehicles: Universal Charging Access Guidelines and Best Practices”, addressing physical accessibility standards and design guidelines for EVs. Website: http://opr.ca.gov/docs/PEV_Access_Guidelines.pdf.

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

CLEAN AIR/
VANPOOL/EV

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

5.106.5.3 Electric vehicle (EV) charging. [N] Construction shall comply with Section 5.106.5.3.1 or Section 5.106.5.3.2 to facilitate future installation of electric vehicle supply equipment (EVSE). When EVSE(s) is/are installed, it shall be in accordance with the *California Building Code*, the *California Electrical Code* and as follows:

5.106.5.3.1 Single charging space requirements. [N] When only a single charging space is required per Table 5.106.5.3.3, a raceway is required to be installed at the time of construction and shall be installed in accordance with the *California Electrical Code*. Construction plans and specifications shall include, but are not limited to, the following:

1. The type and location of the EVSE.
2. A listed raceway capable of accommodating a 208/240-volt dedicated branch circuit.
3. The raceway shall not be less than trade size 1.”
4. The raceway shall originate at a service panel or a subpanel serving the area, and shall terminate in close proximity to the proposed location of the charging equipment and into a listed suitable cabinet, box, enclosure or equivalent.
5. The service panel or subpanel shall have sufficient capacity to accommodate a minimum 40-ampere dedicated branch circuit for the future installation of the EVSE.

5.106.5.3.2 Multiple charging space requirements. [N] When multiple charging spaces are required per Table 5.106.5.3.3 raceway(s) is/are required to be installed at the time of construction and shall be installed in accordance with the *California Electrical Code*. Construction plans and specifications shall include, but are not limited to, the following:

1. The type and location of the EVSE.
2. The raceway(s) shall originate at a service panel or a subpanel(s) serving the area, and shall terminate in close proximity to the proposed location of the charging equipment and into listed suitable cabinet(s), box(es), enclosure(s) or equivalent.
3. Plan design shall be based upon 40-ampere minimum branch circuits.
4. Electrical calculations shall substantiate the design of the electrical system, to include the rating of equipment and any on-site distribution transformers and have sufficient capacity to simultaneously charge all required EVs at its full rated amperage.

5. The service panel or subpanel(s) shall have sufficient capacity to accommodate the required number of dedicated branch circuit(s) for the future installation of the EVSE.

5.106.5.3.3 EV charging space calculation. [N] Table 5.106.5.3.3 shall be used to determine if single or multiple charging space requirements apply for the future installation of EVSE.

Exceptions: On a case-by-case basis where the local enforcing agency has determined EV charging and infrastructure is not feasible based upon one or more of the following conditions:

1. Where there is insufficient electrical supply.
2. Where there is evidence suitable to the local enforcing agency substantiating that additional local utility infrastructure design requirements, directly related to the implementation of Section 5.106.5.3, may adversely impact the construction cost of the project.

TABLE 5.106.5.3.3

TOTAL NUMBER OF PARKING SPACES	NUMBER OF REQUIRED EV CHARGING SPACES
0-50	0
51-75	1
76-100	2
101-200	3
201 and over	3% ¹

1. Calculation for spaces shall be rounded up to the nearest whole number

5.106.5.3.4 [N] Identification. The service panel or subpanel(s) circuit directory shall identify the reserved overcurrent protective device space(s) for future EV charging as “EV CAPABLE”. The raceway termination location shall be permanently and visibly marked as “EV CAPABLE.”

5.106.5.3.5 [N] Future charging spaces qualify as designated parking as described in Section 5.106.5.2 Designated parking.

Notes:

1. The California Department of Transportation adopts and publishes the California Manual on Uniform Traffic Control Devices (California MUTCD) to provide uniform standards and specifications for all official traffic control devices in California. Zero Emission Vehicle Signs and Pavement Markings can be found in the New Policies & Directives number 13-01. www.dot.ca.gov/hq/traffops/policy/13-01.pdf.
2. See Vehicle Code Section 22511 for EV charging spaces signage in off-street parking facilities and for use of EV charging spaces.
3. The Governor’s Office of Planning and Research published a Zero-Emission Vehicle Community Readiness Guidebook which pro-

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vides helpful information for local governments, residents and businesses. www.opr.ca.gov/docs/ZEV_Guidebook.pdf.

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

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

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

Exceptions: [N]

1. Luminaires that qualify as exceptions in Section 140.7 of the *California Energy Code*.
2. Emergency lighting.

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

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

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

Exception: Additions and alterations not altering the drainage path.

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

ALLOWABLE RATING	LIGHTING ZONE 1	LIGHTING ZONE 2	LIGHTING ZONE 3	LIGHTING ZONE 4
Maximum Allowable Backlight Rating³				
Luminaire greater than 2 mounting heights (MH) from property line	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1 – 2 MH from property line	B2	B3	B4	B4
Luminaire back hemisphere is 0.5 – 1 MH from property line	B1	B2	B3	B3
Luminaire back hemisphere is less than 0.5 MH from property line	B0	B0	B1	B2
Maximum Allowable Uplight Rating				
For area lighting ⁴	U0	U0	U0	U0
For all other outdoor lighting, including decorative luminaires	U1	U2	U3	U4
Maximum Allowable Glare Rating⁵				
Luminaire greater than 2 MH from property line	G1	G2	G3	G4
Luminaire front hemisphere is 1 – 2 MH from property line	G0	G1	G1	G2
Luminaire front hemisphere is 0.5 – 1 MH from property line	G0	G0	G1	G1
Luminaire back hemisphere is less than 0.5 MH from property line	G0	G0	G0	G1

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

Applied Water for Turf Calculator

The Applied Water for Turf Calculator (Calculator) is a Microsoft Excel tool created in the fall of 2015 by town staff to show users how much water they will need to apply annually to their irrigated turf landscapes. Therefore, the Calculator can be used to show roughly how much water will need to be stored in a rainwater catchment system or cistern in order to meet the annual watering needs of irrigated turf. The following are the key inputs for the calculator: (a) the evapotranspiration for applied water (ET_{aw}) for warm-season and cool-season turf, (b) the irrigated landscape area in square feet, (c) the conversion factor for going from acre-inches/acre/year to gallons/ft²/year, (d) and the irrigation efficiency for drip and spray irrigation.

The methodology used for calculating the annual water demands for irrigated turf is consistent with the methodology used by the California Department of Water Resources to estimate ET of applied water (ET_{aw}) for grass on a 4x4 km grid using the daily soil water balance program “California Simulation of Evapotranspiration of Applied Water” or “Cal-SIMETA_W.”¹

Cal-SIMETA_W is a new tool developed by the California Department of Water Resources and the University of California, Davis to estimate daily water balance in the crop root zone to determine crop evapotranspiration (ET_c) and evapotranspiration of applied water (ET_{aw}) for use in California Water Plan Update 2018, which is mandated by the state law to be updated every 5 years.¹ Cal-SIMETA_W was specifically designed to improve the department’s estimates of ET_c and ET_{aw} for agricultural crops and other surfaces which account for most evapotranspiration losses and water contributions from ground water seepage, precipitation, and irrigation. The model requires weather data, soils, crop coefficients, rooting depths, seepage etc., that influence crop water balance.¹ The model uses daily PRISM weather data, which are derived from monthly PRISM climate data and daily US National Climate Data Center climate station data to cover California on a 4 x4 km grid spacing.¹

The model also uses SSURGO soil characteristic data and crop information with precipitation and ET_c data to generate hypothetical water balance irrigation schedules to determine ET_{aw}, which is the amount of applied irrigation water that contributes to crop evapotranspiration or ET_c assuming 100% application efficiency.¹ Therefore, ET_{aw} is the amount of diverted water needed to produce a crop or maintain an urban landscape.¹

¹ Orang, Morteza, “Assessment of Water Demand for Cool-season Grass in California Using CAL-SIMETA_W,” California Department of Water Resources, March 2015, p 2.

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PLANNING COMMISSION REGULAR MEETING, TOWN OF PORTOLA VALLEY, MAY 18, 2016, SCHOOLHOUSE, TOWN CENTER, 765 PORTOLA ROAD, PORTOLA VALLEY, CA 94028

Chair Hasko called the Planning Commission regular meeting to order at 7:00 p.m.

Present: Commissioners McKitterick, Targ, and Von Feldt; Chair Hasko

Absent: Vice Chair Gilbert

Staff Present: Debbie Pedro, Planning Director

ORAL COMMUNICATIONS

None.

NEW BUSINESS

- (a) Preliminary Review of a Proposed Conditional Use Permit Amendment and Architectural Review to Add an Attached Six Bedroom Dwelling Unit to the Existing Facility. File #15-2016, 3639 Alpine Road, Stanford University/Murdoch.

Planning Director Pedro presented the staff report. She said that in 2002 the Planning Commission had approved a use permit for Glen Oaks Equestrian Center. She said the applicant is requesting to build six dormitory-style units for the employees by enclosing the porch at the northeast corner of the stable building. She said that each of the six rooms measures approximately 8' x 10'. There will also be a shared kitchen, a lounge, and an ADA-compliant bathroom.

Commissioner McKitterick said an equestrian facility that boards and train horses is not an agricultural use; however, since the Commission is not making any findings that this is an agricultural use but rather a use that is of similar character, he is comfortable with the proposal.

In response to Chair Hasko's question, Planning Director Pedro confirmed that the Geologist was generally comfortable with the proposal, but they wanted updated information because the report was 15 years old.

With no further questions, Chair Hasko called for discussion by the Commission.

Commissioner Targ was supportive of the application. He said the proposed use was entirely consistent with the character and setting of the property, including the requirements associated with the Scenic Corridor. He was supportive of adding the six housing units on site.

Commissioner Von Feldt was supportive of the project. She said it was very appropriate for the site and being able to provide housing for six people would help the Housing Element numbers, reduce the carbon footprint, and increase the diversity of the Town's housing stock. She said the project fit within the general character of the permitted use.

Commissioner McKitterick was supportive of the project. He noted that the original use permit did foresee housing on the site.

Chair Hasko was supportive of the project. She said that as an equestrian she felt it was important to have people on the premises who could respond to emergencies. She was happy to see housing being made available to people who work in the community. She agreed with her fellow commissioners

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that the proposed use is of similar character and consistent with the permitted uses in the zoning district.

Planning Director Pedro said the project will next be presented to the ASCC for their review and then be brought back to the Planning Commission.

(b) Portola Valley's Geology – Presentation by the Town Geologist.

Town Geologist, Ted Sayre, narrated a slide show presentation of Portola Valley's Geology. He described the development of the Ground Movement Potential Map, landslides, creeks, and earthquake faults that affect the Town.

He said the geology maps provide information regarding natural hazards, provide early warnings for developers, and address conservation and public safety. He said the geology classifications can become building blocks for ordinances, reduce the Town's liability exposure, and allow residents who have preexisting homes situated in hazard areas to be proactive in improving the safety of their sites.

He described the ground movement potential maps and the geologic designations. He explained that designations beginning with "S" denote a relatively stable type of ground. "Sbr" is stable bedrock; "Sun" is stable unconsolidated granular materials; "SlS" is stabilized landslide; and "Sex" is stable but potentially expansive soil areas.

He said any designation started with "P" indicates potential instability. "Pd" is potential deep instability, such as existing landslides or ground that may fail 10 feet or deeper in the future; "Ps" is potential instability less than 10 feet in depth; "Pdf" is debris flow hazard; "Pf" is a potential fault rupture hazard; and "Pmw" is potential mass-wasting, primarily related to rock fall areas.

He said "Ms" is moving shallow landslides and "Md" is moving deep landslides.

Commissioner McKitterick asked regarding the timeframe from when a moving landslide becomes some other geologic classification. The Town Geologist said there had been changes made to the movement potential map where people had monitored landslides over a period of 10 or more years and shown there had been no movement, which would change an Md rating to a Pd rating. He said the intent of moving ground is to catch recently active landslides and ones that may move under wet winter conditions. He said each of the categories is tied to certain types of landslides – active, dormant, recent, old, and ancient landslides.

Chair Hasko asked regarding the significance of the 10-foot depth. The Town Geologist said 10 feet was an arbitrary measurement, but it fits well in that most instability that is 10 feet or less in depth is amenable to standard engineering solutions such as pier supports that go through the material to more stable ground, grading with sub-drain systems, etc. He said deeper instability would require much more extensive engineering, if it was even possible.

The Town Geologist described the dynamics of the town creeks. He said their office has created various creek condition maps and do reconnaissance at local creeks after big storm seasons and map various bank improvements and the location and performance of various bank improvements, which shows them what type of bank stabilization measures do and don't work. Commissioner Von Feldt asked if they also documented fish barriers along the creek. He said if they see any engineered structure, they photograph and document it.

The Town Geologist said the town is in an active tectonic environment and pointed out the faults and the rift zones, and also showed LiDAR images. In response to a question by ASCC Vice Chair Danna

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Breen, the Town Geologist described the movement that has occurred along the San Andreas Fault and the changes in the physical terrain.

Commissioner Targ asked if the Commission should be thinking proactively about slide areas to avoid some of the impacts that may occur. The Town Geologist said there are some landslide areas that were built on before regulatory controls were in place. He said there are existing situations where there could be instability and he said it is important to think about fire issues, breaking water mains, and roadway access. He said that major earthquake events are relatively infrequent, every 200 years; however, he is more concerned regarding the ability to deal with fires in some of the hillside areas.

The Commission and the Town Geologist discussed seismic shut-off valves for residential lateral gas leads and suggested that could be a discussion item for the Emergency Preparedness Committee. They also discussed various tax incentive programs for retrofitting, outreach programs to educate residents regarding earthquake safety, and State grants for retrofit bracing.

The Commission thanked the Town Geologist for the presentation.

OLD BUSINESS

- (a) Update on Priory School Annual Report.

Chair Hasko said the Planning Commission had requested additional student enrollment data for the Priory School. This arose from the Priory's obligation to continue using all reasonable efforts to increase the number of Portola Valley students in the school. Planning Director Pedro passed around an updated chart which included a column that referred to Portola Valley percentage of day students.

Commissioner McKitterick pointed out that the "PV" zone on the chart includes areas in the Town's sphere of influence which is the same measurement used in the Use Permit.

Tim Molak, Head of School, noted that during the original use permit discussion, it was acknowledged that while commercial or office use in the Town are required to have a majority of their clients come from Portola Valley, it was not possible with a school. He said even though it was not in writing, the former Town Planner had come up with the yearly goal of 20% Portola Valley residents and the school has been striving to meet that target.

In response to a question from the Commission, Mr. Molak said the chart does not include boarded students.

Chair Hasko called for questions from the Commission.

Commissioner McKitterick asked if the CUP designated a certain number of day students versus boarders. Mr. Molak said a maximum of 50 of the students may be in the residential program. He said there was no distinction between day students and boarding students with regard to the effort to increase the number of Portola Valley students.

Hearing no more questions, Chair Hasko asked for comments.

Commissioner McKitterick said, given the CUP language, he would like to see future reports make clear that all of the "PV" statistics include the sphere of influence. He also requested the report show percentage for total students, including the boarders, since the CUP does not distinguish between the two, although as far as Planning is concerned, boarders do not have the same traffic impact. He said the report was very informative.

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Commissioner Targ said boarding is an intrinsically out-of-area service being provided and he would also like to see those statistics included in the report.

Commissioner McKitterick said the CUP doesn't contain a 20 percent goal but contains language about efforts. He said because of that, the PV Accept Rate is important.

Mr. Molak said they would be providing admissions and enrollment charts and include all the information requested. He said the Complete PV Applications figure is indicative of how many students are interested in the Priory and that figure has never been high. He said that figure may be 20 or 40 percent of potential eligible students.

Chair Hasko expressed her appreciation to the Priory for providing this information.

COMMISSION, STAFF, COMMITTEE REPORTS AND RECOMMENDATIONS

Chair Hasko said Town Manager Dennis circulated an email for volunteers to serve as emergency operations center backup. She said that since a lot of the staff does not live near here, there is an effort to have a team lined up and ready to go to address a range of tasks in the event of an emergency. Chair Hasko asked that this item be added to the next Commission agenda.

Commissioner Targ asked staff regarding the status of the Affordable Housing discussion. Planning Director Pedro said the Town Manager has tentatively scheduled this item to go to Council in July before coming to the Planning Commission for discussion. Commissioner Targ said that this issue has been identified by the Council as a high priority, but since the Commission is typically out of session in August, the matter would not be revisited until the fall. Chair Hasko suggested staff speed up that process if possible.

APPROVAL OF MINUTES: May 4, 2016

Commissioner McKitterick moved to approve the minutes of the May 4, 2016, meeting, as amended. Seconded by Commissioner Targ; the motion carried 4-0.

ADJOURNMENT [8:30 p.m.]