

# City of Santa Cruz Green Building Program

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The Green Building Program is a set of user friendly requirements and resources to ensure that all new construction in the City of Santa Cruz adheres to the highest environmental standards possible.

The intent of the program is to provide the means, motivation, and support to act responsibly. It is designed to enhance and preserve our natural resources, conserve energy and improve the indoor air quality of the built environment. The program is accomplishing these goals through the utilization of sustainable environmentally preferable materials and construction techniques.

The City of Santa Cruz' Green Building Program is one of the first in the United States. This means that we as a community are taking a leadership role to ensure a greener and more sustainable future. We should all be proud.

A Green Building....

- Minimizes environmental impact.
- Effectively utilizes natural resources.
- Conserves Energy and Resources.
- Provides a healthy live or work space.
- Reduces cost of services and utilities.



# Project Qualification

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The Green Building Program Applies to all Residential, Commercial and Industrial building projects within the City of Santa Cruz.

## SPECIFICALLY:

- Residential additions and remodels 350 square feet or more
- Non-residential remodels and additions 1000 square feet or more
- Stand alone decks of less than 350 square feet are exempt from the program
- Unless exempted, in order to obtain a building permit in the City of Santa Cruz all new residential and non-residential buildings, remodels and additions must obtain a minimum number of points by implementing Green Building features as outlined in the following chapters.
- Points required are dependent on the square footage of the project and increase as the project size increases.
- Plan sets for building permit submittals must include mandatory features at application stage.

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## Program History – SCMC 24.15

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**RECOMMENDATION:** That the City Council (1) introduce for publication an ordinance of the City of Santa Cruz amending Title 24 of the Santa Cruz Municipal Code by adding Section 24.15, Green Building Regulations, creating Green Building Regulations for all new and substantially remodeled buildings and additions thereto; (2) by motion adopt the “City of Santa Cruz Green Building Program – Standards for Compliance” as a reference document for the Green Building Regulations; and (3) by motion sunset the Green Building Working Group and direct the Mayor to express appreciation to the members for their service.

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### BACKGROUND

On September 26, 2002, the Planning Commission, in response to direction from the City Council, established a Green Building Working Group (GBWG) to develop a green building policy and regulatory framework for the City of Santa Cruz. Over the next two years, the fifteen-member committee reviewed policies and programs from a variety of sources and held two well-attended public workshops. The GBWG presented a draft plan to the Planning Commission in August 2004 and to the City Council two months later.

The plan proposed at that time received generally positive comments from the Commission and Council but had several components that were seen as problematic:

1. A negative incentive in the form of a “brown fee” charged for not building “green.”
2. A positive incentive of reduced or deferred permit fees, resulting in loss of revenue to the City.
3. The cost of creating a new staff position, the Green Building Coordinator.

The Council directed the GBWG to rethink its proposed plan with the objective of producing a workable program that would involve minimal expense to the City. On September 15, 2005, the GBWG’s revised program was presented to the Planning Commission, which unanimously recommended approval to the City Council. Following is a summary of both the original and the revised plans.

### DISCUSSION

#### Original Proposal

*Point System.* The program proposed a point system based upon the Alameda County green building program for residential structures and the U.S. Green Building Council’s “Leadership in Energy and Environmental Design” (LEED) program for all non-residential structures. The program would apply to all new construction, additions and remodels, with exclusions for minor projects. After a trial period of voluntary compliance

and participation, there would be increasing requirements for participation until 100% mandatory participation is achieved within two years of plan implementation.

Incentives. All development applications would require submission of a checklist identifying the green building practices which would qualify the project for points as specified in the program.

Projects that failed to meet a minimum point threshold (or that opt out of participation) would be subject to a “brown” fee for not building “green.” Projects that met specified thresholds would qualify for four incentives:

1. Waiver of the “brown” fee
2. Priority permit processing
3. Reduction or deferral of planning and building permit fees
4. Public recognition and awards

City Participation. Projects undertaken by the City or that receive funding from the City or Redevelopment Agency would be required to achieve points equivalent to the LEED Silver standard.

Program Coordination. A “Green Building Coordinator” position would be created to oversee program compliance and implementation.

Staff concerns. At the presentations to the Planning Commission and City Council last fall, staff identified several concerns:

1. The legality of collecting a “brown fee.”
2. The added staff workload of verifying compliance with claimed “points.”
3. What to do with deconstructed materials, as our landfills are unprepared to accept them.
4. Providing priority processing in a reduced staffing environment.
5. Reduction of fees, with resulting loss of revenue to support staffing.
6. Applying the program to the existing building stock, especially historic buildings.

### **Revised Proposal**

In rethinking its proposed plan, the GBWG concluded that an incentive-based voluntary program as the initial phase is not feasible, given the difficulties posed by the incentives. Instead, the GBWG recommends implementation of a mandatory program for all new and substantially modified buildings, with a one-year, no-penalty trial period for testing the process and ironing out any problems.

Point System. All development applications will still require submission of a checklist identifying the green building practices which would qualify the project for points as specified in the program. Projects that fail to meet a minimum point threshold will simply not be issued a building permit. While this provision might conceivably result in construction without permits and thus the need for increased code enforcement activity,

the compliance limit is set very low to encourage participation. It can be raised in the future as the program matures.

Incentives. Since participation after the trial period will be mandatory, the “brown fee” and fee reduction incentives for voluntary participation have been dropped. However, the incentive of accelerated processing has been retained for projects that substantially exceed the minimum point threshold, and a public recognition program is proposed for projects achieving the highest level of participation.

City Participation. The City of Santa Cruz will be expected to lead by example in all of its construction projects and any private projects funded with public money. Projects undertaken by the City or that receive funding from the City or Redevelopment Agency would be required to achieve points equivalent to the LEED certified standard for non-residential projects and equivalent to the points necessary for accelerated processing for residential projects.

Program Coordination. The revised plan is designed to be administered by existing staff without hiring additional personnel to coordinate the program, at least initially. The Department of Planning and Community Development will implement the program in conjunction with its existing building and zoning permit programs, with Inspection Services staff having primary responsibility. Program implementation will involve modification of current permit review procedures to incorporate green building program requirements, development of monitoring tools, and creation and maintenance of education and outreach efforts. If the program is adopted, the department will propose upgrading one of its Senior Building Inspector positions to a management position with these added responsibilities.

Education of the public and the building community is critical to the success of this program. Green building requires a fundamental rethinking of construction techniques to incorporate sustainable measures. As demand for sustainable measures has grown, local suppliers have begun to stock more and more "green materials" and the materials are finding their way into many homes and businesses. One of the most important factors in increased demand is increased awareness on the part of consumers. To that end, the City's program should provide regular educational opportunities that can be attended at little or no cost by the public and City staff.

To accomplish this goal a small fee has been built into the program that will be used to fund educational opportunities and offset staff costs for program coordination. Education and outreach efforts would include bringing in experts to lead seminars on green building; purchasing green building resource materials such as brochures, workbooks and other handouts; advertisement of program offerings; and funding of a plaque program for exceptional projects, similar to that already in place for historical buildings.

Staff concerns. Most of staff's earlier concerns have been addressed in the program revisions. The implications of those that remain, such as the provision for accelerated processing, can be assessed during the one-year trial period and brought back for consideration of program adjustments as appropriate.

### **Program Regulatory Components**

- Zoning Ordinance Section 24.15 (added): Establishes the basic program requirements and standards for compliance; provides criteria for accelerated processing and recognition for exceptional design; establishes Green Building Educational Resource Fund.
- City of Santa Cruz Green Building Program: Standards for Compliance: Explains the point system and the categories into which green building opportunities and techniques are grouped; includes as appendices the points checklists for residential and non-residential buildings; provides for program implementation and phasing.

### **SUMMARY**

The Green Building Working Group has developed a green building regulatory framework for the City of Santa Cruz that provides for minimum mandatory measures as well as incentives for fuller participation. The program is designed for easy compliance without adding a significant burden to design and/or construction costs. By keeping the program flexible, it can be easily updated to reflect current practices and updated technologies without interfering with normal code adoption or creating an excessive work load for staff. Upon adoption of the program, it is recommended that the Council sunset the GBWG with appreciation for their work.

### **FISCAL IMPACT**

Implementation of the proposed Green Building Program will require additional staff time to handle increased plan checking and inspection/monitoring requirements. As building and construction standards are the core of the program, it is recommended that a senior building inspector position be upgraded with responsibility for program implementation and monitoring. City building construction projects could incur greater up-front costs that would be offset by long-term savings in operating costs. Revenue generated by the proposed education resource fund is expected to fully offset costs associated with program management, public education and outreach programs.

# Program History: 2008 Update FYI to City Council

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## INFORMATION REPORT

DATE: 4-3-2008

TO: City Manager  
DEPARTMENT: Planning and Community Development  
SUBJECT: **SCMC 24.15 – Green Building Residential Program Update**

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APPROVED:

DATE:

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### BACKGROUND:

In 2005, the City Council adopted and put into effect Chapter 24.15 of the Municipal Code; creating the Green Building Ordinance. This ordinance was adopted as a living document which allows for changes and upgrading of the "Standards for Compliance" as new materials, techniques and technologies emerge without having to modify the enabling document. The program operated on a voluntary basis in 2006 becoming mandatory in 2007 and has been an exceptional success.

### DISCUSSION:

With the recent adoption of new building codes in January 2008 as well as changes to the California Energy Code, staff has analyzed our residential Green Building program to determine how to stay current. It is clear that there is now a need to upgrade the program to both meet the changing needs of the construction community and to continue the effort to provide regional and state wide program continuity.

Some of the features and corresponding points that were available are now mandated on the state level and therefore should not be included as opportunities for compliance within our program. New features have been added and consequently more points are available. At the same time, a higher threshold has been established to take advantage of these points. A modest increase in compliance requirements is being built in to accomplish this task.

### SUMMARY:

Bearing in mind a year's worth of experience and community feedback about what is working, what needs to be changed, and features that need to be added; the Department of Planning and Community Development recommends that the Green Building Residential Checklists be modified to reflect advances in practices and the new building codes. The total available points and required base points have both been increased yet the ratio between the two has undergone little change; with an increase of approximately 1 percent. Appendix B (Residential) will be modified to follow the intent of the ordinance by raising the compliance limit to a level that maintains the cutting edge nature of the program while not becoming cost prohibitive or overly difficult for builders.

**EFFECTIVE DATE:**

Staff intends to implement the updated residential checklists and points thresholds unless notified of any concerns by the City Council within seven days of their receipt of this item. Staff will then commence analyzing the non-residential program for similar upgrades

Submitted by:

Alex Khoury, Acting Director of  
Planning and Community Development

Attached:

- Appendix B - As approved by Council in 2005
- Appendix B - As proposed by Department of Planning and Community Development
- Summary of changes, deletions and modifications to Appendix B

# Program History: 2008 Update Summary of Modifications

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One prerequisite was added to the program:

1. All projects must provide verification of Proper Insulation Installation

## A. Community Design Issues (In 2008 Version: Integrated Design Features)

- In the 2007 version no points were possible, now 42 points are available
- Of the 8 original categories, 2 were kept. 8 new categories were added.

## B. Site

- The points available for Category 3 were decreased from 2 to 1
- A mathematical error was corrected; the point totals for the section should have been 25 and 21, not 27 and 23.
- A grammatical clarification; total available points for recycling = 4
- Credit for Installation of Solar Walkway Lights was moved from Renewable Energy and Roofing to Site.

## C. Foundation

- Category 4 was amended to offer the use of recycled aggregate as a sub-base/ under-layer for paths and driveways rather than use in concrete.
- Category 9 was added.
- Category 10 was added.
- Category 11 was added.

## D. Structural Frame

- Category 12 was added.

## E. Exterior Finish

- Category 6 was added.

## F. Plumbing

- Category 4 was amended to read: Install Chlorine Filter on Showerhead (1 Point Per Showerhead up to 4) or A Whole House Chlorine Filter (4 Points)
- Category 7 was amended to read: Install Indoor Grey Water Recovery/ Reuse System (10 Points)
- Category 10 was modified.

#### G. Electrical

- The following changes to the section apply only to new construction and were changed to reflect current title 24 regulations.
- Zero points for Category 1.
- Zero points for Category 2.
- Zero points for Category 3.

#### H. Appliances

- No modifications were made to this category.

#### I. Insulation

- The points available for category 2 were reduced from 3 to 1.
- Category 3 changed from ‘Advanced Infiltration Reduction Techniques’ to ‘Practice Proper Insulation Installation’ and became mandatory for new homes as well as additions/ remodels. (See Forms: Proper Insulation Installation Verification Form)
- Cellulose and recycled cotton insulation were removed from the list of insulation materials.

#### J. Windows

- The following changes to the section apply only to new construction and were changed to reflect current title 24 regulations.
- Zero points for category 1
- Zero points for category 3
- Zero points for category 4

#### K. Heating Ventilation and Air Conditioning

- The points available for Category 6 were reduced from 4 to 3
- Category 13 was changed to require a MERV 6+ rating rather than HEPA

#### L. Renewable Energy and Roofing

- The points available for category 2 were increased from 10 to 14
- Category 4 was amended. Points no longer correspond to kW installed. Points available were decreased from 18 to 14
- Category 5 was added

#### M. Natural Heating and Cooling

- Category 2 was added.
- Category 4 was added.

#### N. Indoor Air Quality and Finishes

- Category 11 was added.

O. Flooring

- The available points for category 3 were decreased from 4 to 3
- Category 5 was deleted.
- The available points for category 1 were decreased from 8 to 6
- The available points for category 6 were increased from 4 to 6
- Category 7 was deleted

P. Other

- Category 4 had subcategories a-h added as innovation points. These sub-categories will be monitored and at the time of the next update may be applied as new categories.

Points

- The total possible points for the program were increased
  - New Homes: 460 points to 506 points
  - Remodel/Additions: 464 points to 523 points
- The multipliers were not changed
- The base points were changed for both the new homes and remodels/additions.

# Program Overview

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The City of Santa Cruz Green Building program distinguishes between two types of building projects: (a) non-residential projects, and (b) residential projects.

The non-residential component is based on the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED®) standard, which awards points based on building performance. The calculations of performance for LEED are typically done by design professionals using specialized knowledge and forms. Thus the LEED system is typically used for larger projects in the non-residential (commercial) sector, where specialized professionals will typically be involved already.

The residential component is based on the Alameda County Waste Management Authority (ACWMA) Green Building Guidelines and awards points for specific measures rather than performance. The identification of the measures being utilized does not require specialized knowledge. Thus the ACWMA system is suitable for both small and large projects, not necessarily employing specialized professionals.

The basis for compliance consists of the checklists from these two programs, which set out the number of points earned for any one of the measures on the checklist. Compliance is measured in terms of the total number of points for the items to which the applicant commits at the time of building permit application. However, the program is flexible enough to permit some modifications as projects progress.

Projects are required to implement items for which points have been awarded. Typically this will be enforced at intermediate or final building inspections. If for some reason beyond the applicant's control a measure cannot be implemented, then other green item(s) with an equivalent point total must be substituted, with prior approval from the Building Department.

The point systems are used to award the following actions:

(1) Receipt of the building permit (mandatory)

A minimum number of points (as described below) are required to receive the building permit. This element of the program is mandatory. The only exceptions are relatively small projects; the threshold sizes for these exceptions are given below along with the point requirements.

(2) Accelerated permit processing (optional, awarded for exceptional design)

If the project applicant commits to a larger number of points (as described below) accelerated Building Permit processing will be given. The specific accelerated processing protocol to be followed by Building Department staff is enumerated in a separate document.

### (3) Project Recognition and Green Building Award (optional)

Projects achieving a still larger number of points (as described below) will be recognized publicly through the education and outreach program and will receive Green Building Awards.

## **II. STANDARDS FOR COMPLIANCE FOR NON-RESIDENTIAL PROJECTS:**

### **LEED® Model**

The LEED system was used as a model to develop the non-residential aspect of the program. The system recognizes six major categories of opportunities and uses the checklist similar to Appendix C. Points are awarded for performance that meets or exceeds defined metrics in each category. As a performance-based system, LEED provides the flexibility to accommodate a variety of designs and materials. Design teams can develop their own solutions to achieve a given point, or build upon elements of previously successful projects. After completion, the USGBC awards certification levels, ranging from basic Certification to Platinum recognition, according to the total number of points earned for green elements incorporated into the final project.

The six categories addressed by LEED are:

#### Sustainable Sites

Site selection affects energy consumption, commuting choices, local ecosystems, and infrastructure needs. Considerations include proximity to downtown, urban redevelopment, rehabilitation of adversely affected lands, minimizing building footprint, preserving natural ecosystems and agricultural lands, building orientation, landscaping, storm water flow, and erosion control.

#### Materials and Resources

- Maximize use of reused/reusable and recycled-content/recyclable materials. Minimize use of scarce resources and materials that create environmental or health problems during mining, production, transportation, building, use, or at the end of their useful life.

#### Energy and Atmosphere

- Maximize use of renewable energy sources, energy efficiency and passive solar design measures. Minimize fossil fuel and other non-renewable resource use.

#### Water Conservation and Management

- Maximize water conservation and water quality.

#### Indoor Air Quality

- Maximize indoor air quality. Minimize or eliminate toxic emissions generated by chemical off-gassing from synthetic and treated materials or from mold, including chemicals in furniture, rugs, and prefabricated materials.

Innovation and Design

- Encourage innovative approaches not specified in the other five categories that enhance LEED objectives and City policies.

The Santa Cruz Green Building Program uses the same guidelines for compliance, and while it does not recognize the various LEED levels of compliance, a project eligible for enhanced processing is essentially equivalent to a LEED Silver certified project (33-38 points) and projects eligible for both enhanced processing and award recognition are essentially equivalent to a LEED Gold certification (39-51 points). If a development team opts for full LEED certification through the USGBC system, they may substitute like for like compliance with the Santa Cruz program.

**Non-Residential Green Building Actions**

A total of 75 points (Appendix C) are available to earn actions at the building permit stage. (Projects in the Santa Cruz Green Building Program are awarded points for each of the measures considered ‘prerequisites’ in the original LEED rating system that did not provide for points in this category.) The point totals required to receive these actions, whether for new construction, additions, or interior remodels, are summarized in Table 1 below.

The non-residential system is performance based, so the point threshold for each of the actions is not dependent on project size.

**Non-Residential Green Building Actions**

A total of 75 points (Appendix C) may earn actions at the building permit stage. (Projects in the Santa Cruz Green Building Program are awarded points for each of the measures considered ‘prerequisites’ in the original LEED rating system that did not provide for points in this category.) The point totals required to receive these actions, whether for new construction, additions, or interior remodels, are summarized in Table 1 below.

The non-residential system is performance based, so the point threshold for each of the actions is not dependent on project size.

TABLE 1: NON-RESIDENTIAL (COMMERCIAL) ACTIONS AND POINT REQUIREMENTS

Total points possible	75
<i>Action</i>	<i>Points required to receive action:</i>
C-1. Receipt of Building Permit*	7
C-2. Accelerated building permit processing	33
C-3. Green Building Award	40

\*Exceptions: These points are not required for non-residential additions and remodels totaling less than 1000 square feet, or interior-only non-residential remodels of any size

### **III. STANDARDS FOR COMPLIANCE FOR RESIDENTIAL PROJECTS**

#### **Alameda County Waste Management Authority Model**

The Green Building Program for residential projects is based on the Residential Green Building Guidelines provided by the Alameda County Waste Management Association (ACWMA). It utilizes a checklist (Appendix B) derived from the ACWMA checklists for new construction and additions/remodels. ACWMA defines residential construction as single-family or multi-family residences, less than or equal to three stories (above grade) in height.

#### **Earning Residential Green Building Rating System Points**

The ACWMA-based checklist awards points for specific measures. Where no explicit quantitative measure for receiving credit under a specific point item is given, the following guideline shall apply: If a point credit is claimed, that item shall be applied wherever the specific building element mentioned appears in the project, except where physical factors prevent its use. For example, if credit is awarded for recycled low-VOC carpets (item N6) then wherever carpets are installed as part of the project, recycled low-VOC carpets shall be used. This would not preclude use of other types of flooring elsewhere. As a second example, if credit is awarded for "Use Wood I-joists for floors and ceilings" (item C.3) but solid sawn lumber needs to be used for deck framing in order to taper the joists to create proper coping for drainage, then credit C.3 applies if Wood I-joists are used for all of the interior (non-deck) floors and ceilings.

#### **Residential Green Building Sub-Categories and Size Dependence**

The residential system distinguishes between new construction and additions/remodels. The two columns in Appendix A of this document (covering new and additions/remodels, respectively) differ slightly because certain elements are practical only for new construction, while certain other elements are important mainly for remodels which may not be subject to other standards that apply to new construction.

Construction of a detached unit on property with existing dwellings is considered new construction.

Larger projects have more opportunities to incorporate specific measures than small projects. Therefore, larger buildings require more points than smaller buildings, to receive the same building permit action. For the purpose of determining the required points, the size of the project is defined as heated square footage per dwelling unit.

#### New Residential Construction

For new residential construction, there are 460 points available for building permit actions. No project will ever earn all 460 points, inasmuch as some measures are mutually exclusive.

For multi-unit properties, points are calculated per dwelling unit. When many of these units are identical to each other, the points do not need to be reported separately for each unit, but all units of a type must incorporate the sustainable measures in order for the

project to receive an action. The point requirements to earn each of the actions are summarized below in Table 2.

**TABLE 2: RESIDENTIAL NEW CONSTRUCTION ACTIONS AND POINT REQUIREMENTS**

Total Points Available	506	
<i>Action</i>	<i>Points required to receive action:</i>	
	<i>First 350 Square Feet</i>	<i>Each Additional 100 Square Feet</i>
R-N-1. Receipt of building permit	20	1.5
R-N-2. Accelerated building permit processing	45	2.5
R-N-3. Green Building Award	75	3.5

Exception: Stand alone decks less than 350 square feet are exempted from the program.

Residential remodeling or additions

For residential remodeling or additions, 464 points are available. For multi-unit properties, points are calculated per dwelling unit. The point requirements to earn each of the actions are summarized below in Table 3.

**TABLE 3: RESIDENTIAL REMODEL AND ADDITION ACTION POINT REQUIREMENTS**

Total Points Available	523	
<i>Action</i>	<i>Points required to receive action:</i>	
	<i>First 350 Square Feet</i>	<i>Each Additional 100 Square Feet</i>
R-A/R-1. Receipt of building permit*	15	1.1
R-A/R -2. Accelerated building permit processing	35	1.9
R-A/R -3. Green Building Award	45	2.5

\*Exception: These points are not required for additions and/or remodels of less than 350 square feet. Stand alone decks less than 350 square feet are exempted from the program.

**IV. PROGRAM IMPLEMENTATION AND PHASING**

Phase 1 (First 12 months after enactment of the Ordinance)

Phase-in period. All projects first applying for a building permit within this period are required to complete the checklist for their category (residential or non-residential) indicating which measures are being implemented. There is no mandatory requirement for a Building Permit. Both higher-level actions are available to participants. Outreach and Education Program activities begin.

Phase 2 (Thereafter)

Same as Phase 1 except mandatory point requirements for receiving a Building Permit are in effect.

## Program Overview: Compliance Process

### Plan Submittal:

- Plans Submitted for permit application must include an index of the green features and techniques to be implemented (See page 88)
- The Index must be specific to the project
- The Index must include the point category, features, points and plan page number
- The points must be taken from appendices B or C
- The Index must show the points required for the desired level of action (i.e. Permit Issuance, Accelerated Permit Processing, or Green Building Award)
- The Index must be cross referenced on the plan page specific to the features location, application, utilization, or installation
- Exceeding the minimum point requirement by 15%-20% is suggested to allow for project modifications such as unavailability of materials

**Plan submittals that do not include all of the above will not be accepted for permit processing.**

### Compliance Steps:

- The Green points for the projects are verified and totaled during the plan check process. They must be shown on the plans with the necessary documentation (A conference may be held with the designers at this juncture to discuss required features and points)
- Green Features are checked and verified by the building inspectors during the inspections process. Changes or substitutions are allowed provided they are equal in merit to the original feature. Upgrades are also verified during the inspection phase.
- All major changes, substitutions or upgrades must be submitted in writing or renderings for approval/ verification by the Building Department and will become part of both the Job and City set of plans.
- As part of the final inspection process and prior to authorization for occupancy or the issuance of a certificate of occupancy the project must successfully pass a final green point verification/inspection. The project must meet the points required for the level of action specified on the project plans green index. If the project does not pass final verification/inspection it will be incumbent upon permit holder remedy any deficiencies or occupancy will be denied until inspection is successfully passed.

### Inspection Sequence:

As part of the final inspection process and prior to authorization for occupancy or the issuance of a certificate of occupancy the project must successfully pass a final green point verification/inspection. The project must meet the points required for the level of action specified on the project plans green index. If the project does not pass final verification/inspection it will be incumbent upon permit holder remedy any deficiencies or occupancy will be denied until inspection is successfully passed.

Inspection Sequence:

GB01 Site/Foundation Inspection:

Verify points taken for features prior to placing foundation concrete, examples B.5.Storm Water Management (BMP'S) and C.3. re-usable metal forms.

GB02 Under-Floor Frame

Verify points taken for features that will be covered by sub-floor or slab on grade concrete placement, examples F.1.Plumbing insulate hot water piping and K.1. HVAC use duct mastic.

GB03 Frame/Insulation (Close-in\*\*)

Verify points for features taken prior to covering the walls, example D.3. Structural Frame wood I-joist, K.2 HVAC ductwork in conditioned spaces and L.3 Pre-wire for Solar Panels

GB15 Final Inspection:

Verify all points for features taken prior to occupancy, example Exterior Finish E.1. Recycled content decking, O.1. Use FSC flooring and O.6. Use Finished or Exposed Concrete for 50% or More of the Project Floor Area on the Ground Floor

\*\*At this phase the project must pass the required proper insulation installation verification/inspection.

# Program Overview: Prerequisites & Requirements

## **Requirements:**

1. All projects, Addition/Remodel and New Construction, must provide verification of Proper Insulation Installation.

## **Multi-Family Residential**

Multi-Family residential projects have one or more of the following characteristics:

1. The housing units have shared utility meters.  
Or
2. The project has common spaces such as community rooms, lobbies, meeting rooms, offices, retail space, central laundry, or hallways within the same building envelope as the residential units.  
Or
3. The project has 4 or more housing units included within the same building envelope.

If the project qualifies as multi-family, there are three methods for determining the square footage that is to be used for the calculation of points required for permit issuance, accelerated permit issuance, or a green building award. (Use conditioned space)

1. The square footage of the largest unit if all fixtures in all of the units are similar.  
Or
2. The average square footage of the units provided the fixtures in all units are similar, and the largest unit is not more than 25% larger than the rest of the units being averaged  
Or
3. The square footage of each unit type, if each unit is to be considered separately.

## **Multi-Family Program Prerequisite:**

- a. **Must carry out a preconstruction green building conference**

# Program Overview: Residential Buildings

Unless exempted from the Green Building Program by SMC Sec. 24.15.040, your project must comply with the minimum number of points to obtain a building permit for your new or remodeled building or addition. For Accelerated processing or eligibility for a Green Building Award, the appropriate number of points must be attained as outlined in tables 1-3 in Section 12.15.030.

## Step 1: Calculate Required Points

To figure out the points required for your project, enter the square footage of your project in line (A). Proceed through the equation, from (A) to (B) to (C). Multiply by the appropriate multiplier for the desired level of action, Permit Issuance or Accelerated Processing or Green Building Award, to calculate (D). Add the appropriate number for the desired level of action, permit issuance or Accelerated Processing or Green Building Award, to calculate the total required points.

### NEW CONSTRUCTION:

$$\begin{aligned}
 \text{(A)} \quad & \underline{\hspace{2cm}} \text{ (Sq. Ft.)} - 350 \text{ (Sq. Ft.)} = \text{(B)} \quad \underline{\hspace{2cm}} \text{ (Sq. Ft.)} \\
 \text{(B)} \quad & \underline{\hspace{2cm}} \text{ (Sq. Ft.)} / 100 = \text{(C)} \quad \underline{\hspace{2cm}} \text{ (points per 100 Sq. Ft.)} \\
 \text{(C)} \quad & \underline{\hspace{2cm}} \times 1.5 \text{ (Permit issuance multiplier)} = \text{(D)} \quad \underline{\hspace{2cm}} \text{ (additionally required points)} \\
 & \qquad \qquad \qquad \text{or} \\
 & \qquad \qquad \qquad \times 2.5 \text{ (Accelerated Permit)} \\
 & \qquad \qquad \qquad \text{or} \\
 & \qquad \qquad \qquad \times 3.5 \text{ (Green Building Award)} \\
 \\
 \text{(D)} \quad & \underline{\hspace{2cm}} + 20 \text{ (Permit issuance)} = \underline{\hspace{2cm}} \text{ (**required points**)} \\
 & \qquad \qquad \qquad \text{or} \\
 & \qquad \qquad \qquad + 45 \text{ (Accelerated processes)} \\
 & \qquad \qquad \qquad \text{or} \\
 & \qquad \qquad \qquad + 75 \text{ (Green Building Award)}
 \end{aligned}$$

Enter the square footage of the project on line (A), subtract 350, multiply by the chosen multiplier (Permit Issuance, Accelerated, or Award) and then add the corresponding points to figure out how many points are required for your project



# Residential Compliance Summary:

Permit Number: _____		Square Footage: _____	
<b><u>Type of Project: (Check One)</u></b>		New: _____	Addition/Remodel: _____
<b><u>Level of Action Desired: (Check One)</u></b>		-Permit Issuance: _____	
		-Accelerated Plan Check: _____	
		-Green Building Award: _____	
		<b><u>Points By Category:</u></b>	
A: Integrated Design Features: _____		I: Insulation _____	
B: Site: _____		J: Windows _____	
C: Foundation _____		K: HVAC _____	
D: Structural Frame _____		L: Renewable Energy & Roofing _____	
E: Exterior Finish _____		M: Natural Heating & Cooling _____	
F: Plumbing _____		N: Indoor Air Quality & Finishes _____	
G: Electrical _____		O: Flooring _____	
H: Appliances _____		P: Other _____	
<b>Total Points:</b> _____		<b>Verified By:</b> _____	

# A. Integrated Design Features

	New Homes	Remodel & Additions
1. Design Smaller Homes (See Chart on Following Page)	9	9
2. Orient Roof to Obtain Maximum Solar Access	1	1
3. Orient Buildings on E/W Axis for Solar Access	1	1
4. Conduct Preconstruction Green Building Techniques/ Methods/ BMP Conference	10	10
5. Certified/Accredited Green Building Project Staff: a. Designer b. Builder c. Management	1 point each up to 3	1 point each up to 3
6. Design Project Without Fencing	1	1
7. Deconstruct Existing Structure	5	5
8. Locate Buildings to Preserve Open Space and Wildlife Habitat	1	1
9. Construct Detached Garage or Carport	2	2
10. Design and Build a Zero Energy Home	10	10
Available Points	43	43

## Number of Bedrooms

	2	3	4	5+	Points
A	1382	1890	2648	3424	0
R	1332	1825	2555	3296	1
E	1282	1756	2459	3172	2
A	1232	1688	2363	3048	3
<u>of</u>	1182	1619	2267	2925	4
H	1132	1551	2171	2801	5
O	1082	1482	2075	2677	6
M	1032	1414	1979	2553	7
E	982	1345	1883	2430	8
(Square Feet)	932	1277	1788	2306	9

(Chart Based on ANSI z765 3003)

1. Design Smaller Homes

A3. Please show clearly on the plans number of bedrooms, total square footage and reference the Home Size Chart on previous page.

Intent: Building smaller homes conserves resources, lowers energy consumption and preserves open space.

2. Orient Roof to Obtain Maximum Solar Access

A1. Please note on plot map and plans the orientation of the roof to verify maximum solar gain.

Intent: Orientation of the roof or structure to allow for installation of PV panels to maximize the benefit of the free energy from the sun.

3. Orient Buildings on E/W Axis for Solar Access

A9. Please note on plot map and plans the orientation of the building to verify maximum solar gain.

Intent: Orientation of the roof or structure to allow for installation of PV panels to maximize the benefit of the free energy from the sun.

4. Conduct Preconstruction Green Building Conference

A4. Please reference on the green features index. Contact the Santa Cruz Green Building Department and set up time for conference.

Intent: Investing a little time to discuss the green features of your project with those responsible for their implementation, installation and application at the start, saves time and money in the long run.

5. Certified/Accredited Green Building Project Staff:

- a. Designer
- b. Builder
- c. Management

A5. Please provide verification of accreditation, and note on green features index.

Intent: Having experienced, accredited professionals on staff helps ensure that the designated green features for the project are understood and implemented properly.

6. Design Project without Fencing On Property

A6. Make note on site plans and reference the green features index

Intent: Not building a fence helps conserve resources by reducing the need to harvest virgin materials, typically redwood, for fences.

7. Deconstruct Existing Structure

A7. Please designate how and what type of structures will be deconstructed. Please provide index of materials to be reclaimed after deconstruction by types, volumes and final disposition of the materials. Show a location on the site plan where material will be stored and classified during the course of deconstruction and construction.

Intent: Disassembling and reusing materials from a currently constructed structure reduces pressure on landfills and reduces the need to harvest new resources

8. Locate Buildings to Preserve Open Space and Wildlife Habitat

A8. Please note on plan and plot map the location of the proposed project in relation to open space and cross reference the green features index

Intent: Open space is a valuable, non renewable resource that we should do our best to conserve.

9. Construct Detached Garage or Carport

A2. Please note on plan and plot map the construction of a detached garage or carport

Intent: Garages contain many toxic gases released from cars, paints, power tools and other typical household goods. By separating the garage from the house, or constructing a carport these fumes and gases are stopped from entering the home and degrading the interior air quality.

10. Design and Build a Zero Energy Home

A10. Please provide documentation showing the annual energy consumption versus the annual energy production of the building to verify that the structure has a net zero energy ratio of +/- <9.9%

Intent: Homes that annually produce an equivalent of what they consume are maximizing their conservation of energy.

## B. Site

Intent:

The concepts of green building extend beyond the walls and foundation of the home that you are building. Systems based thinking includes the surrounding environment as an integral and important aspect of the building process. By being conscientious of the existing flora and fauna on the building site, the water that runs on, under and away from the site, and the materials that are carried away as garbage or recycling we can mitigate the impact that construction has on our environment.

Interesting Fact: 75% of construction and demolition byproducts can be recycled, yet only 20% are.

	New Homes	Remodel & Additions
1. Recycle Job Site Construction and Demolition waste 50% required 65% Recycling Rate = 1 point 75% Recycling Rate = 2 points 80% Recycling Rate = 4 points <i>*maximum of 4 points</i>	4	4
2. Donate Unused Materials	2	2
3. Protect Native Soil	1	0
4. Minimize Disruption of Existing Plants/ Trees	1	1
5. Implement Construction Site Storm water Practices	2	2
6. Protect Water Quality with Landscape Design	2	0
7. Design Resource and Water- Efficient Landscapes	2	2
8. Reuse Materials/ Use Recycled Content Materials for Landscape Areas	2	2
9. Install High Efficiency Irrigation System	2	2
10. Provide On-Site Water Catchment/ Retention	2	2
11. Utilize Permeable Paving for 50% of Non-Structural Site Paved Area	2	2
12. Install Solar Walkway Lights	2	2
Available Points	24	21

1. Recycle Job Site Construction & Demolition Waste. 50% Rate is Required

65% Recycling Rate = 1 point

75% Recycling Rate = 2 points

80% Recycling Rate = 4 points

B1. Please designate how and what materials will be recycled. Please provide index of materials to be recycled by types and volumes and their final disposition of the materials. Show a location on the site plan where material will be stored and classified during the course of construction.

Intent: Promotes recycling efforts, reduces pressure on the landfills and the need to harvest new resources.

2. Donate Unused Materials

B2. Please specify the types and quantities of materials and indicate who will be recipient of donated materials (church group, Goodwill, etc.)

Intent: Donating unused or old but still useful material and appliances has the double benefit of helping those in need and reducing the flow of materials to the landfill.

3. Protect Native Soil

B3. Please show how this will be accomplished. Please indicate on the plans areas to be protected and the measures to be used to protect them such as mulches, coverings etc. Provide source verification for materials to be used.

Intent: Preserve the existing and healthy topsoil, landscape and vegetation. Reduce the effort and resources needed to rebuild soils and landscape with new, foreign, less stable and established soils and plants. Reduce water runoff during construction, as well as water needed to establish new plants.

4. Minimize Disruption of Existing Plants/ Trees

B4. Please provide details of how this will be accomplished. Please show on the plans location of and the types of measures such as temporary fencing, barricades, covering, etc. that will be used during the course of construction.

Intent: Protecting existing plants and trees decreases the need to re-vegetate with foreign, non native, newly harvested plants. Plants and trees also stabilize the project site during and after construction.

5. Implement Construction Site Storm Water Practices

B5. Please show how this will be accomplished. Please show on the plans location of and types of measures to be implemented on the B.M.P.S Erosion control plan (Example: schedule grading so that disturbed slopes are stabilized and re-vegetated during the non-rainy season)

Intent: Implementing best management practices keeps water from running off of the project site onto surrounding properties. Stemming this flow reduces sedimentation of creeks, streams, and rivers by keeping the construction site on site.

6. Protect Water Quality with Landscape Design

B6. Please show how this will be accomplished. Please show on plans location of and types of measures to be implemented such as bio-filters, swales, rain-catchment systems.

Intent: These types of measures help recharge the ground water system as well as allow property owners to store water during the wet season for irrigation during the dry season.

7. Design Resource and Water-Efficient Landscapes

Provide at a minimum a landscape plan specifying, documenting and incorporating the following features: Plant no invasive species as listed by Cal-IPC (California Invasive Plant Council), Plant no species that require shearing, Plant 75% California native or Mediterranean species. Please verify that they are California native or other Mediterranean species that are appropriate for the soil and microclimate.

Intent: Planting with native species, hydro-zoning (placing plants that require similar amounts of sun and water in zones together) and installing high efficiency irrigation (bubblers, timers, and soil moisture sensors) saves water and decreases the flow of green waste to the landfills.

8. Reuse Materials/ Use Recycled Content Materials for Landscape Areas

B8. Please specify on plans location and types of materials to be used. (Example: use recycled plastics or composites for benches or edging, concrete debris as planters or pathways) and note on plan page specific to the installation/ utilization location.

Intent: Recycling and using recycled materials decrease the flow of waste to the landfill, and minimizes the harvest of raw materials.

9. Install High Efficiency Irrigation System

B9. Please specify H/E sprinkler manufacturer and show schematic drawing on plan on plan page specific to the installation location.

Intent: Installing high efficiency irrigation (bubblers, timers, and soil moisture sensors) saves water by minimizing waste and insuring irrigation takes place only when and where required.

10. Provide for On-Site Water Catchment/ Retention

B10. Please provide specifications for and show location details for onsite water retention system, cistern or other water storage device including source of water, connection and distribution schematics.

Intent: Storing water during the wet season to use during the dry season for irrigation decreases the demand on water sources, both municipal and private wells.

11. Utilize Permeable Paving for 50% of Non-structural Site Paved Area

B11. Please provide specifications for and show location of area to be paved on plan page specific to the installation location.

Intent: Using permeable paving allows for water to be absorbed back into the soil rather than running off. This has the double benefit of reducing runoff into street and neighboring properties and recharging the ground water system.

12. Install Solar (PV) Walkway Lights

B12. Please show location(s) of the lights on the plot or landscape plans and provide manufacturers specifications.

Intent: Solar walkway lights store energy from the sun during the day to use at night. This conserves energy and resources. The lights do not have to be hard wired, saving copper and piping.

## C. Foundation

Intent:

Building a comfortable and green home starts from the foundation up. Sustainable practices such as replacing a percentage of the Portland cement in your concrete with flyash, or reusing form boards for framing saves resources and diverts materials from the landfill.

Interesting Fact: For each ton of Portland cement produced, one ton of CO<sub>2</sub> is released into the atmosphere

	New Homes	Remodel & Additions
1. Incorporate Recycled Flyash in Concrete up to 15% = 2 points; Add 1 Point for Every 10% Increase in Flyash, Up to 5 Points	5	5
2. Reuse Form Boards	1	1
3. Re-usable Metal Forms	2	2
4. Use Recycle Content Aggregate for building pads, pathways, driveways etc.	2	2
5. Insulate Foundation/ Slab Before Backfill	3	3
6. Install Rigid Foam, Insulated Concrete Forms (ICF's)	3	3
7. Rammed Earth Foundation (Must Meet Engineering Requirements for Seismic Design Category D)	5	5
8. Use Non-Toxic Release Agents on Concrete Forms	1	1
9. Seal Crawl Space with Vapor Barrier & Install Sump Pump	10	10
10. Create Drainage Swale @ 2% Grade For 3' Away From Foundation	2	2
11. Install Drainage Plane and Barrier Adjacent To Foundations (No Plant Strip 3' Extending From Foundation)	2	2
Available Points	36	36

1. Incorporate Recycled Flyash in Concrete up to 15% = 2 points; Add 1 point for every 10% increase in Flyash up to 5 points

C1. Please make a note of this feature on the plans specific to the location where the feature will be used. Example: 15% flyash mixture will be used in the buildings foundations and slabs, concrete mix design will be provided as verification, load tickets to be provided as verification as requested.

Intent: Flyash is a byproduct of burning coal in power plants. It can be used to replace a percentage of Portland cement in concrete with no deleterious effects. Using flyash diverts it from the landfills and reduces the need to create new Portland cement.

2. Reuse Form Boards

C2. Please specify how forms will be reused, (example reused as blocking, joist, contractor to reuse on successive projects) index and note on plan page specific to the installation location.

Intent: Reuse of lumber minimizes the need for harvest of raw materials.

3. Re-usable Metal Forms

C3. Please note this feature on the plans (example metal forms will be provided by a specialty concrete contractor and reused on other projects)

Intent: Metal forms can be used many times. This reuse eliminates the need to cut, fit and throw away wood used for forming.

4. Use Recycled Content Aggregate

C4. On the plan please identify the materials supplier, specify the concrete mix design and note the location where the concrete will be placed.

Intent: Crushing concrete to use as underlayment diverts it from the waste stream and is cost and time effective.

5. Insulate Foundation/ Slab Before Backfill

C5. Please note the location and specifications of the insulation on the plan page specific to the installation location and cross reference to the points check list.

Intent: Insulating the foundation increases the total R-value of the structure and reduces heat loss resulting in a more efficient home.

6. Install Rigid Foam, Insulate Concrete Forms (ICF's)

C6. Please provide information on material to be used, methodology, and specifications from the engineer. Make note of location on the plans, and cross reference the points check list.

Intent: Reduce waste generation through a more efficient construction process. Increase the R-value, air tightness, durability and structural strength of the building envelope.

7. Rammed Earth Foundation (must meet engineering requirements for seismic zone-4)

C7. Please provide information on material to be used, methodology, and specifications from the engineer. Make note of location on the plans, and cross reference the points check list.

Intent: Using material that is onsite decreases the need to ship and harvest raw materials. Rammed earth walls also provide excellent insulation.

8. Use Non-Toxic Release Agents on Concrete Forms

C8. Please specify product manufacturer and note this feature on the plans specific to the location where the product is to be used.

Intent: Using non-toxic chemicals on the jobsite protects both the people and the site.

9. Seal Crawl Space with Vapor Barrier & Install Sump Pump

C9. Please provide schematic and product listings for vapor barrier (5 mil minimum thickness) and sump pump. The vapor barrier must extend up the walls of the foundation 1foot and be completely attached to the foundation walls.

Intent: The primary purpose of sealing the under floor crawl space is to keep moisture from accumulating and causing damage to the structure of the home. As a secondary benefit, dust and other particulates are kept from entering ducting for the HVAC system.

10. Create Drainage Plane @ 2% Grade for 3' Away From Foundation

C10. Please show as a detail on the plan page specific to the application location.

Intent: A slope away from the foundation helps protect against moisture intrusion.

11. Install Drainage Plane and Barrier Adjacent to Foundations (No Plant Strip 3' Extending from Foundation).

C11. Please show as a detail on the plan page specific to the application location

Intent: Vegetation attracts insects and traps moisture that are detrimental to the structure of your home.

## D. Structural Frame

Intent:

The vast majority of our national forests have been logged into extinction. Aside from the obvious effects on the environment, we are now seeing the effects at our local lumber yards as well; the lumber that is available is expensive and of poor quality. Engineered lumber such as laminated beams and I-Joists provide solutions to both of these issues. These products are produced using younger, rapidly renewable species of trees. They are also straighter, stronger and cheaper than their solid sawn counterparts.

Interesting Fact: Construction of a 2085 sq ft home uses 1.5 acres of forest. (16,000 board feet or twenty three 20” diameter trees) (NRDC)

	New Homes	Remodel & Additions
1. Substitute Solid Sawn Lumber with Engineered Lumber		
A. Floors	1	1
B. Headers (non-structural)	1	1
C. Structural Beams and Headers	1	1
2. Use FSC Certified Wood for Framing (For every 10% of FSC lumber used = 2 points, up to 10).	10	10
3. Use Wood I- Joists for Floor and Ceilings	2	2
4. Use Steel Interior Web Trusses	2	2
5. Use Energy Heels on Trusses	2	2
6. Use OSB		
A. Sub-floors	1	1
B. Sheathing	1	1
7. Use Finger- Jointed Studs for Non- Structural Vertical Applications	2	2
8. Use Engineered Studs for Vertical Applications	2	2
<b>Continued on Next Page</b>		

	New Homes	Remodel & Additions
9. Use Recycled Content Steel Studs for Interior Framing	2	2
10. Reduce Lumber Framing by Utilizing Alternative Wall Construction Such As: -Insulated concrete forms** -Rammed-earth and pressed earthen block** -Straw bale** -Structural bamboo** -2 points for every 10% reduction in framing compared to standard framing. <i>*Steel framing is not eligible for this point due to thermal performance. ** Must meet code requirements for Seismic Design Category D</i>	20	20
11. Design with 8 foot high plate: 2 points for each floor where used	6	6
12. Design Using 2' Modules, 1 Point Per Dimension (Length/Width) Up To 2 points	2	2
13. Apply Advanced Framing Techniques	4	4
14. Use Reclaimed Lumber for Non-Structural Applications	3	3
Available Points	62	62

1. Substitute Solid Sawn Lumber with Engineered Lumber

D1. Note location and type of engineered lumber on plans. (glulam, LVL, LSL, PSL, OSB) Please provide the specifications for the lumber and note on plan page specific to the installation location.

Intent: Engineered lumber comes from smaller, younger, rapidly renewable sources and minimizes the demand on old growth forests.

2. Use FSC Certified Wood for Framing (for every 10% of FSC lumber used =2 points up to 10 points)

D2. Provide FSC Certification and supply provider/ lumber yard information to inspector for verification at time of framing inspection.

Intent: The Forest Stewardship Council (FSC) guarantees that the lumber that they certify comes from a sustainable harvested forest.

3. Use Wood I-Joists for Floor and Ceilings

D3. Note location and type of engineered lumber on plans. (glulam, LVL, LSL, PSL, OSB) Please provide the specifications for the lumber and cross reference to the points check list.

Intent: Engineered lumber comes from smaller, younger, rapidly renewable sources and minimizes the demand on old growth forests.

4. Use Steel Interior Web Trusses

D4. Please note location of web trusses on plan page specific to the installation location. Please provide specifications for the trusses and cross reference to the points check list.

Intent: Increases durability of construction by installing materials that reduce damage caused by common pests, rot and fire. Promote recycling efforts and reduce pressure on landfills by using recycled content and recyclable steel.

5. Design Energy Heels on Trusses

D5. Note location and design of trusses on plan page specific to the installation location and cross reference to the points check list.

Intent: Designing trusses with energy heels allows for more efficient insulation and increase the comfort and performance of your home.

6. Use OSB

D6. Please delete all references to plywood and note location of Oriented Strand Board (OSB) and specifications on plan page specific to the installation location.

Intent: Engineered lumber comes from smaller, younger, rapidly renewable sources and minimizes the demand on old growth forests.

7. Use Finger-Jointed Studs for Non-Structural Vertical Applications

D7. Please note and show location of finger jointed studs on plan page specific to the installation location. Provide specifications and cross reference to the points check list.

Intent: Finger jointed studs are fabricated using small sections of lumber. The result are straighter studs that reduce the demand for solid sawn lumber.

8. Use Engineered Studs for Vertical Applications

D8. Note location and type of engineered studs on plan page specific to the installation location. Please provide specifications and cross reference points check list.

Intent: Engineered lumber comes from smaller, younger, rapidly renewable sources and minimizes the demand on old growth forests.

9. Use Recycled Content Steel Studs for Interior Framing

D9. Please note and show location of recycled content steel studs on plans. Provide specifications and cross reference to the points check list.

Intent: Increases durability of construction by installing materials that reduce damage caused by common pests, rot and fire. Promote recycling efforts and reduce pressure on landfills by using recycled content and recyclable steel.

10. Reduce Lumber Framing and Improve Thermal Performance with Alternative Wall Construction

D10. Please note and show location of alternative techniques on plans. (Example: Energy heels in trusses, or use of only two studs in the corner. Both of these techniques allow for more efficient application of insulation at the houses perimeter.) Please cross reference the points check list and make note of techniques on the plan page specific to the utilization location.

Intent: Designing with insulation installation in mind allows for Proper Insulation Installation and improves the performance of your home.

11. Design with 8 foot High Plate: 2 Points for Each Floor Where used

D11. Please note location of this feature on the plan page specific to the utilization location and cross reference the points check list.

Intent: Designing and building 8' high plates maximizes the dimensions of studs and reduces waste of materials.

12. Design Using 2' Modules, 1 Point Per Dimension (Length/Width) Up To 2 points  
D13. Please note location of this feature on the plan page specific to the utilization location and cross reference the points check list.

Intent: Designing and building in 2' modules maximizes the dimensions of lumber and reduces waste of materials. (Example: rooms that are 20'x20', 22'x26')

13. Apply Advanced Framing Techniques  
D13. Please note and show location of advanced framing techniques on plans. (Example: framing on 24 inch centers instead of 16 inch centers) Cross reference the points check list and note on the plan page specific to the installation and utilization location.

Intent: Reduce framing material consumption and related costs. Increase the comfort and performance of the home by decreasing thermal bridging.

14. Use Reclaimed Lumber for Non-Structural Applications  
D14. Please note and show location of reclaimed lumber usage on plan page specific to the installation location. Cross reference the points check list.

Intent: Reduces pressure on landfills and the need to harvest new resources.

## E. Exterior Finish

Intent:

Durability is a key characteristic of any material that you choose to use during the construction of your home. Materials that maintain their integrity don't require replacement, saving money on replacement costs, and also protecting the house from the moisture and sun damage that occurs when products deteriorate.

Interesting Fact: Beware of "green-washing." There are many products that are advertised as green, that are not truly environmentally friendly. Be sure to thoroughly research the products you intend to use.

	New Homes	Remodel & Additions
1. Use Sustainable Decking Materials		
A. Recycled Content	3	3
B. FSC Certified Wood	3	3
2. Use Non-CCA Treated Wood	1	1
3. Install House Wrap Under Siding	1	1
4. Use Alternative Siding Materials		
A. Recycled Content	1	1
B. Fiber-Cement	3	3
C. Earth and/or Plaster	3	3
5. Use Low/No VOC Exterior Paint	2	2
6. Provide Advanced Flashing/ Weather Proofing Details	2	2
Available Points	19	19

1. Use Sustainable Decking Materials

E1. Show and reference the specific location of the decking material to be installed and provide products information, listings and approvals in the form of a notation on the plan page specific to the installation location.

Intent: Promote recycling efforts, reduce pressure on landfills, and the need to harvest new resources. Promote use of sustainably harvested materials as designated by the premiere sustainable forestry program.

2. Use Non-CCA Treated Wood

E2. Please specify product to be used, verify product is not treated with CCA and index on plan page specific to the installation location.

Intent: Chromated copper arsenate (CCA) is a chemical wood preservative containing chromium, copper and arsenic. CCA is used in pressure treated wood to protect wood from rotting due to insects and microbial agents. It is harmful to the environment and is not allowed in residential construction.

3. Install House Wrap under Siding

E3. Please specify product to be installed and index and note on plan page specific to the installation location.

Intent: Promote durability and reduce unwanted moisture in exterior walls by providing a clear area for positive water movement and a barrier to moisture intrusion.

4. Use Alternative Siding Materials

E4. These features must be qualified. Show and reference the location of the siding material to be installed and provide products information and listings in the form of a notation on the plan page specific to the installation location.

Intent: Promote durability and reduce material consumption with long lasting products. Increase safety by use of noncombustible materials

5. Use Low/ No VOC Exterior Paint such as Silicate

E5. Please specify product to be used, provide manufacturers information (MSDS Sheet) to verify product is low VOC and note on the plan page specific to the application location.

Intent: Volatile Organic Compounds are dangerous outside the home as well as inside the home.

6. Provide Advanced Flashing/ Weather Proofing Details

E6. Please provide detailed plans showing advanced flashing and water proofing and cross reference green feature index

Intent: Advanced Flashing and other water proofing procedures decrease moisture intrusion which leads to better indoor air quality, and increased life of the structure

## F. Plumbing

**Intent:**

By conserving water, we are also saving energy. It takes an enormous amount of electricity move, and treat the water that we use everyday. With the average American using between 140-170 gallons of water per day, the energy use adds up fast. By installing low flow, and high efficiency fixtures, we can save resources and money.

Interesting Fact: Landscaping accounts for about half the water Californians use at home. Showers account for another 18 percent, while toilets use about 20 percent.

	New Homes	Remodel & Additions
1. Insulate All Hot Water Pipes	2	2
2. Install Flow Reducers to Reduce Flow to Less Than is Currently Required By SCMC		
A. Faucets (1 point each up to 2 points)	2	2
B. Showerheads (1 point each up to 2 points)	2	2
3. Install Dual Flush Toilets (1 point each up to 4 points)	4	4
4. Install Chlorine Filter on Showerhead (1 Point Per Showerhead up to 4) or A Whole House Chlorine Filter (4 Points)	4	4
5. Install Tankless Water Heater	2	2
6. Pre-Plumb for Grey Water Conversion	4	4
7. Install Indoor Grey Water Recovery/ Reuse System	10	10
8. Install water Filtration Units as Faucets (2 points each up to 4 points)	4	4
9. Install On-Demand Hot Water Circulation Pump	4	4
10. Install Pans/ Drains Under Water Using Appliances	2	2
11. Install Rainwater Collection and Storage		
A. 2500 Gallon Capacity	5	5
B. 5000 Gallon Capacity	10	10
12. Install Drain Water Heat Recovery Fixtures	3	3
Available Points	58	58

1. Insulate all Hot Water Pipes

F1. Please provide product information including R-value, note and index on plan page specific to the installation location.

Intent: Decreases energy consumption by minimizing heat loss from hot water pipes.

2. Install Flow Reducers to Reduce Flow to Less than Code Requirement

F2. Please make specific notes showing location of fixtures that will incorporate low flow devices and provide product listing, make or manufacturer's specification/ information and flow notes for these devices on the plan page specific to the installation location to verify flow is less than current standards. See Glossary for current standards.

Intent: Flow reducers and low-flow showerheads can cut water usage by as much as 40% with little noticeable effect. They also save money by saving water and reducing energy used to heat water.

3. Install Dual Flush Toilets

F3. Provide the manufacturer information and product specification (water used GPM per flush) of the toilets and show this information as a note on the plan page specific to the installation location.

Intent: Reduce potable water consumption and pressure on sewage infrastructure and treatment facilities.

4. Install Chlorine Filter on Showerhead

F4. Please show the location of this feature on the plans and specify by note the make or manufacturer of the showerhead filter on the plan page specific to the installation location.

Intent: Removes the chlorine from your water

5. Install Tankless Water Heater

F5. Please provide detail for location of water heater and provide manufacturers specifications and listings on plan page specific to the installation location.

Intent: Reduce consumption of energy required to heat water. Water heating accounts for a significant portion of a household's energy use, installation of a tankless water heater can save money and energy.

6. Pre-Plumb for Graywater Conversion

F6. Please provide piping diagram showing size, routing, and type of piping to be used. Also show proposed location of graywater system. (NOT CURRENTLY PERMITTED)

Intent: Reduce potable water consumption and pressure on sewage infrastructure and treatment facilities by utilizing graywater for irrigation purposes.

7. Install Indoor Grey Water Recovery/ Reuse System

F7. Please provide manufacturers specifications and system information as well as piping diagram showing size, routing, and type of piping to be used. Also show proposed location of graywater system.

Intent: Reduce potable water consumption and pressure on sewage infrastructure and treatment facilities by utilizing graywater for irrigation purposes. (i.e. capturing water from the bathroom sink to flush the toilet)

8. Install Water Filtration Units at Faucets

F8. Please show the location of this feature on the plan page specific to the installation location and specify by note the make or manufacturer of the faucet(s) filter.

Intent: Conserves energy by increasing the drinkability of your water and decreasing the amount of bottled water purchased

9. Install On Demand Hot Water Circulation Pump

F9. The Pump must be an on demand type, equipped with an activation switch (at the fixture) and be located at the fixture furthest from the water heater. Please provide specification for pump on the plan page specific to the installation location.

Intent: An on demand hot water circulation pump speeds the rate of hot water delivery to the shower or faucet and most importantly, reduces water wasted down the drain while waiting for hot water to arrive at the plumbing fixture.

10. Install Zero-Water Urinals

F10. Please provide manufacturers specifications and show location of zero water urinals on plan page specific to the installation location.

Intent: Reduce potable water consumption and pressure on sewage infrastructure and treatment facilities.

11. Install Rainwater Collection and Storage

F11. Please provide piping diagram and schematic showing size, routing, and type of piping to be used. Also show proposed location of collection and storage unit. Please include manufacturer's specifications including listings, approvals for all collection and storage system equipment and cross reference to the points check list.

Intent: Reduces potable water consumption by storing rain water during the wet season for use during the dry season.

12. Install Drain Water Heat Recovery Fixtures

F12. Please note location of recovery fixtures on the plans. Provide manufactures specifications and listings and cross reference the points check list.

Intent: Conserves energy by recovering heat from waste water (shower etc) to heat potable water.

## G. Electrical

Intent:

Title 24, the California State energy code, ensures that our homes far out perform those in other states. By exceeding title 24 requirements we can assure that our homes are that much more efficient and comfortable to live in.

Interesting Fact: Standing in moving air under a ceiling fan makes the body feel 4 degrees cooler, which helps to reduce the need for air conditioning.

	New Homes	Remodel & Additions
1. Install Compact Fluorescent Light Bulbs- CFL's -6 bulbs = 2 points -12 bulbs = 4 points *up to a max of 4 points	0	4*
2. Install Air-Tight Insulation-Compatible Recessed Fixtures for CFL's (1 point each up to 5 points, T-24 required)	0	5
3. Install Lighting Controls (1 point per fixture up to 4 points)	0	4
4. Install High Efficiency Ceiling Fans with CFL's (1 point each up to 4 points)	4	4
Available Points	4	17

\* Only CFL's located in the remodeled and existing portions of the project are counted. Those located in the addition will not be.

1. Install Compact Fluorescent Light Bulbs

G1. Please indicate (show clearly) the type and location of all fluorescent lighting on the plans by number and symbol.

Intent: Fluorescent bulbs use much less energy than do incandescent bulbs and have a much longer usable life.

2. Install Air-tight Insulation Compatible Recessed Fixtures for CFL's

G2. Please provide specifications for Air-tight features on the plans. Please indicate (show clearly) the type and location of all air-tight fixtures on the plans by number and symbol.

Intent: Fluorescent bulbs use much less energy than do incandescent bulbs and have a much longer usable life

3. Install Lighting Controls

G3. Please specify type to be installed, show locations on plans and designate by number and symbol.

Intent: Occupancy sensors ensure that lights are on only when they are needed while dimmers provide ability to match the amount of light to the situation. Both of these characteristics conserve energy.

4. Install High Efficiency Ceiling Fans with CFL's (1 point each fan, up to 4 points)

G4. Please indicate (show clearly) the type and location of all high efficiency fans on the plans by number and symbol

Intent: Fluorescent bulbs use much less energy than do incandescent bulbs and have a much longer usable life. Ceiling fans are an energy efficient way to make the interior environment more comfortable.

## H. Appliances

Intent:

Electricity is costly both monetarily, and environmentally. By installing the most efficient appliances available we can lower the demand on the power grid as well as our wallets.

Interesting Fact: ENERGY STAR qualified appliances incorporate advanced technologies that use 10–50% less energy and water than standard models.

	New Homes	Remodel & Addition
1. Install ENERGY STAR Dishwasher	1	1
2. Install ENERGY STAR Horizontal Axis Washing Machine	1	1
3. Install ENERGY STAR Refrigerator	1	1
4. Install Built-In Recycling Center	1	1
Available Points	4	4

1. Offer ENERGY STAR Dishwasher

H1. Provide product information and show these features as a notation on the plan page specific to the installation location.

Intent: High efficiency dishwashers reduce water and energy use

2. Offer ENERGY STAR Horizontal Axis Washing Machine

H2. Provide product information and show these features as a notation on the plan page specific to the installation location.

Intent: Qualified washing machines use substantially less water and energy than conventional washers.

3. Offer ENERGY STAR Refrigerator

H3. Provide product information and show these features as a notation on the plan page specific to the installation location.

Intent: Energy Star qualified refrigerators can reduce the total annual electricity bill by more than 10%. Choosing a refrigerator that is properly sized for your home will further reduce energy consumption

4. Install Built-In Recycling Center

H4. Please specify the location of this feature (cabinet detail) on the plans page specific to the installation location.

Intent: Recycling reduces the amount of material that enters landfills and can save money for homeowners through reduced fees.

# I. Insulation

**Intent:**

The most efficient way to increase the comfort and performance of your home is to install your insulation properly. By insuring that all points of infiltration are sealed, you can increase the heat retention of an average home by 25%.

Interesting Fact: A single 4” gap reduces the effectiveness of a batt of insulation by 40%

	New Homes	Remodel & Additions
1. Upgrade Insulation to Exceed Title 24 Requirements by 20%		
A. Walls	2	2
B. Ceilings	2	2
2. Install Recycled-Content, Formaldehyde-Free Fiberglass Insulation	1	1
3. Practice Proper Insulation Installation	Required	Required
4. Use Environmentally preferable Insulation Materials ( Wool, Foamed Concrete, Soy-Based Polyurethane)		
A. Walls	4	4
B. Ceilings	4	4
5. Install Straw Bale Insulation at Least 18” thick	6	6
Available Points	19	19

1. Upgrade Insulation to Exceed Title 24 Requirements by 20%

I1. Please provide type of insulation to be used, location of installation and specifications as a note on the plan page specific to the installation location. Cross reference the points check list.

Intent: Increased ceiling, wall and floor insulation improves comfort, decreases heating and cooling requirements, saves money and makes the home quieter

2. Install Recycled-Content, Formaldehyde-Free Fiberglass Insulation

I2. Provide product specification and show this feature on the plans as a notation specific to the installation location.

Intent: Improve indoor air quality by installing insulation with reduced levels of toxic chemicals.

3. Practice Proper Insulation Installation

I3. Please provide completed Proper Insulation Installation Verification Form.

Intent: Effectively installed insulation creates a more comfortable home and reduces the owner's utility costs. Lower energy demand reduces pollution and improves public health

4. Use Environmentally Preferable Insulation Materials. (Wool, Foamed Concrete, Soy-Based Polyurethane)

I4. Please specify type of insulation, manufacturer, R-value, and location on plan page specific to the installation location.

Intent: Using high recycled content reduces reliance on virgin raw materials. High post consumer recycled content closes the loop in the curbside recycling process and reduces landfill deposits.

5. Install Straw Bale Insulation at Least 18" Thick

I5. Please provide engineers calculations on plans and reference the green features index

Intent: When designed and build correctly, straw bale homes can be beautiful, efficient and long lasting. Straw is an inexpensive, rapidly renewable resource that has been used as a building material for hundreds of years.

# J. Windows

**Intent:**

Natural light increases productivity and is good for our health and well being. Windows are terrible insulators however, and are akin to having holes in the wall of your home. By installing high efficiency fenestration products we can achieve better insulation and maintain day lighting.

Interesting Fact: In 1990 alone, the energy used to offset unwanted heat losses and gains through windows in residential and commercial buildings cost the United States \$20 billion (1/4 of all the energy used for space heating and cooling)

	New Homes	Remodel & Additions
1. Install Energy-Efficient Windows		
A. Double-Paned	0	1
B. Triple-Paned	1	1
C. Low-Emissivity (Low-E)	0	2
D. Low Conductivity Frames	0	2
Available Points	1	6

1. Install Energy-Efficient Windows

J1. Please specify the window types and features on the window schedule or on the plan page specific to the installation location. Please cross reference points check list.

Intent: Windows play a big role in the energy efficiency of homes. In the summer, they can allow unwanted heat into the house, and in the winter, they can account for as much as 25% of the home's heat loss. High performance windows reduce heating and cooling costs and keep the home more comfortable.

# K. Heating Ventilation and Air Conditioning

**Intent:**

The average American spends 90% of their time indoors. Modern homes are sealed tightly to conserve energy and to insure against moisture and air leaks. As a result, proper ventilation has become increasingly important to ensure that the air inside of our homes is part of a safe and comfortable environment.

Interesting Fact: You wouldn't let your plumber complete a job with a 40% leak rate, why would you let your HVAC installer get away with it?

	New Homes	Remodel & Additions
1. Use Duct Mastic on All Duct Joints	0	1
2. Install Ductwork Within Conditioned Space	3	3
3. Vent Range Hood to the Outside	0	1
4. Clean All Ducts Before Occupancy	1	1
5. Install Attic Ventilation System	1	1
6. Install Whole House fan	3	3
7. Install Sealed Combustion Units		
A. Furnaces	3	3
B. Water Heaters	3	3
8. Install 13 Seer/11 EER or Higher AC with a TXV	3	3
9. Install AC with Non-HCFC Refrigerants	2	2
10. Install 90% Annual Fuel Utilization efficiency (AFUE) Furnace	2	2
11. Eliminate Wood Burning Fireplaces	1	1
12. Install Zoned Hydronic Radiant Heating	3	3
13. Install High Efficiency Particulate Air Filter (MERV 6+)	4	4
14. Install Heat Recovery Ventilation Unit (HRV)	5	5
15. Install Separate Garage Exhaust Fan	3	3
Available Points	37	39

1. Use Duct Mastic on all Duct joints

K1. Please specify mastic manufacturer to be used and make installation note on the plan page specific to the installation location.

Intent: Leaks in the joints between ductwork have been shown to allow an average of 20-30% of the conditioned air to leak. Leaky air ducts can cause negative pressure in the house, which can draw many outdoor and indoor contaminants into the home, including carbon monoxide from gas water heaters and furnaces. To maintain a tight seal for decades use a water-based mastic at every duct joint and seam.

2. Install Ductwork within Conditioned Space

K2. Please clarify this feature by providing a schematic drawing or graphic depiction detailing how ducting will be run within the heated conditioned space of the building.

Intent: Poorly designed and installed ductwork lowers heating and cooling system efficiency and capacity, and can contribute to poor indoor air quality and comfort problems. Installing ductwork within conditioned space minimizes infiltration of particulates and heat loss.

3. Vent Range Hood to the Outside

K3. Please note and show this feature on the plan page specific to the installation location.

Intent: Evacuating the products of combustion and fumes from cooking from the conditioned space help prevent adverse health effects.

4. Clean All Ducts Before Occupancy

K4. Please provide verification that all ducts have been cleaned before occupancy and make note of this on plans.

Intent: Debris and dust from construction can lodge in HVAC units and the ductwork, potentially causing occupants to have allergic reactions and reducing the effectiveness of the blower fan and heating/cooling elements. As soon as the ducts are installed, completely seal off each duct register and the HVAC unit to block out any construction dust. Use methods that will stay in place under the abuse of a typical construction site. After construction has been completed, vacuum the blower unit and ductwork as necessary.

5. Install Attic Ventilation System

K5. Please specify manufacturer and provide listings of the attic ventilation system. Show location of the fan, ducting and discharge termination on the plan page specific to the installation location.

Intent: During the summer months an attic can act as an oven, capturing heat and increasing the ambient temperature of the rooms below. An attic ventilation system evacuates that hot air and increases the efficiencies of the cooling systems in the home.

6. Install Whole House Fan

K6. Please note and show location on plan page specific to the installation location. Please provide manufacturers specifications and cross reference the points check list.

Intent: Whole house fans are used instead of an air conditioner to cool the house at night. They exhaust warm indoor air and bring in large volumes of cool outdoor air. An average whole house fan uses one-tenth the electricity of an air conditioner. Moving large volumes of air can achieve indoor comfort at higher temperatures as well as improving indoor air quality by bringing fresh outdoor air indoors.

7. Install Sealed Combustion Units

K7. Please clarify by providing manufacturers specifications to verify water heater/furnace is a sealed combustion type either power or direct vent. Note this feature on the plans.

Intent: Sealed combustion furnaces, boilers, and water heaters duct outdoor air directly into a sealed jacket around the combustion chamber so that air from inside the house isn't used for combustion. These products also vent combustion gasses directly outdoors so they don't pollute the home.

8. Install 13 SEER/ 11 EER or Higher AC with a TXV

K8. Please clarify by providing manufacturers specifications to verify water AC unit is 13 SEER/ 11 EER or higher. Note on the plan page specific to the installation location.

Intent: Choose an air conditioner with a SEER of 13 or higher or an EER of 11 or higher. While these units usually have higher upfront costs, they are a good investment. Many utilities offer rebates for higher efficiency units.

9. Install AC with Non- HCFC Refrigerants

K9. Please note and show location on plan page specific to the installation location. Provide specifications to verify that the AC unit is using non –HCFC refrigerants and cross reference the points check list.

Intent: Environmentally sound refrigerants reduce the risk of damage to the ozone layer.

10. Install 90% Annual Fuel Utilization Efficiency (AFUE) Furnace

K10. Please note and show location on the plans page specific to the installation location. Provide manufacturers specifications for the furnace to verify the AFUE. Cross reference the points check list.

Intent: High efficiency heating equipment increases comfort, reduces pollution, and lowers energy use and associated greenhouse gas emissions.

## 11. Eliminate Wood Burning Fireplace

K11. Show location of fireplace and note its removal on the plans.

Intent: Burning wood in fireplaces is a major source of air pollution in the winter, generating up to 1/3 of outdoor air particulates on cold nights. In addition, conventional open fireplaces suck air out of the house and send more heat up the chimney than they provide to the room.

## 12. Install Zoned, Hydronic Radiant Heating

K12. Please provide a system schematic, product listings and cross reference the green features index.

Intent: Hydronic radiant heating can provide even heat throughout a room, reduce drafts and eliminate duct leakage. Hydronic radiant heating systems are also easily zoned, allowing residents to turn off heat in areas that aren't being used.

## 13. Install Air Filter (MERV)

K13. Please provide manufacturers specifications as a note and show location on plan page specific to the installation location. Cross reference the points check list.

Intent: HVAC filters remove particulates from the air. MERV, or Minimum Efficiency Reporting Value, is a metric used to measure an air filter's efficiency. Use HVAC air filters rated at MERV 6-10. These filters are recommended for cleaner air without compromising the performance of standard mechanical systems.

## 14. Install Heat Recovery Ventilation Unit (HRV)

K14. Please note and show location on the plan page specific to the installation location. Please provide the manufacturers specification and cross reference the points check list.

Intent: Conserves energy by recovering heat from conditioned air exiting the building to pre-heat air that is to be conditioned

## 15. Install Separate garage Exhaust Fan

K15. Please provide manufacturers specifications as a note on the plan page specific to the installation location.

Intent: A fan that comes on when either the garage door closes, or the door between the house and the garage opens helps keep VOC's and other compounds released from chemicals, equipment and vehicles from entering the residence and protects indoor air quality.

# L. Renewable Energy and Roofing

Intent:

California is rich with solar energy. In fact, Northern California receives more energy per square foot from the sun than Texas. With careful consideration we can build homes that take advantage of this natural resource.

	New Homes	Remodel & Additions
1. Pre-Plumb for Solar Hot Water	4	4
2. Install Solar Hot Water Heating System	14	14
3. Pre-Wire for Future Photovoltaic Installation	4	4
4. Install Photovoltaic Panels	14	14
5. Install Solar Tubes (1 point each up to 5 points)	5	5
6. Select Safe and Durable Roofing Material, (Class 'A', 40 year)	3	3
7. Install Radiant Barrier Roof Sheathing Material	3	3
8. Select EPA ENERGY STAR Cool Roofing Material (California Cool Roof Rated)	3	3
9. Use Roofing Materials with at least 33% Recycled Content	3	3
10. Install a Green Roof (Living Roof)	12	12
Available Points	65	65

1. Pre-Plumb for Solar Water Heating

L1. Please provide piping diagram showing size, routing, and type of piping to be used. Also show proposed location of solar collectors.

Intent: Many solar water heating systems can provide all the hot water needed during summer months. Pre-plumbing for a solar hot water system greatly increases the chances that a system will be installed in the future.

2. Install Solar Water Heating System

L2. Please provide piping diagram showing size, routing, and type of piping to be used. Also show proposed location of solar collectors. Please include manufacturer's specifications including listings, approvals for all solar water heating equipment.

Intent: Solar hot water heating systems use solar panels and water storage to collect and store heat from the sun for domestic hot water use or space heating. Solar water heating is more cost effective now as a result of advances in technology and increasing energy costs.

3. Pre-Wire for Future Photovoltaic (PV) Installation

L3. Please show schematic on the plan indicating the routing for, types, sizes of conductors and raceways for conductors and service size and location on plans.

Intent: Pre-wiring greatly increases the chances that a PV system will be installed in the future.

4. Install Photovoltaic (PV) Panels

L4. Please show schematic on the plan indicating the routing for, types, sizes of conductors, raceways for conductors and service size and location. Please include manufacturers specifications including listings, approvals for all photovoltaic equipment (invertors, panels etc)

Intent: Benefits of installing PV panels include lower energy costs, reduced greenhouse gas and other emissions from fossil fuel-burning power plants, reduced need to develop new power plants and improved national energy security.

5. Install Solar Tubes

L5. Please note and show on plans installation location of solar tubes and reference the green features index

Intent: Utilization of natural light decreases the need to use artificial sources and thus conserves energy. Natural light has the added benefits of increased productivity and elevated moods

6. Select Safe and Durable Roofing Materials

L6. Please specify roof materials, class and rating note or otherwise show this feature on the plans page specific to the installation location. Must be at least a class A, 40 year rated roof to qualify.

Intent: Short-lived roofing materials result in more waste going to landfills and more money spent on roof replacement. In extreme cases, early failure of roofing material can result in water damage.

7. Install Radiant Barrier Roof Sheathing

L7. Please show location of radiant barrier and provide manufacturers installation specifications.

Intent: A radiant barrier reflects heat energy from the sun that would normally be trapped in the attic or crawl space and radiated into the home.

8. Select EPA ENERGY STAR Cool Roofing Material

L8. Please note and show on plan page specific to the installation location. Please provide manufacturers specifications to verify EPA Energy Star and cross reference the points check list.

Intent: Installing a ‘cool’ roof material that is rated high in reflectivity and emissivity will reduce the amount of heat that is driven through the roofing assembly and into the attic. Cool roofing materials and radiant barriers reduce heat build-up and can prevent 97% of the sun’s radiant heat from entering the home lowering the temperature in the attic by 30-40 degrees.

9. Use Roofing Materials with at Least 33% recycled Content

L9. Please note and show on plans. Please provide manufacturers specifications to verify content and cross reference the points check list.

Intent: Utilization of recycled materials keeps waste out of the landfills and reduces the need for the harvest of virgin materials

10. Install a Green Roof (Sod or other Living Roof)

L10. Please provide engineers calculations as well as landscape plan and reference the green features index

Intent: Living roofs decrease the heat island effect by absorbing rather than reflecting light and heat

# M. Natural Heating and Cooling

**Intent:**

By taking extra care in the planning stage our homes can take advantage of the most abundant and rapidly renewable source ever discovered; the sun. Time tested techniques such as thermal mass and solar orientation and new Photo Voltaic technology allow modern homes to be more comfortable while consuming less.

	New Homes	Remodel & Addition
1. Incorporate Passive Solar Heating	5	5
2. Install Subterranean Cooling Tubes (Ground Coupled Heat Exchangers)	3	3
3. Overhangs or Awnings on South Facing Walls Sized to Maximize Solar Heat Gain for Building	3	3
4. Oversized Overhangs Around Entire Structure for increased weather proofing: 16' = 1 point 24' = 2 points	3	3
5. Plant Deciduous Trees on the West and South Sides	3	3
Available Points	17	17

1. Incorporate Passive Solar Heating

M1. Please note and show on plans. Please provide information on the thermal mass characteristics of the house; window locations and specifications (including solar heat gain coefficient and low-e ratings and varying placement of these windows to allow for solar heating qualities); house orientation with the long axis running east-west.

Intent: In the winter the sun's energy is captured and stored during the day in building materials that have high thermal mass, such as concrete, stone or ceramic tile floors. In the evening, those materials radiate their heat to interior spaces, reducing the need to run the heating system.

2. Install Subterranean Cooling Tubes (Ground Coupled Heat Exchangers)

M2. Please provide piping diagram showing size, routing, and type of piping to be used and location of system on the site map. Please reference the green features checklist

Intent: At a depth of 6' the earth maintains a temperature of +/- 55°. By running air through tubes that are buried at this level, air can be conditioned to 55° before being either heated or cooled. This lowers the energy consumed for heating and or cooling.

3. Overhangs or Awnings on South Facing Walls

M3. Please provide building elevation and graphic depiction showing overhangs and windows relative to the angle of the sun to verify seasonal shading effects. Ideal target is complete window shading 10 a.m. to 2 p.m. June 21 and no shading December 21.

Intent: By shading the sun during the summer, and allowing sunlight during the winter, overhangs and awnings take advantage of thermal mass to moderate temperature swings by way of passive heating or cooling.

4. Oversized Overhangs Around Entire Structure for Increased Weather Proofing

M4. Please note and illustrate increased size of overhangs and reference the green features checklist

Intent: larger overhangs decrease moisture intrusion which leads to better indoor air quality, and increased life of the structure

5. Plant Deciduous Trees on the West and South Sides

M5. Please note species of tree and location on plot plans.

Intent: During the spring and summer, deciduous trees provide shade. During the winter and fall, after they drop their leaves, they let sunlight into the home that helps to passively heat the space.

## N. Indoor Air Quality and Finishes

Intent:

The Environmental Protection Agency considers 60% of US Homes sick. “...sick building syndrome (SBS) symptoms, may include irritation of eyes, nose, and skin, headache, fatigue, and difficulty breathing.” Indoor pollutant levels inside can be 2-5 times higher and sometimes as much as 100 times more polluted than outside air.(US EPA) A major contributing factor to the quality of indoor air is the off gassing of Volatile Organic Compounds (VOC’s) contained in almost all of the standard building materials in use today. Carpet, paint, cabinets, furniture, insulation, adhesives, cleaners, and many other products release formaldehyde and hundreds of other chemicals into the air that we breathe.

Interesting Fact: 40% of children born today will develop some form of respiratory disease. Studies have shown that poor indoor air quality is linked to the increased occurrence of childhood asthma.

	New Homes	Remodel & Additions
1. Install Whole House Vacuum System	3	3
2. Use Low/No VOC Paint	1	1
3. Use Low VOC, Water Based Wood Finishes	2	2
4. Use Solvent-Free Adhesives	3	3
5. Formaldehyde Free Particleboard	6	6
6. Use Exterior Grade Plywood for Interior Uses	1	1
7. Use Formaldehyde-Free MDF and Materials	4	4
8. Seal All Exposed Particleboard or MDF	4	4
9. Use FSC Certified Materials for Interior Finish	4	4
10. Use Finger-Jointed or Recycled Content Trim	1	1
11. Use Recycled Content Counter Tops and Finishes	3	3
Available Points	32	32

1. Install Whole House Vacuum System

N2. Please provide manufacturers specifications and note installation location on the plans.

Intent: Locating the vacuum motor and filters in the garage minimizes the spread of dust and other organic particulates

2. Use Low/ No VOC Paint

N1. Please provide product specifications, such as MSDS or product listing and reference this information as a notation on the plans specific to the application location.

Intent: Most interior paints contain volatile organic compounds (VOC's), a major class of indoor and outdoor air pollutants. Besides affecting indoor air quality, certain VOC's react with other chemicals in the atmosphere, producing ground-level ozone (smog) that can affect human health. Low VOC paints contain less than 150 grams per liter (gpl) of VOC's for nonflat finishes, and 50 gpl or less for flat finishes.

3. Use Low VOC, Water Based Wood Finishes

N3. Please note and show location on plans. Please provide manufactures specifications to verify low VOC content and cross reference points check list.

Intent: Conventional petrochemical-based wood finishes can offgas for months and be harmful to children and chemically sensitive individuals. Low VOC wood finishes contain less than 250 gpl VOC

4. Use Solvent –Free Adhesives

N4. Please note and show location on plans. Please provide manufactures specifications to verify solvent free and cross reference points check list.

Intent: The solvents in standard adhesives emit pollutants that are potentially harmful and may have detrimental health impacts. Low VOC caulks and adhesives have 70 gpl VOC's

5. Formaldehyde-Free Particleboard

N5. Please note and show location on plans. Provide specifications to verify that the particleboard is formaldehyde free and cross reference points check list.

Intent: Reducing formaldehyde exposure helps protect the health of residents, particularly children, who are the most susceptible.

6. Use Exterior Grade Plywood for Interior Uses

N6. Please note this on the plan page specific to the installation and utilization location.

Intent: Exterior grade plywood is manufactured using phenol formaldehyde rather than urea formaldehyde. Both are potent mucous membrane irritants, but of the two, phenol is less toxic.

7. Use Formaldehyde-Free MDF and Materials

N7. Please show manufactures specifications for this product note and detail locations where product is to be installed

Intent: Reducing formaldehyde exposure helps protect the health of residents, particularly children, who are the most susceptible.

8. Seal all Exposed Particleboard or MDF

N8. Please note and show location on plan page specific to the installation location. Provide specifications of sealant and cross reference points check list.

Intent: Sealing particleboard and MDF reduces formaldehyde exposure and helps protect the health of residents, particularly children, who are the most susceptible.

9. Use FSC Certified Materials for Interior Finish

N9. Please note and show location on plans. Provide FSC Certification to inspector for verification at time of framing inspection.

Intent: The Forest Stewardship Council guarantees that the lumber that they certify comes from a sustainable harvested forest.

10. Use Finger-Jointed or Recycled Content Trim

N10. Please note and show location on plans. Provide specifications and note on the plan page specific to the installation location.

Intent: Finger jointed trim, studs and fascia are manufactured from short pieces of wood glued together to create finished material. Finger-jointed elements are straighter and more stable than conventional clear wood, and is a more efficient use of raw materials.

11. Use Recycled Content Counter Tops and Finishes

N11. Provide products listing and documentation (from supplier) that verify recycled content in ceramic counter tops and finishes and show location on plans.

Intent: Recycled content materials decrease the flow of waste to the landfill, and minimize the harvest of raw materials

# O. Flooring

Intent:

There are many options for high quality ‘green’ flooring. From FSC certified hardwoods and bamboo, to recycled content tile and finish concrete. All of these options provide durable, rapidly renewable options that will increase the beauty of your home, without harm to the environment.

	New Homes	Remodel & Additions
1. Select FSC Certified Wood Flooring	6	6
2. Use Rapidly Renewable Flooring Materials	4	4
3. Use Salvaged or at least 20% Recycled Content Ceramic Tiles	3	3
4. Install Natural Linoleum in Place of Vinyl	5	5
5. Install Recycled Content Carpet with Low VOC's	4	4
6. Use Finished or Exposed Concrete for 50% or More of the Project Floor Area on the Ground Floor	6	6
Available Points	28	28

1. Select FSC Certified Wood Flooring

O1. Please Provide FSC Certification and supply provider/ lumber yard information to inspector for verification at time of inspection.

Intent: The Forest Stewardship Council guarantees that the lumber that they certify comes from a sustainable harvested forest.

2. Use Rapidly Renewable Flooring Materials

O2. Provide products listing and documentation (from supplier) that verify flooring is certified as a rapidly renewable material and show location on plans.

Intent: Rapidly renewable flooring materials are attractive, durable, low-toxic, perform well and reduce pressure to harvest forests.

3. Use Salvaged or at Least 20% Recycled Content Ceramic Tiles

O3. Provide products listing and documentation (from supplier) that verify 20% or greater recycled content in ceramic tiles and show location on plans.

Intent: Recycled-content ceramic tiles can contain up to 70% recycled glass or other recycled materials.

4. Install Natural Linoleum in Place of Vinyl

O4. Please provide manufacturers specifications and note location on plans.

Intent: Natural linoleum is fire and moisture resistant as well as a sound absorber. It is manufactured primarily from renewable materials such as cork, wood flour and linseed oil.

5. Install Recycled Content Carpet with Low VOC's

O5. Provide documentation (from supplier) that the carpet is CRI (Carpet and Rug Institute) Green Label Certified complies with CA Section 01350 low VOC. Show this feature as a notation on the plans specific to the installation location.

Intent: Recycled content carpet can be used in all applications where conventional carpet is specified, and is comparable in appearance, performance and price to conventional synthetic carpet made from virgin materials.

6. Use Finished Concrete for 50% or More of the Floor Area on the Ground Floor

O6. Please note location of this feature on the plans and specify materials to be used as finish, please provide product or manufacturers specifications and listings and note location of this feature on the plans and designate areas to be finished by shading, dotting, cross hatching etc.

Intent: With slab-on-grade construction, the concrete can be polished, scored with joints in various patterns, or stained with pigments to make an attractive finish floor.

## P. Other

	New Homes	Remodel & Additions
1. Incorporate Index of Green Features into Cover of Blueprints	1	1
2. Develop Homeowner Manual of Green Features and Benefits	1	1
3. Energy Ratings: Every 1 % Reduction in Whole House Energy Beyond Title 24 = 1 point up to 30 points. Use Energy Software to Show Improvement over California Residential Energy Standards (Title 24)	30	30
4. Innovation Points – These points are given for innovations or new approaches, new materials or practices. These Approaches must meet environmental goals identified in the Residential Green Building Guidelines	-	-
a. Design, Provide and Install Compost Bin	1	1
b. Turf Less than 10% of Total Lot Area Minus Building Footprint, Decking, Patios, Driveways	8	8
c. After Installation of Finishes, Indoor Air Tests Show Formaldehyde Level <27 ppb, Install CO Monitors, Install Humidity Monitors	5	5
d. Conduct and Pass a Duct Blower Test	5	5
e. Install Mudroom with Bench, Shoe Rack, and Hard Floor to Protect IAQ	3	3
f. Install Permanent Clothes Line	1	1
g. Increased Damp Proofing of Bathrooms	2	2
h. Features Not Listed: Requires Submittal of Verification Form and Must be Approved by Green Building Department		
Available Points	57	57

1. Incorporate Listing of Green Features into Cover of Blueprints  
P1. Please note on plans.

2. Develop Homeowner Manual of Green Features/ Benefits  
P2. Create a document separate from the plans that list the Green Building Features and benefits that are realized by incorporating Green Building features into this particular residence.

Example: The use of energy star appliances will reduce you energy consumption and therefore your utility bill; this should be a qualifier to accompany the appliance manual.

3. Energy Ratings: Every % Reduction in Whole House Energy Beyond Title 24 Code- 1 Point (up to 30 points) Use Energy Software Such as EnergyPro or MicroPas to Show Improvement over California Residential Standards (Title 24)

P4. Please note on plans with a cross reference to the points check list. Please provide report from software such as EnergyPro or MicroPas to verify efficiency.

4. Innovation Points- There Pints are Given for Innovative Approaches, Such As New Materials and Methodologies, Currently not identified above. These Approaches Must Meet Environmental Goals Identified in the Residential green Building Guidelines

P4a. Design, Provide and Install Compost Bin

Please note and show location of compost bin on plan page specific to the installation location.

Intent: Diverting organic materials from the landfill by composting on site increases the life of our landfills and produces high quality fertilizer.

P4b. Turf Less than 10% of Total Lot Area Minus Building Footprint, Decking, Patios, Driveways

Please note and show clearly on the plot map or site plan locations to have turn in relation to area with out turf.

Intent: Kentucky blue grass, the most common species of grass used to plant lawns is not a native species adapted to our climate. As a result, a typical lawn requires at least as much, if not more water to survive than the people inhabiting the residence.

P4c. After Installation of Finishes, Indoor Air Tests Show Formaldehyde Level <27 ppb, Install CO Monitors, Install Humidity Monitors

Please provide verification that a test has been conducted and results show levels <27 ppb. Note and show location of CO and humidity monitors on plan page specific to the installation location

Intent: The quality of the indoor environment is affected by the chemicals and organics that are contained in our homes. Formaldehyde is toxic but levels below 27 parts per billion are considered acceptable. Monitors for CO and moisture in the walls will assure that your home remains a safe and comfortable environment by alerting you when undesirable conditions occur.

P4d. Conduct and Pass a Duct Blower Test

Please provide verification that a duct blower test was conducted and passed

Intent: Checking for leaks helps maximize the efficiency of your homes HVAC equipment

P4e. Install Mudroom with Bench, Shoe Rack, and Hard Floor to Protect IAQ

Please note and show location of mudroom on plans

Intent: A mudroom provides a location to take off shoes and quarantine any chemicals or harmful organics that may otherwise be tracked into the house

P4f. Install Permanent Clothes Line

Please note and show location on the plan page specific to the installation location

Intent: Use of a clothes line rather than an electric drier decreases energy consumption

P4g. Increased Damp Proofing of Bathrooms

Please note and show detailing on plan page specific to the application of increased damp proofing.

Intent: Mold grows in damp areas. Keeping moisture off and out of the walls in bathrooms decreases the risk of mold growth and helps maintain good indoor air quality

# Green Building Glossary

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**There are a number of terms in the Green Building Check Lists that you may not be familiar with. Use this glossary for an explanation of terms for both residential and non-residential applications.**

**Adhesive:** Any substance that is used to bond one surface to another surface by attachment. Adhesives include adhesive bonding primers, adhesive primers, adhesive primers for plastics, and any other primer.

**Advanced Framing Techniques:** Also, called Optimum Value Engineering (OVE), is a methodology of construction designed to conserve construction materials by using alternative framing methods. Concepts include 19.2-24" framing centers, modular layout, single top plates, individually sized (right sized) headers or no headers or double rim joists in lieu of headers, framing ladders at T-intersections and open corner framing. Some methods may not work in engineered structures, but many will. The overall savings in framing materials and associated costs can be significant. An excellent website that describes in detail the concept is [www.toolbase.org](http://www.toolbase.org).

**AFUE:** Annual Fuel Utilization Efficiency. The higher the percentage the greater the efficiency of the appliance. Standard efficiencies run in the mid 70% range. Higher efficiency furnaces run between 82 and 90+ %AFUE.

**Alternative Fuel Vehicle:** Vehicles which utilize fuel other than gasoline or diesel fuels. Vehicles may be electric, LPG, natural gas, bio-diesel or a hybrid of these fuels.

**ASHRAE:** American Society of Heating, Refrigeration and Air Conditioning Engineers. This organization writes many of the standards for installation of these systems.

**Balancing Dampers:** Regulate fresh air flows to specific rates.

**Bedroom:** For the purposes of the home size adjuster, any room or space that could be used or is intended to be used for sleeping purposes and meets local fire and building code requirements.

**Build It Green:** Build It Green is a non-profit membership organization whose mission is to promote healthy, durable, energy and resource-efficient building practices in California. Visit [www.builditgreen.org](http://www.builditgreen.org).

**Borate:** Borate is used as a wood preservative that is non-toxic to humans but highly toxic for wood boring insects like termites.

**Brownfield:** Abandoned, idle or underused industrial or commercial buildings where expansion or development is complicated by real or perceived environmental contamination.

**Built Environment:** The man-made creation of, or alterations to, a specific area, including the environment where those changes are made. On a home site, this includes everything that has been disturbed during construction.

**Charrette:** An intensive, collaborative session in which the project team discusses various design options related to all aspects of home construction.

**Chlorofluorocarbons:** (CFCs) are hydrocarbons that deplete the stratospheric ozone layer.

**CIR (Credit Interpretation Requests):** A request for the clarification on certain credits the design team may have questions about. The CIRs should be submitted to the Provider who will then bring them to the attention of a TASC (Technical Advising Sub-Committee).

**Circulation Loop:** A system that loops cold water back to the water heater (instead of down the drain) until hot water reaches the faucet. This is the primary component of a structured plumbing system.

**Central Vacuum System:** Network of tubing with inlets throughout the house designed to remove debris to an out of the way receptacle. A central vacuum system is more efficient at the removal of dust and debris than traditional vacuums.

**Closed Combustion:** A design for combustion equipment (e.g. furnaces, water heaters) in which the air provided to the combustion equipment is ducted from the outside, and all exhaust gases are ducted directly to the outdoors. All elements of the system are sealed to prevent leakage of combustion exhaust into the home.

**Combustion Exhaust Gases:** The most common gases resulting from fossil fuel combustion include carbon dioxide, sulfur dioxide, and a number of sulfur dioxides. These gases can be dangerous if allowed to build up indoors.

**Compensating Shower Valves:** compensating valves are designed to keep bathing water temperature in the shower fairly constant when other appliances such as a washing machine or toilet are in use and when the hot or cold water supply pressures change or the bathing water outlet temperatures changes.

These types of valves are available:

**Thermostatic Compensating Valves** are designed to keep bathing water temperatures in the shower fairly constant when other appliances such as a washing machine or toilet are in use and when the hot or cold water supply pressures change or the bathing water outlet temperatures changes. The response of this type of mechanism is different to that of a pressure balance compensating valve.

**Pressure Balance Compensating Valves** are designed to keep bathing water temperature fairly constant when other appliances such as a washing machine or toilet are in use and when the hot or cold water supply pressures change.

**Conventional, Non-Compensating Valves** are completely dependent on the user to adjust the temperature at all times by changing the adjustment.

**Composite Wood:** A product consisting of wood or plant particles of fibers bonded together by a synthetic rein or binder. Examples include plywood, particle-board, OSB, MDF, and composite door cores.

**Conditional Space:** An interior space that utilizes any method of air conditioning or heating to control the temperature and/or humidity levels. CFA is generally used to determine a building's habitable floor area.

**Conventional Turf:** Grass that requires considerable watering, mowing, and/or fertilizers. What is considered conventional may vary by region, but turf should be classified as 'conventional' if it is a monoculture and requires regular irrigation, chemicals, or significant mowing.

**Cool Roof:** Specialized roofing materials designed to reflect the heat of the sun away from building this reducing the cooling load and associated air conditioning costs. In Santa Cruz, because of our moderate climate there is less need for cool roofs than in a place like the central valley, however larger buildings can benefit from these roofing systems. In California, the CA Energy Commission requires a cool roof to have a reflectance of .7 and an emissivity of .75 under the Title 24 requirements.

**Demand Controlled Circulation Pump:** Circulation pumps use looped systems to ensure hot water is immediately available while keeping unused cold water in the system. The demand controlled circulation pumps use a switch or motion sensor to automatically activate the circulation of water, thus it saves water and energy.

**Designed Landscape:** Traditional landscape features that have been incorporated into the home site. Designed landscape features may include soft-scapes (e.g. grass, shrubs) or hard-scapes (e.g. rocks, fountains), but do not include driveways or areas under roof. Designed landscape also does not include preserved natural areas.

**Disturbed Lot Area:** Area of the lot that is directly affected by construction activity, including any activity that would lead to soil compaction or damage to vegetation.

**Diverted Waste:** Waste from construction or demolition that is not sent to a landfill or incinerator. Strategies for diverting waste include reclamation, recycling, or for certain materials mulching.

**Drip Irrigation System:** An irrigation system that slowly applies water to the root system of plants to maximize transpiration while minimizing wasted water and topsoil runoff. Drip irrigation usually involves a network of pipes and valves that rest on the soil or underground at the root zone.

**Drywall Clips:** Provide support for drywall at corners while eliminating the need for excessive wood backing.

**Dual-Flush Toilet:** Toilets that have two different settings, usually 0.8 gallons for liquid removal and 1.6 gallons for full flush solid removal. On the average they use about 2500 gallons per year compared to a 1.6 single flush that uses about 4500 gallons per year.

**Durability:** The ability of building or any of its components to perform its required function in its service environment over the period of time without unforeseen cost for maintenance or repair.

**Earthen Flooring:** Earth that has been compacted with straw or other fibers and conditioned with various oils to form a hard surface. Fairly labor intensive, but relatively easy to repair and usually very low bodied energy and inexpensive materials.

**EER-** (see SEER)

**Energy Heel Truss:** An engineered roofing truss with an elevated portion at the wall plate line to provide for full depth insulation.

**Engineered Lumber:** Generally engineered lumber is construction materials designed to reduce the amount of material needed for framing a building. By designing away from full dimension sawn lumber, less large growth trees need to be cut and smaller dimension lumber can be assembled in various configurations to span long distances with equal or superior strength. Trusses have always been a good example of engineered lumber by using smaller dimension lumber and distributing forces more efficiently, the materials needed are a fraction of that required to span the same distances with sawn lumber.

**Energy Star:** Introduced in 1992 by the U.S. Environmental Protection Agency (EPA) as a voluntary labeling program designed to identify and promote energy efficient products to help reduce greenhouse emissions by identifying energy efficient products. Originally designed for computers and monitors, it has now expanded to include office products, major appliances, lighting, home electronics and more. New expanded programs now also include complete buildings such as homes, commercial and industrial buildings.

**Energy Star Home:** Homes built to a high standard of energy efficiency (at least 15% more efficient than the International Energy Conservation Code). For more information, visit [www.energystar.gov/homes](http://www.energystar.gov/homes).

**Energy Star with Indoor Air Package (IAP):** A certification that recognizes homes with systems to ensure high standards of indoor air quality and rated as an Energy Star Qualified Home.

**Engineered Studs:** A little different than engineered lumber, usually smaller diameter stock is shredded and reassembled by forming them into nominal sized framing materials. The material is combined with a binder and compressed into large billets that are then cut to dimensional size. Similar products have been around for many years in the form of oriented strand board (OSB) and other laminated wood beam products. An advantage of engineered studs is that they are dimensionally stable and less susceptible to warping. These studs are considerably heavier than sawn wood, cost about twice as much and may be subject to water damage.

**Erosion:** A combination of processes in which materials of the earth's surface are loosened, dissolved or worn away, and transported from one place to another by natural agents such as water, wind or gravity.

**Finger Jointed Studs:** Often the lumber being cut today is a shadow of the old growth lumber of yesterday in quality, density and overall suitability for construction. However, by conserving the shorter sections of lumber and removing the undesirable wane and knots, these sections can be fitted with special splicing techniques to form longer and more dimensionally stable lumber. The application is usually limited to vertical installation because of this splicing technique.

**Flow Reducer:** A device attached either just downstream from the water shutoff valve to a building or at the outlet of a fixture designed to reduce or limit the amount of water flow in relation to the delivery pressure from the street. Flow reducers can cut the flow of water dramatically saving thousands of gallons each year in a dwelling or even more in larger buildings. Flow reducers are never installed on automatic fire extinguishing systems for obvious reasons.

**Flyash:** A byproduct of a coal burning furnace, usually from power generation equipment. Consisting mostly of silica, alumina and iron, and fine glass like particles. When mixed with lime and water it forms a cementitious material similar to Portland cement (a bonding material in concrete). The cement produced is hard, smooth and easily worked. Other uses include fills for abandoned coal mines, sealing liners for hazardous waste sites and seaside docking areas.

**Formaldehyde:** A naturally occurring VOC found in small amounts in animals and plants, but is an irritant to most people when present in high concentrations—causing headaches, dizziness, mental impairment, and other symptoms. Formaldehyde may be a carcinogen.

**FSC Certified Wood:** The Forest Stewardship Council is a non-profit organization that certifies various forests around the world exhibiting good sustainability and management practices based on specific management criteria. The wood from these forests are often quickly renewable often using hybrid timber and advanced forestry methods. Other forests are simply carefully managed by limiting the impact on both the environment and the people and demonstrating a social benefit in the process.

**Granny Flat:** Another name for an accessory dwelling unit. Granny flats are usually associated as being attached to the main dwelling unit, but may also be detached. City regulations limit the number and size of these units.

**Graywater:** Waste water from lavatories, laundry, showers, baths and sinks only. This water can be stored in special equipment and may then be used to water lawns, gardens or other relatively benign non-potable uses such as groundwater recharge. Graywater systems must comply with the requirements of California Plumbing Code Appendix Chapter G to qualify as a green element. Water from toilets is called black water and is not eligible for any type of reuse under this program and must be properly drained to the sewer or septic system.

**Green Power:** Generally this is the production of electricity from environmentally friendly sources such as photovoltaic geothermal, hydroelectric, biomass, hydrogen fuel cells, ocean energy and wind power. As with all forms of electricity generation, there are significant costs involved and in some cases undesirable byproducts such as vane noise and unsightly appearance or diversion of wild waterways. While large scale versions of these methods are not practical within an urban environment, many homes and businesses are taking advantage of solar systems that not only make electricity but also heat water and interior environments.

**Green Rater:** An individual that performs field inspections and performance testing for homes.

**Green Roof:** Essentially this is a growing roof system utilizing a specialized undercarriage for the waterproof membrane and excess water removal. Various types of vegetation are set into a special growing media and help to replace displaced vegetation in the building footprint as well as greatly reduce the heat island effect of a roof, especially in hot climates. Depending on the

species of plants chosen, significant increases in watering requirements may be required. On the other hand, on large walk able roofs pleasing garden atmospheres can be created and watering requirements can be reduced by the installation of storm water recovery systems. Green roofs can also regulate the flow of excessive storm water by metering the release of the water from the roof area.

**Hardscapes:** Defined by the American Society of Landscape Architects as “elements added to a natural landscape, such as paving stones, gravel, walkways, irrigation systems, roads, retaining walls, sculpture, street amenities, fountains, and other mechanical features.” Hardscapes are often impermeable, but they are not impermeable by definition.

**Heat Island Effect:** As cities replace natural landscaping with streets, buildings and other infrastructure, the average ambient temperatures within these areas begin to rise, as much as 10 degrees F higher than less developed rural areas. This increases the need for cooling energy, can exacerbate pollution problems and may be contributing to the problem of global warming. Heat islands can be effectively reduced by shading streets with trees and improving the urban forest overall. Ironically, heat islands can be beneficial in cold climates in the winter by reducing heating demands; however the overall effect is much more on the negative side.

**HERS index:** A system for evaluating the energy efficiency of home using an energy simulation model. The HERS index ranges from 0 to 100, where the index represents the percent energy use compared to a reference home that meets basic code requirements.

**High Albedo Materials:** Materials with a high amount of surface reflectivity.

**High Efficiency Toilets (HET):** Toilets that use no more than 1.3 gallons per flush.

**HVAC:** The acronym for Heating, Ventilation and Air Conditioning.

**Hydro chlorofluorocarbons (HCFCs):** Refrigerant used in building equipment that deplete the stratospheric ozone layer, but to a lesser extent than CFCs.

**Hydronic System:** A heating or cooling system that relies on the circulation of water as the heat-transfer medium. A typical example is a boiler with hot water circulated through radiators.

**Hydronic Radiant Heating:** This is a system of heating a building by using a central boiler or hot water heater to distribute heat under a floor through a system of tubes just under the flooring surface. A single heater may be zoned to provide independent heat to different parts of a building as needed. The heating system is efficient and provides a comfortable conditioned room.

**IAQ:** The acronym for Indoor Air Quality. As buildings become tighter, indoor air quality suffers unless specific measures are taken to improve the exchange of fresh air without sacrificing heating/cooling economy.

**Infiltration:** This is the entrance of exterior unconditioned air to a building through various means into a building. Under the older codes, a dwelling generally had the equivalent of a four-foot diameter hole in infiltration leakage. While newer buildings greatly improve this leakage, other problems such as poor indoor air quality and transpiration of moisture to internal stud bays can occurs and must be remedied with such items as air-to-air exchangers and specialized waterproofing techniques.

**Insulated Concrete Form (ICF):** Expanded polystyrene foam (EPS), high density polyethylene (HDPE), polyvinylchloride (PVC) or polycarbonate (PC) is cast or injection molded in various panel shapes and form the permanent forming method for reinforced concrete walls. These highly insulated forms have various thermal resistance values (R values) ranging from about R-22 up to about R-40. In hot or cold climates, these forms can significantly reduce heating and cooling loads. The panels are usually pre-engineered and produce a fire resistive barrier up to 4-hour rated.

**Invasive:** Defined by Executive Order 13112 as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” Not all non-native species are considered invasive. Invasive species differ by region, and can be identified through local and state agencies. A list of regional agencies is provided at [www.invasivespeciesinfo.gov/unitedstates/state.shtml](http://www.invasivespeciesinfo.gov/unitedstates/state.shtml)

**Ladder Blocking:** A method of framing that is used where interior partition walls meet and are reinforced by exterior walls. This eliminates unnecessary framing at these intersections.

**Lean Building:** Maximum performance with minimum material usage- see advanced framing technique use.

**LEED:** Leadership in Energy and Environmental Design. The LEED program was developed by the U.S. Green Building Council as a system for rating new and existing commercial, institutional and high-rise residential buildings. It evaluates the overall environmental performance during the lifecycle of a building and provides a tangible methodology for analyzing the standards of a green building. The version currently being used in the City of Santa Cruz Green Building Program is NC 2.1.

**Light Fixture:** A light system that is permanently fixed to the home, in the case of fluorescent light fixtures, the fixture includes an integrated ballast. A compact fluorescent lamp (CFL) is not a light fixture.

**Light Pollution:** Light pollution comes from many sources, but generally from unshielded lighting that allows light on a site to escape. Some lighting cannot be effectively reduced by shielding such as parking lot or street lights that reflect off of structures and bounce light away from the site. However, simple hooding of the “naked” light source directing the light to the ground or limiting its outward influence can significantly reduce light pollution.

**Local Heat Island Effect:** the incidence of higher air and surface temperatures caused by solar absorption and re-emission from roads, buildings and other structures.

**Manufactured Locally:** Generally this refers to products that are manufactured within a relatively short distance from the job site. Depending on who is making the definition, this can be within 100 to 1000 miles. The main intent is to be cognizant of long distance shipping and the energy expended and pollution created to move a product from greater distances.

**MDF– Medium Density Fiberboard:** An engineered panel product that can be used for such things as cabinets and wall panels while other MDF products can be shaped into moldings, ceiling tiles, flooring, interior doors and a variety of other uses. Exterior grades of MDF can be made into

garage doors, sheds and other outdoor applications. A middle grade called “moisture resistant MDF” can be used externally but must be protected from water intrusion by sheltering.

**MERV:** The Minimum Efficiency Reporting Value is used to describe worst case performance of air filters.

**No-Disturbance Zones:** An area that has no alterations or construction byproducts located within it, and has been designated to be preserved during construction.

**Native Plants:** Plants that have evolved within their own ecological habitats, and are not invasive within their own native ranges. Native plants provide food and shelter to indigenous wildlife, stabilize shorelines and fields, ect., growing in balance with surrounding plant and animal species.

**Oriented Strand Board (OSB):** a manufactured wood structural panel generally cut to the size of standard plywood sheets and in various thicknesses. It is made by chipping very specific species of wood from smaller growth trees and “orienting” the grain of these chips into a pattern that provides optimum strength in the panel. The chips are then saturated with glue and pressed into production sizes.

**Ozone Depletion:** Destruction of the earth’s ozone layer by the photolytic breakdown of chlorine and/or bromine containing compounds (chlorofluorocarbons or CFC’s) which catalytically decomposes ozone molecules. Commonly used as refrigerants, CFC’s have been found to damage the stratospheric ozone layer, creating holes and allowing harmful ultraviolet radiation to leak through.

**Permeable Paving:** Pavement that allows the passage of water into the ground. There are a variety of permeable pavement methods including spaced pavers with soil infill and newer specialized asphalt and concrete applications that actually allow rainwater to pass through the surface and help to keep the water table from being depleted.

**Photovoltaic Panel:** These are panels that are typically roof or ground mounted that collect solar energy and through the use of special solar voltaic cells, convert the energy to direct current electricity. A special controller called an inverter then converts this electricity to alternating current, making it usable in most residential and commercial applications. Electricity made in this fashion can be stored in batteries for later use, consumed as it is made to help offset the overall electrical use of a building, or placed into the commercial electrical grid for use in other locations. These panels only work when there is light, but can effectively produce electricity even on cloudy days.

**Post-Consumer Recycled Content:** Material used and then recalled by consumers. This is distinguished from by-products of the manufacturing process that are recycled (pre-consumer recycling)

**Post-Consumer Waste:** Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of materials from the distribution chain. Examples of this include construction and demolition debris materials collected through curbside and drop-off recycling programs, broken pallets (if from a pallet refurbishing company, not a pallet making

company), discarded products (e.g. furniture, cabinetry and decking) and urban maintenance waste (leaves, grass, clippings and tree trimmings).

**Potable Water:** water suitable for drinking, generally supplied by the municipal water systems.

**Power Vented Exhaust:** A design that uses active exhaust to pull combustion out of the home, combustion equipment with power venting can use indoor air as the combustion supply air.

**Pre-Consumer Content:** Previously referred to as Post-Industrial Content, this is material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process that generated and capable of being reclaimed within the same process that generated it. Examples include planer shavings, plytrim, sawdust, chips, bagasse, sunflower seed hulls, walnut shells, culls, trimmed materials, print over-runs, over-issue publications and obsolete inventories.

**Pressed Earthen Block:** Like adobe, pressed (or compressed) earthen block is made from a mixture of soil and aggregate with no chemical additives. Often machine manufactured at the construction site. Because there is relatively no quality control routine compared to other types of manufactured block, its use may be limited, especially in high seismic zones. Careful engineering will be required to use this material in structural applications.

**Previously Developed:** Having pre-existing paving, construction or altered landscapes. This does not apply to altered landscapes resulting from current agricultural use, forestry use, or use as preserved natural area.

**Previously Developed Site:** A site consisting of at least 75% previously developed land.

**Prime Farmland:** Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops.

**Public Transit Stop:** A neighborhood or business area location where public transportation such as a bus can be accessed. To be effective, public transit stops need to be conveniently located so people do not have to walk long distances (generally less than 1/4 mile), weather protected in severe climates and inter-connected to either transit hubs or continuation lines.

**Radiant Barrier Roof Sheathing:** Usually a foil faced plywood manufactured with proprietary methods that is used as the roof sheathing under the roofing material itself. The reflective surface of the material reflects heat away from the roof back through the shingles without significantly increasing the thermal load on the material, usually only 2 to 5 degrees. Other methods are rolled materials that are applied after the regular plywood or OSB sheathing is applied. Both materials can reduce attic and subsequent living area cooling loads significantly. Some manufacturers claim up to 97% effectiveness.

**Radon:** A radioactive gas that naturally vents from the ground. It can be dangerous if certain areas of the home like basements are not properly sealed and ventilated. Areas with potentially elevated indoor radon levels can be found at <http://www.epa.gov/radon/zonemap.html>.

**Rain Garden:** Low tracts of land that water flows to with vegetation designed to absorb rain water in ways that reduce stress on storm drains and replenish ground water.

**Rammed Earth:** Essentially, this is a soil-cement mixture that is rammed into forms to create walls that are generally 18 to 24 inches thick. The screened soil is usually engineered to assure the correct clay to sand ratio and is mixed with about 3% cement and sprinkled with water to provide cohesion and is compacted in 5 or 6 inch lifts to a relative density of around 120 to 130 pounds per cubic foot. Often concrete tie beams are incorporated to help stabilize the lateral strength of the material. The material is relatively labor intensive and the cost of a rammed earth house can be significant. One company in Arizona sets the price at around \$375,000 for a 2000 square foot house. In California, the costs would be even higher due to labor costs and the necessary engineering for high seismic zones.

**Rastra®:** Rastra is a commercially manufactured insulated concrete form (ICF). It is manufactured from recycled, post-consumer plastics and according to the manufacturer offers the structural strength of concrete paired with high insulation values, sound attenuation and fire resistance.

**Reclaimed Lumber:** Exactly as the term implies, this is lumber that is reclaimed by “deconstruction” of a building or structure. This lumber can be used for non-structural applications such as paneling and flooring and if re-graded can be used in structural applications. Major advantages include usually higher quality surface characteristics (it often came from tight grained old growth lumber), less cost than new lumber and reduction in landfill wastes (although it can easily be mulched). Major disadvantages are that it is fairly labor intensive to “clean up”, is often very hard to nail after many years of drying and may need to be predrilled, increasing installation cost.

**Reclaimed Material:** Also referred to as salvaged, reclaimed or reused material consists of building components (wood) that has been recovered from demolition site, but is used in its original state (i.e. not recycled).

**Recycling:** The collection, processing, marketing and use of materials that were diverted or recovered from the solid waste stream.

**Recycled Content Aggregate:** Often concrete salvaged from demolition projects can be crushed and reused. Some can be introduced as a percentage of the aggregate in new concrete, while some can be used for roadbed underlayment. The actual use of the product is limited only to the imagination and structural requirements of the project. Use of the material also reduces the amount of new aggregate that must be mined from quarries and the associated environmental concerns associated with the operation.

**Recycled Content Material:** As the name implies, many products can be manufactured using “post consumer” materials such as plastic, fiber, wood, glass and so on. Deconstruction of various structures can also produce a variety of “raw” materials to create new products from, everything from tiles to carpeting to composite flooring materials and beyond. Recycled content materials help to reduce the need for new raw materials and the accumulation and manufacturing processes involved.

**Recycled Content Steel Studs:** Most new light gauge metal studs are manufactured from a combination of new and recycled steel. About 66% of the total make up is recycled content. Considering that the production of new steel is one of the highest embodied energy manufacturing processes, the use of recycled steel not only redirects a continuously reusable resource, but significantly can reduce the impact on other environmental concerns. The use of

light gauge metal studs on interior infill and demising walls lessens the amount of wood studs needed for construction; however more specialized skills are needed to install the material properly.

**Refrigerants:** The working fluids of refrigeration cycles that absorb heat from a reservoir at low temperatures and reject heat at higher temperatures.

**Return Air Flow:** The differing air pressure throughout a home can potentially cause problems with the building envelope, thus it is important to ensure that pressure is equalized throughout the home by allowing for vents (usually return of transfer grills) to “return” air.

**Reuse:** A strategy to return materials to active use in the same or a related capacity.

**R-values:** A measure of thermal resistance (the number of watts that will be lost per square meter at a given temperature difference). The inverse of the U value (i.e.  $R=1/U$ ).

### Roofing Materials

**Safe and Durable:** This can have a variety of definitions depending on one’s point of view but essentially these are roofing systems designed to last a significantly longer time to delay having to remove them and sending them to the landfill. Modern fiberglass roofing materials now carry warranties between 20 and 40 years. Of course slate, concrete and fired clay tiles can last significantly longer. Additionally, a safe roof generally refers to a fire safe roof and with modern roofing systems, various degrees of fire resistance ranging from class C to class A define the fire retardance of a roof. As a result of the firestorms of recent years, in which literally hundreds of homes were destroyed by flying brands from untreated wooded shingles and shakes, the State Fire Marshal has mandated that all roofs in California shall be at least Class B or better in fire retardance.

**SEER:** Most air conditioners use electricity to produce cooling. The efficiency at which they produce cooling is referred to as a SEER or EER number. SEER stands for Seasonal Energy Efficiency Ratio, and is a ratio of the amount of cooling produced (BTU) divided by the amount of electricity (watts) used. The higher the SEER, the greater the efficiency.

**SHGC (Solar Heat Gain Coefficient):** A measure of how well a window blocks heat from sun as a fraction of the sun that enters the window. A lower SHGC is preferable.

**Softscapes:** Natural elements of a landscape such as a plant materials and the soil. Softscapes can include hard elements, such as rocks and stone.

**Solar Window Screens:** A mesh screen that is used to block insects as well as light and heat from the sun.

**Solar Water Heating:** Generally, this is a method of heating domestic water by allowing ground or rooftop mounted panels to collect solar rays as the water flows slowly through a series of small tubes. The heat transfer is then stored either in a potable drinking water vessel (your water heater) or introduced into a closed loop transport system to provide environmental space heating.

**Straw Bale:** This is a methodology developed to use special tightly bound straw bales as either bearing or infill walls in a variety of structures including homes. The straw bale system was an

offshoot of the Nebraska straw house where their construction over a hundred years ago solved the basic problem of no lumber. The bales provide a substantial increase in insulation value but their installation can be rather labor intensive. The State of California has set down very specific criteria for construction of straw bale houses in the Health and Safety Code. All straw bale structures built in the city must meet Seismic Design Category D engineering requirements.

**Structural Bamboo:** Bamboo as a construction material has many uses. Because the material is very hard it has recently found a niche as flooring material. However, the material is also very strong and with new methods of handling the material, structural uses of bamboo are finding their way into the construction industry. They can be derived into trusses, supporting poles and simple beams. However most building departments are not familiar with the capacity of the material and builders will have to supply significant engineering and detailing to satisfy plan check requirements.

**Sustainable Deck Materials:** Most of us are familiar with the wooden deck. However, new materials on the market are making a dramatic impact in the form of recycled content decking and railing systems. Usually manufactured with recycled plastics, wood chips and binders, the materials hold up well to hostile environments and generally outlast even naturally durable woods such as redwood and cedar. The intent is to select materials that are sustainable or easily replaced with limited effect on the ecology. These new materials are easily worked similar to wood, however are considerably more expensive. The trade off is the longevity of the material. While there are variations to the support structure under these materials, treated wood is still the primary structural system.

**Tankless Water Heater:** Most of us have a 30 or 40 gallon storage water heater in our house. However, when you are not home or sleeping, that water heater is diligent in keeping your hot water ready at all times. Modern advances in storage tank water heaters reduces the amount of times it must fire to maintain temperature, but the basic operation remains the same. Tankless water heaters are designed to wait until you actually need the hot water and on demand, fire up raising the water temperature very quickly to operating level. The term instantaneous is often used for these heaters and generally by the time the water clears the heat exchanger inside, it's ready for use. Additionally, these water heaters take up less space than a storage tank type, but the amount of fuel needed to reach temperature quickly usually exceeds most storage types, but in a lot less time and a lot less often.

**Technical Advisory Sub-Committee:** The TASCs rule on Credit Interpretation Requests (CIRs) and Innovative Design Requests (IDRs).

**Thermal Bridge:** Areas in a building envelope that have a high heat conductance lowering the average R value.

**Thermal Envelope:** The thermal enclosure created by the building exterior and insulation. Improving the thermal envelope is one of the most important aspects to creating an energy efficient home.

**Topsoil:** The uppermost layer of soil with high levels of nutrients and organic matter. Healthy topsoil is essential for the survival of trees and plants.

**Tree/Plant Preservation Plan:** A formal assessment of the lot and a development of a landscaping plan that seeks to preserve the most trees and native plants. This is important to do as

one of the first steps in the design process to ensure the developed area takes into account the preservation plan.

**Title 24:** Title 24 is contained in the California Code of Regulations (CCR) and is the embodiment of most of the construction and energy conservation requirements for the state. All cities and counties are mandated to enforce the requirements of Title 24.

**Treated Wood:**

**CCA-Chromated Copper Arsenate.** As the name implies the chemicals used to treat wood to prevent attacks by wood destroying organisms such as boring insects, fungi and dry rot contains arsenic, a rather nasty poison. Since December 31, 2003, the distribution of CCA has been severely limited and is generally not available to the average homeowner anymore once existing stocks are depleted. It can still be manufactured for very specific commercial applications such as underwater saltwater pilings and cross member materials, but not for the decking, above water bracing or railings.

**ACQ-Alkaline Copper Quaternary (or Quat).** This method of treatment uses copper as the primary active ingredient. While the material is effective for direct contact and above ground protection, it is highly corrosive to fasteners and fittings and special precautions must be taken in the selection (usually hot dipped galvanized or stainless steel) and the handling of the material.

**CA-Copper Azole.** Like ACQ, the primary active ingredient is copper. While not quite as corrosive as ACQ, the material does have a tendency to migrate into the soil. Again special care in selection of fasteners and handling is required.

**DOT-Disodium Octaborate Tetrahydrate.** DOT or simply borate or boron preserved wood is the least corrosive of the treatments. The material is intended for interior or protected use only and must be protected from direct water exposure which can leach the material out of the wood. Protected in dry conditions, the borates will migrate into the wood even deeper than the initial pressure injection application over time. The material is very effective against many wood pests including the voracious Formosan termite.

**TXV:** Thermostatic Expansion Valve – (also **TEV**): A TXV installed on an air conditioning system can dramatically improve the efficiency of the unit. When cooling demand is high, the valve opens up and lets more coolant pass through the indoor coils. When demand is low, the valve closes to reduce the refrigerant flow. AC units not equipped with TXV's have either a fixed orifice or capillary tube system. Because they are not very efficient, they are generally not sold in California, since they cannot meet the CA Energy Commission requirements.

**U Value (U-Factor):** A measure, (often used for windows), of thermal conductivity that is the inverse of R value. A lower U value means a more energy efficient window.

**Vegetated Roof:** A roof partially or fully covered by vegetation. By creating roofs with a vegetated layer, the roof can counter-act the heat island effect as well as provide additional insulation.

**Volatile Organic Compound (VOC):** Many of the products that we buy are made with materials that off-gas VOC's usually in the form of formaldehyde gas, a by-product of hydrocarbon based materials. Building materials such as particle board, plywood, adhesives, paints, varnishes, carpet, drapes and furniture are often made with formaldehyde products. Other sources include some you

may not think of like tobacco, burning gas, perfume, cleaning agents, hairspray and even copy and printing machines. Degrees of exposure to VOC's can cause everything from mild symptoms like irritated eyes, ears and throat to more severe reactions like wheezing and lung, memory and anxiety problems. By using low-VOC products, exposures are reduced and indoor air quality is improved.

**Walk-Off Mats:** Interior mats designed to reduce dust and debris. Walk off mats should be placed at the entrances and allow for a few strides on the mat to be most effective.

**Whole House Fan:** Essentially a large fan that draws hot air out of a building and replaces it with cooler exterior air as opposed to attic fans that only remove the hot air from the attic. Compared to an air conditioner that can draw up to 6000 watts, whole house fans use about the same amount of electricity as a couple of light bulbs, or around 120 watts for smaller units up to about 700 watts for larger units. New homes of especially tight construction may need to have barometric vents installed a distance away from the exhaust intake to prevent negative pressure problems in the house that could have an adverse effect on fuel burning appliances (or simply open a couple of screened windows). It is important to prevent creating negative pressure around fuel burning appliances that may be in the house and starving them for combustion air as the fire can actually leave the firebox looking for oxygen. Not good. A good whole house fan can reduce the interior temperature of a house by 10 to 15 degrees within about 20 minutes as well as create a "sensible" feeling that the moving air is cooler. The exhaust intake is usually located in the highly heated attic air space and many homes use a gravity damper system in the ceiling that opens automatically as the systems operates and then seals closed upon shut down.

# City of Santa Cruz Green Building Program Verification Form



I, \_\_\_\_\_ from \_\_\_\_\_  
Verify that the information provided below is accurate, to the best of my knowledge.

The following measures have been implemented to the full extent of the City of Santa Cruz Green Building program guidelines, per appendices B or C. A brief narrative of each measure is attached.

If necessary during any audit process, I can provide backup documentation for the measure(s) claimed below.

Category, Number & Letter	Feature or Material	Description of Implementation, Installation, Application or Utilization

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_ Permit #: \_\_\_\_\_

Email: \_\_\_\_\_ Phone: \_\_\_\_\_



## Proper Insulation Installation Verification Form

Per SCMC title 24.15 all residential projects shall provide verification of insulation installation; completion of this checklist satisfies the requirement.

### **Checklist:**

- Insulation shall be cut to fit around wiring and plumbing without compression
- Insulation shall be placed between the sheathing and the rear of electrical boxes without compression
- Insulation shall be cut to fit around junction boxes
- Insulation shall be cut to fit properly - There should be no gaps, nor should insulation be doubled over or compressed
- Facing shall be placed toward living space
- Narrow Spaces at windows, between studs at corners, and at the intersections of partitions and wall shall be filled with small pieces of insulation; care should be taken not to compress the insulation

\*\* For insulation installed by specialty contractor, such as blown cellulous, verification form or other proof of proper insulation installation is allowed.

\*\*\* For a HERS Rating third party verification is required

Signed: \_\_\_\_\_ Date: \_\_\_\_\_  
City of Santa Cruz Building Department Staff

# EXAMPLE

<b>Green Building Plan Check Index of Green Building Points/Categories</b>			
<b>Category</b>	<b>Example of an Index or Table of Green Building Points Categories that must be shown and referenced on the Project Plans (See below)</b>	<b>Plan Sheet or Page</b>	<b>Points</b>
<b>B. Site</b>	9. Install H.E. Irrigation, (details/spec)* 11. Permeable Paving, (Note)	L-1 L-1	2 points 2 points
<b>C. Foundation</b>	1. Use 15% Flyash Concrete, (note)	S-1	5 points
<b>D. Structural</b>	3. Uses Wood I-Joist, (See Spec.) 5. Use Truss with heels, (detail) 6. B. OSB Sheathing, (detail)	S-2 S-2 S-2	2 points 2 points 2 points
<b>E. Ext. Finish</b>	1. Composite Decking, (Note/Spec.) 4. B. Fiber Cement Siding, (Note/Spec.)	A-3 A-4	2 points 2 points
<b>F. Plumbing</b>	1. Insulate all H.W. pipes, (Note/Spec.) 5. Tankless W.H., (Note/Spec.) 11. A 2500 Gal. Tank, (Note/Spec.)	P-1 A-2 L-1	2 points 2 points 10 points
<b>G. Electrical</b>	4. E. Ceiling Fans, (Note/Spec.)	A-3	4 points
<b>H. Appliances</b>	1. Energy Star Dishwasher, (Note/Spec.) 3. Energy Star Refrigerator, (Note/Spec.)	A-3 A-3	1 point 1 point
<b>P. Other</b>	1. List Green Features on Plans,	A-1	1 point
	<b>TOTAL POINTS</b>		40 points

# Pre-Construction Conference Checklist



Job Location \_\_\_\_\_ Permit # \_\_\_\_\_  
 Owner \_\_\_\_\_ Phone # \_\_\_\_\_  
 Builder \_\_\_\_\_ Phone # \_\_\_\_\_

Trade	Name	Green Feature Responsibility
<b>Site &amp; Grading</b>		
<b>Concrete</b>		
<b>Landscaping</b>		
<b>Framing</b>		
<b>Plumbing</b>		
<b>Electrical</b>		
<b>Mechanical</b>		
<b>Exterior Finish</b>		
<b>Interior Finishes</b>		
<b>Roof</b>		
<b>Insulation</b>		
<b>Other</b>		

\_\_\_\_\_  
 City of Santa Cruz Building Department Staff

Date: \_\_\_\_\_

\_\_\_\_\_  
 Authorized Project Representative

Date: \_\_\_\_\_