



**City of Boulder**  
**Residential Building Guide**

**Green Building and Green Points  
Guideline Booklet**

**[www.BoulderGreenPoints.com](http://www.BoulderGreenPoints.com)**

**May 2009**

# Introduction

The Green Building and Green Points (GBGP) updates are important not just to keep up with the many developments within sustainable construction practices, the updates also continue an effort to make the building regulatory process work toward overall Climate Action Plan (CAP) goals. In 2006 the city passed a resolution which set greenhouse gas emission reductions in alignment with the Kyoto Protocol which targets greenhouse gas emissions reductions so that emissions are seven percent below 1990 levels by 2012. Since buildings contribute upwards of 75 percent of the greenhouse gas emissions reducing emissions by improving building energy efficiencies is important to attaining the CAP goals. Recent updates of the program add measurement and verification mechanisms for remodels and additions so that these types of projects will also enhance program contributions to citywide goals.

## Green Building and Green Points Program

These rules are intended to assist the city and building permit applicants with compliance of Chapter 10-7.5, Green Building and Green Points Program, B.R.C. 1981. To the extent that there is any conflict between these rules and the Boulder Revised Code, the Boulder Revised Code shall govern.

### Legislative Intent and Purpose (10-7.5-1)

The purpose of the Green Points program is to protect the public health, safety, and welfare by regulating residential construction with the intent to conserve energy, water, and other natural resources, while preserving the health of our environment through optional and mandatory requirements related to design, construction, operations, recycling, and deconstruction. This chapter has the following components:

Criteria for rating the environmental performance of residential construction practices and guidelines for documentation that demonstrate conformance with the criteria.

Information on cost-effective and sustainable residential building methods that can encourage conservation of fossil fuels, water, and other natural resources, reduction of greenhouse gas emissions, recycling of construction materials, reduction of solid waste, and improvements of indoor air quality.

Specific requirements for complying with the Green Points program and information about how the program interfaces with and exceeds the 2006 International Energy Conservation Code adopted in Chapter 10-7, "Energy Conservation and Insulation Code," B.R.C. 1981.

Mandatory green building requirements to ensure that construction waste and deconstruction materials are recycled, reused, or otherwise diverted from landfills, and minimum requirements to ensure that dwellings are constructed in an efficient manner.

Provisions intended to provide for joint administration with the processing of building permits for remodeling, adding to, and constructing dwelling units.

## **Scope and Administration (10-7.5-2)**

**(a) Scope.** The provisions of this chapter apply to the following:

1. Residential new construction, demolition, remodeling and additions, including without limitation single-unit dwellings, multi-unit dwellings, and dwellings within mixed-use developments.
2. Any two or more building permits for the same structure that are applied for in any 12-month period shall be considered as one application for the purpose of meeting the requirements of Section 10-7.5-3, "Mandatory Green Building Requirements," and 10-7.5-4, "Resource Conservation - Green Points," B.R.C. 1981.
3. The requirements of this chapter shall apply to construction activities of all types of dwellings unless the context clearly indicates otherwise.
4. The requirements of this chapter are in addition to and do not replace the requirements within the Boulder Revised Code including, without limitation, all of the life safety codes, the historic preservation ordinance, the land use code, and the city of Boulder Design and Construction Standards.

For the purposes of the GBGP program:

Floor area is the total conditioned area in square feet of all levels included within the interior face of the outside walls of a building or portion thereof, but excludes courts, garages, attics and crawlspaces

Addition is an extension or increase in conditioned floor area of a dwelling unit of 500 square feet or greater.

Remodel is an interior reconfiguration or upgrade of an existing structure of 500 square feet in area or greater and the work required to complete the reconfiguration or upgrade requires a building permit

### **(b) Administration**

The GBGP program shall be administered and interpreted in accordance with Chapter 1, "Administration," Chapter 2, "Definitions," of the International Building Code (IBC) and the International Residential Code (IRC) as adopted with amendments by Sections 10-5-2, "Adoption of International Building Code with Modifications," and 10-5.5-2, "Adoption of International Residential Code with Modifications," B.R.C. 1981.

### **(c) Inspection and Compliance**

No person shall fail to comply with the requirements of this chapter. No person shall construct in violation of a GBGP approval. All approvals and inspections of Green Points applications and requirements shall be done in conjunction with a residential building permit application and field

inspections. An application shall be made on a form that is approved by the city manager. The applicant shall demonstrate compliance with all of the provisions of this chapter prior to the issuance of a certificate of occupancy by the city manager.

**(d) Exceptions**

Any structure that includes dwellings that are pursuing a U.S. Green Building Council's LEED™ (Leadership in Energy and Environmental Design) Silver Certification or comparable green building rating certification or higher will be exempt from the Green Points requirements. However, all applications must still meet the mandatory requirements for Demolition Waste Management, Construction Waste Recycling, and the applicable GBGP standards for maximum HERS index based on the square footage of the proposed project (even when the GBGP required HERS index is lower than that which will meet LEED Silver standards). No person that applies for this exception shall fail to complete the LEED™ certification process and must receive such certification within six months of the final inspection on the building permit. The city manager may grant an extension to this time period if a request is made by the applicant and the applicant demonstrates a good cause as to why additional time is needed to complete the certification.

**Mandatory Green Building Requirements (10-7.5-3)**

Mandatory green building requirements are listed in Table 1 for new dwelling units, as well as remodels and additions to existing dwelling units. Each type of project will have mandatory green building requirements and Green Points requirements associated with the type and size of project.

**TABLE 1 - Mandatory Green Building Requirements**

<b>Type of Project:</b>	
New Dwelling Units*	Remodels and Additions to Existing Dwelling Units**
Energy Efficiency and HERS Index Refer to Sections (a) and (b)  See Table 1A	Energy Audit Refer to Section (e)
	Lighting Efficiency Refer to Section (f)
Construction Waste Recycling and Demolition Management Refer to Sections (i) and (j)	Direct Vent Furnace Refer to Section (g)
	Direct Vent Boiler Refer to Section (h)
	Construction Waste Recycling and Demolition Management Refer to Sections (i and j)  Energy efficiency must meet the levels specified in table 1A and be documented through the HERS or ResCheck processes.
For mandatory Green Points requirements, see Table 2	

\*Includes the construction of a new dwelling unit or the replacement of an existing dwelling unit.

\*\*Refer to section (b) as some additions or remodels must meet new construction energy efficiency requirements.

### **(a) Energy Efficiency for New Construction**

Applicants for new construction must show energy efficiency compliance through the Home Energy Rating System (HERS). Table 1A lists the HERS index requirement for different sizes of projects. A HERS index lower than the minimum required may apply towards the project's Green Points requirements specified in Table 2.

**TABLE 1A – Tiers for Energy Efficiency Thresholds and Equivalent  
HERS Index**

Type of Project	Square Footage	HERS Index (max.)	Energy Efficiency Thresholds Above Code (2006) (min.)
New Construction	Up to 3,000	70	30%
	3,001-5,000	60	50%
	5,001 and up	35	75%
Multi-Unit Dwellings	Applies to all	70	30%

### **(b) Thresholds for Application of New Construction Standards to the Entire Building as the Result of an Addition**

- 1) Additions that meet the thresholds below will be considered as new construction and the entire structure will be required to comply with the requirements detailed in section (a) Energy Efficiency for New Dwelling Units.
  - a) The addition is 100 percent or more than the conditioned floor area of the existing dwelling unit and the dwelling unit will have a total conditioned floor area after the addition to the dwelling unit that is up to and including 3,000 sq. ft. in size.
  - b) The addition is 50 percent or more than the conditioned floor area of the existing dwelling unit and the dwelling unit will have a total conditioned area after the addition to the dwelling unit that is from 3,001 to 5,000 sq. ft. in size.
  - c) The addition is 25 percent or more than the conditioned floor area of the existing dwelling unit and the dwelling unit will have a total conditioned floor area after the addition to the dwelling unit that is 5,001 sq. ft. or more in size.

**Addition and Remodel  
New Construction Thresholds**

<b>Total Proposed Conditioned Floor Area:</b>	<b>New construction threshold (percentage of existing area)</b>
<b>500 to 3,000 s.f.</b>	<b>100 %</b>
<b>3,001 to 5,000 s.f.</b>	<b>50 %</b>
<b>5,001 s.f. and up</b>	<b>25 %</b>

**(c) Energy Efficiency for Additions and Remodels**

**Additions that do not exceed the thresholds detailed in (1) above or remodels shall demonstrate meeting the energy efficiency requirements by meeting one of the following standards:**

- 1) If upgrading the energy efficiency of the entire structure the applicant may demonstrate that the entire building meets the HERS requirements that are described in Table 1B below, or
- 2) The new addition or the area of the house that is subject to the remodel may demonstrate that the addition or the remodeled area meets the requirements of the IECC as described in Table 1B below. These projects shall also meet the following requirements:
  - (A) Complete a blower door test before applying for a building permit to determine whether the building has an air infiltration rate of no more than 0.5 natural air changes per hour (NACH) compliance rating. If the test shows a NACH rating higher than 0.5 the applicant shall meet the requirement detailed in (B.) below.
  - (B) Improve, repair and seal the dwelling unit, verified by a subsequent blower door test and prior to a certificate of occupancy or completion that demonstrates that:
    - (i) For buildings that had an infiltration rate of 1.0 NACH or greater, the building shall have a NACH 50 percent or less than the original blower door test.
    - (ii) For all other buildings an air infiltration rate of not greater than 0.5 NACH compliance rating.

Note: A copy of the follow-up blower door test demonstrating that the required reduction in the NACH has been achieved must be placed in the permit sleeve before final inspection.

**Table 1B – Energy Efficiency Thresholds for Remodels and Addition**

Total Conditioned Area	HERS Index	Increased Efficiency Above IECC
Up to 3,000	100	15 percent
3,001-5,000	85	30 percent
5,001 and up	70	50 percent

(3) Remodels – Limitations. A remodel that doesn't substantially remove the interior finish of the thermal envelope, less than 25 percent of total wall and ceiling areas, of the conditioned space is not required to meet the energy efficiency requirements of Table 1B.

**(d) Energy Efficiency - HERS Index**

A HERS index encompasses the building envelope and equipment components of a house; therefore an applicant cannot take green points for these features as it will be accounted for in the HERS index. For new construction, the energy efficiency and solar options specified in section 10-7.5-4 (e) and (f) cannot also apply to the Green Points requirement. A dwelling that is required to meet the energy efficiency requirements for new construction shall demonstrate that it meets such standard by:

1. The HERS index will be used for the verification of energy performance in new construction. A HERS rating shall be performed by a rater accredited by the Residential Energy Services Network (RESNET).
2. For multi-dwelling projects, through a HERS index sampling protocol authorized and approved by the city Manager; or
3. For multi-dwelling projects, by demonstrating that the energy efficiency has been achieved by using methodology in section 404, "Simulated Performance Alternative" or section 506, "Total Building Performance" of the 2006 International Energy Conservation Code.

Application: A HERS Rater must be employed to assist the designer and/or builder on meeting the mandated HERS requirement for new construction, based on housing type and size.

Verification: A Preliminary HERS Certificate with 'Draft' watermark or a copy of a REM/Rate Building File Report with 'Draft' watermark must be submitted with building permit plans. The HERS index documents proposed compliance with mandated requirements. The **final** HERS Certificate must be submitted to the city before issuance of a Certificate of Occupancy. For new construction, the HERS Rater will also need to perform a pre-drywall inspection and final inspection as part of the standard HERS process.

**(e) Energy Audit** (Must be completed before building permit submittal.) An Audit Certificate is part of permit documentation.) Contact J.C. Martel with Xcel Energy at 303-999-3820 x224 for assistance with the audit.

An applicant for a building permit for an addition to a dwelling or a remodel of a dwelling shall be

required to obtain an energy audit. Audits must be performed by a Building Performance Institute (BPI) certified professional or RESNET accredited Home Energy Rating System (HERS) rater. For a list of audit resources visit: [www.bouldergreenpoints.com](http://www.bouldergreenpoints.com) or [www.conservationcenter.org](http://www.conservationcenter.org).

**The applicant shall provide proof of the completion of the energy audit with a building permit application.** The energy audit of the house shall quantify the air infiltration rate and annual energy performance of the building according to generally accepted standards for energy audits approved by the city manager. An energy audit or an optional HERS index will indicate how efficiently the building is operating and where inefficiencies are occurring. A standard home energy audit includes an energy bill analysis and diagnostic testing on the house, which includes a blower door test, checking for building envelope leaks, an insulation assessment, heating, cooling, and hot water assessment, and appliances. Once the audit is completed, a report is delivered to the homeowner listing energy saving opportunities.

Application: The homeowner must provide the Home Energy Audit (HEA) Certificate, or HERS index with the building permit application.

Verification: The HEA Certificate or HERS index documentation must be submitted with the building permit documents. City staff will verify compliance with this requirement during plan review.

#### **(f) Lighting Efficiency**

Prior to final inspection for an addition and/or a remodel of a dwelling, the applicant shall install energy efficient lamps (light bulbs) with a luminous efficacy of 40 lumens per watt or above, such as compact fluorescents, in at least 50 percent of the existing home's light fixtures.

Verification: Final inspection

#### **(g) Direct Vent Furnace**

When the scope of the work of an addition to a dwelling or a remodel of a dwelling requires replacement of a furnace, the furnace shall be replaced with a direct vent unit that has a minimum 90 percent Annual Fuel Utilization Efficiency (AFUE).

Verification: Final Inspection

#### **(h) Direct Vent Boiler**

When the scope of the work of an addition to a dwelling or a remodel of a dwelling requires replacement of a boiler, the boiler shall be replaced with a direct vent unit that has a minimum 85 percent AFUE.

Verification: Final Inspection

#### **(i) Construction Waste Recycling**

An applicant for a building permit for a new dwelling or an addition to a dwelling shall demonstrate that a minimum of 50 percent of construction waste is recycled. Recycling ALL clean wood, cardboard and metal will count for 50% waste diversion.

Application: Submit a Deconstruction Plan and Construction Waste Recycling Form (Attachment C) with the GBGP building permit applications.

Verification: A completed Construction Waste Recycling Tracking Spreadsheet (Attachment D), showing that minimum recycling/waste diversion requirements have been met along with copies of weight tickets and donation receipts must be placed in the permit sleeve for collection by a City inspector before final inspection..

### **(j) Demolition Management**

An applicant proposing to demolish more than 50 percent of exterior walls shall demonstrate through a deconstruction plan that at least 65 percent of material by weight from the deconstruction of the existing structure, including concrete and asphalt, will be diverted from the landfill.

Application: Submit a Deconstruction Plan and Construction Waste Recycling Form (Attachment C) with the Demolition Permit or GBGP building permit applications, whichever is applicable.

Verification: A completed Construction Waste Recycling Tracking Spreadsheet (Attachment D), along with copies of weight tickets and donation receipts must be placed in the permit sleeve for collection by a City inspector, before final inspection showing that minimum recycling/waste diversion requirements have been met.

## **10-7.5-4 Resource Conservation—Green Point Requirements**

Green Points are required for all new dwelling units as well as remodels and additions to existing dwelling units. Each type of project is required to obtain the minimum number of mandatory Green Points specified in Table 2 and demonstrate compliance with the minimum green building requirements specified in Table 1 on page 5. These Green Point requirements are in addition to the Mandatory Green Building requirements (refer to Table 1).

An applicant proposing to increase the floor area of the existing building as detailed in (b) 1. a, b or c above where the home is considered to be “new construction” shall meet the Table 2 Green Points Requirements for New Construction, Single Unit New Dwellings.

### **(a) Schedule for Green Points**

Residential building permit applicants are required to earn Green Points according to the following table:

**TABLE 2 – Minimum Green Points Requirements**

Project Description	Square Footage Thresholds	Green Point Requirements <sup>1,2</sup>
New Construction Single Unit Dwellings	1,501-3,000	20
	3,001-5,000	40
	5,001 and up	60
Multi-unit Dwellings: final tenant finish of a unit in a multi-unit dwelling <sup>3</sup>	1,001-2000	10
	2,001-3000	20
	3,001 and up	30
Additions to a Dwelling Unit <sup>4</sup>	500-1,000	15
	1,001-2,000	20
	2,001-3,000	30
	3,001 and up	45
Interior Remodel of a Dwelling Unit <sup>4</sup>	500-1,000	10
	1,001-2,000	15
	2,001-3,000	20
	3,001 and up	30

\* Note 1: One Green Point is awarded for each HERS index point below the HERS index rating requirement.

\* Note 2: The Green Point values listed in Subsections 10-7.5-4(e) through (f) (5) only apply to those projects that are not required to have a HERS rating.

\* Note 3: Each dwelling in a multi-unit dwelling shall be required to meet the Green Points requirement separately.

\* Note 4: For projects that are both an addition and a remodel, add the square footage of each project together for a total square footage, then use the Addition to a Dwelling Unit category to calculate the number of Green Points required.

**(b) Site Development**

The Green Points options listed in the following section can be applied for individually, or as a whole. Applicants can choose to submit a “landscape package” including, at a minimum, a tree inventory and preservation plan, a landscape plan with a detailed plant list and an irrigation plan. The landscape plan includes all proposed planting (grasses, perennials, shrubs and trees) and indicates areas of impervious surfaces. Depending on the complexity of the site, a separate site plan may be required to determine the amount of impervious surface and planted areas. This package of drawings supplies information to verify the majority of the possible landscape points accept those noted below. Final inspections may also be required to verify implementation. Please see the application form for additional details.

**(1) Landscaping**

**a. Organic Soil Amendments: Up to 2 points**

Good quality, organic soil amendments can increase permeability, water-holding capacity, and plant nutrient availability and improve the ability of the soil to filter pollutants.

Application: Use a minimum of three cubic yards of organic material on site. Indicate the type and amount of organic material in the landscape package. Any organic material used shall meet U.S. Composting Council standards ([www.compostingcouncil.org](http://www.compostingcouncil.org)) or their equivalent.

1 point—Complete the Water Quality and Environmental Services customer rebate program form available at [www.bouldersaveswater.net](http://www.bouldersaveswater.net)

1 point—Compile receipts and specifications of the material content and place in the permit sleeve prior to final inspection.

Verification: This will be reviewed by Planning & Development Services staff at the time of final inspection. Optional landscape inspection may be completed after construction if applicants are choosing other options under the site development category.

#### **b. Xeriscape Landscaping: Up to 4 points**

Xeriscaping saves water and encourages growth of native plants. The need for long-term irrigation can be minimized by using a variety of native and non-native, non-invasive plant materials. Plants may be chosen from the following approved lists available at [www.boulderpoint.com](http://www.boulderpoint.com):

Landscape requirements for streetscapes, parking lots, and all other developments

Suggested native plants for horticultural use on the front range of Colorado

Application: Submit planting and irrigation plans with the Green Points application. The irrigation plan must be completed by an irrigation association or equivalent certified professional. For this section, landscape area is defined as the total site area that is not covered by the building footprint or the necessary drive and walkway accesses to the structure. For Boulder's climate, appropriate turf grasses include Turf-Type Tall Fescue and Turf-Type Buffalo Grass.

1 point—Reduce turf areas to a minimum, by limiting turf areas to 25 percent of the total landscaped area.

1 point—All planting beds (except desert plantings) mulched with wood chips at least 3" deep

1 point—Xeric (low water demand) plants should be grouped by water needs. A minimum of 75 percent of all landscaped areas must use low to moderate water demand plants. The landscape should be designed so that, at maturity, not more than 10 percent of the landscaped area is exposed non-plant materials—rock or wood-chip mulch beds, for example.

1 point—Zoned irrigation system: Irrigation system must be zoned to deliver different appropriate amounts of water to different plant zones. High water zones are limited to 25 percent of the total landscaped area. The remainder of the landscape should include low-to-moderate water demand plants, and should be irrigated with drip irrigation, bubbler, or micro-spray systems. All irrigation zones shall use a smart system that adjusts for rainfall and other weather factors.

Verification: A final inspection must be requested by the applicant and completed by city staff to verify the approved plans were implemented.

## **(2) Shading of Hardscapes**

### **a. Preserve Existing Mature Trees On-Site: Up to 5 points (1 point per tree)**

Mature shade trees can create microclimates up to 15 degrees cooler than surrounding areas and can reduce summer air-conditioning costs by 25 to 40 percent. Trees also filter pollutants from the air, improve water quality, reduce stormwater runoff, provide habitat for wildlife and play places for children, and make neighborhoods more beautiful.

Application: Maintain and protect the existing mature trees on the site. If the building design includes passive solar heating and/or cooling, make sure to integrate the existing trees on the site into the design of the project.

1 point—For each approved mature tree (greater than 6" diameter) that is protected during the construction project. To achieve points for tree preservation, a tree inventory must be completed prior to any site disturbance. Trees will be approved based on species, size, and overall condition. If significant damage to a tree takes place during the construction process, no points will be awarded. Final approval is at the discretion of city staff. Applicants should use the city of Boulder Design and Construction Standards, Chapter 3.05 Tree Protection for Construction Sites as a guide in protecting trees for both public and private property.

Verification: Documentation must be provided by one of two methods outlined below:

(a) An arborist certified through the International Society of Arboriculture inspects existing trees before site disturbance and building permit submittal. The applicant includes a tree preservation plan signed by the certified arborist with an inventory of trees to be preserved and trees to be removed for construction as part of the building permit plan set. Post construction inspections by a certified arborist or city staff may be required to achieve maximum points.

(b) Tree preservation plan, including a tree inventory may be submitted as part of a landscape package with planting and irrigation plans with building permit submittal. Then an inspection by city staff must be completed prior to any site disturbance to approve all trees selected for preservation. A final inspection by city staff is required before a Certificate of Occupancy is issued.

### **b. Plant Shade Trees: Up to 5 points (1 point per tree)**

Trees provide shade in the summer, lowering cooling costs and increasing comfort. It is advisable to plant deciduous, drought-tolerant tree species that are appropriate for the site soil and microclimates, particularly on the east and west sides of the building. Plant trees to shade walls, windows, air conditioner units, and paved areas. If the building design includes passive solar heating, do not plant trees too close to the home's south side because even with their bare branches, these trees can block as much as 30 percent of the available winter solar energy.

Application: A tree planting plan may be submitted as part of a landscape package with planting and irrigation plans with the Green Points application.

1 point—Awarded for the planting of each deciduous tree, in addition to required trees. Trees eligible for Green Points must be selected from the lists available at [www.bouldergreenpoints.com](http://www.bouldergreenpoints.com).

Verification: Post-construction inspection by a city inspector is required.

Optional: Provide a signed and dated letter from a certified arborist and place it in the permit sleeve before final inspection.

**(3) Surface Water Management - Permeable Sites: Up to 4 points**

As lot coverage increases, handling storm water runoff on site becomes more difficult. By encouraging the use of permeable surfaces beyond the building, more water can passively infiltrate on site, reducing the need for designed detention systems.

Application: Submit a site plan or planting plan prepared by a qualified professional (architect, planner, landscape architect, or equivalent) that shows calculations for the total lot area, building coverage, and permeable surfaces. All planted areas shall be clearly labeled with their plant cover. Include product information for all permeable paving materials. Design sites to maximize permeability to reduce run-off and increase groundwater recharge. For this section, site area is defined as the total lot area that is not covered by the building footprint. Areas that count toward the minimum include:

Vegetative landscape or plant cover (grass, trees, shrubs, perennials, etc.)

Permeable paving, installed by an experienced professional. Permeable paving must include porous above ground materials (open pavers, engineered products, etc.) and a porous 6-inch sub-base. The base layer must be designed to ensure proper drainage away from the house.

1 point—If greater than 50 percent of the site is permeable

2 points—If greater than 75 percent of the site is permeable

3 points—If greater than 90 percent of the site is permeable

4 points—If 100 percent of the site is permeable

Percentage of site that is permeable	Points
> or equal to 50%	1
> or equal to 75%	2
> or equal to 90%	3
100%	4

Verification: To receive points, applicant must submit a site plan or planting plan with the Green

Points application. The plan is reviewed during plan review and final inspection.

**(4) High-Efficiency Automatic Irrigation: Up to 2 points**

Drip and bubbler irrigation technologies apply water to the soil at the plant root zones at the rate the soil can absorb it and are often more efficient than overhead sprinklers in areas that are narrow, oddly shaped, or densely planted, or in plantings adjacent to areas such as parking lots and medians. Low-flow sprinkler heads apply water uniformly and slowly. High-efficiency irrigation systems minimize overspray and evaporation and reduce runoff, dramatically reducing landscape water use while preventing disease and minimizing weed growth that results from over watering. Smart irrigation controllers can reduce outdoor water usage by irrigation systems 25 percent or more.

1 point—Systems with a 75 percent efficiency rating

2 points—Systems with a 95 percent efficiency rating

Application: Install drip, subsurface drip, or low-flow sprinklers in place of standard sprinkler systems for all landscape applications. Upgrade to new “smart” (weather-based) irrigation controllers that have at a minimum the following capabilities:

Water budgeting feature.

Automatic periodic adjustments to the irrigation program, accomplished through external sensors, internally stored historical weather data, or a provider-supplied signal.

Multiple start times, none of which occur during the day when evaporation occurs.

Run times able to support low-volume applications.

Irrigation intervals for days of the week or same-day intervals.

More than one operating program (for example, A=turf, B=shrubs, C=water features).

Ability to turn off the irrigation system or valve for the landscape or hydrozone that includes all Colorado natives once the plants are established.

Smart controllers that have a soil-moisture and/or weather-tracking device (NOT a simple rain shut-off) built in to the unit to direct irrigation only when needed.

Applicant must complete an irrigation audit to demonstrate an efficiency rating.

Verification: Boulder Water Conservation Rebate Program audit, application, and approval is necessary prior to permit application. Refer to [www.bouldersaveswater.net](http://www.bouldersaveswater.net) for more information.

**(c) Building Rehabilitation**

**(1) Rehabilitation and/or Retrofitting of Windows and Doors:  
Up to 10 points**

Rehabilitation of windows and doors can improve both building energy efficiency and the comfort

of the occupants.

Application: Rehabilitation of existing windows and doors on non-historic buildings and windows and doors on individual historic landmarks and contributing buildings in designated historic districts to make weather tight, and/or retrofitting of appropriate interior or exterior storm windows. Please note that for individually landmarked properties and historically contributing buildings located in historic districts, these points are approved in conjunction with, or contingent upon, the Landmark Preservation Advisory Board's assessment and approval of a Landmark Alteration Certificate (LAC).

Up to 3 points—Complete an appropriate rehabilitation and/or retrofitting of windows and doors - (.5 point for each window)

Up to 2 points—Storm window system - (.5 point for each window)

Up to 5 additional points - (.5 point for each window) - If the building is designated as an individual landmark or contributing to an historic district pursuant to Chapter 9-11, "Historic Preservation," B.R.C. 1981

Verification: Inspected during plan review and in conjunction with LAC compliance at final inspection.

## **(d) Waste Management**

### **(1) Reuse Existing Building: Up to 5 points**

Preserving as much of the existing building as possible extends the life-cycle of the existing housing stock, reduces waste and conserves the embodied energy of the existing building materials by reducing the amount of new materials needed, because resource extraction, energy use, and pollution due to the transportation of construction materials are reduced.

Application: In order to be awarded points for this provision, the wall length that will be preserved must be highlighted on submitted plans. Green Points will be awarded according to the following percentages of existing walls that will be incorporated in the project:

3 points—Save 50 percent of exterior walls (external sheathing and framing)

5 points—Save 75 percent of exterior walls (external sheathing and framing)

Verification: Inspected during plan review and site inspection by city inspector.

### **(2) Remodels, Additions, and Demolition Waste Diversion: Up to 3 points**

Green Points can be achieved for waste diversion beyond the mandatory waste diversion requirements by using the Deconstruction Plan and Construction Waste Recycling form or an inventory of material proposed to be diverted by a qualified deconstruction contractor to create a site-specific deconstruction plan.

Application: Points will be awarded on waste diversion of 75 percent or more material by weight from deconstruction of the existing structure, including concrete and asphalt, from the landfill. Points will be awarded for additional diversion according to the following:

2 Points—Divert 75 percent

3 Points—Divert 85 percent

Verification: The Deconstruction Plan and Construction Waste Recycling Form (Attachment C) must be submitted with plans indicating the intent to divert more waste material than the required amount. Complete the Construction Waste Recycling Tracking Spreadsheet (Attachment D) and include verification of hauler weight tickets, receipts, and a sign-off from the recycling provider to affirm that the requirements have been met. Place the Spreadsheet documentation in the building permit sleeve prior to requesting a final inspection.

### **(3) New Construction Waste Recycling: Up to 3 points**

In 2006, the city of Boulder accepted a Master Plan for Waste Reduction and a Zero Waste Resolution with goals of capturing valuable materials from the community's waste stream. The National Association of Home Builders (NAHB) estimates that the construction of a typical 2,000 square foot home generates about 8,000 pounds (four tons) of waste, occupying roughly 51 cubic yards of landfill space. This equates to an average of about four pounds of waste per square foot of conditioned space.<sup>5</sup>

<sup>5</sup> Source: NAHB Research Center, 2001, [www.nahbrc.org](http://www.nahbrc.org).

Application: Points will be awarded on waste diversion of 75 percent or more of the waste generated on site. Points will be awarded according to the following:

2 points—Divert 75 percent of construction waste generated on site

3 points—Divert 85 percent of construction waste generated on site

Complete a Deconstruction Plan and Construction Waste Recycling Form (Attachment C) to identify the types and quantities of materials that will be generated at the job site. Contact local recycling hauler, contractor, or facilities to identify terms and conditions required for recycling materials. Allocate space for recycling containers. Use the Construction Waste Recycling Tracking Spreadsheet (Attachment D) to enter recycled materials, quantities, and waste generated on site.

Verification: Complete the Construction Waste Recycling Tracking Spreadsheet and include verification of hauler weight tickets, receipts, and a sign-off from recycling provider to affirm that the requirements have been met. Place the Spreadsheet documentation in the building permit sleeve prior to requesting a final inspection.

## **(e) Energy Efficiency**

### **(1) Insulation**

Insulation is rated in terms of thermal resistance, called R-value, which indicates the resistance to

heat flow. R-values are determined by material type, thickness, and installed weight per square foot, not by thickness alone. For those projects that are not required to go through the HERS process, such as remodels and additions, incorporating construction that has a higher R-value can be used to attain Green Points.

Wall Insulation: 2 points

Application: For this point option, 2" x 6" wall studs, R-19 minimum wall cavity insulation, plus R-5 insulative wall sheathing must be used.

Verification: Checked during plan review and during insulation inspection.

Ceiling Insulation: 2 points

Application: For this point option, a minimum ceiling insulation R-value of 49 must be attained.

Verification: Checked during plan review and during insulation inspection.

Basement or Foundation Insulation: 2 points

Application: A minimum R-10 insulation must be installed on the exterior of the full height of a basement or foundation wall.

Verification: Checked during plan review and during insulation inspection.

Insulated Pre-cast Concrete Foundation: 2 points

Application: A panelized foundation wall system that has a minimum R-5 insulation integral to the panel must be used. Pre-cast foundation wall panels allow a foundation wall to be built with fewer materials than conventional site-cast foundation walls, and the integral insulation helps reduce heat loss through the wall.

Verification: Inspected during foundation inspection.

Insulated Concrete Forms: 2 points

Application: An insulated concrete form system must be used for the foundation. The foam forms stay in place and add to the energy efficiency of the wall.

Verification: Inspected during plan review and during insulation inspection.

## **(2) Windows: Up to 10 points**

Application: New windows or replacement windows installed as part of a remodel or an addition are awarded Green Points as follows:

Up to 5 points—National Fenestration Rating Council (NFRC): Rated window with maximum U-value of 0.35 or lower: (.5 point for each window)

Up to 5 points (an additional)—NFRC Rated Window with Maximum Solar Heat Gain Coefficient (SHGC) of 0.55 or lower. (.5 point for each window). The SHGC requirement does not apply to south-facing glazing.

Verification: Checked during rough inspection. The inspector must be able to clearly identify the U-value and SHGC ratings and window type by the National Fenestration Rating Council's stamp

or the manufacturer's label. Applicant must show the number of windows to be upgraded on building plans.

### **(3) HERS for Existing Buildings: Up to 5 points**

A HERS Rater uses a blower door test and other tools to determine a home's air tightness and energy performance. A HERS index establishes the home's performance prior to the construction project. If the addition or remodel project is designed and built to maximize energy efficiency, it is possible to minimally increase or even decrease the energy use of the house, even though the project may add square footage.

Application: Applicant must employ a HERS Rater to rate the existing home and model the project to estimate the projected outcome of the completed project. Depending on the pre and post HERS results, Green Points will be awarded according to the following:

3 points—No net increase in HERS index\*

5 points—Decrease in HERS index\*

\*Because of the variability of existing construction, projecting the final HERS index can be difficult. Homeowners should develop contingency plans to meet Green Points requirements, in case the project does not achieve the anticipated HERS index.

Verification: A Preliminary HERS Certificate must be submitted with building permit plans and estimated goal of 'no net' or 'decrease in HERS index' - must be documented as part of submittal process. Place a copy of the final HERS certificate in the permit packet prior to final inspection.

### **(4) Heating, Ventilation, and Air Conditioning (HVAC) Systems**

#### **a. HVAC Commissioning: 3 points**

Even when built or retrofitted using formal design procedures, houses often fail to meet comfort and energy-use expectations. Residential commissioning uses component and system testing to optimize home energy efficiency and comfort. Commissioning helps improve energy consumption, thermal comfort, and pollutant control.

Application: The following tests are required for HVAC commissioning:

Duct Leakage Testing

Combustion Testing

Air conditioning Charge

Duct System Flows and Pressures

Verification: A Building Performance Institute (BPI) certified professional must provide documents indicating the results of the tests shown above and certify that the systems are operating at its rated efficiency level.

### **b. Ground Source Heat Pumps: Up to 10 points**

A Ground Source Heat Pump (GSHP) takes advantage of the earth's stable sub-surface temperatures to provide energy efficient heating and cooling. GSHPs can be installed on almost any size lot—under lawns, landscaped areas, driveways, or the house itself. An existing house can be retrofitted with a GSHP using the home's existing ductwork.

Application: Green Points are awarded for GSHPs according to the following criteria:

4 points—30-39 percent calculations from a heating/cooling load bin analysis

6 points—40-49 percent calculations from a heating/cooling load bin analysis

8 points—50-59 percent calculations from a heating/cooling load bin analysis

10 points—60-69 percent calculations from a heating/cooling load bin analysis

Verification: Geothermal design specifications, energy calculations (heating/cooling load bin analysis), and engineer stamped plans must be submitted during plan review.

### **c. Direct Vent Combination Space/Water Heating System: 2 points**

Combination systems merge space heating and domestic hot water into a single appliance. Combination systems can reduce the first cost of installing high-efficiency equipment. Domestic hot water is heated directly and space heating is accomplished with a hot water heat exchanger coil that pipes water to the forced air heating system.

Verification: Checked during plan review. Inspected in field.

### **d. Zoned, Hydronic Radiant Heating: 2 points**

Application: Use a hydronic heating system that circulates hot water through radiant floor panels, wall radiators, or baseboard convectors located in different areas or zones of the house. Hydronic heating systems improve comfort and energy efficiency by reducing thermal stratification and eliminating duct heat loss.

Verification: Checked during plan review. Inspected in field.

### **e. Passive Cooling: 2 to 5 points**

Passive cooling systems incorporate shading from deciduous trees (for east- and west-facing glass), window overhangs and awnings, and radiant heat-reflective barriers installed in the attic space. The goal in optimally sizing window overhangs is to provide a balance between passive summer cooling and winter heating through solar gain. The formula below will result in window overhangs that shade 100 percent of south-facing window glazing on June 21 (summer solstice).

Application: Applicants should use this formula as a guide for sizing all south-facing overhangs:

$D = H/F$  where:

D = Distance of overhang

H = Height from bottom of glass to overhang

F = 3.38 (F is a value corresponding to the noon sun altitude angle on June 21, 73 degrees for Boulder latitude.)

Points will be awarded for passive cooling systems using any two or more of these techniques (one point per option):

Exterior vertical shading devices for east- and west-facing glass.

Reflective films or glass on east- and west-facing windows.

Radiant, heat-reflective barriers installed in the attic space.

Landscaping that shades east- and west-facing windows during the cooling season (June to September).

South window overhang sized to effectively shade the window (from June to September).

The key is not to let the house heat up. Any combination of natural cooling techniques can be used to reduce overheating in homes. Use awnings and window overhangs primarily on south-facing glass to provide a balance between summer cooling and winter heating through solar gain. Use landscaping to shade east- and west-facing windows.

Code Issues: Understand how these items affect the property's setbacks, easements, and engineering.

Verification: Checked during plan review. Indicate the passive cooling design features on the building permit plan, for option 5 above; submit a calculation that demonstrates overhangs have been designed in accordance with the equation above for all south-facing glass.

#### **f. Whole House Fan: 2 points**

Application: Install a whole-house fan with an insulated cover that creates an airtight seal between attic and living space when the fan is off. Whole house fans work by replacing warm indoor air with cooler outdoor air.

For maximum effectiveness, the fan should be mounted in a hallway ceiling on the top floor of the house, and should be sized to produce four to five air changes per hour within the home.

Verification: Checked during plan review and at final inspection.

#### **g. Evaporative Cooling: 3 points**

Application: Modern evaporative coolers use four to five times less energy than efficient conventional air conditioners, and result in enhanced air quality as well.

Verification: Checked during plan review and at final inspection.

### **(5) Water Heating**

**a. Tankless Water Heater: 2 points**

Application: Tankless water heaters, also called instantaneous or demand water heaters, provide hot water only as it is needed. Tankless water heaters heat water directly without the use of a storage tank, and deliver a constant supply of hot water. Gas-fired models must have a minimum Energy Factor of 0.82 to achieve this credit.

Verification: Checked during plan review and at final inspection.

**b. Point-of-Use Water Heater: 2 points**

Application: Point-of-use water heating uses a mini-water heater at remote fixtures to reduce the energy and water use associated with long piping runs. They are sized to supply hot water to a single fixture such as a sink.

Verification: Checked during plan review and at final inspection.

**(6) Lighting and Appliances**

**a. ENERGY STAR Advanced Lighting Package (ALP): 5 points**

Compared with a standard house lighting package, ENERGY STAR qualified lighting fixtures use about two-thirds less energy, which will reduce electricity bills significantly. The monthly savings on energy bills offset the higher incremental cost of the Advanced Lighting Package.

<b>High-Use Rooms</b>	Kitchen, dining room, living room, family room bathroom(s), hall(s)/stairway(s)	50 percent of total number of fixtures
<b>Medium/Low-Use Rooms</b>	Bedroom(s), den, office, basement, laundry room, garage, closet(s), and all other rooms	25 percent of total number of fixtures
<b>Outdoor</b>	Outdoor lighting affixed to the structure or free-standing pole(s) except for landscape and solar lighting	50 percent of total number of fixtures including all flood lighting

Application: Lighting products that have earned the ENERGY STAR rating generate about 70 percent less heat than standard incandescent lighting. This means they are cool to the touch, keep the home more comfortable, and help reduce home cooling costs.

Any new fixture must comply with city of Boulder Lighting Ordinance requirements of 9-9-16, B.R.C. 1981.

Verification: ENERGY STAR ALP criterion is estimated to be inspected by a HERS rater, if new construction, and by a city inspector for remodels and additions. Place a signed copy of the Verification of Accountability by Responsible Party found at the end of the Green Points application in the permit sleeve before final inspection.

**b. Efficient Light Controls: Up to 2 points**

Efficient lighting controls include occupancy sensors, dimming controls, and automatic daylight dimming controls. Some lighting controls use occupant sensors and timers to turn lights off in unused areas.

Application: Green Points will be awarded for efficient light controls according to the following:

- 1 point—4 control devices
- 2 points—6 control devices

Verification: Specification of efficient light controls with the number installed will be checked by a HERS rater or city inspector during final inspection. Place a signed copy of the Verification of Accountability by Responsible Party found at the end of the Green Points application in the permit sleeve before final inspection.

### **c. Energy Efficient Appliances: Up to 6 points**

Because appliances can account for up to 25 percent of household energy use, ENERGY STAR rated appliances offer substantial energy savings. Green Points will be awarded for ENERGY STAR appliances according to the following:

- 2 points—Install ENERGY STAR rated refrigerator
- 2 points—Install ENERGY STAR rated clothes washer
- 1 point—Install ENERGY STAR rated freezer
- 1 point—Install ENERGY STAR rated dishwasher

Verification: Appliance ENERGY STAR labels must remain on the equipment for inspection by a HERS rater or city inspector during final inspection. Place a signed copy of the Verification of Accountability by Responsible Party found at the end of the Green Points application in the permit sleeve before final inspection.

## **(f) Solar**

### **(1) Passive Solar Heating Design: Up to 12 points**

Design with passive solar heating elements of south-facing glazing, appropriate thermal mass, and building overhangs.

- 6 points—40-49 percent verifying calculations of the solar heat gain fraction
- 8 points—50-59 percent verifying calculations of the solar heat gain fraction
- 10 points—60-69 percent verifying calculations of the solar heat gain fraction
- 12 points—More than 70 percent verifying calculations of the solar heat gain fraction

Application: Colorado has perfect weather and 300 days of sunshine per year to take advantage of this type of design. If the building lot has passive solar opportunity, this is the best way to increase the efficiency of the house and reduce utility costs by decreasing the size of the HVAC equipment needed.

Verification: Submit modeling documentation with the designer or architect's signature verifying calculations of the solar heat gain fraction.

**(2) Solar Thermal Domestic Hot Water System: 8 points**

A solar water heating system includes south-facing rooftop or ground-mounted collectors through which water or a heat transfer fluid circulates and is warmed by the sun. A heat exchanger transfers the solar heat to the domestic water, and the heated water is stored in an insulated storage tank. The system must be sized to provide at least 50 percent of the domestic hot water load. Water preheated by a solar system can also supplement use of a standard hot water heater.

Application: Provide sufficient unshaded south-facing roof area for collectors and space in a mechanical equipment room for the additional hot water storage tank. Inspected during plan review. Applicant must submit calculations and diagrams for solar water heating system.

Verification: Inspected during rough plumbing inspection.

**(3) Solar Thermal Space Heating or Pool/Spa System: 3 points**

Install a solar thermal space heating system interfaced with the central heating system for the structure, pool, or spa. Solar thermal space heating can offset fuel consumed for the heating of these systems over the entire heating season. The system must be used in conjunction with a properly designed low temperature hydronic heating system or pool/spa heat exchanger.

Application: While system sizes of these types may vary, appropriate calculation and design of the system must be demonstrated. The system must be designed to offset a minimum of 15 percent of the annual space heating load or 15 percent of the annual pool or spa load. It is assumed in a system of this type that the domestic hot water for the structure in space heating applications will be prioritized.

Verification: Checked during plan review. Applicant must submit calculations and diagrams. The recommended solar thermal calculation program and industry standard is T-SOL.

**(4) Pre-Plumb for Solar Thermal System Retrofit: 2 points**

Preparing for the installation of solar water heating will substantially reduce the cost of future installation, and adds little cost during the time of construction. Solar hot water pre-plumbing will make it easier and less expensive to install a solar water heater in the future.

Application: In order to facilitate the installation of a solar heat system, install minimum ½" (5/8" OD) copper pipes, minimum 1" wall thickness high temperature 250°F rated insulation, and THN shielded 4 conductor sensor wiring between the attic and the water heater location. To accommodate "active" systems, provisions should be made for a solar storage tank footprint, (with pressure relief drain line) and an electrical outlet for a pump. An 8 ft. by 8 ft. section of south-facing roof suitable for future installation of solar panels must be provided.

Verification: Checked during plan review. Inspected in field.

**(5) Active Solar Electric System: Up to 12 Points**

Net metering rules, time-of-use electric rates, and utility and government financial incentives are improving the economics of PV systems, which can provide all of a home's electricity on a net annual basis. PV-generated electricity produces no air pollution and reduces the need for building new power plants.

Design and install a solar photovoltaic (PV) system to meet some of the electrical load of the building.

6 Points—30-39 percent solar electricity or equivalent to 2 kilowatt (kW) system

8 Points—40-49 percent solar electricity or equivalent to a 3 kW system

10 Points—50-59 percent solar electricity or equivalent to a 4 kW system

12 Points—More than 60 percent solar electricity or equivalent larger than 5 kW system

PV systems convert sunlight into electricity using PV modules. The direct current (DC) electricity generated by the modules is converted to utility grade alternating current (AC) by an inverter.

For individually landmarked buildings and those located in designated historic districts, photovoltaic panel placement is contingent upon the Landmark Preservation Advisory Board's assessment and approval of a Landmark Alteration Certificate.

Verification: The applicant must submit documentation by a qualified engineer or equivalent of the solar installation company of the electrical production calculations using industry-accepted formulas. Inspected in field.

#### **(6) Pre-Wire for Future Solar Electric, Photovoltaic (PV) System Retrofit: 2 points**

Making provisions during construction for installing future PV systems can significantly lower the cost when systems are installed later. These provisions include installing conduit from the attic to a location near the electric service entrance/circuit breaker panel, allowing space for installation of PV modules on south-facing roofs, and ensuring that roof trusses are adequate to accommodate any added roof loads. Net metering rules, time-of-use electric rates, and utility and government financial incentives are improving the economics of PV systems, which can provide all of a home's electricity on a net annual basis. PV-generated electricity produces no air pollution and reduces the need for building new power plants.

Application: Maintain a 200 square foot or larger section of unshaded south roof area clear of vent pipes and other obstructions to allow for the installation of modules. Install ¾-inch or larger EMT (electrical metal tubing) or FMC (flexible metal conduit) to accommodate wires run from the attic to a junction box near the main panel and meter. Provide the owner with a roof plan with the preferred location for PV modules and the conduit location clearly marked, and provide structural information on what added loads the roof can accommodate.

Verification: Checked during plans review.

#### **(g) Water Efficiency - High Efficiency Fixtures: Up to 6 points**

High-efficiency fixtures can reduce indoor water use by 30 to 40 percent. Faucets, showers, baths, and toilets typically account for two-thirds of indoor water use in a home, and one-third of total water use. Green Points are awarded according to the following:

- 2 points—25 percent of all fixtures
- 4 points—50 percent of all fixtures
- 6 points—75 percent of all fixtures

One or more of the following requirements must be met by installing high-efficiency (low flow) fixtures:

The average flow rate for all bathroom faucets must be less than or equal to 1.5 gallons per minute (gpm). The average flow rate for all shower heads must be less than or equal to 2.0 gpm.

The average flow rate for all toilets, including dual-flush toilets, must be less than or equal to 1.28 gpf (gallons per flush). A common dual-flush toilet has a 1.6 gpf and a 0.8 gpf. This makes an average of 1.2, which would qualify.

Application: Indicate the total number of fixtures and the number and location of high efficiency fixtures on building permit plan notes. Include receipts and specification sheet for fixtures in building permit sleeve before final plumbing inspection.

Verification: Inspected during final plumbing inspection.

## **(h) Material Efficient Framing and Structure**

### **(1) Advanced Framing Techniques: Up to 10 points**

Conventional framing techniques use about 15 to 20 percent more framing material than the following material-efficient framing systems. Advanced or efficient framing practices can reduce the need for lumber while still providing sufficient structural support. A reduction in lumber demand reduces material costs and can also reduce labor and shipping costs.

Application: Advanced framing techniques must be specified in building permit plans with details called out for framing carpenters. At least two of the options below must be incorporated together to receive points for this point option.

Verification: These measures must be included on design plans and inspected during plan review.

#### **a. 24-inch On-Center Framing: 2 points**

By using 2"x 6" studs on 24-inch centers rather than 2" x 4" studs on 16-inch centers, builders save time and labor costs (offsetting slightly higher per-item material cost). The increased room for insulation allows for additional insulation in wall cavities, which improves thermal performance and saves the homeowner money on energy bills.

#### **b. Resource Efficient Insulated Headers: 2 points**

Insulated headers reduce thermal bridging to increase the energy efficiency of the wall framing. Green Points are awarded for incorporating a minimum R-10 insulation in the header section.

#### **c. Energy Efficient Roof Trusses: 2 points**

The perimeter intersection between walls and roof framing is often an area of increased heat loss

because conventional trusses reduce the cavity that can accept insulation to less than 6 inches. Raising the heels on trusses allows for full insulation around the house, saving energy and money. Install where conventional trusses are used. The increased height may require modifications to exterior soffits and trim design.

**d. HVAC Ducts Within Conditioned Spaces: 2 points**

Installing all of the ductwork within the conditioned spaces of the home reduces heat loss/gain and air leakage compared to duct systems installed in unconditioned spaces. Detailing the plans to show that all of the HVAC ducts can be accommodated within conditioned space will allow the Green Points shown above to be awarded.

**e. Minimum 12-inch Roof Overhangs: 2 points**

Design at least a 12-inch overhang with gutters around the building's entire roof. Install gutter and downspout system to divert water five feet away from foundation and, from there, into the overall on-site drainage area or install crushed stone or other material below roof drip line to minimize splash on siding in high snow areas. Overhangs and gutters protect siding, windows, and doors from water intrusion, thereby reducing the likelihood of rot and mold issues. Overhangs also provide protection from the sun's harsh UV rays, which can degrade building materials and furnishings. All overhangs must meet building code and zoning restrictions.

**(2) Structural Insulated Panels (SIPs): Up to 8 points**

Structural insulated panels (SIPs) are more energy efficient, provide excellent soundproofing, and reduce infiltration relative to frame construction. Panels can be erected more quickly providing for faster construction. SIPs also save wood and reduce waste on site compared to conventional framing. Green Points will be awarded for the use of SIPs according to the following:

5 points—at least 50 percent of exterior walls

8 points—at least 50 percent of exterior walls and roof

Application: Incorporating SIP construction requires that stamped plans be submitted from a designer.

Verification: The applicant must provide plans or designs certified by a structural engineer. Inspected in field.

**(3) Structural Alternatives to Wood: Up to 8 points**

Alternative building methods that demonstrate energy- and resource-efficient construction with less embodied energy are awarded Green Points according to the following:

5 points—at least 50 percent of exterior walls

8 points—at least 50 percent of exterior walls and roof

Application: Exterior walls must be constructed with alternative materials, which may include, but are not limited to, adobe, rammed earth, and straw bale.

Verification: The applicant must provide plans or designs certified by a structural engineer.

inspected in field.

## **(i) Sustainable Products**

### **(1) FSC-Certified Tropical Woods or No Tropical Wood: Up to 6 points**

Forest Stewardship Council (FSC) certification assures that the forest from which the wood was harvested is managed in an environmentally, economically, and socially responsible manner. FSC maintains chain-of-custody certification throughout the cutting, milling, and final delivery of products, thus ensuring that wood labeled as FSC actually came from a certified sustainably managed forest. Although other certification systems maintain chains of custody, FSC remains the most robust certification program.

2 points—2 BF (board feet) of FSC lumber per square foot (SF) of floor area (2 BF/SF)

4 points—3 BF of FSC lumber per SF of floor area (3 BF/SF)

6 points—50 percent or more of dimensional lumber in total BF is FSC, excluding engineered wood products

The biological wealth of the tropical rainforests, and their devastation due to poor forestry practices, are of such great importance that they merit singular treatment in this credit. Tropical wood can end up in a wide variety of products unbeknownst to the purchaser. For the purposes of this option, a species of wood is considered “tropical” if it is grown in a moist country that lies, either in part or in its entirety, between the tropics of Cancer and Capricorn. See Chart A below.

### **Chart A: Tropical Countries by Continent**

<b>Continent</b>	<b>Tropical Countries</b>
Africa	All except Morocco, Tunisia, Algeria, Egypt and Libya
Asia & Southeast Asia	All except Japan, N. & S. Korea and Russia
Australia/Oceania	All except New Zealand
Central America and Caribbean	All countries
Europe	None
Middle East	None
North America	Mexico
South America	All except Uruguay

Products containing tropical woods, if intentionally used (specified in purchasing documents), must be certified in accordance with the guidelines of the FSC. Reused or reclaimed wood products are exempt.

The builder shall provide all wood product suppliers with a notice containing the following elements:

Statement that the builder’s preference is to purchase products containing tropical woods

only if they are FSC-certified.

Request for the country of manufacture of each product supplied.

Request for a list of FSC-certified products the vendor can supply.

Verification: The builder or responsible party will sign Verification of Accountability by Responsible Party in the Green Points application declaring that all tropical wood, if used, is FSC-certified. Also a copy of the FSC Chain of Custody certification and/or invoice from supplier. Place in building permit sleeve before final inspection.

## **(2) Environmentally Preferred Materials: Up to 10 points**

Products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose are awarded Green Points if they meet the specifications in Chart B below. Many new products are available including those that have lower emissions, are sustainably produced, include recycled content, are rapidly renewable, etc. Qualifying products have more than one of these attributes:

Recycled content

Reclaimed

Bio-based

Agricultural residue

Low or no volatile organic compounds (VOCs) emissions.

AND/OR

## **(3) Locally Sourced Materials**

Products that are environmentally preferable and/or extracted, processed, and manufactured within 500 miles of the city are considered local. Applicants can earn a maximum of 2 points for any single component listed in Chart B regardless of the amount by which a minimum performance threshold is exceeded. A "recycled content" product must contain a minimum of 25 percent post-consumer recycled content except as noted otherwise above. Post-industrial (pre-consumer) recycled content is counted at half the rate of post-consumer content. Points will be awarded as shown in Chart B below.

Using products that are extracted, processed, and manufactured within the region encourages the use of indigenous resources, reduces environmental impacts from transportation, and increases awareness of the environmental impacts associated with material extraction and consumption, such as deforestation, mining, etc., thereby encouraging a conservation ethic. Purchasing locally sourced materials is also supporting local industry and businesses, which is an important aspect of our region's economic vitality.

Use products that are environmentally preferable and/or extracted, processed, and manufactured within 500 miles of the home (“local”). For each component shown in Chart B, earn 0.5 points for each product specification type met (Environmentally Preferable Product [EPP] Specifications, Emission Specifications, and/or “Local”). Except as otherwise noted in Chart B, 90 percent of the component, by weight or volume, must meet the specification shown.

Verification: The applicant must sign the Verification of Accountability by Responsible Party in the Green Points application. , declaring that the materials meet the criteria in Chart B, and place the form in building permit sleeve before final inspection.

### **Chart B: Environmentally Preferable Products/Locally Sourced Materials**

Assembly	Component	Product Specification Types (see Note 1)		
		Specifications	Emission Specifications	Local
Exterior Wall	Framing	FSC-certified		X
Exterior Wall	Framing	Finger-jointed studs (vertical use only for structural components)		X
Exterior Wall	Siding or masonry	Recycled content or FSC-certified		X
Floor	Flooring	BONUS 1/2 for 90% of home	BONUS 1/2 for NO carpet in home	
Floor	Framing	FSC-certified		X
Foundation	Cement	Fly ash or slag as replacement for, not addition to, cement content (min. 20%)		X
Interior Wall	Framing	FSC-certified		X
Interior Wall	Framing	Finger-Jointed, (vertical use only for structural components)		X
Interior Walls AND ceilings	Gypsum board	Recycled content		X
Interior Walls AND millwork	Paint		Comply with Green Seal Standard GS-11, Paints, First Edition, May 20, 1993	
Interior Walls AND millwork	Wood finishes		VOC concentrations of 150 gpl or less	
Landscape	Decking or patio material	Recycled content or FSC-certified		X
Other	Cabinets	Recovered, recycled content, or FSC-certified	Wood and/or agrifiber products with no added urea-formaldehyde resins	X
Other	Counters	Recycled content	Wood and/or agrifiber products with no added urea-formaldehyde resins	

Other	Doors (not incl. garage)	Recycled content or FSC-certified	Wood and/or agrifiber products with no added urea-formaldehyde resins	X
Other	Trim	Recovered, recycled content, or FSC-certified	Wood and/or agrifiber products with no added urea-formaldehyde resins	
Other	Adhesives and sealants		VOC concentrations of 70 gpl or less	
Roof	Framing	FSC-certified		X
Roof	Roofing	Recycled content or vegetated (min. 200 sf)		X
Roof AND floor AND wall	Insulation	Recycled content (min 20%)	Comply with State of California, DHS, "Practice for Testing of VOCs from Building Materials using Small Chambers"	X
Roof, floor, wall (2 of 3)	Sheathing	Recycled content or FSC-certified		X

Note 1: A maximum of 2 points can be earned for any single component listed in Chart B (e.g., roofing, siding, etc.) regardless of the amount by which a minimum performance threshold is exceeded.

Note 2: "Recycled content" products must contain a minimum of 25 percent post-consumer recycled content except as noted otherwise above. Post-industrial (pre-consumer) recycled content is counted at half the rate of post-consumer content.

## (j) Indoor Air Quality

### (1) ENERGY STAR's Indoor Air Quality Package Requirements: 10 points (New Construction and ENERGY STAR qualified homes are eligible for this label ONLY. )

ENERGY STAR's Indoor Air Quality Package (IAP) goes beyond energy efficiency and requires that duct leakage be controlled, the thermal envelope tightened, air pressures balanced, fresh air introduced, pest control measures installed, indoor contaminants reduced, and all major moisture issues managed. These requirements help to effectively manage building comfort, health and durability.

For this point option, all of the requirements of EPA's ENERGY STAR Indoor Air Package must be met.

Verification: A HERS Rater must perform a visual inspection of installed measure(s) and relevant documents/test results; to affirm compliance and place an IAP Certificate in the building permit sleeve before final inspection.

### (2) Mechanical Ventilation: Up to 5 points

Mechanical ventilation systems are used to deliver fresh air in tightly sealed homes. Whole house ventilation systems improve indoor air quality by diluting pollutants. Properly ventilating bathrooms will reduce the possibility of rot, mold, and other moisture problems. Green Points are awarded for providing mechanical ventilation according to the following table:

1 point—Installation of a kitchen exhaust fan

- 1 point—Bath exhaust fans with timer or humidistat controls
- 1 point—Ventilation integrated into the HVAC system
- 2 points—Incorporating heat recovery ventilation

Integrated systems use the furnace fan to bring in outside air through a dampered duct, and should be equipped with controls to regulate air volume. Heat recovery ventilators (HRVs) and energy recovery ventilators (ERVs) employ heat exchangers to recover heat. The unit must be integrated into the HVAC system. Ventilation is particularly appropriate with blower door test results of less than 0.35 natural air changes per hour (NACH). A timer or humidistat requirement for bathroom fans ensures proper run-time to adequately remove moisture from the room.

Verification: Inspected during final mechanical inspection.

### **(3) High-Efficiency HVAC Filter: 1 point**

MERV, or Minimum Efficiency Reporting Value, is a metric used to measure an air filter's efficiency. The MERV scale ranges from 1 to 20. The higher the MERV number, the more efficient the filter is at removing particles. The U.S. Environmental Protection Agency (EPA) has identified micro-particulates as a leading cause of respiratory discomfort. By removing these particles a high-efficiency filter protects the HVAC equipment elements and makes the living space healthier.

Filters with MERV ratings of 6 to 10 are recommended for cleaner air without compromising the performance of standard mechanical systems. Filters with MERV ratings of 10 or more create resistance to airflow, because the filter media becomes denser as efficiency increases. Only use a filter with a MERV of 10 or higher if the HVAC fan system is specifically designed for it.

Verification: Inspected during final inspection.

### **(4) Radon Mitigation: Up to 2 points**

Mitigation will minimize indoor radon levels and exposure to radon gas. Prolonged exposure to elevated concentrations of radon has been associated with increases in the risk of lung cancer. Boulder County is located in Zone 1, indicating a predicted average indoor radon screening level of greater than 4 pico Curies of radon gas per liter of air (pCi/L), which indicates the importance of testing and mitigation. The following Green Points are awarded for the type of system indicated:

- 1 point—Passive system
- 2 points—Active system

Soil depressurization, the most common mitigation approach, involves running PVC pipe through the slab (or underneath a membrane in a crawl space), then routing it up and through the roof.

Verification: Inspected at the same stages as other plumbing systems, under-slab, rough-in and final.

### **(5) Attached Garage Exhaust Fan: 1 point**

Install an exhaust fan on the opposite wall from the door to the house. It must be wired to an electric garage door to run after the door has been opened or closed or put on a timer. A garage exhaust fan creates a healthier indoor environment by reducing the amount of contaminants that can enter the house from the garage.

Verification: Inspected during rough-in and final stages of construction.

### **(k) Homeowner Information - Operations and Maintenance Binder: 1 point**

The performance and durability of a building can be enhanced through proper use of its features and maintenance of its systems throughout its service life. Occupants benefit from information about how to use and maintain the home's energy efficiency measures and equipment.

The builder shall provide a binder to be left in the dwelling for future occupants that includes the following four items:

The Green Points checklist

Home Energy Audit or HERS certificate, whichever applies

The equipment manufacturers' installation manuals, except for manuals required to be affixed to the equipment, for all installed equipment, fixtures, and appliances

Verification: Inspected during final inspection.

### **(l) Design Process and Innovation**

#### **(1) Green Building Consultants: 2 points**

Understanding Boulder's Green Building and Green Points program is beneficial to the construction process. Consultants certified through Green Points Certification, Green Advantage, LEED™ Accredited Professional, or CU Denver's Green Certificate Program can provide valuable expertise.

Verification: A Green Building consultant must sign the application as a responsible party and provide proof of certification or accreditation during building plans submittal.

#### **(2) ENERGY STAR Builder: 1 point (New Construction Only)**

For this point option, the general contractor must be an ENERGY STAR builder. Builders can sign up on the ENERGY STAR Web site free of charge. This gives builders guidelines to include ENERGY STAR standards and the opportunity to market themselves as ENERGY STAR builders and use the branding power of EPA's distinguished marketing and verification program.

Verification: The builder must sign the application as a responsible party and the builder's name

must be listed on ENERGY STAR's Web site.

### **(3) Innovation Points: Up to 10 points**

Minimize the environmental impact of the house by incorporating green design and construction measures that have tangible and demonstrable benefits beyond those outlined in the Green Points program. Suggested innovations include: exceptional performance (e.g., zero energy, carbon neutral); innovative design strategies; or emerging technologies, materials, or construction practices.

The applicant **MUST** prepare a written submittal that includes:

The intent of the innovation measure(s)

The proposed requirement for compliance

The proposed documentation to demonstrate compliance

A description and an estimate of the benefit/impact provided by the proposed measure

The above information must document how such an approach will minimize the impacts of the building in a tangible and demonstrable way beyond the methods outlined in the Green Points Program. The product, design, or technology must comply with existing city codes and standards.

Verification: Applicant must provide the above documentation in writing and any other supporting documentation, such as an evaluation report or specifications to quantify performance. This information is submitted with building permit plans and will be awarded during city staff's evaluation and determination of measures proposed. If you have questions about how to apply the innovation points provisions contact either Jim Gery at 303-441-3129 or Kirk Moors at 303-441-3172.

## **Glossary**

**Addition.** An extension or increase in floor area of a building or structure of 500 sq. ft. or greater.

**B.R.C. or Boulder Revised Code.** The BRC is made up of the collected and published laws of the city. The city's laws are established by ordinances passed by the City Council.

**BPI or Building Performance Institute Inc.** The Building Performance Institute offers nationally-recognized training, certification, accreditation, and quality assurance programs. BPI measures the knowledge, skills, and competency of individuals, and evaluates the organizations impacting building performance.

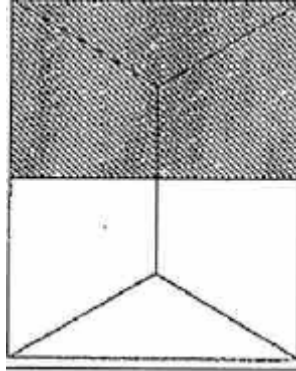
**City of Boulder Charter.** Boulder is a home rule city. The Charter is the constitution-like document that governs the city.

**Contributing Buildings.** Those buildings built during a historic district's period of significance that exist in comparatively original condition, or have been appropriately restored, and clearly

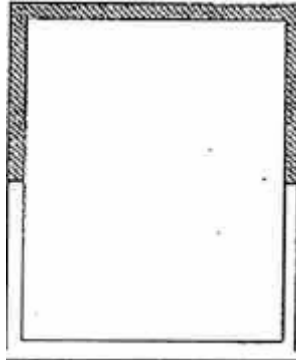
contribute to the historic significance of the district. Such buildings may have compatible additions.

**"Demolition"** or **"demolish"** means an act or process which removes one or more of the following. The shaded area illustrates the maximum amount that may be removed without constituting demolition.

- a) Fifty percent or more of the roof area as measured in plan view (see diagram);



- b) Fifty percent or more of the exterior walls of a building as measured contiguously around the "building coverage" as defined in this section (see diagram); or



A wall shall meet the following minimum standards to be considered a retained exterior wall:

- 1) The wall shall retain studs or other structural elements, the exterior wall finish, and the fully framed and sheathed roof above that portion of the remaining building to which such wall is attached;
- 2) The wall shall not be covered or otherwise concealed by a wall that is proposed to be placed in front of the retained wall; and
- 3) Each part of the retained exterior walls shall be connected contiguously and without interruption to every part of the retained exterior walls.

**Embodied energy.** All the energy required to manufacture, transport, and dispose of a material or product.

**Floor Area.** Floor area is the total square footage of all levels included within the outside walls of a building or portion thereof, but excluding courts, garages, attics and crawl spaces.

**FSC or Forest Stewardship Council.** FSC certified lumber products are accredited and abide by criteria that ensure responsible management of the world's forests.

**HERS Index or Home Energy Rating System Index.** A rating system where an index of 100 represents the energy use of the “American Standard Building” and an index of zero indicates that the Proposed Building uses no net purchased energy (a Zero Energy Building).

**ICC or International Code Council.** The International Code Council, a membership association dedicated to building safety and fire prevention, develops the codes used to construct residential and commercial buildings, including homes and schools. Most U.S. cities, counties, and states that adopt codes choose the International Codes developed by the International Code Council.

**IECC or International Energy Conservation Code.** An energy conservation code establishing minimum regulations for energy efficient buildings using prescriptive and performance-related provisions.

**Remodel.** An interior reconfiguration or upgrade of an existing structure of 500 sq. ft. or greater and the work required to complete the reconfiguration or upgrade requires a building permit.

**RESNET or Residential Energy Services Network.** An organization that sets the standards of quality, and increases the opportunity for ownership of high performance buildings and ensures the success of the building energy performance certification industry.

## Acronyms

AFUE	Annual Fuel Utilization Efficiency
BF	Board feet
BPI	Building Performance Institute
B.R.C.	Boulder Revised Code
CFLs	Compact Fluorescent Light Bulbs
CFM	Cubic feet per minute
EMT	Electrical metal tubing
EPA	U.S. Environmental Protection Agency
FMC	Flexible metal conduit
FSC	Forest Stewardship Council
GPM	Gallons per minute
GPF	Gallons per flush
HEA	Home Energy Audit
HERS	Home Energy Rating System
HRV	Heat recovery ventilator
IBC	International Building Code
IECC	International Energy Conservation Code
kW	kilowatt
LEED™	Leadership in Energy and Environmental Design
MERV	Minimum Efficiency Reporting Value
MLS	Multiple Listing Service

NACH Natural Air changes per hour  
pCi/L PicoCuries per liter  
RESNET Residential Energy Services Network  
RPA Radiant Panel Association  
SF Square feet

## **Resources**

Boulder's Climate Action Plan  
[www.beclimatesmart.com](http://www.beclimatesmart.com)

Boulder Green Building Guild  
[www.bgbg.org](http://www.bgbg.org)

Boulder Historic Preservation  
[www.boulderhistoricpreservation.net](http://www.boulderhistoricpreservation.net)

Boulder's Master Plan for Waste Reduction  
[www.environmentalaffairs.com](http://www.environmentalaffairs.com) > recycling & composting

City of Boulder Office of Environmental Affairs  
[www.environmentalaffairs.com](http://www.environmentalaffairs.com)

ENERGY STAR  
[www.energystar.gov](http://www.energystar.gov)

Financial Incentive Information  
Database of State Incentives for Renewable Energy (DSIRE)  
[www.dsireusa.org](http://www.dsireusa.org)

Geothermal Heat Pumps  
Geothermal Heat Pump Consortium  
[www.geoexchange.org](http://www.geoexchange.org)

International Ground Source Heat Pump Association  
[www.igshpa.okstate.edu/index.htm](http://www.igshpa.okstate.edu/index.htm)

Radon  
EAP Radon Zone Map  
[www.epa.gov/radon/zonemap/colorado.htm](http://www.epa.gov/radon/zonemap/colorado.htm)

Radon-Resistant New Construction (RRNC)  
[www.epa.gov/radon/construc.html](http://www.epa.gov/radon/construc.html)

Water Efficiency  
City of Boulder Water Conservation Office  
[www.bouldersaveswater.net](http://www.bouldersaveswater.net)

EPA's WaterSense Program  
[www.epa.gov/watersense](http://www.epa.gov/watersense)

U.S. Composting Council  
[www.compostingcouncil.org](http://www.compostingcouncil.org)

**Attachments:**

Attachment A: HERS Index Certificate EXAMPLE

Attachment B: Not used

Attachment C: Deconstruction Plan and Construction Waste Recycling Form

Attachment D: Construction Waste Recycling Tracking Spreadsheet

Attachment E: Not used

\* Program documents and resources available for download on the Web at  
[www.bouldergreenpoints.com](http://www.bouldergreenpoints.com) or  
[www.boulderplandevlop.net](http://www.boulderplandevlop.net) .



# Home Energy Rating Certificate

635 Balsam Avenue  
Boulder, CO 80301



**5 Stars Plus  
Confirmed Rating**

## Uniform Energy Rating System

1 Star	1 Star Plus	2 Stars	2 Stars Plus	3 Stars	3 Stars Plus	4 Stars	4 Stars Plus	5 Stars	5 Stars Plus
500-401	400-301	300-251	250-201	200-151	150-101	100-91	90-86	85-71	70-0

## Energy Efficient

**HERS Index: 33**

### General Information

Conditioned Area: 2000 sq. ft.      HouseType: Single-family detached  
 Conditioned Volume: 16000 cubic ft.      Foundation: Conditioned basement  
 Bedrooms: 2

### Mechanical Systems Features

Heating: Fuel-fired air distribution, Natural gas, 96.0 AFUE.  
 Cooling: Air conditioner, Electric, 16.0 SEER.  
 Water Heating: Conventional, Natural gas, 0.70 EF, R-5 wrap.  
 Duct Leakage to Outside: 0.03 CFM.  
 Ventilation System: Exhaust Only: 100 cfm, 25.0 watts.  
 Programmable Thermostat: Heating: Yes      Cooling: Yes

### Building Shell Features

Ceiling Flat: R-60      Exposed Floor: R-38  
 Vaulted Ceiling: NA      Window Type: Boulder Window Upgra  
 Above Grade Walls: R-31      **Infiltration:**  
 Foundation Walls: R-30.0      Rate: Htg: 2.00 Clg: 2.00 ACH50  
 Slab: R-10.0 Edge, R-0.0 Under      Method: Blower door test

### Lights and Appliance Features

Percent Fluorescent Pin-Based: 20.00      Clothes Dryer Fuel: Natural gas  
 Percent Fluorescent CFL: 50.00      Range/Oven Fuel: Natural gas  
 Refrigerator (kWh/yr): 400.00      Ceiling Fan (cfm/Watt): 0.00  
 Dishwasher Energy Factor: 0.67

The Home Energy Rating Standard Disclosure for this home is available from the rating provider.

**REM/Rate - Residential Energy Analysis and Rating Software v12.41 RESNET Accreditation**

This information does not constitute any warranty of energy cost or savings.  
 © 1985-2007 Architectural Energy Corporation, Boulder, Colorado.

**Rating Number: XYZ-5465**

Certified Energy Rater: Cindy Jones

Rating Date: 8/22/07

Rating Ordered For: John Smith

## Estimated Annual Energy Cost

Use	Confirmed Rating		
	MMBtu	Cost	Percent
Heating	13.9	\$104	18%
Cooling	2.5	\$50	8%
Hot Water	15.7	\$110	19%
Lights/Appliances	21.4	\$374	63%
Photovoltaics	-10.6	-\$243	-41%
Service Charges		\$195	33%
<b>Total</b>		<b>\$589</b>	<b>100%</b>

**This home meets or exceeds the minimum  
criteria for all of the following:**

2006 International Energy Conservation Code

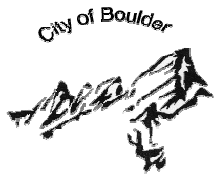
**Boulder Energy Raters**

**4235 Valmont Avenue**

Boulder, CO 80301

303.555.7878





## City of Boulder Deconstruction Plan and Construction Waste Recycling Form

### SEE THE GREEN BUILDING AND GREEN POINTS GUIDELINE BOOKLET FOR ADDITIONAL INFORMATION

**PURPOSE:** The City of Boulder is working towards establishing a Zero Waste Community. The following program requirements are meant to promote the practices of reusing and recycling of building materials through demolition management and construction waste recycling in order to limit the amount of materials sent to landfills.

### **DECONSTRUCTION MANAGEMENT PRE AND POST-APPLICATION REQUIREMENTS – Not required when less than 50% of exterior walls will be demolished**

**PREAPPLICATION:** The city of Boulder provides a free deconstruction assessment with a deconstruction professional through ReSource.

**1. Schedule an On-site Deconstruction Assessment:**

Call Shaun LaBarre at ReSource (303-419-5427) to schedule a free deconstruction assessment. The assessment includes a consultation to help with this form (Attachment C). Attachment C must be submitted to the Planning & Development Services (P&DS) offices when applying for a demolition/deconstruction permit.

**2. Conduct an on-site visit with the ReSource deconstruction professional:**

As a part of the on-site assessment, you will receive a *material inventory* indicating which materials, equipment and interior finishes may be utilized to attain the mandatory diversion rate. The inventory will also provide information on which of these materials may be donated for a tax deduction. A list of registered deconstruction professionals will be provided after the deconstruction assessment is completed. At least 65% of the materials (by weight) available for deconstruction must be diverted from the landfill. Higher diversion rates may be used towards required Green Points. Consult the Guidebook for more details.

**3. Submit your permit application:**

Submit your completed building or demolition/deconstruction permit application, along with this form to the P&DS offices. The completed deconstruction form must include a sign-off by the deconstruction professional.

**POST-APPLICATION:** Once your application has been approved and purchased, follow these steps.

- 1. Contact a city of Boulder registered deconstruction contractor:** It is up to the homeowner or contractor to solicit bids for the deconstruction project. Please see the end of this form for additional information.
- 2. Collect donation receipts and recycling center weight tickets.** Receipts and weight tickets are required for final verification of deconstruction plan compliance. Your deconstruction contractor should collect receipts and tickets. The homeowner and/or contractor will be responsible for ensuring that copies these documents are collected.
- 3. Submit final verification of deconstruction plan compliance:** Upon project completion, submit a copy of the Construction Waste Recycling Tracking Spreadsheet (Attachment D), copies of hauler receipts, weight tickets and donation receipts. Tickets and receipts may be placed in the Building or Demolition/deconstruction permit sleeve for collection by a City inspector when final inspections are called. Use original non-profit donation receipts to evaluate possible tax deductions. For help with maximizing deduction benefits, visit [ww.irs.gov](http://ww.irs.gov) and use form 8283.

Permit number: \_\_\_\_\_

## NEW CONSTRUCTION WASTE RECYCLING REQUIREMENTS

1. Estimate what materials will be reused and/or recycled from your building site. Recycling ALL clean wood, cardboard and metal will count for 50% waste diversion. Points may be chosen for recycling above the required amount. Review Green Points Program Guidelines Booklet for additional point options.
2. Projected quantities of waste generation can be estimated by assuming 4 lbs. of waste are generated per square foot by new home construction.
3. A Construction Waste Recycling Tracking Spreadsheet (Attachment D, and all hauler receipts, weight tickets, facility sign-offs and/or invoices are required as verification of the material diverted) must be placed in building permit sleeve before final inspection.

<b>Applicant's Name:</b>  <input type="checkbox"/> <b>Owner</b> <input type="checkbox"/> <b>Contractor</b>	<b>Phone:</b>  
<b>Property Address:</b>  	<b>Date:</b>  

Deconstruction Professional (preformed the deconstruction eval):	Year the structure was built):
Deconstruction Professional sign-off: _____ Date: _____	: Company Name: _____
	Project & Size (sq. ft) New construction _____ Interior remodel _____ Addition _____

<b>Type of Dwelling</b>			
Single family Dwelling	Multifamily Dwelling	Townhome: _____	# of Units
<b>Accessory Structure</b>	Detached	Attached	
_____ Existing Sq. Ft.	_____ Sq. Ft. to be deconstructed		
_____ Sq. Ft. of existing wall area		_____ Sq. Ft. of wall area to be deconstructed	
<b>Describe structure to be deconstructed: PROJECT DESCRIPTION:</b> Please list all exterior alterations proposed. Additional resources can be downloaded at <a href="http://www.bouldergreenpoints.com">www.bouldergreenpoints.com</a> to assist with estimations and/or diversion and waste generation quantities. All four pages must be included in the application.			

Permit number: \_\_\_\_\_

Who do you intend to hire to deconstruct and/or manage waste recycling?

Deconstruction/Recycling Contractor company name: \_\_\_\_\_

Address: \_\_\_\_\_ Phone: \_\_\_\_\_

Complete the Diversion Rate (DR) Table on the following page indicating the building materials that you plan to reuse, donate or recycle from this construction project. **Verification of the actual diversion will be tracked on the Construction Waste Recycling Tracking Spreadsheet available for download from the city's web sites. [www.bouldergreenpoints.com](http://www.bouldergreenpoints.com) or [www.boulderplandevlop.net](http://www.boulderplandevlop.net)**

**Instructions for completing the Diversion Rate table by weight.**

Column 1 - This is the **total** tons of materials generated from this project listed by material type.

Column 2 - Total tons of material type that was separated out for salvage or reuse onsite or taken to a building material reuse facility.

Column 3 - Total tons of material type that is taken to a recycling facility to be reprocessed into new products.

Column 4 - Total tons of material type that is taken to a facility that processes mixed deconstruction debris.

Materials taken to a Boulder/Denver Registered Facility will be credited with 65% diversion.

Registered facilities are approved by the city of Boulder, Office of Environmental Affairs.

Column 5 - Total tons of material type that is taken to a disposal/trash facility/landfill.

Column 6 - Name the hauler, contractor, and facility you are working with to divert the material. For contractor information refer to the "Construction & Deconstruction Waste, Reuse& Recycling Guide".

Calculate your **Diversion Rate** using the following formula

Permit number: \_\_\_\_\_

Material Type (Tons)	1. Total Tons Generated	2. Salvage or Reuse	3. Recycling	4. Mixed Processing Facility	5. Disposal/ Trash	6. Hauler, Contractor or Facility
<i>Example: Lumber</i>	3	2.5	.5			2. ReSource /3. Western Disposal
<b>MANDATORY 65% DIVERSION FROM EXISTING STRUCTURES TRIGGERING DECONSTRUCTION - EARN POINTS FOR HIGHER DIVERSION – REFERENCE THE GUIDELINE BOOKLET FOR MORE DETAILS</b>						
Lumber						
Plywood						
Trusses						
Clean wood						
All Metal HVAC system /Appliances						
Working Appliances						
Doors/Windows						
Cabinets/Fixtures						
Wood Flooring/Tile						
Carpet/Pad						
Brick/Stone/Block						
Concrete/Rubber/ Plaster						
All Electrical Wire						
Subtotal						
<b>TOTAL</b>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>		
<b>NEW CONSTRUCTION WASTE RECYCLING – 50% MANDATORY DIVERSION – EARN ADDITIONAL POINTS FOR HIGHER DIVERSION – REFERENCE THE GUIDELINE BOOKLET FOR MORE DETAILS</b>						
Clean wood waste						
Cardboard						
Metal						
Masonry						
Subtotal						
<b>TOTAL</b>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>		

$$\boxed{\frac{B}{A}} + \boxed{\frac{C}{A}} + \boxed{\frac{D \times \text{---} (DR)^*}{A}} = \boxed{\text{---}} \text{ Divide by } \boxed{\frac{A}{A}} = \boxed{\text{---}} \times 100 = \boxed{\text{---}}$$

Your Diversion Rate

Permit number: \_\_\_\_\_

\* If you are taking materials to Boulder/Denver Registered Facilities, using a Deconstruction Professional, or self-hauls (pursuant to Ordinance No. 7565) calculate  $D \times .65$  (DR = 65% minimum diversion rate requirement for deconstruction) and calculate  $D \times .50$  (DR = 50% minimum diversion rate for new construction).

List all registered transporters that will be moving material off site.

1. Name: \_\_\_\_\_ Phone Number: \_\_\_\_\_

2. Name: \_\_\_\_\_ Phone Number: \_\_\_\_\_

3. Name: \_\_\_\_\_ Phone Number: \_\_\_\_\_

I AGREE TO SUBMIT A FINAL REPORT for this Deconstruction Permit WITHIN 30 DAYS AFTER COMPLETION OF THE DECONSTRUCTION PROJECT; FINAL REPORT MUST VERIFY THE ACTUAL DIVERSION RATE ACHIEVED & **INCLUDE ALL RECEIPTS and WEIGHT TICKETS FROM FACILITIES.**

**ESTIMATED DATE OF COMPLETION:** \_\_\_\_\_

Submitted by (signature): \_\_\_\_\_ Date \_\_\_\_\_

Print Name \_\_\_\_\_ Title \_\_\_\_\_

*If Your Diversion Rate is less than 65% for deconstruction or 50% for new construction waste, please provide justification why the project cannot meet the 65% diversion requirement.*

\_\_\_\_\_  
\_\_\_\_\_

**FOR OFFICE USE ONLY**

DATE PLAN/REPORT/TRACKING SPREADSHEET RECEIVED BY PERMITTING OFFICE:

APPROVED \_\_\_\_\_ NOT APPROVED \_\_\_\_\_ DATE \_\_\_\_\_

COMMENTS \_\_\_\_\_  
\_\_\_\_\_

APPROVED BY \_\_\_\_\_ TITLE \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

