Boulder County

Land Use

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Boulder County
BOARD OF COUNTY COMMISSIONERS
DOCKET #BORC-12-0001
BOULDER COUNTY BUILDING CODE AMENDMENTS
Staff Recommendation
PUBLIC HEARING
October 11, 2012 – 2:30 p.m.
Commissioners Hearing Room, Third Floor
Boulder County Courthouse
Boulder, Colorado

STAFF: Gary Goodell, Chief Building Official

RE: 2012 AMENDMENTS TO THE BOULDER COUNTY BUILDING CODE

- **Proposed BOCC Resolution 2012-50.** Please refer to Attachment 1, proposed BOCC Resolution 2012-50, for the detailed version of the proposed code adoptions and amendments.

- **The ICC.** The "International" family of codes is published by the International Code Council, or ICC, with the latest edition being the 2012s. See Attachment 2 for a description of the ICC and the ICC code development process.

- **The ISO Building Code Effectiveness Grading Schedule (BCEGS).** Please refer to Attachment 3 for a description of how Boulder County's BCEGS rating of "3" helps to lower property insurance premiums in the county, and how fully adopting the latest nationally recognized model codes is a key component of the rating.

- **Code Change Review Criteria.** Please refer to Attachment 4 for a set of criteria for reviewing proposed code changes.

THE CODES UPDATES, FROM THE ~~2009~~ TO THE 2012 EDITIONS

- International Building Code ("IBC")
- International Residential Code ("IRC")
- International Energy Conservation Code ("IECC")
- International Fuel Gas Code ("IFGC") (ANSI Z223.1, the National Fuel Gas Code)
- International Mechanical Code ("IMC")
- International Plumbing Code ("IPC")
- Please refer to Attachment 5 for ICC's brief summary of the changes to the 2012 editions.

THE NATIONAL ELECTRICAL CODE ("NEC")

- The National Electrical Code is published by the National Fire Protection Association ("NFPA") as NFPA 70.
- Adoption by the State Electrical Board pre-empts any local adoptions.

- The State Electrical Board has adopted the 2011 edition and it has been effective since July 1, 2011.

THE INTERNATIONAL GREEN CONSTRUCTION CODE ("IGCC")

- This is a new green construction code, developed jointly by ICC, the U.S. Green Building Council, IES, ASHRAE, ASTM and the American Institute of Architects**.** Boulder County previously adopted only portions of Public Version 2.0 of the code.
- The IGCC also permits the use of ASHRAE/USGBC/IES Standard 189.1-2011 as an alternate compliance method.
- The IGCC is proposed only for application to commercial buildings or complexes over 25,000 sq. ft. in total building floor area.
- The proposed adoption includes a number of jurisdictional options, which are included in the proposed Table 302.1.

THE INTERNATIONAL CODE COUNCIL PERFORMANCE CODE

- This performance-based code is being proposed for adoption only as a guide and a tool for the evaluation of appeals for modifications and alternate materials, designs and methods of construction and equipment. Solutions can involve fire protection engineers and fire, smoke and egress modeling to determine performance-based equivalency to prescriptive code requirements.

SUMMARY OF PROPOSED CHANGES
ADMINISTRATIVE PROVISIONS

- **Section 105.2 Work exempt from permit.** The list of items that are exempt from obtaining a building permit is changed to match current published code language for exempting only playground equipment accessory to one- and two-family dwellings and for exempting detached decks up to 200 sq. ft. and up to 30" above grade.
- **Section 107.1 Information on construction documents.** Three areas are amended to match published IBC or IRC language, including wall bracing (shear) information, manufacturer's installation instructions and means of egress features.
- **TABLE 1-A, FEES.** Changes to add an intermediate application deposit fee of $100 for projects from $25,001 - $50,000 valuation and to increase the "TCO" fee from $87 to $150 and to reduce the per watt cost for PV systems to current cost for use tax purposes.
- **110.5.2.14 Insulation inspection.** Language is added to further clarify that the county will do insulation inspections for additions of 500 sq. ft. or less and that inspection by an energy (HERS) rater is not required.
- **110.5.3.5 Gas piping.** Relocate the current 10 psi, 15-minute gas piping pressure test requirement, moving it to more appropriate locations in the IFGC and the IRC.

INTERNATIONAL BUILDING CODE
CHAPTER 7
FIRE AND SMOKE PROTECTION FEATURES

- **723.1 General.** Rather than duplicating identical provisions in Section 723 of the IBC and Section R325 of the IRC, Section 723.1 is revised to include only a reference to the ignition-resistant construction (wildfire mitigation) provisions of Section R325 and the remainder of Section 723 is deleted.

CHAPTER 15
ROOF ASSEMBLIES AND ROOFTOP STRUCTURES
SECTION 1505
FIRE CLASSIFICATION

- **TABLE 1505.1, footnote d.** Delete current references to Section 722, IBC, and replace with references to Section R325, IRC.

IBC CHAPTER 18
FOUNDATIONS AND RETAINING WALLS
IBC SECTION 1805
DAMPPROOFING AND WATERPROOFING

- **1805.5 Gutters and downspouts.** Add a 5th exception to the gutters and downspouts requirements to permit an alternate means designed by a soils engineer or other qualified registered design professional.

IBC APPENDIX J
GRADING

- **J103.2 Exemptions.** In coordination with amendments to the agricultural policies and the Land Use Code, add an exception to the exemptions from grading permits requiring that irrigation ponds and stock ponds constructed at a depth of more than 18" are to obtain a grading permit and that ponds with a depth greater than 24" are to meet the pool barrier requirements of Appendix G of the *International Residential Code.*

INTERNATIONAL RESIDENTIAL CODE
CHAPTER 3
BUILDING PLANNING

- **IRC TABLE R301.2(1), CLIMATE AND GEOGRAPHIC DESIGN CRITERIA.** Add a summer design temperature of 90° F. and a "YES" for ice shield underlayment that is qualified by published code language about when and where "ice and water shield" is required.

IRC SECTION R302
FIRE-RESISTANT CONSTRUCTION

- **R302.2 Townhouses, Exception.** Since the 2009 edition, the IRC has assumed that all townhouses are sprinklered as required in the published code, and it was necessary to amend the exception to note that a reduction from the normal 2-hour party wall to a 1-hour wall is permitted only if the townhouses are sprinklered. This is no longer necessary, as all new townhouses are required to be sprinklered in accordance with the published code.

IRC SECTION R303
LIGHT, VENTILATION AND HEATING

- **R303.8 Required heating, EXCEPTION:** Add a provision to the existing exception allowing wood-burning appliances to be the primary source of heat that requires an approved means to keep pipes from freezing if a dwelling is vacant.

IRC SECTION R313
AUTOMATIC FIRE SPRINKLER SYSTEMS

- The 2009 IRC and the 2012 IRC as published include a minimum requirement for the installation of automatic fire sprinkler systems in all new townhouses and all new one-and two-family dwellings.
- Boulder County has had an automatic fire sprinkler system requirement for new dwellings larger than 3,600 sq. ft. and additions resulting in more than 4,800 sq. ft. for over 17 years, since January 1, 1995.
- Colorado building and fire officials and others, totaling 54 individuals from all over Colorado, formed a Joint Ad-Hoc Residential Sprinkler Committee. Their report, dated September 25, 2009, and revised on November 17, 2009, contains a number of recommendations, including adopting the sprinkler requirements, but delaying the effective date until January 1, 2013.

- According to a 2012 survey, the Colorado jurisdictions that plan on adopting the 2009 or 2012 IRC, including the sprinkler provisions, include Centennial, Cherry Hills Village, the City & County of Denver, Edgewater, Federal Heights, Garfield County, Golden, Pitkin County, Thornton and Westminster, among others.
- Boulder County's current adoption of the 2009 IRC includes the sprinkler requirements for all new townhouses and one- and two-family dwellings and the January 1, 2013 effective date, and, in the interim, continues the existing requirements for fire sprinkler installations in new dwellings over 3,600 sq. ft. and existing dwellings with additions totaling more than 4,800 sq. ft., including the current exception from sprinklering if International Fire Code hydrant fire flow requirements are met.
- Two (2) of the county's 20+ fire protection districts have already adopted editions of the International Fire Code (IFC) that include a matching sprinkler requirement for all new dwellings. The county's Fire Code Review Committee and the Board of County Commissioners review all fire code adoptions, with one of the main review criteria being a lack of conflicts with the county's building codes. If the sprinkler requirements are not included in the county's building code, the county, for consistency, would need to require that the fire protection districts delete the sprinkler requirements from their fire code adoptions.
- One of the criteria for ISO's ratings of both building departments and fire departments is the adoption of the latest nationally recognized model codes, and not adopting the latest codes can have a detrimental impact on the ISO ratings, which have an impact on insurance premium rates.
- The proposal includes existing provisions for sprinklering existing dwellings when additions or remodels/renovations total 4,800 sq. ft. or larger, but adds an exception for one-time additions of 200 sq. ft. or less. Staff has found that remodels/renovations of existing homes sometimes include "bump outs" of existing space(s) resulting in relatively minor additions to the existing square footage.
- The existing exception for not sprinklering if International Fire Code (IFC) hydrant fire flows are met is proposed to be deleted, as the published codes require <u>both</u> hydrant fire flow and sprinklering, although reductions in the required fire flow are allowed if buildings are sprinklered.
- **Fire department connection (FDC).** At least one of the fire districts has recommended that a fire department connection requirement be added. This allows the fire department to connect to the sprinkler system via a connection on the outside of the home and supply the sprinkler system with additional water. Since the requirement for an NFPA 13D sprinkler system is only 26 gallons per minute (gpm) for 10 minutes, or 260 gallons, this could fit with our "level of service" philosophy, allowing the sprinkler system to extinguish or contain a fire until the fire department has time to arrive and supplement the water supply from a fire truck, hydrant or other water supply. The proposal includes a requirement that an FDC and associated other components be provided if they are required by the local fire department.
- **Size and Cost Data.** Attachments 6, 7 and 8 provide information on Boulder County's new single-family dwelling sizes from issued building permits for 2011 and 2012 to date, estimated costs from a survey of sprinkler system installers and a report from the National Association of Home Builders on construction cost breakdowns in 2011, respectively.
- **Boulder County Fire Code Review Committee Resolution.** The Fire Code Review Committee has adopted Resolution 2012-02 (Attachment 9) recommending approval of the proposed residential fire sprinkler requirements for the following reasons:
    - For life safety, to allow occupants time to escape the dwelling before being overcome by fire and smoke,
    - As a level of service measure, to extinguish or contain a fire until volunteer fire departments have time to respond and arrive on the scene, and
    - For wildfire hazard mitigation, to reduce the risk of structure fires spreading to the forest and other homes.

- **Fire Sprinkler Requirements Adopted, 2010.** The Board of County Commissioners could take no action on the fire sprinkler requirements today and the existing fire sprinkler requirements for all new one- and two-family dwellings and townhouses that were approved and adopted on December 9, 2010 with the existing 2009 International Codes will go into effect on January 1, 2013.

IRC SECTION R325
IGNITION-RESISTANT MATERIALS AND CONSTRUCTION

- **R325.1.1 General**. In order to be able to delete the duplicate language that is currently contained in the IBC amendments, add language to clarify that the ignition-resistive requirements also apply to commercial and multiple-family buildings constructed under the IBC.
- **R325.2.3 Definitions.** Add an item 5 to the definition of "IGNITION-RESISTANT BUILDING MATERIAL" to include materials currently approved by the California Department of Forestry and Fire Protection, Office of the State Fire Marshal, in their "WUI Products Handbook."
- **R325.4.5 Deck walking surface.** Amend this section to permit the use of any composite decking material that has an ICC-ES evaluation report approval and an ASTM E84 flame-spread index no greater than 200.
- **R325.5.10, R325.6.10, R325.7.10 Defensible space.** Amend these sections for extreme, high and moderate hazard ratings to clarify that, for additions projects, both existing and new structures are to be provided with defensible space, that gravel or crushed rock around structures is to be at least 3/4-inch in diameter and that columns or posts are also to have gravel or rock extending 3 feet beyond them.
- **R325.7.3 Exterior walls.** Amend the moderate hazard exterior walls requirements to require the same ignition-resistant materials as are required for high hazard sites. Lessons learned from recent fires like the Fourmile Canyon Fire and the Waldo Canyon Fire show that homes are often lost even though green trees and other vegetation survive immediately around them. In the Fourmile Canyon Fire, 83% of the 168 homes destroyed were the result of surface fire, and not the more stereotypical image of a raging crown fire. Most homes are lost to low or moderate intensity fires from fire spotting or ember "blizzards" setting combustible materials on fire. The Fourmile Canyon Fire Findings discuss the concept of the Home Ignition Zone, or HIZ, extending for 100 feet around a home, and the increased likelihood that a home will survive if the HIZ includes only ignition-resistant materials.
- **R325.8.1 Roofing.** Revise to require at least a Class B roof covering instead of the current Class C minimum in Wildfire Zone 2, the plains portion of the county.

There are basically three (3) things that we can count on:

1. There will be more fires in the wildland-urban interface, including extreme fire behavior.
2. There won't be nearly enough fire fighters or engines available to protect homes.
3. We can't guarantee (or regulate) the maintenance of defensible space by homeowners, whether it be trees, shrubs, grasses, storage of firewood, pine needles accumulating in gutters and valleys, or other features.

Our basic premise then is that, at the time of new construction, we should achieve the highest level of ignition-resistant construction that we're reasonably able to achieve and that this is one-near permanent feature that won't grow back or be greatly reduced in its effectiveness by a lack of maintenance or the passage of time.

IRC SECTION R327
ELECTRIC VEHICLE CHARGING PRE-WIRE OPTION

- Patterned after the state law and the county's existing amendment on solar pre-wiring (Section R326), this requires either a receptacle, wiring or conduit in new garages and carports to facilitate future Level 2 (240-volt) charging of electric vehicles.

IRC CHAPTER 11
ENERGY EFFICIENCY
IRC SECTION N1101
GENERAL

Changes are proposed to clarify existing provisions and to provide increased energy efficiency, since the published 2012 IECC has provisions that reduce energy use from the 2006 IECC by 30% and from the 2009 IECC by about 8% - 15%.

- **N1101.3 Identification and definitions.** Add the definition of HIGH-EFFICACY LAMPS from IRC Section N1101.9.
- **N1102.1.1 *R*-value computation.** Added wording to clarify insulation *R*-value computations.
- **N1102.2.9.2.2 Ventilated crawlspaces.** Add wording to clarify that naturally ventilated crawl spaces may not contain equipment, ducts or plumbing.
- **N1102.4 Air leakage, N1102.4.1 Building thermal envelope.** Add details on requirements for sealing two problem areas for air barriers.
- **N1103.2 Ducts.** Delete vague wording on ducts location.
- **N1103.2.2 Sealing.** Clarify test requirements for ducts and that duct testing is not required for existing duct systems that are being extended for additions.
- **N1103.5.1 Minimum required ventilation.** Clarify that requirements of this section and Table N1103.5.1 are for <u>continuous</u> ventilation and add an option for intermittent ventilation per IRC M1507.3.3 and Table M1507.3.3(2.).
- **N1104.1 High-efficacy lamps.** Clarify that minimum high-efficacy lamp requirements are for projects using the prescriptive path.
- **N1105.2.5.2 Calculation of energy usage for projects using the performance path option.** Delete exception because it is not necessary.
- **N1105.2.5.3.3 Performance path option requirements for remodels/renovations.** Revise HERS rating for this option from 80 to 75. This rating is relatively easy to achieve and other options are available.
- **N1105.2.5.3.4 Performance path option requirements for basement finishes.** Revise HERS rating for this option from 80 to 75. This rating is relatively easy to achieve and other options are available.
- **N1105.2.5.4 Prescriptive path option requirements, EXCEPTIONS 1, 2 and 3.** Revise exceptions for new dwellings and additions and add a new exception for remodels/renovations to require the Performance Path at <u>5,000</u> sq. ft. of conditioned floor area instead of the current ~~6,000~~. This is also reflected in revisions to the tables at the back of Chapter 11. Currently, some very large houses can use the prescriptive path and achieve a HERS rating of only about 60.
- **N1105.2.5.4.7.1 Additions that result in an increase in conditioned floor area of 50% or more of the pre-existing dwelling and remodels/renovations where 50% or more of the existing finished wall membrane is removed.** Clarify that existing wall cavities must be filled with insulation, but exterior insulation is not required to be added unless siding is removed.
- **IRC TABLE N1102.1.** Revise to lower prescriptive Fenestration U-Factor from 0.35 to 0.30. The published 2012 IECC value is 0.32 and 0.30 windows are readily available.
- **IRC TABLE N1102.1.3.** Revise to lower existing Maximum Air Leakage rate from ~~**5**~~ Air Changes per Hour (ACH) at 50 Pascals to the published 2012 IECC/IRC value of **<u>3</u>** ACH.
- **TABLE 1 – NEW CONSTRUCTION.** Revise Table 1 to adjust required HERS ratings lower, as follows:
    1. Change rating for homes 0 – 1,000 sq. ft. from 85 – 75.
    2. Change rating for homes 1,001 – 2,500 sq. ft. from 60 – 55.

3. Change rating for homes 2,501 – 8,000 sq. ft. and above from a range of 60 – 10 to a range of 55 – 0.

Recent actual energy use data from the county's EnergySmart program (see Attachment 10, *Residential Energy Use and Utility Bill Benchmarking by Size of Home in Boulder County*) shows that larger homes have a disproportionately large increase in electrical use, which compared to gas usage, has a larger impact on greenhouse gases. This supports the concept of requiring even lower HERS ratings for very large homes, especially since the study capped the largest square footage at 4,000, and the county is still seeing homes as large as 9,485 sq. ft. in total floor area.

- **TABLE 3 – PV Requirements for New Residences.** Revise to cut table off at the revised 5,000-sq.-ft. maximum for the Prescriptive Path.
- **TABLE 4 – PV Requirements for Additions.** Revise to cut table off at the revised 5,000-sq.-ft. maximum for the Prescriptive Path and to bring minimum system size to 1 kW. Both staff and contractors have noted that the existing requirements for a system as low as 0.2 kW don't make sense and don't have economy of scale or much of a payback for consumers.

IRC CHAPTER 13
GENERAL MECHANICAL SYSTEM REQUIREMENTS
SECTION M1302
APPROVAL

- **M1302.2 Solid fuel burning equipment.** Add language to refer to state and federal lists of approved wood-burning appliances.

IRC CHAPTER 24
FUEL GAS
SECTION G2417
INSPECTION, TESTING AND PURGING

- **G2417.1 Test pressure, G2417.4.2 Test duration.** Relocate current gas pipe test requirements for 10 psi for 15 minutes to appropriate location in code.

IRC CHAPTER 26
PLUMBING
SECTION P2601
GENERAL

- **P2601.2, EXCEPTION.** Delete the existing exception regarding garage floor drains, as it conflicts with state and local public health department requirements.

IRC CHAPTER 29
WATER SUPPLY AND DISTRIBUTION

- **P2903.10 Hose bibb, P2903.10.1 Yard hydrants.** Delete this existing amendment, as the same requirements are contained in published IRC Section P2903.9.5.

IRC CHAPTER 30
SANITARY DRAINAGE
SECTION P3009
GRAY WATER RECYCLING SYSTEMS

- Amend this section to reflect the limitations of Colorado water law and the regulations of the Colorado Division of Water Resources. These requirements were previously located in Appendix O of the IRC, but have been moved to Section P3009 in the 2012 edition.

SECTION P3010
RAINWATER RECYCLING SYSTEMS

- Add a new Section P3010, "Rainwater Recycling Systems," with provisions identical to those currently found in Appendix O of the IRC amendments. Please refer to Attachment _, a newspaper article regarding limitations on the exterior use of rainwater.

2012 INTERNATIONAL MECHANICAL CODE
IMC CHAPTER 9
SPECIFIC APPLIANCES, FIREPLACES AND SOLID FUEL-BURNING EQUIPMENT

- **901.5 Solid fuel burning equipment.** Add language to refer to state and federal lists of approved wood-burning appliances.

2012 INTERNATIONAL PLUMBING CODE
IPC CHAPTER 6
WATER SUPPLY AND DISTRIBUTION

SECTION 608
PROTECTION OF POTABLE WATER SUPPLY

- **608.1.1 Yard hydrants.** Delete this amendment, as the requirements are contained in Section 608 of the Plumbing Code.

2012 INTERNATIONAL FUEL GAS CODE
IFGC CHAPTER 4
GAS PIPING INSTALLATIONS
SECTION 406
INSPECTION, TESTING AND PURGING

- **406.4.1 Test pressure, 406.4.2 Test duration.** Note that these gas piping test requirements (10 psi and 15 minutes) are not being changed from previous amendments, but are being placed in more appropriate locations in the IRC and the IFGC, and that these requirements match those of the cities of Boulder and Longmont.

2012 INTERNATIONAL ENERGY CONSERVATION CODE

- **IECC TABLE 402.1.1.** Revise our amended table to upgrade Fenestration *U*-Factor from current 0.35 to 0.30 and change Maximum Air Leakage rate from current 5 ACH to 2012 IECC/IRC rate of 3 ACH.

2012 INTERNATIONAL GREEN CONSTRUCTION CODE
CHAPTER 1
SCOPE AND ADMINISTRATION
SECTION 101
GENERAL

- **101.3 Scope.** Amend scope to include only buildings or complexes of buildings on the same property with over 25,000 square feet of total floor area.
- **Table 302.1, REQUIREMENTS DETERMINED BY THE JURISDICTION.** Fill in table to require various jurisdictional elective items and a zEPI (Zero Energy Performance Index) of 46, which is about 10% more energy-efficient than the 2012 IECC.

THE INTERNATIONAL CODE COUNCIL PERFORMANCE CODE

- This performance-based code is being proposed for adoption only as a guide and a tool for the evaluation of appeals for modifications and alternate materials, designs and methods of construction and equipment.

PUBLIC MEETING AND HEARING SCHEDULE

- All meetings (except August 30 & September 11) have been held in the County Commissioners Hearing Room on the 3rd Floor of the Main Courthouse in downtown Boulder.
- **Tuesday, August 14, 2012 - 4:30 – 6:30 P.M.:** Public Meeting for Input/Feedback on Proposed Code Amendments.
- **Tuesday, August 21, 2012 - 4:00 – 6:00 P.M.:** Board of Review Public Meeting and Work Session.
- **Thursday, August 30, 2012 –** 6:30 – 8:00 P.M., Presentation and public input, Allenspark Fire Station.
- **Tuesday, September 4, – 4:00 – 6:00 P.M.:** Board of Review Public Hearing.
- **Tuesday, September 11, – 12:00 – 2:00 P.M.:** Presentation to Colorado Green Building Guild (CGBG) Brown Bag Luncheon, REI Community Room, 1789 28th St., Boulder, CO 80305.
- **Thursday, October 11, 2012, 2:30 P.M.:** Board of County Commissioners Public Hearing, Resolution 2012-50.

SUMMARY OF PUBLIC COMMENTS

- **Wood Stoves.** Although wood stoves are allowed to be a principal source of heat, per Boulder County amendment, the HERS rating system doesn't always give them as much credit as they should get for utilizing a renewable fuel.

  The HERS rating system is the most nationally recognized energy rating system and, like any software system, it has its quirks, and the county has no control over this. The county's amendments already permit wood-burning appliances to be used as a primary source of heat.

- **Wood burning.** Wood burning outdoors, i.e., wood-burning fire pits, should be banned. The county's requirements for renewable energy offsets for outdoor use of fossil fuels leads people to burn wood instead, which is more dangerous.

  Bans on open burning are under the jurisdiction of the local fire department, the county sheriff, and, in some cases, the governor. We still believe that the use of non-renewable fossil fuels for uses other than cooking outdoors should be offset by renewable energy sources.

- **Fire Sprinklers.** A home builder is planning on building 20 new homes (in the 4,000+-sq.-ft. size range) just outside of and northwest of Longmont. They had counted on having sufficient hydrant fire flow to avoid installing fire sprinkler systems under the current amendments that do not require sprinklers if *Fire Code* hydrant fire flow requirements are met. This exception is proposed to be deleted and they would prefer to see it stay in the code.

  The published model codes require <u>both</u> hydrant fire flow and sprinklers, although hydrant fire flow is permitted to be reduced if sprinklers are installed. Not requiring sprinklers when fire flow is present does not eliminate our "level of service" issue. No one is available to apply the water from the hydrants until the volunteer fire department is able to respond and arrive on the scene, which, depending on the location, terrain, access and weather conditions, can be a lengthy time period, where the fire sprinkler system will respond immediately and apply water to the fire. A home in Superior, a relatively urban area with good water supplies and good fire department response times, was a complete loss after a fire on September 4, 2012. See Attachment 13, "Daily Camera article, Superior house fire 9/24/12."

- **Fire Sprinklers.** Some Allenspark residents have noted that there may be issues with fire sprinkler requirements for buildings that are only used on a seasonal basis, such as seasonal cabins and hunting cabins, with pipes freezing.

  See the discussion below under Board of Review Issues.

- **Fire Sprinklers/Codes in General.** A representative of an existing mountain children's camp stated that building code requirements, including the requirement for fire sprinkler systems, make it too expensive to add additional children's sleeping facilities.

  This was not so much a fire sprinkler issue as an issue of meeting modern building code requirements. Sleeping facilities for children are a high risk use and should be adequately constructed and protected. The 2012 codes actually improve this situation, as the 2012 IBC clarifies that "congregate residences" with 10 or less occupants may be constructed to the same requirements as single-family dwellings and may be protected by an NFPA 13D sprinkler system, the same as for single-family dwellings, as opposed to a commercial fire sprinkler system. The services of a fire protection engineer, along with the use of the proposed ICC Performance Code, could also be used to arrive at a solution with an equivalent level of fire and life safety.

- **Ignition-Resistant Construction.** A number of Allenspark residents have noted that the county's ignition-resistant construction (wildfire hazard mitigation) requirements for exterior walls conflict with their desire to use materials that fit their community's character, such as smaller diameter half-log siding. They would like to see exceptions that permit these types of exterior wall materials if, for instance, additional defensible space (vegetation modification) is provided. Another commenter is concerned that installing new ignition-resistant siding will trigger additional costs due to BuildSmart requirements.

  This item is also discussed under Section R325 of the IRC above. The Home Ignition Zone (HIZ) concept, which is discussed in the Fourmile Canyon Fire Findings report, provides that the risk of losing a home can be greatly reduced if the area within 100 feet of a home does not contain a great deal of vegetation that would create radiant heat and if the home itself is constructed of ignition-resistant materials that will not ignite due to radiant heat or flying embers. In response to this concern, the list of approved materials from the California Department of Forestry and Fire Protection, Office of the State Fire Marshal, has been added to the list of approved ignition-resistant materials in Section R325.2.3. The proposed amendments also include an exception from BuildSmart requirements to not require additional insulation if new siding is being installed only to upgrade ignition-resistance.

- **BuildSmart.** Especially for remodels and additions, BuildSmart requirements are too complex, hard for builder's clients to understand. It would be nice to try to simplify them. Homeowners get discouraged and frustrated and are more likely to do work without permits. What is the rationale for the proposed 5,000-sq.-ft. limit for using the prescriptive path (currently 6,000 sq. ft.)?
- **BuildSmart.** BuildSmart should look more like the published model codes and thus be more user friendly. It should be better organized. There should be an annotated version, or a commentary. The next amendments process should start with the published energy code and put the BuildSmart provisions into that format.

  Staff and the Board of Review are proposing that, in the near future, BuildSmart is revised to begin with the format and organization of the published Energy Code (IECC) and insert the BuildSmart provisions into this format so that the provisions are easier to understand and use.

The 5,000- and 6,000-sq.-ft. figures are conditioned floor area, which means that total floor areas are in the range of 6,000 to 7,000 sq. ft. and above. Currently, a dwelling with 6,000-sq.-ft. of conditioned floor area can utilize the prescriptive path, with an equivalent HERS rating of about 58, when the performance path requires a HERS rating of 30. The proposed amendment is an attempt to eliminate some of this discrepancy.

- **Square footage measurements.** Measurements should be the same for the Land Use Code and the Building Code (and perhaps the Assessor as well). Exterior walls are thicker due to increased insulation, but owners are penalized by measuring to the exterior side of the wall instead of the former measurement to the inside of the exterior walls.

  Staff is in the process of coordinating between the Land Use Code and the Building Code and possibly the Assessor's Office, to deal with measuring square footage.

- **Duct leakage testing.** A representative of Aeroseal would like to see more duct testing requirements in the code.

  BuildSmart required duct testing before it was required in the published model codes, but there are issues with requiring duct testing for existing systems where the ductwork is not accessible for additional sealing, so we do not require duct testing for existing duct systems that are being added to for residential additions projects.

BOARD OF REVIEW ACTION AND ISSUES

The Board of Review, at their public hearing held on September 4, 2012, has recommended APPROVAL of Docket #BOR-12-0001, 2012 Amendments to the Boulder County Building Code, and ADOPTION of proposed BOCC Resolution #2012-50, but has also expressed a number of concerns about the proposed codes. Please refer to Attachment 11, the draft minutes from the September 4 public hearing. Staff will attempt to summarize the board's concerns and address them, as follows:

- **Rainwater use.** One Board of Review member expressed a concern that there are severe limitations on the use of rainwater due to Colorado water law and that this should be stated up front in Section P3010, the rainwater recycling provisions.

  Section P3010.1 is such a statement, but the text "…which have severe limitations on the use of rainwater" has been added.

- **Townhouses as separate units.** A board member expressed a concern about a situation wherein an existing townhouse did an addition and was required to sprinkler because the total area was 4,800 sq. ft. or more and what would happen with the adjoining units.

  Other code provisions require that townhouses are separated by "party walls" that consist of either two 1-hour fire-resistant walls or one 2-hour fire-resistant wall, and townhouses, by their definition and nature, do not have other units above or below them or in front or behind them, but only beside them.

- **BuildSmart and Energy Code (IECC).** The board stated that they would like to see the BuildSmart requirements folded into the format of the IECC and thus made simpler and easier to use.

  Since it was "ahead of its time" in terms of its provisions, BuildSmart was written as a total rewrite of Chapter 11 of the IRC, its residential energy provisions, and does not bear much

resemblance to the published energy provisions in the model codes. As the published energy code has "caught up" with BuildSmart in some areas, for example, mechanical ventilation, it has been difficult, organization- and format-wise, to return to a document that looks more like the published codes. For consistency and ease of understanding and use, it would now be better to start with the published residential energy code provisions and insert the BuildSmart requirements, and this is what staff would like to do in the future. The Board of Review has asked that staff report back to them within six months.

- **Issues/Concerns, fire sprinklers.** The board stated that they had two concerns with the residential fire sprinkler requirements:
    - **Freezing.** There is a concern that the sprinkler pipes might freeze if the use is a seasonal cabin or hunting lodge or if the dwelling has a wood stove as its primary source of heat.

    Staff has further explored this issue and has also discussed it with the Fire Code Review Committee, whose members have a great deal of knowledge and experience with fire sprinkler systems. They feel that freezing is a non-issue for various reasons, including the fact that most sprinkler systems are installed with antifreeze. They also feel that systems can be designed and engineered in other ways to overcome the potential for freezing and that, in the worst case, the system in a building that is unoccupied for a portion of the year could be designed to be drained during that time period. Staff notes that we very rarely see a new building that is proposed for seasonal use. It is more typical to see an existing seasonal use that is being converted to year round use. In a rare case where such a new building is proposed, the modification provisions of Section 104.10 of the code can be used, and the proposed adoption of the ICC Performance Code for use as a guide in determining an equivalent level of protection can also be used.

    - **Hydrant exception.** The board might wish to consider retaining the existing exception that does not require sprinklers if fire hydrants within 400 feet meet *Fire Code* hydrant fire flow requirements.

    Please refer to the discussion under "Fire Sprinklers" in the summary of public comments above.

PROPOSED CODES EFFECTIVE DATE

- **January 1, 2013:** The updated codes are proposed to be effective for all building permit applications received on or after this date for construction in the unincorporated portions of Boulder County.

STAFF RECOMMENDATION: Staff recommends that the Board of County Commissioners APPROVE Docket #BOR-12-0001, 2012 Amendments to the Boulder County Building Code, and ADOPT proposed BOCC Resolution #2012-50.

GRG:grg

Attachments:
1. Proposed BOCC Resolution 2012-50
2. The International Code Council and the International Codes
3. The ISO BCEGS Program
4. Code Change Review Criteria
5. ICC 2012 Changes Summary
6. Boulder County New Single-Family Dwelling Sizes 2011-2012

7. Fire Sprinkler System Installer Survey Results
8. NAHB New Construction Cost Breakdown
9. Boulder County Fire Code Review Committee (FCRC) Resolution 2012-02
10. *Residential Energy Use & Utility Bill Benchmarking by Size of Home, Boulder County*
11. Board of Review Draft Minutes, September 4, 2012
12. Article, Rainwater Harvesting Limitations
13. Daily Camera article, Superior fire, 9/24/12

Susie Strife
Sustainability Coordinator
Boulder County

July 12, 2012

Re: Residential Energy Use Benchmarking by Home Size and Month to Assist County Program Planning Efforts and to Help Energy Advisors Promote EnergySmart Services

Dear Ms. Strife:

To make every effort to utilize the energy use data already collected and the analytical capabilities of the County's Sustainability Information Management System (SIMS), we would like to provide the following energy use benchmarks for residential customers in Boulder County. To our knowledge, these data have never before been made available to public officials, energy professionals or the general public in the County.

This document is meant to be used as a technical reference for the energy use patterns of different sized homes throughout the County and the associated utility bills and greenhouse gas (GHG) emissions resulting from this use. It is our hope that this information can be used by Advisors and EnergySmart staff to help individual residents better contextualize their energy use in relation to other homes like them, and from this potentially drive further interest among customers to make efficiency investments in their homes. In addition, this information provides excellent benchmarking data on the energy performance of homes in Boulder County for future policy analyses.

Here is a summary of a few key highlights, which are discussed in more detail below.

- "Efficient" homes perform similarly in terms of total energy use as "Average" homes that are about 1,000 square feet smaller in size. For example, "Efficient" homes in the 2,500 to 3,000 square feet size range spend about $1,291 per year, which is comparable to the "Average" homes in the 1,500 to 2,000 square foot size range that use $1,288 per year.

- Although it varies across home sizes, "Average" homes spend about 23% more than "Efficient" homes on their energy bills on average, which amounts to about $1,400 over a five year period.

- Electricity use increases at a greater rate than natural gas does as home size increases. For every additional 1,000 square feet of home, electricity use on average is increasing by 40 percent and natural gas use is increasing by 29 percent.

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- A majority of GHG emissions from energy use in Boulder County homes comes from their electricity use. "Average" homes' electricity use comprises about 60% of a home's energy GHG footprint and larger homes exhibit a greater percentage of GHG emissions coming from electricity use than smaller homes.

- GHG emissions for the 3,000 to 4,000 square foot homes are about twice that of the 1,000 to 1,500 square foot homes (100% greater), while their energy bills are about 75% greater.

- "Efficient" homes use from 20% to 30% less electricity than their counterpart "Average" home, while they only use 13% to 22% less natural gas. This widespread difference in electrical energy use (not to mention that a majority of residential GHG emissions result from electricity use) may represent a significant opportunity to focus energy conservation efforts moving forward in the County.

Based on our observations to date, electricity use in homes represents the largest source of GHG emissions in the residential sector and it exhibits greater variability among homes (whether same size or across home sizes) than natural gas use does. We therefore, recommend that the County consider targeting future conservation and GHG emission reduction strategies towards better understanding why there is such a great variation in how homes are using electricity as well as strategies – which will likely need to emphasize behavioral interventions – to reduce this use.

We look forward to continue working with the County to glean valuable insight from utility billing data being collected and analyzed in your Sustainability Information Management System. If you have any questions or would like clarification on the information provided in this brief residential energy use benchmarking report, please don't hesitate to contact me as we are happy to assist you.

Sincerely,

Tim Hillman, PhD
Director, Energy Services
Hillman@symbiotic-engineering.com

Residential Energy Use and Utility Bill Benchmarking by Size of Home in Boulder County

Over 1,000 single family homes and their energy use patterns have been analyzed in the Sustainability Information Management System (SIMS) and are the basis for this benchmark document. The tables below provide a summary of energy use and their associated energy bills by home size for an "Efficient" home and an "Average" home. The "Efficient" home benchmark is based on the energy use at the 25th percentile of energy use across homes in a particular home size bracket. The "Average" home benchmark is based on the median energy use across the same set of homes in a particular size bracket. It is important to note that numerous factors can influence the energy performance of home (e.g. occupant behaviors, temperature setpoints, number and efficiency of appliances, number of occupants, etc.), and these benchmarks are not meant to imply a certain makeup of these factors but simply represent the "lay of the land" of energy use across a large sample of single family homes in the County.

Energy bill estimates for these benchmarks are based on Xcel Energy's electric and natural gas residential rates in Colorado and account for a variety of fixed charges and adjustments as well as per usage fees. These estimates reflect Xcel's two summer block rates for electricity as well as natural gas charges for winter and summer consumption separately.[1] We are also providing Boulder County with the monthly consumption figures so that the County can produce utility bill estimates for non-Xcel customers or bills under different escalation rate scenarios to predict future costs.

The total utility bills comparing "Efficient" and "Average" homes grouped in size brackets (varying from 1,000 square feet to 4,000 square feet) and over time periods of one year, five year, and ten year periods, are summarized in Table 1. A couple of interesting trends to note, from a policy and building code perspective, is that "Efficient" homes perform similarly in terms of total energy use as "Average" homes that are about 1,000 square feet smaller in size. For example, "Efficient" homes in the 2,500 to 3,000 square feet size range spend about $1,291 per year, which is comparable to the "Average" homes in the 1,500 to 2,000 square foot size range that use $1,288 per year. In addition, although it varies across home sizes, "Average" homes spend about 23% more than "Efficient" homes on their energy bills on average, which amounts to about $1,400 over a five year period.

[1] Xcel's two-tiered electric block rates are applied from June through September. The first block is charged ~ $0.046/kWh up to 500 kWh and the second block charges $0.09/kWh for everything above 500 kWh.

Table 1 Utility bill comparison among "Efficient" and "Average" homes by size of home over one, five and ten year periods

Home Size (sf)	1-Year Total Bill		5-Year Total Bill		10-Year Total Bill	
	Efficient	Average	Efficient	Average	Efficient	Average
1000 to 1499	$921	$1,114	$4,603	$5,569	$9,206	$11,138
1500 to 1999	$1,061	$1,288	$5,306	$6,438	$10,612	$12,876
2000 to 2499	$1,179	$1,485	$5,893	$7,426	$11,786	$14,852
2500 to 2999	$1,291	$1,667	$6,454	$8,335	$12,907	$16,670
3000 to 3999	$1,628	$1,931	$8,138	$9,655	$16,275	$19,309

The total energy related greenhouse gas (GHG) emissions for "Efficient" and "Average" homes by size are summarized in Figure 1 and Table 2.[2] GHG emissions from residential energy use increase with home size greater than the energy bills (Table 1). For example, GHG emissions for the 3,000 to 4,000 square foot homes are about twice that of the 1,000 to 1,500 square foot homes (100% greater), but their energy bills are only about 75% greater.

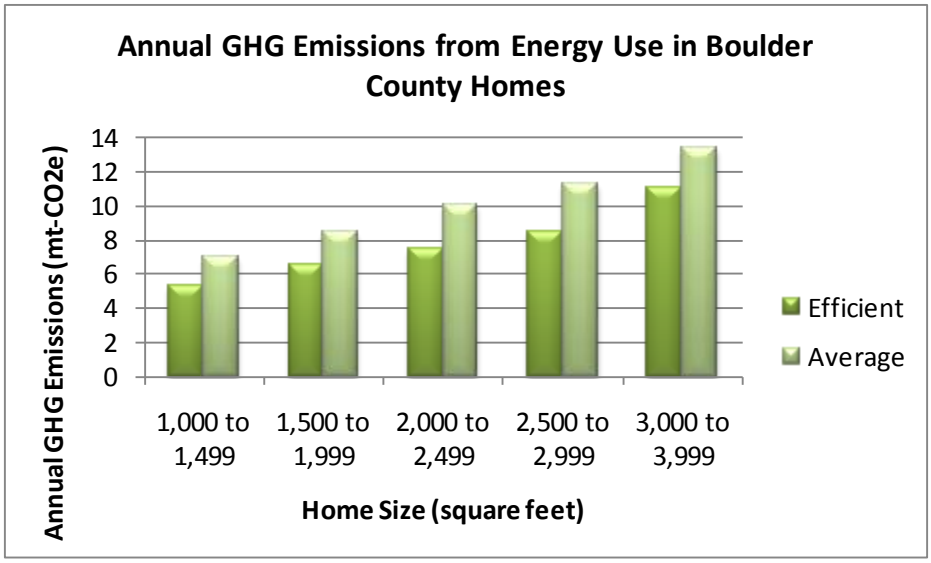

Figure 1 Annual GHG emissions from energy use in Boulder County homes

There are few factors that are responsible for the observed trend that GHG emissions are increasing by size of home greater than energy bills. First, electricity production in Colorado, due to the relatively large percentage of coal used to produce electricity, is much more carbon intensive for every unit of energy delivered to the home than natural gas is.[2] As a result, a majority of GHG emissions from energy use in Boulder County homes comes from their electricity use, as is summarized in Figure 2. This figure shows that the "Average" home's

[2] The GHG emissions factors use for electricity and natural gas are 0.8 kg-$CO2_e$/kWh and 5.32 kg-$CO2_e$/therm, respectively.

electricity use comprises about 60% of a home's energy GHG footprint and that larger homes exhibit a greater percentage of GHG emissions coming from electricity use than smaller homes.

Table 2 Comparison of energy related greenhouse gas emissions among "Efficient" and "Average" homes by size of home over one, five and ten year periods (metric tonnes $CO2_e$)

Home Size (sf)	1-Year Total Emissions		5-Year Total Emissions		10-Year Total Emissions	
	Efficient	Average	Efficient	Average	Efficient	Average
1000 to 1499	5.3	7.0	26.6	34.8	53.1	69.7
1500 to 1999	6.5	8.4	32.6	42.2	65.2	84.4
2000 to 2499	7.5	10.0	37.5	50.1	74.9	100.2
2500 to 2999	8.4	11.3	42.2	56.7	84.4	113.3
3000 to 3999	11.1	13.4	55.4	67.0	110.8	134.0

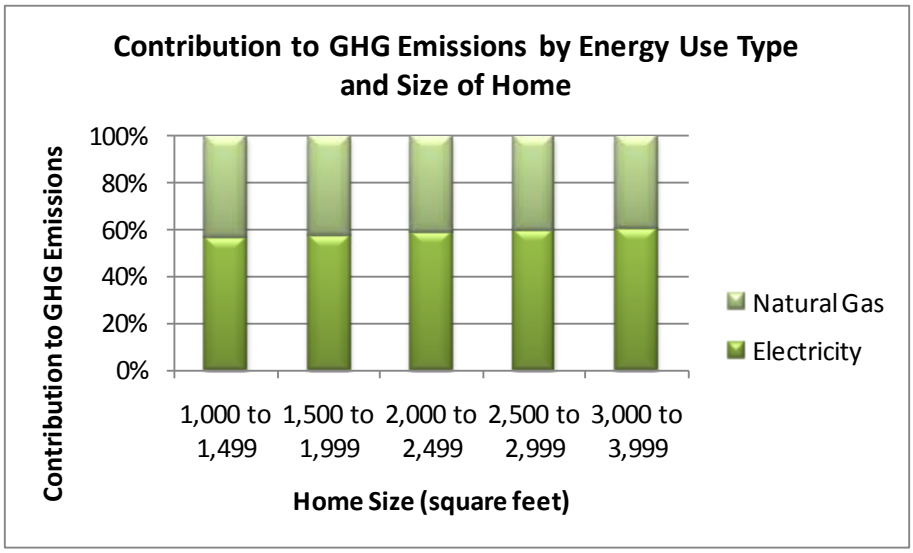

Figure 2 Contribution to GHG emissions by energy use type and size of home for the "Average" home

Another contributing factor to GHG emissions increasing with home size greater than utility bills is that electrical energy use increases by home size at a greater rate than natural gas use does. Figure 3 shows the increase in energy use for the "Average" homes by home size relative to the 1,000 to 1,500 square foot homes. Electricity use more than doubles across these home sizes while natural gas use only increases 76 percent. Based on these trends, for every additional 1,000 square feet of home, electricity use on average is increasing by 40 percent and natural gas use is increasing by 29 percent.

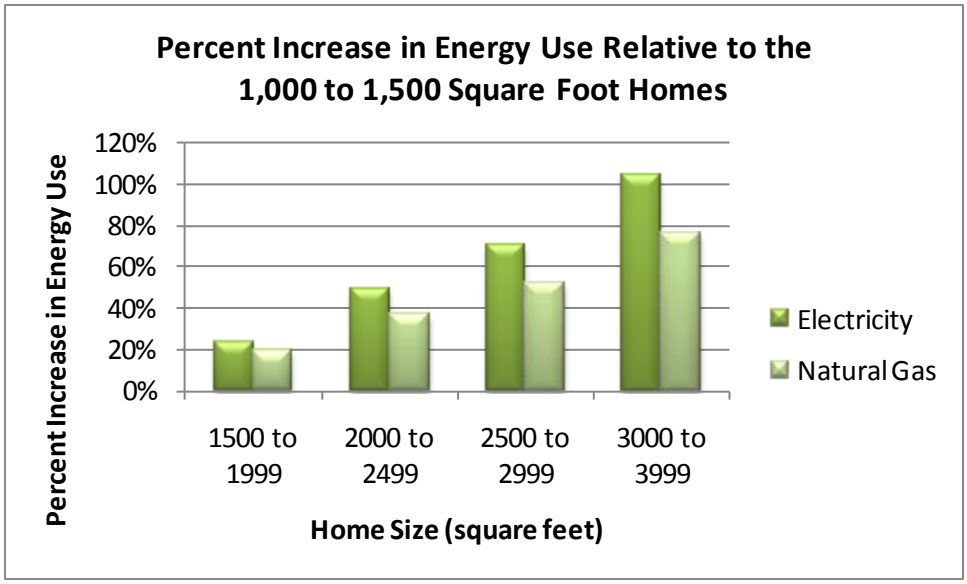

Figure 3 Percent increase in energy use relative to the 1,000 to 1,500 square foot homes

In terms of the difference in electricity and natural gas use between "Efficient" and "Average" homes, electricity use shows much more variability among homes in a particular size bracket. Table 3 shows that "Efficient" homes use from 20% to 30% less electricity than their counterpart "Average" home, while they only use 13% to 22% less natural gas. This widespread difference in electrical energy use (not to mention that a majority of residential GHG emissions result from electricity use) may represent a significant opportunity to focus energy conservation efforts moving forward in the County.

Table 3 Difference in energy use between an "Efficient" and "Average" home by size of home

Home Size (sf)	Electricity	Natural Gas
1000 to 1499	27%	19%
1500 to 1999	23%	22%
2000 to 2499	30%	18%
2500 to 2999	30%	19%
3000 to 3999	20%	13%

The remainder of this document provides detailed summary tables on monthly energy bills (see Tables 4 – 9) and monthly energy use (see Tables 10 – 13) across the same home size brackets as presented above.

Table 4 and Table 5 summarize the total utility bill (combining electricity and natural gas) by home size and month for the "Efficient" and "Average" home, respectively.

Table 4 Total utility bills by month and home size for "Efficient" homes[1]

Home Size (sf)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1000 to 1499	$118	$104	$91	$72	$63	$51	$53	$51	$52	$65	$91	$109	$921
1500 to 1999	$141	$122	$102	$80	$71	$60	$61	$61	$62	$71	$103	$126	$1,061
2000 to 2499	$160	$135	$119	$89	$80	$62	$64	$65	$61	$78	$116	$148	$1,179
2500 to 2999	$175	$151	$126	$94	$85	$68	$75	$71	$70	$88	$127	$159	$1,291
3000 to 3999	$208	$180	$158	$119	$109	$96	$103	$98	$90	$108	$156	$202	$1,628

1. Efficient homes are described as those whose energy use is at the 25th percentile of energy use among similar sized homes.

Table 5 Total utility bills by month and home size for "Average" homes[1]

Home Size (sf)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1000 to 1499	$142	$124	$110	$86	$76	$63	$64	$63	$66	$79	$109	$132	$1,114
1500 to 1999	$172	$146	$126	$98	$86	$73	$75	$71	$72	$87	$128	$154	$1,288
2000 to 2499	$192	$165	$148	$113	$98	$80	$91	$92	$79	$100	$147	$178	$1,485
2500 to 2999	$206	$180	$156	$120	$107	$99	$117	$113	$99	$109	$158	$202	$1,667
3000 to 3999	$243	$209	$184	$138	$127	$119	$130	$128	$111	$125	$186	$229	$1,931

1. Average homes are described as those whose energy use is at the median of energy use among similar sized homes.

Table 6 and Table 7 summarize the electricity portion of the monthly utility bill by home size and month for the "Efficient" and "Average" home, respectively.

Table 6 Electric utility bills by month and home size for "Efficient" homes[1]

Home Size (sf)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1000 to 1499	$47	$42	$40	$37	$35	$34	$37	$35	$34	$37	$41	$45	$463
1500 to 1999	$60	$51	$47	$42	$41	$42	$44	$44	$42	$42	$49	$56	$559
2000 to 2499	$64	$53	$53	$46	$46	$43	$47	$48	$41	$46	$54	$64	$604
2500 to 2999	$69	$60	$56	$47	$48	$49	$57	$53	$49	$52	$58	$69	$667
3000 to 3999	$87	$71	$74	$63	$64	$75	$83	$79	$66	$65	$74	$88	$891

1. Efficient homes are described as those whose energy use is at the 25th percentile of energy use among similar sized homes.

Table 7 Electric utility bills by month and home size for "Average" homes[1]

Home Size (sf)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1000 to 1499	$58	$52	$51	$45	$43	$44	$47	$46	$44	$46	$50	$58	$584
1500 to 1999	$74	$61	$58	$51	$49	$52	$56	$53	$49	$52	$61	$67	$685
2000 to 2499	$82	$71	$71	$61	$58	$59	$72	$74	$56	$61	$69	$80	$816
2500 to 2999	$87	$77	$73	$64	$64	$77	$96	$93	$73	$68	$75	$91	$937
3000 to 3999	$104	$90	$88	$75	$78	$96	$110	$108	$86	$78	$93	$105	$1,110

1. Average homes are described as those whose energy use is at the median of energy use among similar sized homes.

Table 8 and Table 9 summarize the natural gas portion of the monthly utility bill by home size and month for the "Efficient" and "Average" home, respectively.

Table 8 Natural gas utility bills by month and home size for "Efficient" homes[1]

Home Size (sf)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1000 to 1499	$72	$62	$51	$35	$28	$17	$16	$16	$19	$28	$50	$64	$458
1500 to 1999	$81	$71	$55	$39	$31	$18	$17	$17	$20	$29	$54	$70	$502
2000 to 2499	$96	$82	$66	$44	$34	$19	$17	$17	$21	$32	$62	$84	$574
2500 to 2999	$106	$91	$70	$47	$38	$20	$18	$18	$22	$35	$69	$89	$624
3000 to 3999	$121	$109	$84	$56	$45	$22	$20	$19	$23	$43	$83	$113	$736

1. Efficient homes are described as those whose energy use is at the 25th percentile of energy use among similar sized homes.

Table 9 Natural gas utility bills by month and home size for "Average" homes[1]

Home Size (sf)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1000 to 1499	$84	$72	$59	$41	$33	$19	$18	$17	$22	$33	$58	$74	$530
1500 to 1999	$98	$85	$67	$47	$37	$20	$19	$18	$22	$35	$67	$87	$602
2000 to 2499	$110	$94	$77	$52	$39	$21	$20	$19	$24	$39	$77	$98	$669
2500 to 2999	$119	$104	$83	$56	$43	$22	$20	$20	$26	$41	$84	$111	$730
3000 to 3999	$139	$119	$96	$63	$48	$24	$21	$20	$25	$46	$94	$125	$821

1. Average homes are described as those whose energy use is at the median of energy use among similar sized homes.

Table 10 and Table 11 summarize the monthly electricity use by home size for the "Efficient" and "Average" home, respectively.

Table 10 Monthly electricity use by home size for "Efficient" homes (kWh/month)[1]

Home Size (sf)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1000 to 1499	390	335	321	279	262	245	280	265	247	278	326	374	3,601
1500 to 1999	539	442	396	335	322	338	358	365	337	334	414	492	4,670
2000 to 2499	581	458	456	380	385	347	392	405	325	386	470	584	5,168
2500 to 2999	638	536	492	395	402	411	505	459	414	453	516	641	5,861
3000 to 3999	840	664	694	574	587	631	693	658	570	596	688	851	8,046

1. Efficient homes are described as those whose energy use is at the 25th percentile of energy use among similar sized homes.

Table 11 Monthly electricity use by home size for "Average" homes (kWh/month)[1]

Home Size (sf)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1000 to 1499	521	448	442	373	346	355	389	377	360	384	432	513	4,939
1500 to 1999	688	551	519	441	420	452	494	462	419	448	549	620	6,064
2000 to 2499	786	658	661	552	518	520	610	621	493	548	643	764	7,375
2500 to 2999	837	721	680	577	580	648	784	758	618	627	699	886	8,415
3000 to 3999	1,021	865	849	707	741	780	880	867	712	740	898	1,033	10,093

1. Average homes are described as those whose energy use is at the median of energy use among similar sized homes.

Table 12 and Table 13 summarize the monthly natural gas use by home size for the "Efficient" and "Average" home, respectively.

Table 12 Monthly natural gas use by home size for "Efficient" homes (therms/month)[1]

Home Size (sf)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1000 to 1499	86	72	56	33	22	10	8	7	9	23	56	75	457
1500 to 1999	101	85	62	38	26	12	10	9	11	25	61	84	523
2000 to 2499	122	102	79	45	31	15	10	9	12	28	73	104	631
2500 to 2999	137	115	84	51	37	15	12	11	13	34	83	113	704
3000 to 3999	159	141	104	63	47	19	15	14	16	44	103	148	873

1. Efficient homes are described as those whose energy use is at the 25th percentile of energy use among similar sized homes.

Table 13 Monthly natural gas use by home size for "Average" homes (therms/month)[1]

Home Size (sf)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1000 to 1499	104	87	68	41	31	14	11	10	13	29	67	91	567
1500 to 1999	125	106	80	50	36	16	13	12	14	33	80	109	674
2000 to 2499	142	119	94	58	39	18	15	13	16	39	95	125	774
2500 to 2999	156	134	104	64	45	20	17	16	19	42	104	144	865
3000 to 3999	186	156	122	74	52	24	18	17	19	49	119	164	1,000

1. Average homes are described as those whose energy use is at the median of energy use among similar sized homes.

Land Use
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Building Safety and Inspection Services Team (303) 441-3925

Boulder County
Board of Review

DRAFT Minutes
September 4, 2012
4:00 PM
Hearing Room, Third Floor
County Courthouse, Boulder

On September 4, 2012 the Boulder County Board of Review met for a Public Hearing to review the staff's recommendations for amending and adopting the 2012 International Building Codes.

The meeting convened at 4:46PM.

Board Members Present: Paul Bradley (Chair), Vernon Seieroe, Henry Lopez, Douglas Greenspan. John Murray (Vice Chair) was absent.

Staff Present: Gary Goodell (Chief Building Official), Michelle Huebner (Plans Examiner Supervisor), Patrick Delumpa (Building Inspector), Dan Mastin (Plans Examiner), Ben Doyle (Assistant County Attorney), Leslie Cline (Permit Specialist).

Interested Others: 5 citizens.

1. Call to Order

Paul Bradley called the meeting to order. Gary Goodell conducted the roll call of board members present.

2. Minutes

Approval of Board of Review Minutes from August 21, 2012.
Motion: Henry Lopez moved to approve the minutes.
Second: Vern Seieroe
Approved: Motion passed.

3. Nominations of Board Chair and Vice Chair

Motion to nominate Chairperson

Motion: Vern Seieroe nominates Paul Bradley for Chairperson
Second: Henry Lopez
Approved: Motion passed.

Motion to nominate John Murray for Vice Chairperson

Motion: Vern Seieroe
Second: Henry Lopez
Approved: Motion passed.

4. Public Testimony

1. Greg Balmer of 5188 Old Stage Rd., Boulder: Requested some clarity on wood stove venting; wood burning appliances, do the State or Federal listings take precedence? He recommended gas outdoor fires not require an offset as an alternative to wood fire pits because of wildfire risks. He is also concerned with the requirement of ignition-resistant materials and their costs regarding residing his home.
2. Nick Lizo of Midtown Homes, Longmont: Is concerned with the elimination of the fire hydrant exception from the Fire Sprinkler requirement. Currently, his subdivision of 22 lots meets the fire hydrant exception. He has 18 lots remaining to be built on and is concerned with passing on the fire sprinkler costs to his customers. He recommends the fire hydrant exception remain in the new codes.
3. John Mathews of 3333 Iris St, Boulder: Is a builder in Boulder County and recommends simplifying the BuildSmart codes so homeowners can understand them. He also questions the rational of changing the BuildSmart tables from 6000 sq. ft. down to 5000 sq. ft. and eliminating the prescriptive path for this size home.

5.
BORC-12-0001: 2012 International Codes Adoption & Amendments

Gary noted that the proof of publication for this meeting was posted in the Longmont Times Call as a public hearing on August 28, 2012 and did provide a seven-day public notice so we will be taking Public Testimony. Gary explained the process of the International Code Council's method of creating the code changes. Gary explained the ISO rating and how the insurance companies set their rates based on this rating. At the last code adoption Boulder County was rated a 3 on a scale of 1 – 10 with the lower rating the better. He is proposing that we adopt the 2012 IBC, IRC, IFGC, IPC, IGCC, IECC and IMC codes. The 2011 NEC was adopted by the State Electrical Board and we honor that adoption. Gary proposed that we adopt the IGCC only for commercial buildings over 25,000 sq. ft. in total building floor area and that it has jurisdictional options. The ICC Performance Code is proposed to be adopted for the evaluation of appeals for modifications and alternative materials, designs and methods of construction.

Gary prosed some administrative changes regarding playground equipment accessory to one- and two-family dwellings; exempting detached decks up to 200 sq. ft. and up to 30”above grade; amending language to match the IBC and IRC regarding wall bracing(shear) information, manufacturer’s installation instructions and means of egress; some fee changes; adding language to clarify that insulation inspections are required for additions 500 sq. ft. or less and that the inspection by an energy rater is not required; moving the 10 psi, 15-minute gas piping pressure test requirement to the IFGC and the IRC and that this requirement matches the City of Boulder and the City of Longmont’s requirement. Revise 723.1 to include a reference to Section R325 and delete the remainder of Section 723. An exception has been added to the exception of the gutters and downspouts to permit an alternative means designed by a soils engineer or other qualified registered design professional.

The proposed amendments clarify the “ice and water shield” language for roofing; The elimination of the exception of allowing a 1-hour party wall for townhouses was made as the new code requires all new townhouses to be sprinklered. Add an approved means of heat to prevent freezing pipes to the exception allowing wood-burning appliances to be the primary source of heat. Gary explained the county’s history on sprinklering townhomes and one- and two- family dwellings and additions, the Colorado Ad Hoc Residential Sprinkler Committee, a 2012 survey of jurisdictions planning on adopting the code, the fact that the IFC includes a matching code, the ISO rating impacting insurance premium rates, the proposed 2012 code amendments include sprinklering existing dwellings when additions or remodels/renovations total 4800 sq. ft. or larger, the exception for a one-time addition of 200 sq. ft. or less, deleting the existing exception of not sprinklering if IFC hydrant fire flows are met and he will leave the fire department connection requirement up to the fire departments to include in their sprinkler plan if they so choose. The Building staff would like to combine the ignition-resistant construction requirements that are duplicated in both the IRC & IBC amendments currently and possibly tighten up our requirements and add the use of additional materials approved by the California State Fire Marshal. Amend the Defensible Space section to create clarity for the requirements on additions, existing and new structure projects. In light of the findings from the Fourmile Canyon Fire, staff would like to amend the exterior wall requirement to also require ignition-resistant materials in moderate hazard sites. We plan to upgrade the roofing shingle requirement in the Wildfire Zone II area from a Class C to a Class B shingle.

We have added a provision to require wiring or conduit for wiring in new garages and carports to facilitate charging of electric vehicles. We added various clarifications to BuildSmart including revising the prescriptive path option pertaining to additions and new single family dwellings and added an exception for remodels/renovations to require the performance path at 5000 sq. ft. of conditioned floor area instead of the current 6000 sq. ft. We lowered the required HERS ratings in Table 1. Eliminate the Prescriptive Path option for new residences over 5000 sq. ft. We will add some updating to wood-burning appliances per State and Federal mandates. The section on gray Water Recycling Systems will be amended to reflect the Colorado water Laws. We have revised our amended table to reflect the 2012 IECC’s Maximum Air Leakage rate of 3 ACH.

Board Comments: Doug suggested the 4,800 sq. ft. threshold for remodel/renovation be made very clear in the text. He and Ben Doyle suggested adding text to the Rainwater Recycling Systems that this is not allowed per state statues. Doug also questioned the amount of work required for the Electric Vehicle Charging pre-wire requirement. Paul requested clarification from Gary on the methodology of the public challenging the codes. He requested to be notified of the resolution to the camp structure/sprinkler issue brought up in the BOR meeting dated 8/21/2012. Vern stated that he has found little difference in the cost of a small house versus a large house and wonders if modifying the BuildSmart codes would simplify the building process. Vern, Gary and the Board discussed the fact that the Energy Code will continue to become more restrictive as the years go on. Doug sees the restrictive codes creating more building without a permit.

6. Motion to Recommend Adoption of the 2012 Codes

The Board of Review recommends to the Board of County Commissioners the APPROVAL of Docket #BOR-12-0001, 2012 Amendments to the Boulder County Building Code, and that the Board of County Commissioners ADOPTS the proposed BOCC Resolution #2012-50.

Motion: Vern Seieroe
Second: None
Motion dies.

The Board of Review recommends to the Board of County Commissioners the APPROVAL of Docket #BOR-12-0001, 2012 Amendments to the Boulder County Building Code, and that the Board of County Commissioners ADOPTS the proposed BOCC Resolution #2012-50, with the following friendly amendments:

-Clarifying the restrictions on rainwater use.
-Clarifying that townhomes are considered separate units.
-The Board of Review recommends combining the Energy Code and BuildSmart to make it simpler and easier to understand and use.
-Concerns about fire sprinkler pipes freezing in seasonal cabins or dwellings heated only by wood stoves and consider keeping the sprinkler exception if hydrant fire flow is available.

Motion: Vern Seieroe
Second: Paul Bradley
Approved: Motion passed 4-0.

7. Code Adoption Schedule

Tuesday, September 11, 2012 – 12:30 – 2:20 P.M.: Presentation to Colorado Green Building Guild (CGBG) Brown Bag Luncheon, REI Community Room, 1789 28th St, Boulder CO 80305.

Thursday, October 11, 2012, 2:30 P.M.: Board of County Commissioners Public Hearing, BOCC Resolution 2012-50, BOCC Hearing Room, 3rd floor, Main Courthouse, downtown Boulder, CO.

Tuesday January 1, 2013: Updated codes become effective for all building permit applications received on or after this date.

Adjourned

Motion: Doug Greenspan
Second: Vern Seieroe

The meeting was adjourned at 6:50 PM.

The official record of this meeting is on compact disc (CD). Detailed information regarding the docket items, including maps and legal descriptions are available for public use at the Land Use Department, 13th and Spruce, Boulder, CO. 303-441-3930.

Harvesting rain takes redirection

After weeks of clear skies and searing heat, you watch the one puff of cloud like it's the rainmaker you've been hoping for. But the quick downpour does nothing but tease with a few minutes of moisture and you're left looking at a landscape still thirsting for water.

By Carol O'Meara
Colorado State University Extension

Before bemoaning the lack of rain barrels, consider an alternative, says Alison Peck, what you can do is channel rainwater coming off your roof into the landscape so that it flows to thirsty plants and stores in the soil. There, plants can access the water as summer heat dries the land.

"The interesting thing is that we've always been told you can't use rainwater, but there's nothing illegal about collecting rainwater in the landscape, storing it in the soil," says the pro landscape designer and founding member of the Front Range Sustainable Coalition.

"You can't put rainwater in containers, but are they really helpful? Think about how small an area can survive on rain barrels, which only hold about 30 to 50 gallons."

Generally, you can store between a quarter- to two-and-a-half inches of water in your soil but to make use of it you need plants with deep root systems, like natives, says Peck, an Associated Landscape Contractors of Colorado member. As you plan your rain redirection, look over your landscape for where the plants with big root systems are, which are the perennials, grasses, shrubs and trees.

The simplest way to harvest rain is to ensure down spouts don't release onto hard surfaces; instead, get extenders to let the water flow directly onto the landscape. You don't want an area for water to pool in, which could cause structural problems if near buildings or drives.

"We know how erratic rainfall is here, and I certainly wouldn't plant a high water garden and then rely on runoff to water it. Design low water gardens and create areas within that for a few plants with higher water needs."

When it comes to redirecting runoff from houses, watering plants with it is ok, provided the primary purpose of the redirection is to protect the structure, not to drench the landscape, says Kevin Rein, Deputy State Engineer with the Colorado Division of Water Resources. "Colorado water law is difficult when it comes to rainwater harvesting; it's a tough one to put into words when it comes to residential situations. You can't collect in a cistern or rain barrels, but if you're protecting your house from water damage by redirecting runoff, water consumed by the lawn is incidental."

Redirecting water for a beneficial use is an invalid reason to do so, says the 14-year veteran of water administration. The quick test to see which side of the law you're on is to ask yourself "why am I doing this? To consume more water than I would have, or to protect my structure?" Impeding the flow of water could, technically, interfere with Colorado's obligation to send water downstream, but Rein doesn't expect people to take extreme measures to prevent it.

"We all agree you don't have to cover your lawn to prevent it from using water in a rainstorm. It's also reasonable to direct water away from the house and in so doing, the water may be consumed by vegetation."

There are a few safety tips Peck encourages people to remember:

- If your home is built on a lot of expansive clay soil, get the rainwater at least 10 feet away from the foundation of the home. Be very cautious and check with an engineer before you try this.
- Make sure all water infiltrates the landscape within 24 hours.
- Avoid directing runoff onto leech fields and near plants that need good drainage.
- Above all, when harvesting rainwater, be sure you aren't interfering with water flowing onto a neighbor's property.

Colorado State University Extension provides unbiased, research-based information about consumer and family issues, horticulture, natural resources, agriculture and 4-H youth development. For more information contact Extension at the Boulder County Fairgrounds, 9595 Nelson Rd., Box B, Longmont, 303.678.6238.

Family safe, but firefighter injured battling early morning Superior house fire

By Amy Bounds/Camera Staff Writer Boulder Daily Camera
Posted: DailyCamera.com

A family renting the house at 3929 South Torrey's Peak Drive in Superior made it out safely during a fast burning, early morning house fire, but the house is considered a total loss.

A Rocky Mountain Fire Department firefighter was injured when glass blew out of the house, requiring four stitches, while two cats are unaccounted for, according to Boulder County Sgt. Vinnie Montez. The cause of the fire, which appeared to start in the basement, is being investigated by Rocky Mountain Fire, he said. The call came in at about 2:30 a.m.

Montez said firefighters were still fighting the fire when he arrived at 6 a.m. and continued to work through the morning to douse hot spots. At noon, the smell of smoke remained heavy in the air. The roof of the house was gone and the interior blackened.

Renting the house was a family of four. Cindy Ullman and Jeffrey Ullman and their 14-year-old son were home when the fire started. An older son was in the mountains for the weekend.

Cindy Ullman said the fire alarm woke them up and her husband began urging everyone to get out. She grabbed her glasses and phone, threw on some clothes and took two steps out of the bedroom to find her house smothered in smoke.

“I couldn't see, couldn't breathe,” she said. “I held on to the railing and stumbled down the stairs. It was insane, the fire went so fast.”

No one was wearing shoes, she said, and so neighbors brought them some. A coffee shop down the street also gave them free coffee, while her adult daughter — who also lives in Rock Creek — is helping them.

“Everybody was so nice,” she said.

Though they have renters' insurance, she said, she doubts it will cover everything they lost.

Torrey's Peak is closed at Indiana as firefighters work to evaluate the structural integrity of the home. Residents of the two houses on either side have been evacuated because of structural concerns, including the possibility that a large chimney could topple.

“There's just stucco holding it up,” said Sgt. Montez.

Brian and Caren Shaltakoff and their two-year-old and 8-year-old boys were in the house next door when the fire started. They said they were both awake at 2 a.m. with their 2-year-old, who had a cold, when they heard the sound of glass breaking and shortly after saw flames.

“Within seconds, it engulfed,” Caren Shaltakoff said. “By the time we were running down the stairs, the police were knocking on our door.”

Outside, she said, the house next door was engulfed in what looked like 100-foot flames. She said she feared her house would be next, but the only damage is from smoke.

“The firefighters were miracle workers,” she said.

The Boulder County Sheriff's Office, Rocky Mountain Fire, Lafayette Fire, Louisville Fire and North Metro Fire responded.

October 4, 2012 DRAFT

RESOLUTION ~~2010-138~~ 2012-50: ~~2009~~ 2012 AMENDMENTS TO THE BOULDER COUNTY BUILDING CODE

WHEREAS, the Board of County Commissioners is authorized by Resolution to alter and amend the Boulder County Building Code, pursuant to Title 30, Article 28, Section 204 of the Colorado Revised Statutes; and

WHEREAS, the Board of County Commissioners held a duly advertised public hearing on ~~December 9, 2010~~ September 27 2012, and adopted proposed Commissioners Resolution ~~2010-138~~ 2012-50 approving the ~~2009~~ 2012 Amendments to the Boulder County Building Code; and

WHEREAS, this Resolution shall be known as the "Boulder County Building Code," may be cited as such and will be referred to herein as "this code;" and

WHEREAS, this code shall provide for minimum standards to safeguard life or limb, health, property and public welfare by regulating the design, construction, quality of materials, use, occupancy and location of all construction or alteration of dwellings, buildings and structures together with plumbing, mechanical and electrical installations therein or in connection therewith, in all parts of Boulder County not including areas embraced within the limits of any incorporated city or town; and

WHEREAS, the purpose of this code is to provide for and promote the health, safety and welfare of the general public; and

WHEREAS, the provisions of this code shall apply to the erection, construction, reconstruction, alteration, remodeling, or the change of use of all dwellings, buildings and structures including buildings or structures used for the purpose of providing shelter for agricultural implements, farm products, livestock, or poultry within the unincorporated territory of Boulder County, and shall include the authority over existing buildings and structures provided in the International Building Code; and

WHEREAS, pursuant to Title 30, Article 28, Section 205 of the Colorado Revised Statutes, the County Building Inspector, also referred to herein as the "building official," as authorized in Title 30, Article 28, Section 114 of the Colorado Revised Statutes, shall be authorized by the Board of County Commissioners to administer and enforce this code; and

WHEREAS, the Land Use Director shall be responsible for enforcing and administering this code in the event of the absence or disability of the building official; and

WHEREAS, upon the adoption of this code, the Board of County Commissioners shall file certified copies thereof in its office, which copies shall be accessible to the public at a cost not to exceed that of printing the same. Copies of this code printed by authority of the Board of County Commissioners shall be prima facia evidence of the original text in all courts and tribunals of this state.

NOW THEREFORE, BE IT RESOLVED AS FOLLOWS:

The Boulder County Building Code, as adopted in Board of County Commissioners in this Resolution ~~2010-138~~ 2012-50, shall read as follows:

REFER TO EXHIBIT "A" ATTACHED HERETO AND INCORPORATED HEREIN.

EXHIBIT "A" TO COMMISSIONERS RESOLUTION ~~2010-138~~ 2012-50
ADOPTION OF MODEL CODES BY REFERENCE,
WITH DELETIONS AND AMENDMENTS

The following publications shall hereby be adopted as the Boulder County Building Code by reference thereto, with deletions and amendments as indicated.

1. ~~2009~~ 2012 INTERNATIONAL BUILDING CODE, including specifically **Appendix Chapters C, I and J;**
2. ~~2009~~ 2012 INTERNATIONAL RESIDENTIAL CODE, including specifically **Appendix Chapters F, G~~,~~ and H ~~and O~~;**
3. ~~2009~~ 2012 INTERNATIONAL MECHANICAL CODE;
4. ~~2009~~ 2012 INTERNATIONAL PLUMBING CODE;
5. ~~2009~~ 2012 INTERNATIONAL FUEL GAS CODE;
6. CURRENT VERSION ADOPTED BY THE STATE OF COLORADO OF THE NATIONAL ELECTRICAL CODE;
7. ~~2009~~ 2012 INTERNATIONAL ENERGY CONSERVATION CODE; ~~and the~~
8. 2012 INTERNATIONAL GREEN CONSTRUCTION CODE, ~~Public Version 2.0, November 2010~~ (selected portions); and the
9. 2012 INTERNATIONAL CODE COUNCIL PERFORMANCE CODE;

all, except the National Electrical Code, as published by the International Code Council (ICC), 4051 West Flossmoor Road, Country Club Hills, IL 60478-5795; and the National Electrical Code, as published by the National Fire Protection Association, One Batterymarch Park, Quincy, MA 02169-7471; with additions, deletions and amendments as follows:

The administrative provisions of the International Building Code, International Residential Code, International Mechanical Code, International Plumbing Code, International Fuel Gas Code, National Electrical Code, International Green Construction Code and the International Energy Conservation Code are combined under the amended administrative provisions of Chapter 1 of the International Building Code.

Exception: IRC R101.1, IRC R101.2, IRC R101.3, IFGC 101.2, IECC Section 101.3, IECC Section 101.4, and IECC Section 101.5.

ADMINISTRATIVE CHAPTER 1
ADMINISTRATION

ADMINISTRATIVE SECTION 101
GENERAL

101.1 Title. These regulations shall be known as the "Boulder County Building Code," ~~may be cited as such and will be~~ hereinafter referred to ~~herein~~ as ``this code."

Sections 101.2 through 101.21 have no proposed changes and are not shown.

Amend this section to reflect language in the published IBC and IRC.

101.3 Intent. The purpose of this code is to establish ~~the~~ minimum requirements to safeguard the public safety health and general welfare through affordability, structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.

Sections 101.4 through 101.4.6 have no proposed changes and are not shown.

Add sub-sections describing the roles of the Performance Code and the Green Construction Code.

101.4.7 Performance. The provisions of the International Code Council Performance Code for Buildings and Facilities shall apply for use as guide and a tool to evaluate proposals for modifications and alternate materials, design and methods of construction and equipment submitted in accordance with Sections 104.10 and 104.11 of the Boulder County Building Code, respectively.

101.4.8 Green Construction. The provisions of the International Green Construction Code shall apply to the design, construction, commissioning and operation of new buildings or complexes of buildings on the same site, existing building additions, and alterations to existing buildings over 25,000 square feet in total building floor area and their associated building sites for sustainability and the effective use of energy.

ADMINISTRATIVE SECTION 102
APPLICABILITY

Sections 102.1 through 102.6 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 103
DIVISION OF BUILDING SAFETY AND INSPECTION SERVICES

Sections 103.1 through 103.3 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 104
DUTIES AND POWERS OF BUILDING OFFICIAL

Sections 104.1 through 104.12 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 105
PERMITS

105.1 Required. No person shall erect, construct, reconstruct, alter, or change the use of any building or other structure without first obtaining a building permit.

105.2 Work Exempt from Permit. Exemptions from permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. Permits shall not be required for the following:

Building:

1. One story detached accessory structures used as a storage shed, playhouse, greenhouse, chicken coop, agricultural loafing shed, or similar uses, provided:
    a. The floor area of any structure does not exceed 120 square feet, except agricultural listed in item b. below.
    b. Loafing sheds not exceeding 200 square feet,
    c. Structures without utilities of less than 12 feet in height,
    d. Structures that do not violate the conditions of any existing land use approval or conservation easement.
    e. The number of detached accessory structures which may be constructed without a building permit shall be determined by the size of the subject parcel:
        i. One detached accessory structure may be constructed without a building permit on parcels 0.5 acres or less in size.
        ii. Two detached accessory structures may be constructed without a building permit on parcels greater than 0.5 acre and less than ten acres.
        iii. Three detached accessory structures may be constructed without a building permit on parcels 10 acres and larger.
2. Fences not over 6 feet high. *(2012 IBC and IRC changed to 7 feet.)*
3. Retaining walls not over 4 feet in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding flammable liquids.
4. Water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons and the ratio of height to diameter or width does not exceed ~~2~~ two to ~~1~~ one.
5. Platforms, sidewalks and driveways not more than 30 inches above grade and not over any basement or story below and not subject to a grading permit.
6. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
7. Temporary motion picture, television and theater stage sets and scenery.
8. Shade cloth structures constructed for nursery or agricultural purposes, and not including service systems.
9. Prefabricated swimming pools where the pool walls are entirely above the adjacent grade and the capacity does not exceed 5,000 gallons.
10. Swings and other playground equipment <u>accessory to detached one- and two-family</u>

dwellings.

11. Window awnings supported by an exterior wall which do not project more than 54 inches from the exterior wall and do not require additional support.
12. Non-fixed and movable fixtures, cases, racks, counters, and partitions not over 5 feet 9 inches in height.
13. Antennas and/or their supporting structures other than buildings, accessory to residential use less than ten feet in height and lower than the structure height limit in the zoning district in which located, or which were constructed or erected prior to July 1, 1988.
14. Temporary emergency noncommercial telecommunication-sites operated by a governmental agency, or by a volunteer public safety agency officially sanctioned by a governmental agency for that purpose, for public safety communication uses, for a period not to exceed six months.
15. Decks accessory to one- and two-family dwellings and townhouses not exceeding 200 square feet in area, that are not more than 30 inches above grade at any point, are not attached to a dwelling and do not serve the exit door required by IRC Section R311.4.

The above exceptions to the building permit requirements do not exempt structures from meeting the other applicable provisions of this Code, including but not limited to the applicable zoning district setback and height requirements and the provisions of the Floodplain Overlay District.

Electrical:

Repairs and Maintenance: Minor repair work, including the replacement of lamps or the connection of approved portable electrical equipment to approved, permanently installed receptacles.

Radio and Television Transmitting Stations: The provisions of this code shall not apply to electrical equipment used for radio and television transmissions but does apply to equipment and wiring for power supply for the installation of towers and antennas.

Temporary Testing Systems: A permit shall not be required for the installation of any temporary system required for the testing or servicing of electrical equipment or apparatus.

Gas:

1. Portable heating appliance.
2. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.

Mechanical:

1. Portable heating appliances;
2. Portable ventilation appliances and equipment;
3. Portable cooling units;
4. Steam, hot or chilled water piping within any heating or cooling equipment or appliances regulated by this code;

5. The replacement of any minor part that does not alter the approval of equipment or an appliance or make such equipment or appliance unsafe;
6. Portable evaporative coolers;
7. Self-contained refrigeration systems that contain 10 pounds or less of refrigerant, or that are actuated by motors of 1 horsepower (0.75 kW) or less; and
8. Portable fuel cell appliances that are not connected to a fixed piping system and are not interconnected to a power grid.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe provided, however, that if any concealed trap, drainpipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a permit shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures, and the removal and reinstallation of water closets, provided such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

Exemption from the permit requirements of this code shall not be deemed to grant authorization for any work to be done in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

105.2.1 Emergency Repairs. Where equipment replacement and repairs must be performed in an emergency situation the permit application shall be submitted within the next working business day to the building official.

105.2.2 Repairs. Application or notice to the Building Official is not required for ordinary repairs to structures, replacement of lamps, or the connection of approved portable electrical equipment to approved permanently installed receptacles. Such repairs shall not include the cutting away of any wall, partition, or portion thereof, the removal or cutting of any structural beam or load bearing support, or the removal or change of any required means of egress, or rearrangement of parts of a structure affecting the egress requirements; nor shall any ordinary repairs include the addition to, alteration of, replacement or relocation of any standpipe, water supply, sewer, drainage, drain leader, gas, soil, waste, vent or similar piping, electric wiring, or mechanical, or other work affecting public health or general safety.

105.2.3 Public Service Agencies. A permit shall not be required for the installation, alteration or repair of generation, transmission, distribution, or metering or other related equipment that is under the ownership and control of public service agencies by established right.

Sections 105.3 through 105.7 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 106
FLOOR AND ROOF DESIGN LOADS

Sections 106.1 through 106.3 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 107
SUBMITTAL DOCUMENTS

107.1 Submittal Documents. Construction documents, special inspection and structural observation programs, and other data shall be submitted in one or more sets with each application for permit. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist the building official is authorized to require additional construction documents to be prepared by a registered design professional.

Exception: The building official is authorized to waive the submission of construction documents and other data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that review of construction documents is not necessary to obtain compliance with this code.

Add language from Section R106.1.1 of the published IRC regarding showing wall bracing requirements.

107.1.1 Information on Construction Documents. Construction documents shall be dimensioned and drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature, and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules, and regulations as determined by the building official. Where required by the building official, all braced wall lines shall be identified on the construction documents and all pertinent information, including, but not limited to, bracing methods, location and length of braced wall panels, foundation requirements of braced wall panels at top and bottom, shall be provided.

107.1.1.1 Fire Protection System Shop Drawings. Shop drawings for the fire protection system(s) shall be submitted to indicate conformance with this code and the construction documents and shall be approved prior to the start of system installation. Shop drawings shall contain all information as required by the referenced installation standards in Chapter 9.

Add language from Section R106.1.2 of the published IRC regarding manufacturer's installation instructions.

107.1.1.2 Manufacturer's installation instructions. Manufacturer's installation instructions, as required by this code, shall be available on the job site at the time of inspection.

Add and delete language to match the published IBC.

107.1.2 Means of Egress. The construction documents shall show in sufficient detail the location, construction, size and character of all the portions of the means of egress including the path of the exit discharge to the public way in compliance with the provisions of this code. In other than occupancies in Groups R-2, ~~and~~ R-3 ~~as applicable in Section 101.2~~ and I-1, the construction documents shall designate the number of occupants to be accommodated on every floor, and in all rooms and spaces.

Sections 107.1.3 through 107.7 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 108
TEMPORARY STRUCTURES AND USES

Sections 108.1 through 108.4 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION
109 FEES

Sections 109.1 through 109.6 have no proposed changes and are not shown.

Building Permit Fees

This fee table is inserted for information only and is not considered to be part of the Boulder County Building Code. These fees are established by the Board of County Commissioners and are subject to change by BOCC resolution.

TABLE 1-A[1]
BUILDING PERMIT FEES*

Total Valuation[2] of project	**Building Permit Fee**
$1.00 to $800.00	$36.40
More than $800.00, but not more than $2,000.00	$36.40 for the first $800.00, plus $3.92 for each additional $100.00 or fraction thereof, up to and including $2,000.00
More than $2,000.00, but not more than $25,000.00	$83.40 for the first $2,000.00, plus $14.35 for each additional $1,000.00 or fraction thereof, up to and including $25,000.00
More than $25,000.00, but not more than $50,000.00	$413.27 for the first $25,000.00, plus $10.85 for each additional $1,000.00 or fraction thereof, up to and including $50,000.00
More than $50,000.00, but not more than $100,000.00	$684.44 for the first $50,000.00 plus $9.58 for each additional $1,000.00 or fraction thereof, up to and including $100,000.00
More than $100,000.00, but not more than $200,000.00	$1,163.63 for the first $100,000.00 plus $12.47 for each additional $1,000.00, or fraction thereof, up to and including $200.000.00
More than $200,000.00, but not more than $500,000.00	$2,410.94 for the first $200,000.00, plus $8.68 for each additional $1,000.00 or fraction thereof, up to and including $500,000.00

More than $500,000.00, but not more than $1,000,000.00	$5,014.24 for the first $500,000.00, plus $7.47 for each additional $1,000.00 or fraction thereof, up to and including $1,000,000.00
More than $1,000,000.00	$8,750.36 for the first $1,000,000.00, plus $4.82 for each additional $1,000.00 or fraction thereof

[1] Building permits for structures being rebuilt after being destroyed in the 2010 Fourmile Canyon Fire, if they are the same size or smaller than the structures that existed prior to the fire, and not larger than 2,500 sq. ft. in floor area for dwellings or not larger than 530 sq. ft. in floor area for accessory buildings, may have the building permit fee calculated in accordance with the table above reduced by 25 percent (25%). This provision applies only to qualifying building permit applications received on or before September 30, 2012, unless an extension has been granted by the Land Use Director.

[2]Valuation shall be determined in accordance with Section 109.4 of the Boulder County Building Code. Where the valuation that is calculated based upon standard building valuation data and the actual total contract construction cost differ, the higher of the two valuation figures shall be used to determine the building permit fee.

Plan Check Fee*
The plan review fee is determined by multiplying the building permit fee by 65%.

Use Taxes	
1994 Open Space Use Tax	½ of the valuation X .0035
Boulder County Transportation Sales and Use Tax	½ of the valuation X .0010
Non Profit Human Services Tax	½ of the valuation X .0005
Jail Improvement & Operation Tax	½ of the valuation X .0005
2005 Open Space Tax	½ of the valuation X .0010
2011 Open Space Tax	½ of the valuation X .0015

Total Cost of the Building Permit
Add the building permit fee, plan check fee, and use taxes.

Application Deposit Fees. The application deposit is based on the stated valuation shown on the building permit application in accordance with the following schedule:

Revise deposit fees to add an intermediate range at $25,001 - $50,000 valuation.

APPLICATION DEPOSIT FEES

Project Valuation	**Deposit**
$00.00 - ~~$ 50,000~~ $ 25,000	$ 25.00
$25,001 - $ 50,000	$100.00
$50,001 - $ 200,000	$200.00
$200,001 and up	$500.00

Revise other fees to increase "TCO" fees from $87.00 to $150.00 and reduce PV materials cost from $8.00 per watt to $5.00 per watt.

OTHER FEES[4]

1. Manufactured Home Setup Permit Fee — $131.00
2. For manufactured homes installed upon permanent foundations, use the schedule above with valuation of foundation and other associated work performed on the site.
3. Re-inspection fees assessed under provisions of Section 109.8 — $72.00
4. Inspections outside of normal business hours — $72.00 per hour**
5. Appeals to the Board of Review — $278.00
6. Temporary Certificates of Occupancy — ~~$87.00~~ $150.00
7. Oil and gas well drilling permits — $52.00
8. Additional plan review required due to changes, additions or revisions to plans — $72.00 per hour**
9. For use of outside consultants for plan checking and inspections, or both — Actual costs***
10. Grading Fees (see Grading Permit Fee table below)
11. Renewable Energy Permit — $400.00 plus tax (based on materials only at ~~$8.00~~ $5.00 per watt)
12. Returned Check Fee — $20.00

*Calculated fees are to be rounded to the nearest whole dollar figure, with amounts of $0.50 or less rounded down and amounts of $0.51 or more to be rounded up.

**Or the total hourly cost to the jurisdiction, whichever is the greatest. This cost shall include supervision, overhead, equipment, hourly wages and fringe benefits of the employees involved.

***Actual costs include administrative and overhead costs.

[4] Where structures are being rebuilt after being destroyed by the 2010 Fourmile Canyon Fire and qualified third party inspectors satisfactorily perform required inspections that would otherwise need to be performed by county building inspectors, rebates of $125.00 per such required inspection may be paid to the holder of the building permit. This provision applies only to qualifying building permit applications received on or before September 30, 2012, unless an extension has been granted by the Land Use Director.

GRADING PERMIT FEES

For grading less than 50 cubic yards, no permit is required.

TOTAL EARTHWORK, CUBIC YARDS	PERMIT FEE	PLAN REVIEW FEE	TOTAL FEE
51 - 100	$ 58.46	$ 38.00	$ 96.46
101 - 200	$ 86.90	$ 56.49	$ 143.39
201 - 300	$ 115.34	$ 74.97	$ 190.31
301 - 400	$ 142.20	$ 92.43	$ 234.63
401 - 500	$ 170.64	$ 110.92	$ 281.56
501- 600	$ 197.50	$ 128.38	$ 325.88
601 - 400	$ 225.94	$ 146.86	$ 372.80
701 - 800	$ 252.80	$ 164.32	$ 417.12
801 - 900	$ 281.24	$ 182.81	$ 464.05
901 - 1,000	$ 308.10	$ 200.27	$ 508.37
1,001 - 2,000	$ 330.22	$ 214.64	$ 544.86
2,001 - 3,000	$ 353.92	$ 230.05	$ 460.10
3,000 - 4,000	$ 376.04	$ 244.43	$ 620.47
4,001 - 5,000	$ 399.74	$ 259.83	$ 519.66
5,001 - 6,000	$ 421.86	$ 274.21	$ 696.07
6,001 - 7,000	$ 445.56	$ 289.61	$ 735.17

7,001 - 8,000	$ 467.68	$ 303.99	$ 771.67
8,001 - 9,000	$ 491.38	$ 319.40	$ 810.78
9,001 - 10,000	$ 513.50	$ 333.78	$ 847.28
10,001 - 20,000	$ 617.78	$ 401.56	$ 1,019.34
20,001 - 30,000	$ 722.06	$ 469.34	$ 1,191.40
30,001 - 40,000	$ 826.34	$ 537.12	$ 1,363.46
40,001 - 50,000	$ 930.62	$ 604.902	$ 1,535.52
50,001 - 60,000	$ 1,034.90	$ 672.69	$ 1,707.59
60,001 - 70,000	$ 1,139.18	$ 740.47	$ 1,879.65
70,001 - 80,000	$ 1,243.46	$ 808.25	$ 2,051.71
80,001 - 90,000	$ 1,347.74	$ 876.03	$ 2,223.77
90,001 - 100,000	$ 1,452.02	$ 943.81	$ 2,395.83

NOTE: *Taxes are not associated with grading permits as there are no taxable materials*.

ADMINISTRATIVE SECTION 110
INSPECTIONS

Sections 110.1 through 110.4 have no proposed changes and are not shown.

110.5 Required Inspections.

110.5.1 General. Reinforcing steel, structural framework, plumbing, electrical or mechanical systems of any part of any building or structure shall not be covered or concealed without first obtaining the approval of the building official. Protection of joints and penetrations in fire-resistive assemblies shall not be concealed from view until inspected and approved. The building official, upon notification, shall make the inspections set forth in the following subsections.

110.5.2 Rough Inspections:

110.5.2.1 Temporary Electric Construction Pole: To be made after all wiring installations have been made as required in the National Electrical Code, Article 590, entitled "Temporary Wiring."

110.5.2.2 Zoning/Building Code Setbacks: May be performed at the same time as inspection 109.5.2.4 below but only after location of the structure has been laid out and staked. A general observation of distances between building(s) and property lines will be conducted. If any discrepancies are apparent a survey may be required by the building official to verify that the structure is located in accordance with the approved plans.

110.5.2.3 Trenches, Footings, Pads, Caissons: To be made after trenches are excavated, forms erected, steel in place and prior to placement of concrete. The County requires on-site observation and a stamped written report by an architect or professional engineer when plans call for drilled piers (caisson) construction. Observation of the preparation, reinforcement and placement shall be described in detail in the written report as mentioned by an architect or en-

gineer and is not the responsibility of the County.

110.5.2.4 Foundation Walls and/or Grade Beams Steel Reinforcement: To be made after all forms are erected, steel in place, and prior to placement of concrete.

110.5.2.5 Damp-proofing of Footing and Foundation and/or Grade Beams of Basement Walls: To be made prior to backfilling. Contractor or homeowner shall provide an invoice from the damp-proofing applicator or receipts for the materials used. Foundation drainage systems for concrete and masonry foundations that enclose habitable spaces shall be inspected by the engineer of record.

110.5.2.6 Electrical-Underground: Within building, inspection to be made prior to backfilling and/or pouring concrete floor. Note: If meter housing is mounted on a pole, the County must inspect between pole and structure prior to backfilling.

110.5.2.7 Plumbing-Underground: Within building only, inspection to be made prior to backfilling and/or pouring concrete floor.

110.5.2.8 Gas Piping-Underground: Inspection to be made prior to backfilling.

110.5.2.9 Rough Electrical: Prior to covering and concealing, inspection will be made of all walls, ceilings, floors, service equipment panel and service entrance.

110.5.2.10 Rough Plumbing: Inspection will be made prior to concealing and/or covering all walls, ceilings and floors. Includes waste lines, vents and water lines.

110.5.2.11 Rough Gas Piping: Inspection will be made prior to covering and/or concealing all walls, ceiling, and floor.

110.5.2.12 Rough Heating and Ventilation: Inspection will be made prior to covering and/or concealing all walls, ceilings, and floors.

110.5.2.13 Rough Framing: Inspection to be made after the roof, all framing, fire blocking and bracing are in place and all pipes, chimneys, and vents are complete. Note: the roof covering (shingles) must be installed in order to pass inspection.

Revise to clarify that county will do insulation inspections for projects of 500 sq. ft. or less.

110.5.2.14 Insulation Walls/Ceilings/Floors: Inspection will be made prior to covering and concealing all walls, ceilings and floors. Insulation inspections for projects exceeding ~~200~~ 500 sq. ft. of conditioned floor area (CFA) must be done by a certified energy rater. For projects of ~~200~~ 500 sq. ft. of conditioned floor area (CFA) or less, an insulation inspection will be performed by the county upon request or the insulation installer shall post an insulation certificate

in accordance with ~~IECC Section 401.3 or~~ IRC Section N1101.9.

110.5.2.15 Lath and/or Wallboard: Inspection will be made prior to plastering or taping wall and ceiling covers and after all nails and/or screws are installed.

110.5.2.16 Fire-Resistant Penetrations. Protection of joints and penetrations in fire-resistant-rated assemblies shall not be concealed from view until inspected and approved.

110.5.3 Final Inspections. The following final inspections must all be made after building and site are completed and ready for occupancy.

110.5.3.1 Final Grading. Positive drainage away from building(s).

110.5.3.2 Frame. All rooms and areas complete in every respect.

110.5.3.3 Electrical. All fixtures, service equipment panel and service entrance.

110.5.3.4 Plumbing. All fixtures installed.

The inspection test pressure and duration requirements are be moved to the appropriate locations in Section 406.4 of the IFGC and Section 2417.4 of the IRC. Note that 10 psi for 15 minutes matches the existing requirements of the cities of Boulder and Longmont.

110.5.3.5 Gas Piping. All piping and gas-fired appliances installed. ~~This inspection shall include an air pressure test of not less than ten (10) pounds per square inch gauge pressure, which shall hold not less than fifteen (15) minutes in the presence of an inspector.~~

110.5.3.6 Heating and Ventilation.

110.5.3.7 Window Glazing and Insulation.

110.5.3.8 Other. As may be specific to the project..

110.6 Special Inspections. For special inspections, see IBC Section 1704.

110.7 Other Inspections.

110.7.1 General. If due to excessive workload and ~~manpower~~ staffing limitations the building official is unable to perform a requested inspection on the working day following the inspection request, special inspection reports, contractor certifications, or other satisfactory evidence of the work being completed substantially in compliance with this code may be accepted in lieu of the required inspections noted below. When approved by the building official, trenches, footings, or pads inspections of foundation walls and/or grade beams steel reinforcement in-

spections may be performed by a qualified architect or engineer serving as a Special Inspector (See Section 1704.1). The building official may accept written, signed certifications from the contractor performing the work in lieu of the required inspections for damp-proofing, insulation, and lath and/or wallboard fastening if all or a portion of the work cannot be inspected on the working day following the day of the inspection request. In addition to the called inspections specified above, the building official may make or require other inspections of any construction work to ascertain compliance with the provisions of this code and other laws, which are enforced by the code enforcement agency.

110.7.2 Inspections in Hillside or Geologic Hazard Areas. At the completion of rough grading and/or foundation excavation and prior to the construction of retaining walls, footings, or bearing caissons, a soil engineer and/or an engineering geologist within their respective fields of competency shall inspect the site at the applicant's expense and render opinions in writing to the building official concerning the soil and geologic conditions actually encountered and that all known geologic hazards or constraints have been taken into account in the design of the facility.

Sections 110.8 has no proposed changes and is not shown.

ADMINISTRATIVE SECTION 111
CERTIFICATE OF OCCUPANCY

Sections 111.1 through 111.5 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 112
SERVICE UTILITIES

Sections 112.1 through 112.3 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 113
BOARD OF REVIEW

Sections 113.1 through 113.5 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 114
OCCUPANCY AND USE VIOLATIONS

Sections 114.1 through 114.6 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 115
STOP WORK ORDER

Sections 115.1 through 115.3 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 116
UNSAFE STRUCTURES AND EQUIPMENT

Sections 116.1 through 116.5 have no proposed changes and are not shown.

ADMINISTRATIVE SECTION 117
CONTRACTOR LICENSING

Sections 117.1 through 117.15 have no proposed changes and are not shown.

IBC CHAPTER 2
DEFINITIONS

IBC SECTION 202
DEFINITIONS

Section 202 has no proposed changes and is not shown.

IBC CHAPTER 7
FIRE AND SMOKE PROTECTION FEATURES

IBC SECTION 72~~2~~3
REQUIREMENTS BASED ON LOCATION IN WILDFIRE ZONES

Delete most of the currently duplicative content of this section, leaving only a reference to comply with the identical provisions found in Section R32.

72~~2~~3.1. General. Unless other more restrictive requirements, such as those imposed through Site Plan Review, apply, ~~this~~ the ignition-resistant construction requirements of Section R325 of this code shall be applicable to all new buildings, additions and repairs.

Portions proposed to be deleted are not shown, but can be seen in the IRC amendments at Section R325, which are proposed to be retained and to apply to buildings designed and constructed under the IBC.

IBC CHAPTER 15
ROOFS ASSEMBLIES AND ROOFTOP STRUCTURES

IBC SECTION 1503
WEATHER PROTECTION

Add the following sentence to Section 1503.4:

The rainfall rate to be used to size roof drainage components in unincorporated Boulder County shall be 2.4 inches per hour.

IBC SECTION 1505
FIRE CLASSIFICATION

Add a new footnote to the table heading and text of Table 1505.1 as follows:

IBC TABLE 1505.1 [a, b]

d. For roof coverings in Wildfire Zones, see Sections ~~722.4.1.1~~ R325.4.2 and ~~722.8.1~~ R325.8.1.

IBC CHAPTER 16
STRUCTURAL DESIGN

IBC SECTION 1608
SNOW LOADS

Section 1608 has no proposed changes and is not shown.

IBC SECTION 1609
WIND LOADS

Section 1609 has no proposed changes and is not shown.

IBC CHAPTER 18
FOUNDATIONS AND RETAINING WALLS

IBC SECTION 1803
GEOTECHNICAL INVESTIGATIONS

Section 1803 has no proposed changes and is not shown.

IBC SECTION 1805
DAMPPROOFING AND WATERPROOFING

1805.5 Gutters and downspouts. Gutters, downspouts, and downspout extensions are required on all buildings in unincorporated Boulder County.

Exceptions:

1. Post framed buildings.
2. Buildings where, in the opinion of the Building Official, the gutters will become damaged by sliding snow.

3. Roofs with eaves or overhangs of six feet or greater.
4. Roofs that are constructed with internal roof drains.
5. Buildings where an approved alternate means of drainage is designed by a soils engineer or other qualified registered design professional.

Sections 1806.1 through 1806.1.4.4 have no proposed changes and are not shown.

IBC CHAPTER 30
ELEVATORS AND CONVEYING SYSTEMS

This chapter is deleted in its entirety.

Elevator repairs, installations, and inspections are governed by the **COLORADO DEPARTMENT OF LABOR AND EMPLOYMENT, DIVISION OF OIL AND PUBLIC SAFETY, ELEVATOR AND ESCALATOR CERTIFICATION ACT, TITLE 9, ARTICLE 5.5, SECTIONS 1 - 7, COLORADO REVISED STATUTES.**

IBC CHAPTER 34
EXISTING STRUCTURES

IBC SECTION 3410
MOVED STRUCTURES

Sections 3410.1 through 3410.2.5 have no proposed changes and are not shown.

IBC APPENDIX CHAPTER J
GRADING

J103.2 Exemptions. A grading permit shall not be required for the following:

8. Grading of 50 cubic yards or less.
9. Grading associated with approved agricultural grading.

EXCEPTION: Irrigation ponds and stock ponds to be constructed at a depth of more than 18" must obtain a grading permit prior to construction. Irrigation ponds and stock ponds that contain water more than 24 inches deep must also meet the requirements of Appendix G of the International Residential Code.

2. **INTERNATIONAL RESIDENTIAL CODE,** ~~2009~~ 2012 edition, including specifically Appendix Chapters F, G, and H ~~and O~~ thereof, published by the International Code Council (ICC), with amendments to the following:

IRC CHAPTER 1
ADMINISTRATION
IRC SECTION R101
TITLE, SCOPE AND PURPOSE

Sections R101.1 through R101.3 have no proposed changes and are not shown.

IRC SECTION R202
DEFINITIONS

Section R202 has no proposed changes and is not shown.

IRC SECTION R301
DESIGN CRITERIA

Sections R301.2.1 and R301.2.3 and the accompanying map have no proposed changes and are not shown.

IRC TABLE R301.2(1)
CLIMATE AND GEOGRAPHIC DESIGN CRITERIA

Add a Summer Design Temperature and revise ice and shield requirement to note that ice and water shield may be required if conditions warrant, as per existing published code language.

GROUND SNOW LOAD:	Varies [1]
WIND SPEED (mph):	Varies [2]
SEISMIC DESIGN CATEGORY:	B
SUBJECT TO DAMAGE FROM:	
Weathering:	severe
Frost line depth:	30”
Termite:	Slight to Moderate
WINTER DESIGN TEMP:	1°F.
SUMMER DESIGN TEMPERATURE:	90°F.
ICE SHIELD UNDERLAYMENT REQUIRED:	~~No~~ Yes[3]
FLOOD HAZARDS:	
AIR FREEZING INDEX:	1000
ANNUAL MEAN TEMP:	50°F.
ANTICIPATED SNOW DEPTH:	
PLAINS:	12 Inches
MOUNTAINS:	24 Inches

[1]See Boulder County‘s Snow Load Map.
[2]See Boulder County‘s Wind Speed Map.
[3]In situations where there is evidence of previous damage due to the effects of ice damming or where there is clearly potential for damage due to ice damming, the provisions of Sections R905.2.7.1, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, as applicable, shall apply.

IRC SECTION R302
FIRE-RESISTANT CONSTRUCTION

This existing amendment may be deleted since all new townhouses are to have automatic residential fire sprinkler systems as required by Section R313.
~~*Revise the exception to Section R302.2 to read as follows:*~~

> ~~**Exception:** A common 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263 is permitted for townhouses with automatic residential fire sprinkler systems installed throughout if such walls~~
> ~~do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall… (remainder of exception to read as published).~~

IRC SECTION R303
LIGHT, VENTILATION, AND HEATING

Add a new Section R303.1.1 to read as follows:

> **R303.1.1 Habitable rooms.** Mechanical ventilation shall be provided in all habitable rooms by an approved mechanical ventilation system capable of providing the rate of air change required in Table N1103.5.1.

Add an exception to Section R303.8 to read as follows:

R303.8 Required heating. When the winter design temperature in Table R301.2(1) is below 60°F (16°C), every dwelling unit shall be provided with heating facilities capable of maintaining a minimum room temperature of 68°F (20°C) at a point 3 feet (914 mm) above the floor and 2 feet (610 mm) from exterior walls in all habitable rooms at the design temperature. The installation of one or more portable space heaters shall not be used to achieve compliance with this Section.

> **Exception:** Appliances relying on biofuels that are capable of maintaining the required temperature may be used to meet the requirements of this section. <u>Permanently installed automatic space heating or other approved methods must be used to prevent pipes from freezing when outdoor temperatures are below freezing and the dwelling is vacant.</u>

IRC SECTION R313
AUTOMATIC FIRE SPRINKLER SYSTEMS

<u>*Amend to delete January 1, 2013 date, since all 2012 amendments will be effective on this date, to include a modified version of existing requirements to sprinkler existing dwellings with additions or remodels/renovations when the total area exceeds 4,800 sq. ft., to add a one-time exception for 200-sq.-ft. additionsto existing structures over 4,800 sq. ft. and to delete the existing exception for not sprinklering if Fire Code hydrant fire flow requirements are met.*</u>

R313.1 Townhouse automatic fire sprinkler systems. ~~Effective for all building permit applications received on or after January 1, 2013, a~~ An automatic residential fire sprinkler system shall be installed in townhouses.

> ~~**Exception:** An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed, except as provided for in Section R313.3.~~
>
> **R313.1.1 Additions to existing townhouses.** An automatic residential fire sprinkler system shall be installed throughout existing townhouses with additions when the sum of the total floor area of the addition plus the existing townhouse is increased to 4,800 sq. ft. or greater.
>
> > **Exception:** One-time additions not exceeding 200 square feet in floor area.
>
> **R313.1.~~1~~2 Design and installation.** Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904. Systems shall be installed with a fire department connection (FDC) and other associated devices when required by the fire code official.

R313.2 One- and two-family dwellings automatic fire systems. ~~Effective for all building permit applications received on or after January 1, 2013, a~~ An automatic residential fire sprinkler system shall be installed in one- and two-family dwellings.

> ~~**Exception:** An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential sprinkler system, except as provided for in Section R313.3.~~
>
> **Exception:** An automatic residential fire sprinkler system shall not be required for federally-certified manufactured dwellings or Colorado Department of Local Affairs, Division of Housing, state-certified factory-built dwellings that are certified to editions of the International Residential Code prior to the 2012 edition.
>
> **R313.2.1 Additions to existing one- and two-family dwellings.** An automatic residential fire sprinkler system shall be installed throughout existing one- and two-family dwellings with additions when the sum of the total floor area of the addition plus the existing one- and two-family dwelling is increased to 4,800 sq. ft. or greater. The floor area of detached structures having floor areas of 120 square feet or greater that are located less than 50 feet from the dwelling shall be included in the floor area calculated for the dwelling.
>
> > **Exception:** One-time additions not exceeding 200 square feet in floor area.
>
> **R313.2.2 Remodels/renovations to existing one- and two-family dwellings.** An automatic residential fire sprinkler system shall be installed throughout existing one- and two-

family dwellings with a floor area of 4,800 sq. ft. or greater where renovations or remodeling work for which a building permit is required takes place in more than 50% of the area within the structure.

R313.2.~~1~~3 Design and installation. Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D. Systems shall be installed with a fire department connection (FDC) and other associated devices when required by the fire code official.

~~**R313.3 Automatic fire sprinkler system required.** An automatic fire sprinkler system shall be installed throughout every dwelling where one of the following conditions exists:~~

~~1. In new dwellings with a floor area in excess of 3,600 square feet. The floor area of detached structures having floor areas of 120 square feet or greater that are located less than 50 feet from the dwelling shall be included in the floor area calculated for the dwelling.~~
~~2. In existing dwellings where the combined new and existing floor area is increased to 4,800 sq. ft or greater.~~
~~3. In existing dwellings with a floor area of 4,800 sq. ft. or greater where renovations or remodeling work for which a building permit is required takes place in more than 50% of the area within the structure. Closets, stairways, and non-habitable spaces will not be included in the area calculation.~~

~~**Exception:** Dwellings which have approved fire fighting water supply hydrants within 400 feet of all portions of the structure as measured around the structure may be constructed without automatic fire sprinkler systems. In order to be considered approved fire fighting water supplies, fire flow from hydrants shall be in accordance with the provisions of Appendix Section B105.1 and Table B105.1 of the International Fire Code, Minimum Required Fire Flow and Flow Duration for Buildings.~~

~~**R313.3.1 Standards.** Automatic sprinkler systems shall be designed and installed in accordance with Section P2904 or the current National Fire Protection Association Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, NFPA 13D. Residential or quick-response standard sprinklers shall be used.~~

IRC SECTION R324
MOVED BUILDINGS

Sections R324.1 through R324.5 have no proposed changes and are not shown.

IRC SECTION R325
IGNITION-RESISTANT MATERIALS AND CONSTRUCTION

R325.1 Requirements based on location in wildfire zones.

Add language to clarify that the ignition-resistive requirements also apply to commercial and multiple-family buildings constructed under the IBC.

R325.1.1 General. Unless other more restrictive requirements, such as those imposed through Site Plan Review, apply, this Section shall be applicable to all new buildings, additions and repairs, including buildings designed and constructed in accordance with the International Building Code.

Exceptions:

1. Detached accessory structures with a floor area not exceeding 400 sq. ft.
2. Additions to structures that do not increase the existing floor area by more than 20%.
3. Additions which increase the existing floor area by more than 20% but not more than 30% need not comply, provided defensible space is provided for the entire dwelling in conformance with Sections 325.5.10, 325.6.10 or 325.7.10, as applicable.

R325.2 Wildfire zones defined. For the purpose of this code, the unincorporated portion of Boulder County is divided into wildfire zones, which shall be known and designated as Wildfire Zone 1 and Wildfire Zone 2. The wildfire zones shall include such territory or portions of the unincorporated county as shown in Figure No. 1, the Wildfire Zone Map, which is attached to and incorporated into this Section by this reference.

R325.2.1 Buildings located in more than one wildfire zone. A building or structure that is located partly in one wildfire zone and partly in another shall be considered to be in the wildfire zone in which the more restrictive conditions apply.

R325.2.2 Moved buildings. Any building or structure moved within or into any wildfire zone shall be made to comply with all the requirements for new buildings in that wildfire zone.

R325.2.3 Definitions. The following words and terms shall, for the purpose of this Section, have the meanings shown herein.

CRITICAL FIRE WEATHER. A set of weather conditions (usually a combination of low relative humidity and wind) whose effects on fire behavior make control difficult and threaten fire fighter safety.

HEAVY FUEL. Vegetation in closed canopy and mixed forest areas consisting of woody plants 6 inches to 8 inches or greater in diameter. Vegetation at the site includes: Dense conifer stands with heavy accumulation of litter and downed wood, abundant conifer regeneration, dense conifer stands that are suffering damage from insects, disease, or wind, closed stands of ponderosa or lodgepole pines, Douglas fir and/or Engleman spruce/Subalpine fir.

MEDIUM FUEL. Vegetation in closed canopy areas with some openings consisting primarily of woody plants 6 to 8 inches in diameter with some larger diameter trees. Vegetation at the

site includes: Dense brush, brush where 1/4 of the area is covered with dead fuel, stands of ponderosa pine and Douglas fir, with woody understory and/or conifer regeneration occupying at least 1/3 of the site.

LIGHT FUEL. Vegetation in open canopy areas with some leaf and needle litter consisting of primarily herbaceous and woody plants less than 1/4 inch in diameter or 3 ft. in height. Vegetation at the site includes: grasses, forbs, some shrubs and overstory trees occupying less than 1/3 of the area.

EXTREME HAZARD WILDFIRE SITES. A building site with the potential critical fire weather condition in excess of 8 days-with slopes of 40% and greater and medium fuel loading; or a building site with a critical fire weather condition in excess of 1 day with slopes greater than 40% and heavy fuel loading.

HIGH HAZARD WILDFIRE SITES. A building site with the potential critical fire weather condition of at least 8 days with slopes greater than 60% and light fuel loading; a building site with a critical fire weather condition greater than 1 day with slopes of at least 40% and medium fuel loading; a building site with a critical fire weather condition of at least 1 day with level ground or slopes not greater than 40% and heavy fuel loading.

Add a new definition (from Section 503.2 of the 2012 International Wildland-Urban Interface Code), as follows:

IGNITION-RESISTANT BUILDING MATERIAL. Ignition-resistant building materials shall comply with any one of the following:

1. Extended ASTM E 84 testing. Materials that, when tested in accordance with the test procedures set forth in ASTM E 84 or UL 723, for a test period of 30 minutes, comply with the following:

   1.1. Flame spread. Material shall exhibit a flame spread index not exceeding 25 and shall show no evidence of progressive combustion following the extended 30 minute test.

   1.2. Flame front. Material shall exhibit a flame front that does not progress more than 101/2 feet (3200 mm) beyond the centerline of the burner at any time during the extended 30 minute test.

   1.3. Weathering. Ignition-resistant building materials shall maintain their performance in accordance with this Section under conditions of use. Materials shall meet the performance requirements for weathering (including exposure to temperature, moisture and ultraviolet radiation) contained in the following standards, as applicable to the materials and the conditions of

use:

1.3.1. Method A "Test Method for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing" in ASTM D 2898, for fire-retardant-treated wood, wood-plastic composite and plastic lumber materials.

1.3.2. ASTM D 7032 for wood-plastic composite materials.

1.3.3. ASTM D 6662 for plastic lumber materials.

1.4. Identification. All materials shall bear identification showing the fire test results.

2. Noncombustible material. Material that complies with the definition for NONCOMBUSTIBLE in this Section R325.2.3.

3. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section R802.1.3 of the International Residential Code.

4. Fire-retardant-treated wood roof coverings. Roof assemblies containing fire-retardant-treated wood shingles and shakes which comply with the requirements of Section R902 of the International Residential Code and classified as Class A roof assemblies as required in Section R902 of the International Residential Code.

Add the following to the definition of "IGNITION-RESISTANT BUILDING MATERIAL":

5. Materials currently approved by the California Department of Forestry and Fire Protection, Office of the State Fire Marshal, in the publication, "Wildland Urban Interface (WUI) Products" and referred to as the "WUI Products Handbook," published by *CAL-FIRE*, Fire Engineering Division, Building Materials Listing Program (http://osfm.fire.ca.gov/strucfireengineer/pdf/bml/wuiproducts.pdf).

MODERATE HAZARD WILDFIRE SITES. A building site with the potential critical fire weather condition of at least 1 day with level or sloping ground with light fuel loading; a building site with a critical fire weather condition of at least 1 day with level or sloping ground with medium fuel loading.

Add a new definition (from Section 202 of the 2012 International Wildland-Urban Interface code) as follows:

NONCOMBUSTIBLE. As applied to building construction material means a material that, in

the form in which it is used, is either one of the following:

1. Material of which no part will ignite and burn when subjected to fire. Any material conforming to ASTM E 136 shall be considered noncombustible within the meaning of this Section.

2. Material having a structural base of noncombustible material as defined in Item 1 above, with a surfacing material not over 1/8 inch (3.2 mm) thick, which has a flame spread index of 50 or less. Flame spread index as used herein refers to a flame spread index obtained according to tests conducted as specified in ASTM E 84 or UL 723.

"Noncombustible" does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to Item 1. No material shall be classified as noncombustible that is subject to increase in combustibility or flame spread index, beyond the limits herein established, through the effects of age, moisture or other atmospheric condition.

R325.4 Restrictions in wildfire zone no. 1. Buildings constructed in Wildfire Zone 1 must comply with this Section. When additions to existing structures increase the floor area by 100% or more, existing portions of the building must be made to comply.

R325.4.1 Exterior material requirements throughout wildfire zone 1.

R325.4.2 Roof covering. Roof covering materials installed in Wildfire Zone 1 shall be listed Class A roof covering materials or be constructed as a Class A roof assembly. For roof coverings where the profile allows a space between the roof covering and roof decking, the space at the eave ends shall be fire stopped to preclude entry of flames or embers, or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D 3909 installed over the combustible decking.

R325.4.2.1 Roof valleys. When provided, valley flashings shall be not less than 0.019 inch (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide underlayment consisting of one layer of 72-pound mineral-surfaced, nonperforated cap sheet complying with ASTM D 3909 running the full length of the valley.

R325.4.3 Gutters and downspouts. Gutters and downspouts shall be constructed of noncombustible material.

R325.4.4 Spark arrestors. Chimneys serving fireplaces, barbecues, incinerators or decorative heating appliances in which solid or liquid fuel is used, shall be protected with a spark arrester. Spark arresters shall be constructed of woven or welded wire screening of 12 USA standard gauge wire (0.1046 inch)(2.66 mm) having openings not exceeding ½ inch (12.7 mm). The net

free area of the spark arrester shall not be less than four times the net free area of the outlet of the chimney.

Amend this section to permit the use of any composite decking material that has an ICC-ES evaluation report approval and an ASTM E84 flame-spread index no greater than 200.

R325.4.5 Deck walking surface. Deck walking surface materials are to be approved noncombustible materials, ignition-resistant materials in accordance with Section R325.4.2, approved wood thermoplastic composite lumber with an ASTM E84 flame-spread index no greater than 200 or any Class A roof assembly.

R325.4.6 Wildfire hazard zone classification. Upon application for a building permit, each building site within Wildfire Zone 1 shall have its site-specific wildfire hazard classified by the Building Official. Wildfire hazard sites shall be classified as extreme wildfire hazard sites, high wildfire hazard sites, or moderate wildfire hazard sites pursuant to the definitions in Section R325.2.3 Exterior materials shall be approved based on the wildfire hazard site classification. Buildings hereafter erected, constructed, enlarged, altered, repaired or moved into Wildfire Zone No. 1 shall comply with the specific construction requirements for their wildfire hazard classification.

R325.5 Restrictions for extreme hazard wildfire sites.

R325.5.1 General. Construction in extreme hazard wildfire sites shall be in accordance with Sections R325.5.2 through R325.5.10.

R325.5.2 Protection of eaves. Eaves, soffits, covered decks, and covered porch ceilings shall be protected on the exposed underside by ignition-resistant materials or by materials approved for a minimum of 1-hour fire-resistance-rated construction, 2-inch nominal dimension lumber, or 1-inch nominal fire-retardant-treated lumber, or 3/4 inch nominal fire retardant-treated plywood, identified for exterior use and meeting the requirements of Sections R802.1.3 of the International Residential Code. Fascias are required and shall be protected on the backside by ignition-resistant materials or by materials approved for a minimum of 1-hour fire-resistance-rated construction or 2-inch nominal dimensional lumber.

R325.5.3 Exterior walls. Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Noncombustible materials approved for a minimum of 1-hour fire-resistance-rated construction on the exterior side.

2. Approved noncombustible materials.

3. Heavy timber or log wall construction with a minimum member dimension or di-

ameter of 6 inches.

4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section R802.1.3 of the International Residential Code.

5. Ignition-resistant materials on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

R325.5.4 Unenclosed under floor protection. Buildings or structures shall have all underfloor areas enclosed to the ground with exterior walls in accordance with Section R325.5.3.

Exception. Complete enclosure may be omitted where the underside of all exposed floors and all exposed structural columns, beams, and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction or heavy timber construction or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section R802.1.3 of the International Residential Code.

R325.5.5 Decks, appendages, and projections. Unenclosed accessory structures attached to buildings with habitable spaces and projections, such as decks, shall be a minimum of 1-hour fire resistance-rated construction, heavy timber construction or constructed of one of the following:

1. Approved noncombustible materials,

2. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section R802.1.3 of the International Residential Code, or

3. Ignition-resistant building materials in accordance with Section R325.3.

504.7.1 Underfloor areas. When the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have all underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section R325.5.2.

R325.5.6 Exterior windows and glazing. Exterior windows, window walls, glazed doors, windows within exterior doors, and skylights shall be tempered glass, multi-layered glazing, glass block, or have a fire protection rating of not less than 20 minutes. Window frames and sashes must be metal, vinyl covered metal, solid wood, vinyl-covered solid wood or fiberglass.

R325.5.7 Exterior doors. Exterior doors and garage doors shall be approved noncombustible

construction, metal clad, solid core wood not less than 1 3/4 inches thick, or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section R325.5.6.

R325.5.8 Vents. Attic ventilation openings, foundation or under-floor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed ~~1/4~~ 1/8 inch, or shall be designed and approved to prevent flame or ember penetration into the structure.

R325.5.8.1 Vent locations. Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located at least 10 feet from property lines. Underfloor ventilation openings shall be located as close to grade as practical.

R325.5.9 Detached accessory structures. Detached accessory structures located less than 50 feet from a building containing habitable space shall have exterior walls constructed in accordance with Section R325.5.3.

R325.5.9.1 Underfloor areas. When the detached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have all underfloor areas enclosed to within 6 inches of the ground with exterior wall construction in accordance with Section R325.5.3 or underfloor protection in accordance with Section R325.5.4.

Exception: The enclosure shall not be required where the underside of all exposed floors and all exposed structural columns, beams, and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction or heavy timber construction or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section R802.1.3 of the International Residential Code.

Amend this section to clarify that, for additions projects, both existing and new structures are to be provided with defensible space, that gravel or crushed rock around structures is to be at least 3/4-inch in diameter and that columns or posts are also to have gravel or rock extending 3 feet beyond them.

R325.5.10 Defensible space. Individual buildings or structures on a property must be provided with a fuel modification zone of at least 100 ft. When additions requiring a permit occur, both existing and new structures must be provided with defensible space in accordance with this section. The fuel modification zone must be maintained at all times.

Exception: The fuel modification zone may extend to the property line if it is less than 100 ft. from the building or structure.

Vegetation, leaves, needles and dead organic material must be removed and kept clear of the structure. Trees may be located in the fuel modification zone, provided crowns do not extend within 10 feet of other trees or within 10 feet of buildings or structures. Limbs located less than 6 ft. above the ground and dead wood must be removed. A weed barrier and gravel or crushed rock not less than ¾-inch in diameter applied at least 2 inches thick must be installed beneath decks, unenclosed floors, and around the perimeter of the building to extend 3 feet beyond the exterior walls, columns or posts.

R325.6 Restrictions for high hazard wildfire sites.

R325.6.1 General. Construction in high hazard wildfire sites shall be in accordance with Sections R325.6.2 through R325.6.10.

R325.6.2 Protection of eaves. Eaves, fascias, and soffits, covered decks or covered porch ceilings shall be enclosed by using any materials permitted by this code.

R325.6.3 Exterior walls. Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Noncombustible materials approved for a minimum of 1-hour fire-resistance-rated construction on the exterior side.

2. Approved noncombustible materials.

3. Heavy timber or log wall construction with a minimum member dimension or diameter of 6 inches.

4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section R802.1.3 of the International Residential Code.

5. Ignition-resistant materials on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

R325.6.4 Unenclosed under floor protection. Buildings or structures shall have all underfloor areas enclosed to the ground, with exterior walls in accordance with Section R325.6.3.

Exception. Complete enclosure may be omitted where the underside of all exposed floors and all exposed structural columns, beams, and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction or heavy timber construction or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the International Building Code.

R325.6.5 Decks, appendages, and projections. Decks and other unenclosed accessory structures attached to buildings shall be constructed of the following materials:

Deck surface. Non-combustible material, approved wood thermoplastic composite lumber with an ASTM E84 flame-spread index no greater than 200 or materials meeting the ignition-resistant building material requirements defined in Section R325.3.

Deck framing. Deck framing may be of any material permitted by this code.

R325.6.6 Exterior windows and glazing. Exterior windows, window walls, and glazed doors, windows within exterior doors, and skylights shall be tempered glass, multilayered glazing, glass block, or have a fire protection rating of not less than 20 minutes. Window frames and sashes must be metal, vinyl covered metal, or solid wood or fiberglass.

Exception: Vinyl windows may be used in high hazard wildfire sites.

R325.6.7 Exterior doors. Exterior doors and garage doors shall be approved noncombustible construction, metal clad, solid core wood not less than 1 3/4 inches in thickness, or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section R325.6.6.

R325.6.8 Vents. Attic ventilation openings, foundation or under-floor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall no exceed 144 square inches each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed ~~1/4~~ 1/8 inches or shall be designed and approved to prevent flame or ember penetration into the structure. Gable end and dormer vents shall be located at least 10 feet from property lines. Underfloor ventilation openings shall be located as close to grade as practical.

R325.6.9 Detached accessory structures. Detached accessory structures located less than 50 feet from a building containing habitable space shall have exterior walls constructed in conformance with Section R325.6.3. When the detached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have all underfloor areas enclosed to within 6 inches of the ground with exterior wall construction in accordance with Section R325.6.3 or underfloor protection in accordance with Section R325.6.4.

Exception: The enclosure may be omitted where the underside of all exposed floor and all exposed structural columns, beams, and supporting walls are protected as required for exterior 1-hour fire-resistive-rated construction or heavy timber construction.

Amend this section to clarify that, for additions projects, both existing and new structures are to be provided with defensible space, that gravel or crushed rock around structures is to be at least

3/4-inch in diameter and that columns or posts are also to have gravel or rock extending 3 feet beyond them.

R325.6.10 Defensible space. Individual buildings or structures on a property must be provided with a fuel modification zone of at least 50 ft. When additions requiring a permit occur, both existing and new structures must be provided with defensible space in accordance with this section. The fuel modification zone must be maintained at all times.

Exception: The fuel modification zone may extend to the property line if it is less than 50 ft. from the building or structure.

Vegetation, leaves, needles and dead organic material must be removed and kept clear of the structure. Trees may be located in the fuel modification zone, provided crowns do not extend within 10 feet of other trees or within 10 feet of buildings or structures. Limbs located less than 6 ft. above the ground and dead wood must be removed. A weed barrier and gravel or crushed rock not less than ¾-inch in diameter applied at least 2 inches thick must be installed beneath decks, unenclosed floors, and around the perimeter of the building to extend 3 feet beyond the exterior walls, columns or posts.

R325.7 Restrictions for moderate hazard wildfire sites.

R325.7.1 General. Construction in moderate hazard wildfire site shall be in accordance with Sections R325.7.2 through R325.7.10.

R325.7.2 Protection of eaves. Eaves, fascias, soffits, and covered deck or covered porch ceilings may be constructed of any material permitted by this code.

R325.7.3 Exterior walls. Exterior walls ~~may be constructed of any material permitted by this code.~~ of buildings or structures shall be constructed with one of the following methods:

1. Noncombustible materials approved for a minimum of 1-hour fire-resistance-rated construction on the exterior side.

2. Approved noncombustible materials.

3. Heavy timber or log wall construction with a minimum member dimension or diameter of 6 inches.

4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section R802.1.3 of the International Residential Code.

5. Ignition-resistant materials on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

R325.7.4 Unenclosed under floor protection. Buildings or structures shall have all under floor areas enclosed to the ground with exterior walls in accordance with Section R325.7.3

Exception: Enclosure may be omitted where the underside of all exposed floors and all exposed structural columns, beams, and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction, heavy timber construction or by ¾-inch thick plywood.

R3257.5 Decks, appendages, and projections. Decks and other unenclosed accessory structures attached to buildings shall be constructed of the following materials:

R325.7.5.1 Deck surface: Noncombustible material, approved wood thermoplastic composite lumber with an ASTM E84 flame-spread index no greater than 200 or materials meeting the ignition-resistant building material requirements defined in Section R325.4.5.

R325.7.5.2 Deck framing: Deck framing may be of any material permitted by this code.

R325.7.6 Exterior windows and glazing. Window glazing, frames, and sashes may be of any material permitted by the International Residential Code.

R325.7.7 Exterior doors. Exteriors and garage doors may be of any material permitted by the International Building Code.

R325.7.8 Vents. Attic ventilation openings, soffits vents, foundation or under floor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches each. Such vents shall be covered with noncombustible corrosion-resistant mesh with openings not to exceed 1/4 inch.

R325.7.9 Detached accessory structures. Detached accessory structures may be of any material permitted by the International Building Code.

Amend this section to clarify that, for additions projects, both existing and new structures are to be provided with defensible space, that gravel or crushed rock around structures is to be at least 3/4-inch in diameter and that columns or posts are also to have gravel or rock extending 3 feet beyond them.

R325.7.10 Defensible space. Individual buildings or structures on a property must be provided with a fuel modification zone of at least 30 ft. When additions requiring a permit occur, both existing and new structures must be provided with defensible space in accordance with this section. The fuel modification zone must be maintained at all times.

Exception: The fuel modification zone may extend to the property line if it is less than 30 ft. from the building or structure.

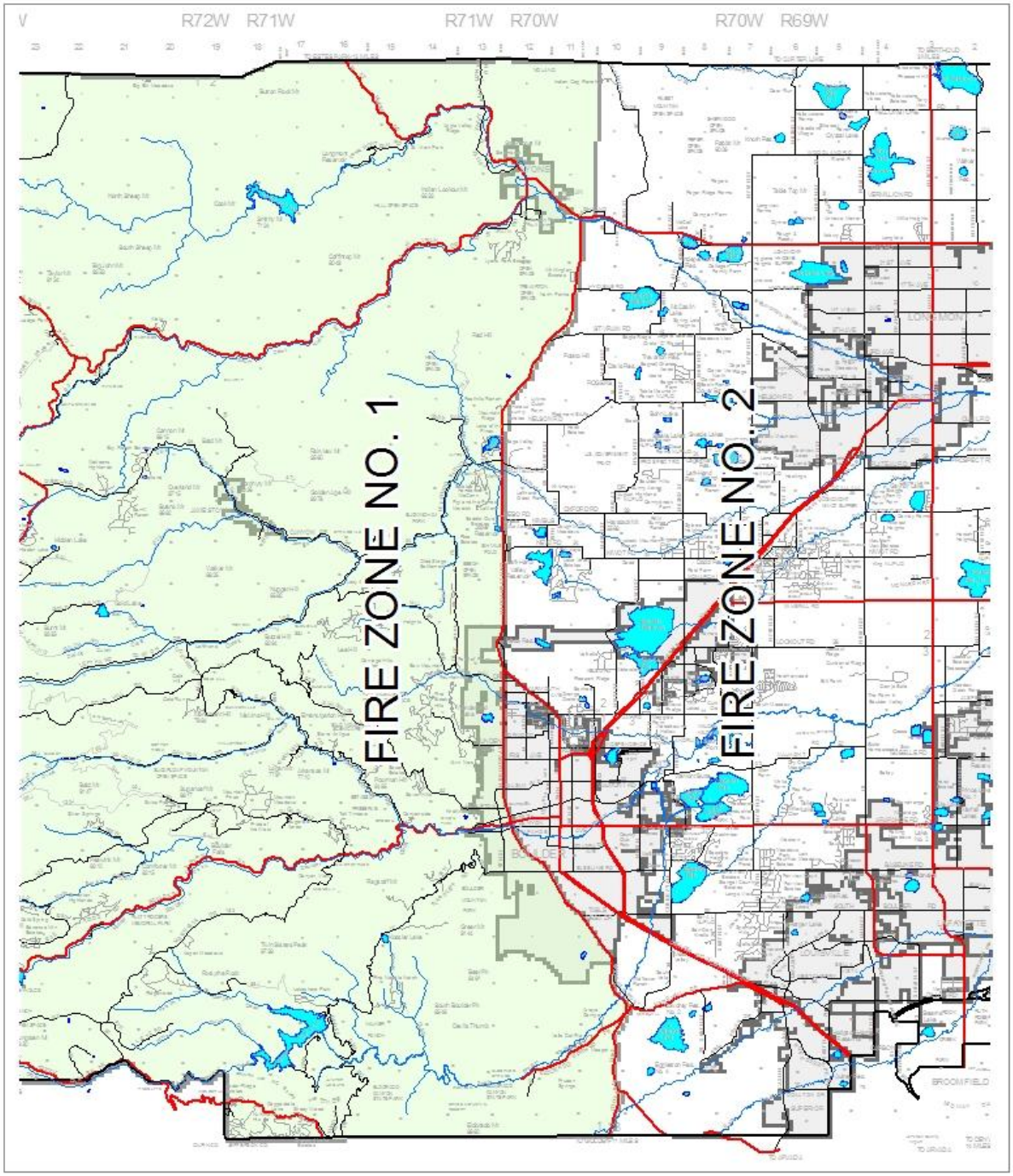
Vegetation, leaves, needles and dead organic material must be removed and kept clear of the structure. Trees may be located in the fuel modification zone, provided crowns do not extend within 10 feet of other trees or within 10 feet of buildings or structures. Limbs located less than 6 ft. above the ground and dead wood must be removed. A weed barrier and gravel or crushed rock not less than ¾-inch in diameter applied at least 2 inches thick must be installed beneath decks, unenclosed floors, and around the perimeter of the building to extend 3 feet beyond the exterior walls, columns or posts.

R325.8 Restrictions in wildfire zone 2.

R325.8.1 Roofing. Roof coverings for new buildings, additions, or materials used for re-roofing shall be Class A~~,~~ or Class B~~, or Class C~~ materials. Wood roofing materials must be listed and tested as minimum Class ~~C~~ B fire-retardant material.

FIGURE NO. ~~1~~
R325.2

WILDFIRE ZONE MAP



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IRC SECTION R326
SOLAR PRE-WIRE OPTION

R326.1 Solar pre-wire option. In accordance with Section 1, Article 37.7 of title 38 of the Colorado Revised Statutes, every new single-family detached residence shall include one of the following:

1. A residential photovoltaic solar generation system or a residential solar thermal system, or both, or
2. Upgrades of wiring or plumbing, or both, installed by the builder to accommodate the future installation of a residential photovoltaic solar generation system or a residential solar thermal system, or both, or
3. A metallic chase or conduit, or both, constructed to allow ease of future installation of the necessary wiring or plumbing for a residential photovoltaic solar generation system or a residential solar thermal system, or both.

IRC SECTION R327
ELECTRIC VEHICLE CHARGING PRE-WIRE OPTION

R327.1 Electric vehicle charging pre-wire option. Every new garage or carport that is accessory to a one- or two-family dwelling or townhouse shall include one of the following, installed in accordance with the requirements of Article 625 of the Electrical Code:

1. A Level 2 (240-volt) electric vehicle charging receptacle outlet, or
2. Upgraded wiring to accommodate the future installation of a Level 2 (240-volt) electric vehicle charging receptacle outlet, or
3. Electrical conduit to allow ease of future installation of a Level 2 (240-volt) electric vehicle charging receptacle outlet.

IRC CHAPTER 4
FOUNDATIONS

IRC SECTION R401
GENERAL

Sections R401.2.1 through R401.2.1.6 have no proposed changes and are not shown.

R401.3 Drainage.

R401.3.1 Gutters and downspouts. Gutters, downspouts, and downspout extensions are required on all buildings in unincorporated Boulder County.

Exceptions:

1. Post framed buildings.
2. Buildings where, in the opinion of the building official, the gutters will become damaged by sliding snow.
3. Roofs with eaves or overhangs of six feet or greater.
4. Roofs that are constructed with internal roof drains.

5. Buildings where an approved alternate means of drainage is designed by a soils engineer or other qualified registered design professional.

SECTION IRC R408
UNDER-FLOOR SPACE

For additional ventilation requirements for crawl spaces, See Chapter 11, Boulder County's BuildSmart program requirements.

IRC CHAPTER 8
ROOF-CEILING CONSTRUCTION

IRC SECTION R806
ROOF VENTILATION

R806.1 Ventilation Required. See the provisions of Sections R325.5.8, R325.6.8, and R325.7.8 for attic ventilation in Wildfire Zone 1.

IRC CHAPTER 9
ROOF ASSEMBLIES
IRC SECTION R902
ROOF COVERING MATERIALS

R902.1 Roof Covering Materials. See Section R325.4.2 for roof covering materials in Wildfire Zone 1.

IRC SECTION R903
ROOF DRAINAGE

Add a new subsection to read as follows:

R903.4.1.1 Sizing of Roof Drains, Scuppers, and Downspouts. The rainfall amount to be used to size roof drainage components in unincorporated Boulder County shall be 2.4 inches per hour.

IRC CHAPTER 11
ENERGY EFFICIENCY

2009 IRC Chapter 11 has been re-written in its entirety. This new version serves as Boulder County's energy code for one- and two-family dwellings and conditioned accessory buildings.

IRC SECTION N1101
GENERAL

N1101.1 Scope and intent. This Chapter 11 implements the provisions of the "Boulder County BuildSmart" program. BuildSmart serves the County's stated goals of promoting and encouraging high performing, sustainable residential development and redevelopment in the unincorporated areas of Boulder County by: Promoting development that will create energy efficient structures that reduce both the production of greenhouse gases from residential buildings and the amount of material sent to landfills; Conserving water and other natural resources in the home-building process; and insuring proper indoor air quality. BuildSmart also furthers the goals and measures outlined in the Colorado Climate Action Plan and the County's Sustainable Energy Plan. The production and efficient use of energy will continue to play a central role in the future of Colorado and the nation as a whole. The development, production, and efficient use of renewable energy will advance the security, economic wellbeing, and public and environmental health of Colorado, as well as contributing to the energy independence of our nation. The 2010 revision to BuildSmart includes both a performance and a prescriptive option for compliance, providing additional flexibility in selection of the most cost-effective design for each project.

> **N1101.1.1 Requirements for all dwellings.** Sections N1101.1 thru Section N1105.3 apply to the conditioned floor area for all one- and two-family dwellings and accessory buildings, as defined in IRC Section R202. Section N1105.2.5.3 provides a Performance Path Option for compliance. Section N1105.2.5.4 provides a Prescriptive Path Option for compliance.

N1101.2 Compliance. Compliance shall be demonstrated by meeting the amended requirements of this chapter for Climate Zone 5B.

N1101.3 Identification and definitions. Materials, systems, and equipment shall be identified in a manner that will allow a determination of compliance with the applicable provisions of this chapter.

N1101.3.1 Definitions. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings indicated in this chapter.

ADDITION. The placement of or fabrication of a structure that adds floor area to an existing structure. (See definition of floor area in Section R202).

CERTIFIED OR ACCREDITED HOME ENERGY RATER. A residential energy professional who is certified by the Residential Energy Services Network (RESNET); also referred to as an Energy Rater.

CONDITIONED FLOOR AREA. The floor area of a building that is heated or cooled or that is constructed with rough-in ducts or piping with the intent of it becoming heated or cooled at a future date. This includes: floor area with a fixed opening (such as a door or doorway) into heated or cooled space and unfinished basement space. Unenclosed unconditioned covered porches, decks and unconditioned garages are not considered conditioned floor area.

DECONSTRUCTION. The dismantling of an existing building or portion thereof without the use of heavy machinery or the destruction of the materials. Deconstruction includes the salvage of materials from the existing structure for recycling, resale, or reuse as an alternative to sending them to a landfill. There are two types of deconstruction, structural and non-structural deconstruction.

- **NON-STRUCTURAL DECONSTRUCTION** (also referred to as "soft-stripping") is the removal and reclaiming of the reusable non-structural components such as appliances, cabinets, doors, windows, flooring, fixtures, and finish materials.
- **STRUCTURAL DECONSTRUCTION** is the removal and reclaiming of the reusable structural components of a building, such as walls, floors, and roofs.

DECONSTRUCTION PROFESSIONAL. A professional engaged in the deconstruction field.

DEMOLITION. The tearing down of an existing structure and the disposal of its components or materials without the implementation of deconstruction techniques.

ENERGY EFFICIENCY RATING. An unbiased indication of a residential building's relative energy efficiency based on consistent inspection procedures, operating assumptions, climate data, and accepted calculation methods.

ENERGY RATER. See "Certified or Accredited Home Energy Rater."

FLOOR AREA (as defined in IRC Section R202). The area of the building, existing or new, under consideration, including basements and attached garages, calculated without deduction for corridors, stairways, closets, the thickness of interior walls, columns, or other features as measured from the exterior face of the exterior walls.

GROSS WALL TO FLOOR AREA RATIO. The relationship of the total wall area and the total floor area of the conditioned space including the floor area within the inside face of the exterior wall and the wall area measured between the top of the floor and the bottom of the ceiling including window and door openings.

HERS RATING. Home Energy Rating System rating.

Add definition of high-efficacy lamps from IRC Section N1101.9.

HIGH-EFFICACY LAMPS. Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:

1. 60 lumens per watt for lamps over 40 watts;
2. 50 lumens per watt for lamps over 15 watts to 40 watts; and
3. 40 lumens per watt for lamps 15 watts or less.

HOME ENERGY RATING SYSTEM. A nationally recognized and accepted method of providing a standardized evaluation of a dwelling's energy efficiency and projected energy costs resulting in a numerical rating based on standardized performances determined by the Residential Energy Services Network ("RESNET").

PERFORMANCE PATH OPTION. Construction of conditioned space where compliance is measured using the RESNET system to determine anticipated energy consumption and energy efficiency, (HERS Rating System).

PRESCRIPTIVE PATH OPTION. Construction of conditioned space where compliance is achieved by applying minimum standards to the dwellings thermal envelope, fenestration, lighting, and air leakage, (from Tables N1102.1 & N1102.1.3) Plus Either Table 3 or 4 if applicable

RECONSTRUCTED DWELLING. A dwelling which has been completely deconstructed, deconstructed to the foundation level, or deconstructed to the first floor level.

REMODEL/RENOVATION. Work within the conditioned spaces of an existing dwelling that requires a building permit but does not increase the floor area of the dwelling.

RENEWABLE ENERGY SYSTEMS. Any renewable energy systems which meet the intent of the required on-site renewable energy offset required by other Sections of this code, including solar thermal systems, solar photovoltaic electric systems, geo-thermal heating systems, wood and pellet burning stoves, boilers, or furnaces, small scale wind generation systems, and other similar systems.

N1101.4 Building thermal envelope insulation. An R-value identification mark shall be applied by the manufacturer to each piece of building thermal envelope insulation 12 inches or more in width. Alternately, the insulation installers shall provide a certification listing the type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope. For blown or sprayed insulation, the initial installed thickness, settled thickness, settled R-value, installed density, coverage area, and number of bags installed shall be listed on the certification. For insulation, the installed thickness shall be listed on the certificate. The insulation installer shall sign; date and mail the certificate or electronically mail the certificate to the Building Division office at the completion of the work.

N1101.4.1 Blown or sprayed roof/ceiling insulation. The thickness of blown in or sprayed roof/ceiling insulation shall be written in inches on markers that are installed a minimum of one in each 300 sq. ft. throughout the insulated space. The markers shall be affixed to the trusses or joists and marked with the minimum initial installed thickness with numbers a minimum of 1 inch high. Each marker shall face the attic access opening. Spray polyurethane foam thickness and installed R-value shall be listed on the certificate provided by the insulation installer.

N1101.4.2 Insulation mark installation. Insulating materials shall be installed such that the manufacturer's *R*-value mark is readily observable upon inspection.

N1101.5 Fenestration product rating. *U*-factors of fenestration products, including windows, doors, and skylights, shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer.

N1101.6 Insulation product rating. The thermal resistance (*R*-value) of insulation shall be determined in accordance with Section N1105.2.5.3 and Section N1105.2.5.4.

N1101.7 Installation. All materials, systems, and equipment shall be installed in accordance with the manufacturer's installation instructions and the provisions of this code.

N1101.7.1 Protection of exposed foundation insulation. Insulation applied to the exterior of basement walls, crawl space walls, and the perimeter of slab-on-grade floors shall have a rigid, opaque, and weather-resistant protective covering to prevent the degradation of the insulation's thermal performance. The protective covering shall cover the exposed exterior insulation and extend a minimum of 6 inches below grade.

N1101.8 Above code programs. *This Section has been deleted and is non-applicable*.

N1101.9 Certificate. A certificate bearing the address of the residence shall be completed by the installer. The certificate shall list the predominant *R*-values of the insulation installed in or on the ceiling/roof, walls, foundation, slab, basement slab, crawlspace wall or floor, and ducts outside conditioned spaces, *U*-factors for fenestration, and the solar heat gain coefficient of fenestration. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall be mailed or electronically mailed to the Building Division at the completion of the work.

Exception: Projects constructed in conformance with the Performance Path Option.

N1101.10 Renewable energy requirements. Whenever renewable energy systems are required by this chapter, those systems must be constructed on-site. If an applicant's property is situated in a part of the county where state law permits local utility companies to operate "solar gardens," "solar farms," or similar community renewable energy facilities, the renewable energy requirements of Chapter 11 may also be satisfied off site through the purchase of an adequate share in a community facility, at the discretion of the Chief Building Official. At a minimum, an "adequate" share in a community facility must (1) enable the production of an equivalent amount of power compared to what the applicant would otherwise be required to produce on-site; (2) be purchased from a facility located within Boulder County or a county contiguous to Boulder County; and (3) given that such shares do not automatically run with the applicant's land, include a mechanism that ensures the share cannot be sold or modified in any way without the consent of

Boulder County, with the exception of legal transfer to the applicant's successors-in-interest for use on the same property. Written proof that these requirements are met must be filed with the Building Department before a Certificate of Occupancy will be issued.

IRC SECTION N1102
BUILDING THERMAL ENVELOPE

N1102.1 Insulation and fenestration criteria. The building thermal envelope shall meet the requirements of Tables N1102.1 and N1102.1.2 or be constructed as prescribed by the Energy Rater.

N1102.1.1 *R*-value computation. Insulation materials used in layers, such as framing cavity insulation and insulating sheathing, shall be summed to compute the component *R*-value. The manufacturer's settled *R*-value shall be used for blown insulation <u>and aged R-value is to be used for blown foam products</u>. Computed *R*-values shall not include an *R*-value for other building materials or air films. <u>Insulator shall provide manufacturer's documentation for R-value of insulation(s) used.</u>

> **Exception:** Where the energy efficiency is being determined by using a HERS rating, the required insulation *R*-value shall be determined by the Energy Rater.

N1102.1.2 U-Factor alternative. An assembly with a *U*-factor equal to or less than that specified in Table N1102.1.2 shall be permitted as an alternative to the *R*-value in Table N1102.1.

N1102.1.3 Total UA alternative. If the total building thermal envelope UA (sum of *U*-factor times assembly area) is less than or equal to the total UA resulting from using the *U*-factors in Table N1102.1.2 (multiplied by the same assembly area as in the proposed building), the building shall be considered in compliance with Table N1102.1. The UA calculation shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The SHGC requirements shall be met in addition to UA compliance.

IRC Section N1102.2 Specific insulation requirements.

N1102.2.1 Ceilings with attic spaces. *This Section has been deleted and is non-applicable*

N1102.2.2 Ceilings without attic spaces. *This Section has been deleted and is non-applicable.*

N1102.2.3 Access hatches and doors. Access doors from conditioned spaces to unconditioned spaces shall be weather stripped and insulated to a level equivalent to the insulation on the surrounding surfaces. Access shall be provided to all equipment, which prevents damaging or compressing the insulation. A wood framed or equivalent baffle or retainer is required to be provided when loose fill insulation is installed, the purpose of which is to prevent the loose fill

insulation from spilling into the living space when the attic access is
opened and to provide a permanent means of maintaining the installed *R*-value of the loose fill insulation.

N1102.2.4 Mass walls. Mass walls, for the purposes of this chapter, shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick other than brick veneer, earth or compressed or rammed earth, and solid timbers or logs.

N1102.2.5 Steel-frame ceilings, walls, and floors. Dwellings constructed with steel-framed ceilings, walls, or floors must be constructed in accordance with Section N1105.2.5.3 in accordance with the Performance Path Option.

N1102.2.6 Floors. Floor insulation shall be installed to maintain permanent contact with the underside of the sub floor decking.

N1102.2.7 Basement walls. Exterior walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet below grade or to the basement floor, whichever is less. Exterior basement wall insulation associated with conditioned space must be continuous from the top of the foundation wall to the top of the footing and protected as prescribed in Section N1101.8.1. Walls associated with unconditioned basements shall meet this requirement unless the floor above is insulated in accordance with Section N1102.2.6 and Table N1102.1

N1102.2.8 Slab-on-grade-floors. Slab-on-grade floors with a floor surface less than 12 inches below grade shall be insulated on the perimeter in accordance with Table N1102.1. The insulation shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall be extended the distance provided in Table N1102.1 by any combination of vertical insulation, or insulation extending out from the building. Insulation extending away from the building shall be protected by pavement or by a minimum of 10 inches of soil. The top edge of the insulation installed between the exterior wall and the edge of the interior slab shall be permitted to be cut at a 45-degree angle away from the exterior wall.

N1102.2.9 Crawlspaces.

> **N1102.2.9.1 Crawlspace grade.** Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder with a minimum thickness of 10 mils. All joints of the vapor retarder shall overlap by 6 inches and be sealed and taped. The edges of the vapor retarder shall extend at least 6 inches up the stem wall and shall be attached to the stem wall.
>
> **N1102.2.9.2 Crawlspace insulation.**
>
> > **N1102.2.9.2.1 Conditioned crawlspaces and unvented crawlspaces.** Condi-

tioned crawlspaces and unvented crawlspaces shall be provided with insulation in compliance with Table N1102.1. The insulation must be permanently fastened to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizontally for at least an additional 24 inches.

N1102.2.9.2.2 Ventilated crawlspaces. Ventilated crawlspaces shall be provided with cavity insulation in accordance with Table N1102.1 <u>and may not contain mechanical equipment, ducts or plumbing</u>.

N1102.2.9.3 Crawlspace ventilation. Additions that result in an increase in conditioned floor area of 50% or more of the pre-existing dwelling and remodels/renovations where 50% or more of the existing finished wall membrane is removed shall have crawlspaces that are conditioned in accordance with IRC Section R408.3(2.)(2.2.).

Exception: For additions which do not result in an increase in conditioned floor area of 50% or more of the pre-existing dwelling and remodels/renovations where less than 50% of the existing finished wall membrane is removed, crawlspaces may be ventilated in compliance with any of the methods permitted under IRC Section R408.

N1102.2.10 Masonry veneer. Insulation shall not be required on the horizontal portion of the foundation that supports a masonry veneer.

N1102.2.11 Thermally isolated sunrooms. *This Section has been deleted and is non-applicable.*

N1102.3 Fenestration.

N11021.3.1 *U*-factor. An area-weighted average of fenestration products shall be permitted to satisfy the *U*-factor requirements.

N1102.3.2 Glazed fenestration SHGC. *This Section has been deleted and is non-applicable.*

N1102.3.3 Glazed fenestration exemption. *This Section has been deleted and is non-applicable.*

N1102.3.4 Opaque door exemption. One side-hinged opaque door assembly up to 24 square feet in area is exempted from the *U*-factor requirement in Section N1101.5(2). This exemption shall not apply to the *U*-factor alternative approach in Section N1102.1.2 and the Total UA alternative in Section N1102.1.3.

N1102.3.5 Thermally isolated sunroom *U*-factor. *This Section has been deleted and is non-*applicable.

N1102.3.6 Replacement fenestration. Where some or all of an existing fenestration unit is replaced with a new fenestration product, including sash and glazing, the replacement fenestration unit shall meet the applicable requirements for U-factor in Table N1102.1.

N1102.4 Air leakage.

N1102.4.1 Building thermal envelope. The building thermal envelope shall be durably sealed to limit infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked, gasketed, weather-stripped, or otherwise sealed with an air barrier material, suitable film, or solid material.

1. All joints, seams, and penetrations.
2. Top plates adjacent to ceilings being used as air barriers shall be sealed to the wall drywall.
3. Site-built windows, doors, and skylights.
4. Openings between window and door assemblies and their respective jambs and framing.
5. Utility penetrations.
6. Dropped ceilings or chases adjacent to the thermal envelope shall have an air barrier at the interior of the thermal envelope.
7. Knee walls.
8. Walls and ceilings separating the garage from conditioned space.
9. Behind tubs and showers on exterior walls.
10. Common walls between dwelling units.
11. Attic access openings.
12. Rim joists junction.
13. Other sources of infiltration.

N1102.4.2 Air sealing and insulation. Building envelope air tightness and insulation installation shall comply with Section N1102.4.2.1.

N1102.4.2.1 Testing. Tested air leakage is less than 5 ACH when tested with a blower door at a pressure of 50 Pascals (7ACH at 50 Pa for additions and remodels). Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation, and combustion appliances.

During testing:

1. Exterior windows and doors, fireplace, and stove doors shall be closed, but not sealed.
2. Dampers shall be closed, but not sealed, including exhaust, intake, makeup air, back draft, and flue dampers.
3. Interior doors shall be open.
4. Exterior openings for continuous ventilation systems and heat recovery ventilators shall be closed and sealed.
5. Heating and cooling systems(s) shall be turned off.

6. HVAC ducts shall not be sealed.
7. Supply and return registers shall not be sealed.

N1102.4.3 Fireplaces. *This Section has been deleted and is non-applicable*.

N1102.4.4 Fenestration air leakage. Windows, skylights, and sliding glass doors shall have an air infiltration rate of no more than 0.3 cubic foot per minute per square foot, and swinging doors no more than 0.5 cubic foot per minute per square foot when tested according to NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440 by an accredited, independent laboratory, and listed and labeled by the manufacturer.

Exception: Site built windows, skylights, and doors that serve unconditioned space.

N1102.4.5 Recessed lighting. Recessed luminaires installed in the building thermal envelope shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaires shall be IC-rated and labeled as meeting ASTM E 283 when tested a 1.57 psi pressure differential with not more than 2.0 cfm of air movement from the conditioned space to the ceiling cavity. All recessed luminaires shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

IRC SECTION N1103
SYSTEMS

N1103.1 Controls. At least one thermostat shall be installed for each separate heating and cooling system.

N1103.1.1 Programmable thermostat. Where the primary heating system is a forced air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55 degrees F or up to 85 degrees F. The thermostat shall initially be programmed with a heating temperature set point no higher than 70 degrees F and a cooling temperature set point no lower than 78 degrees F.

N1103.1.2 Heat pump supplementary heat. Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.

N1103.1.3 Equipment design. New equipment installed for heating, cooling, or ventilation must be designed and sized based on building loads in accordance with ACCA Manual J or other approved software or methodologies. Calculations must be provided to the Building Division prior to scheduling the rough inspection.

Exception: Submittal of calculations is not required for permits issued only for the re-

placement of existing equipment in existing dwellings.

N1103.2 Ducts. New ductwork installed in new dwellings, additions, and existing dwellings shall be located inside the building's thermal envelope ~~unless structural or design conditions make this type of installation impossible~~.

N1103.2.1 Insulation. Supply ducts in attics shall be insulated to a minimum of *R*-8. All other ducts shall be insulated to a minimum of *R*-6.

N1103.2.1.1 Duct design. New duct systems serving heating, cooling, and ventilation equipment shall be designed in accordance with ACCA Manual D or other approved software. Design calculations must be provided to the Building Division prior to scheduling the rough inspections.

Exception: Submittal of calculations for ductwork is not required for existing ductwork or for existing ductwork serving replacement appliances.

N1103.2.2 Sealing. Ducts, air handlers and filter boxes shall be sealed. Joints and seams shall comply with IRC Section M1601.4. Framed building cavities shall not be used as ducts. Duct tightness shall be verified by <u>one of the following</u>:

1. Post-construction test: Leakage to outdoors shall be less than or equal to 8 cubic feet per minute (cfm) per 100 square feet of conditioned floor area or a total leakage less than or equal to 12 cfm of conditioned floor area when tested at a pressure differential of 0.1 inch w. g.(25 Pascals) across the entire system, including the manufacturer's air handler end closure. All register boots shall be taped or otherwise sealed during the test. If the air Handler is not installed at the time of the test, total leakage shall be less than or equal to 4 cfm of conditioned floor area.

2. Rough-in test: Total leakage shall be less than or equal to 6 cfm per 100 ft.2 of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pascals) across the roughed in system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 4 cfm per 100 ft2 of conditioned floor area.

<u>**Exception:** Duct testing is not required for existing duct systems that are extended or enlarged as part of an addition or remodel/renovation. Exposed existing ducts and new ducts are to be sealed in accordance with IRC Section M1601.4.</u>

N1103.2.3 Building cavities. Building framing cavities shall not be used as supply or return ducts.

N1103.3 Mechanical system piping insulation. Mechanical system piping capable of carrying

fluids above 105 degrees F. or below 55 degrees F. shall be insulated to a minimum of *R*-3.

N1103.4 Circulating hot water systems. All circulating service hot water piping shall be insulated to at least *R*-2. Circulating hot water systems shall include an automatic or readily accessible manual switch that can turn off the hot water circulating pump when the system is not in use.

Add a new sentence at the beginning of Section N1103.5, to read as follows:

N1103.5 Mechanical ventilation. Mechanical ventilation of all habitable spaces is required for new dwellings and for additions and remodels/renovations in accordance with this subsection. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

N1103.5.1 Minimum required ventilation. In addition to and in lieu of the requirements of IRC Section R303.1, all residences must be provided with mechanical ventilation. All habitable rooms must be supplied with a mechanical ventilation system capable of producing an air flow in conformance with Table N1103.5.1.

Exception 1: Additions that result in an increase in conditioned floor area of less than 50% of the pre-existing dwelling and remodels/renovations where less than 50% of the existing finished wall membrane is removed.

Exception 2: Intermittent ventilation may be used in accordance with IRC Section M1507.3.3 and IRC Table M1507.3.3(2).

IRC TABLE N1103.5.1
CONTINUOUS VENTILATION AIR REQUIREMENTS IN CUBIC FEET PER MINUTE[1]

Floor Area (square feet)	Bedrooms				
	0-1	2-3	4-5	6-7	>7
< 1,500	30	45	60	75	90
1,501-3.000	45	60	75	90	105
3,001-4,500	60	75	90	105	120
4,501-6,000	75	90	105	120	150
6,001-7,500	90	105	120	135	150
>7,500	105	120	135	150	165

For SI: 1 square foot = 1 square foot=0.0929 m2.
Alternative Method of Calculating Ventilation Air Requirements:
Qfan=0.01 Afloor+7.5(Nbr+1)
Where:
Qfan=fan flow rate in cubic feet per minute (cfm).
Afloor=floor area in square feet (ft2)
Nbr = number of bedrooms; not to be less than 1
[1] Requirements are for continuous ventilation. See Exception 2 for intermittent ventilation.

N1103.6 Equipment sizing. Heating and cooling equipment shall be sized as specified in IRC

Section M1401.3.

N1103.7 Snow melt systems.

N1103.7.1 Controls. Snow and ice melting systems supplied through energy service to the building shall include automatic controls capable of shutting off the system when the pavement temperature is above 50 degrees F. and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40 degrees F.

N1103.7.2 Design. Energy use by snow and ice melt systems must be offset by on-site renewable energy generation equivalent to the energy used by the snow and ice melting equipment. Plans must be submitted that detail the type, size and location of the on-site renewable energy generation equipment.
Note: A separate building permit is required for on-site renewable energy generation equipment.

N1103.7.2.1 Design criteria for supporting on-site renewable energy equipment. On-site renewable energy generation equipment installed to offset the energy used by snow and ice melt systems must be designed to provide 34,425 BTUs per square foot per year.

N1103.8 Swimming pools. Swimming pools must be provided with energy conservation measures in accordance with Section N1103.8.1 through N1103.8.6, or be unheated. Heated pools must be heated by solar thermal or other equipment that does not rely directly or indirectly on the burning of fossil fuels or they must have their energy use offset by on-site renewable energy generation equipment equivalent to the energy use by the swimming pool. The energy use shall be determined as follows:

Exception: Swimming pools less than 200 sq. ft. in area are exempt from the requirements to provide renewable energy.

N1103.8.1 Pool heaters. All pool heaters shall be equipped with a readily accessible on-off switch to allow shutting off the heater without adjusting the thermostat setting. Pool heaters fired by natural gas or LPG shall not have continuously burning pilot lights.

N1103.8.2 Time switches. Time switches that can automatically turn heaters and pumps off and on according to a preset schedule shall be installed on swimming pool heaters and pumps.

Exception: Where pumps are required to operate solar and waste heat recovery pool heating systems.

N1103.8.3 Pool covers. Heated pools shall be equipped with a vapor retardant pool cover on or at the water surface. Pools heated to more than 90 degrees F. shall have a pool cover with a minimum insulation value of *R*-12.

N1103.8.4 Filters. Swimming pool filters must be cartridge-type filters.

N1103.8.5 Pumps. Swimming pool pumps must be multi-speed pumps.

N1103.8.6 Energy conservation design standards for swimming pools. For the purpose of calculating the energy use of swimming pools, the following are assumed. Note: This Section is not intended to limit the season or temperature of swimming pools.

Swimming pool season:
Outdoor pools: 3 months
Indoor pools: 12 months

Pool heating temperature: 82 degrees Fahrenheit or less.

On-site renewable energy requirements:
29,000 BTUs per square foot of pool surface area per year.

N1103.9 Spas. Any energy use by indoor or outdoor spas must be offset by on-site renewable energy generation equivalent to the energy use by the spa. Plans must show the annual energy use of the spa, the calculation method used to determine the expected energy use, and the on-site renewable energy system(s) which will be used to offset the energy used by the spa. All spas must be equipped with an insulated cover that is listed to provide a minimum *R*-value of at least 12.

Exception: New Spas and hot tubs which have been tested and listed for compliance with the requirements of the California Energy Commission (CEC) Title 20 (Standby power for portable electric spas shall not be greater than 5[V2/3] watts where V=the total volume of the spa in gallons), and are less than 64 square feet in surface area shall be exempted from the requirement to offset their energy usage by on-site renewable energy generation. Spas larger than 64 sq. ft. in surface are that are certified to meet the requirements of the CEC shall offset their requirements at the rate of 140,000 BTUs per square foot per year.

N1103.9.1 Design Criteria for Spas. The requirements of this Section apply to spas that do not meet the standards in Section N1103.9.

Spa Season:
Season: 12 months
On-site renewable energy requirements: 430,000 BTUs per square foot per year.

N1103.10 Other exterior energy uses. Exterior energy uses, with the exception of cooking appliances, must be offset with on-site renewable energy production.

IRC SECTION N1104
LIGHTING SYSTEMS

N1104.1 High-efficacy lamps. For the prescriptive path, ~~A~~ a minimum of 80 percent of the ~~lamps in~~ permanently installed lighting fixtures shall ~~be~~ have high-efficacy lamps.

IRC SECTION N1105
SUSTAINABILITY

N1105.1 Applicability. This Section implements the provisions of the Boulder County BuildSmart program. This Chapter applies to new one and two family dwellings and residential accessory buildings as defined in IRC Section R202, and all related residential construction work that requires a building permit including: renovated dwellings, remodeled dwellings, moved dwellings, additions to existing dwellings, and combined additions and/or remodels/renovations. Sections N1101.1 through Section N1105.3 apply to the conditioned floor area of all one- and two-family dwellings and accessory buildings as defined in IRC Section R202. Section N1105.2.5.3 provides a Performance Path Option for compliance. Section N1105.2.5.4 provides a Prescriptive Path Option for compliance. All work not constructed using the Performance Path Option shall be done in accordance with the Prescriptive Path Option.

Exception: Federally-certified manufactured dwellings and state-certified factory-built dwellings.

N1105.2 Required elements.

N1105.2.1 Deconstruction All existing buildings and portions thereof requiring removal of building materials must be deconstructed as defined in this chapter. Demolition is not permitted.

N1105.2.1.1 Penalty. Buildings that are demolished or partially demolished rather than deconstructed will, at the discretion of the Building Official, be issued a Stop Work notice for a period not exceeding 30 days.

N1105.2.1.2 Documentation of intent to deconstruct. Documentation of intent to deconstruct consisting of a deconstruction plan, a written description of deconstruction work, or the County Deconstruction Checklist must be provided at building permit application. The documentation of intent to deconstruct must include: the name of the Deconstruction Contractor, a list of the materials to be recovered, donated, or reused, and the destination of the materials. The documentation must include both Nonstructural Deconstruction and Structural Deconstruction. Items which must be donated, sold, or re-used include: cabinets, dimensional lumber, flooring, and solid core doors.

N1105.2.1.3 Verification of deconstruction of a structure. The completion of deconstruction as approved on the deconstruction plan must be verified by the Building Division. The

owner or deconstruction contractor shall provide written verification of deconstruction by means of receipts or a written log, maintained by the homeowner or general contractor, which includes the volume or weight of materials and the destination where they were transported to the Building Division office. Verification must be received prior to scheduling the rough inspections.

N1105.2.2 Construction jobsite waste reduction and recycling. All construction jobsite waste must be recycled including wood, scrap metal, cardboard, and concrete. Labeled containers must be provided at the construction-site for use in capturing recyclable material. A mixed load container may be used if that container is being sent to a waste/recycling center that will verify the weight of recycled material recovered from that mixed load.

N1105.2.2.1 Documentation of intent to recycle. Documentation of intent to recycle which consists of a recycling plan, a written description of recycling activity, or the submittal of the County Recycling Checklist must be provided at building permit application. The documentation must clearly show how the requirements of Section 1105.2.1 will be met and must specify the locations of recycling containers and the destination where material will be recycled.

N1105.2.2.2. Verification. Field inspection will be made by the Boulder County Building Division during the construction process to assure that recycling containers have been placed on-site. Prior to the final inspection, documentation must be provided to the Building Division office by the owner or waste/recycling contractor indicating the weight or volume of materials diverted from the waste stream. Materials that must be recycled include: appliances, concrete, metals, cardboard, and wood (except pressure treated or painted wood), and thermostats and other devices containing mercury. Other materials which are accepted by the waste/recycling contractor must also be recycled.

N1105.2.3. Indoor water conservation.

N1105.2.3.1 Requirements. The following new and replacement plumbing fixtures must be labeled as meeting EPA Water Sense (http://www.epa.gov/WaterSense/) criteria: bathroom sink faucets, shower heads, toilets, and urinals.

Exception: Showerheads with a maximum flow of 2.0 gpm, urinals with a flush rate of .5 gallons per flush.

N1105.2.4 Indoor air quality.

N1105.2.4.1 Attached garages. Doors between attached garages and living space shall be weather stripped to the degree necessary to make them airtight and shall be self-closing and self-latching.

N1105.2.5 Energy conservation. The provisions of this Section apply to conditioned portions of one and two family dwellings and conditioned accessory buildings as defined in IRC Section R202. Dwellings and accessory buildings with new, remodeled/renovated, conditioned floor area as defined in Section N1101.4.1 shall be constructed in accordance with either the Performance Path Option in Section N1105.2.5.3.2 or in accordance with the Prescriptive Path Option in Section N1105.2.5.4.

> **Exception:** Federally-certified manufactured dwellings and state-certified factory-built dwellings.

N1105.2.5.1 Construction. Conditioned floor area within new dwellings, additions to dwellings, remodeled dwellings, and accessory buildings that contain conditioned space shall be constructed in accordance with for the Performance Path Option in Section N1105.2.5.3.2 or in accordance with the Prescriptive Path Option in Section N1105.2.5.4. All work that is not done in accordance with the Performance Path Option must meet the requirements of the Prescriptive Path Option.

N1105.2.5.2 Calculation of energy usage for projects using the performance path option. Energy conservation requirements of this Section will be calculated by using the HERS Index applicable on the date of the adoption of this Chapter.

Delete exception because it is not necessary, i.e., dwellings allowed to be designed and constructed using the prescriptive path don't need to meet performance path requirements.

> ~~**Exception:** Dwellings constructed in accordance with the Prescriptive Path in Section N1105.2.5.4.~~

N1105.2.5.3 Performance path option requirements. The provisions of this Section apply to the conditioned floor area of all new one- and two-family dwellings, additions of conditioned floor area to one- and two-family dwellings, and remodels of the conditioned floor area of one- and two-family dwellings unless the design and construction complies with the Prescriptive Path Option of Section N1105.2.5.4.

N1105.2.5.3.1 New dwellings and reconstructed dwellings. The requirements of this subsection apply to the conditioned floor area of new dwellings and reconstructed dwellings constructed in accordance with the Performance Path Option. New dwellings and reconstructed dwellings shall meet the HERS Index Rating shown on Table 1. A RESNET model prepared by an Energy Rater shall be provided with the building permit application showing compliance with the required HERS Index Rating.

N1105.2.5.3.2 Performance path option requirements for additions to existing dwellings. The requirements of this subsection apply to the total combined conditioned floor area of existing dwellings and the new conditioned floor area of additions. The required HERS

rating will be first determined by applying Figure 1. The combined new and existing conditioned floor area must comply with Table 1 or Table 2 as indicated by Figure 1. A RESNET model prepared by an Energy Rater must be provided with the building permit application showing compliance with the required HERS Index rating.

N1105.2.5.3.3 Performance path option requirements for remodels/renovations. Remodel/renovations of conditioned interior spaces including basement spaces must meet the requirements of this subsection unless constructed in accordance with the Prescriptive Path Option in Section N1105.2.5.4. A RESNET model prepared by an Energy Rater must be provided with the building permit application showing that the entire dwelling can achieve a HERS rating of ~~at least 80~~ 75 or less.

N1105.2.5.3.4 Performance path option requirements for basement finishes. Basement finishes *(the finishing of previously unfinished conditioned basement space)* must meet the requirements of this subsection unless constructed in accordance with the Prescriptive Path Option in Section N1105.2.5.4. A RESNET model prepared by an Energy Rater must be provided with the building permit application which demonstrates that the total conditioned floor area of the dwelling has achieved a HERS rating of ~~80~~ 75 or less.

N1105.2.5.3.5 Performance path option requirements for accessory buildings. Detached accessory structures as defined in IRC Section R202 that contain conditioned space that are constructed in accordance with the Performance Path Option must meet the HERS Rating shown on Table 1. As an alternative, an acceptable analysis may be presented by an Energy Rater demonstrating that the building design achieves the applicable percent above current code. The RESNET energy model or analysis must be provided with the building permit application.

N1105.2.5.3.6 Performance path option for relocated dwellings. Dwellings relocated from one building site to another, or to a new location on the same site shall meet the requirements of Section N1105.2.5.3.3 for renovations/remodels.

N1105.2.5.3.7 Inspection requirements for projects constructed under the performance path option.

N1105.2.5.3.7.1 During construction. An Energy Rater must perform a pre-drywall inspection including a duct blaster test (if applicable) to ensure the ability of the residence to achieve the required HERS Index rating. **Prior to the installation of the wall or ceiling finish materials,** the owner or contractor must submit verification of the Energy Rater's inspection to the Building Division office which certifies that the building has been constructed in conformance with the RESNET model.

N1105.2.5.3.7.2 Final inspection. Upon completion of construction and prior to final building inspection approval, or (if applicable) issuance of a Certificate of Occupancy an

Energy Rater must perform a final inspection which includes a blower door test and submit documentation to the Building Division office certifying that the residence meets the applicable HERS Index rating, (final HERS certificate).

N1105.2.5.4 Prescriptive path option requirements. As an alternative to compliance with the Performance Path Option requirements in Section N1105.2.5.3, the conditioned floor area of new dwellings, additions, remodels/~~, and~~ renovations, as well as combinations thereof, may be constructed in accordance with the Prescriptive Path Option. Dwellings constructed in compliance with the Prescriptive Path Option must conform to Tables N1102.1, N1102.1.2, N1102.1.3 and, as applicable, Tables 3 ~~and~~ or 4.

Exceptions:

1. New dwellings with conditioned floor area exceeding ~~6,000~~ 5,000 sq. ft. must be constructed in accordance with the Performance Path Option in Section N1105.2.5.3.
2. Additions where the combined new and existing conditioned floor area exceeds ~~6,000~~ 5,000 sq. ft. must be constructed in accordance with the Performance Path Option in Section N1105.2.5.3.
3. Remodels/renovations where more than 50% of the existing finished wall membrane is removed and the conditioned floor area exceeds 5,000 square feet must be constructed in accordance with the Performance Path Option in Section N1105.2.5.3.

N1105.2.5.4.1 New dwellings and reconstructed dwellings constructed using the prescriptive path option. Conditioned areas of new and reconstructed dwellings designed and constructed to meet the Prescriptive Path requirements must conform to the values in Table N1102.1 or Table N1102.1.2. Dwellings with conditioned floor area in excess of 3,000 sq. ft. must also comply with Table 3.

N1105.2.5.4.2 Additions to existing dwellings constructed using the prescriptive path option. Additions which result in a total conditioned floor area (new and existing) of 3,000 sq. ft. or less must conform to the values of Table N1102.1 or Table N1102.1.2. Additions which result in a total conditioned floor area of not more than ~~6,000~~ 5,000 sq. ft. must also conform to the values of Table 3 or Table 4.

N1105.2.5.4.3 Remodels/renovations constructed using the prescriptive path option. Remodels/renovations in existing dwellings including basement spaces must conform to the values of Table N1102.1 or Table N1102.1.2.

N1105.2.5.4.4 Basement finishes constructed using the prescriptive path option. Basement finishes (*the finishing of previously unfinished conditioned basement space)* must conform to the values of Table N1102.1 or Table N1102.1.2.

N1105.2.5.4.5 Accessory buildings constructed using the prescriptive path option. Accessory buildings must conform to the values of Table N1102.1 or Table N1102.1.2.

N1105.2.5.4.5.1 Garages and shops. Garages and shops that contain conditioned floor area that are equipped with overhead doors must have fully weather stripped overhead doors with a minimum *R*-value of 13. Such doors must be weather stripped at the top, sides, bottom, and between the panels.

N1105.2.5.4.6 Relocated dwellings. Dwellings which have been moved to a new location on a parcel or dwellings which have been moved from one parcel to another must comply with the requirements of this Section.

N1105.2.5.4.6.1 New construction. New construction associated with the relocation of the building must conform to Table N1102.1 or Table N1102.1.2.

N1105.2.5.4.6.2 Existing building. The existing portions of the relocated building must conform to the requirements of Section N1105.2.5.4.7 for Requirements for the Existing Portions of Dwellings for Additions and Remodels/Renovations.

N1105.2.5.4.7 Prescriptive path option requirements for additions and remodels/renovations. Existing portions of dwellings shall be upgraded in accordance with ~~this subsection:~~ Section N1105.2.5.4.7.1 or Section N1105.2.5.4.7.2.

Exception: The following projects are not required to comply with items 1 - 5 of Section N1105.2.5.4.7.1 or items 1 - 3 of Section N1105.2.5.4.7.2:

1. Window replacements.
2. Bathroom remodel/renovation projects limited to the replacement of fixtures and cabinets.
3. Kitchen remodel/renovation projects limited to the replacement of cabinets, counter tops, fixtures and appliances.
4. Projects involving exterior siding replacement only
5. or to replace existing siding in Wildfire Zone 1 with ignition-resistant siding

N1105.2.5.4.7.1 Additions that result in an increase in conditioned floor area of 50% or more of the pre-existing dwelling and remodels/renovations where 50% or more of the existing finished wall membrane is removed:

1. The insulation in the existing attic must be upgraded to a value of R-38. Vaulted or cathedral ceiling cavities must be completely filled with insulation.
2. The existing dwelling must achieve a maximum air leakage of 7 air changes per hour measured at 50 pascals.
3. Mechanical ventilation is required in compliance with Section N 1103.5.
4. Crawlspace walls must be insulated in compliance with Table N1102.1 or Ta-

ble N1102.1.2.

a. A Class 1 vapor retarder shall be placed on the crawlspace grade with joints sealed and overlapped a minimum of 6 inches and edges extending at least 6 inches on to the stem wall and sealed.

b. The crawlspace must be provided with continuously-operated mechanical exhaust ventilation at a rate of 1 cu. ft./minute for each 50 sq. ft. of crawlspace floor area including an air pathway to the common area such as a duct or transfer grill. *(see IRC Section R408)* As an alternative to the continuously operated mechanical exhaust ventilation, a conditioned air supply of at least 1 cu. ft./minute for each 50 sq. ft. of crawlspace area and a return air pathway to the common area may be provided. *(see IRC Section R408)*

5. A minimum of 50 percent of the lamps in existing permanently installed lighting fixtures shall be high-efficacy lamps.
6. <u>Existing wall cavities where drywall is removed must be filled with insulation. Additional exterior insulation is required only if exterior siding is being replaced.</u>

N1105.2.5.4.7.2 Additions that result in an increase in conditioned floor area of less than 50% of the pre-existing dwelling and remodels/renovations where less than 50% of the existing finished wall membrane is removed:

1. The insulation in the existing attic must be upgraded to a value of R-38. Vaulted or cathedral ceiling cavities must be completely filled with insulation.
2. The existing dwelling must achieve a maximum air leakage of 7 air changes per hour measured at 50 pascals.
3. A minimum of 50 percent of the lamps in existing permanently installed lighting fixtures shall be high-efficacy lamps.

Exception: Additions and remodels/renovations which result in less than 500 sq. ft. of conditioned floor area must be caulked and weather stripped, but need not be tested for air leakage.

N1105.2.5.4.4 Inspection requirements for projects constructed under the prescriptive path option.

<u>During construction</u>

1. An Energy Rater must perform an insulation inspection. Insulation must meet RESNET Grade 1 Standard.
2. An Energy Rater must perform a duct blaster test (when applicable). Duct leakage must not exceed 8 cfm per 100 sq. ft. of conditioned floor area or a total leakage less than or equal to 12 cfm of conditioned floor area when tested at a pressure differential of 0.1 inch w. g. across the entire system (25 Pascals), including the manu-

facturer's air handler enclosure.

3. An Energy Rater must verify the installation of the mechanical ventilation equipment and the ventilation rate of flow.

   Exception: For additions and renovations/remodels that result in less than 500 sq. ft. of conditioned floor area, an insulation certificate shall be posted in compliance with Section N1101.9, but a duct blaster test will not be required.

Upon completion of construction and prior to final building inspection approval, an Energy Rater must perform a blower door test and submit documentation to the Building Division office verifying that air leakage does not exceed 5 air changes per hour at 50 pascals of pressure.

Exception: Whole house ~~A~~air leakage not exceeding 7 air changes per hour(ACH50) at 50 Pascals (PA) of pressure is permitted for additions and remodels/renovations.

Note: With the exception of "Fenestration U-Factor" and "Maximum Air Leakage" below, all of the existing 2009 Boulder County amendments values meet or exceed the requirements of the published 2012 IECC and IRC. Those two values, as ~~struck through~~ and underlined below, are proposed to be changed to meet or exceed the 2012 published values.

IRC TABLE N1102.1

INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT								
Fenestration U-Factor	Skylight U-Factor	Ceiling R-Value	Wood Frame Wall R-Value	Mass Wall R-Value[a]	Floor[f]. R-Value	Basement[b] Wall R-Value	Slab[c] Edge R-Value and Depth	Crawl Space[b] Wall R-Value
~~0.35~~ **0.30**	0.45	54	19+10[d]	18/24	42	15/20	15, 3ft	15/20

IRC TABLE N1102.1.2

EQUIVALENT U-FACTORS						
Ceiling U-Factor	Wood Frame Wall U-Factor	Mass Wall U-Factor[e]	Floor U-Factor[f]	Basement Wall U-Factor	Slab U-Factor and Depth	Crawl Space Wall U-Factor
0.020	0.039	0.056	0.026	0.05	0.067, 3ft	0.05

Note: *R*-Values are minimums. *U*-factors and solar heat gain coefficients (SHGC) are maximums. *R*-19 batts compressed in to nominal 2x6 framing cavity such that the *R*-value is reduced by *R*-1 or more shall be marked with the compressed batt *R*-value in addition to the full thickness *R*-value.

a. The Second *R*-value applies when more than half the insulation is on the interior.

b. The first *R*-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.

c. *R*-5 shall be added to the required slab edge *R*-values for heated slabs and the entire underside of the heated slab shall be insulated with a minimum R-value of 10.

d. "19+10" means *R*-19 cavity insulation plus *R*-10 insulated sheathing. If structural sheathing covers 25% or less of the exterior, *R*-10 sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25% of exterior, structural sheathing shall be supplemented with insulated sheathing of at least *R*-5

e. When more than half the insulation is on the interior, the mass wall *U*-factor shall be the same as the frame wall *U*-factor.

f. Floors over conditioned space are exempt from this requirement.

IRC TABLE N1101.5(2)
DEFAULT DOOR U-FACTORS

Door Type	U Factor
Uninsulated metal	1.2
Insulated metal	0.6
Wood	0.5
Insulated, nonmetal edge, max 45% glazing, any glazing double pane	0.35

IRC TABLE N1102.1.3

ADDITIONAL REQUIREMENTS						
Maximum Glazing to Floor Area Ratio	Maximum Air Leakage [3]	Appliances (New or Re-placed)	Lighting Fixtures	Insulation Installation Standards	Furnaces And Boilers [1,2]	Water Heaters [1,2]
18%	~~5~~ **3** ACH at 50 Pascals	Energy Star Certified	80% CFL or equal	RESNET grade 1 standards	92%AFUE With ECM Blower Motors	82 EF

1. Permits issued for the replacement of existing furnaces, boilers, and water heaters are exempt from these requirements.
2. For projects involving additions and remodels/renovations, furnaces and water heaters are required to meet these requirements only if they are replaced.
3. 7 Air Changes per Hour (ACH) at 50 Pascals for additions and remodels/renovations.

N1105.3 Modifications. The Chief Building Official may make modifications to the requirements of this Chapter as allowed in Section 104.10 of the Boulder County Building Code if it is determined that strict application of the requirements of this Chapter:

1. Creates practical difficulties or excessive expense in the upgrade of an existing residential structure.
2. Requires alteration to either a structure greater than 50 years in age or any structure in a historic district or site which would materially alter the historic integrity of that structure or adversely affect the historic integrity of the district or site.
3. Creates practical difficulties in meeting on-site renewable energy requirements due to

topographic constraints associated with the lot or location of the structure.

In assessing whether a request for a modification should be granted, the Chief Building Official shall, in consultation with the staff and/or an Energy Rater retained by the Building Official at the applicant's expense, determine whether the strict application of this Chapter creates a situation described in items 1 through 3 listed above. If it is determined that the request warrants a modification on this basis, the Chief Building Official shall determine what appropriate mitigation measures shall be required to ensure that the structure meets the intent and spirit of this Chapter. Appropriate mitigation measures may include requiring additional energy-saving or resource-efficient construction methods or materials, sustainable framing techniques, use of environmentally friendly materials, adoption of water-saving landscaping and irrigation, or similar conservation measures.

How To Use Figure 1 (below):

First, calculate the **Total Conditioned Floor Area** of your project by adding the area of the addition to the area of the existing dwelling, then calculate **the Percent of Increase to the Existing Structure** by dividing the area of the addition by the area of the existing dwelling.

Take the results of these two calculations and plot their intersecting point on Figure 1 to determine the next steps for compliance.

FIGURE 1

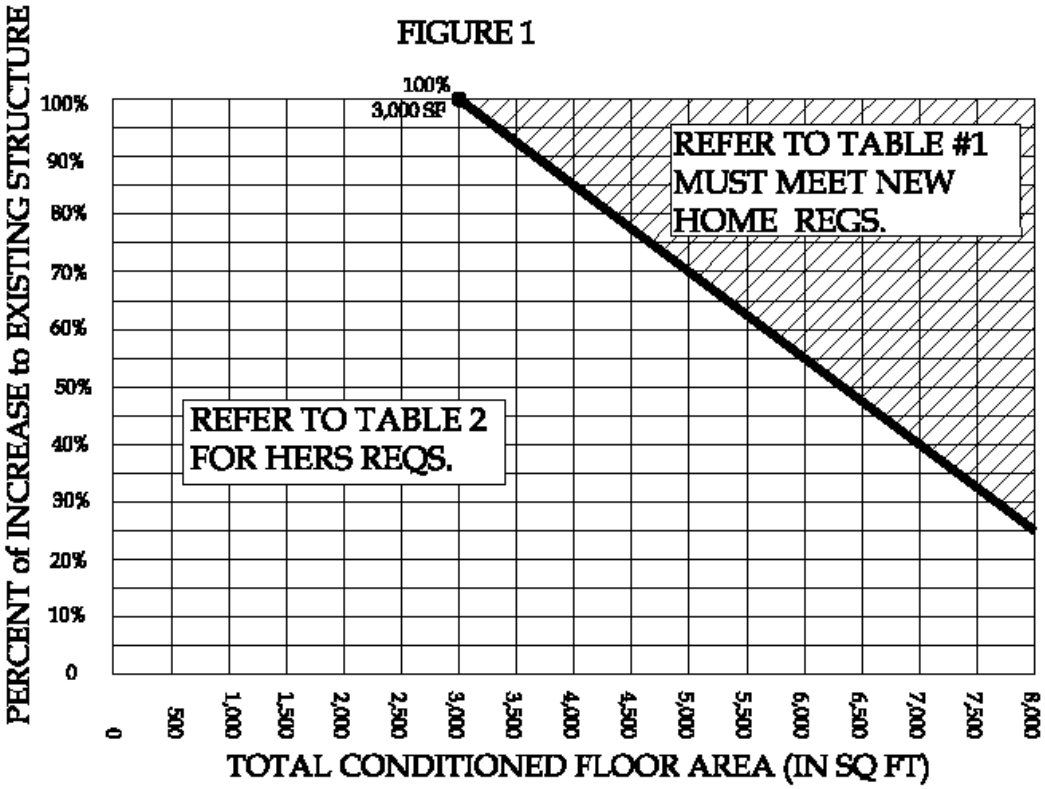
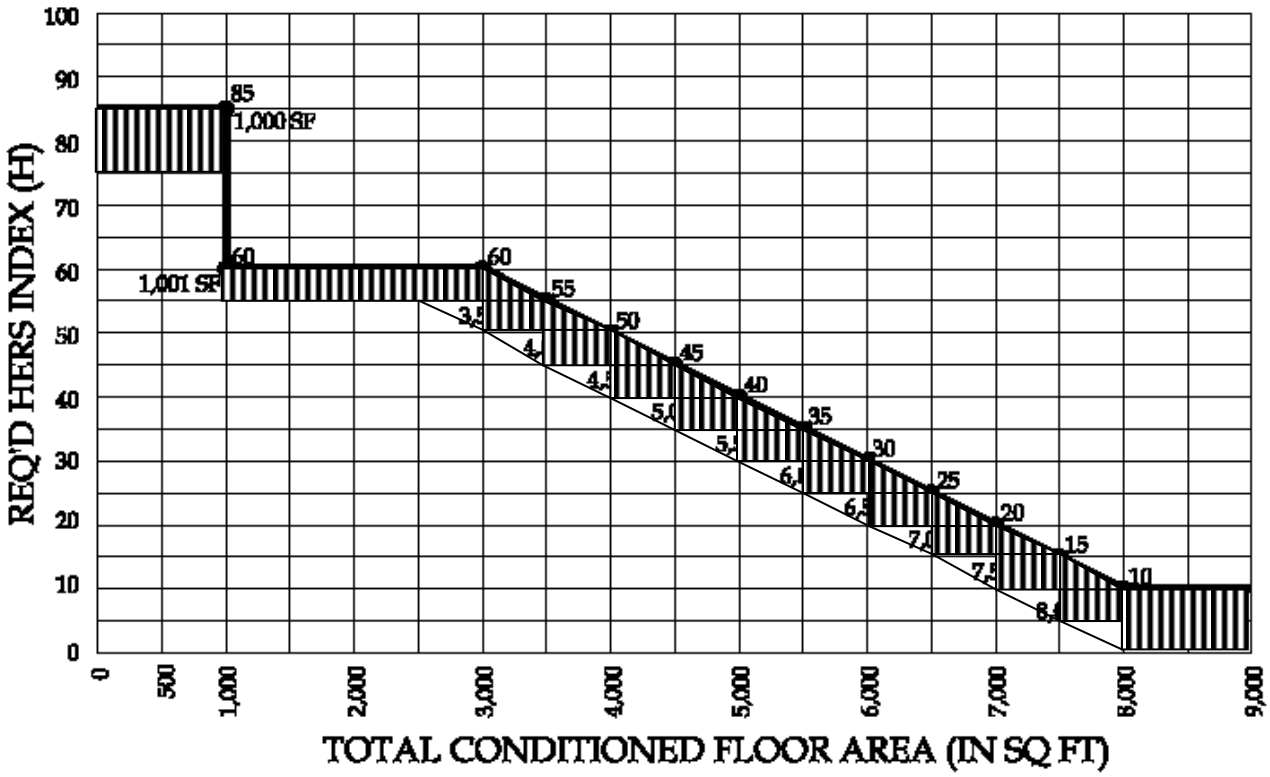
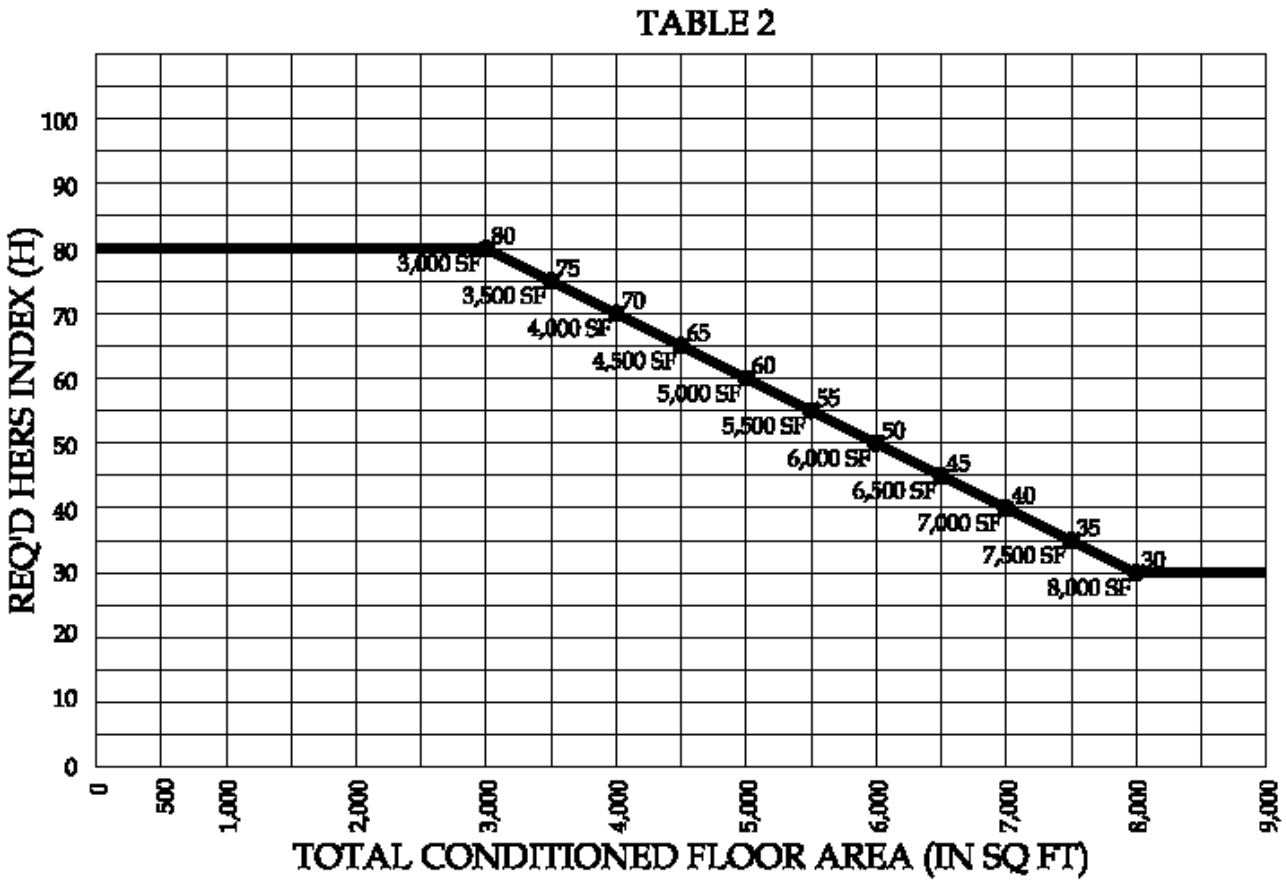

PERCENT of INCREASE to EXISTING STRUCTURE
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0
100%
3,000 SF
REFER TO TABLE #1
MUST MEET NEW
HOME REGS.
REFER TO TABLE 2
FOR HERS REQS.
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
5,500
6,000
6,500
7,000
7,500
8,000
TOTAL CONDITIONED FLOOR AREA (IN SQ FT)

TABLE 1 - NEW CONSTRUCTION



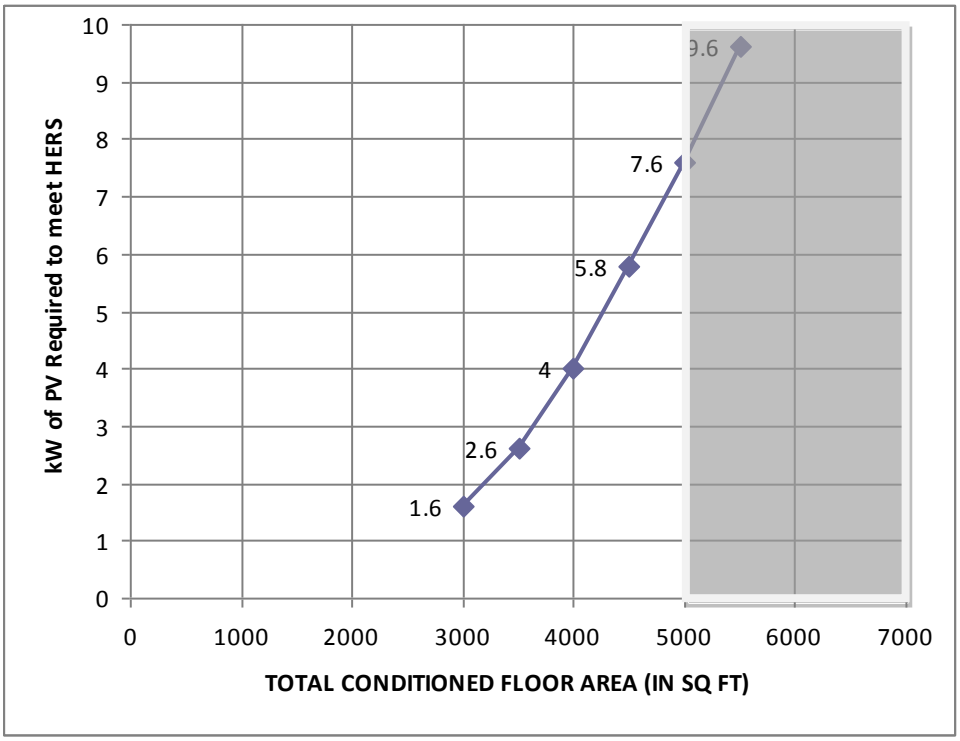
<u>Revise Table 1 to adjust required HERS ratings lower, as follows:</u>
<u>1.Change rating for homes 0 - 1,000 sq. ft. from 85 to 75.</u>
<u>2.Change rating for homes 1,001 - 2,500 sq. ft. from 60 – 55.</u>
<u>3. Change rating for homes 2,501 - 8,000 sq. ft. and above from a range of 60 – 10 to a range of 55 - 0.</u>

Table 2 HERS Rating Requirements for Additions



Revise to change maximum conditioned floor area for prescriptive to 5,000 sq. ft.

Table 3
PV Requirements for New Residences
Prescriptive Path Option 3000 sq. ft. to ~~6000~~ 5000 sq. ft.



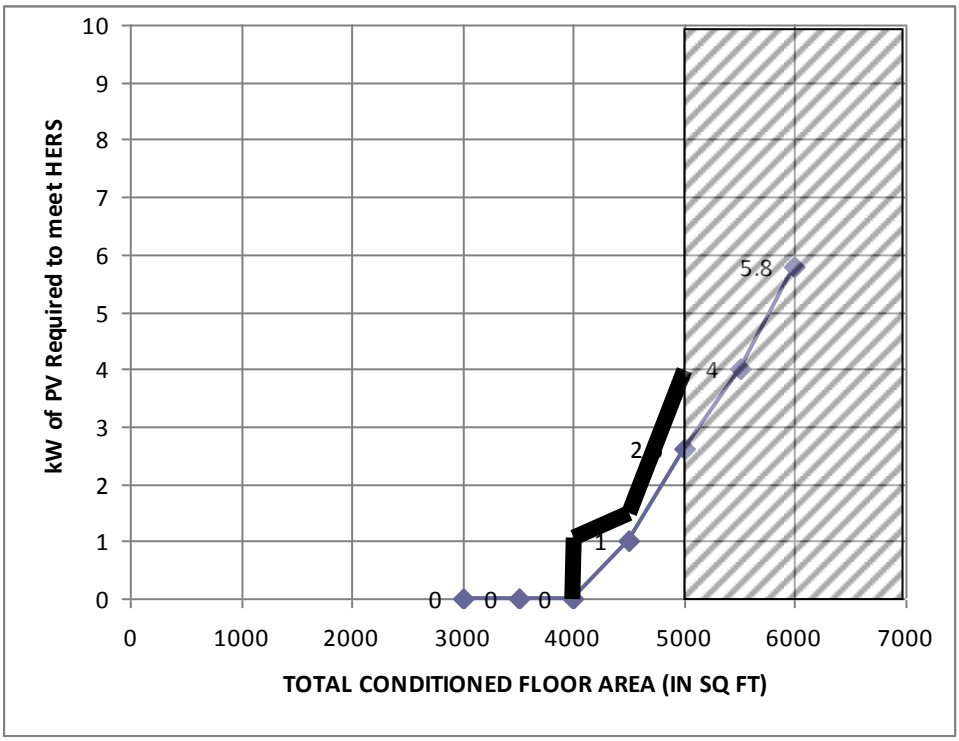
If the gross wall to floor area ratio is greater than one, the Performance Path Option must be used.

In calculating the wall to floor area ratio, the following must be included:

- *The entire floor area within the outside face of the exterior wall.*
- *The wall area measured from the top of the foundation to the bottom of the ceiling including all door and window openings.*
- *The gross wall area is divided by the gross floor area.*

Revise to show maximum 5000 sq. ft. conditioned floor area for prescriptive and adjust lower end to not require PV systems smaller than is practical to install and use.

Table 4
PV Requirements for Additions
Prescriptive Path Option 3000 sq. ft. to ~~6000~~ 5000 sq. ft.



If the gross wall to floor area ratio is greater than one, the Performance Path Option must be used.

In calculating the wall to floor area ratio the following must be included:

- The entire floor area within the outside face of the exterior wall.
- The wall area measured from the top of the foundation to the bottom of the ceiling including all door and window openings.
- The gross wall area is divided by the gross floor area.

Revise table to require 1 kW at 4,000 sq. ft. and 1.5 kW at 4,500 sq. ft., with the 1.5 kW requirement connected to the existing 2.6 kW requirement at 5,000 sq. ft. (both staff and contractors have noted that current requirements for as little as 0.2 kW of PV don't make sense). End table at 5,000 sq. ft. to reflect related revision to require Performance Path at 5,000 sq. ft. CFA instead of 6,000 sq. ft

IRC CHAPTER 12
ELEVATORS AND CONVEYING SYSTEMS

R1201 General.

Sections 1201.1 through 1201.4 have no proposed changes and are not shown.

IRC CHAPTER 13
GENERAL MECHANICAL SYSTEM REQUIREMENTS

SECTION M1302
APPROVAL

Add language to refer to state and federal lists of approved appliances.

M1302.2 Solid fuel burning equipment. No permit shall be issued for the installation of a solid-fuel-burning fireplace stove, fireplace insert or wood stove appliance unless the appliance fully conforms with the requirements for emissions testing, certification and labeling found under Title 30, Article 28, Sections 402-405 of the Colorado Revised Statutes. All such appliances to be installed must be certified by the Air Pollution Control Division of the Colorado Department of Health to meet the emissions standards set forth in Section IV of Regulation No. 4 of Volume I of the Colorado Air Quality Control Commission as EPA Phase II or Colorado Phase III solid-fuel-burning devices. Please refer to the list of Colorado-certified residential burning devices at: http://www.cdphe.state.co.us/ap/down/coloradoapprovedstoves.pdf

and the EPA-certified residential burning devices at:
http://www.epa.gov/Compliance/resources/publications/monitoring/caa/woodstoves/certifiedwood.pdf

IRC CHAPTER 24
FUEL GAS
SECTION G2417
INSPECTION, TESTING AND PURGING

Amend Section G2417.4.1 to read as follows:

G2417.1 Test pressure. The test pressure to be used shall be not less than one and one-half times the proposed maximum working pressure, but not less than ~~3~~ 10 psig (~~20~~ 67 kPa gauge)…

G2417.4.2 Test duration. The test duration shall be not less than ~~10~~ 15 minutes.

Note that these gas piping test requirements are not being changed from previous amendments, but are being placed in more appropriate locations in the IRC and the IFGC, and that these requirements match those of the cities of Boulder and Longmont.

Section G2434.3 has no proposed changes and is not shown.

IRC CHAPTER 26
PLUMBING

SECTION P2601
GENERAL

Delete the existing exception regarding garage floor drains, as it conflicts with state and local public health department requirements.

~~*Add an exception to Section P2601.2 to read as follows:*~~

> ~~**Exception:** Garage floor drains may drain to the exterior of the building to a point at least 5 feet away from the building.~~

Add a new sub-Section to read as follows:

P2601.4 Sanitation facilities for construction workers. Toilet facilities shall be provided for construction workers and such facilities shall be maintained in a sanitary condition. Construction worker toilet facilities of the non-sewer type shall conform to ANSI Z4.3

IRC CHAPTER 28
WATER HEATERS

SECTION P2801
GENERAL

P2801.2 Installation.

Add a new sub-Section to read as follows:

P2801.2.1 Heat traps. Water heating equipment not supplied with integral heat traps that serve noncirculation systems shall be provided with heat traps on the supply and discharge piping consisting of an arrangement of piping and fittings that prevents thermo-siphoning of hot water during standby periods.

Delete this existing amendment, as the same requirements are contained in IRC Section P2903.9.5.

IRC CHAPTER 29
WATER SUPPLY AND DISTRIBUTION

P2903.10 Hose bibb.

~~Add a new sub-Section to read as follows:~~

~~**P2903.10.1 Yard hydrants.** All yard hydrants that are connected to a potable water supply shall be listed sanitary hydrants or shall comply with Section P2902 for backflow and cross connection protection.~~

IRC CHAPTER 30
SANITARY DRAINAGE

SECTION P3009
GRAY WATER RECYCLING SYSTEMS

Amend this section to reflect the limitations of Colorado water law and the regulations of the Colorado Division of Water Resources. These requirements were previously located in Appendix O of the IRC, but have been moved to Section P3009 in the 2012 edition.

P3009.1 Scope. The provisions of Section P3009 shall govern the materials, design, construction and installation of gray water systems for flushing of water closets and urinals ~~and for subsurface landscape irrigation~~. See Figure~~s~~ P3009.1(1) ~~and P3009.1(2)~~.

Delete Figure P3009.1(2).

~~**FIGURE P3009.1(2)**~~
~~**GRAY WATER RECYCLING SYSTEM FOR SUBSURFACE LANDSCAPE IRRIGATION**~~

Amend Section P3009.2 to read as follows:

P3009.2 Installation. In addition to the provisions of Section P3009, systems for flushing of water closets and urinals shall comply with Section P3009.13. ~~and systems for subsurface landscape irrigation shall comply with Section P3009.14.~~ Except as provided for in Section P3009, all systems shall comply with the provisions of the other sections of this code.

Delete Section P3009.14, "Landscape irrigation systems."

~~**P3009.14 Landscape irrigation systems.**~~

Add a new Section P3010, "Rainwater Recycling Systems," with provisions identical to those currently found in Appendix O of the IRC amendments.

SECTION ~~AO104~~ P3010
RAINWATER RECYCLING SYSTEMS

~~**AO104.1**~~ **P3010.1 Compliance with Colorado revised statutes.** The reuse of rainwater must comply with all of the requirements of the Colorado Division of Water Resources and applicable state statutes, which have severe limitations on the use of rainwater.

~~**AO104.2**~~ **P3010.2 Scope.** The provisions of this Section apply to the construction, installation, alteration, and repair of rainwater recycling systems for the supply of water to water closets and urinals.

~~**AO104.3**~~ **P3010.3 Plans.** All rainwater recycling system piping, valves, connections, and equipment must be clearly detailed on the building plans.

~~**AO104.4**~~ **P3010.4 Connections to potable water.** Rainwater recycling system piping shall not be connected to potable water piping. Backflow protection devices shall comply with IRC Chapter 29.

~~**AO104.5**~~ **P3010.5 Pipe sizing.** Rainwater recycling system piping shall be sized in accordance with IRC Chapter 29.

~~**AO104.6**~~ **P3010.6 Materials.** All materials used for rainwater recycling systems shall comply with this Section.

~~**AO104.6.1**~~ **P3010.6.1 Gutters, downspouts, leaders and conductors.** Gutters, downspouts, leaders and conductors shall comply with Chapter 11 of the International Plumbing Code.

~~**AO104.6.2**~~ **P3010.6.2 Piping.** Piping shall comply with IRC Chapter 29.

~~**AO104.6.3**~~ **P3010.6.3 Storage tanks.** Storage tanks shall be made of durable material. Above-grade tanks shall be listed for above-grade use. Below-grade tanks shall be listed for below-grade use and tank surfaces shall be designed to withstand the loads imposed.

~~**AO104.7**~~ **P3010.7 Installation.** The installation of rainwater collection systems shall comply with the requirements of this Section.

~~**AO104.7.1**~~ **P3010.7.1 Collection surface.** Rainwater for reuse must be collected from hard, impermeable, unpainted roof surfaces. Rainwater may not be collected from vegetated surfaces.

Exception: Roof surfaces that are painted with materials that are certified as having a toxicity level that is acceptable for drinking water contact.

~~**AO104.7.2**~~ **P3010.7.2 Storage tanks.** The installation, use and maintenance of storage tanks

shall comply with this Section.

~~**AO104.7.2.1**~~ **P3010.7.2.1 Maintenance.** Tanks shall be maintained in a way that will prevent the entry of birds, rodents, and in Sections. Inlet openings, vent openings, and overflow pipes shall be protected by screens with aperture openings not greater than 1/16 inch. Storage tanks shall be provided with a means of draining and access for cleaning and repairs. Access openings greater than 12 inches shall be fastened and secured to prevent unintended entry.

~~**AO104.7.2.2**~~ **P3010.7.2.2 Overflow.** Storage tanks shall be equipped with an overflow drain sized to be not less than the area of the inflow piping.

~~**AO104.7.2.3**~~ **P3010.7.2.3 Underground tanks.** Underground storage tanks shall be provided with a manhole opening located a minimum of 4 inches above grade.

~~**AO104.7.2.4**~~ **P3010.7.2.4 Labeling.** Storage tanks shall bear the label "NON-POTABLE RAINWATER."

~~**AO104.7.2.5**~~ **P3010.7.2.5 Outlet.** Tank outlets shall be located a minimum distance of 4 inches above the bottom of the tank.

~~**AO104.7.3**~~ **P3010.7.3 Protection from freezing.** Where tanks, valves, pumps, and piping are installed in locations where sustained freezing temperatures occur, provisions shall be made to adequately protect the equipment from freezing.

~~**AO104.7.4**~~ **P3010.7.4 Pumps.** Pumps shall be listed and be accessible for maintenance and repair. Pumps shall be capable of maintaining a minimum pressure of 15 psi to all outlets.

~~**AO104.7.5**~~ **P3010.7.5 Roof washer.** Roof washers shall be sized to capture the first gallon for each 100 square foot of roof area. The roof washer shall operate automatically without the use of manually operated valves or devices. Roof washers shall drain to a location at least 10 feet from the foundation of the building. Drainage water shall not cause erosion.

~~**AO104.7.6**~~ **P3010.7.6 Trenching and underground pipe installation.** Water service piping shall be installed to a minimum depth of 30 inches measured from the top of the pipe. Water service piping may be located in the same trench as the building sewer provided the sewer piping is installed in accordance with IRC Section P2905.4.2.

~~**AO104.7.7**~~ **P3010.7.7 Filtration.** Collected rainwater shall be filtered by means of a filter which permits passage of particles no larger than 100 microns.

~~**AO104.7.8**~~ **P3010.7.8 Makeup water.** Plumbing fixtures that rely on rainwater must be provided with a source of makeup water to the storage tank . Potable water used for makeup water must be protected against pollution and contamination by means of an approved backflow device

or an air gap of not less than 4 inches. The makeup water supply shall be connected to the supply to the tank by means of a full open valve.

IRC APPENDIX G
SWIMMING POOLS, SPAS, AND HOT TUBS

Add a new item 11 under Section AG105.2, to read as follows:

AG105.2 Outdoor swimming pool.

11. Pool barriers constructed of wood framing and wire mesh must meet the following requirements:
    a. Wood columns in contact with earth or set in concreted that is in direct contact with earth must be preservative-treated wood in accordance with AWPA U1.
    b. Columns and rails must be mechanically fastened together.
    c. Wire mesh must be a minimum 14 gage.
    d. Wire mesh must be fastened to the columns and rails using minimum 1" galvanized staples placed a maximum of 6 inches on center.

Delete Appendix O and relocate to IRC Section P3009, where the gray water recycling provisions are located in the 2012 IRC. Since the provisions are being deleted, they are not shown below.

~~IRC APPENDIX O~~
~~GRAY WATER RECYCLING SYSTEMS~~

Move "Rainwater Recycling Systems" provisions to a new Section P3010 in the IRC. Since the provisions are being deleted, they are not shown below.

~~SECTION AO104~~
~~RAINWATER RECYCLING SYSTEMS~~

3. INTERNATIONAL MECHANICAL CODE (IMC), ~~2009~~ 2012 edition, published by the International Code Council (ICC), with amendments to the following;

IMC CHAPTER 1
ADMINISTRATION

This chapter is deleted in its entirety.

IMC CHAPTER 9
SPECIFIC APPLIANCES, FIREPLACES AND SOLID FUEL-BURNING EQUIPMENT

Add language to refer to state and federal lists of approved appliances.

901.5 Solid fuel burning equipment. No permit shall be issued for the installation of a solid-fuel-burning fireplace stove, fireplace insert, or wood stove appliance unless the appliance fully conforms with the requirements for emissions testing, certification, and labeling found under Title 30, Article 28, Sections 402-405 of the Colorado Revised Statutes. All such appliances to be installed must be certified by the Air Pollution Control Division of the Colorado Department of Health to meet the emissions standards set forth in Section IV of Regulation No. 4 of Volume I of the Colorado Air Quality Control Commission as EPA Phase II or Colorado Phase III solid-fuel-burning devices. Please refer to the list of Colorado-certified residential burning devices at:
http://www.cdphe.state.co.us/ap/down/coloradoapprovedstoves.pdf
and the EPA-certified residential burning devices at:
http://www.epa.gov/Compliance/resources/publications/monitoring/caa/woodstoves/certifiedwood.pdf

4. INTERNATIONAL PLUMBING CODE (IPC), ~~2009~~ 2012 edition, including specifically **Appendix E,** published by the International Code Council (ICC).

IPC CHAPTER 1
ADMINISTRATION

This chapter is deleted in its entirety.

IPC CHAPTER 5
WATER HEATERS

SECTION 502
INSTALLATION

502.1.2 Heat traps. Water heating equipment not supplied with integral heat traps that serve noncirculation systems shall be provided with heat traps on the supply and discharge piping consisting of an arrangement of piping and fittings that prevents thermo-siphoning of hot water during standby periods.

IPC CHAPTER 6
WATER SUPPLY AND DISTRIBUTION

SECTION 608
PROTECTION OF POTABLE WATER SUPPLY

Delete this amendment, as the requirements are contained in Section 608 of the Plumbing Code.

~~**608.1.1 Yard hydrants.** All yard hydrants that are connected to a potable water supply shall be listed sanitary hydrants or shall comply with Section Table 608.1 for backflow and cross connection protection.~~

IPC CHAPTER 11
STORM DRAINAGE

SECTION 1106
SIZE OF CONDUCTORS, LEADERS AND STORM DRAINS

Revise Section 1106.1 to read as follows:

1106.1 General. The size of the vertical conductors and leaders, building storm drains, building storm sewers, and any horizontal branches of such drains or sewers shall be based on the 100-year hourly rainfall rate of 2.4 inches per hour.

5. INTERNATIONAL FUEL GAS CODE (IFGC), ~~2009~~ 2012 edition, published by the International Code Council (ICC).

IFGC CHAPTER 1
ADMINISTRATION

This chapter is deleted, except for Section 101.2.

IFGC CHAPTER 4
GAS PIPING INSTALLATIONS
SECTION 406
INSPECTION, TESTING AND PURGING

Amend Section 406.4 to read as follows:

406.4.1 Test pressure. The test pressure to be used shall be not less than one and one-half times the proposed maximum working pressure, but not less than ~~3~~ 10 psig (~~20~~ 67 kPa gauge)…

406.4.2 Test duration. Test duration shall be not less than ½ hour for each 500 cubic feet (14 m^3) of pipe volume or fraction thereof. When testing a system having a volume of less than 10 cubic feet (0.28 m^3) or a system in a single-family dwelling, the test duration shall be not less than ~~10~~ 15 minutes. The duration of the test shall not be required to exceed 24 hours.

Note that these gas piping test requirements are not being changed from previous amendments, but are being placed in more appropriate locations in the IRC and the IFGC, and that these requirements match those of the cities of Boulder and Longmont.

IFGC CHAPTER 6

SPECIFIC APPLIANCES

602.4 Gas logs in fireplaces.

Section 602.4 has no proposed changes and is not shown.

6. **NATIONAL ELECTRICAL CODE (NEC) (ANSI/NFPA 70),** the edition currently adopted by the State of Colorado, published by the National Fire Protection Association (NFPA).

7. **INTERNATIONAL ENERGY CONSERVATION CODE (IECC),** ~~2009~~ 2012 edition, published by The International Code Council (ICC), with amendments as follows:

IECC CHAPTER 1
ADMINISTRATION

This chapter is deleted with the exception of the following Sections: 101.3, 101.4, and 101.5

Add the following language to IECC Section 101.5:

101.5 Compliance. Residential buildings shall meet the provisions of Chapter 4. Commercial buildings shall meet the provisions of Chapter 5. New commercial buildings with over 25,000 square feet in total building floor area and additions and remodels/renovations to existing commercial buildings that result in over 25,000 square feet in total building floor area shall meet the amended provisions of the International Green Construction Code, ~~Public Version 2.0~~ 2012 edition, as adopted by Boulder County.

303.1.3 Fenestration product rating.

Amend this Section to read:
U-factors of fenestration products (windows, doors, and skylights) shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer.

The remainder of this Section and Table 303.1.3(1), Table 303.1.3(2), and Table 303.1.3(3) are deleted.

401.2 Compliance.

Amend this Section to read:

Projects shall comply with all applicable provisions of Sections 401, 402, 403, and 404 or meet the provisions of Section 405.

402.2.1 Ceilings with Attic Spaces. *This Section is deleted*

402.2.2 Ceilings without Attic Spaces. *This Section is deleted*

Table 402.1.1 Insulation and fenestration requirements by component.

These tables are amended to read as follows:

IECC TABLE 402.1.1

INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]								
Fenestration U-Factor	Skylight U-Factor	Ceiling R-Value	Wood Frame Wall R-Value	Mass Wall R-Value[a]	Floor[f]. R-Value	Basement[b] Wall R-Value	Slab[c] Edge R-Value and Depth	Crawl Space[b] Wall R-Value
~~0.35~~ **0.30**	0.45	54	19+10[d]	18/24	42	15/20	15, 3ft	15/20

ADDITIONAL REQUIREMENTS						
Maximum Glazing to Floor Area Ratio	Maximum Air Leakage [3]	Appliances (New or Re-placed)	Lighting Fixtures	Insulation Installation Standards	Furnaces And Boilers [1,2]	Water Heaters [1,2]
18%	~~5~~ **3** ACH at 50 Pascals	Energy Star Certified	80% CFL or equal	RESNET grade 1 standards	92%AFUE With ECM Blower Motors	82 EF

Note: R-Values are minimums. U-factors are maximums. R-19 batts compressed into nominal 2x6 framing cavity such that the R-value is reduced by R-1 or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.

a. The Second *R*-value applies when more than half the insulation is on the interior.
b. The first *R*-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
c. *R*-5 shall be added to the required slab edge *R*-values for heated slabs.
d. "19+10" means *R*-19 cavity insulation plus *R*-10 insulated sheathing. If structural sheathing covers 25% or less of the exterior, *R*-10 sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25% of exterior, structural sheathing shall be supplemented with insulated sheathing of at least *R*-5.
e. When more than half the insulation is on the interior, the mass wall *U*-factor shall be the same as the frame wall *U*-factor
f. Floors over conditioned space are exempt from this requirement

1. Permits issued for the replacement of existing furnaces, boilers, and water heaters are exempt from these requirements.
2. For projects involving additions and remodels, furnaces and water heaters must meet these requirements only if they are being replaced.
3. 7 Air Changes per Hour (ACH) at 50 Pascals for additions and remodels

IECC TABLE 402.1.3

EQUIVALENT U-FACTORS[a]						
Ceiling U-Factor	Wood Frame Wall U-Factor	Mass Wall U-Factor[b]	Floor U-Factor	Basement Wall U-Factor[d]	Slab U-Factor and Depth	Crawl Space Wall U-Factor[c]
0.020	0.039	0.056	0.026	0.067/0.05	0.067, 3ft	0.067

a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
b. When more than half the insulation is on the interior, the mass wall *U*-factors shall be a maximum of 0.17 in Zone 1,0.14 in Zone 2,0.12 in Zone 3 3,0.10 in Zone 4 except Marine, and the same as the frame wall *U*-factor in Marine Zone 4 and zones 5 through 8
c. Basement wall *U*-factor of 0.360 in warm-humid locations as defined by Figure 301.1 and Table 301.2
d. Foundation U-factor requirements shown in Table 402.1.3 include wall construction and interior air films but exclude soil conductivity and exterior air films. *U*-factors for determining code compliance in accordance with Section 402.2.4 (total UA alternative) of Section 405 (simulated Performance Alternative) shall be modified to include soil conductivity and exterior air films.

Amend Table 402.2.5 to read as follows:

IECC TABLE 402.2.5
STEEL-FRAME CEILING, WALL, AND FLOOR INSULATION

Wood Frame R-Value Requirement	**Cold=Formed Steel Equivalent R-Value a**
	Steel Truss Ceilings b
R-35	R-44 or R-34 +3 or R-30 + 6
R-44	R-56 or R-38 + 3
R-56	R-44 + 6
	Steel Joist Ceilings b
R-35	R-46 in 2X4, or 2X6, or 2X8, R56 in any framing
R-44	R-56 in 2X4, or 2X6, or 2X8, or 2X10
	Steel-Framed Wall
R-15	R-15+5, or R-17+4, or R-24+3, or R-0+11
R-22	R-15+10, or R-22+9, or R-29+8
R-24	R-15+11, or R-22+10, or R-29+9
	Steel Joist Floor
R-15	R-22 in 2X6, R-22 in 2X8, R-22 inn 2X10
R-22	R-22 +6 in 2X6, R-22 + 14 in 2X8 or 2X10

402.2.9 Crawl space walls.

Amend this Section to read:

Crawlspaces shall be provided with conditioned air in compliance with Section N1105.3.5.4.3. Crawlspace walls shall be insulated in accordance with Table N1102.1 or Table N 1102.21.2. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finish grade level and then vertically and/or horizontally for a least an additional 24 inches. Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder with a minimum thickness of 10 mil. All joints of the vapor retarder shall overlap by 6 inches and be sealed and taped. The edges of the vapor retarder shall extend at least 6 inches up the stem wall and shall be attached to the stem wall.

402.2.11 Thermally isolated sunroom insulation. *This Section is deleted*

402.3.5 Thermally isolated sunroom *U*-factor. *This Section is deleted*

402.4.2.2 Visual inspection option. *This Section is deleted*

402.4.3 Fireplaces. *This Section is deleted.*

403.2.2 Sealing (Mandatory). *Delete the exception to item 2.*

403.9 Pools (Mandatory).

Amend this Section to read:

Swimming pools shall be provided with energy-conserving measures in accordance with Section 403.9.1 through 403.9.3, or be unheated. Heated pools must be heated by solar thermal or other equipment that does not rely directly or indirectly on the burning of fossil fuels or they must have their energy use offset by on-site renewable energy generation equipment equivalent to the energy use by the swimming pool. The energy use shall be determined by using the Boulder County Renewable Energy Offset Requirements Form, or by other means approved by the Building Official.

> **Exception:** Swimming pools less than 200 sq. ft. in area are exempt from the requirements to provide renewable energy.

403.9.3 Pool covers. *Exception deleted*

404.1 Lighting equipment. (Prescriptive)

Amend this Section to read:

A minimum of 80% of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.

405.3 Performance-based compliance

Amend this Section to read:

Compliance based on simulated energy performance requires that a proposed residence (proposed design) be shown to have an annual energy cost that is 15% less than the annual energy cost of the standard reference design. *The remainder of this Section shall remain as published.*

IECC TABLE 502.1.2
BUILDING ENVELOPE REQUIREMENTS OPAQUE ELEMENT, MAXIMUM U-FACTORS

This table shall be amended as follows:

CLIMATE ZONE 5 AND MARINE 4

	All Other	Group R
Roofs		
Insulation entirely above deck	U-0.039	U-0.039
Metal Buildings	U-0.035	U-0.035
Attic and other	U.027	U.027
Walls, Above Grade		
Mass	U-.078	U-0.068
Metal Building	U-.052	U-0.052
Metal framed	U-0.064	U-0.064
Wood framed & other	U-0.064	U-0.064
Walls Below Grade		
below-grade wall [a]	C-.119	C-.119
Floors		
Mass	U-0.074	U-0.064
Joist/Framing	U-0.033	U-0.033
Slab-on-Grade Floors		
Unheated slabs	F-0.54	F-0.540
Heated slabs	F-0.058	F-0.058

a. When heated slabs are placed below-grade, below grade walls must meet the F-factor requirements for perimeter insulation according to the heated slab-on-grade construction.

IECC TABLE 502.2(1)
BUILDING ENVELOPE REQUIREMENTS-OPAQUE ASSEMBLIES

This table shall be amended as follows:

Climate Zone 5 and Marine 4 Roofs

Insulation entirely above deck	R-25ci	R-25ci

Metal buildings (with R-5 thermal blocks a,b	R-19 + R-11ci	R-19 + R-11ci
Attic & other	R-38	R-38
Walls, Above Grade		
Mass	R-11.4ci	R-13.3ci
Metal Building b	R-13 + R-13ci	R-13 + R-13ci
Metal framed	R-13 + R-7.5ci	R-13 + R-7.5ci
Wood framed & other	R-13 + R-3.8ci or R-20	R-13 + R-7.5ci
Walls, Below Grade		
Below grade wall d	R-7.5ci	R-7.5ci
Floors		
Mass	R-10ci	R-12.5ci
Joist/framing Steel.(wood)	R-30	R-30
Slab-on-Grade Floors		
Unheated slabs	R-10, for 24 in. below	R-10, for 24 in. below
Heated slabs	R-15, for 36 in. below	R-15, for 36 in. below
Opaque doors		
Swinging	U-0.37	U-0.37
Roll-up or sliding	U-4.75	U-4.75

For SI: 1 inch = 25.4 mm.

CI= Continuous insulation. NR= No requirement

a. When using *R*-value compliance method, a thermal spacer block is required, otherwise use the *U*-factor compliance method. (see Tables 502.1.2 and 502.2(2).

b. Assembly descriptions can be found in Table 502.2(2).

c. *R*-5.7 CI is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or les on center horizontally, with ungrouted cores filled with material having a maximum thermal conductivity of 0.44 Btu-in/h-f2 F.

d. When heated slabs are placed below grade, below=grade walls must meet the exterior insulation requirements for perimeter insulation according to the heated slab-on-grade construction.

e. Steel floor joist systems shall be *R*-38.

IECC TABLE 502.2(2)
BUILDING ENVELOPE REQUIREMENTS-OPAQUE ASSEMBLIES

This table shall be amended as follows:

Roofs	Description	Reference
R-22	Standing seam roof with single fiberglass insulation layer. This construction is R-19 fiberglass insulation batts draped per-pendicular over the purlins. A minimum r-3.5 thermal spacer block is placed above the purlin/batt, and the roof deck is Sec-tionured to the purlins.	ASHRAE/IESNA 90.1 Table A2.3 including Addendum "G"
R-15 + R-15 R-15 + R+22	Standing seam roof with two fiberglass insulation layers.	ASHRAE/IESNA 90.1

	The first R-value is for faced fiberglass insulation batts draped over purlins. The Sectionond R-value is for unfaced fiberglass insulation batts installed parallel to the purlins. A minimum R-3.5 thermal spacer block is placed above the purlin/batt, and the roof deck is Sectionured to the purlins.	Table A2.3 including Addendum "G"
R-13 + R-22	Filled cavity fiberglass insulation. A continuous vapor barrier is installed below the purlins and un-interrupted by framing members. Both layers of uncompressed, unfaced fiberglass insulation rest o top of the vapor barrier and are installed parallel, between the purlins. A minimum R-3.5 thermal spacer block is placed above the purlin/batt, and the roof deck is secured to the purlins.	ASHRAE/IESNA 90.1 Table A2.3 including Addendum "G"
Walls		
R-18, R-22	Single fiberglass insulation layer. The construction is faced fiberglass insulation batts installed ver-tically and compressed between the metal wall panels and the steel framing.	ASHRAE/IESNA 90.1 Table A3.2 including Addendum "G"
R-15 + R6.4 R-22 + R6.4	The first T-value is for faced fiberglass insulation batts installed perpendicular and compressed between the metal wall panels and the steel framing. The Second rated R-value is for continuous rigid insulation installed between the metal wall panel and steel framing, or on the interior of the steel framing.	ASHRAE/IESNA 90.1 Table A3.2 including Addendum "G"

IECC TABLE 502.3
BUILDING ENVELOPE REQUIREMENT: FENESTRATION

Climate Zone	**5 and Marine 4**
Vertical fenestration (40% maximum of above-grade wall	
U-Factor	
Framing material other than metal with or without metal reinforcement or clad-ding.	
U factor	0.35
Metal framing with or without thermal break	
Curtain wall/storefront U-factor	0.42
Entrance door U-factor	0.80
All other U-factor [a]	0.50
SHGC-all frame types	
SHGC: PF < 0.25	0.40
SHGC: 0.25 ≤ PF< 0.5	NR
SHGC: PF≥0.5	NR
Skylights (3%maximum)	
U-factor	0.50
SHGC	0.40

NR= No requirement.
PF= Projection factor (see Section 502.3.2)
a. All others includes operable windows, fixed windows and nonentrance doors.

Add a new IECC subsection 502.4.9 to read as follows:

502.4.9 Air barriers. A continuous air barrier shall be provided throughout the building thermal envelope. The air barriers shall be permitted to be located on the inside or outside of the building envelope, located within the assemblies composing the envelope, or any combination thereof. The air barrier shall comply with Sections 502.4.1.1 and 502.4.1.2.

Section 502.4.9.1 The continuous air barrier shall be constructed to comply with all of the following:

1. The air barrier shall be continuous for all assemblies which are the thermal envelope of the building and across the joints and assemblies.

2. Air barrier joints and seams shall be sealed including sealing transitions in places and changes in materials. Air barrier penetrations shall be sealed in accordance with Section 502.4.2. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movement.
3. Recessed lighting fixtures shall comply with Section 504.2.8. Where similar objects are installed which penetrate the air barrier, provisions shall be made to maintain the integrity of the air barrier.

Exception: Buildings that comply with Section 502.4.9.2(3) below are not required to comply with either 1 or 3.

Section 502.4.9.2 Air barrier compliance options. A continuous air barrier for the opaque building envelope shall meet the requirements of at least one of the compliance options in Section 502.4.1.2(1), 502.4.1.2(2), or 502.4.1.2(3).

502.4.9.2.1 Materials. One of the individual materials listed in items 1 through 13 with joints sealed or any material with an air permeability no greater than 0.02 $L/s \cdot m^2$ under a pressure differential of 75 Pa (0.004 cfm/ft^2 under a pressure differential of 0.3 in. water (1.57 lb/ft^2)) when tested in accordance with ASTM E2178. Complying materials shall be installed as air barriers in accordance with manufacturer's installation instructions.

1. Plywood - minimum 3/8 in (10 mm)
2. Oriented strand board - minimum 3/8 in (10 mm)
3. Extruded polystyrene insulation board - minimum ½ in (12 mm)
4. Foil-back polyisocyanurate insulation board – minimum ½ in (12 mm)
5. Spray foam with a minimum density of 1.5 pcf (2.4 kg/m3) no less than 1.5 in (36 mm)

6. Spray foam with a density between 0.4 and 1.5 pcf (0.6 and 2.4 kg/m3) no less than 3 in (72 mm)
7. Exterior or interior gypsum board - minimum 1/2 in (12 mm)
8. Cement board - minimum 1/2 in (12 mm)
9. Built up roofing membrane
10. Modified bituminous roof membrane
11. Fully adhered single-ply roof membrane
12. A Portland cement/sand parge, or gypsum plaster minimum 5/8 in (16 mm) thick
13. Cast-in-place and precast concrete.
14. Fully grouted concrete block masonry.
15. Sheet steel or aluminum

502.4.9.2.2 Assemblies. Assemblies of materials and components shall have an average air leakage not to exceed 0.2 L/s·m2 @ 75 Pa (0.04 cfm/ft2 under a pressure differential of 0.3" w.g. (1.57psf)) when tested in accordance with ASTM E2357 or ASTM E1677.

502.4.9.2.3 Building test. The completed building shall be tested and the air leakage rate of the building envelope shall not exceed 2.0 L/s·m^2 @ 75 Pa (0.40 cfm/ft^2 at a pressure differential of 0.3" w.g. (1.57 psf)) in accordance with ASTM E779 or an equivalent method approved by the code official.

502.4.9.3 Air barrier penetrations. Penetrations of the air barrier and paths of air leakage shall be sealed with caulking materials or closed with gasketing systems compatible with the construction materials and location. Joints and seals shall be sealed in the same manner or taped or covered with a moisture vapor-permeable wrapping material. Sealing materials shall be appropriate to the construction materials being sealed. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movement.

502.4.9.4 Fenestration. The air leakage of fenestration assemblies and doors shall meet the provisions of Table 502.4.9.4. Testing shall be in accordance with the applicable reference test standard referenced in Table 502.4.9.4 and all fenestration assemblies shall be listed and labeled.

Exceptions:

1. Field-fabricated fenestration assemblies that are sealed in accordance with Section 502.4.1 shall not be tested, listed or labeled.
2. Fenestration in buildings that comply with Section 502.4.2 shall not be tested, listed or labeled.

Add a new Table 502.4.3 to read as follows:

IECC TABLE 502.4.9.4
MAXIMUM AIR INFILTRATION RATE FOR FENESTRATION ASSEMBLIES

Fenestration Assembly	Maximum Rate [a]
Windows	0.20
Sliding Doors	0.20
Swinging Doors	0.20
Skylights	0.20
Curtain Walls	0.06
Storefront Glazing	0.06
Commercial Glazed Swinging Entrance Doors	1.00
Revolving Doors	1.00
Garage Doors	0.40[b]
Rolling doors	1.00

a. cfm per square foot of fenestration area when tested in accordance with NFRC 400, AAMA/WDMA/CSA101/I.S.2/A440 or ASTM E283 at 1.57 psf (75 Pa). Alternatively the maximum rate for Windows, Sliding and Swinging Doors and Skylights is permitted to be 0.3 cfm per square foot of fenestration area when tested in accordance with AAMA/WDMA/CSA101/I.S.2/A440 at 6.24 psf (300 Pa)
b. cfm per square foot of fenestration or door area when tested in accordance with NFRC 400, AAMA/WDMA/CSA101/I.S.2/A440, ANSI/DASMA 105 or ASTM E283 at 1.57 psf (75 Pa)

505.2.2.2 Automatic lighting shutoff.

Amend the first paragraph to read

Buildings larger than 2,000 square feet shall be equipped with an automatic control device to shut of lighting in those areas. This automatic control device shall function on either: *The remainder of this Section remains as published.*

Add a new Section 507.

IECC SECTION 507
SYSTEM COMMISSIONING

507.1 General. This Section covers the commissioning of the building mechanical systems in Section 503 and electrical power and lighting systems in Section 505.

507.2 Mechanical systems commissioning and completion requirements.

Prior to passing the final mechanical inspection, the *registered design professional* shall provide evidence of mechanical systems *commissioning* and completion in accordance the provisions of this Section.

Drawing notes shall clearly indicate provisions for *commissioning* and completion requirements in accordance with this Section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner and made available to the *code official* upon request in accordance with Sections 507.2.4 and 507.2.5

Exceptions: The following systems are exempt from the commissioning requirements:

1. Mechanical systems in buildings where the total building capacity does not exceed 480,000 Btu/h cooling capacity and 600,000 Btu/h heating capacity.
2. Systems included in Section 503.3 that serve dwelling units and sleeping units in hotels, motels, boarding houses or similar units

507.2.1 Commissioning plan. A *commissioning plan* shall be developed by a *registered design professiona*l or approved *agency* and shall include as a minimum the following items:

1. A narrative describing the activities that will be accomplished during each phase of commissioning, including guidance on who accomplishes the activities and how they are completed,
2. Equipment and systems to be tested, including but not limited to, the specific equipment, appliances or systems to be tested and the number and extent of tests.
3. Functions to be tested, including, but not limited to calibrations and economizer controls.
4. Conditions under which the test shall be performed including, but not limited to, affirmation of winter and summer design conditions and full outside air.
5. Measurable criteria for performance.

507.2.2 Systems adjusting and balancing. HVAC systems shall be balanced in accordance with generally accepted engineering standards. Air and water flow rates shall be measured and adjusted to deliver final flow rates within the tolerances provided in the product specifications. Test and balance activities shall include as a minimum the following:

507.2.2.1. **Air systems balancing**. Each supply air outlet and zone terminal device shall be equipped with means for air balancing in accordance with the requirements of Chapter 6 of the International Mechanical Code. Discharge dampers are prohibited on constant volume fans and variable volume fans with motors 10 hp (18.6 kW) and larger. Air systems shall be balanced in a manner to first minimize throttling losses then, for fans with system power of greater than 1 hp, fan speed shall be adjusted to meet design flow conditions.

Exception: Fans with fan motors of 1 hp or less.

507.2.2.2 Hydronic systems balancing. Individual hydronic heating and cooling coils shall be equipped with means for balancing and measuring flow. Hydronic systems shall be proportionately balanced in a manner to first minimize throttling losses, then the pump impeller shall be trimmed or pump speed shall be adjusted to meet design flow conditions. Each hydronic system shall have either the capability to measure pressure across the pump, or test ports at each side of each pump.

Exceptions:
1. Pumps with pump motors of 5 hp or less.
2. When throttling results in no greater than five percent of the nameplate horsepower draw above that required if the impeller were trimmed.

507.2.3 Functional performance testing.

507.2.3.1 Equipment. Equipment functional performance testing shall demonstrate the installation and operation of components, systems, and system-to-system interfacing relationships in accordance with approved plans and specifications such that operation, function, and maintenance serviceability for each of the commissioned systems is confirmed. Testing shall include all modes of and *sequence of operation*, including under full-load, part-load and the following emergency conditions:

1. All modes as described in the *sequence* of *operation*,
2. Redundant or *automatic* back-up mode,
3. Performance of alarms, and
4. Mode of operation upon a loss of power and restoration of power.

Exception: Unitary or packaged HVAC equipment listed in Tables 503.2.3 (1) through (3) that do not require supply air economizers.

507.2.3.2 Controls. HVAC control systems shall be tested to document that control devices, components, equipment, and systems are calibrated, adjusted and operate in accordance with approved plans and specifications. *Sequences of operation* shall be functionally tested to document they operate in accordance with *approved* plans and specifications.

507.2.3.3 Economizers. Air economizers shall undergo a functional test to determine that they operate in accordance with manufacturer's specifications.

507.2.4 Preliminary commissioning report. A preliminary report of commissioning test procedures and results shall be completed and certified by the *registered design professional* or *approved agency* and provided to the building owner. The report shall be identified as "Preliminary Commissioning Report" and shall identify:

1. Itemization of deficiencies found during testing required by this Section that have not been corrected at the time of report preparation.
2. Deferred tests that cannot be performed at the time of report preparation because of

climatic conditions.

3. Climatic conditions required for performance of the deferred tests.

507.2.4.1 Acceptance of report. *Buildings*, or portions thereof, shall not pass the final mechanical inspection until such time as the *code official* has received a letter of transmittal from the *building* owner acknowledging that the *building* owner has received the Preliminary Commissioning Report.

507.2.4.2 Copy of report. At the request of the *code official*, a copy of the Preliminary Commissioning Report shall be made available for review.

507.2.5 Completion requirements. The *construction documents* shall specify that the *construction documents* described in this Section be provided to the *building* owner within 90 days of the date of receipt of the *certificate of occupancy*.

507.2.5.1 Drawings. Construction documents shall include as a minimum the location and performance data on each piece of equipment.

507.2.5.2 Manuals. An operating manual and a maintenance manual shall be in accordance with industry-accepted standards shall be provided and shall include all of the following:

1. Submittal data stating equipment size and selected options for each piece of equipment requiring maintenance.
2. Manufacturer's operation manuals and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall be clearly identified.
4. Names and addresses of at least one service agency.
5. HVAC controls system maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions. Desired or field-determined setpoints shall be permanently recorded on control drawings at control devices or, for digital control systems, in programming comments.
6. A complete narrative of how each system is intended to operate, including recommended setpoints.

507.2.5.3 System balancing report. A written report describing the activities and measurements completed in accordance with Section 507.2.2.

507.2.5.4 Final commissioning report. A complete report of test procedures and results identified as "Final Commissioning Report" shall include:

1. Results of all Functional Performance Tests.
2. Disposition of all deficiencies found during testing, including details of corrective measures used or proposed.

3. All Functional Performance Test procedures used during the commissioning process including measurable criteria for test acceptance, provided herein for repeatability.

Exception: Deferred tests which cannot be performed at the time of report preparation due to climatic conditions.

507.3 Lighting controls completion requirements. Prior to issuance of a *certificate of occupancy*, the *registered design professional* shall provide evidence of lighting and electrical systems *functional testing* in accordance with Section 508.3.1

507.3.1 Functional testing. Testing shall ensure that control hardware and software are calibrated, adjusted, programmed, and in proper working condition in accordance with the construction documents and manufacturer's installation instructions. The construction documents shall state the party who will conduct the required functional testing. The party responsible for the functional testing shall not be directly involved in the design or construction of the project and shall provide documentation to the *code official* certifying that the installed lighting controls meet the provisions of Section 505.

When *occupant sensors*, time switches, programmable schedule controls, *photosensors or daylighting controls* are installed, the following procedures shall be performed:

1. Confirm that the placement, sensitivity and time-out adjustments for *occupant sensors* yield acceptable performance.
2. Confirm that the time switches and programmable schedule controls are programmed to turn the lights off.
3. Confirm that the placement and sensitivity adjustments for *photosensor* controls reduce electric light based on the amount of usable daylight in the space as specified.

Add new IECC Chapters 6 – 10 and renumber the published 2009 IECC Chapter 6, Referenced Standards, as Chapter 11.

IECC CHAPTER 6
WATER CONSERVATION

601 Plumbing fixtures. All new or replaced plumbing fixtures shall be EPA Water Sense certified, including irrigation controllers, where such fixtures are certified.

602 Hot water distribution.

602.1 Hot water distribution systems. Hot water distribution lines shall be constructed as a central core/remote manifold system, a central manifold system, or a recirculation loop.

602.2 Maximum volume of hot water. The maximum volume of water contained in hot water distribution lines between the water heater and the fixture stop or connection to showers, kitchen faucets, and lavatories shall be calculated using Table 602.7.

TABLE 602.7
WATER VOLUME FOR DISTRIBUTION PIPING MATERIALS

OUNCES OF WATER PER FOOT LENGTH OF PIPING								
Nominal Size (inch)	Copper M	Copper L	Copper K	CPVC CTS SDR 11	CPVC SCH 40	PEX-AL-PEX	PE-AL-PE	PEX CTS SDR 9
3/8	1.06	0.97	0.84	NA	1.17	0.63	0.63	0.64
½	1.69	1.55	1.45	1.25	1.89	1.31	1.31	1.18
¾	3.43	3.22	2.90	2.67	3.38	3.39	3.39	2.35
1	5.81	5.49	5.17	4.43	5.53	5.56	5.56	3.91
1 ¼	8.70	8.36	8.09	6.61	9.66	8.49	8.49	5.81
1 ½	12.18	11.83	11.45	9.22	13.20	13.88	13.88	8.09
2	21.08	20.58	20.04	15.79	21.88	21.48	21.48	13.86

Add a new Chapter 7.

IECC CHAPTER 7
ENERGY EFFICIENCY REQUIREMENTS FOR EXISTING PORTIONS OF BUILDINGS

701.1 Additions and remodels or renovations. For additions that result in an increase in conditioned floor area of 50% or more of the pre-existing building and remodels or renovations where 50% or more of the existing finished wall membrane is removed, the following requirements are applicable to existing portions of buildings Existing portions of buildings must be upgraded with the following elements:

1. The existing building must achieve a maximum air leakage of 7 air changes per hour measured at 50 pascals
2. The insulation in the existing attic must be upgraded to a minimum value of *R*-38. Vaulted or cathedral ceiling cavities must be completely filled with insulation.
3. A minimum of 80 percent of the lamps in existing permanently installed lighting fixtures shall be high-efficacy lamps.

Add a new Chapter 8.

IECC CHAPTER 8
DECONSTRUCTION

801 Deconstruction. All existing buildings and portions thereof requiring removal of building materials must be deconstructed as defined in this Section . Demolition is not permitted.

801.1 Penalty. Buildings demolished or partially demolished rather than deconstructed will, at the discretion of the Building Official, be issued a Stop Work notice for a period not exceeding 30 days.

801.2 Documentation of intent to deconstruct. Documentation of intent to deconstruct consisting of a deconstruction plan, a written description of deconstruction work, or the County Deconstruction Checklist must be provided at building permit application. The documentation of intent to deconstruct must include: the name of the Deconstruction Contractor, a list of the materials to be recovered, donated, or reused, and the destination of the materials. The documentation must include both Nonstructural Deconstruction and Structural Deconstruction. Items which must be donated, sold, or re-used include: cabinets, dimensional lumber, flooring, and solid core doors.

801.3 Verification of deconstruction of a structure. The completion of deconstruction as approved on the deconstruction plan must be verified by the Building Division. The owner or deconstruction contractor shall provide written verification of deconstruction by means of receipts or a written log, maintained by the homeowner or general contractor, which includes the volume or weight of materials and the destination where they were transported to the Building Division office. Verification must be received prior to scheduling the rough inspections.

Add a new Chapter 9.

IECC CHAPTER 9
CONSTRUCTION JOBSITE WASTE REDUCTION AND RECYCLING

901.1 Construction jobsite waste reduction and recycling. All construction jobsite waste must be recycled, including wood, scrap metal, cardboard, and concrete. Labeled containers must be provided at the construction-site for use in capturing recyclable material. A mixed load container may be used if that container is being sent to a waste/recycling center that will verify the weight of recycled material recovered from that mixed load.

901.2 Documentation of intent to recycle. Documentation of intent to recycle which consists of a recycling plan, a written description of recycling activity, or the submittal of the County Recycling Checklist must be provided at building permit application. The documentation must specify the locations of recycling containers and the destination where material will be recycled.

901.3. Verification. Field inspection will be made by the Boulder County Building Division during the construction process to assure that recycling containers have been placed on-site. Prior to the final inspection, documentation must be provided to the Building Division office by the owner or waste/recycling contractor indicating the weight or volume of materials diverted from the waste stream. Materials that must be recycled include: appliances, concrete, metals, cardboard, and wood (except pressure treated or painted wood), and thermostats and other devices

containing mercury. Other materials which are accepted by the waste/recycling contractor must also be recycled.

Add a new Chapter 10.

IECC CHAPTER 10
TRASH STORAGE AND RECYCLING AREAS

Section 1001 On-site recycling. The following standards shall apply to the construction of trash storage and recycling areas for attached dwellings and all business and industrial buildings or uses:

(a) Covered Area: Trash storage and recycling area shall be accommodated within the structure, or adequate common area shall be included on-site and indicated on a site plan.
(b) Hard Surface Required, Screening and Landscaping: All outdoor trash recycling storage and containers shall be placed on a hard surface, including, without limitation, concrete, and shall be screened.
(c) Maintenance and Service: Trash storage and recycling area shall include adequate space for the maintenance and servicing of containers for recyclable materials that are provided by local disposal and recycling companies.
(d) Adequate Space for Trash and Recyclables: The amount of space provided for the collection and storage of recyclable materials shall be at least as large as the amount of space provided for the collection and storage of trash materials.
(e) Convenience and Accessibility: The recycling area shall be must be at least as accessible and convenient for tenants and collection vehicles as the trash collection and storage area.
(f) Minimum Clearance: A minimum height clearance of eight feet shall be required if the space is provided in a covered enclosure.

IECC CHAPTER 11
REFERENCED STANDARDS

Renumber Chapter 6 as Chapter 11 and modify remaining section numbers accordingly.

8. **INTERNATIONAL GREEN CONSTRUCTION CODE, ~~Public Version 2.0, 2010~~ 2012 edition,** published by the International Code Council, ~~Chapters 2, 6 and 12 only~~, with amendments as follows:

~~*Chapters 1, 3 – 5 and 7 – 11 are deleted.*~~

CHAPTER 1
SCOPE AND ADMINISTRATION

SECTION 101
GENERAL

[A] 101.1 Title. These regulations shall be known as the Green Construction Code of Boulder County, hereinafter referred to as "this code."

101.3 Scope. The provisions of this code shall apply to the design, construction, addition, alteration, change of occupancy, relocation, replacement, repair, equipment, building site, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures and to the site on which the building is located for new buildings, existing building additions, and alterations to existing buildings or complexes of buildings on the same property over 25,000 square feet in total building floor area. Occupancy classifications shall be determined in accordance with the *International Building Code*® (IBC®).

TABLE 302.1
REQUIREMENTS DETERMINED BY THE JURISDICTION

Section	Section Title or Description and Directives	Jurisdictional Requirements	
CHAPTER 1. SCOPE			
101.3 Exception 1.1	Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories in height above grade plane with a separate means of egress, their accessory structures, and the site or lot upon which these buildings are located, shall comply with ICC 700.	☐ Yes	X No
101.3 Exception 1.2	Group R-3 residential buildings, their accessory structures, and the site or lot upon which these buildings are located, shall comply with ICC 700.	☐ Yes	X No
101.3 Exception 1.3	Group R-2 and R-4 residential buildings four stories or less in height above grade plane, their accessory structures, and the site or lot upon which these buildings are located, shall comply with ICC 700.	☐ Yes	X No
CHAPTER 4. SITE DEVELOPMENT AND LAND USE			
402.2.1	Flood hazard area preservation, general	X Yes	☐ No
402.2.2	Flood hazard area preservation, specific	X Yes	☐ No
402.3	Surface water protection	X Yes	☐ No
402.5	Conservation area	X Yes	☐ No
402.7	Agricultural land	X Yes	☐ No
402.8	Greenfield sites	X Yes	☐ No
407.4.1	High-occupancy vehicle parking	X Yes	☐ No
407.4.2	Low-emission, hybrid and electric vehicle parking	X Yes	☐ No
409.1	Light pollution control	X Yes	☐ No
CHAPTER 5. MATERIAL RESOURCE CONSERVATION AND EFFICIENCY			
503.1	Minimum percentage of waste material diverted from landfills	☐ 50% X 65% ☐ 75%	

CHAPTER 6. ENERGY CONSERVATION, EFFICIENCY AND CO2e EMISSION REDUCTION			
302.1, 302.1.1, 602.1	zEPI of Jurisdictional Choice – The jurisdiction shall indicate a zEPI of 46 or less in each occupancy for which it intends to require enhanced energy performance.	Occupancy: **ALL** zEPI: **46**	
604.1	Automated demand response infrastructure	X Yes	☐ No
CHAPTER 7. WATER RESOURCE CONSERVATION, QUALITY AND EFFICIENCY			
702.7	Municipal reclaimed water	☐ Yes	X No
CHAPTER 8. INDOOR ENVIRONMENTAL QUALITY AND COMFORT			
804.2	Post-Construction Pre-Occupancy Baseline IAQ Testing	☐ Yes	X No
807.1	Sound transmission and sound levels	☐ Yes	X No
CHAPTER 10. EXISTING BUILDINGS			
1007.2	Evaluation of existing buildings	X Yes	☐ No
1007.3	Post Certificate of Occupancy zEPI, energy demand, and CO2*e* emissions reporting	☐ Yes	X No

~~CHAPTER 6~~

~~ENERGY CONSERVATION, EFFICIENCY AND ATMOSPHERIC QUALITY~~

~~SECTION 601~~
~~GENERAL~~

~~**601.1 Scope.** This chapter shall regulate the design, construction, commissioning and operation of new buildings, existing building additions, and alterations to existing buildings over 25,000 square feet in total building floor area and their associated building sites for the effective use of energy.~~

~~**601.2 Intent.** The intent of this code is to ensure the effective use of energy by buildings and building sites. This chapter is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve the effective use of energy.~~

~~**601.3 Minimum requirements.** Buildings and building sites shall comply with Sections 502.4, 503.2, 504 and 505 and Chapters 6 – 11 of the *International Energy Conservation Code* as amended by Boulder County regardless of the compliance path chosen.~~

~~SECTION 602~~
~~ENERGY PERFORMANCE, PEAK POWER AND REDUCED CO2e EMISSIONS~~

~~**602.1 *Zero energy performance index* (zEPI).** The building shall be designed and constructed to have a zEPI not greater than the values shown in Table 602.1.~~

~~TABLE 602.1~~
~~MINIMUM ZERO ENERGY PERFORMANCE INDEX~~

~~Building Occupancy Types~~	~~zEPI Point of Entry[a]~~	~~zEPI of Jurisdictional Choice[b]~~
~~Assembly: Groups A-1, A-2, A-3, A-4, A-5~~	~~51~~	~~**44**~~

~~Business: Group B~~	~~51~~	**~~44~~**
~~Educational: Group E~~	~~51~~	**~~44~~**
~~Factory and Industrial: Groups F-1,F-2~~	~~51~~	**~~44~~**
~~High Hazard: Groups H-1, H-2, H-3, H-4, H-5~~	~~51~~	**~~44~~**
~~Institutional: Groups I-1, I-2, I-3, I-4~~	~~51~~	**~~44~~**
~~Mercantile: Group M~~	~~51~~	**~~44~~**
~~Groups R-1, R-2, R-3, R-4 (see note c)~~	~~51~~	**~~44~~**
~~Storage: Groups S-1, S-2~~	~~51~~	**~~44~~**
~~Utility and Miscellaneous: Group U~~	~~51~~	**~~44~~**

~~a. Minimum acceptable performance for all *building* types and sizes.~~
~~b. Where the *jurisdiction* elects to adopt a greater threshold for energy efficiency, a zEPI of Jurisdictional Choice shall apply only to *buildings* pursuing performance-based compliance in accordance with Section 602.2.2.~~
~~c. Residential occupancies as regulated by this code in accordance with Section 101.2.~~

~~**602.2 Compliance paths.** New *buildings*, existing *building additions*, and *alterations* to existing *buildings* over 25,000 square feet in *total building floor area* and their associated *building* sites shall comply with Section 602.2.2. or 602.2.3.~~

~~**602.2.1 Prescriptive-based compliance.** *Buildings* designed on a prescriptive basis shall comply with the requirements of Sections 604, 605, 606, 607, 608, 609, 610, 611 and 612 of this code, and shall be deemed to have a zEPI in compliance with Section 602.1.~~

~~**602.2.2 Performance-based compliance.** *Buildings* designed on a performance basis shall comply with Sections 604, 605, 609.6, 610, 611 and 612 of this code.~~

~~**602.2.2.1 Minimum performance.** The *building* shall be designed and constructed to deliver a *zero energy performance index* (zEPI) not greater than the value shown in Table 602.1. The zEPI shall be calculated in accordance with Section 603.1.1. *Buildings* complying with the 2006 *International Energy Conservation Code* shall be deemed to have a zEPI of 73.~~

~~**602.2.2.2 Building peak energy demand.** *Buildings* shall be designed and constructed to limit peak energy demand during the *building's* anticipated peak consumption period in accordance with Section 603.1.2.~~

~~**602.2.2.3 Annual direct and indirect CO2e emissions.** Where total annual *CO2e emissions* limits are required in Table 302.1, *CO2e* emissions calculations shall be performed in accordance with Sections 603.1.3 and 603.1.4. The emissions associated with the proposed design shall be less than or equal to the *CO2e emissions* associated with the *standard reference design* in accordance with Equation 6-1.~~

~~*CO^2e emissions* associated with the proposed *building design* $\leq$ *CO^2e emissions* associated with *the standard reference design x zEPI of proposed building/100*~~

~~**(Equation 6-1)**~~

~~**602.2.3 Outcome based compliance.** *Buildings* that are intended to comply on an outcome basis shall comply with this section and Sections 604, 605 and 612 of this code.~~

~~**602.2.3.1 Maximum energy use.** The *building* shall be designed, constructed, commissioned, operated and maintained to have an *annual net energy performance* in accordance with Section 603.2.~~

~~**602.2.3.2 Building peak energy demand.** The *building* shall be designed, constructed, commissioned, operated and maintained to limit *peak net energy demand* during the *building's* anticipated peak consumption period in accordance with Section 603.2.~~

~~**602.2.3.3 CO2e emissions.** The *building* shall be designed, constructed, commissioned, operated and maintained to limit *annual direct and indirect CO2e emissions* in accordance with SecTion 603.2.~~

~~*The remainder of Chapter 6 is to be adopted as published.*~~

9. INTERNATIONAL CODE COUNCIL PERFORMANCE CODE FOR BUILDINGS AND FACILITIES, 2012 EDITION, published by the International Code Council, for use as a guide and a tool to evaluate proposals for modifications and for alternate materials, design and methods of construction and equipment in accordance with Sections 104.10 and 104.11, respectively, of the Boulder County Building Code.

VALIDITY, REPEALS AND EFFECTIVE DATE

1. **VALIDITY:** If any Section, subsection, sentence, clause or phrase of this Resolution is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this Resolution. The Board of County Commissioners hereby declares that it would have passed this Resolution, and each Section, subsection, clause, or phrase thereof, irrespective of the fact that any one or more Sections, subsections, sentences, clauses and phrases be declared unconstitutional.

2. **REPEALS:** The following codes or regulations shall be repealed at the effective date of adoption of this Resolution:

INTERNATIONAL BUILDING CODE, ~~2006~~ 2009 EDITION
INTERNATIONAL RESIDENTIAL CODE ~~2006~~ 2009 EDITION
INTERNATIONAL MECHANICAL CODE ~~2006~~ 2009 EDITION
INTERNATIONAL FUEL GAS CODE ~~2006~~ 2009 EDITION
INTERNATIONAL ENERGY CONSERVATION CODE ~~2006~~ 2009 EDITION
NATIONAL ELECTRICAL CODE ~~2005~~ 2008 EDITION
INTERNATIONAL GREEN CONSTRUCTION CODE, Public Version 2.0, 2010

3. **DATE EFFECTIVE:** This Resolution shall be, and is hereby declared to be in full force and effect for all applications for building permits filed on or after January 1, ~~2011~~ 2013.

THIS RESOLUTION ~~2010-138~~ 2012-50 IS HEREBY ADOPTED on this ~~28th~~ ____ day of ~~December~~_____, ~~2010~~ 2012, nunc pro tunc the ~~9th~~ 27th day of ~~December~~ September, ~~2010~~ 2012 as further specified in this Resolution, above.

BOULDER COUNTY BOARD OF COMMISSIONERS

_____	_____
CINDY DOMENICO, CHAIR	WILL TOOR, VICE CHAIR

ATTEST:

_____	_____
Clerk to the Board	DEB GARDNER, COMMISSIONER

THE INTERNATIONAL CODE COUNCIL & THE INTERNATIONAL CODES

- The International Building Codes, including the International Building Code ("IBC"), International Residential Code ("IRC") and other nationally recognized model codes dealing with building fuel gas, mechanical and plumbing systems, energy conservation and green building, are promulgated by the International Code Council ("ICC"). The ICC is composed of building officials, fire officials, design professionals, industry representatives, contractors, homebuilders and others involved in the design and construction of buildings.
- The International Codes are nationally recognized minimum safety standards governing the design and construction of buildings and structures.
- The ICC conducts an ongoing code development process. Changes to the codes may be proposed by anyone. Hearings are held on the proposed changes, and the changes are voted upon by national committee members and the ICC's code official members.

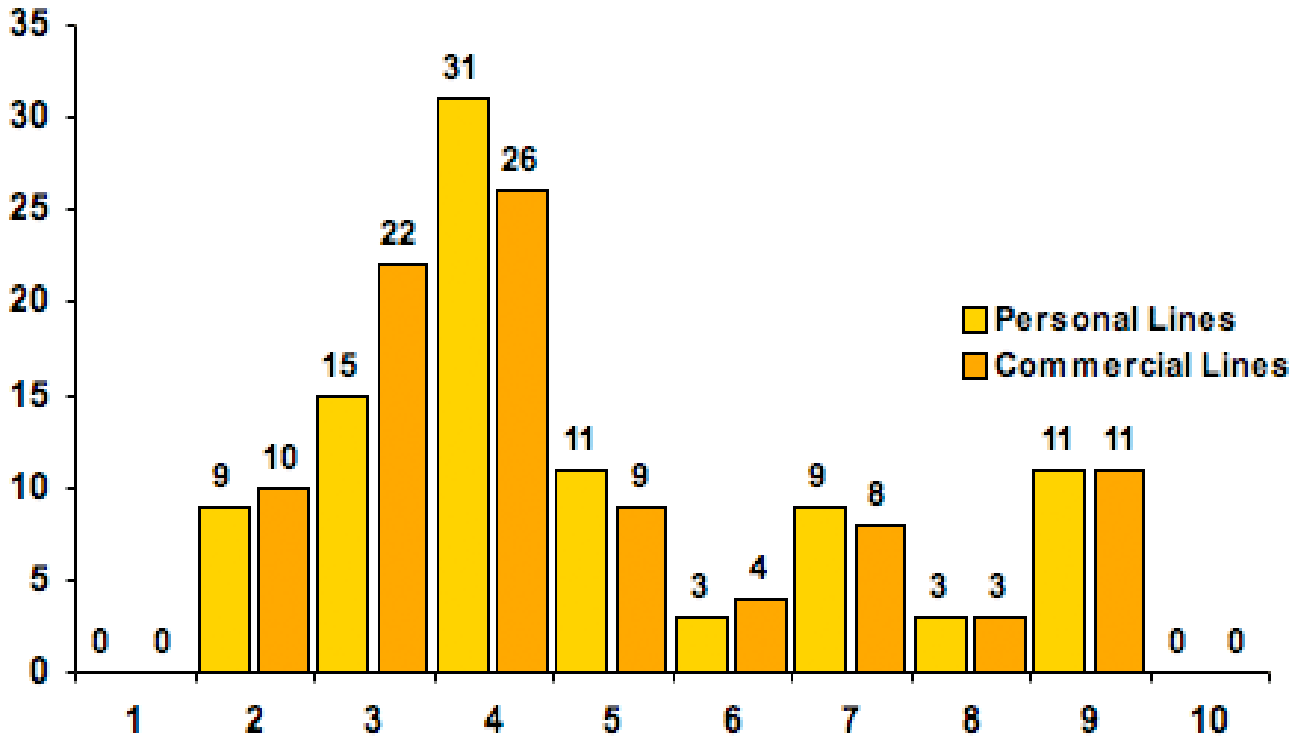
Major editions of the International Codes are published every three (3) years. The most current are the 2012 editions, which are being proposed for adoption and application in the unincorporated areas of Boulder County.

THE ISO BCEGS PROGRAM

- **"ISO BCEGS"** stands for the Insurance Services Organization Building Code Effective Grading Schedule.
- Much as it rates fire departments with an "ISO rating," the ISO surveys and rates building departments all over the country with ratings from 1 – 10, with lower ratings being better.
- Insurance companies use the ISO ratings to assign insurance premium rates. Jurisdictions whose building departments earn lower ISO BCEGS ratings have lower insurance premium ratings for commercial and residential buildings. Discounts begin if a building department achieves a rating of 9 or lower.
- Adopting the latest editions of the nationally recognized model codes is a key component of a good ISO rating.
- Boulder County achieved an ISO BCEGS rating of "3" as a result of its last ISO survey. According to ISO records, there are only 9-10 jurisdictions in the state that have earned a higher rating of "2" and no jurisdictions with a rating of "1."

Colorado

Distribution of Communities by BCEGS Class



The personal lines classification addresses building code adoption and enforcement for 1- and 2-family dwellings. The commercial lines classification is for all other buildings.

CODE CHANGE DEVELOPMENT AND REVIEW CRITERIA

1. Is the code change NECESSARY? Is there really a problem with the existing code? Does the proposed change already exist in another section of the code or as part of a recently approved code change?

2. Is there SUPPORTING DATA or convincing evidence to illustrate or support the specific code change?

3. Is it UNIFORM? Can it be applied to any geographic area or is it needed only in a limited region? Is it generic in terms of any products to be used and thus not a proprietary code change?

4. Is it FEASIBLE? Can the requirement be constructed with existing or readily available methods and technology? If a product is involved, is that product readily available? Is any additional cost to the consumer commensurate with the benefit gained?

5. Is it a PRACTICAL solution to the problem? Does it do what the proponent intended? Will it increase the cost of enforcement?

6. Is it located in the right code chapter or section? Could it be more effective in a different LOCATION?

7. Is the proposed change CONSISTENT with other code provisions and other model codes? Does it require corresponding changes in other code sections or other codes?

8. Is the wording as CLEAR as it can be? Is it concise while still saying everything it needs to say? Does it avoid confusion and the potential for varying interpretations?

9. Is the FORMAT of the code change consistent with proper code organization and writing style?

10. Does the 'REASON" portion of the submittal clearly and concisely explain the need for the change and the effect it will have on the code?

FINALLY, WILL THE PROPOSED CODE CHANGE CLEARLY IMPROVE THE EXISTING CODE?

(Gordon Murdoch, City of Dana Point, CA

Gary Goodell, County of Boulder, CO)

INTERNATIONAL CODE COUNCIL®

People Helping People Build a Safer World™

2012 International Codes®

New Codes for a Changing World

New Editions Coming Spring–Summer 2011

2012 International Building Code

2012 International Residential Code

2012 International Fire Code

2012 International Energy Conservation Code

2012 International Plumbing Code

2012 International Mechanical Code

2012 International Fuel Gas Code

2012 International Private Sewage Disposal Code

2012 International Existing Building Code

2012 International Property Maintenance Code

2012 International Wildland-Urban Interface Code

2012 International Zoning Code

2012 ICC Performance Code for Buildings and Facilities

New I-Codes Coming Spring 2012

2012 International Green Construction Code

2012 International Swimming Pool and Spa Code

What's New in the 2012 I-Codes?

Key changes include:

2012 IBC®

Nonstructural

- All definitions are included in Chapter 2.
- Classifications for a variety of health-care related facilities have been clarified.
- Covered- and open-mall provisions revised to fully address the construction of open malls.
- Clarified provisions for incidental-use rooms and spaces.
- Modified provisions addressing exterior wall projections.
- Reformatted requirements for protection of vertical openings through floors.
- Automatic sprinkler systems required where furniture and mattresses are manufactured or stored.
- Increased capacity for stairways and other egress components in buildings with sprinklers and an emergency communication system.
- Clarification of when unenclosed stairways can be used as a part of the means of egress system, including how travel distance is measured.
- In three- and four-exit buildings, some exits are now permitted to serve a portion of a story rather than an entire story.

Structural

- Wind design requirements extensively revised.
- Wind load maps are now based on ultimate design wind speeds.
- New terminology for wind speeds.
- Updated seismic ground motion maps.
- The term "occupancy category" changed to "risk category."
- Special inspection requirements for structural steel and masonry construction are now based on referenced standards.
- Penetration firestop and fire-resistant joint systems in high-rise buildings and in Risk Category III or IV structures require special inspection.
- Modifications to the seismic provisions of ACI 318 Appendix D.

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scroll for more changes ↓

2012 IRC®

- New Seismic Design Categories maps.
- Wind design including new maps.
- Exterior wall clearances to lot lines.
- Wireless smoke alarms.
- Prescriptive roof connections to resist wind uplift forces.
- Required clearance between townhouse separation walls and roof penetrations.
- Prescriptive requirements for isolated masonry pier foundations.
- Gypsum board under non fire-resistance rated floor assemblies.
- Wall bracing provisions including a new simplified method.
- Prescriptive design of whole-house ventilation systems.
- Gray water recycling systems.

2012 IFC®

- Complete reformatting into eight different parts that correlate to a specific area of regulation.
- New requirements for: photovoltaic solar cells on roofs; mass notification fire alarm systems in large stadiums; portable fire extinguishers in Group A, B, and E occupancies; sub-atmospheric gas systems; and automated LP-Gas cylinder exchange cabinets.
- Revised definitions for health, day and ambulatory care occupancies.
- Clarified automatic sprinkler protection requirements for upholstered furniture.
- Revised requirements for specific dry cleaning plants.

2012 IECC®

- A comprehensive set of changes includes measures to improve the thermal envelope, HVAC systems and electrical systems of residential buildings up to three stories in height.
- Commercial enhancements include required energy savings for windows, doors and skylights; thermal envelope efficiency; and increased efficiencies for installed HVAC equipment.

2012 IPC®

- All plumbing products and materials are now required to be listed by a third party certification agency.
- Requirements for the design of a Siphonic Roof Drainage System have been added.
- Gray water recycling requirements have moved to the body of the code in a new Chapter 13.
- "Hydro-mechanical" and "Gravity" are the new terms for the two general types of grease interceptors.
- Air admittance valves complying with standard ASSE 1049 are now allowed for venting chemical waste systems.
- The length of a combination waste and vent system is now unlimited.
- The Single Stack Vent System method has been added.
- The code expands on suitable materials for pressurized sewage discharge applications and ratings.

2012 IMC®

- New and existing mechanical systems must be maintained in accordance with ASHRAE/ACCA/ANSI Standard 180.
- Parking garage exhaust now defined as environmental air.
- Includes specifications for grease reservoirs in commercial cooking exhaust duct systems.
- Includes requirements for underground grease ducts.
- Requires any combustible material in a return air plenum to be listed and labeled to verify compliance with ASTM E-84 or UL 723.
- Air dispersion systems are now allowed.
- New requirements for evaporative coolers.

2012 IFGC®

- All piping, tubing and fittings in a fuel gas system must bear the manufacturer's identification.
- Clarification that gypsum board requires reduced clearances to combustibles the same as any other combustible material.
- Requirement of flashback arrestors and check valves in fuel gas systems used with oxygen.

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11-04655

BOULDER COUNTY NEW SINGLE-FAMILY DWELLING SIZES[1], 2011 AND 2012 BUILDING PERMIT APPLICATIONS TO DATE

	2011	2012 To Date	Combined
Maximum	8,272	9,485	9,485
Median	2,943	3,606	3,561
Average	3,277	3,857	3,466
Minimum	664	603	603

BOULDER COUNTY NEW SINGLE-FAMILY BUILDING PERMITS, 2011 AND 2012 TO DATE, BY SIZE RANGE

Total Floor Area[1]	0-1,000 (FMF)	1,001-2,500 (FMF)	2,501-3,000 (FMF)	0-3,599 (FMF)	3,600 and up (FMF)	≥5,000 (FMF)	≥6,000 (FMF)	Total Permits (FMF)
2011	4 (3)	22 (13)	14 (6)	55 (31)	26 (11)	15 (6)	6 (3)	81 (39)
2012 to Date	2 (0)	10 (4)	2 (1)	20 (6)	18 (2)	8 (0)	5 (0)	37 (8)
TOTAL	6 (3)	33 (17)	16 (7)	75 (37)	44 (13)	23 (6)	11 (3)	118 (47)

[1]Total Floor Area includes finished spaces, garages and finished or unfinished basements, but does not include exterior covered areas, such as covered porches or decks or covered patios. Conditioned Floor Area, as used in BuildSmart, is typically less, as it does not include unheated garages or other unconditioned spaces.

FIRE SPRINKLER SYSTEM INSTALLER SURVEY RESULTS, AUGUST 2012

INSTALLER	# of Systems Installed in Boulder County	$/Sprinklered Sq. Ft. with public water	$/sprinklered Sq. Ft. with well water	Well Water Supply System Portion of Cost	Addition of Fire Department Connection (FDC)	$/Sq. Ft., Existing Dwelling
Arapahoe Fire Protection, Inc. Aurora, CO	3-5	3.00	3.75	$2,000	$300	----
Flow Fire Protection, Inc. Fort Collins, CO	5-10	1.65	2.35	$2,700	$350 -$ 500	2.85 - 8.00
Freedom Fire Protection Longmont, CO	150+	2.50	2.50	Not sure	$350	$3.00
Kobobel Fire Protection, LLC Loveland, CO	100+	1.75 – 3.00	2.25 – 4.00	$1,500	$500.00	3.00 – 4.25
Lifeguard Fire Sprinkler Bennet, CO	4	2.00 – 3.00	2.50 – 4.00	$2,500	$300	4.00 – 5.00
Meridian Fire & Security Centennial, CO	0	3.00	5.00	$5,500	$300	7.00 – 9.00
Pioneer Fire Systems, Inc. Centennial, CO	----	3.20	5.40	$3,500 - $4,500	$150 - $200	6.00 – 7.00
AVERAGES	**N/A**	**2.60**	**3.62**	**$3,033**	**$336**	**$5.17**
Cost, 2,500 sq. ft.		**$6,500**	**$9,050**			
Cost, 2500 sq. ft. house @ $200/sq. ft.		**$500,000**	**$500,000**			
Sprinkler % of Total Cost		**1.28%**	**1.78%**			

HousingEconomics.com NAHB

New Construction Cost Breakdown
Special Study for HousingEconomics.com
By Heather Taylor

Introduction

Over the years, NAHB has periodically conducted "construction cost surveys" to collect information from builders on the various components that go into the price of a typical single-family home. NAHB's most recent construction cost survey (conducted in 2011) shows that the cost of construction accounted for almost 60 percent of the final sales price of the average home, and the cost of the finished lot accounted for 22 percent. These shares are similar to the previous construction cost survey (conducted in 2009). However, when you compare these shares to construction cost surveys conducted prior to 2009, you will notice a large difference. In 2009, the survey methodology changed to provide a better, more representative sample of single-family construction across the country. Although the changes in survey methodology could account for differences in the sales price breakdown, the construction cost breakdown has remained relatively stable over the years. The following sections describe the methodology of the survey and discuss the results in more detail.

Methodology

NAHB's 2011 construction cost survey was conducted by emailing a questionnaire to a representative sample of 2,185 home builders. The sample was stratified by size of the builder (based on number of starts) and region of the country (the sample being proportional to housing starts in each of the four principal Census regions).

Respondents were asked to provide information about the average home built by their firms during 2011. Usable responses were received from 44 builders. As is usually necessary when conducting a detailed business cost survey, extensive follow-up phone calls and emails were undertaken in order to verify various cost numbers and minimize item non-response. Table 1 shows the detailed results of the 2011 construction cost survey.

Table 1. Single Family Price and Cost Breakdowns 2011 National Results		
	Average Lot Size:	20,614 sq ft
	Average Finished Area:	2,311 sq ft
I. Sale Price Breakdown	**Average**	**Share of Price**
A. Finished Lot Cost (including financing cost)	$67,551	21.7%
B. Total Construction Cost	$184,125	59.3%
C. Financing Cost	$6,669	2.1%
D. Overhead and General Expenses	$16,306	5.2%
E. Marketing Cost	$4,645	1.5%
F. Sales Commission	$10,174	3.3%
G. Profit	$21,148	6.8%
Total Sales Price	**$310,619**	**100.0%**
II. Construction Cost Breakdown	**Average**	**Share of Construction Cost**
Building Permit Fees	$3,107	1.7%
Impact Fee	$2,850	1.5%
Water and Sewer Inspection	$2,952	1.6%
Excavation, Foundation, and Backfill	$17,034	9.3%
Steel	$1,012	0.5%
Framing and Trusses	$24,904	13.5%
Sheathing	$2,142	1.2%
Windows	$6,148	3.3%
Exterior Doors	$2,150	1.2%
Interior Doors and Hardware	$2,883	1.6%
Stairs	$1,052	0.6%
Roof Shingles	$5,256	2.9%
Siding	$8,739	4.7%
Gutters and Downspouts	$870	0.5%
Plumbing	$10,990	6.0%
Electrical Wiring	$8,034	4.4%
Lighting Fixtures	$2,193	1.2%
HVAC	$8,760	4.8%
Insulation	$3,399	1.8%
Drywall	$8,125	4.4%
Painting	$6,005	3.3%
Cabinets and Countertops	$10,395	5.6%
Appliances	$3,619	2.0%
Tiles and Carpet	$8,363	4.5%
Trim Material	$3,736	2.0%
Landscaping and Sodding	$6,491	3.5%
Wood Deck or Patio	$1,918	1.0%
Asphalt Driveway	$2,729	1.5%
Other	$19,487	10.6%
Total	**$184,125**	**100.0%**

These results are national averages; the survey sample is not large enough for a geographic breakdown. Building practices, the cost of labor, the cost of land, and to some extent the cost of the materials can vary from place to place and depend on the nature of the particular home being built. Although the NAHB construction can provide a broad idea of construction costs for an average home, it is not a perfect tool for estimating costs for a particular house. Companies that provide more specific cost estimating, usually for a fee, include RSMeans (http://rsmeans.reedconstructiondata.com/) and Marshall & Swift (http://www.marshallswift.com/). The costs include all the costs paid by a builder that go into a particular item, including labor costs paid directly by the general contractor, the cost of hiring subcontractors, and the cost of materials however they are purchased

Home Size and Lot

The average size of homes built across all 44 builders in the 2011 construction cost survey was a little over 2,300 square feet, which is 400 square feet less than the average size of the homes reported in the 2009 construction cost survey. The Census Bureau's "Characteristics of New Single-Family Homes Completed" contains annual data on the floor area of a single-family home. According to Census Bureau's annual report, the average floor area of single-family homes completed peaked at 2,521 square feet in 2007, and then declined regularly to 2,392 square feet in 2010.

The average lot size of homes built across all 44 builders in the 2011 construction cost survey was 20,614 square feet—just under half an acre (21,780 square feet). The average lot size has declined only slightly from 21,879 square feet reported in the 2009 cost of construction survey. The Census Bureau's data on new residential construction shows that the average lot size for new homes sold was 17,590 square feet in 2010, up slightly from an average of 17,462 in 2009 and down from 18,433 in 2008.

Sales Price

The average price of the new single-family home in the 2011 construction cost survey was $310,619, down from $377,624 in 2009. The Census Bureau's data on new residential construction shows that the average sales price of a single-family home sold was $272,900 in 2010, similar to the average sales price of $270,900 in 2009, and down from the average sales price of $292,600 in 2008.

Table 2 contains historical information on the for sale breakdown of the sales price of a single-family home. The total construction cost of a home accounts for 59.3 percent of the sales price in 2011, almost identical to the share of 58.9 percent in 2009. Finished lot costs account for 21.7 percent of the sales price, only slightly higher than the share of 20.3 percent in 2009.

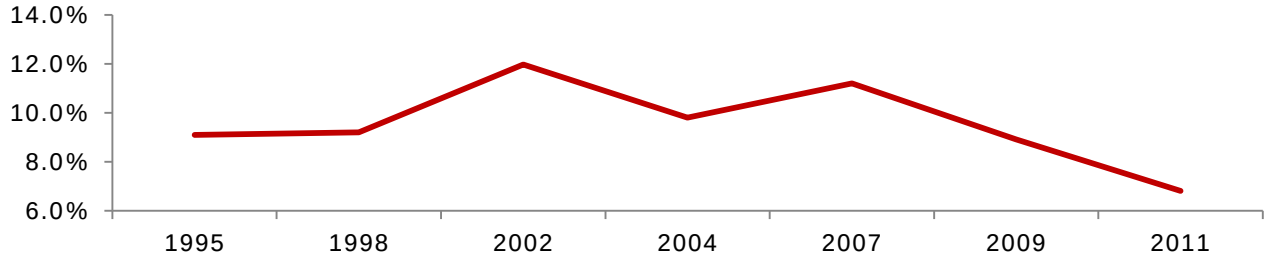
Table 2. SINGLE-FAMILY HOMES SALES PRICE BREAKDOWN HISTORY

Sale Price Breakdown	1995	1998	2002	2004	2007	2009	2011
1. Finished Lot Cost	24.4%	23.6%	23.5%	26.0%	24.5%	20.3%	21.7%
2. Total Construction Cost	53.3%	54.8%	50.8%	51.7%	48.1%	58.9%	59.3%
3. Financing Cost	2.0%	1.9%	2.1%	1.8%	2.4%	1.7%	2.1%
4. Overhead and General Expenses	5.8%	5.7%	5.5%	5.8%	7.0%	5.4%	5.2%
5. Marketing Cost	2.2%	1.4%	2.4%	1.9%	2.5%	1.4%	1.5%
6. Sales Commission	3.3%	3.4%	3.7%	3.0%	4.3%	3.4%	3.3%
7. Profit	9.1%	9.2%	12.0%	9.8%	11.2%	8.9%	6.8%
8. Total Sales Price ($)	**183,585**	**226,680**	**298,412**	**373,349**	**454,906**	**377,624**	**310,619**

Source: NAHB Construction Cost Surveys, 1995-2011

Not surprisingly, the share of sales price going to a builder's profit has dropped from 8.9 percent in 2009 to an all-time low of 6.8 percent in 2011 (see historical comparison in Graph 1). The remainder of the sales price is divided between overhead and general expenses (5.2 percent), sales commission (3.3 percent), financing cost (2.1 percent) and marketing cost (1.5 percent). Each of these shares is similar to the breakdown in 2009.

Graph 1. PROFIT HISTORY



Source: NAHB Construction Cost Surveys, 1995-2011

NAHB's Business Management Department sponsors the Builders' Cost of Doing Business (CODB) survey every other year (on even years). The CODB is based on the income statements for a firm, rather than the price of an average house. Although the surveys are not perfectly comparable, the sales price breakdown in the Cost of Construction Survey is generally consistent with the results of the CODB. Table 3 contains the comparable parts of the Cost of Construction Survey and the Cost of Doing Business Survey. One noticeable difference is between the Cost of Construction's profit (6.8 percent) and the sum of CODB owner's compensation and net income before taxes (2.1 percent). Since 2008, the supply of new unsold homes on the market has been historically high. Firm-level costs associated with the unintended build up of an unsold inventory would tend to be captured in firm-level income data, but probably not in the price breakdown of an average home reported in the construction cost survey. The share of profit in the sales price of a home indicates that the home was sold, whereas the net income share in the CODB takes into account homes that have both been sold and those that haven't.

Table 3. 2011 CONSTRUCTION COST SURVEY VS. 2010 COST OF DOING BUSINESS SURVEY

2011 Construction Cost Survey for Single-Family Homes *(Share of Sales Price)*		**2010 Cost of Doing Business Survey** *(Share of Revenue)*	
Total Construction Cost	59.3%	Single-family home building Direct Construction Costs	58.0%
Financing Cost	2.1%	Financing Expenses	2.1%
Overhead and General Expenses	5.2%	General and Administrative Expenses	5.8%
Marketing Cost	1.5%	Sales and Marketing Expenses	5.2%
Sales Commission	3.3%		
Profit	6.8%	Owners Compensation	1.6%
		Net Income Before Taxes	0.5%

Source: NAHB 2011 Construction Cost Survey, NAHB 2012 Cost of Doing Business Survey

Construction Cost

The average construction cost of a single-family home in 2011 is $184,125. This average is significantly lower than the 2009 average construction cost of $222,511. This is potentially the result of an average smaller finished area. While the average finished area of a single-family home dropped from 2,716 square feet in 2009 to 2,311 square feet in 2011, the average price per square foot remained relatively stable at $80 per sq ft in 2011 ($184,125 divided by 2,311 sq ft), compared to $82 per sq ft in 2009 ($222,511 divided by 2,716 sq ft). Lower cost finishes on the average single-family home in 2011 could also account for the lower average cost of construction.

Framing and trusses account for the largest share of construction costs (13.5 percent), followed by excavation, foundation and backfill (9.3 percent), plumbing (6.0 percent), and cabinets and countertops (5.6 percent). HVAC, siding, tiles and carpet, electrical wiring, and drywall each account for between 4 and 5 percent of total construction costs.

Table 4. SINGLE-FAMILY CONSTRUCTION COST BREAKDOWN HISTORY

Construction Cost Breakdown	1998	2002	2004	2007	2009	2011
Building Permit Fees	0.9%	1.3%	0.8%	1.7%	1.9%	1.7%
Impact Fee	1.0%	1.6%	1.1%	1.4%	1.4%	1.5%
Water and Sewer Inspection	1.0%	1.4%	1.2%	1.6%	1.7%	1.6%
Excavation, Foundation, and Backfill	9.6%	6.9%	9.9%	7.0%	7.1%	9.3%
Steel	1.1%	0.8%	0.3%	0.8%	0.7%	0.5%
Framing and Trusses	20.2%	18.4%	21.3%	15.8%	15.6%	13.5%
Sheathing	NA	0.9%	1.4%	1.6%	1.7%	1.2%
Windows	3.8%	3.3%	3.2%	2.9%	2.8%	3.3%
Exterior Doors	1.1%	0.8%	0.9%	0.9%	0.9%	1.2%
Interior Doors and Hardware	1.9%	1.6%	2.4%	1.5%	1.5%	1.6%
Stairs	0.4%	0.6%	0.6%	0.8%	0.8%	0.6%
Roof Shingles	2.6%	2.6%	2.2%	3.2%	3.8%	2.9%
Siding	4.3%	4.2%	3.6%	5.7%	5.8%	4.7%
Gutters and Downspouts	0.6%	0.5%	0.2%	0.4%	0.4%	0.5%
Plumbing	5.9%	5.4%	5.3%	5.4%	5.3%	6.0%
Electrical Wiring	3.8%	3.3%	3.4%	3.9%	3.7%	4.4%
Lighting Fixtures	1.0%	0.8%	0.9%	1.0%	1.1%	1.2%
HVAC	4.1%	4.2%	3.7%	3.9%	4.0%	4.8%
Insulation	1.4%	1.6%	1.4%	1.6%	1.5%	1.8%
Drywall	5.5%	5.3%	4.9%	5.1%	5.1%	4.4%
Painting	3.8%	3.6%	3.6%	3.4%	3.4%	3.3%
Cabinets and Countertops	5.0%	4.3%	6.6%	5.7%	5.6%	5.6%
Appliances	1.3%	1.2%	1.3%	1.7%	1.6%	2.0%
Tiles and Carpet	4.8%	4.3%	4.2%	5.0%	5.1%	4.5%
Trim Material	3.1%	4.1%	2.5%	3.1%	3.3%	2.0%
Landscaping and Sodding	1.8%	2.5%	2.6%	2.8%	3.2%	3.5%
Wood Deck or Patio	0.7%	0.7%	1.0%	0.7%	0.9%	1.0%
Asphalt Driveway	1.5%	1.6%	1.3%	1.4%	1.4%	1.5%
Other	7.7%	12.2%	8.2%	9.7%	8.6%	10.6%
Total ($)	**124,276**	**151,671**	**192,846**	**219,015**	**222,511**	**184,125**

Source: NAHB Construction Cost Surveys, 1998-2011

Table 4 shows the detailed construction cost breakdown for surveys conducted since 1998. Although the largest share of construction costs has always been framing and trusses, this share fell from 15.6 percent in 2009 to 13.5 percent in 2011. The framing and trusses total cost for an average single-family home in 2011 is $24,904, compared to $34,805 in 2009. However because the average size of a single-family home fell between 2009 and 2011, the average price per square foot remained relatively stable—$11 per square foot in 2011 ($24,904 average cost of framing and trusses divided by 2,311 square feet of average finished area), compared to $13 per sq ft in 2009 ($34,805 average cost of framing and trusses divided by 2,716 square feet of average finished area)—so the drop in average finished area of a single-family home between 2009 and 2011 may account for the smaller share of framing and trusses.

The share of HVAC as a percentage of total construction cost rose from 4.0 percent in the 2009 construction cost survey to 4.8 percent in the 2011 construction cost survey. The share of insulation as a percentage of total construction cost rose from 1.5 percent to 1.8 percent over this same time period. In an effort to make homes more energy efficient, the codes concerning new homes have become significantly stricter. The stricter codes could account for the increase in the share of both HVAC and insulation as a percentage of the total construction cost.

The increase in the price of copper and cost of adhering to stricter electrical codes could help explain the increase in the share of electrical wiring as a percentage of the total construction cost—from 3.7 percent in the 2009 construction cost survey to 4.4 percent in the 2011 construction cost survey. Historically, the share of electrical wiring has been fluctuating with the cost of copper and copper products[1]. Since a majority of electrical wiring is done with cooper wire, an increase in the share of electrical wiring could also be attributed to an increase in the cost of copper and copper products between 2009 and 2011. Also, as local jurisdictions adopt newer versions of building codes, the use of arc fault circuit interrupters may be on the rise, which could add several hundred dollars to the cost of electrical wiring in some homes.

Another component that has been increasing as a share of total construction costs is appliances. An NAHB study on the spending patterns of home buyers[2] found that new home buyers spend about twice as much on appliances than non-moving home owners. This indicates a gap between all the appliances that go into a new home and appliances customarily offered by builders. In October of 2011, builders responding to the survey that underpins the NAHB/Wells Fargo Housing Market Index (HMI) indicated a very slight increase in their tendency to provide appliances like wall or microwave ovens, refrigerators, washer/dryers, trash compactors, etc. Eighteen percent of builders said they were providing more of these appliances compared to two years ago; 12 percent said they were providing less.

Respondents indicated that the second largest share of construction cost goes to "other" costs. NAHB made a series of phone calls and emails to further investigate what these "other" costs are. Some of the most common responses are the following: construction clean-up, such as the cost of cleaning the house, the cost of the dumpster, and disposal of trash; mirrors, glass and shower doors; insurance; utility costs; fireplaces; and bathroom accessories.

The shares of various fees paid by builders to local governments—for permits, inspections, estimated impacts—remained relatively stable between 2009 and 2011 and together add to approximately 5 percent of construction costs. A recent article, based on HMI survey results, produced a slightly higher average of 5.8 percent for fees paid by the builder during the construction phase of a project.[3] The construction cost survey asked about 3 specific types of fees; the HMI survey question was very broad and sought to capture all categories of fees paid by builders. The HMI survey results also indicated that actual fees paid by builders do not have as big an impact on construction costs as changes in building codes and standards over the past 10 years; which, according to the survey, increase construction costs by an average of 8.3 percent.

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[1] Cooper and Copper Products Prices as reported by the U.S. Bureau of Labor Statistics

[2] "Spending Patterns of Home Buyers" by Natalia Siniavskaia, December, 2008: http://www.nahb.org/generic.aspx?sectionID=734&genericContentID=106491&channelID=311

[3] "How Government Regulation Affects the Price of a New Home" by Paul Emrath, July 2011: http://www.nahb.org/generic.aspx?sectionID=734&genericContentID=161065&channelID=311

RESOLUTION NO. 2012-02 OF THE
BOULDER COUNTY FIRE CODE REVIEW COMMITTEE

WHEREAS, the Boulder County Fire Code Review Committee was given the proposed Boulder County residential fire sprinkler requirements for review at its public meeting duly called and held on August 15, 2012; and

WHEREAS, the Boulder County Fire Code Review Committee considered and discussed the proposed residential fire sprinkler requirements at a public meeting duly called and held on Thursday, September 6, 2012, at 3:30 p.m.; and

WHEREAS, the committee members unanimously support the adoption of the proposed residential fire sprinkler requirements, including the elimination of the current exception for hydrant fire flow, for the following reasons:

1. For life safety, to allow occupants time to escape the dwelling before being overcome by fire and smoke,
2. As a level of service measure, to extinguish or contain a fire until volunteer fire departments have time to respond and arrive on the scene, and
3. For wildfire hazard mitigation, to reduce the risk of structure fires spreading to the forest and other homes.

NOW, THEREFORE, BE IT RESOLVED THAT THE Fire Code Review Committee recommend to the Board of County Commissioners APPROVAL of the proposed 2012 International Residential Code residential fire sprinkler requirements.

DATED this Sixth (6th) day of September, 2012.

BOULDER COUNTY FIRE CODE REVIEW COMMITTEE

Gary R. Goodell, Secretary