

MULBERRY GROVE GREEN BUILDING PROGRAM RESOURCE GUIDE

The Mulberry Grove Resource Guide has been created to help builders and residents choose appropriate building products and methods to achieve the requirements for building and landscape design, energy efficiency and/or natural building for the Mulberry Grove Green Building Program.

This guide is intended to be used side by side with the Mulberry Grove Rules and Regulations; Covenants, Conditions and Restrictions and the Mulberry Grove Green Building Program. The numbering system below for the Rules and Regulations and CC&R's coincide with numbering system for said documents.

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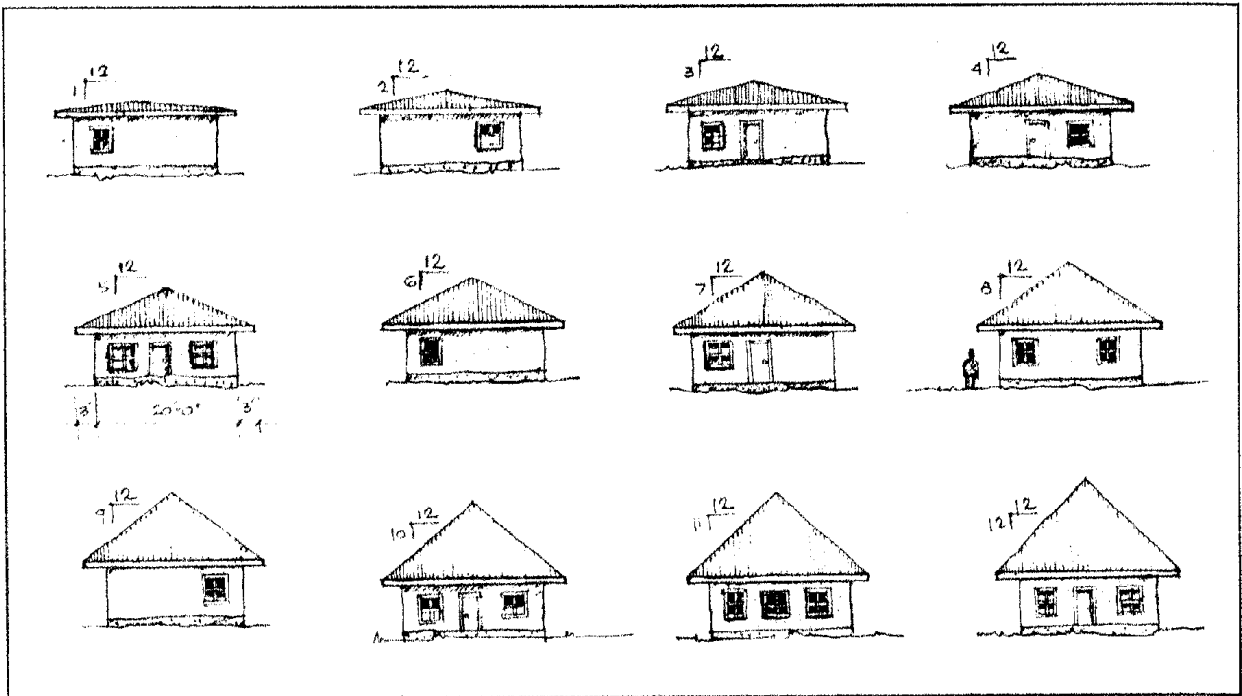
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MULBERRY GROVE COVENANTS

This document has been formatted to read side by side with the Mulberry Grove Covenants, Conditions & Restrictions document. For example, when reading the CC&R's, if more information is desired regarding roof pitches under section 7-C.2., please refer to the same section in this document. In addition, only a few sections in the CC&R's have references cited in this document to clarify technical or less mainstream concepts.

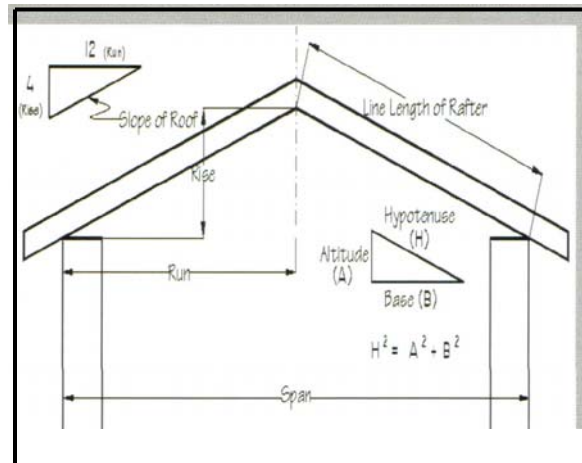
II. 2. (iv) Roof pitches will be between 3:12 and 6:12 unless it is a curved or living roof, in which case pitch may be greater or lesser. Variations from said slopes are allowed for smaller roof sections (e.g., porch roofs, dormers).



Drawing courtesy of Athena and Bill Steen

“The slope describes the incline of a roof as a ratio of the distance of the horizontal run. It is usually shown in drawings as a right-angle triangle where the inclination of the hypotenuse of the triangle matches that of the roof. The base of the triangle is always 12 units, which represents a horizontal run of 12 (from 12 inches per foot), And the altitude of the triangle represents the rise. Hence, a slope of 4 in 12 (written as 4/12 or as a ratio of 1:3) means that for every 12 units of horizontal run, there will be a 4- unit rise.”

-Athena and Bill Steen, *Small Straw Bale*



Drawing courtesy of Athena and Bill Steen

For more information on roof slopes and pitches, please refer to pages 110-111 of *Small Straw Bale*, by Athena and Bill Steen.

II. D.1.(ii) Maximum unbroken wall height is 10 feet 6 inches, although height variation may be allowed for wall segment with a horizontal dimension of less than 8 feet:

II. D.1.(iii) Maximum unbroken wall area on public side of building is 190 square feet.



The above home is a good example of breaking up long walls with the recessed porch and the bump out on the side.



The above home is a good example of a long, unbroken wall length.



The above home is an example of breaking up wall height with the addition of a porch.



The above home is a good example of unbroken wall length and height.



The above home is a good example of breaking up wall length and height with variations in roof line and footprint.



The above home is a good example of unbroken wall length and height.



The above home is a good example of breaking up a back wall with the addition of a bump out.



The above home is a good example of unbroken wall height.



The above home is a good example of a simple way to break up wall height and creating a welcoming entryway.



The above home is a good example of unbroken wall length and height.

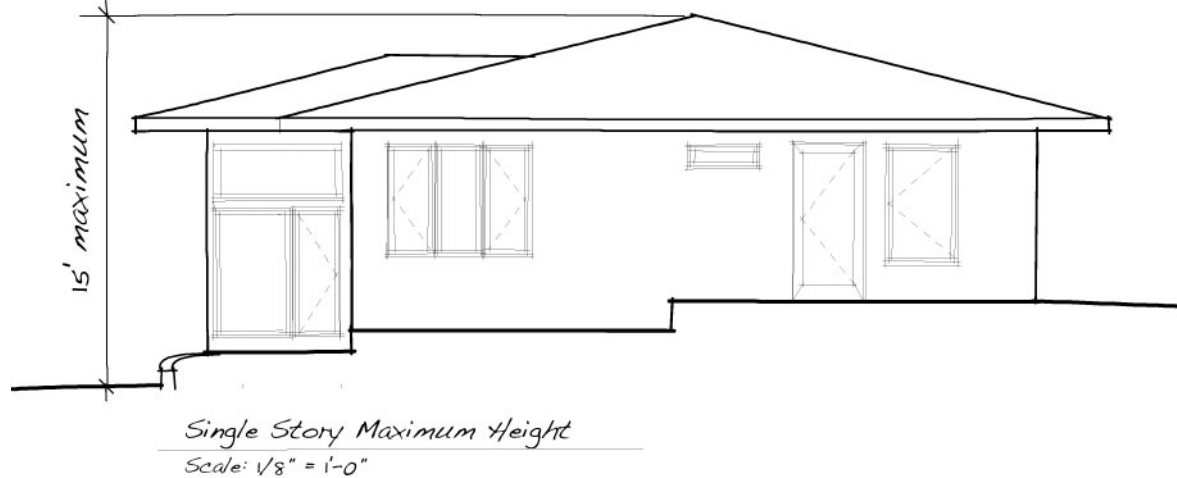


The above home is a good example of breaking up wall length and height with variations in roof line.



The above home is a good example of breaking up wall length with a recessed porch.

III A.1. Building heights are measured from the lowest adjacent finish grade and limits are: one storey/ 15 feet, two storey/ 20 feet



10. Please consider containing or semi-containing your cat with a cattery or difficult-to-scale courtyard walls:

- www.catfencein.com (888)738-9099
- www.purrfectfence.com (888) 280-4066
- www.lisaviolet.com/cathouse/backyard.html - a do-it-yourself-site
- <http://cats.about.com> –several links to cat fencing and outdoor enclosures
- www.bigfencingguide.com/cat-proof-fencing.html -has many links to cat fencing and outdoor enclosures

MULBERRY GROVE GREEN BUILDING PROGRAM

This document has been formatted to read side by side with the Mulberry Grove Green Building Program. The resources listed provide a good starting point for your research in building a home, and is by no means an all-inclusive guide. Please research and consider products carefully before purchase or use.

We encourage buying locally as much as possible and have listed businesses that carry products and offer services that will help you achieve energy efficiency. For researching products and services, and sourcing those that are unavailable locally, the following websites are great one stop resources for natural, recycled and healthy house materials and information on green building:

- The Green Building Center, www.greenbuildingcenter.net , (801) 484-6278, and is located at 1952 East 2700 South, Salt Lake City 84106.
- www.greenbuild.org, an invaluable and comprehensive online service, fee is \$12/week or \$199/year. Archives of Environmental Building News, with objective product reviews and in-depth articles on green building. GreenSpec (\$89 for print version, or online w/ subscription) provides extensive listings of green building products.
- PATH: Partnership for Advancing Technology in Housing, www.toolbase.org
- www.oikos.com features articles on and resources for green building

To decrease redundancy, the above sites have not necessarily been listed specifically throughout the sections of this document.

1~ CONSTRUCTION • DEMOLITION • USE OF RECYCLED MATERIALS

1.2 Construction Debris Recycled

- Canyonlands Community Recycling Center, 1000 East Sandflats Road, 259-8640- Drop off and sort yourself. Call for hours and materials accepted. Free.
 - Bob's Sanitation Transfer Station, 2295 South HWY 191, 259-7585- Bob's recycles much of the same material as the recycling center and a lot of material that you might not expect, such as copper and steel. This is a good place to salvage items, too. Call for hours. Fee charged.
 - Wabi Sabi, 145 West 200 South, 259-3313 or 259-9114- Wabi Sabi is a non-profit community thrift store and has a recycled construction section at its warehouse location. Call for hours and materials accepted. Free drop off and donated items are tax deductible.
-

1.3 Use of Reclaimed Lumber

Reclaimed lumber may be any wood that is salvaged or reused, such as timbers from an old barn or house, or even wood pallets (the latter often available for free or cheap from the recycling center or Bob's Sanitation). The following are some good starting points for purchasing reclaimed lumber in Utah:

- Pioneer Millworks Western Office, www.pioneermillworks.com
547 West 700 South
SLC, Utah 84101
 - www.trestlewood.com, Salt Lake City, Utah
 - Wood Finder, www.woodfinder.com – national company that has offices in Lindon and Promontory Point, Utah
-

1.4 Recycled Content Carpeting

- Antron Carpet Fiber, www.antron.net
 - Green Sage, www.greensage.com - organization that carries many green building products in addition to several brands of recycled carpet
 - The Carpet and Rug Institute, www.carpet-rug.com - an incredibly comprehensive site if you're really into recycled carpeting and rugs
-

1.5 Recycled Plastic Deck Materials

- Turner Lumber-Trex Decking, www.trex.com - can be special ordered
 - Timber tech, www.timbertech.com
 - Louisiana Pacific, www.lpcorp.com , (800)521-4316
 - EPOCH Composite Products Inc., www.evergrain.com , (800) 405-0546
 - Kadant Composites, Inc., www.geodeck.com , (781) 275-3600
-

1.6 Recycled Content Sheathing

- Pioneer Millworks, www.pioneermillworks.com – has reclaimed barn siding
 - Fiberock Brand Sheathing, www.usg.com , (800) USG-4YOU – 95% recycled materials, manufactured by United States Gypsum (USG)
-

1.8 Recycled Content Roofing

- Eco Shake, www.renewwood.com, (800) 420-7576- roofing material comprised of 100% recycled materials, reinforced vinyl and cellulose fiber.
-

1.9 Recycled Content Wall & Ceiling Insulation

- Blown cellulose is available from Grand Rental Center, 259-6976 and Home Depot

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2~ WATER CONSERVATION • LAND USE

2.1 Xeriscape Landscaping

The following is a list of local landscape architects, designers and nurseries that are familiar with drought tolerant plants and landscaping, and some reading material:

- Wildland Scapes, 259-6670 - landscape design and installation
 - With Gaia Design, 259-7073 - landscape architect
 - High Desert Gardens, 259-4531- design and plants
 - High Country Gardens, Santa Fe, NM (800) 925-9387- mail order nursery that publishes an annually updated, free, comprehensive plant guide
 - *Xeriscape Plant Guide*, Denver Water and American Water Works Association
 - *Plants for Natural Gardens*, Judith Phillips
 - *Natural By Design: Beauty and Balance in Southwest Gardens*, Judith Phillips
 - *Sustainable Landscape Construction*, L. William Thompson & Kim Sorvig
 - The Grand County Library has a good gardening section that includes the above books
-

2.2 Edible Landscaping

Refer to the list above for designers and Grand County Library gardening section, as well as the following:

- Seeds of Change, www.seedsofchange.com – mail order organic seed source from New Mexico
 - Johnny's Selected Seeds, www.johnnyseeds.com – mail order seeds source from Maine, organic and otherwise
 - Peaceful Valley Farm Supply, www.groworganic.com – mail order seeds, bare root plants and farming supplies from California
-

2.3 Drip Irrigation Installed

- Wildland Scapes, 259-6670- design and installation
 - Riverside Heating and Plumbing, Inc, 259-8324- installation & carries irrigation supplies
 - Walker True Value, Turner Lumber and Rim Supply carry irrigation supplies
 - Drip Works, www.dripworksusa.com –sells drip irrigation supplies
 - The Grand County Library gardening section has a few books on drip irrigation
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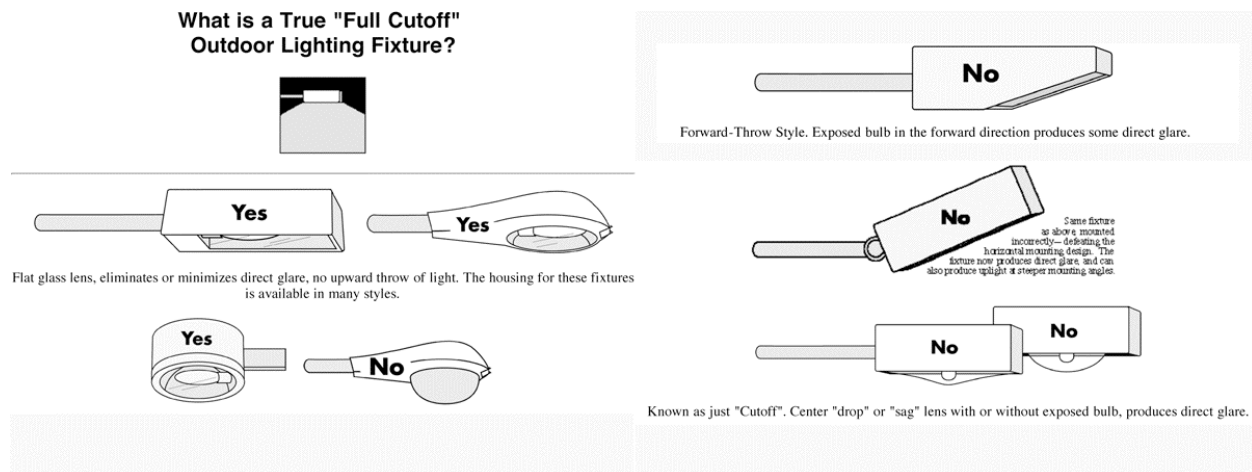
2.4 Additional Water Conservation

- Graywater
 - As of 2006, Utah allows the installation and use of graywater systems, which local health departments are in charge of administering. For information regarding rules and regulations, go to www.utah.gov. There is a browser for the website in the upper left hand corner. Above the browser, click on "utah.gov", which is written in gray. In the browser, type in "Graywater Systems."
 - *Create an Oasis with Graywater: Your Complete Guide to Choosing, Building and Using Graywater Systems*, Art Ludwig
- Rainwater Harvesting

- www.rainwaterharvesting.org
- www.twdb.state.tx.us- click on "Top Requested Area of Interest" and then on "Rainwater Harvesting Group"
- American Rainwater Catchment Systems Association (ARCSA), www.arcsa-usa.org
- www.harvesth2o.com , online rainwater harvesting resource with articles and frequently asked questions answered

2.7 Outdoor Lighting • 1 points

- The international Dark-Sky Association (darksky.org) has a list of full cutoff fixtures, and installation hints that can help meet the requirements of this section (as well as information on the numerous aesthetic, health, environmental, economic, and security benefits of non-glaring lighting).
- A lumen is a measure of light, and is more accurate than specifying brightness in watts, as bulbs can vary greatly in the efficiency with which they convert electricity to light. 7000 lumens is the equivalent of (for example) all of the following: four 50w incandescent bulbs (i.e. one at each of 4 doors), two 100w incandescent bulbs illuminating an outdoor area, and nine 10w 12v halogen path lights. Some fluorescent bulbs are rated for low temperature operation, and are suitable for year-round outside use in Moab.



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3~ FRAMING

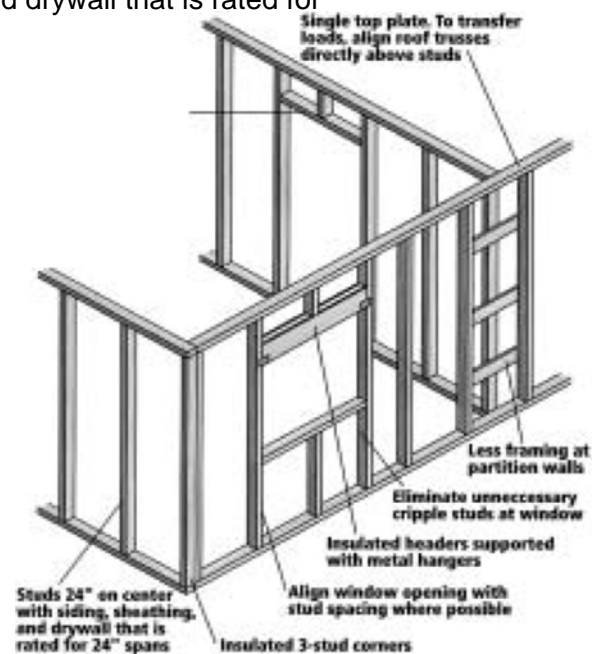
3.1 Alternative Materials

- With Gaia Design, 259-7073 – local company that provides strawbale and energy efficient home design
- OKOKOK Productions, 259-8171, www.okokok.org –local business that provides earthbag construction and workshops
- The Canelo Project, www.caneloproject.com – organization located outside of Tuscon, Arizona that provides excellent strawbale building workshops
- Solar Energy International, www.solarenergy.org , P.O. Box 715, (970) 963-8866, Carbondale, CO 81623- a non-profit organization that offers natural building, solar, wind and water power workshops, programs and resources
- *Small Strawbale*, by Bill & Athena Steen
- *The Hand Sculpted House*, Ianto Evans, Michael G. Smith & Linda Smiley

- *The Art of Natural Building*, Joseph F. Kennedy, Michael G. Smith & Catherine Wanek
- *Greenspec*, Buildinggreen.com- available online and in print, a comprehensive and evaluative resource that is updated weekly
- *A Primer on Sustainable Building*, Barnett & Browning, published by Rocky Mountain Institute
- *Serious Strawbale*, Lacinski & Bergeron

3.2 Incorporate Optimal Value Engineering (OVE) Framing Techniques

- Single top plate. To transfer loads, align roof trusses directly above studs.
- Less framing at partition walls
- Eliminate unnecessary cripple studs at window
- Insulated headers supported with metal hangers
- Align window opening with stud spacing where possible.
- Insulated 3-stud corners
- Studs 24" on center with siding, sheathing and drywall that is rated for 24" spans.
- Natural Resources Defense Council, www.nrdc.org, OVE may be researched through this website. Publishes *Efficient Wood Use in Residential Construction* with excerpts online.



3.3 FSC Certified Sustainably Harvested Lumber Used for Framing

- Forest Stewardship Council, www.fscus.org – great website for searching certified companies and their products by state

3.5 Engineered Lumber Used for Structural Framing

- Turner Lumber- trus Joist products can be special ordered
- Temple-Inland, www.temple.com
- Trus Joist, www.trusjoist.com
- Georgia Pacific, www.gp.com
- Boise Engineered Wood Products, www.bc.com

3.6 Structural Insulated Panels (SIP) Used for Exterior Walls and Roofs

- Structural Insulated Panel Association, www.sip.org – information on SIP and where to buy
 - Big Sky Insulation, www.bigskyrcontrol.com , Grand Junction, Colorado
-

3.7 Wet Spray Insulation in Walls/Ceiling

- At the time of this writing, one local insulation contractor was in the process of getting certified.
 - Biobased (BioBased.net) Insulation is soy-based polyurethane spray foam insulation products. As of this writing, the closest installer (in CO) is <http://www.wycmont.com> .
-

3.8 Frost Protected Shallow Foundation

- Design Guide for Frost Protected Shallow Foundations, pdf available from <http://www.huduser.org/publications/destech/desguide.htm>
- Big Sky Insulation, www.bsiinc.com, Grand Junction, Colorado for sub-grade rated no-HCFC foam.

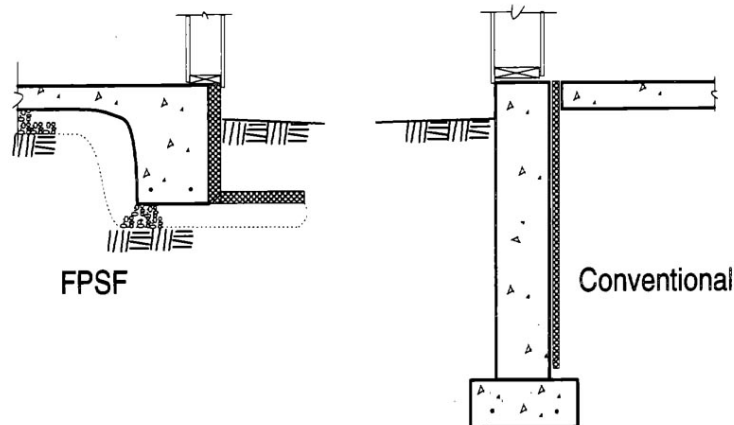


Figure 1. Schematic of FPSF and Conventional Foundation Systems

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4 ~ PLUMBING

4.4 Low Flow Fixtures

- www.epa.gov/watersense/ - like Energystar for water, has information and resources on high efficiency toilets and low flow faucets

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5~ ELECTRICAL

5.1 Energy Efficient Appliances

- www.energystar.gov , resource on Energy Star rated appliances
- American Council for an Energy Efficient Economy, www.aceee.org, resource that rates and compares products

- Knowles Home Furnishings, 259-1585, and Southeastern Utah Appliance Center, 259-4437, carry some Energy Star appliances

5.3 Energy Efficient Lighting

- Lighting is a significant household use of electricity, and it is a field currently in rapid evolution. One should consider the adaptability of a fixture to accept different, possibly much more efficient, bulb types in the future.
- *Prescriptions for Healthy House*, Baker, Elliott, & Banta

* * *

6~ MULBERRY GROVE ENERGY EFFICIENCY STANDARD

6.1 Mulberry Grove Energy Efficiency Standard

All houses in Mulberry Grove are required to meet a standard of energy efficiency. The standard is based on the International Energy Conservation Code (IECC) which was most recently updated in 2006. The IECC is widely used by governments in the U.S. Since Mulberry Grove aims to be a sustainable community, and energy use for heating and cooling homes is one of the largest impacts by individuals on the environment, our standard is to achieve energy efficiency 30% greater than that required by the current IECC, or IECC 2006, whichever is greater. The goal in choosing this standard was to encourage efficiency, while making sure that the standard can be achieved with common construction techniques and materials, and at reasonable cost. A 30% standard was chosen by modeling homes of different sizes, and construction types. Homes which achieve higher levels of efficiency are credited points. In addition, all homes must follow the basic standards of the most current version of the IECC (i.e. for air sealing, pipe insulation etc.)

There are currently three ways in which one can assess a home's performance by using IECC standards. For those with access to a computer, one can download a free program (REScheck) in which you enter details about the different components (walls, roof, foundation, windows) of the home. There is also an online version of the same program which can be used via a web browser. For those without access to a computer, there are also prescriptive packages of insulation levels which meet the code. REScheck provides % exceedance (and deficiency) numbers (and they can be calculated manually, if necessary). All methods are available via www.energycodes.gov/rescheck

Example Building Packages for MLC

1300 ft²
 2x6 walls w/ R-19 insulation
 Double pane low-e windows
 R-38 ceiling insulation
 4" foam on exterior of foundation
 2" foam under slab
 High efficiency furnace

2000 ft²
 Strawbale walls
 Double pane windows
 R-38 ceiling insulation
 2" foam on exterior of foundation
 Standard furnace

1000 ft²
 14" Adobe Walls
 Double pane low-e windows
 R-49 ceiling insulation
 4" foam on exterior of foundation
 2" foam under slab
 High efficiency furnace

*Notes: adobe factors in mass;
 windows are wood or vinyl;
 other conditions apply*

When inputting data for a building, the following changes may be made: if the house has an exposed mass floor (slab, tile) and/or walls (adobe, sandbag, rammed earth), then glazing which is:

- within 30° of south
- is exposed to winter sun
- shaded from summer sun

may be omitted. If the house does not have significant mass, up to 6% of such glazing may be omitted. Thermal mass may be factored in to the insulative value of wall; please document

methodology used. If available, use third party testing as the basis for u-values, such as from the Oak Ridge National Laboratory - www.ornl.gov/sci/roofs+walls/AWT/Ref/TechHome.htm

Component	Assembly	Gross Area or Slab Perimeter	Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	UA	Depth of Insulation (ft)	Comments/Description (Optional)			
Building											
1	Ceiling 1	Flat Ceiling or Scissor...	2000	ft2	38.0	0.0	0.03	60			
2	Wall 1	Other	1631	ft2			0.034	46			
3	Window 1	Wood Frame:Double ...	200	ft2			0.4	80	non-south only, double...		
4	Door 1	Glass	73	ft2			0.5	37			
5	Floor 1	Slab-On-Grade:Heat...	196	ft			9.75	0.686	134	6.0	first 6 feet averaged

Compliance: **Passes** Max. UA: 539 Your UA: 357 33.8 % Better Than Code

Select the buttons to create a list of envelope components for the building.

- Windows:
 - National Fenestration Rating Council (NFRC), www.nfrc.org , (301) 589-1776- an independent and non-profit organization that rates the energy efficiency of windows, doors and skylights; has a list of manufactures and participants with website links
 - Energy Star, www.energystar.gov , (888) 782-7937
 - Efficient Windows Collaborative Alliance to Save Energy, www.efficientwindows.org , (202) 530-2245- great website with information on NFRC and Energy Star ratings and resources on how to choose windows for your climate, including costs and fact sheets for each state.

7~ HEATING, VENTILATION & AIR CONDITIONING

7.1 Passive Cooling

- With Gaia Design, 259-7073 – green architect
- *The Passive Solar Energy Book*, Edward Mazria

7.4 Energy Recovery Ventilator (ERV)

- www.oikos.com- search for “energy recovery ventilators”
- Positive Energy Conservation Products www.positive-energy.com - has been the most inexpensive source of the Renewaire ERVs for the past five years

7.6 Biofuels

- The EPA maintains a list of woodstoves, and their emissions, <http://www.epa.gov/woodstoves/>

8~ SOLAR

8.1 Solar Hot Water Heating System

- The Green Building Center, www.greenbuildingcenter.net , (801) 484-6278
 - Solar Energy International, www.solarenergy.org , P.O. Box 715, (970) 963-8866, Carbondale, CO 81623- a non-profit organization that offers solar, wind and water power workshops, programs and resources
 - George Udbery, (435) 680-6805- has done several installations in the Moab area and has a good reputation
-

8.2 Passive Solar Space Heating

- With Gaia Design, 259-7073 – green architect
 - The Canelo Project, www.caneloproject.com – organization located outside of Tuscon, Arizona that provides excellent strawbale building workshops
 - *The Passive Solar Energy Book*, Edward Mazria
-

8.3 Active Solar Pre-Plumbing

- The Green Building Center, www.greenbuildingcenter.net , (801) 484-6278
 - Solar Energy International, www.solarenergy.org , P.O. Box 715, (970) 963-8866, Carbondale, CO 81623- a non-profit organization that offers solar, wind and water power workshops, programs and resources
 - George Udbery, (435) 680-6805- has done several installations in the Moab area and has a good reputation
-

8.4 Active Solar Space Heating

- The Green Building Center, www.greenbuildingcenter.net , (801) 484-6278
 - Solar Energy International, www.solarenergy.org , P.O. Box 715, (970) 963-8866, Carbondale, CO 81623- a non-profit organization that offers solar, wind and water power workshops, programs and resources
-

8.5 Solar Generated Electricity

- The Green Building Center, www.greenbuildingcenter.net , (801) 484-6278
- Solar Energy International, www.solarenergy.org , P.O. Box 715, (970) 963-8866, Carbondale, CO 81623- a non-profit organization that offers solar, wind and water power workshops, programs and resources

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9~ INDOOR AIR & ENVIRONMENTAL QUALITY

9.1 High Efficiency Particulate Air (HEPA) Filter on Furnace

- www.allergybegone.com –has many filter choices
-

9.2 Sealed Combustion Gas Furnace/Boiler & Water Heater

- www.oikos.com- under “Browse by Product Division” click on “Mechanical” or search “sealed combustion gas furnace” or “boiler/water heater”
-

9.3 Low Volatile Organic Compound (VOC) Interior Paint

- Turner Lumber- carries Benjamin Moore low VOC paints, in stock
- Benjamin Moore, www.benjaminmoore.com - has an Eco Spec line of low VOC paints

- ICI Dulux Paints, www.iciduluxpaints.com , (216) 344-8000- carries a no VOC line of latex paint called Lifemaster 2000 and a low odor oil based stain called Dulux Advance Oil
 - Sherwin-Williams, www.sherwin.com - carries low and no VOC lines of interior latex paint, called Duration Home and harmony, respectively
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9.4 Low Solvent Construction Adhesives

- The Green Building Center, www.greenbuildingcenter.net , (801) 484-6278
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9.5 Low-Toxic Water-Based Wood and Floor Finishes

- The Green Building Center, www.greenbuildingcenter.net , (801) 484-6278

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10~ SUSTAINABLY HARVESTED NATURAL MATERIALS

10.1 Natural and Sustainably Harvested Flooring

- The Green Building Center, www.greenbuildingcenter.net , (801) 484-6278
 - Heartwood Sawmill, www.triassicstone.com – a local sawmill operation that is committed to the sustainable use of local trees and the removal and milling of invasive species.
-

10.2 Adobe Flooring

- With Gaia Design, 259-7073 – green architecture firm that has hands on experience with adobe floor installation
 - OKOKOK Productions, 259-8171, www.okokok.org
-

10.3 Natural and Sustainably Harvested Exterior/Interior Finishes

- OKOKOK Productions, 259-8171, www.okokok.org – business that provides natural plaster and paint consultation and services, including lime and earth plasters and milk paints
- The Canelo Project, www.caneloproject.com – an organization located outside of Tuscon, Arizona that provides excellent natural plaster workshops
- *The Natural Plaster Book*, Cedar Rose Guelberth and Dan Chiras
- American Clay, www.americanclay.com –company that sells natural earth plasters