

# FGBC Green Home Designation Standard Reference Guide

This document provides descriptions for each rating criteria included within the *Florida Green Home Designation Standard checklist*.

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## **Prerequisites:**

### **Swimming Pool / Spa**

Although a popular amenity for homes in Florida, swimming pools and spas utilize precious fresh water resources and harmful chemicals in their operation and maintenance. If you do own a swimming pool or spa, simple steps can be taken to minimize or eliminate chemical usage, minimize energy used for pumping and heating, and reduce reliance on fresh water addition by minimizing evaporation. In order to qualify for the FGBC green designations, pool owners must utilize one of the following measures, or not have a pool or spa on the property.

Sanitation system that reduces / eliminates chlorine use: In order to maintain a sanitary swimming environment, pools generally require that chlorine levels be kept at a concentration of 2-4ppm (parts per million). Chlorine is generally added on a weekly basis, in relatively large quantities, in order to shock the pool. This high level of chlorine evaporates rather quickly, and the required constant level is maintained. There are swimming pool sanitation systems currently on the market that eliminate the use of liquid chlorine by recycling a salt alternative, or reduce the amount of liquid chlorine required by using ionization technology.

For more information on salt water systems visit [www.ecomatic.com](http://www.ecomatic.com). For more information on ionization systems visit [www.clearwaterpoolsystems.com/system.htm](http://www.clearwaterpoolsystems.com/system.htm) or [www.mikeronstore.com/floatron.htm](http://www.mikeronstore.com/floatron.htm).

Pool cover: The greatest loss of heat and chemicals from a pool occurs from its surface due to evaporation. By reducing this evaporation loss, pool covers are effective in lengthening the swimming season. They also keep the pool clean, thereby reducing the costs associated with chemicals and filter maintenance. Pool covers also can reduce chlorine loss by blocking direct sunlight that leads to chlorine evaporation. Depending on materials and the amount of use, temperature increases of 5°F to 10°F may be expected from a pool cover. A 5°F increase is reasonable when the cover is used 12 hours a day, and a 10°F increase could be expected when it is used 20 hours a day. Transparent or lightly translucent covers work best because they allow solar energy to pass through and be absorbed by the pool water, and they also prevent heat loss at night. Opaque covers are best used in Florida at night to prevent heat loss. Various types of pool covers are available at your local pool supply store.

Solar pool heating system: The average yearly cost for heating a residential pool in Florida is approximately \$1,450 using electrical resistance (electricity at \$0.09/kWh), and often over \$500 using an electric heat pump or using natural gas. Liquid propane costs about the same as electrical resistance. A solar pool heating system is appropriate in our Florida climate, and can pay for itself in as little as two years. For information on the State of Florida solar pool heating testing and certification program and a list of all certified manufacturers, visit:

[www.fsec.ucf.edu/Solar/Apps/POOLHTG/Poolhtg.htm](http://www.fsec.ucf.edu/Solar/Apps/POOLHTG/Poolhtg.htm)

Efficient pool pumping (0.5 hp /10,000gal): Pool pumping costs easily comprise 20% of total electricity use. One cost-effective way to reduce this expense is to use an oversized cartridge filter and 2" PVC piping rather than the standard 1 1/2" inch. Then locate a pump no larger than 1/2 hp per 10,000 gallons of pool volume. Set the pump on a timer to operate no more than six hours per day in summer and three hours in winter. Pool pumping is also a good application for photovoltaic technology. For more information visit: [www.fsec.ucf.edu/~bdac/pubs/CR978/cr1.htm#Pool Pump Replacement](http://www.fsec.ucf.edu/~bdac/pubs/CR978/cr1.htm#Pool Pump Replacement)

### **Waterfront Considerations**

Waterfront Florida Yards present special challenges and responsibilities. Waterfront property owners have firsthand knowledge of the special contributions that the lagoon, rivers, streams and lakes add to our quality of life. However, a special responsibility goes along with the benefit of being a next-door neighbor to these natural resource treasures. Landscapes bordering our surface-water resources need to be designed with special sensitivity to the environment. Those landscapes also present some unique management challenges for the environmentally conscious homeowner. In order to qualify for the green designation, home sites that border water bodies must implement at least one of the following measures. For more information consult [A Guide to Environmentally Landscaping: Florida Yards and Neighborhoods Handbook](#) or visit [hort.ufl.edu/fyn/maintain17.htm](http://hort.ufl.edu/fyn/maintain17.htm). Any criteria elected here except for "Home site does not border natural water body" must be verified by a Florida Yards & Neighborhoods certified inspector.

Use of native aquatic plants in the shoreline area: Naturally sloping lagoon shorelines, particularly when buffered by a fringe of mangroves and/or marsh grass, help smooth out waves and reduce turbidity (cloudiness) in the water. Mangroves and other shoreline plants contribute to the lagoon's food web, attract wildlife, such as wading birds, and help prevent erosion of the shoreline. Such plants also contribute to the treatment of storm water runoff before it enters the water body. To receive the credit, 75% of your property's shoreline must be bordered by native aquatic plants. To find appropriate plant species for your area, contact your water management district or your local horticultural extension office.

Low maintenance plants placed between lawn and shoreline; no turf adjacent to water: Erosion problems are typical along water bodies where vegetation has been disturbed by construction activities. Enhancing natural vegetation with additional native plantings and removing non-native, invasive plants can improve both the function and aesthetics of your shoreline. Native plantings require little maintenance in the form of fertilizer that can enter the water body via storm water runoff and encourage harmful algal blooms. Turf is an especially poor choice for the shoreline area due to high fertilizer use and potential for grass clippings to enter the water body. To receive the credit, no turf can be adjacent to the water. Instead, choose a low maintenance ground cover, or a mulched area with low maintenance plantings. To find appropriate plant species for your area, contact your water management district or your local horticultural extension office.

Use of terraces, swales, or berms to slow storm water movement into water body and prevent erosion: Sloping shorelines with no aquatic plants in the littoral zone are pathways for storm water entry, along with contaminants it picks up along the way. There are various techniques to slow storm water movement into the water body, thereby allowing it to be treated naturally by the onshore environment, such as terraces, swales, and berms. Such structures should be placed landward of the mean high water line. A qualified individual should be consulted before changing drainage patterns along your shoreline. Contact your local water management district.

## Category 1: Energy (Building Envelope and Systems)

### Code/Ratings

Along with a mandatory energy code for buildings, the State of Florida has created an optional uniform rating system that enables participants to gain insight into their home's energy usage compared with other similar homes within that geographic region. Participating in this program gives homeowners access to certified energy professionals who are able to recommend energy improvements for your home. The code and rating system cover all factors of the home that relate to cooling, heating, and hot water energy use.

Meets Florida Energy Code (HERS=80): In 1979, the State of Florida decided to encourage builders to build more energy efficient houses; in response to this decision, the State developed the Florida Energy Efficiency Code (FEEC). This Code requires all houses to demonstrate a minimum level of energy efficiency before a building permit is issued. This Code is updated periodically to further improve the minimum level of energy efficiency of new houses. FGBC encourages participants to exceed the FEEC for their building projects, but awards 100 points for proper code compliance. FGBC acknowledges that many other states do not have energy codes, and that a home that meets the FEEC may be significantly more energy efficient than similar houses across the country.

In the case of an existing home, to receive the 100 points, the home must acquire a confirmed Florida HERS rating with a score of at least 80.

Confirmed Florida HERS Rating (attach): In 1993, the Florida Legislature passed Florida Statute 553.990, which is called the Building Energy-Efficiency Ratings Act. This law (as subsequently amended) provides for a statewide uniform system for rating the energy efficiency of all buildings, consistent with the federal Home Energy Rating System (HERS) guidelines.

The HERS rating system is a performance-based system that compares the energy efficiency of a new or existing home to a hypothetical or "baseline" version of the home. This baseline home is created to be identical to the home being rated; however, it is configured to meet minimum accepted levels of energy efficiency. The rated home is given credit for decreasing the amount of energy required for heating, cooling, and hot water generation compared to the baseline home. In Florida, a home that meets the minimum standards of the FEEC receives a HERS score of 80. A rated home can achieve an additional HERS point for every 5% increase in efficiency over the baseline home—which translates into a 5% reduction in the home's electricity bill. To qualify for the EPA's ENERGY STAR<sup>®</sup> program, the house requires a HERS score of 86. For FGBC's *Green Home Designation Standard*, a home is awarded 5 points for every HERS point it achieves over 80, with a maximum of 50 points available for this criterion (HERS = 90). A copy of the signed rating guide must be submitted as documentation.

The HERS rating system rewards homes based on performance, not for incorporating certain "prescribed" measures. Many techniques can be used to improve the energy performance of a home. To obtain a confirmed Florida HERS Rating, one must rely on an Energy Rater—an individual certified by the State of Florida to perform an energy rating on a home using a specialized software tool called EnergyGauge. The Energy Rater is trained to inspect the home and to enter data into the software, which then predicts the home's energy use. These data include climate and siting characteristics, detailed construction techniques and materials

(including insulation and window information), and HVAC specifications. Performance data are also measured on air infiltration into the home and on duct leakage.

To find out more about Florida Energy Ratings, visit the Florida Solar Energy Center's website at: <http://www.fsec.ucf.edu/ratings/>. This website contains priorities for designing an energy-efficient home in Florida, along with listings of local Energy Raters.

### **Design**

As previously mentioned, the HERS Rating System only takes into account certain measures that act to reduce the heating, cooling, and hot water demand of a home. FGBC has created this design section to award points for other energy conservation measures that are not taken into account within the HERS Rating System. Most of these measures involve proper design and layout of the home that can lead to energy savings through passive, rather than active action.

Document proper sizing of HVAC system: A report from a software program or hand-calculation of the Air Conditioning Contractor's Association (ACCA) Manual J method of determining system sizing must be included, and the components used as inputs must be shown. Interior set points must not be greater than 70 F for heating or lower than 75 for cooling. The installed cooling system size must be within ½-ton of the size closest to the Manual J value to claim this credit of one point.

Adequate return air transfer paths: To receive the point, returns for space conditioning systems should provide at least 1 square inch of free return air path for every 3 cfm of supply air. One point is available.

Although included in the Energy section, this criterion has many other benefits including health and durability.

Cross ventilation and ceiling fans code credits: In the HERS system, credit is awarded for incorporating either cross ventilation or ceiling fans, but not for both. Incorporating cross ventilation and ceiling fans into a home design encourages less reliance on air conditioning systems during periods of cooler ambient temperatures by circulating air more efficiently, and thus making the home more comfortable. FGBC awards 1 point for incorporating both ceiling fans and cross ventilation. To receive this point, however, ceiling fans must be installed in each bedroom and each major living area of the house, and all primary living areas and bedrooms must qualify as having cross ventilation (*i.e.*, windows on at least two walls of the room).

Roofed porch, min. 100 ft<sup>2</sup> and 3 sides open: Porches provide a comfortable outdoor living, cooking, and eating space during cooler months and reduce reliance on the home's air conditioning system. As with the rest of the home's design, providing shade with overhangs, keeping the roof cool, and installing a ceiling fan will increase comfort. FGBC awards 1 point to a house that includes a porch or outdoor living space, although to receive the point, a minimum of 3 sides of the porch must be open or screened, meaning that it is not enclosed by solid walls.

Passive solar space heat system: A home designed for passive solar heating utilizes, and sometimes stores energy from the sun during the winter months. South-facing windows receive significant winter sun and much less summer sun. Incorporating south-facing glass and placing the main living area on the south side of the home takes full advantage of this. Heat storage can be achieved by using a good conducting material on the slab floor, such as tile or slate, to provide for thermal mass. Concrete block and brick partition walls also provide good thermal

mass, as do designs that incorporate water. Homes can also use this “mass” to preserve cool temperatures when the air conditioning system is operating. FGBC awards 1 point for a solar space heat system that incorporates 30 BTU/°F/ft<sup>2</sup> of storage for every square foot of south-facing glass. Credit not available (or appropriate) for homes in the South Florida climate zone.

Passive solar day-lighting: A home designed for passive solar day lighting allows sunlight to enter the home without excessive heat gain. Examples include north- and south-facing clerestory or dormer windows. Such windows should be operable to also provide a ventilation outlet. Skylights and other types of horizontal glass are not recommended, for they receive too much summer sun and are difficult to shade. Solar light tubes (domed glass roof fixtures coupled with an insulated reflective tube) are encouraged, and provide usable reflected light without the heat gain. Light-colored interior surfaces (walls, ceilings, floors) also aid with natural lighting by reflecting light rather than absorbing it. Light-colored surfaces are beneficial whether using natural or artificial lighting. FGBC awards 1 point to a home that incorporates solar day lighting with clerestory or dormer windows or light tubes. Light-colored interior surfaces are treated separately below.

House shaded on the East and West by trees: During the cooler seasons, a house can achieve a large solar heat gain during the morning and early evening hours as the sun rises and sets. These times also correspond to peak demand placed on utilities. By providing shade trees on the east and west sides of the house, cooling demand can be significantly reduced, since a single mature tree can avert as much heat from a home site as two residential size central air conditioners. Placing deciduous trees on the south side of the house is also beneficial, as they provide shade in the summer and let in winter sunlight. Foundation plantings of smaller shrubs are also beneficial to keep the ground next to the house cool and to block re-radiation from adjacent hot surfaces (however, no plants should be placed within 36” of the foundation to prevent excess moisture from accumulating). Trees can also be used to shade the air conditioner condenser, which can further reduce cooling costs. To receive points, sum up the wall areas that are oriented within 45° of due east or west and that separate the conditioned area from the outside (omit garage and porch walls). Observe amount of wall area under full shade during the summer or use a sunpath tool. FGBC awards 1 point for each 25% of the designated wall areas (average of east and west walls) that are shaded by trees.

Washer and dryer outside of conditioned space: Washers and dryers emit large quantities of heat under operation. If located within the conditioned space, they represent an additional load on the home’s air conditioning system. FGBC awards 1 point if this equipment is located outside of the conditioned space—garage, unconditioned utility room, etc.

Light colored roof/exterior walls: Dark colors absorb more heat from sunlight; in contrast, light-colored surfaces have been shown to reduce cooling costs. FGBC awards 1 point for having a roofing material and 1 point for having an exterior wall material with a reflectance of at least 50%. Generally such materials will be colored “white.”

South roof area for future solar use: The best efficiency of a solar system, whether using collectors or modules, is obtained by facing the system south. FGBC awards 1 point if provisions are made such that there is available south-facing roof area for future installation of a PV system or solar water heating system. At least 75 ft<sup>2</sup> of roof facing within 20° of due South must be provided. This point is not available if a system is installed. Systems that are actually installed are given credit either within the HERS rating system or in the General category.

Pre-plumb for solar hot water: Besides providing south-facing roof area, the next step in preparing for a future solar hot water system is to install plumbing from the hot water tank location up to the roof. FGBC awards 1 point for this, acknowledging that it will be easier to install a solar system in the future. Plumbing must be copper pipe or CPVC. This point is not available if a system is installed. Systems that are actually installed are given credit either within the HERS rating system or in the General category.

Centrally locate hot water heater: By centrally locating the hot water heater, heat losses can be minimized by minimizing piping runs. FGBC awards 1 point if the water heater is installed in a central location (between locations that use hot water), rather than on one end of the home.

Insulate all hot water piping: All hot water piping (including that which is buried) must be insulated with a minimum of ½ ” insulation. In order to receive the 1 point, a photo of the buried insulated lines must be available or a receipt for the appropriate amount of pipe insulation must be provided.

Efficient envelope volume: Some home designs minimize the amount of outside surfaces while others have shapes that have many projections. Although many projections may help for cross ventilation, minimal outside surface area is beneficial for times when air conditioning or heating is occurring. FGBC provides 1 credit point if the:

$$\left( \frac{\text{Total gross wall area}}{\sqrt{(\text{Conditioned square footage}) * (\text{Number of stories})}} \right) < 40$$

Total gross wall area refers to the walls, windows and doors that separate the conditioned space from the non-conditioned space.

Dwelling unit attached; zero lot-line; row house: FGBC awards 1 point if the home has an attached dwelling unit such as an apartment, is a zero lot-line, or is a row house.

## **Category 2: Energy (Appliances, Lights, Amenities)**

### **Energy-efficient appliances**

As previously mentioned, the HERS Rating System **Score** only takes into account certain measures that act to reduce the heating, cooling, and hot water demand of a home. FGBC has created this second energy section to award points for other energy conservation measures that are not taken into account within the HERS Rating System **Score**. These measures involve the selection of household appliances that use less energy than those typically employed by the building industry.

ENERGY STAR<sup>®</sup> appliances: Appliances labeled with the EPA ENERGY STAR<sup>®</sup> label use less energy than other products, save money on utility bills, and help protect the environment. Although energy-efficient models sometimes cost more to purchase initially, any extra up-front cost can often be made up with savings on your utility bill. Also, check with your local utility; some may offer rebates on the purchase of ENERGY STAR<sup>®</sup>-rated appliances. FGBC awards 2 points for the installation of an ENERGY STAR<sup>®</sup> labeled refrigerator or clothes washer and 1 point for the installation of an ENERGY STAR<sup>®</sup> labeled dishwasher (credit is limited to one of

each per house). For more information, visit the ENERGY STAR<sup>®</sup> web page at: [www.energystar.gov/products/appliances.html](http://www.energystar.gov/products/appliances.html).

Refrigerators represent the single largest power consumer of all household appliances. ENERGY STAR<sup>®</sup> models incorporate better insulation, more efficient compressors, better heat transfer surfaces, and more precise temperature and defrost mechanisms. They must exceed federal standards by 20% to be considered ENERGY STAR<sup>®</sup>. As a result of the better insulation and more efficient operation, installation of such a refrigerator will also keep the kitchen cooler, providing more savings from space cooling.

ENERGY STAR<sup>®</sup> dishwashers save by using both improved technology for the primary wash cycle, and by using less hot water to clean. These appliances include energy efficient motors and other advanced technologies such as sensors that determine the length of the washing cycle and the temperature of the water necessary to clean the dishes. Dishwashers use built-in electric heaters to heat water to a temperature hot enough to clean dishes effectively. ENERGY STAR<sup>®</sup> dishwashers minimize water use, saving the energy required to heat it, in addition to other efficiencies. ENERGY STAR<sup>®</sup> dishwashers must exceed minimum federal standards by at least 13% to be considered ENERGY STAR<sup>®</sup>.

ENERGY STAR<sup>®</sup> clothes washers use superior designs that require less water to get clothes thoroughly clean. These machines use sensors to match the hot water needs to the load, preventing energy waste. ENERGY STAR<sup>®</sup> washers use nearly 50% less water and 30%-40% less energy per load. The washer design also causes less wear and tear on clothes. In addition, better water extraction means less drying time, which yields further energy savings. There are two designs, top-loading and front-loading. They are described in more detail as follows:

Front-loading ENERGY STAR<sup>®</sup> models are similar in design to washers used in laundromats. These horizontal-axis or tumble-action machines repeatedly lift and drop clothes, instead of moving clothes around a central axis.

Top-loading ENERGY STAR<sup>®</sup> washers use sensor technology to closely control incoming water temperature. To reduce water consumption, they spray clothes with repeated high-pressure rinses to remove soap residues rather than soaking them in a full tub of rinse water.

Energy-efficient appliances: Clothes dryers and ovens/ranges are currently not covered by the ENERGY STAR<sup>®</sup> program; however, there are energy-efficient models on the market. FGBC awards 1 point for installing an efficient clothes dryer and 1 point for installing an efficient oven/range.

### Clothes dryers

The clothes dryer is typically the second-biggest electricity-using appliance after the refrigerator. Some new clothes dryers remove moisture more efficiently, have moisture sensors, and have automatic shut-off controls to avoid over-drying. The efficiency of a clothes dryer is measured by a term called the energy factor. This factor is somewhat similar to 'miles per gallon' for a car, but in this case the measure is pounds of clothing per kilowatt-hour of electricity. The minimum rating for a standard capacity electric dryer is 3.01; for gas dryers, the minimum energy factor is 2.67. The rating for gas dryers is provided in kilowatt-hours even though the primary source of fuel is natural gas. Unlike most other appliances, energy consumption does not vary

significantly among clothes dryers, and clothes dryers are not required to display EnergyGuide labels.

- Look for a clothes dryer with a moisture sensor that automatically shuts off the machine when your clothes are dry. Not only will this save energy, it will reduce the wear and tear on clothes from over-drying. The best dryers have moisture sensors in the drum for sensing dryness, while most only infer dryness by sensing the temperature of the exhaust air. Compared with timed drying, you can save about 10% with a temperature sensing control, and 15% with a moisture sensing control.
- Look for a dryer with a cycle that includes a cool-down period, sometimes known as a “perma-press” cycle. In the last few minutes of the cycle, cool air, rather than heated air, is blown through the tumbling clothes to complete the drying process.
- Gas dryers are usually less expensive to operate than electric dryers. The cost of drying a typical load of laundry using an electric dryer is 30-40 cents compared to 15-20 cents using a gas dryer.

FGBC awards 1 point if a clothes dryer with a moisture sensor is installed.

### Ovens/Ranges

Conventional ovens must first heat up about 35 pounds of steel and a large amount of air before they heat up the food. Tests indicate that only 6% of the energy output of a typical oven is actually absorbed by the food. New ovens have additional insulation and tighter-fitting oven door gaskets and hinges to save energy.

- For gas ovens, new electronic pilot-less ignitions reduce gas usage by about 30% over a constantly burning pilot light. These are also more convenient, eliminating the need to restart a standing pilot light. About 58% of American households cook with electricity, but gas cooking is making a steady comeback. Gas ovens use much less energy compared to their electric counterparts because the fuel is used directly for cooking. A gas appliance costs less than half as much to operate as an electric one, provided it is equipped with electronic ignition instead of a pilot light.
- Consider buying a self-cleaning oven. They use less energy for normal cooking because of higher insulation levels. However, if you use the self-cleaning option more than once a month, you will end up using more energy than you will save from the extra insulation.
- With electric cook tops, there are a number of new types of burners on the market: solid disk elements, radiant elements under glass, halogen elements, and induction elements. Solid disk elements and radiant elements under glass are easier to clean, but they take longer to heat up and use more electricity. Halogen elements and induction elements are more efficient than conventional electric coil elements. Induction elements require that you use only iron or steel pots and pans. Aluminum cookware will not work with induction elements.
- The range hood should ventilate to the outside and not simply re-circulate and filter the cooking fumes. This is especially important with gas ranges. But also be careful about the sizes of fans—too large a fan can waste energy and cause back-drafting of combustion gases into the house. This is a major concern with large downdraft ventilation fans used with some cook-tops and ranges. Ask about make-up air ducts available for these models. Points are awarded for exterior vented range hoods under the Health section.

FGBC awards 1 point if the oven is: self-cleaning or pilotless gas, **and** the cooktop is pilotless gas or has halogen or induction elements.

Buyer given info if none installed: If no ENERGY STAR® or energy-efficient appliances are installed at the time of occupancy, FGBC will still award 1 point if the builder gives the homeowner printed information about available models. The information contained in this reference book may be used, or information can be obtained from [www.energystar.gov](http://www.energystar.gov).

Efficient or no well pumping: FGBC awards 1 point if steps are taken to minimize electricity used for well pumping. To receive the points power to the pump must be 220V, and the system must contain a storage tank with a volume greater than 35 gallons. Larger storage volumes will minimize the number of times the pump must cycle on/off, thereby minimizing the large amount of energy needed to start the pump motor. You may also receive a point if there is no well pump installed or if the pump is powered by photovoltaics.

### **Energy-efficient lighting**

Lighting can easily account for 15% of a home's yearly electric bill. Not only do the lights use energy themselves, but they also generate heat that must be removed by the home's air conditioning system. Recently the market has been flooded with energy efficient products that carry no added cost over conventional models, or can relate any added cost to an improvement in product life. Many of the techniques listed here, if incorporated in the design stage of a project do not cost more than the conventional approach. Many energy efficient lighting technologies and strategies focus on producing a higher quality of light appropriate for the task at hand, with less energy wasted as heat that needs to be removed by the home's air conditioning system.

Indoor lights are fluorescent: The most common artificial light source is the incandescent bulb. Although they are relatively inexpensive, almost 90% of the power is wasted as heat and the bulbs usually burn out after about 750 hours of use. Fluorescent lamps require only one-fourth the electricity as an incandescent bulb and last 10-12 times longer. Fluorescent bulbs also produce equivalent light with far less heat. Although more costly, such bulbs can pay for themselves in about three years, considering they also reduce the load on the home's air conditioner. FGBC awards 10 points if at least 75% of the installed lighting in the home uses fluorescent or compact fluorescent bulbs.

Recessed, sealed, insulated IC fixtures: Recessed IC fixtures refer to fixtures installed in the ceiling that are rated for insulation contact. Sealed IC fixtures have no penetrations. During installation, it is important that the gap between the can and the ceiling material be sealed also to prevent conditioned air from leaking through this gap, and/or to prevent hot attic air from entering into the conditioned space. FGBC awards 2 points if all recessed light fixtures are sealed IC fixtures and insulated to the same amount as the rest of the ceiling.

Max installed lighting wattage < 0.5 W/ft<sup>2</sup>: In many cases, houses are over-lit: Installed lighting is augmented with freestanding lamps, and more light is available than necessary for various tasks. As previously mentioned, excessive lighting can add to the air conditioning load. FGBC awards 2 points for a home with maximum installed lighting of less than 0.5 watts per square foot of living space. This can be calculated by dividing the total wattage of installed light inside the home by the home's conditioned floor area.

Light-colored interior walls, ceilings, carpet/floors: Light-colored interior surfaces increase lighting efficiency by reflecting and dispersing light rather than absorbing it. Light-colored surfaces are beneficial whether using natural or artificial lighting. FGBC awards 2 points if bedrooms and all major living spaces in the home have light-colored surfaces.

Single light in bathroom: Typically bathrooms have lighting fixtures that contain 4 or 5 incandescent bulbs. Such fixtures can add excessive heat to the conditioned space, and the extent of light output is generally unnecessary. FGBC awards 1 point if all bathroom light fixtures are designed to use only a single bulb and no more than one light fixture shall be connected to the same switch.

Outdoor lights are fluorescent/electronic ballast, photovoltaic, low voltage, or have motion sensor: Outdoor lighting, including exterior house, path, and driveway lights, typically consume a great deal of energy, especially when left on throughout the entire night. Suggested choices for brightly lit outdoor spaces like patios include using fluorescent bulbs and fixtures with electronic ballasts (more efficient than magnetic type), low-pressure sodium, or mercury vapor lamps. Photovoltaic systems are a good choice for walkways, driveways, and landscaping. Most available units have storage batteries that will charge during daylight hours and power the lights all night; some will even provide power for 2 to 3 days in case the weather is cloudy. Motion sensors are recommended for outdoor lighting, particularly if incandescent floodlights are used. Low voltage landscape lights that operate on a timer will also qualify. FGBC awards 2 points if *each* exterior light employs one or more of these lighting conservation strategies.

### **Category 3: Water**

#### **Appliances**

Hot water recirculation system: Inevitably, some fixtures that deliver hot water in a home are installed some distance away from the hot water heater. When these fixtures are not in use, hot water remains stagnant inside the pipes and loses its heat to the surrounding environment. When the fixture is turned on, the cold water is wasted while it is allowed to run out of the fixture until hot water from the tank can make it to the point of use. Hot water recirculation systems are now on the market to remedy this situation. Installation of such a system involves installing a hot water line from the fixture the farthest distance from the hot water tank returning back to the tank. A “tee” type fitting combines this line with the cold-water inlet to the tank. Rather than remaining stagnant inside the pipes, as the water cools, it flows back to the tank, and is continuously replaced with hot water. Hot water is then available as soon as the fixture is turned on. By installing the line on the fixture farthest from the tank, all fixtures in the home are included within the loop. Some models are available with pumps to aid circulation, which only present a small added electricity demand. FGBC awards 2 points if a hot water recirculation system is installed. Such a system is more appropriate for new construction, since replumbing may require extensive renovation.

Similar results can be achieved, without the added complication, by insulating all hot water pipes, and by centrally locating the hot water heater. Points are given for these items in Category 1. If both of these criteria are selected, points for the recirculation system are not available due to redundancy.

Low-flow fixtures: The Florida Building Code and National Energy Policy Act of 1992 (EPACT) require that all installed showerheads and faucets be rated at a maximum flow rate of 2.5 gallons/minute at 80 psi water pressure. There are available fixtures on the market today that exceed these standards. FGBC awards 1 point if all fixtures installed in the home are rated at a flow rate equal to or lower than that mandated by the EPACT.

Faucet aerators: Faucet aerators are also required items under the Florida Building Code. They reduce the flow emitted by a faucet fixture, while also enhancing its quality by injecting air into the water stream, thereby increasing velocity of the flow. In turn, faucet aerators increase the usefulness of a low-flow fixture, thereby allowing the same task to be completed (dish washing, hand washing) in less time, using less water. In your kitchen, you will want a 1.5-2.0 gallon-per-minute (gpm) aerator to make sure the flow of water is enough to wash and rinse dishes. You may want to use a low-flow aerator with an on/off handle that allows you to increase or reduce the flow as needed. Your bathroom faucet is used primarily for rinsing tasks. A 0.5-1.5 gpm aerator will provide enough water for shaving, hand washing and other personal hygiene tasks. In the laundry, a 2.0 gpm aerator works best. Although required by code, FGBC awards 1 point if faucet aerators are installed on all fixtures in the home, which ensures that this sometimes overlooked task is properly completed. Check <http://sjr.state.fl.us/info/PIOretr1.htm> for more information.

Faucets do not drip upon occupancy: Properly installed faucets that do not drip are required by the plumbing code. However, like faucet aerators, this item is often overlooked. Leaky faucets can waste up to 20 gallons of water per day. To stress the importance of this simple task, FGBC awards 1 point if all the faucets in the home do not drip.

No garbage disposal: Although a popular item that increases the convenience of food cleanup, garbage disposals are notorious for wasting water. A much better choice for disposal of food scraps is composting, discussed in more detail later. FGBC awards 2 points to a home that does not have a garbage disposal.

Low-flow toilets: The Florida building code and National Energy Policy Act of 1992 (EPACT) require that all installed toilets be rated at a maximum flow rate of 1.6 gallons/flush. There are toilets on the market today that exceed these standards. Toilets represent the largest source of indoor water use in the home, accounting for up to 30%-40% of water demand. FGBC awards 1 point if all toilets installed in the home are rated at a flow rate equal to or lower than that mandated by EPACT. A good source for information on low-flow toilets is [www.terrylove.com](http://www.terrylove.com).

Waterless toilet: There are also toilet systems on the market that use no water at all. Two technologies include composting toilets and incinerating toilets. Although they are bulkier and require a separate tank, they are easy to maintain and have no associated smells. FGBC awards 4 points if at least 1 waterless toilet is installed in the home. For more information visit [www.compostingtoilet.org](http://www.compostingtoilet.org) or [www.keyswastewater.org/ayres2.htm](http://www.keyswastewater.org/ayres2.htm).

### **Greywater reuse**

Greywater is generally defined as domestic wastewater from any source except toilets and the kitchen sink—this includes laundry, shower/bath, faucets, and dishwasher. Reusing greywater for landscape irrigation presents an exciting opportunity for water conservation. Statistics show that 50-75% of the water consumption in an average Florida home is for exterior landscape irrigation, and generally our precious potable water resource is used for this purpose. Greywater is rich in nutrients, and many landscape plants and grasses will thrive when watered with greywater. In turn, the terrestrial environment acts to naturally purify this waste stream, without chemicals or added energy, and returns the water to its natural cycle. FGBC awards 3 points if a greywater system is installed, or 1 point if a new home is constructed with separate plumbing for future greywater reuse. At a minimum, a greywater system is defined as one that appropriately distributes reject water from a washing machine to the landscape.

Greywater differs from blackwater (water from toilets and kitchen sink), in that it is free of pathogens and solids. Greywater only contains 1/10 the amount of nitrogen as blackwater, and the organic content of greywater typically decomposes much faster than that of blackwater. Although inherently safer than blackwater, greywater cannot be considered as potable, and, therefore, landscape application must take place subsurface, and cannot be used with sprayers or rotors. To utilize greywater from household fixtures, plumbing in the home must separate drains from blackwater and greywater sources. For new construction, a reuse system should be planned during the design stage. Since laundry equipment generally has drain hoses that are not fixed, washing machines are an excellent source of reuse water.

Two excellent greywater resources are the book entitled “Create an Oasis with Greywater” by Art Ludwig, and the Oasis Design website, located at: [www.oasisdesign.net](http://www.oasisdesign.net). Another good source of information is the City of Austin’s Sustainable Building Sourcebook at: [www.greenbuilder.com/sourcebook/greywater.html](http://www.greenbuilder.com/sourcebook/greywater.html). The Florida Department of Health regulates the installation and use of greywater and onsite systems, and the specifics are defined in rule 64E-6. This rule is available for download from the Department’s web site: [www.doh.state.fl.us](http://www.doh.state.fl.us). Details concerning greywater reuse systems may appear in the 2001 Florida Building Code.

### **Rainwater harvesting**

With an average rainfall of 54 inches/year in the state of Florida (compared to the national average of 27 inches/year), harvested rainwater is an excellent source of water for landscape irrigation. The equipment is readily available and of relatively low complexity. Rainwater harvesting is now mandated for new construction in Bermuda and the U.S. Virgin Islands. Rainwater is generally harvested from a roof surface, and system components include properly designed gutters, piping, roof washers, screens, and a storage tank/cistern. System capacities can range from thousands of gallons to trashcan-sized rain barrels. Harvested rainwater could also be a good source for toilet flushing, but it is unclear at this point if it will be allowed to be plumbed into the home without disinfection. A good primer on rainwater harvesting can be found at: [www.greenbuilder.com/sourcebook/Rainwater.html#contents](http://www.greenbuilder.com/sourcebook/Rainwater.html#contents). FGBC awards 3 points if a rainwater harvesting system is installed, or 1 point if suitable guttering with leaf screens has been installed for future use. At a minimum, a rainwater harvesting system is defined as a rain barrel that is designed to collect water from a roof via gutters, with proper overflow control. For more information consult [A Guide to Environmentally Landscaping: Florida Yards and Neighborhoods Handbook](#) or visit [hort.ufl.edu/fyn/create6.htm](http://hort.ufl.edu/fyn/create6.htm).

### **Installed Landscape**

Plant selection is an important part of landscaping your yard. The plants you select determine the wildlife value of your yard, the level of maintenance that will be required, how much money you will be spending on water or electricity to run a sprinkler pump, and how much fertilizer or pesticide may be required. Stormwater runoff, or rain that falls on yards, roads, and parking lots and then washes into water bodies, carries pollutants such as fertilizers, pesticides, soil, and petroleum products. Fertilizers and pesticides from residential areas can be serious threats to the health of Florida’s waters. Plant selection will also determine how long your landscape will last. Fast growing plants often have a shorter life span than slower growing species. More people are conserving water both inside and outside the home, and interest is growing in landscaping with native and other beneficial trees, shrubs, and ground covers. Homeowners are choosing plants that blend beauty and environmental benefits. Many of these benefits to the environment also save time and money while enhancing our special Florida lifestyle. For more information consult [A Guide to Environmentally Landscaping: Florida Yards and Neighborhoods Handbook](#)

or visit [hort.ufl.edu/fyn/hand.htm](http://hort.ufl.edu/fyn/hand.htm). Another good source of information on this subject is Waterwise Florida Landscapes publication from Florida's water management districts. An electronic version is available for download at [www.sjr.state.fl.us/](http://www.sjr.state.fl.us/). A Florida Yards & Neighborhoods certified inspector must verify all criteria elected from this section.

Drought tolerant turf in sunny areas only; no turf in densely shaded areas: Turf is generally the largest consumer of water in the landscape, and most types will not flourish in shady areas. FGBC awards 2 points if a drought tolerant type of turf grass, such as Bahia grass, is used in sunny areas of the landscape and if no turf is planted in densely shady areas.

50%/80%/100% of plants/trees from local drought tolerant list: Drought-tolerant plants and trees are able to survive on rainfall with little or no supplemental irrigation. FGBC awards 1 point if at least 50% of the plants and trees incorporated into the landscape are from a local drought tolerant list; 2 points are available if 80% are from such a list; and 3 points are available if 100% of the plants and trees are from such a list. There must be a minimum of twelve total plants to qualify for the credit. To obtain a list of drought tolerant plants and trees, contact your local water management district or consult the Waterwise Florida Landscapes publication.

Turf less than 50% of landscape: As previously mentioned, lawns are generally the largest consumers of water in the landscape. Minimizing the amount of turf in your yard by confining it to play, pet, or entertainment areas will greatly reduce your yard's burden on our limited freshwater resource. FGBC awards 3 points if turf is planted on less than 50% of the landscape.

Evenly shaped turf areas; no turf on berms: Evenly-shaped turf areas are easier to water efficiently and easier to maintain. Turf planted on berms requires more water to remain healthy, due to water run-off from the slope. FGBC awards 2 points if 100% of turf is planted in evenly-shaped areas (such as circles, ovals, and rectangular areas rather than in long thin strips) and if no turf is planted on berms.

No invasive exotic plant species: Often times, exotic plants that are not native to Florida's environment are not suited to local rainfall conditions, and require more water to remain healthy. In addition, invasive species sometimes crowd out our natural vegetation. FGBC awards 2 points if no invasive exotic species are included in the landscape. A list of such plants can be found at: [www.fleppc.org](http://www.fleppc.org) and [www.dep.state.fl.us/stland/bapm/index.htm](http://www.dep.state.fl.us/stland/bapm/index.htm).

Plan for edible landscape/food garden: Homeowner food production is often organic, requiring less fertilizer and pesticide use, and is free from pollution associated with transporting the produce. FGBC awards 2 points if a minimum of 50 square feet is dedicated to edible landscape plants. The 50 sqft can be a combination of garden space, area under fruit/nut tree drip lines, and shrubs. To estimate area under tree drip line, measure the distance from the outer leaves to the trunk. This is the radius of the tree. For immature trees, use the 1/5 of the mature tree radius (1/2 the published diameter or "width" as given in plant directories). This is the effective radius. Then calculate the area using the actual radius or the effective radius, whichever is greater.

Area under tree =  $3.1413 \times \text{radius} \times \text{radius}$

Homeowner also must be in possession of, or receive at closing, a one-page handout on growing fruit/vegetables organically, available from the local extension service or other suitable source, in order to claim credit.

Plants with similar maintenance requirements grouped together: Grouping plants with similar maintenance requirements together increases irrigation efficiency. Lawns that require a lot of water from sprayers and rotors should not be watered in the same irrigation zone as drought-tolerant plants that require less water and that can be efficiently irrigated with micro-irrigation such as drip systems or soaker hoses. FGBC awards 2 points if the landscape is planned and installed according to plant maintenance requirements.

Mulch applied 3-4" deep around plants: In addition to preventing weed growth, a thick layer of mulch will help retain soil moisture, retard erosion, cool the soil surface, and reduce some soil pests. Mulching around trees also reduces damage from mowers and line trimmers. FGBC awards 2 points if 3-4" of mulch are placed around plants and trees (extending out to drip line) and in landscaped beds. It is important to leave some open space close to the plant stems.

Use of alternative mulches: FGBC awards 2 points if all mulch used is an alternative type such as melaleuca, pine straw, bark, recycled, eucalyptus, etc. Brazilian pepper, Australian pines, and palms should not be used as mulch and are not given credit.

Soil amendment where necessary: In some areas of Florida, native soil is very sandy and porous, and does not retain water or nutrients well. This often results in the need for excessive irrigation and fertilization to maintain a healthy landscape. The simplest way to avoid these problems in the landscape is to use only plants that are compatible with the site. However, in the case of a vegetable or flower garden a soil amendment such as compost (or other organic matter) may be mixed with the native soil to improve moisture and nutrient retention. FGBC awards 2 points if highly permeable soil is appropriately amended where necessary.

### **Installed irrigation**

Homeowners in some parts of Florida are becoming accustomed to restrictions that limit irrigation to certain days and times. Still, most of us are watering too much. Overwatering depletes our water supply, often makes plants pest prone, and adds to stormwater runoff that pollutes our natural waters. By choosing and operating a watering system correctly, you can reduce water bills, fungal diseases, and maintenance requirements.

Coupled with appropriate plant selection, implementing efficient irrigation techniques can reduce outdoor water use anywhere from 20% - 60%. A Florida Yards & Neighborhoods certified inspector must verify all criteria elected from this section.

Separate irrigation zones for turf/drought tolerant species (sprayers and rotors separate): In addition to grouping plants with similar maintenance requirements together, it is important to design the irrigation system to deliver the appropriate amount of water for each plant type. This includes installing a multiple program controller that can divide the landscape into zones and operate the different zones for different lengths of time. In this way, lawns that require a large amount of water from sprayers or rotors can be separated from more drought-tolerant plants that require little or no water. In contrast, a single program controller is often set for the watering requirements of the least drought-tolerant landscape feature, and the rest of the landscape ends up being over-watered—which can lead to problems such as root rot in some plants. FGBC awards 1 point if the irrigation system is controlled by a multiple program controller and is designed with zones corresponding to plant water requirements.

Calibrate irrigation system for less than ¾ ” per application, emitters properly directed: Even during the summer, turf areas—which generally require the most water of all landscape features—will not benefit from more than ¾ ” of water per application. Applying more than ¾ ” will result in excess water being lost to evaporation, runoff, or percolation through the soil. Over-watering turf also allows weeds such as dollarweed to become established. Many landscape plants do not require as much water as turf, and their zone can be set for less than ¾ ” of water per application. FGBC awards 1 point if all of irrigation zones are set to receive ¾ ” or less of water per application. An easy way to determine this is to place small containers (i.e. paper cups) throughout each zone and take note of the time it takes for the cups to accumulate ¾ ” of water. Then, set your irrigation controller to operate for no longer than that time in each zone. One must also ensure that no irrigation water is directed to the walls of the house or to areas not intended to be watered (i.e. driveway, street), and that other plants do not interfere with desired spray patterns.

Use of micro-irrigation in landscape beds: Landscape features other than turf can be watered much more efficiently by using micro-irrigation rather than sprayers and rotors. Equipment such as drip emitters, bubblers, micro-spray jets, and soaker hoses deliver water precisely where it is needed. In contrast, much of the water emitted from sprayers and rotors is blown away by wind or evaporates. FGBC awards 1 point if micro-irrigation is used on landscape plants, trees, and shrubs. The point is also awarded if a sub-surface system is used in conjunction with a greywater reuse system.

Use of micro-irrigation in lawns: Although lawns are usually watered with sprayers and/or rotors, there are systems on the market that are designed to deliver water directly to turf roots rather than spraying it on the leaves. In addition to conserving water ordinarily lost by wind and evaporation, such systems encourage deeper root growth, yielding a more robust and drought-tolerant lawn. FGBC awards 2 points if turf is watered with micro- or sub-surface irrigation. For more information visit [www.turfbubbler.com](http://www.turfbubbler.com) or [www.ecsgreen.com/index.html](http://www.ecsgreen.com/index.html) for example systems.

Rain shut-off device properly installed: Rain shut-off devices are required by Florida building code for all newly installed irrigation systems. These devices automatically turn off the irrigation system if it is operating during a rain event. Although the building code requires the device to be present, it does not require that the device be connected to the irrigation controller. FGBC awards 1 point if a rain shut-off device is properly installed.

Irrigation system efficiency checked by qualified technician: Often times extra money is spent on a sophisticated irrigation system and controller but the benefits are not realized due to improper setup of the system or hidden system leaks. FGBC awards 1 point if the irrigation system is inspected by a qualified irrigation technician. Contact your local water management district for more information.

Landscape exists primarily on rainfall; no permanent irrigation system: The most water-efficient landscape is one that does not rely on supplemental irrigation and can exist primarily on rainfall. Such landscapes are designed with drought-tolerant plant and turf species, and may only need to be manually watered occasionally with a hose or hose-type sprinkler. FGBC awards 7 points if the home has a landscape properly designed to exist primarily on rainfall and if no permanent irrigation system is installed, recognizing that this type of landscape conserves more water than even the most efficient irrigation system.

## Category 4: Site

### Native tree and plant preservation

Several studies have shown that trees can increase the value of a home anywhere from 5% - 20%. Trees can also offer energy savings by providing considerable shade. In order to protect this investment, it is always more economical to prevent tree damage than to remedy it. Trees are often damaged during home construction by accidental cutting, mechanical equipment, grade changes, excavation, and chemical substances. For more information consult the Florida Department of Forestry's Tree Protection Manual for Home Builders.

Develop a tree/plant preservation plan: Provide a survey of the property that identifies all trees 2 inches in diameter at greater than breast height (4.5feet) and all native plant communities. Identify areas to be preserved and develop a strategy for avoiding mechanical and chemical damage, grade changes, trenching, and compaction. See the next criteria for suggestions. Also provide a strategy to identify and remove invasive species. Two points will be awarded for development of a plan that preserves 10% of the site or at least 12 inches of tree caliber measured at chest height (i.e. four 3-inch trees, two 6-inch trees, etc.).

Maximize tree survivability: Two points will be awarded if all of the following techniques are employed to at least 12 inches of tree caliber measured at chest height (i.e. four 3-inch trees, two 6-inch trees, etc.). Here, FGBC is looking to see the plan developed in the previous criteria implemented.

- 1) To avoid accidental cutting of trees, clearly mark the trees to be cut with paint at eye level, and also on the ground to make it easier to see if unmarked trees have been cut. Also, make sure the cut trees will not damage other trees when they fall.
- 2) Construct barricades around trees or groups of trees to be preserved at their dripline to prevent mechanical damage. Mechanical damage can be caused by heavy equipment, carelessness with tools, soil compaction, and improper cutting of roots. Make sure the barriers are tall enough to be seen by equipment operators. Use hand tools when removing brush and weeds around a tree.
- 3) Plan for tree survival when making grade changes, for filling can damage trees. Fill may raise the water table or cause surface drainage to puddle over the roots. A light fill of porous or gravel material up to 6 inches in depth will usually do little harm, however heavier or more impervious fills such as clay and marl will harm the tree. It is often advantageous to install an aeration system before the fill is added, to maintain a normal balance of air and water around the roots. Consult with a tree expert or the Florida Division of Forestry for more information regarding construction of an aeration system which generally includes installing tile for drainage and aeration, constructing a drywell, and filling.
- 4) Minimize damage to roots during excavation:
  - a. Cut roots cleanly and retrim after excavation.
  - b. Treat cuts in larger roots (1/4 inch and up) with wound dressing.
  - c. Refill the excavation as soon as possible or construct retaining walls.
  - d. Avoid leaving air pockets when refilling.
  - e. Mix peat moss or other soil amendment with fill soil to promote new growth.
  - f. Top-prune to aid in maintaining tree vigor.
  - g. If cables or piping must be laid through the tree root zone, it is better to tunnel underneath it rather than trench through it.

- 5) Keep the soil within the dripline undisturbed and free from building materials and harmful runoffs to avoid chemical damage. Do not use areas near trees as dump or storage areas. Do not use herbicides or pesticides, or fertilizers containing herbicides, near any of the vegetation you are trying to preserve.

Replant or donate removed vegetation: If native vegetation must be removed, receive 2 points if it is taken offsite (i.e. to a plant nursery) and then after construction brought back and planted onsite. Alternatively, transplant the removed material to another site. Either transplant 10% of the site or at least 12 inches of tree caliber measured at chest height (i.e. four 3-inch trees, two 6-inch trees, etc.)

Preserve or create wildlife habitat or shelter: Preserve existing plant communities in their undisturbed state or if there is no existing native plant community, then create one that will survive on natural rainfall, soil nutrients, and pest control. One point is awarded for each contiguous 10% of property. For more information see [A Guide to Environmentally Landscaping: Florida Yards and Neighborhoods Handbook](#) (page 21) or visit [hort.ufl.edu/fyn/maintain17.htm](http://hort.ufl.edu/fyn/maintain17.htm).

### **On-site use of cleared materials**

Mill cleared trees or grind for mulch: Grind all removed trees that will not be replanted or donated for use as mulch in the landscape, or have the cleared logs milled into lumber. No credit is given for mulching Brazilian pepper, Australian pines, or palms (these should not be used as mulch). One point is available. Save the money that would be spent on waste disposal or purchasing mulch. If logs are milled they could represent a possible source of lumber or revenue. One point is available.

Reuse stumps and limbs for mulch/landscape: Reuse all removed stumps and limbs greater than 2 inches in diameter in the landscape. Examples include mulch, landscape decorations, fences, etc. One point is available.

### **Erosion Control and Topsoil Preservation**

Trees and plants depend upon nutrients in the soil. Often when a new home is constructed the entire lot is cleared and then the topsoil is washed away by rain and blown away by wind. Not only is it a valuable resource by leaving it on the site, but it may end up clogging drainage areas and mucking water bodies. Hang on to the soil! More details and examples of criteria in this section can be found at [www.co.broward.fl.us/dni00835.htm](http://www.co.broward.fl.us/dni00835.htm).

Soil costs \$5 to \$10/yard. Left unprotected, a significant amount of soil can be washed away from a typical ¼ acre lot with a downpour. This could be worse over an extended period or on lots with slopes.

Develop an erosion control site plan: Applicant shall submit documentation of a site plan for erosion and sedimentation control before the site is cleared or graded including areas where topsoil will be removed, contours of slopes to be cleared, location and type of erosion control measures, stormwater and sediment management systems, and a vegetative plan for temporary and permanent stabilization. Two points are available.

Stabilize disturbed soil: Document the use of Best Management Practices (BMPs) for soil stabilization, such as silt screens, hydro mulch, non-floatable conventional or alternative mulch, groundcovers, rye grass or millet, and retaining walls. One point is available.

Stage disturbance: When a lot is cleared or extensive landscaping is to be done, staging the work so that only part of the site is disturbed at one time allows existing plants to retain some of the soil that may be lost from erosion during the project construction period.

To qualify for the 1 point, no more than 60% of the site or no more than ¼ acre (whichever is less) can be disturbed at one time. Existing vegetation must remain in tact on the undisturbed part until at least 40% of the site is landscaped.

Create a temporary physical barricade around the section of the site to be protected. If the undisturbed area needs to be disturbed, complete the work on the existing disturbed section and then landscape that section before removing the barricade.

Save and reuse all removed topsoil: Save and reuse any removed topsoil as the final top layer on site following construction. The soil must be covered and protected from weather until used. Organic soils lose their nutrients if left exposed to the elements. One point is available.

### **Drainage/retention**

More details and examples of criteria in this section can be found at [www.co.broward.fl.us/dni00835.htm](http://www.co.broward.fl.us/dni00835.htm).

Onsite designated retention area: Two points are awarded if a designated retention area(s) is constructed to retain the first 1 inch of rainfall onsite. This could be a single retention area or system of berms/swales.

Control sediment runoff during construction: Document the use of Best Management Practices to control sediment runoff/transport during construction including using a temporary gravel construction entrance/exit, straw bale barriers, silt fences, sediment traps, etc. Two points are available.

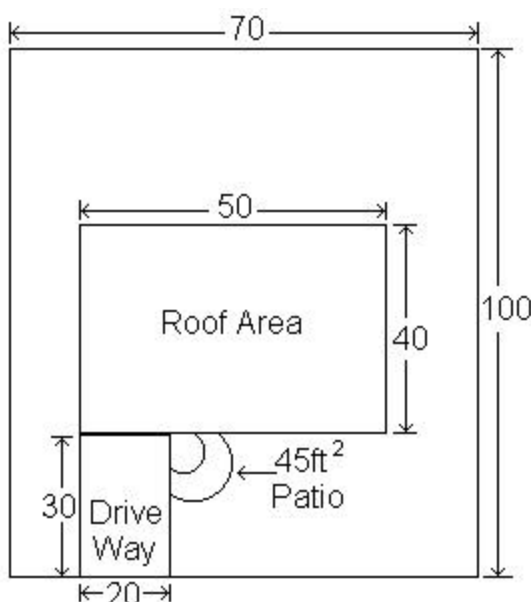
Direct filtered rooftop runoff to planted area(s): Must show on site plan how water from rooftop is directed toward planted area(s). Flow must be disbursed using an infiltration system that spreads runoff over a large area and eliminates focused flow that might cause erosion. Must incorporate a leaf and debris filter within gutter system. Two points are available.

Maintain pervious surface area: For each point received, 20% of the site should be 100% pervious. For semi-pervious sections use the following equation to determine equivalent pervious area:

$$(\% \text{ perviousness of material}/100) \times (\text{coverage area}) = \text{equivalent pervious area}$$

Add the coverage areas of 100% pervious materials and the equivalent area of the semi-pervious materials and divide by the total lot area. Then, divide this result by 0.2 to obtain the eligible points. Consult A Guide to Environmentally Landscaping: Florida Yards and Neighborhoods Handbook for more information.

Example (All units are ft unless specified):



1) The 100% pervious area would be:

$$= (70 \times 100) - (40 \times 50) - 45\text{ft}^2 - (20 \times 30)$$

$$= 7000\text{ft}^2 - 2000\text{ft}^2 - 45\text{ft}^2 - 600\text{ft}^2 = 4355\text{ft}^2$$

2) If the driveway is 30% pervious then we add:

$$(30/100) \times 600\text{ft}^2 = 180\text{ft}^2$$

$$4355\text{ft}^2 + 180\text{ft}^2 = 4535\text{ft}^2$$

3) Total available points is calculated as follows:

$$\text{total equivalent pervious area} / \text{total area}$$

$$= 4535\text{ft}^2 / 7000\text{ft}^2 = 0.648$$

$$0.648 / 0.2 = 3.24 = 3 \text{ available points}$$

(always truncate to the lower whole number)

## Category 5: Health

### Combustion

Detached garage, carport, or no garage: Often times, toxic fumes from automobiles and chemicals stored in the garage can be transferred into the living space of a home when it has an attached garage. FGBC awards 3 points if the home has a detached garage that does not share any common walls or passageways with the enclosed living space, or has a carport with no garage, or no carport/garage.

Attached garage with air barrier between garage and living space, including attic: FGBC awards 2 points if penetrations between a home and its attached garage are sealed properly. An air barrier must be created to restrict air exchange between the garage/attic space over the garage and the living space. This can be accomplished by caulking and sealing of the top and bottom wall plates of the shared garage-living space walls, constructing an airtight partition between the garage attic space and the attic space over the living area, and weather stripping the garage door. An automatic garage door closer should also be added.

Sealing of walls and attic partition can be accomplished with an open-cell foam insulation (i.e. Icynene, Demilec Sealection 500, etc.).

Attached garage – exhaust fan on motion sensor and timer: Install a fan capable of fully exchanging the garage air with the outside air in 15 minutes or less. A typical 20ft x 20ft x 8ft garage would require a 220 cfm fan. The fan must run for a sufficient amount of time to fully exchange the garage air every four hours on a timer, and when activated via a motion sensor to

exhaust carbon monoxide fumes from automobiles. Fan must exhaust to the outside. One point is available.

Direct vent, sealed combustion fireplace with electronic ignition: The direct vent fireplace is an important standard when a fireplace is desired. Direct venting eliminates the threat of harmful combustion gases from entering the home. If a fireplace is not properly vented and sealed, the fireplace can produce harmful combustion pollutants which may be emitted into the home such as carbon monoxide, nitrogen dioxide, and sulfur dioxide.

To achieve the available point a direct vent sealed combustion fireplace must be used. The fireplace should also be equipped with electronic ignition. All fuel burning fireplaces should have sealed combustion and be properly vented to the outside. The point is also available for homes that do not have a fireplace.

For more information on this subject visit [www.healthouse.org](http://www.healthouse.org). Some suppliers of this equipment include Heatalitor and Majestic.

Sealed combustion furnace or furnace isolated from the conditioned area: Sealed combustion appliances eliminate the threat of harmful combustion by-products from entering the home due to the fact that they contain their own air supply directly vented into the appliance for combustion and a vent for exhausting the combustion gases to the exterior of the home. One point is available.

Installation of a non-sealed combustion furnace must be located in a non-conditioned area (outside the house) or in a sealed combustion closet. To receive the point for the sealed closet one must:

- Insulate the four walls of the combustion closet.
- Finish the walls and ceiling with drywall.
- Seal all holes and air leakage pathways through the walls, floor, and ceiling that can connect the closet to the rest of the house (plumbing, gas lines, wiring, and bottom plate).
- Install a non-louvered door that is weatherstripped and equipped with a properly adjusted threshold.
- Install two ducts in the closet, extending to the outside or to a ventilated attic or crawlspace, to provide outside air for combustion. Seal the ducts to the ceiling.
- If a return plenum for a furnace is built below the closet, completely seal the plenum including plenum walls, plumbing, and connection of the furnace to the plenum.
- Seal the ceiling around the flue using sheet metal.
- The area must not be depressurized by more than 3 Pa.

Sealed water heater combustion or isolated from the conditioned area and power vented: One point is available. Sealed combustion appliances eliminate the threat of harmful combustion by-products from entering the home due to the fact that they contain their own air supply directly vented into the appliance for combustion and a vent for exhausting the combustion gases to the exterior of the home.

Non-sealed unit installation must be in a non-conditioned area (outside) or in a sealed combustion closet, directly vented to the outside of the home with venting not passing through any conditioned area. For details on the closet requirements, see “Sealed combustion furnace.”

Carbon monoxide detector: These devices provide advanced warning to the homeowner of any intrusion of carbon monoxide to the living area of the home before becoming dangerously toxic.

To receive the point, detectors should be installed at the entrance to each sleeping area and one on the living area side of garage door entrance to living area within the conditioned space. One detector can be used for adjacent bedrooms. The detectors must be line powered with a battery backup.

Carbon Monoxide detectors are available at most local hardware stores. See Consumer Reports Jan 2001 for an excellent review of these devices.

### **Moisture Control**

Drainage tile around and on top of footing: By draining water away from the home moisture intrusion will be minimized and mildew formation will be reduced. By reducing moisture inside the home, the quality of the health of the occupants will be improved leading to less respiratory problems, etc. The necessity of this criterion depends on soil type in your area and the foundation type of your home. It is most appropriate for basements and crawl spaces located in North Florida. One point is available.

There are several types of drainage tile that may be used to facilitate this undertaking. The easiest to install and the most readily available is constructed of PVC. It is black and is perforated with a fabric cover. This should be placed around or on top of footing. Crushed stone of approximately 6 in. thick should be installed under the pipe with then more stone being used to cover the pipe after installation. The pipe should then be drained to a retention area away from the home.

Drainage board for below grade walls: Drainage board for below grade walls is not common to Florida due to the fact that basements are limited due to the high water table. It is most appropriate for homes located in North Florida. If used, it should be used in conjunction with drain tile. This will allow water to drain down the drain board on top of the drain tile which will then take the water away from the home. One point is available.

By forcing water away from the home moisture intrusion will be minimized and mildew will be reduced. By reducing moisture inside the home, the quality of the health of the occupants will be improved leading to less respiratory problems, etc.

Gravel bed beneath slab on grade floors: Installing a gravel bed beneath slab on grade floors will be very beneficial to the reduction of moisture trapped beneath the slab. Gravel should be a minimum of 6 in but preferably 12 in. The gravel should be placed under the complete slab including footings. All footings should be dug larger to allow for the gravel placement. It is also recommended that several drain tile pipes (4 in. PVC) be installed under the slab to the exterior of the slab to allow water accumulated to drain to the exterior of the slab. One point is available.

The necessity of this criterion depends on soil type in your area and the foundation type of your home. It is most appropriate for basements and crawl spaces located in North Florida. By forcing water away from the home moisture intrusion will be minimized and mildew will be

reduced. With such techniques, water can be retained on the property for irrigation while dramatically reducing the deterioration of the home. By reducing moisture inside the home, the quality of the health of the occupants will be improved leading to less respiratory problems, etc.

Seal slab penetrations: After the slab has substantially cured, any penetration through the slab such as piping or conduit shall be sealed around its perimeter with an elastomeric sealer such as “Vulcum” sealant. This will reduce the moisture and pests from entering the home. One point is awarded.

Capillary break between foundation and framing: A capillary break shall be installed between a concrete foundation wall and sill plate. One point is awarded. A complete framed wall width sill gasket, EPDM-type rubber, or other suitable membrane shall be installed. Alternatively, prior to installing exterior sill plates a generous bead of quality silicone sealant should be applied to bottom side of the sill plate and then secure the sill plate into place. These techniques prevent moisture from wicking through the foundation into the framing.

Central dehumidification system: Install a central dehumidification system in the home’s HVAC system. The unit should be professionally installed by a local HVAC contractor. Two points are awarded.

The unit will reduce mildew by reducing moisture intrusion.

## **Ventilation**

House under positive pressure with respect to the outdoors: To receive the three point credit, the conditioned area of the house (i.e. not garage or exterior porches) must be at least +0.5 Pa with respect to the outdoors while the home’s air handler is running and any continuous forced ventilation systems are running. Bathroom exhaust fans and kitchen range hoods are considered temporary ventilation devices rather than continuous. All windows and exterior doors should be closed during the test. This verification must be completed by someone knowledgeable about house pressures and skilled in the use of a manometer such as an Energy Rater.

Radon/soil gas vent system installed: One point is awarded if a radon/soil gas vent system is installed in the home. Examples of such a system are described below. Another way to achieve the same result without the expense of an active system is to ensure that all slab penetrations are sealed, a vapor barrier is installed under the slab (code required) and the house is at positive pressure with respect to the outdoors. Points for these criteria are available under Health – Ventilation and Moisture Control. If all of these points are selected, points for installation of a soil gas vent system are not available.

Slab on grade: The least expensive way of venting for radon gases under a slab on grade would be to install a series of passive vent stacks (2 – 3 per home) that, in the event radon gas is present, will allow any trapped gas to vent thru the path of least resistance, using 3” PVC piping venting thru the roof. This is accomplished by installing the pipes prior to slab pour, in a dry well made of crushed stone. The end of the pipe must be capped with a well point or screen then buried in the stone. PVC should extend vertically above slab level and be temporarily capped to prevent being plugged by construction debris. Once home has been framed and is in the rough plumbing stage, the pipe should be extended thru the roof and finished in the same manner as a plumbing vent stack.

Slab with stemwalls: See slab on grade method above

Foundation and Basement or Crawl space: Can be accomplished in the same manner as slab on grade but insuring that pipe still extends completely thru roof. Basements and crawl spaces should also be ventilated in the sidewalls using windows, foundation vents, or some type of mechanical ventilation system.

Most items are available through local home center or plumbing supplier. If unfamiliar, it is recommended that the installation be performed by licensed plumber.

Floor drains sealed: FGBC awards one point for insuring the sealing of all floor drains (tub, shower, etc.) with any asphalt based or equally flexible moisture resistant sealer. All areas around drains must be completely and permanently sealed to prevent any intrusion of foreign gases or vapors from beneath the slab.

If radon and other soil gases are not a concern in your area, consider using termite barrier sand for this job, like the US Navy does. Points are awarded for using sand under Integrated Pest Management.

Radon test of home prior to occupancy: FGBC awards 1 point for the successful completion of testing and certification of a home for radon prior to occupancy. This service should be performed by a local radon testing service. Alternatively the home can be tested once it is finished using a charcoal canister that is sent to a lab for analysis. Such test kits are available with instructions for about \$10-\$20.

High efficiency, low noise bathroom exhaust fans with timer or humidistat: FGBC awards 1 point for the installation of high efficiency, low noise bathroom exhaust fans with timers or humidistats in each bathroom throughout the home. A humidistat determines when the fan should turn off/on based on the humidity level in the room. Fans must vent to the exterior.

This installation will allow for greater removal of moisture with the efficiency benefit of automatic shutoff and the comfort feature of low noise. The timer feature will also aid in maintaining positive pressure in the home by turning off after a specified period of time. For a product to qualify it must move 1 cfm of air per 0.30 Watts (e.g., a 50 cfm fan must use less than 15 Watts, a 70 cfm fan must use less than 21 Watts) and be HVI certified to produce less than 1.0 sones.

Timer products are available at any local home center or electrical parts supplier. Fans can be found there or at Shelter Supply Products, 1-800-762-8399.

Kitchen range hood vented to exterior: FGBC will award 1 point to a home equipped with a range hood vented to the exterior of the home. Non-vented or ductless range hoods are not eligible for the point. Hood ducting must be of building code-approved materials and completely sealed to prevent leakage. Exterior of vent must also contain building code approved termination cover.

This item is available at most local hardware stores or home centers.

Laundry room exhaust fan vented to exterior: FGBC will award 1 point to a home equipped with a Laundry Room exhaust fan vented to the exterior of the home. Non-vented or ductless exhaust fans are not permissible. Ducting must be of building-code-approved materials and completely

sealed to prevent leakage. Exterior of vent must also contain building-code-approved termination cover.

This item is available at most local hardware stores or home centers.

All applicable exhausts have backdraft damper: To receive the point, all exhausts must be equipped with a backdraft damper.

Laundry rooms inside conditioned spaces must have window or other make-up air source: FGBC will award 1 point for a home with an inside Laundry Room that contains an operable window or other make-up air source. Other make-up air source can be any of the following: additional HVAC vent connected to system, thru wall vent from adjoining room in home, or pressure activated fan to bring in air as pressure drops in room when dryer is activated.

When a clothes dryer is running it pulls a great quantity of air from the interior of the home. The purpose of this criterion is to maintain equalized air pressure in the Laundry Room when dryer is running even when the Laundry Room door is closed.

Whole house fan with insulated cover: FGBC will award 1 point to a home with a permanently installed whole house fan with insulated, airtight cover. Fan must be centrally located in the home.

Whole house fans are available at your local hardware store or home center.

Manufacturers include but are not limited to:

Tamarack Technologies, Inc.

PO Box 490

West Wareham, MA 02576 USA

tel: 800-222-5932

tel: 508-295-8103

fax: 508-295-8105

No power roof vents: FGBC will award 1 point to a home that does not contain power roof vents. If vented attic is desired, passive venting should be used instead. Power roof vents lead to depressurization of the attic space.

Dampered fresh air intake: FGBC will award 1 point for a home that contains a *dampered* fresh air intake. The intake duct must be equipped with a pressure activated or electronic damper to control when fresh air will be brought into the home.

By controlling the fresh air coming into the home with a damper, you are able to reduce the amount of moisture and temperature differentiated air being brought into the home thus only bringing the fresh air in when the HVAC system is running in an effort to dehumidify and bring the air temperature to a level of the interior of the home.

Efficient HVAC filter: FGBC will award 1 point to a home that contains an electronic filter or 1” or greater pleated media filter with a minimum 30% dust spot efficiency (DSE) as its primary air filter. Passive electrostatic filters may not be used. If the home contains more than 1 HVAC system, a filter must be installed on each unit. Filters must be maintained as per manufacturers specifications.

Pleated media filters greater than 1” are available, however can lead to excessive pressure drop across the filter. Such filters are also more expensive and more difficult to find.

Contact a local HVAC contractor for recommendations. Pleated media filters are available at most local home improvement stores. It is recommended that media filters be changed once a month while the HVAC system is in operation.

Manufacturers include but are not limited to:

3M Filtrete Filters

[www.3m.com/us/home\\_leisure/filtrete/index.jhtml](http://www.3m.com/us/home_leisure/filtrete/index.jhtml)

Heat recovery ventilator or air to air heat exchanger: FGBC will award 2 points to a home that contains a permanently installed heat recovery ventilator (HRV) or air to air heat exchanger (ERV). The unit must be properly installed and connected to the central HVAC system.

Contact a local HVAC contractor for recommendations.

Ventilation system rough-in: FGBC awards one point if a whole home central ventilation system is roughed-in permanently as part of the HVAC system. Provisions must be provided for simple installation in the future including all ducting and electrical.

Install screens on all windows and doors: FGBC will award 1 point to a home that contains screens for all windows and doors to allow for adequate ventilation as needed. Screen enclosure surrounding pool will suffice for windows and doors contained in this space.

Written plan for the location of exhaust and intake vents: FGBC will award 1 point for a home that has a written plan for the location of all exhaust and intake vents and has installed them according to the plan. All exhaust and intake vents *must* be located at a minimum of 6 feet from each other as to not cross contaminate the air being moved. It is also important that all intake vents be as far from the garage, dryer vent, and air conditioning condenser units as possible. Existing homes are eligible for this point without the plan, as long as the specifications are met.

### **Source Control**

Volatile organic compounds (VOCs), especially formaldehyde, and other chemical substances contained within building materials can be injurious to lung health and can be odorous. In selecting low VOC materials, good rules of thumb are to choose water based products and products with a low odor.

No exposed particleboard: One point is awarded if no exposed particleboard is used, even on the invisible under sides or back sides of cabinets, counters, etc. All surfaces must be coated or covered.

No flex vinyl wall covering or flooring: Vinyl acts as a moisture barrier and can trap water which can lead to mold and mildew problems. One point is awarded if products such as vinyl wallpaper or vinyl tile flooring are not used.

Zero VOC paints, stains, and finishes: Use only zero VOC paints, stains, and finishes. They are now available from several manufacturers. If using an oil based paint, the oil must be derived from oil peels. To receive the point, 100% of all paint, stains, and finishes used in the interior of the home must be certified as having zero VOCs.

Low VOC sealants and adhesives: Use only water based sealants and adhesives. Most construction adhesives offer adequate bond strengths in water-based varieties. One point is available.

Minimize carpet use (<50% of cond. area): One point is awarded if carpet is used on less than 50% of all interior flooring. Carpets used must be 100% Nylon carpets and have a green seal label from the Carpet and Rug Institute. Nap height must be less than 0.5 inches. Tack strips must be used for installation (no glues). Carpet pads must be synthetic fiber, virgin urethane, or other low VOC padding.

Protect ducts during construction: One point is awarded if all duct registers are sealed off with tape or other suitable method during construction.

Integrated pest management: Integrated pest management (IPM) can reduce or eliminate the need for chemicals to control pests inside and outside of the house. IPM may benefit both the environment and the health of the occupants, especially children. IPM involves using physical controls installed during construction rather than chemical controls.

Because IPM methods and techniques vary according to location and building details, to receive the 3 points the applicant must consult with a pest control professional that is skilled in IPM. They must then work together to develop and implement a plan. Details of the plan must be submitted along with the Green Home application. To properly implement IPM, there are maintenance issues that need to be undertaken by the homeowner after construction, therefore an IPM maintenance plan should be developed and included in a homeowners manual that is presented to the homeowner.

An excellent source of information on IPM is the Sustainable Building Sourcebook by Austin Energy, Austin, TX. It can be found on the internet at [www.greenbuilder.com/sourcebook/termite.html](http://www.greenbuilder.com/sourcebook/termite.html).

### **Cleanability**

Central vacuum system: Install a central vacuum system with the vent from the dust canister exhausting to the outside. One point is available.

Narrow grout lines: All grout lines between tiles must be less than 3/16 inches wide. One point is awarded.

Useable entry area: Dust and pollen tracked indoors on shoes and outerwear is a major source of allergen. Provide a well defined area in the garage and/or main entry where shoes and outerwear can be comfortably removed and stored. Provide a bench to sit down on in this area and shoe and outerwear closets nearby. One point is awarded.

Low dust collecting window coverings: Install low dust collecting window coverings. Do not use mini-blinds. One point is available.

### **Universal Design**

Universal design/independent living is a concept referring to the design of different products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. The intent of the universal design concept is to simplify life for everyone by making products, communications, and the built environment usable by more

people at little or no extra cost. The universal design concept targets all people of all ages, sizes, and abilities. Universally planning the home will create a safer space for all users. Many universal design features are no-cost options. They may only require different product choices or design decisions. Some general guidelines on features to include are listed below:

Barrier free entrance: One point is awarded if at least one entrance to the home conforms to the following specifications:

- Curb cut from the street level to sidewalk
- Level walks
- Wide doorway – 36 inch entry from exterior
- Covered stoop
- Front door package shelf outside
- ½ inch maximum vertical edge at threshold

Universally designed living area: A total of three points are possible for this criterion. One point is available if at least one bathroom on the first floor conforms to the following specifications:

- Ample clear floor space (5 x 5 foot turning radius) to ensure maneuverability at lavatories, toilets, and tubs/showers
- The bathroom walls must be reinforced for grab bars which are installed at commode, tub, and shower (according to state building code height and size specifications).
- 32 inch minimum door width; 36 inches preferred
- 24 inch space on latch side of doors
- Light switches 38 inches above the floor
- Lever handles on doors or doors without latches
- Rocker or touch switches
- Include at least one of the following options
  - Standard tub with a fold-up seat
  - Tub with a transfer seat
  - Whirlpool tub
  - 3 x 3 foot transfer shower
  - 5 x 5 foot roll-in shower

Two points are available if the bathroom specs are met and at least one bedroom on the first floor must conform to the following specifications:

- 32 inch minimum door width; 36 inches preferred
- 24 inch space on latch side of doors
- Light switches 38 inches above the floor
- Electrical outlets 18 inches above the floor
- Lever handles on doors or doors without latches
- Rocker or touch switches

Three points are available if the bathroom and bedroom specs are met and the entire first floor living space conforms to the following specifications:

- 32 inch minimum door width; 36 inches preferred
- 24 inch space on latch side of doors
- 32 inch wide circulation path
- 48 inch clearance in hallway
- 5 x 5 foot turning radius in activity areas
- Light switches 38 inches above the floor

- Electrical outlets 18 inches above the floor
- Lever handles on doors or doors without latches
- Rocker or touch switches

## Category 6: Materials

### Structure

AAC, ICF, SIP: To receive the indicated points, the material must be used at a minimum for 80% of the first floor living area exterior walls. AAC receives 3 points, ICF and SIPs receive 2 points.

Autoclaved aerated concrete blocks are solid blocks composed of cement, sand, lime, and an aerating agent, which is baked in an autoclave oven. The result is a very lightweight insulated concrete product. Blocks and panels are stacked similar to bricks and held together with adhesive.

Insulated concrete forms are a family of exterior wall systems that provide the strength of structural concrete walls with the thermal performance of integral insulation and high thermal mass. Generally a Styrofoam form is filled with poured concrete.

Structural Insulated Panels (SIP's) consist of two (outer) layers of oriented strand board and foam core, ranging from 2 to 12 inches thick. They can be used to build exterior walls, roofs, and floors. To receive points SIP walls must be elevated minimum 24" above soil grade and use Molded Expanded Polystyrene (MEPS) type foam.

Engineered wood products for roof and/or floor framing: Representative materials include wood I-joists and wood trusses. One point is given when at least 80% (or as much as code will allow) of either material is used as floor structure. One point is given when at least 80% (or as much as code will allow) of either material is used as roof structure. Two points total are possible. I-joists use 50-60 % less lumber than solid dimensional lumber of similar width.

Recycled content roof material: To receive the one point, roofing must be made of 100% recycled rubber and plastic or 100% recycled polymer and rubber or 100% recycled wood and plastic. Roofing may also be metal with 70% recycled content or fiber cement with recycled content. For more product information see the National Association of Home Builders Web site at <http://www.nahb.org>.

Manufacturers include, but are not limited to:

EcoStar Inc

[www.ecostar.com](http://www.ecostar.com)

425-413-8406

(Roof slate tile look, 50 year warranty)

Eco-Shake by

Re-New Wood, Inc.

Wagoner OK

(Wood shake look, 50 year warranty)

Crowe Building Products  
 116 Burrie  
 Hamilton, Ontario L8M 2JS  
[www.authentic-roof.com](http://www.authentic-roof.com)  
 905-529-6818  
 (Roof slate tile look, 50 year warranty)

[www.jameshardie.com/buildingproducts.htm](http://www.jameshardie.com/buildingproducts.htm)

Certified sustainable lumber: One point is given if a minimum of 80% of all lumber used is from certified forests. Documentation of such must be available.

Engineered/alternative material for outdoor living: Minimum of 100ft<sup>2</sup> or 50% of all outdoor structures, whichever is greater, shall be of a product using 50% or more of recycled content material. One point is available.

Manufacturers include but are not limited to:  
 Trex Easy Care Decking  
[www.trex.com](http://www.trex.com)  
 800-buytrex

Polywood Inc Plastic Lumber  
 125 National  
 Edison, NJ 08817  
 800-915-0043

Concrete with fly ash: All concrete or CBS used in building shall have a minimum of 18% of the total cement composed of recycled fly ash or blast furnace slag. Documentation of such must be available. One point is available.

Recycled content siding or soffit material: House uses pre-primed fiber cement siding or aluminum siding with recycled content of over 70%. One point is available.

Manufacturers include but are not limited to:  
[www.jameshardie.com/buildingproducts.htm](http://www.jameshardie.com/buildingproducts.htm)

### **Sub-assembly**

Locally produced doors and/or windows: One point given when a minimum 80% of all new windows and doors are from Florida manufacturers and are operable. One point given when 50% of all doors are reused doors.

Recycled/natural content insulation: One point is awarded if 100% of all insulation within each wall, floor, or ceiling assembly consists of the following or combination thereof:

- Wet spray cellulose insulation with 75% recycled content
- Water sprayed foam insulation  
     Icynene Insulation Inc. [www.icynene.on.ca](http://www.icynene.on.ca)
- Cotton denim insulation – recycled denim material
- Mineral wool insulation – 92% recycled content  
     Fibrex, Inc. Aurora, IL

- Rigid foam insulation produced using steam or HCFC  
Insulfoam, Aurora, CO
- Perlite composite board – with 23% post consumer paper  
Schuller International, Denver, CO
- Cellulose – 75% post consumer recycled paper
- Fiberglass – 20-50% recycled content with no formaldehyde  
Johns Manville Co.

Recycled content drywall: One point is awarded if a minimum of 50% of gypsum is from recycled sources.

Recycled content sheathing/sub floor: One point is awarded when a sheathing material with recycled content is used in the roof, and one point if such a material is used in the floor. Two points are possible. Examples of sheathing that qualify for this point are Oriented Strand Board (OSB), with no or low formaldehyde content which is sealed prior to installation, Structural Insulated Panels (SIPS), as described earlier, and sheathing made from 100% recycled newsprint

Manufacturers include but are not limited to:  
Homosote Co.  
W. Trenton, NJ

Recycled content exterior sheathing: One point is awarded when Oriented Strand Board (OSB), with no or low formaldehyde content (must be sealed prior to installation) or sheathing made from 100% recycled paper and a non-VOC binder is used for exterior sheathing.

Manufacturers include but are not limited to:  
Thermo-Ply by Simplex Products  
Adrian, MI

### **Partitions/Trim**

Finger jointed or laminated studs, top plate, headers, rim joists, beams, columns: One point is given when a minimum 80% of the above listed building components are finger-jointed or laminated materials or a combination thereof. Finger-jointed material is lumber that is made of short lengths of off-cuts from truss and other manufacturing processes that is finger jointed and glued together to make usable lengths of lumber.

Finger-joint lumber may only be used for structural applications when used vertically such as stud framing.

Laminated veneer lumber is dimensional lumber that is composed of thin layers or veneers of wood glued together and sawn to make dimensional lumber, it can be used in any position.

Finger jointed trim: One point is given when a minimum of 80% of the interior trim is finger jointed. Finger jointed trim is paint grade only.

Steel interior studs: One point is awarded if 80% of all interior studs are made from recycled steel. Steel studs are recyclable again after they have been used.

ACQ bottom plate: One point is given when Copper Chromium Arsenic (CCA) treated wood is replaced as the bottom plate over a concrete slab with Aluminum Copper Quat (ACQ) as it is the only alternative to pressure treated lumber that will meet code today.

## **Finishes**

Eco-friendly flooring materials: One point is given if 80% of the flooring material installed has recycled content or is sustainably harvested. Examples include (materials can be combined to achieve 80%):

Domestically produced hardwood materials from sustainably managed forests

Bamboo flooring with no VOC glues

Reuse of salvaged wood

Floor tiles made from recycled glass or other 100% recycled content material

Natural linoleum

Cork

Recycled content carpet/carpet pad and rugs

Carpets/rugs must have a minimum recycled content of 80% with 60% post consumer recycled content or be 100% PET plastic. Carpet pads must have 80% total recycled content. Examples include 80% post consumer tires, 80% nylon, 100% recycled newsprint and 80% textile waste.

Natural content carpet/carpet pad and rugs

Carpets/rugs must be composed of 100% natural materials such as wool, sisal, jute, and hemp. Carpet pad must also be of a natural material such as 85% recycled burlap bags made from fibrous jute plants. Brand names include Protector and Duracushion. For more information consult the AIA Environmental Resource Guide.

Carpets made from natural or recycled materials offer improved thermal and acoustic properties for the home, heat reduction, sound absorbance, decreased allergy potential, and easy cleaning with minimal chemicals. 73% of carpet cushions are made of bonded urethane, and 90% of this is made of scrap polyurethane mixed with a prepolymer.

Manufacturers include, but are not limited to:

Goodwin Heart Pine Co.

Gainesville, Florida

EcoTimber International, 1020 Heinz Ave, Berkley, CA 94710, 510-493-3000  
(manufacturer)

### **Carpets**

Allegro Rug Weaving  
3970 Broadway6000  
Boulder, CO 80304

Talesman Mills  
W. Executive  
Maguon, WI 53092

Image Industries  
P.O. Box 5555  
Armuchee, GA 30105

Martin Color-fi  
P.O. Box 469  
Edgefield, SC 29824

Carpet pad

Ecosurfaces

[www.regupol.com](http://www.regupol.com)

877-ecosurfaces

Dura Undercushions  
 8525 Delmeade Rd.  
 Montreal, PQ H4T IMI  
 514-737-6561

Eco-friendly ceiling materials: One point is given if 80% of the ceiling material installed has recycled content or is sustainably harvested. Examples include (materials can be combined to achieve 80%):

Domestically produced hardwood materials from sustainably managed forests  
 Material consisting of 60% recycled content of mineral wool and cellulose fiber (sample product names include Ultima, Crossgate, Stratus, Cirrus, and Sanserra).  
 Material consisting of 25% recycled content glass (sample product names include Random Fissured, Optima, Panted Nubby.)  
 Reuse of salvaged wood.

For more information visit Armstrong Ceilings at [www.ceilings.com](http://www.ceilings.com).

Recycled content paint: Using recycled paint offers energy savings from the manufacture of the virgin material, added durability, and limits air toxins. Using low or non-VOC paints reduces the amount of indoor air pollution.

To receive the one point, 100% of all paint used (interior and exterior) must have 75% post consumer recycled content, less than 150 grams/liter of VOC's, and be reformulated with mildewcides, surfactants, etc. as specified for original manufacturing. (If you are chemically sensitive you may wish to have no mildewcides or surfactants added.)

Manufacturers include, but are not limited to:  
 Sherman Williams  
 ICI's Lifemaster 2000 is said to be certified as VOC free.  
 Livos  
 Old Fashioned Mil Paint Co., Groton, Ma

Recycled content air conditioner condenser pad: One point is given if all condenser pads are constructed with 100% recycled PET plastic.

### **Durability**

3 in 12 <= roof slope <= 6 in 12: Roof slope shall be less than 6 in 12 to reduce wasted material in the attic and to help "throw" water further away from the building walls, but greater than 3 in 12 for roofs with low or no slopes do not shed rainwater well which can lead to leaks during heavy storm events. Such roofs also allow strong winds to pass over them at high velocities which can create uplift forces likely to damage your roof, especially if fenestrations (windows and doors) have been damaged. Roof slopes of at least 5 in 12 may be best suited for uplift resistance during hurricane force winds. One point is available.

Large overhangs (eave and gable): One point is awarded if overhangs are 1 ft on gable ends (code) and at least 2 ft everywhere else.

Wood frame uses house wrap and vented rain screen: Wrap must be 2 layers of 15lb felt or house wrap installed shingle style. Provide an air gap between siding and wrap to allow water to drain down the wrap and out at the bottom. One point is available.

Siding and exterior trim primed all sides: All siding material and exterior trim should be pre-primed before installation on all sides (even the edges). One point is available.

Window and door flashing: FGBC awards one point if all windows and exterior doors have a metal (aluminum or galvanized steel) flashing properly installed. Using caulk does not qualify for this point. Using an appropriate flashing will ensure that all water is diverted away from the fenestration.

Plants/turf minimum of 3 ft. from foundation: To prevent water from accumulating around foundation. One point is awarded.

### **Waste Management**

Develop a construction and demolition waste management plan: Two points are awarded if the contractor submits a written plan that consists of the following items:

- Estimated amount of waste and types of materials from project.
- Names/locations of waste disposal companies, recyclers, reuse centers for waste materials from project.
- Estimated costs of hauling and disposal, recycling, and revenues from reuse and recycling for major waste materials from project.
- Goals for waste diversion by amount (weight or volume) and types of materials.

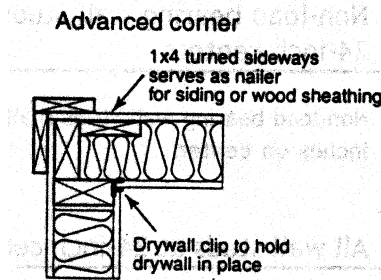
Implement job site waste management: Two points are awarded if at least two of the following are implemented. Three points are awarded if 3-5 of the following are implemented. Four points are awarded if greater than 6 of the following are implemented. In order to receive the credit one individual must be designated as to be job-site “environmental manager” to inspect job-site roll-offs and other materials handling strategies to prevent commingling, damage, other waste creation activities.

- Contractor writes into specifications/contracts with sub-contractors and vendors to be responsible for and remove materials and systems packaging upon either delivery or installation of products.
- Contractor writes into specifications/contract with drywall sub-contractor a price by the square foot of finished drywall wall/ceiling area.
- Clean drywall waste is used as soil amendment on-site where allowable and in proper quantities as approved by county extension service and/or landscape architect.
- Clean and dry drywall scraps are securely placed in interior wall cavities where additional sound-proofing may be desirable using techniques as recommended by the NAHB Research Center.
- A covered area or container is provided, with adequate separation from the ground, labeled as wood off-cuts for reuse in project.
- Individually labeled roll-offs are placed on site for separation of C&D waste materials, for at least 2 different materials, for example, metals, cardboard, concrete, brick, wood, and solid waste recyclables such as cans, plastic bottles.
- Job-site trailer or office implements paper, plastic bottle, and can recycling bins.
- Materials to be stored on site are kept off the ground and protected from weather, machinery, dust, and vehicle routes.
- Job-site fabrication stations or areas implement ground covering, magnets, bins or other means to collect nails, screws, plates, clips, off-cut rebar, electrical wiring, sheet metal off-cuts for metals recycling.
- Use of job site framing plan and cut list.

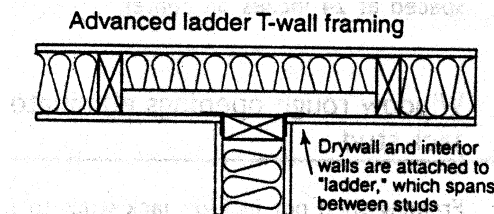
- Use of concrete formwork that has been used at least once before or is reused/reusable by contractor.
- Separation and removal of leftover paint to local paint recycling facility.

Plan and implement design related mechanisms: One point is awarded for each of the following techniques that are included in the design of the home and implemented during construction. Maximum of 5 points for this criterion.

- Perimeter adheres to 2 ft. dimensions: One point is awarded if the exterior layout of the home adheres to 2 ft. dimensions. Adhering to 2 ft dimensions reduces waste and allows for easier future addition.
- Interior floor plan adheres to 2 ft. dimensions: One point is given when over 50% of the interior rooms adhere to a 2-foot layout.
- 2 stud corners with drywall clips: Corner framing shall eliminate non-structural studs and allow for full corner insulation through the use of drywall clips, horizontal nailers, or other means to support drywall.



- T-walls with drywall clips: The intersection of exterior and interior walls shall eliminate non-structural studs and allow for full exterior wall insulation through the use of advanced ladder T-wall framing or other technique.



Compost bin/built in collection of recycleables: One point is awarded if the homeowner is provided with a pre-fabricated compost bin (includes wire mesh type) or if the home has built in (i.e. permanent) recycle bins. Points for built in recycle bins are only awarded if the home is served by a municipal curbside recycling program.

## Category 7: Disaster Mitigation

### **Hurricane (wind, rain, storm surge)**

Safe room: FGBC awards 2 points if a safe room is constructed in accordance with the guidelines set forth in the FEMA publication 320: "Taking shelter from the storm, building a safe room inside your house." These shelters are designed to provide near absolute protection to you and your family from the high winds expected during tornadoes and hurricanes and from associated flying debris, such as wood studs, that tornadoes and hurricanes usually create. The FEMA publication is available at <http://www.fema.gov/mit/tsfs02.htm> complete with construction plans, specifications, and cost estimates.

Inland site (sliding scale with distance from coast): If the site is at least 10 miles from a coastal body of water (i.e., Gulf of Mexico, Atlantic Ocean) and the finished floor is at least 12" above the 100 yr. flood plain then obtain 1 point. Obtain 1 additional point if over fifty miles from a coastal body of water and the finished floor is at least 12" above the 100 yr. flood plain. [0 points for less than 10 miles, 1 point for 10 to 50 miles, and 2 points for more than fifty miles].

Window and skylight protection or impact resistant type: FGBC awards 2 points if all windows, skylights, sliding glass doors, and other doors comprised of at least 60% glass in the home are protected with a Dade County approved shutter or screen product or are classified by Dade County as impact resistant. A list of approved shutter and impact resistant products can be found at [www.buildingcodeonline.com](http://www.buildingcodeonline.com). If unsure whether a particular product is approved, just ask the manufacturer. Strengthening of existing skylights may include repair of surrounding roof.

Attached Garage and exterior door protection or impact resistant type: FGBC awards 2 points if all exterior doors of the home are protected with a Dade County approved shutter or screen product or are classified by Dade County as impact resistant. At least one door must be impact resistant, and not have a shutter or screen, to provide a means of egress from the house. (It is best to have at least two means of egress from the home, which may mean also installing at least one impact resistant window rather than shuttering them all.) All attached garage doors must also be classified as impact resistant or be reinforced (braced) according to Dade County specifications.

Secondary water protection installed on roof: FGBC awards 2 points if the entire roof has a self adhering polymer bitumen roofing underlayment (thin rubber or asphalt sheets with peel and stick underside located beneath the roof covering and on top of the sheathing) or a foamed polyurethane adhesive that is applied to seal all joints in the sheathing to protect from interior water intrusion. Joints may also be sealed with a self adhering polyethylene or rubberized asphalt tape that has a minimum width of 6 inches. Roofing felt or similar paper based products alone are not eligible for secondary water resistance points.

Adhesive applied to roof sheathing: FGBC awards 2 points if a spray on adhesive is applied to the underside of the roof sheathing from the attic such that a positive bond between the joists and the sheathing is formed. The applied adhesive shall have a minimum uplift capacity of 260 psf for a 4x8 ft panel as determined by laboratory testing. The adhesive should be applied continuously to within at least one foot of the eaves.

Gable end braced and vent protection installed: If the home has a gable end vent, FGBC awards 2 points if it is shuttered or otherwise protected according to Dade County specifications. The gable end of the roof must also be braced.

Hip roof design: FGBC awards 2 points if the home has a hip roof.

Roof covering above and below flashing: Two points are awarded if roof flashing is installed on top of the final roofing with a secondary cover of roofing on top of it. Clips must also be installed periodically along the flashing to anchor it to the roof. Flashing is likely to be peeled off by high winds, and if it installed on top of the roof felt, with a single layer of roof covering installed over it, it is likely to take this part of roof covering with it when it blows off. With final roof covering installed above and below the flashing, if the flashing blows off, there is still waterproof material to provide resistance to water intrusion.

Exterior structures properly anchored: FGBC awards 2 points if exterior structures, such as air conditioning condensers and sheds, are properly anchored to a foundation or the building itself. The anchoring must be specified or certified by an engineer (i.e. during wind load calculations).

### **Flood**

Receive 5 points for incorporating all 4 of the following criteria:

Finished floor level at least 12" above 100 yr. flood plain: The finished floor level must be at least 12" above the 100 year flood plain as determined by the water management district or the local building department.

Bottom of slab or first floor at least 8" above the top of backfilled dirt, graded for proper drainage: The bottom of the slab (or in the case of a crawlspace, the floor) must be at least 8" above the adjacent dirt level. This strategy may help with flooding and termite inspections. Please check with appropriate civil engineer to verify if this strategy is appropriate for the given foundation and home.

Grade slopes away from building on all sides: Grade must be sloped away from the building on all sides.

Garage floor and driveway properly sloped to drain out. Garage floor at least 4" lower than living floor: The garage must have a slope of 1" per twenty feet minimum, and the average height in the garage must be 4" lower than the lowest location on the first floor.

### **Wild Fire**

Receive 5 points for incorporating all 3 of the following criteria:

Fire resistant exterior cladding: An exterior cladding other than wood or vinyl must be used on all exterior walls. Examples include stucco, unfinished CBS, brick, aluminum, stone and fiber-cement.

Fire resistant roof covering or sub-roof: A roof covering other than asphalt shingles or wood shakes must used on the entire roof. Examples include metal, concrete, fiber-cement, clay (tile). Credit is also available if the sub-roof (roof deck) is of a fire resistant material, instead of the covering.

Fire resistant soffit and vent material: A soffit and vent material other than wood or vinyl must be used. When these parts of the home are compromised, embers from nearby fires can enter into the attic. Examples include aluminum and fiber-cement.

### **Termites**

Receive 10 points for incorporating all of the following requirements:

The following co-requisites from other sections must be incorporated:

Seal slab penetrations (Health/Moisture Control)

Plants/turf minimum of 3 ft. from foundation (Materials/Durability)

Grade slopes away from building on all sides (Flood)

The following additional criteria must also be incorporated:

Notice of termite protection in place on site: A permanent sign which identifies the termite treatment provider and the need for re-inspection and treatment contract renewal shall be provided. The sign shall be posted near the water heater or electric panel.

Monolithic poured slab: A single slab must be poured monolithically or must have area treated for termites before each portion of slab is poured.

No foam insulation extends below grade: All foam insulation must terminate above ground such that none of it extends below grade.

8" or more clearance between building exterior cladding and final earth grade: The exterior cladding of the home must terminate at least 8" above grade. This will help help prevent termites from entering the home undetected.

Rain gutters installed with leaf screens or meet the "Large Overhangs" co-requisite under Materials/Durability: Rain gutters must be installed to collect water from all roof slopes and covey it away from the building foundation. Rain gutters must have leaf screens installed to help prevent clogging. Alternatively, credit can be obtained for incorporating the "Large Overhangs" criteria listed under Materials/Durability. Keeping moisture away from the foundation discourages termite nesting in that vicinity.

If present, downspouts must discharge 3 or more feet from building: If rain gutters have been installed, the downspouts must discharge 3 or more feet from the building to keep moisture away from the building's foundation.

If installed, irrigation/sprinkler system located 2 or more feet from building, water shown not to hit building while operating: This criteria will again reduce moisture levels in the vicinity of the building foundation, discouraging termites from nesting there.

Condensate line(s) discharge 2 or more feet from building and are located 5 or more feet from dryer vent: Condensate drainage must be done away from the building. High humidity, temperature and moisture all contribute to potential termite infestation. By keeping condensate lines and dryer vents apart, the likelihood of termite problems may be decreased.

Damage replacement warranty issued and available for annual renewal: Florida law requires that a contract be issued whenever a termite treatment is conducted. A "full" or "unlimited" warranty requires the pest control company to restore any property damaged by wood-destroying organisms during a specified period after the treatment. Generally, for this to be in effect with new construction, the first warranty issued (with the pre-construction treatment) must be a full or unlimited warranty that can be renewed by the homeowner. The duration of post-construction contracts and warranties can vary from one year to five years depending on the policy of the pest control company. Normally, the annual renewal fee will remain the same during the term of the contract. If a "limited" guarantee or warranty is issued, the pest control company promises only to provide additional treatment if an infestation occurs during a specified period after treatment.

## Category 8: General

There are a variety of items that do not apply to any one category or apply across many categories that we have grouped here.

### Small house credit

Conditioned house size: Small homes use less material for construction, less energy for heating and cooling, and occupy a smaller footprint than similar larger homes. The FGBC provides the following points for small houses (maximum 50 points):

Conditioned House Size (square feet)	Points
< 1000	50
1000 - 1099	45
1100 - 1199	40
1200 - 1299	35
1300 - 1399	30
1400 - 1499	25
1500 - 1599	20
1600 - 1699	15
1700 - 1799	10
1800 - 1899	5

## **Renewable Power Generation**

Photovoltaics: FGBC will award points for photovoltaic power systems installed at the site that meet loads not specifically described and credited under different categories (e.g., outside lighting). The calculation to determine the photovoltaic contribution will be based on measured or estimated peak demand or annual electric loads for the home. Receive 1 point for each 5% contributed towards either peak demand or annual load.

## **Reconfigurability**

Roof trusses designed for addition: A design that has the roof trusses designed in such a way that a room can be added to the attic space. To qualify for the two points, minimum room size must be 100 square feet with an average finished height of at least seven feet.

Unfinished rooms: Receive one point for each 100 square feet of unconditioned, unfinished space that is built such that it can easily be finished at a later time. A maximum of two points are available.

Pre-wired for security, sound, automation: Receive two points if the house includes pre-wiring for security, house automation, central sound system.

## **Lot Choice**

Build on an infill site: If the lot being built on is on a street where the majority of adjacent sites have homes that are ten or more years old, the site shall qualify as an infill site and two points may be scored.

House built within designated FGBC green development: If the land development where the lot is located has received designation as an FGBC green development then two points may be scored.

Site located within 1/4 mile walk to mass transit: If there is a safe (Sidewalk or other pedestrian path) to a city bus stop or other mass transit station then score two points.

Site located in TND or small-lot cluster development: If the lot is located in a traditional mixed-use development whereby there are at least five commercial establishments within a safe 1/4 mile walk, then score 2 points. Alternatively, if the site is in a development that has clustered the houses into lots that are 5000 square feet or less and has preserved for the common good over 50% of the total acreage score 2 points.

Brownfield site: If the lot has ever been designated a brownfield site by a state or federal agency then score two points. Brownfields are defined by the EPA as abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.

## **Other**

Remodeling of an existing structure: Often, once a home or other structure is built it may not have energy and landscape improvements done to it for a long time. Anyone who performs remodeling is saving resources by not building new and by overcoming barriers put in place many years before. To be considered a remodel the house had to have certificate of occupancy for at least two years. Score 10 points if performing a green remodel.

Home builder/designer/architect/landscape architect member of FGBC: FGBC members are probably aware of a variety of issues and solutions to problems that may occur in building green. This will likely translate in performing the job better than it may otherwise occur. Receive two points maximum for one or more of the design/construction team being members of FGBC.

Homeowner-s manual given to homeowner: The homeowner has received a manual that will help him or her understand how to operate the house and take care of the landscape so that the intended benefits of a green home are realized for the customer and the earth. Two points are available.