



SUMMARY

COMPREHENSIVE PROGRAM OR LEVEL 2?

To obtain a Build San Antonio Green® Certified home, the home must satisfy all the requirements defined in these or any of the other program guidelines. Submitted projects can choose to follow the Certified option, Comprehensive program, or the Level 1, Level 2, or Level 3 formats.

The Level formats were designed to aid builders and designers to follow a suggested green building strategy as an alternative to using the Comprehensive Program.

One may prefer the flexibility offered by the wider range of criteria in the Comprehensive program in order to possibly obtain a score higher than 2.0.

THE SOLAR READY OPTION

The Level 2 program offers an option to prepare a house to easily accept renewable energy installations. Details are found in Appendix I and II.

Guidelines for Level 2 Certification

Build San Antonio Green®

For more information, please call: 210-224-7278

or go to: www.buildsagreen.org

Energy

- The house must be documented to achieve an ENERGY STAR® rating. Max. HERS Index shall be 57. Submit documentation to your Build San Antonio Green® (BSAG) reviewer. Sampling protocol is not acceptable.

- Installing an unvented attic assembly is recommended but not required.

- Install an ENERGY STAR® qualified roof or install roofing with a roofing solar reflectance value (SRV): 0.25 for slopes >2:12; 0.65 for slopes 2:12 or less or install vegetated roofing.

- For all windows, the maximum Solar Heat Gain Coefficient shall be 0.27 and the maximum U-value for all windows shall be 0.60. ENERGY STAR® qualified windows for the Southern Climate Zone meets this requirement.

- For All exterior doors and skylights (if installed) shall be ENERGY STAR® qualified for the Southern Climate Zone.

- The Maximum ACH @50 pascals as determined by the Blower Door test shall be 4 air changes per hour.

- Provide natural gas connections for water heating and space heating where natural gas service is available.

- All builder-installed appliances, HVAC systems, and equipment with the exception of electric tankless water heaters must be ENERGY STAR® qualified.

- Lighting fixtures must be fitted with fluorescent, compact fluorescent (CFL), or light emitting diode (LED) lamps. Exception: maximum 5% of

fixtures may be fitted by dimmable incandescent lamps.

- Check with CPS Energy and SAWS to take advantage of rebates or other incentive programs that may be available.

- Exterior security lights, if provided, should be activated by a motion detection switch (photocell or timer activated not allowed) unless the security lighting is powered by a renewable energy system whereupon any type of activation is acceptable.

- The HVAC system shall be Properly sized using the ACCA Manual "J" (version 8.2 or later is required). The sizing must be conducted using actual inputs instead of using software defaults for any of the aspects considered for calculation. Submit a copy of the Manual "J" documentation to your BSAG reviewer.

- Locate HVAC ductwork entirely within conditioned space -or- provide a ductless or passive conditioned system.

- Gas fired lamps, fire pits, chimeneas, and decorative outdoor torches or other gas-fired displays are not permitted.

- In Level 2, installing a renewable energy system is recommended, but not required. However, if you choose to build a Level 2 house that includes rough-ins for renewable energy and if solar exposure is adequate, the house can be designated "Solar Ready Level 2 Certified." Solar Ready requirements are defined at the conclusion of these Level 2 Guidelines (in the Appendix).



- Provide an ENERGY STAR® programmable thermostat.
- All ceiling fans must be ENERGY STAR® qualified.
- Locate all hot water fixtures within 20 feet from tankless water heaters (or manifold, if installed) -OR- install a hot-water-on-demand system to accommodate hot water fixtures further than 20 feet from the water heater. To obtain a possible rebate for installing this system, contact SAWS.
- Tankless water heaters are required for Level 2 certification unless the house will be provided with an optional solar hot water system. Solar hot water systems require a hot water tank to store solar heated water. The energy factor (EF) for all tankless water heaters shall be 0.8 or greater. Install either electric or gas-fired units.
- For all installed solar water heaters, design the installation to supply a minimum of 80% annual domestic water load. Back-up water heating shall be by an electric heating element within the solar heated water holding tank unless otherwise recommended by the solar hot water system installer. Solar water heating is recommended but not required for a Level 2 house. Refer to Appendix II for criteria required to earn the optional Solar Ready component for Level 2 certification.

SUBSTITUTION

ASK FOR ASSISTANCE

We realize there may be situations where your submission may be close to obtaining a Level 2 designation, but the prescriptive aspects of Level 2 may be too limiting. Don't despair. Your BSAG plan reviewer is available to help you find possible substitutions from the list of elements present in the comprehensive program format. Your reviewer is available to help with any questions or suggestions you may have during your self-evaluation process.

Water

- Install only one shower head per shower area. Maximum flow for showerhead = 2.0 gpm in all shower locations.
- Install WaterSense® approved HET dual flush toilet with MAP flush of 3.50 grams or more.
- Utilize kitchen sink fixtures with water flow of 1.5 gallons per minute or less.
- Install EPA WaterSense® labeled bathroom sink fixtures or fixtures with water flow rates of 1.5 gallons per minute or less under a line pressure of 60 psi and a minimum flow of 0.8 gallons per minute at a line pressure at the inlet of 20 psi. There are no flow rate restrictions for bathroom tub filling. Follow jurisdictional codes in cases where the codes are more conservative.
- Water softeners are discouraged, but if a water softener is installed, the softener must be of a type that uses potassium or another alternative to sodium-based salts. The regeneration (if part of the process), must be demand-based, and the system must be shown to be certified to the NSF/ANSI 44 standard.
- All hot water supply lines not enclosed within foam insulation must be insulated w/ minimum R-4 material designed to insulate water lines. Where water lines penetrate wood framing, do not enlarge penetrations to accommodate larger diameter insulation. Do not bundle hot with cold lines in manifold or conventional systems.
- Locate hot water fixtures within 20 feet of a hot water source (or manifold, if installed).

- If installing gutters, downspouts must drain onto a pervious surface (turf or landscaping) or into a rainwater harvesting cistern.
- Add only landscaping from the SAWS approved plant list.
- Under all turf, soil composition must be at least six inches in depth and consist of a minimum of 5% organic matter (i.e. compost). All shrubs and trees must be planted according to horticultural best practices and mulched with a minimum depth of three inches of mulch.
- Irrigation systems are highly Discouraged for Level 2 houses, but if an irrigation system is installed, there will be no sprays in areas narrower than five feet, be properly zoned, have a rain sensor, and include an inspected backflow preventer; all as required by San Antonio City Ordinance. This is also a requirement for all houses submitted for Level 2 consideration which lie outside the San Antonio jurisdiction. An irrigation plan indicating the zones will be required to be posted near the controller with grow-in and maintenance schedules. Such schedules are provided by SAWS in areas of SAWS jurisdiction. If an irrigation system is to be installed, it is recommended that the system does not extend to all parts of the yard. Less than 50% of the lawn may be dedicated to turf. Maximum turf area is 10,000 square feet regardless of lot size.
- Drip irrigation system is required for all non-turf areas if an irrigation system is installed.



- Irrigation systems that cover 100% of the yard utilizing only spray/rotors only are prohibited for Level 2 certified homes.
- Swimming pools are discouraged, but if a pool is installed with an adjacent spa/hot tub, the design of the pool must include an enclosed connection such as a tube, hose, or pipe between the spa and the pool other than a waterfall or edge spill design to minimize water evaporation.
- Install a Rain Garden or provide a 50% mower-free landscape. Rain Gardens are shallow depressions (2"-8") strategically placed in a yard to collect water flowing off impervious surfaces retaining it on the site for re-absorption into the soil and reduce the impact of stormwater in the development and watershed downstream. Rain gardens are not unlike traditional gardens. The only difference is that the garden is designed to hold and filter rainwater, and involves appropriate plants and mulch for this purpose.
- Artificial turf is prohibited.
- An optional Rainwater Harvesting system is for irrigation purposes only. Providing a system that results in potable water storage is not expected nor required. Potable water systems are recommended only for residences whose only water option is well water supply and are not the subject of Level 2 consideration. If installing a rainwater harvesting system, collect rainwater from gutters for all roof areas. Direct 75% of the roof area draining into gutters toward the storage cistern(s). Cisterns need to be of a type that is covered and screened to discourage mosquito growth and come complete with a hose bibb at the bottom of the cistern, an overflow outlet, and ease of opening from the top for occasional clean-out by adults. Under-deck, and fully or partially below grade cisterns are also an option, but instead of a hose bibb at the bottom, cisterns with the bottom below grade must be equipped with a hand-operated or electric pump. Otherwise, the same requirements for above-grade cisterns apply.

Site

- Comply with the City of San Antonio Tree Protection Ordinance. No more than 50% of paved surfaces, including walks, porches and driveways may be impervious. Half of the impervious surfaces can be defined as semi-pervious (pavers or flagstones in a bed of sand, decomposed granite, porous paving or elevated wood decking). The amount of impervious surfaces for all lots not included in a development or subdivision designated as a Conservation Subdivision under the City of San Antonio Unified Development Code Section 35-203 must not exceed fifteen percent of the area of the lot minus the area of the house and garage footprint. No pervious cover requirements apply for houses built in developments designated as a Conservation Subdivision".
- Mulch removed vegetation and reuse on the site. All Ashe Juniper trees located within the building footprint can be removed if all removed vegetation is mulched and used on or near the site.

RECYCLED MATERIALS

Where possible, use building materials with a high-recycled content. Builders are also required to provide a waste management plan to promote materials recycling or materials re-use to reduce waste ordinarily destined for the landfill.

- Minimize site disruption during construction by designating parking, equipment and material storage and staging away from root protection zones.
- Shade all exterior hardscapes by preserving existing vegetation or planting new trees.
- Provide a plan for recycling and/or reuse/grinding of construction waste.

Health

- Level 2 houses must either earn a certification from the EPA's "Indoor airPLUS" program or comply with all of the following criteria:
- Provide sealed combustion outside

air for all gas fired furnaces and water heaters.

- Use MERV 10 or 11 rated filters for central air conditioners. Verify the HVAC system fan capacity is able to accommodate the filter chosen.
- To obtain an ENERGY STAR® rating, construction must follow the ENERGY STAR® Thermal Bypass Checklist Guide. Rooms of any kind above a garage are highly discouraged. Detached garages are preferred.
- For houses with gas appliances or an attached garage, install one carbon monoxide detector with an American Gas Association (AGA) IAS696 Blue Star Certification Seal every 900 square feet (near bedrooms) at a minimum of one per floor. Install at the height recommended by the manufacturer or 20-40" above the floor.
- Due to their inefficiency, production of toxic byproducts, and air pollution, traditional fireplaces are prohibited. However, a Level 2 house can feature a wood burning fireplace or stove only if it is listed on the EPA List of Certified Wood Stoves, dated December 5, 2007 or later. Gas-burning fireplaces are discouraged, but allowed if the unit is a direct-vent unit with a fixed, sealed glass front keeping combustion byproducts from entering conditioned space. If a chimney is installed, the chimney and chimney surround must be located within conditioned space to minimize poor chimney performance due to the stack effect. A chimney should stay warm by being located inside the house.
- A fan delay timer switch must be installed in every laundry room and bathroom/powder room which includes an exhaust fan. The fan delay timer switch must have an adjustable feature that allows the fan to remain on from one to sixty minutes after the switch is turned off. One example of this device is available through EFI Energy Federation Incorporated catalog #5100.501, 5100.502, or 5100.503. Call 800-876-0660 or www.efi.org/wholesale Having a second switch to control a light fixture without operating a fan is allowed. Also allowed are fan delay timer switches that feature a 3-position switch.

- All ventilation fans must be units with sone levels at 0.8 or below. One exhaust fan in the house is allowed to have a sone level not greater than 1.8. One sone is approximately the sound level of one refrigerator with the compressor on.
- Range vent extends to the exterior.
- Seal HVAC ducts during construction as ducts are being installed. "Speedi-Boot" or other similar method is recommended. Securely taping plastic sheets or unperforated bag material over all supply AND return openings is acceptable. Stuffing insulation in the openings is NOT acceptable. Vacuum boots and grills before first use to extract dust and construction debris that may be present in the ductwork.
- Fiber Glass duct board is allowed in BSAG Certified homes if the board features an airstream surface designed to withstand a maximum velocity of 5,000 fpm and an antimicrobial agent (passing ASTM G 21, and ASTM G 22) as an element in the face of the duct board exposed to the airstream. Approved duct board includes Tough Guard or Ultra Duct Gold by CertainTeed. Johns-Manville also makes duct board products acceptable within Level 2 criteria. Examples include, SuperDuct RC, Mat-Faced Micro-Aire (Type 475 & Type 800), and EnviroAire. If you have found a duct board with similar specifications, provide BSAG staff with information needed to evaluate it for possible substitution.
- Do not use vapor retarding materials on interior surfaces of perimeter walls.
- Carpeting is discouraged, but if installed, all carpet must be listed on the Carpet and Rug Institute's Green Label Plus certified list. Any carpet adhesive or padding used must also be designated as Green Label Plus certified. As carpet supplies change often, checking with the CRI Green Label website before specifying carpet for each house is highly recommended. Carpeting made from natural products such as pure wool and jute may not be on the CRI Green Label Plus list although their attributes may exceed those of most Green Label carpets. If

you found a particular carpet you want to use and it is not listed as Green Label Plus, please submit the carpet for review by Build San Antonio Green®.

- If Carpet is installed in houses larger than 4000 square feet, and the area carpeted exceeds 20% of the flooring installed in the conditioned space, a central (whole house) vacuum system must be installed. For all houses in all size categories, the carpeted area must not exceed 40% of the flooring in the conditioned space.

- Interior paints and finishes, including 90% or more of such products applied to interior surfaces of homes, shall be certified low-VOC or no-VOC by one of the following:

- Green Seal Standard GS-11, OR
- Greenguard Certification for Paints and Coatings, OR
- Scientific Certification Systems (SCS) Standard EC-10.2-2007, Indoor Advantage Gold, OR
- Master Painters Institute (MPI) Green Performance Standards GPS-1 or GPS-2, OR
- A third-party low-emitting product list based on CA Section 01350, e.g., the CHPS List at chps.net/manual/lem_table.htm. This requirement matches the EPA's Indoor airPLUS Program requirement.
- Trim for doors, windows, and



Baseboards are exempt from VOC restrictions if these surfaces are less than 15% of total paintable interior surfaces.

- To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants, plywood, particleboard, and fiberboard materials shall conform to the following standards. Structural plywood and OSB shall be certified compliant with PS1 or PS2, as appropriate and shall be made with moisture-resistant adhesives as indicated by "Exposure 1" or "Exterior"

on the APA label. Hardwood plywood must comply with ANSI/HPVA HP-1-2009 when adopted (use HP-1-2004 until then). Particleboard and MDF shall be compliant with ANSI A208.1-2009 and A208.2-2009 respectively. The composite wood products below must comply with the California Air Resources Board (CARB) Air Toxic Control Measure (ATCM) requirements of formaldehyde emissions: particleboard, medium-density fiberboard (MDF), thin MDF, hardwood plywood made with a veneer core, and hardwood plywood made with a composite core (particleboard or MDF). MDF molding made from postindustrial wood waste is gaining acceptance, is an excellent alternative to conventional molding. CARB compliant materials are readily available and are expected to be priced competitively.

- The best way to discourage termites is to build using no materials they can consume. This is possible by building with most insulating concrete form (ICF) systems, aerated concrete blocks, steel framing, and other wood-free construction strategies. Barring that, there are ways to make a standard wood stud framed house either less palatable or less accessible to

destructive pests without resorting to highly toxic pesticides. Acceptable strategies include, but are not restricted to the following: using wood which is pressure-treated with borate, complete borate application once the framing and wood based exterior sheathing (if used) is in place (this requires access from the interior), or a physical barrier such as screen material secured to slab penetrations.

- Wood deck support must not be in direct contact with the soil or concrete support. Use metal structural support elements designed for this application.

● To minimize water damage due to catastrophic leaks or appliance failure, install a leak detector in rooms where the water heater and clothes washer are located. The leak detector must be able to automatically shut off supply water to the water heater and/or washing machine. An option to this requirement is to install a floor drain in rooms that contain the water heater and/or the washing machine. The drain must be located near the center of the room and not concealed by cabinets or any possible location of appliances. In addition to the drain, there must not be any water-sensitive flooring or carpeting installed within fifteen feet of any portion of the utility room(s) that include the floor drain if the utility room(s) is at or above the elevation of adjacent rooms.

The Rater You Use

A list of the individuals who perform the field verifications for ENERGY STAR® for each submitted house must be provided to Build San Antonio Green®. This list must contain the individual's name, rater company name, HERS Provider name, and proof that the individual is a RESNET-certified Rater or Field Inspector according to the latest RESNET Standards.

More Information

Compact Fluorescent Bulbs

If built-in timing devices are to be installed in a home, make sure they are of the type that does not allow *any* electric current to be in the circuit or fixture when the timer is in the "off" mode. Any timer which allows minimal current in the line to a compact fluorescent fixture in the "off" mode will signal the ballast to attempt to light the bulb without enough current to actually light the bulb. This kind of timer shortens the life of the bulb.

Impact-resistant Roofing

It is recommended that the builder installs roofing which is Class 4, UL 2218 impact-resistant material. To receive any possible insurance benefit, the builder must provide all the proper

documentation in the prescribed manner as indicated on the paperwork. A copy of this paperwork is required to be submitted to BSAG in the Post-Construction document submittal.

Framing and Structural Alternatives

High-performance building materials are encouraged for Level 2 certification. Although it is possible and permissible for a wood frame house to achieve a Level 2 certification, utilization of high performance structural materials and systems are encouraged. Granted these structural strategies are generally more costly than conventional wood frame construction, the advantages in durability and energy conservation often justifies the cost difference. The categories of alternative construction systems includes, but is not limited to the following:

- Insulated Concrete Forms
- Structural Insulated Panels
- Earthen Construction
- Strawbale Construction

The first two categories easier lend themselves to the kind of finished product that would visually "fit" into the context of a conventional neighborhood. They result in residential structures that appear identical to conventional homes. Earthen and strawbale construction, although no less viable, are not likely to be found in suburban settings. Within these four categories, there are sub-categories. For example, some structural insulated panels (SIPs) have a core of compressed, treated straw. Other SIPs feature steel support rather than a "skin" of wood. In all of these alternative construction systems, the nature of the materials, when installed properly, results in a house with lower air infiltration, superior insulation, and excellent durability. The opportunities to provide improved interior air quality over conventional construction methods are also possible in most of these alternative system choices.

Optimum Value Engineering

With careful thought during the design process, wall dimensions, roof planes, window framing and roof framing can

be made more efficient with considerably less waste. Careful attention to the relationship between modular construction materials and the house design has the potential to save on materials costs and waste disposal.

Collectively, these design strategies are called, "optimum value engineering." By thinking of roof slope and overhangs, for example, most conventional roof decking can be built to an even two foot by two foot module. Optimum value engineering does not result in weaker structures as the framing still meets code standards. According to the National Association of Home Builders Research Center, in a 28' x 40' two-story house, the savings in framing can be expected to be about 35 studs. When the spacing of stacked, aligned framing is increased to 19.2" or 24" on center, substantial framing costs can be expected. As an added benefit to the homeowner, the proper elimination of unnecessary exterior framing makes room for extra insulation thereby improving thermal performance.

If you are designing homes based on optimum value engineering, inform your BSAG plan reviewer and your ENERGY STAR® rater.

WHERE IS THE MATERIALS SECTION?

Satisfying the Materials section is contained in satisfying the other four Level 2 requirements. All Level 2 houses must be provided with a Homeowner's Manual. Contact BSAG to learn what information is required for homeowners' use.

APPENDIX I

Solar Ready Option Electricity

Future Renewable Energy System Rough-in

As a builder, architect, or designer submitting a house for Level 2 certification, you are encouraged to incorporate renewable energy systems on the house, but none are required for Level 2 certification. However, you have the option to design the house properly and locate it on the site to make any future upgrade to renewable energy very easy for your homebuyer. If you follow the following criteria for making the house solar ready, your certification will be noted as, "Solar Ready Level 2" certification.

If the solar array is to be installed as panels or integrated roofing material on the house, garage, or out-building, the surface to receive the array must be flat (less than 1:12) or sloped. If sloped, the roof plane supporting the array must be sloped toward due south (ideal) or not more than 70 degrees in either direction from due south. The ideal roof slope is 7:12 for arrays parallel to the roof surface, but roof slopes as shallow as 3:12 would be acceptable. Otherwise, it is recommended that a rack securely attached to the roof structure (or on a free-standing structure away from the house) tilt the array between 25°-35° above horizontal. If installing more than one row of panels in the rack array, do not allow the rows to cast shadows on each other. A rule of thumb is to provide a distance between rows at least four times the vertical height of the rows. Allow for a total area of 400 square feet for the array.

The area of the roof supporting the array must provide an unobstructed exposure with a minimum of shadows from nearby vegetation or other predominant building elements such as chimneys and adjacent roof planes. BSAG staff will determine whether your site is appropriate for a PV system. Contact BSAG for more information regarding the solar

exposure evaluation.

As an option, the solar array may also be mounted on an independent structure or support rack whether or not there are opportunities to support the array on roof surfaces free of shading obstructions as long as the supporting structure follows the same guidelines as noted above for roof mounted conditions. The designer, builder, and mechanical/plumbing trades must plan in advance of construction to locate roof vents, skylights, sun tubes, and other roof



penetrations away from the expected roof-mounted array location as much as possible to avoid shading on the array and to provide an easier array installation. This also provides a more efficient and aesthetically pleasing array.

A wire chase, consisting of a 3/4" or larger diameter EMT (electrical metal tubing) must be provided to connect the array to the house's electrical panel and the future inverter. This diameter EMT should be sufficient to accommodate array capacity from 3kW to 6kW. If there exists a roof area that satisfies the guidelines for solar exposure as described above, provide a weather-tight, properly flashed and capped penetration in the roof for the EMT located at the northern extent of the proposed area for the array.

Provide a slot in the electrical breaker box to accommodate the circuit breaker required for the solar electric feed. The solar equipment installer will determine the capacity of the circuit

breaker based on the size of the array at the time of solar system installation. Provide a clear vertical wall surface measuring 48" x 48" to accommodate a future inverter either adjacent to the electrical meter and main panel or within a mechanical room or utility room inside the house. This wall surface shall not be blocked by any permanently installed equipment or appliances. Extend the EMT continuously from the roof penetration to this location providing a weather-tight (if exposed to the exterior) and capped termination.

APPENDIX II

Solar Ready Option Hot Water

Future Renewable Hot Water System Rough-in

In order to obtain the "Solar Ready" optional designation in your Level 2 certification process, your house must be ready to accept a solar hot water system in addition to the solar electric (photovoltaic) system. Allowing the house to easily accommodate solar hot water and photovoltaic systems by incorporating the guidelines described in this Appendix defines the house as "Solar Ready."

There are three primary considerations for making a house solar ready for hot water: the roof, the utility room, and the pipe runs. Although some solar hot water systems include a hot water storage tank integral with the collector, the builder must account for likely more common installations that feature

a hot water storage tank below the collector in the utility room under the roof framing somewhere within the house. Although the location of the hot water storage tank is fairly flexible, having the tank location close to the collector reduces installation costs as well as giving the homeowner the greatest number of system options when eventually installing the solar hot water system.

ROOF

The description of the ideal roof plane to support the solar hot water collector(s) is similar to the description of the roof area best suited for photovoltaic panels. However, although it's ideal to limit shading to fall on the collector from roof obstructions, trees, and other objects, the exposure is not as critical with regard to solar hot water collectors as it is for a photovoltaic array. In new construction, it is relatively easy to control shading problems. However, preserve the best location on the roof for solar exposure to the photovoltaic array. Nonetheless, indicate an area on the roof plan that faces within 45° of due south, is free from shading for most of the day, is an area that is 12 feet long and 12 feet high. If your roof does not have the ideal orientation, consult a solar thermal professional for roof orientations north of southeast-facing and north of southwest-facing roof planes. The ideal collector area should be as near as possible to the roof ridge and at least two feet from any rake edge, eave edge, or any other obstruction such as a chimney or adjacent roof plane such as a dormer.

The weight of a collector filled with water is generally 4.5 pounds per square foot and therefore is not excessive. However, make sure that this added dead load falls within acceptable loading for the roof framing you are using. Collectors with integral hot water storage are much heavier and will more likely require added structure to satisfy the building code framing requirements to support the added load. A note regarding the augmentation of roof structure will be included in the homeowner's manual. It is required that the builder provide a

notice pinned to the wall in the utility room that states, "Before installing a solar hot water collector on the roof, the system installer must determine that the roof framing will sufficiently support the weight of the system according to the current building code. If the framing is insufficient to support the weight, additional framing to satisfy the building code must be in place before installing the solar hot water system."

UTILITY ROOM

Two major elements of the solar hot water system are the hot water storage tank and the pumping package. These are usually located in the utility room directly below the collector. Local plumbing code prohibits water tanks from being located in the attic (unless there is a door access to the attic from the house at the same floor level). Whenever it's installed, the ideal location for the solar heated water storage tank is on the ground floor below the location on the roof where the solar collectors are installed. In the meantime, this utility room should also be the location of the primary tankless water heater. Realizing the location of the primary water heater should be close to the hot water faucets, consider the need to keep the horizontal distance between the collectors on the roof and the utility room to a minimum to ease the installation of the future insulated pipes connecting the collectors to the storage tanks.

Next to the tankless water heater, provide a four foot by two foot space with a seven foot vertical clearance to accommodate the future hot water storage tank. Do not locate a window or the electrical panel on a wall where access will be blocked by the future tank. This area needs to be adjacent to a 24" x 36" space on the wall where the solar hot water system installer will attach the pumping package and system controls. Provide a 120V duplex electrical outlet within six feet of the pumping package space and a 240V electrical outlet near the position of the hot water storage tank. The utility room must also include a floor drain in case of rupture of the tank or other

failure. If the solar hot water storage tank will be located on the ground floor (concrete slab on grade), there is no need to be concerned about the weight of the tank. However, since a filled tank may weigh between 600 and 900 pounds, you must provide adequate floor framing to support the weight of the tank when the floor of the utility room or platform where the tank is located consists of wood framing members.

PLUMB FOR EASY CONNECTION

If the builder installs a solar hot water system when building the house, the solar heated water storage tank contains the electric backup heating element, and a tankless water heater is not required unless a remote fixture warrants one. When a solar hot water system is installed by the homeowner at a later date, the tankless water heater becomes the house's backup water heater. On the cold water feed to the tankless water heater, plumb for a bypass feed to the future solar hot water system. Cap the stub outs to prevent accidental valve opening before the homeowner installs the system.

PIPE RUNS

The primary importance of having the utility room immediately below or on a floor below the collector on the roof is to eliminate the chance of having to install horizontal pipe runs of such a shallow angle as to negate a possible system warranty. At the floor or ceiling penetration(s) required between the utility room and the location of the future collector, provide a 4 inch PVC pipe chase for each floor or ceiling penetration capped on both ends for easy removal when the homeowner has the system installed. Locate the attic floor penetration chase near the location of the collectors above the roof, but not in such a location where the pipe chase can be damaged by anyone accessing the attic. Do not locate any pipe chases in a location where the future insulated copper pipes, drain line and temperature sensor wire will interfere with controls, electrical panels, windows, or any other

elements that need access. Terminate the uppermost pipe chase six inches above the attic floor, and insure there is at least a twelve inch clearance between the upper termination of the chase and the attic framing to make it easier for the solar system installer to run the insulated pipe at the time of system installation. Make sure everyone in your crew understands the purpose of the pipe chase penetrations so that your sub-contractors do not use the chase for other purposes.

A Note Regarding Brand Names & Companies Listed

All references to materials, services, companies, and specific products in any Build San Antonio Green® (BSAG) publication or on our website are intended as a guide and should not be inferred to represent endorsement by Build San Antonio Green® or the Metropolitan Partnership for Energy. Due to the changing nature of materials and the introduction of new products over time, BSAG cannot be held liable for the efficacy, appropriateness, or performance of materials listed in documents related to the BSAG Level 2 Program.

It is ultimately your responsibility to investigate all references as to their validity and performance for your particular project(s). Please perform thorough research on your own behalf and check references where possible before engaging in any construction project(s). Your decision to choose a company or individual to provide services, materials, and/or to perform work is the sole decision of you, the builder or the designer. No work is guaranteed or warranty expressed or implied by BSAG, and BSAG makes no assurances and no guarantees as to the results, effectiveness, cost, or quality of the products provided and work or services performed by the consultant, energy rater, contractor, employees, or subcontractors you choose for your project(s). BSAG highly recommends you do your own research, on your own, to find products, that could satisfy the intent represented by the BSAG Level 2 program requirements. Please submit any substitutions to BSAG for review

and approval PRIOR to purchase (to make sure they meet program parameters). Should you have any questions regarding this disclaimer or any other part of the BSAG Level 2 Program or other BSAG programs, you can contact BSAG at (210) 224-7278 or via e-mail at scolley@buildsagreen.org

Website References:

ENERGY STAR

www.energystar.gov

EPA WaterSense

www.epa.gov/watersense

Tree Protection Ordinance

PDF is available from the city website.

Google “San Antonio Tree Protection Ordinance”

EPA Indoor airPLUS

www.epa.gov/indoorairplus

EPA Certified Fireplace Inserts and Wood Stoves

www.epa.gov/woodstoves/

Carpet and Rug Institute Green Label

www.carpet-rug.org/index.cfm

California Air Resources Board

(CARB) Air Toxic Control Measure (ATCM)

www.arb.ca.gov

Green Seal

www.greenseal.org

LEVEL 2 SCORING

By adhering to the requirements of these Level 2 guidelines, the house you submit will score a “2.0” in each of the five categories (energy, water, site, health, and materials). If the house passes the evaluation under Level 2, the overall rating indicated on the Certificate will be “Level 2.”

If you included the requirements under the Solar Ready option, your house earns a “Solar Ready Level 2” Certificate.

Split Scoring

What happens if during the evaluation and scoring process the house you submit cannot obtain a level 2.0 in one or more of the five categories? If the house can still pass the requirements to obtain a level 1.0 in all categories, the house can still be certified in the Build San Antonio Green™ program. When this happens, the certificate will reflect the sections that earned the Level 1 scoring and the sections that earned the Level 2 scoring. The average score of all sections will be reflected as well on the house's certificate.