



SUMMARY OF FEATURES

National Homebuilder Mainstream GreenHome™

The National Homebuilder Mainstream GreenHome™ is equipped with many environmentally friendly features and designs for healthy living, making its systems, technologies and products suitable for other new homes across the country. The home appeals to mainstream American homebuyers by incorporating green and sustainable features that still provide all the modern-day comforts, conveniences, and architectural aesthetics that consumers expect. These sustainable features fall into five distinct categories: Site and Landscape, Energy Efficiency, Water Efficiency, Material Efficiency and Indoor Air Quality.

The architectural team's plan considers each of these five main categories in an integrated and whole systems oriented design. William McDonough + Partners is assisting with plan review, keeping cradle-to-cradle principles in mind. Cline Design is providing interior design services to ensure the aesthetics of all interior sustainable elements. Mechanical Equipment Sales is drafting the mechanical systems to efficiently interact with the architectural design and achieve a high level of performance. Southern Energy Management is reviewing all systems-based designs to ensure effective integration. The North Carolina Botanical Garden is designing the landscape to connect the home to its surrounding environment.

SITE AND LANDSCAPE

Landscaping – A landscaping design technique known as *xeriscaping* utilizes native and/or drought resistant species to minimize irrigation needs. The landscaping scheme considers wildlife habitat and food sources, and upon completion it will be eligible for certification by the National Wildlife Federation Backyard Habitat Program. In addition, edible landscaping is included in parts of the design to combine functionality with aesthetics. Other landscaping techniques, such as strategic tree selection and placement, minimize energy use by mitigating the effects of sunlight and wind on the home. The landscaping scheme was designed by the North Carolina Botanical Garden, landscape architecture professor David Swanson and green landscape designer Kathryn James of Green Earth Designs.

www.ncbq.unc.edu

Ongoing landscape care entails use of all natural products and methods. Glutengreen is a natural pre-emergent weed control plus fertilizer that helps control weed growth and slowly feeds the lawn. Humate is a natural soil amendment that strengthens the root zone and increases soil fertility and conditions the soil. Compost is a top dressing that adds organic matter and helps build good soil structure. Compost tea is a foliar application that provides nutrients and gives a boost of micro-organisms. Burnout is an all natural, non-selective herbicide used to safely get rid of weeds in the mulched areas. Gypsum is a calcium supplement used to help disperse clay and discourage weed

growth. Lime is used to adjust pH so plants better utilize available nutrients. Aeration is a technique used to alleviate soil compaction and let air, water and nutrients reach the root zone. Soil tests are conducted as needed to determine pH and nutrients balances so program can be fine tuned.

www.pleasantgreengrass.com

Tree Reuse and Preservation – Mature trees on the site include loblolly pines and mulberry trees. The fruit-producing mulberry trees have been preserved and integrated into the landscape design. Pine trees were preserved during construction but ultimately deemed to be risks during hurricanes and ice storms because of their location adjacent to the home. These also partially shaded the planned roof slopes for the solar system. As such, some of pines were reluctantly felled but still utilized for the site as mulch chips.

Stormwater Management – Swales along the driveway and site paths facilitate groundwater infiltration of stormwater runoff and diversion into a series of interlocking, crate-like underground storage tanks, RainTanks, where water gradually percolates into the ground. This technique naturally filters contaminants while greatly minimizing runoff to the city stormwater system. Water that would otherwise be channeled entirely from the local watershed stays on site to filter through the ground and recharge the local aquifer. The goal is for post-construction hydrology to mimic pre-construction conditions as closely as possible and minimize the undesirable effects of stormwater runoff – such as stream bank erosion, surface water body pollution and localized flooding.

www.braewater.com

Termite Control – Several nontoxic termite strategies minimize the need for chemical sprays both inside and outside the home. A solid metal plate is installed along the exterior of the house between the foundation and framing. This metal plate protrudes across the foundation and into the back of the brick façade to ensure termites can not crawl up the outside of the foundation wall to reach the home's wood framing. Nontoxic borates are applied to the bottom three feet of the framing and serve as backup to prevent termites from entering the home through other openings. Non toxic bait traps are installed along the perimeter of the home to lure termites away from the foundation. A foot wide bed of crushed brick surrounds the foundation to keep mulch, a food source for termites, away from the foundation.

Exterior Pest Management – The home uses an integrated pest management system to minimize the need for harmful chemical application on site. Natural mosquito pest control techniques, including the facilitation of on-site habitat for natural mosquito predators, reduce the need for chemical repellents and enrich site biodiversity.

Reduced Building Footprint – Designers utilized the topographical characteristics of the site to achieve a reduced building footprint by integrating the garage below the home. Without sacrificing convenience (vehicular access is available at the main level around side), the smaller footprint reduces the impact of the built environment on the site.

The building footprint is also reduced by such design strategies as using pocket doors to minimize room size needed, stacking stories, utilizing small stair case corridors, sharing a bathroom between two rooms, sealing the attic to create more usable space, creating a hybrid room by combining the sunroom and back porch, and integrating the hallways as part of the living, family and sitting rooms.

Sustainable Fencing – TimberTech’s FenceScape fencing product never needs sealing, painting or staining and won’t ever rot or warp, reducing any short term need for repair or replacement. It’s made with recycled wood materials and high-density polyethylene, to ensure a durable wood look with a 25 year warranty. FenceScape uses reflective pigments to give the fence a similar heat reflectance as wood and dramatically reduce heat buildup. As such the material is one of the coolest plastic composites around. And during the manufacturing process FenceScape regrinds scrap product for reuse and recycles water.

www.fencescape.com

Earthaven -

<http://www.earthaven.org>

Pleasant Green Grass –

<http://www.pleasantgreengrass.com/>

ENERGY EFFICIENCY

Spray Foam Insulation – BASF’s Polyurethane Spray Foam insulation seals to create a superior, insulating shell to minimize the leakage of conditioned indoor air. COMFORT FOAM® closed-cell polyurethane foam was applied throughout the home’s exterior walls, attic and crawl spaces. Upon application, the foam immediately expanded to 30 times its original size to harden and tightly seal all corners of the home, helping to conserve energy and keep conditioned indoor air where it belongs – inside the home. The insulation now provides the home with a thermal resistance (R-Value) of 6.1 per inch, nearly twice the resistance of most other insulation types, including open-cell spray foam products. COMFORT FOAM technology will not off-gas or adversely affect the home’s occupants. Also, the “closed cell” nature of the spray foam serves as a vapor barrier and prevents the transfer of moisture, reducing the risk of mold. Internal moisture control is achieved through the home’s HVAC system.

www.basf-pfe.com

Total Building Envelope Sealing - Air leakage through openings in the building envelope is caused by air pressure differences due to stack effect, wind and ventilation. Alone, or in combination, the three effects typically represent 15 to 40% of the building’s thermal load, or roughly 4 – 8% of the total energy requirement (ASHRAE Handbook). Uncontrolled air flow is responsible for the corrosion and decay of building materials (thereby reducing life expectancy), increased maintenance costs, poor appearance – and in the event of a fire – the rapid spread of flames and smoke.

Zerodraft Foam Sealant seals gaps and cracks in walls, roof-wall connections, the perimeter of door and window openings, mechanical and electrical penetrations, and similar locations to help provide a continuous, impermeable barrier to air infiltration or loss. Zerodraft Foam Sealant is a polyurethane foam consisting of a single mix of chemicals (MDI Monomer and Isobutane/Propane propellant) in one pressurized container and is formulated so that it will cure when exposed to the moisture present in air. Zerodraft’s formula does not contain urea formaldehyde, CFC’s

(chlorofluorocarbons), or solvents. Its 70% closed cell content provides R Value of 5.4 per 1" thickness which helps in reducing heating and cooling costs.

www.basf-pfe.com

Advanced Framing - Advanced framing techniques better facilitate the effectiveness and reach of spray foam insulation into the home's walls. These framing techniques reduce the amount of lumber needed; the high R-value of the spray foam (R-6.5) enables the home to be framed with 2x4s in place of 2x6s while still achieving superior insulation.

Reflective Roofing - ElkCorp shingles utilize cool-roof technology to reflect sunlight, minimize heat gain and effectively reduce the energy needed to cool the home. Highly reflective granules provide three times more reflectivity than conventional shingles and achieve the same reflectivity as a white shingle without sacrificing aesthetics and architectural norms. With a reflectance rating of .26 and an emittance rating of .92, the shingles are suitable for sealed attic applications where spray foam is applied directly below the roof deck. Such assurance enables a sealed attic strategy to further improve energy performance. Additionally, ElkCorp shingles use less petroleum during the manufacturing process than conventional shingles. They are lighter than conventional shingles and consume less fossil fuel during transport. The shingles lay atop Elk's IceGard MS, a self adhering roofing underlayment that ensures the durability of the roof by protecting against water penetration from ice damming and wind-driven rain.

www.elkcorp.com/homeowners/products/shingles_prestique_ccs.cfm

Sealed Attic and Crawlspace - The attic and crawlspace are not vented but rather sealed, insulated and conditioned to improve energy performance and the overall air quality of the home. Traditional building methods vent these spaces and leave them exposed to the outdoors. Sealing the attic and crawlspace and treating these spaces as interior parts of the home provide greater insulation throughout the home. In the attic, seven inches of spray foam (R-45) is applied between the rafters and the underside of the roof deck. In the crawlspaces, spray foam is applied to the joist ends, BASF's 2" Styropor EPS rigid foam (R-10) is applied to the block walls, and a white 10mm polyurethane sheet is laid on the ground. As a result of all these efforts, any conditioned air that escapes from the ducts running through the crawlspace and attic stays within the home's building envelope, thus saving energy. Backup dehumidifiers are available in each crawlspace should humidity ever rise above 40%. By minimizing the temperature and humidity fluctuations in all interior spaces, mold is significantly inhibited and air quality is greatly improved. Sealing the attic creates additional livable floor space without significant incremental costs per square foot. This vertical increase in livable area has potential to reduce the building's horizontal footprint on the natural environment.

www.basementsystems.com

www.styroporeps.com

Foundation – A dual drainage barrier system waterproofs and insulates the exterior foundation walls. A two-inch rigid foam drainage board (R-10) insulates the foundation, while a membrane whisks water down to the foundation drainage pipe, eliminating the risk of water infiltration and mold growth and ensuring the longevity of the foundation. These techniques used by The Waterproofing Co. add greater insulation and improve the comfort of the basement. The basement is also insulated with a one-inch rigid foam board (R-5) applied beneath the slab.

www.thewaterproofingcompany.com

Windows - Abundant glazing and careful window design encourage natural daylight throughout the home and reduce the need for artificial light. High-performance, low-e Andersen Windows are Greenseal certified and exceed ENERGY STAR® standards by 15 percent to effectively minimize heat loss and gain. Special high-performance Andersen windows are placed on all southwest-facing exposures to minimize late afternoon heat. These windows are manufactured with FSC-certified wood.

According to Andersen Windows, “High performance Low E4 glass employs a hermetically sealed system for optimal insulation from and cold. A patented low-conductivity spacer separates the two panes of glass. The space between the two panes is filled with an argon glass blend to minimize the thermal transfer. Compared to ordinary dual-pane glass, HP LowE4 glass is 35% more energy efficient in winter, 41% more efficient in summer. Depending on where you live, that can cut your energy bills up to 25%.” Likewise, Andersen Windows’ Sun E windows “work like sun block to help filter UV rays that can fade fabric and damage furniture. Ordinary dual pane glass lets 63% of UV light pass through. HP is layered with 11 microscopic coatings that cut UV transmission down to 17% with virtually no effect on the clarity of color of the light that enters your home”.

www.andersenwindows.com

Translucent Roof - The home features three Centerpoint translucent roofs over the sunroom and two gable ends allowing light to penetrate the home from above while maintaining consistent thermal comfort. Centerpoint uses an advanced gel insulation technology called Nanogel™, a lightweight, nonporous aero gel material. Nanogel is the same substance used to insulate NASA space suits. The translucent roof also includes an exterior heat reflecting coat that reduces solar heat gain five times more efficiently than conventional windows. The system provides tremendous sustainability and mainstream living advantages over ordinary translucent roofing options.

www.cptsystems.com

www.fscus.org

Window Shading - Lutron lighting control and shading solutions enhance the beauty and functionality of the home’s daylighting strategy. The Sivoia QED™ shading system conveniently controls sunlight to reduce glare and solar heat gain to protect interior spaces. The RadioRA Home Dimming System integrates both daylight and electrical light with a one-touch pad that controls all the light in the home. Automatic shades track the position of the sun and season to maximize natural light and reduce the need for artificial light and electricity. The whole home-automated shading strategy is very convenient and another example of the convergence of sustainability and better living.

www.lutron.com

Thermal Massing - Thermal massing is a passive design technique that delays the transfer of heat throughout the course of a day and minimizes the impact of the heating or cooling load on a building. Heavy materials such as stone, concrete, and brick can all be used to achieve thermal massing. General Shale bricks were specifically selected for the GreenHome to provide an attractive and traditional means of moderating the day and night temperature fluctuations in the Raleigh, NC, climate.

www.generalshale.com

ENERGY STAR® - The home uses ENERGY STAR-rated appliances, electronics, windows and roofing to minimize the energy needed to operate the home comfortably. On average ENERGY STAR labeled appliances consume 20 percent less energy than

conventional appliances. With the advent of the GreenHome project, Cherokee became an official partner of the U.S. Environmental Protection Agency's ENERGY STAR Program. This home is a demonstration of Cherokee's commitment to the program's goals. In 2005 ENERGY STAR efforts led to avoided greenhouse gas emissions equivalent to those from 23 million cars — while helping Americans save \$12 billion on utility bills.

www.energystar.gov

Duct Design, Zoning, and Staging – The air duct supplies and returns were designed to meet the predetermined heating and cooling loads of the home. All regularly occupied rooms have return vents or transfer grilles to reduce strain on the air handlers and ensure a pressure balanced home. Multiple zones run off the upstairs air handler to give greater control over temperatures in the home. Air handlers have the ability to operate in two stages, allowing them to drop capacity and save energy if less heating or cooling is needed.

Efficient Appliances – Many of the home's Whirlpool KitchenAid appliances are ENERGY STAR qualified including the refrigerator which requires about half as much energy as models manufactured before 1993, and 40 percent less energy than conventional models sold in 2001. Smaller ENERGY STAR qualified undercounter refrigerators enhance style and functionality in the kitchen as well as other areas of the home used for entertaining. The 6 cubic feet of storage space holds generous amounts of food, bottles and cans and saves energy by reducing constant use of the larger refrigerator.

KitchenAid's Optimum Wash Sensor detects water hardness and senses the amount of soil in the dishwasher. The hard food disposer helps keep food from re-depositing on dishes. As with all KitchenAid dishwashers, this model is ENERGY STAR[®] qualified, ensuring that the dishwasher is at least 41 percent more energy-efficient than the minimum federal government standard. ENERGY STAR[®] qualified dishwashers also use an average of 44 percent less water than conventional models.

KitchenAid Instant-Hot water dispenser can quickly and safely get up to 60 cups an hour of near-boiling water by simply turning on the tap. This saves energy by negating any pull from the main hot water heater for small hot water needs.

According to the US Green Building Council, "Clothes washers and dishwashers account for about 25 percent of indoor water use, or as much as 10 to 15 percent of total water use. (LEED for Homes reference guide) The new Whirlpool[®] Duet HT[®] model features a sleek design, intuitive controls and even more energy efficiency. The pair uses half the water and energy of a top load washer. As with all Duet[®] models, the new Duet HT[®] system is ENERGY STAR[®] qualified. In fact, using the normal cycle, it can save up to 70 percent more energy and uses 70 percent less water than top-load washers manufactured before 2004. Dynamic Stability Control minimizes vibration for installation in areas closer to living space or on an upper floor.

Whirlpool[®] Fabric Freshener removes odors from clothing while relaxing wrinkles without using chemicals or detergents. It can also save on trips to the dry cleaner. The Fabric Freshener uses only 9 ounces of water and 10 cents worth of electricity per cycle.

www.whirlpool.com

Ground Source Heat Pump - A ground source heat pump, or “geothermal system,” utilizes the earth’s relatively consistent year-round temperature of 56 degrees in North Carolina as a heat source in the winter and a heat sink in the summer. According to the EPA, ground-source heat pumps can save homeowners 30 to 70 percent on heating and 20 to 50 percent on cooling costs when compared to conventional systems. Designed and installed by TRC Energy Solutions, the five wells are six-inches in diameter, run 300 feet down into the ground and circulate water in a closed-loop system to absorb the earth’s heat during the winter and return this heat in the summer. These wells connect to two Florida Heat Pump geothermal units that act as heat exchangers and condensers and tie into a traditional duct ventilation system. With its desuperheater, the system also contributes to heating hot water in the summer, as some heat collected in the home is channeled to a heat exchanger within the hot water tank.

www.fhp-mfg.com

www.trcsolutions.com

Energy Efficient Electronics - Panasonic manufactures more than 400 ENERGY STAR labeled products that use less energy and last longer than conventional products. Through its Shared Responsibility Program, Panasonic has co-sponsored 1,415 events in 29 States since 2000 that have helped to collect and recycle 31,253,546 pounds of unwanted electronics. At the corporate level Panasonic has implemented the Eco Ideas Strategy to reduce carbon dioxide (CO₂) emissions through a combination of greener products and factories, encouraging resource conservation and promoting eco-friendly individual actions.

www.panasonic.com

Energy Recovery Ventilator - An energy recovery ventilator (ERV) allows fresh air to circulate in the home without the corresponding loss of energy one might expect. The ERV uses a heat exchanger to transfer heat from exiting stale air to incoming fresh air. Given the tightness of the building envelope due to the spray foam insulation, the home must in fact utilize an ERV to mechanically introduce fresh air and maintain a high level of indoor air quality without losing the energy already invested in the outgoing conditioned air.

www.summeraire.com

Solar Thermal Hot Water - Water is primarily heated by a unique passive solar thermal hot water system that operates underneath the shingles on the roof and avoids all aesthetic distractions of traditional roof-applied solar thermal panels. Half inch high-density polyethylene (PEX) tubing runs along the roof decking on the southern and western exposures of the rooftop; an antifreeze/water solution circulates through the tubing and collects heat throughout the year. This Dawn Solar system connects to a large solar thermal storage tank in the basement that transfers heat to the radiant floor system and the incoming cold-water line just before entering the hot water tank. On an annual basis, the GreenHome's Dawn Solar thermal system has the ability to harvest over 41 million BTUs of solar energy for space and water heating, saving the equivalent of 440 gallons of oil or 570 therms of gas each year. When considered over its 40 to 50 year lifespan, this system effectively locks in the owner's energy costs at 20 to 30 percent less than today's current rate.

www.dawnsolar.com

Energy Efficient Water Heater - The home features Marathon's 105-gallon electric water heater. Marathon water heaters are internally insulated with Envirofoam™, a highly efficient and non-ozone depleting foam product. The water heater's incoming cold water

line is preheated by the solar thermal tank. If more hot water is needed than the solar thermal system can provide, the Marathon tank is supported first by heat available from the ground source heat pump desuperheater and then with conventional electric heating backup.

www.marathonheaters.com

Radiant Flooring - Warmboard radiant flooring in the kitchen and master bathroom demonstrates the comfort, energy efficiency and improved indoor air quality of heating via radiant floors. The system receives heat through a heat exchanger connected to the solar thermal storage tank, which in turn receives its heat from the Dawn Solar system and the Florida Heat Pump ground-source heat pumps. Warmboard fuses an aluminum coating onto a plywood sheathing that includes preset grooves for the radiant tubing. Pex-Al-Pex radiant tubing includes an aluminum interior and easily lays in the preset grooves. An antifreeze/water solution transports heat efficiently through the aluminum coated tubing, which quickly disperses through the aluminum coated flooring throughout the kitchen and bathrooms. Radiant floors warm up quickly and evenly without cement and require significantly less floor elevation.

www.warmboard.com

Hot Water Heat Exchange - A waste drain heat exchange system preheats incoming city water with the outgoing heat from hot water running down the drain. According to GFX™ Technology, this system captures up to 60 percent of the energy used for hot showers and baths. This system taps into a significant, though hidden, source of energy exchange given that 33 percent of a home's energy use goes into producing hot water and 80 percent of this is lost down the drain. The Energy Information Agency estimates that these devices can help residential users reduce the energy used to heat water by 34 percent and pay back the cost of the exchange system in two to five years.

<http://gfxtechnology.com/>

Photovoltaics - Atlantis SUNSLATES® photovoltaic (PV) system provides 9.7kW of solar generated electricity to the home. The home still draws from the electrical grid as needed; however, when the PV system provides more power than the home is using (as it does during most of the day), the system's Fronius inverters return the excess power to the grid. When this occurs the electric meter actually spins backward. The homeowner receives \$0.18/kWh when selling the excess power to NC Green Power. This sellback rate is two to three times the retail base rate of electricity in North Carolina and shortens the payback period of a PV system. The Atlantis system is 15 percent more efficient than typical systems because of the unique, symbiotic relationship between SUNSLATES and the Dawn Solar Thermal system. PV systems inherently lose efficiency the hotter they become; however, the Dawn Solar system operates immediately below the Atlantis system to whisk heat away to the solar thermal storage tank.

www.atlantisenergy.org

www.dawnsolar.com

www.fronius.com

Renewable Energy Credits - NC Green Power provides renewable energy credits, derived from renewable sources such as solar PVs and landfill methane, to bring the home closer to its goal of carbon neutral operations. This means that the energy it consumes on a daily basis (not including transportation, construction, material extraction, etc.) does not contribute carbon to the atmosphere and reduces its incremental contribution to the growing concern for anthropogenically induced global climate change.

www.ncgreenpower.org

Lighting – A comprehensive lighting strategy incorporates and coordinates many sustainable lighting features such as daylighting, shading, dimming, motion detection and use of energy efficient fixtures and bulbs. The home intentionally incorporates a heavy glazing (windows) strategy to pull natural daylight deep into the interior spaces of the house as evidenced by heavy groupings of windows and french doors and use of both exterior and interior transoms.

Many ENERGY STAR rated lighting fixtures provided by Progress Lighting utilize light emitting diodes (LEDs) and compact florescent lights (CFLs) to significantly reduce the amount of energy needed to light the home. During the cooling season, these lighting fixtures reduce the amount of heat emitted to alleviate air conditioning demand. During the heating season, the energy saved by using LEDs and CFLs instead of heat producing incandescents is more efficiently applied to producing heat via the HVAC system.

LED lighting provides high quality, strong directional light best for accent lighting, or lighting surfaces directly under the fixture. LEDs are generally at least twice as efficient as conventional incandescent bulbs, though as much as half as efficient as compact fluorescents. They are suitable for use in locations where bright, ambient light is not required and/or lamp maintenance is difficult.

www.progresslighting.com

The home uses Philips Marathon® Classic line of energy saving light bulbs in most of its standard socket lighting fixtures. The bulbs last up to 10 times longer than standard incandescents and provide up to 75% in energy savings.

The Philips Marathon Classic line features advanced SmartBase™ Technology that employs compact circuitry, improved heat management and burner design to create incandescent-like shaped and sized CFL bulbs.

The bulbs also utilize ALTO Lamp Technology to minimize the amount of mercury needed and achieve the lowest mercury doses of any CFL on the market. All fluorescent lamps on the market today contain levels of mercury and most compact fluorescent lamps (CFLs) contain 3 to 5 mg of mercury; however, Philips' ALTO CFLs contain as little as 1 to 3 mg and use 100% recycled mercury during the manufacturing process. Philips has introduced a consumer program for recycling old CFLs.

Note that despite their use of mercury, CFL's are still preferable to incandescents as power plants typically emit 10 mg of mercury into the atmosphere in order to generate the electricity used during the life of a single incandescent bulb.

www.philips.com

Lutron's RadioRA system provides pre-programmed lighting scenes for various purposes and times of day to control when and where light is needed. With Radio RA lights can be turned on and off from anywhere, including the car. The Chronos Package astronomical timeclock is available to automate lighting changes based on time of day or relative to sunrise/sunset.

Lutron's Maestro designer dimming switches enable standard light fixtures to dim as needed and can be used to dim both LEDs and dimmable CFLs. Lights fade up and

down smoothly to allow ones eyes to adjust, ensuring a more pleasant dimming experience.

Lutron's non-PVC, Sivoia QED roller shades offer ultra-quiet operation, uniform movement of multiple shades, minimal light gaps, and convenient one-touch control to ensure privacy and control over daylight. The system integrates seamlessly with other Lutron controls to provide ultimate control over the light, both natural and artificial, in any space. The shades effectively reflect excess sun and serve as an effective thermal barrier for the windows.

www.lutron.com

Highly Insulated Doors - The Formanek exterior doors feature spray foam insulation with an R-value of 14, nearly double the industry's insulation value norm. These doors combine aesthetics with durability — the interior door face is wood while the exterior is either steel or fiberglass.

www.kochandco.com/Formenak_Door.htm

Stained glass windows by SGO Designer Glass surround the outside of the front door. The glass contains ultraviolet inhibitors to protect it from fading and is sealed tightly to keep air and moisture out of the home.

www.sgodesignerglass.com

Biodiesel Fuel - All on-site construction vehicles are powered by Piedmont Biofuel's biodiesel, a nontoxic biodegradable fuel that contains no sulfur, is locally produced and carbon neutral (there is no net carbon gain from production through use), and runs in any type of diesel engine. When compared to conventional diesel, biodiesel emits 67 percent fewer unburned hydrocarbons, 48 percent less carbon monoxide, 80 to 90 percent less carcinogenic PAHs, and 47 percent less particulate matter. Pure biodiesel costs \$3.50/gallon; other blends, such as B20 (20 percent biodiesel and 80 percent diesel), are less expensive.

www.piedmontbiofuels.com

High Performance Bath Ventilation Fans – ENERGY STAR-rated ventilation fans are provided by Panasonic's WhisperGreen™ series. They are highly energy efficient due to variable speeds, timers and back draft prevention technology.

www.panasonic.com

Passive Solar Design – Due to lot constraints, the GreenHome is unable to take advantage of a truly passive solar design by facing one long side of the home due south. Still, the home features large awning overhangs and an expansive front porch to protect windows from the intense North Carolina sun. Awning overhangs on the southwestern side of the house are particularly critical and sized specifically to the height of the windows to minimize exposure during the summer when the sun is high, yet maximize sun exposure during the winter when the sun is low on the horizon.

Energy Efficient Security Wiring – The home's security system was originally wired to draw 12 or more amps at all times, but was re-wired to pull just one amp instead.

www.brinks.com

Fireplaces – The home's Heat & Glo 6000 series fireplaces vent directly, have no continuous pilot lite, send heat to the return duct, and have tight air seals. The IntelliFire ignition system reduces gas consumption and thermogenerator wear by providing a pilot

flame only when needed. There is also a backup battery system to run the fireplace during a power outage. Optional Heat-Zone climate control system turns the fireplace into a flexible, energy-saving heat source by transferring excess heat from the fireplace to other locations of the home. Not available on 6000GCF. Optional Heat Duct system improves furnace efficiency and room comfort by pulling excess heat away from the fireplace, out of the hearth room and into the HVAC system's cold air return ducting. The direct vent fireplace features a sealed combustion chamber that draws in fresh air from outdoors and discards all combustion by-products back outside. This is recognized by the American Lung Association® Health House® program as a Clean Air Choice.
www.heatnglo.com

Energy Management System - The Energy Management Energy Control System uses a microprocessor to control the electrical loads of specific appliances in the home. The system eliminates the home's load spikes by synchronizing the energy loads of the dryer, hot water heater, and two geothermal units. The system enables the homeowner to achieve significant savings of 39-49% in their annual electrical bill though actual energy consumption does not decrease. In Raleigh, NC, electrical costs using this system are anticipated to go from 9-10 cents/kWh down to 5-6 cents/kWh. Most clients see their annual bills drop between \$900 and \$2000, while maintaining the same level of comfort and convenience. This system does require switching over to a "time of use" payment structure, as opposed to a typical "residential plan". This requires the energy company to come switch out the current residential meter to a time of use meter. While the system offers no actual energy savings to an individual home, only cost savings, if the system was used on homes throughout the region, peak demand load would be minimized and in theory reduce the maximum electrical output energy providers would need to have available at any given moment.

[Energy Control Applications](#)

Power Cost Monitors – The Power Cost Monitor is a device which tracks the energy consumed in the home by monitoring the display on the home's regular electricity meter (digital OR rotary). It allows the homeowner to track how much power the house is using, and how much it costs, both in real-time and monthly. An optical pick-up is attached on the outside of the "under-glass" power meter and it transmits energy-use data back to an in-home display unit. The display shows energy use in real time in kW and in dollars. By programming the display unit with the local electric utility rate (can accommodate "time-of-use" rates as well), the homeowner can see how much the electricity used is costing. It also displays outside temperature. Studies have shown that through increased energy awareness, people can save from 10% to 20% of the energy they use by turning off products, or scheduling their use to "off-peak" times.

www.powercostmonitor.com

www.bluelineinnovations.com

Outdoor Living – There are numerous outdoor features in the backyard of the home to help conserve energy used inside the home. The outdoor kitchen reduces energy bills during warmer temperatures by reducing indoor kitchen heat. With an outdoor fireplace by Hearth N Home the living space is expanded to outside the home, providing more reasons to spend more time outdoors in the natural landscaping and improving the home's indoor air quality. There is also a spa in the backyard of the home that combines Hot Spring spa's ultra efficient design with the home's rainwater catchment system to supply water and its solar energy system to generate power and heat.

www.heatnglo.com

www.hotspring.com

Whole House Energy Control – The GreenSwitch is a wireless system that enables the home owner to control lights, appliances and the HVAC unit with the flip of one switch upon exiting the home or before going to bed at night. The system may be retrofitted in an existing home or added during new construction. The Department of Energy estimates that the average American home loses 10-15% of its energy consumption to standby or phantom power, energy consumed by home electronics and appliances in the off position; this figure is expected to grow to 20% by 2010 as we become even more dependant on home electronics. The GreenSwitch can eliminate this waste of energy by cutting power to these appliances altogether while away. The system also controls thermostats and with the flip of the single switch automatically sets all thermostats to a predetermined away mode.

www.greenswitch.tv

WATER EFFICIENCY

Rainwater Catchment System - A rainwater catchment system by Blue Ridge Atlantic Enterprises (BRAE) collects, filters, stores and delivers rainwater for landscape irrigation and certain non-potable uses in the home. Rainwater is diverted from the roof, filtered and then stored in an underground holding tank next to the home. A pump draws water as necessary for landscape irrigation, the outdoor spa and internal, non-potable uses such as toilets or cold water for the washing machine.

Water is cleaned through a series of filters to ensure safety and system performance. Gutterglove gutter guards attach to the top of the gutters and serve as the first line of filtration by preventing large particulate matter such as twigs and leaves from entering and clogging the system. A subterranean basket filter located just before the underground holding tank catches any additional matter that may get through. When rainwater is pulled from the holding tank for use in the home, it is first filtered by a sediment filter (to filter diluted particles), a carbon filter (to eliminate any smells), and a UV filter (to zap microorganisms) – all located inside the home in the mechanical room for easy access to change filters as needed.

www.braewater.com

www.gutterglove.com

High-Efficiency Fixtures - Kohler's water-conserving plumbing fixtures provide comfortable flow while minimizing the water used in faucets, showers and toilets. The bathroom faucets use 1.5 gallons per minute while the showerheads use 2.0 gallons per minute, reducing water consumption by 40 to 80 percent. Some faucets utilize sensor activation to ensure water is turned off immediately after use. The toilets average 1.3 gallons per flush, using 20 to 30 percent less water than conventional toilets.

www.kohler.com

Hot Water Conservation - The Metlund® D'MAND® System uses “structured plumbing” to capture the cold water that is typically lost from faucets and showerheads while waiting for hot water to arrive and return it to the water heater. With significant energy and water savings, this system is expected to have a payback of one to three years. With a flip of a switch, the Metlund Hot Water D'MAND System circulates the ambient temperature water in the hot water pipes (water that is normally lost down the drain waiting for the hot water) back to the water heater. This occurs up to 80 percent

faster than when letting the water run down the drain. As the ambient temperature water in the cold water line travels towards the hot water heater, the D'MAND System fills the hot water line with hot water. When the hot water reaches the D'MAND System, a thermal sensor (thermistor) senses a temperature rise and quickly closes the zone valve to shut off the pump. This results in hot water reaching the fixtures four to five times more quickly. This reduced wait time saves water and energy and reduces sewage costs. This system is available for both new and existing homes.

According to tests conducted in 2001 by Oak Ridge National Laboratory and funded by the Department of Energy, the D'MAND system saves up to 10,000 gallons of water per home per year and over 3000 kWh's. On average a homeowner will save \$300 a year in water, energy, and sewage costs. Cost of operation is less than \$1 a day, and the unit has an ROI of less than 2 years.

For every 1000 homes using the D'MAND system and saving 15 gallons of water per day, 5,475,000 gallons of water and 1,207,517 kWh of electricity (from hot water heaters) are saved each year. An additional 11,810 kWh is saved during waste water treatment. 1,680,864 pounds of carbon dioxide, 3,583 pounds of nitrogen oxide and 7,298 pounds of sulfur dioxide emissions are avoided.

www.gothotwater.com
www.boltoncorp.com

Water Efficient Appliances – New technology makes appliances more water efficient than ever. The ENERGY STAR-certified KitchenAid I-Series™ dishwasher integrates an Automatic Purge Filtration (APF) wash system to provide the correct amount of clean water for efficient wash performance. The front-loading Whirlpool® Duet Sport™ washer uses intelligent technology to determine the optimal water level and energy usage for every load. This washer saves up to 22 gallons (almost two thirds) of water per load when compared to a traditional top-loading washer and outperforms other washers by 85 percent when measuring energy and water use.

www.kitchenaid.com

Water Filtration – The Aquasana EQ-300 water filtration system will be used to address local water quality concerns and reduce chlorine, lead, chromium and odor — among other potential contaminants — in water used for cooking, drinking and showering. In this system, bituminous carbon, catalytic carbon, mesh coconut shell carbon and KDF-55 are used to combat microorganisms, chlorine, VOC's, MTBE, and heavy metals. KDF-55 is a 100 percent recyclable copper-zinc media that not only improves water quality but also increases the life of the carbon filter media. Additional point-of-use filters will be used throughout the home.

www.aquasana.com

Irrigation Sensors – The irrigation system utilizes evapo-transpiration (ET) monitors that incorporate a series of inputs including the day's weather and automatically regulate irrigation. ET, the amount of water that is lost to the atmosphere through evaporation and plant transpiration, is estimated by using empirical calculations and monitoring atmospheric factors that influence ET, such as humidity and temperature. The timing and amount of irrigation for systems using ET controllers depends on atmospheric and weather conditions rather than the day of the week. They are basically robots once programmed, meaning no homeowner worries.

Annual subscription cost for daily ET data is about \$50. Some water conservation districts give homeowners rebates for using these, or exempt them from water restrictions.

Sink Positive – A hands free sink above the toilet helps conserve water and stops the spread of germs. Water from the sink is used to fill the tank of the toilet in preparation for the next flush. The user is able to wash their hands immediately, and thus avoiding contact with other items en route to the bathroom sink.

www.sinkpositive.com

MATERIAL EFFICIENCY

Construction Waste Management - The goal for the project is to recycle 75 percent of all construction waste. An independent waste management company collects site waste, sorts it and recycles a significant portion.

Efficient Manufacturing - The selection of many products is influenced by the sustainable nature of their manufacturing processes. For example, since 1990 Andersen Windows has reduced landfilled solid waste in its main facilities by 83 percent, toxic releases by 96 percent and VOC emissions by more than 60 percent. The front porch, sunroom and backyard patio are tiled with Hartstone's regionally produced, handcrafted concrete tiles that mimic the look of limestone pavers. The tiles are sustainably manufactured and cured in naturally cooled underground caves with almost no energy consumption and very little waste. ElkCorp roofing shingles are a "hybrid" shingle, offering a mainstream look but manufactured with significantly less petroleum than traditional asphalt shingles.

www.hartstonetile.com

Recycled Content and Reused Materials – Many of the home's products contain recycled content that minimizes the use of new resources for manufacturing and diverts waste that would otherwise end up in the landfill.

The building façade uses General Shale bricks that are fired by waste fuel that otherwise would have been sent to a landfill.

Andersen Window's Fibrex® material is a highly sustainable blend of synthetic material and wood fiber reclaimed from the manufacturing process.

Armstrong's lightweight, vinyl-coated tiles, called TinTile, were installed on the ceilings of several rooms. Armstrong uses up to 78 percent recycled content in its ceiling tiles. This helps divert thousands of tons of waste, including old ceiling tiles and newsprint, from landfills. In addition to their sustainable design, the tiles help create a sense of elegance and charm to the rooms in the home.

www.armstrong.com

Ankmar garage door CladPanels™ contain at least 86 percent recovered and recycled content (81 percent recovered wood fiber and 5 percent paper).

www.ankmar.com

IceStone® countertops, made of colored concrete and recycled glass, are installed in the kitchen and bathrooms. These attractive counter tops look much like granite and provide elegance and durability. The countertops are sealed with zero VOC sealants.

www.icestone.biz

Masisa USA's MDF mouldings with Ultra Prime™ are produced from ultralight boards manufactured eco-friendly standards that earn SCS (Scientific Certification Systems) approved certification for incorporating recycled materials.

www.masisa.com

All decorative glass in the home is 100% recycled.

www.stainedglassoverlay.com

The drywall utilizes 100% synthetic gypsum. Rather than sourcing virgin gypsum, the drywall incorporates gypsum created from coal fired power plants. Calcium carbonate is mixed with the sulfur dioxide scrubbed from the smokestacks via the flue gas desulfurization process to create calcium sulfate (pure gypsum) that's used for drywall manufacturing. Sulfur dioxide that would otherwise be solidified and sent to the landfill is diverted for other purposes.

In-Home Recycling - Built-in recycling bins facilitate ongoing recycling throughout the home's life. An on-site composting system provides a hygienic means of composting organic waste that would otherwise be diverted to the landfill and away from natural organic cycles.

Certified Wood - National forestry certification programs like SFI® (Sustainable Forest Initiative) and FSC (Forest Stewardship Council) promote sustainable harvesting techniques and ensure that forests remain healthy and diverse by regulating the practices of foresters, landowners, loggers and wood producers when procuring wood.

Weyerhaeuser's dimensional lumber package utilizes softwood certified through the SFI program.

www.weyerhaeuser.com

Nearly two thirds of the wood used in Andersen Windows is FSC-certified.

www.andersenwindows.com

The home features furniture that uses wood from forests that are FSC-certified.

www.metamorphousfurniture.com

Engineered Wood – Engineered wood reduces the need for large, older growth wood; engineered I-joists, beams and OSB sheathing are made by binding the composites of smaller pieces of wood together with strong resins. Weyerhaeuser's engineered wood resins do not contain urea-formaldehyde, a chemical that typically off-gases and negatively impacts indoor air quality.

Salvaged Wood – Old Growth Riverwood saves our forests by using ecologically sensitive techniques to salvage trees from rivers and reclaim wood from old tobacco warehouses to produce beautiful heart of pine hardwood floors. These floors are sourced locally and lessen the need for transportation-related energy.

www.oldgrowthriverwood.com

Transportation/Embodied Energy – Cape Fear Riverwood is salvaged 130 miles from the GreenHome site, while General Shale bricks are manufactured only 40 miles away. Using locally and regionally sourced materials significantly reduces the amount of energy consumed during transportation. ElkCorp's hybrid shingle is significantly lighter than other shingles and requires less energy for transportation.

Durability – Durable building products ensure that the home does not require significant maintenance, repair and/or product replacement over the life of the home. Durability is an especially important principle for the exterior materials that endure elements year after year.

Nichiha provides fiber cement siding for the home's dormers that resists rot, fungus and termite infestation. Nichiha's fiber cement siding is a highly durable product made of cement, sand, clay and wood fiber and carries a 30-year warranty.

www.n-usa.com

The furniture promotes durability as the frame and seat suspension are guaranteed not to break for 28 years and has a proven track record of being used in time share properties, hospitals and libraries. The product that can be changed as often as lifestyle, fashion trends or seasons change. The furniture can readily be repaired, recovered, repurposed or restyled while remaining in the home at a cost that's less than any reupholstering shop. And it is recyclable at end of its useful lifecycle.

www.metamorphous.com

Multifunctioning Façade – General Shale bricks, fired by industrial waste product that would otherwise be landfilled, are attractive, locally produced and environmentally manufactured. Brick provides a very durable façade that needs little maintenance and resists weathering. Likewise, brick acts as a thermal barrier to moderate day and night temperature fluctuations.

www.generalshale.com

Sustainable Design Consulting – Sustainable designers are critical to the success of any green building project by providing informed information about product options, viable systems and advanced building techniques. Sustainable designers involved with the GreenHome include: Cline Design, Southern Energy Management and William McDonough + Partners.

www.clinedesignassoc.com

www.southernenergymanagement.com

www.mcdonoughpartners.com

Sustainable Doors and Cabinets – Humabuilt interior doors and cabinets are specially manufactured to ensure healthy indoor air quality. The Humabuilt Door is the first quality, affordable and healthy interior door manufactured with wheatboard, a rapidly renewable resource, and the finest wood veneers and ultra low-VOC, water-based adhesives. Doors are available in paint or stain grade with a wide selection of styles, sizes and wood species that have been laboratory-certified to be free of synthetic formaldehyde. Doors contain 85 percent wheatboard by volume. Ultraviolet examination is used to ensure glue residue removal.

www.humabuilt.com

www.kochandco.com

Humabuilt Cabinets are affordable, free of synthetic formaldehyde resins and certified by the Kitchen Cabinet Manufacturers Association (KCMA). The cabinets utilize wheatboard for the cabinet sides, floors, drawers and back. The cabinets also utilize Purebond, a structurally sound panel product that includes a soy-based, formaldehyde free, water resistant resin developed using the process of biomimicry. The cabinet hardware includes non-voc/formaldehyde emitting pulls.

www.humabuilt.com

www.kochandco.com

www.pottersmilldesign.com

www.columbiaforestproducts.com

www.amerock.com

Sustainable Closet Systems – Well organized closets that maximize the use of space are critical to the successful performance of any sustainable home. Custom designed closets ensure that the unique spatial attributes of any closet are fully utilized to minimize need for space occupying drawers and wardrobes. Closets by Design used Columbia Forest Products' formaldehyde free Purebond panels to custom build all walk in closet systems.

www.closetsbydesign.com

www.columbiaforestproducts.com

Cork Flooring – Duro Design's cork flooring, featured in the kitchen, is a rapidly renewable resource that promotes natural aesthetics and comfort underfoot. The floor is sealed with a durable, yet low VOC, sealant to ensure long wear. The floating flooring nature of the cork flooring compliments the radiant floor underneath, enabling the floors to expand and contract as the floor warms and cools.

www.duro-design.com

www.brentwoodcarpets.com

Sustainable Carpet – Shaw's Evergreen residential carpeting, which embodies William McDonough's "Cradle to Cradle" can be constantly reused to create new carpeting. The carpets are manufactured with a patented technology that converts nylon carpet into caprolactam, the raw material used to make nylon 6 carpet fibers. Type 6 nylon is used in such applications as residential and commercial carpet, engineering plastics, automotive parts, sporting goods, films, and packaging. The recycling system at Shaw's Evergreen plant is designed to utilize post-consumer carpets in a cradle-to-cradle, closed-loop process. The sustainable cradle-to-cradle process allows nylon fibers to be recycled over and over again without the loss of any aesthetic or performance properties. The collection system is expected to collect as much as 300 million pounds of carpet waste of all types annually.

www.shawfloors.com

TimberSIL – Wood used for the back deck and square foot garden planters is treated with TimberSIL, which replaces the hazardous copper, chromium, and arsenic-based preservatives that were used in the past with more environmentally-friendly and healthy ingredients.

www.timbersilwood.com

INDOOR AIR QUALITY

Supply Air Filtering - Fine air filters (MERV 12) in the home's ventilation system capture most contaminants to achieve an exceptional level of indoor air quality. The MERV 12 air filters have 80 percent or better filtration efficiency on 1-3 micron particles and greater than 90 percent efficiency on 3-10 micron particles. For reference, the size of pollen is generally 0.5-50 microns and that of dust mites and pet dander are approximately 0.5-100 microns. Common home air filters can have MERV ratings of just 4 to 6, which allow many more potential air pollutants to enter and re-circulate within the home.

House Foundation and Mold Mitigation - Extensive waterproofing on the exterior of the foundation, including the installation of two-inch rigid foam insulation, ensures that water cannot penetrate the foundation and also keeps water out of the basement to maintain healthy indoor air quality and inhibit mold growth. The foam board offers both superior insulation and highly effective waterproofing as the foam board actually wicks water away from the foundation and into a drain.

www.thewaterproofingcompany.com

The home's crawlspace is also treated with an EPA-registered anti-microbial treatment by Mold Solutions. Unlike all other conventional antimicrobials, this treatment does not off-gas, leach, diffuse, migrate, volatilize or otherwise leave the surface to which it has been applied. Much like a layer of microscopic swords, the treatment functions by interrupting or "popping" the organism's delicate cell membrane to prevent it from carrying on vital life processes.

www.microbeguardinc.com

Low-Emitting Products - Poor indoor air quality degrades the quality of life for building occupants and homeowners and can trigger respiratory diseases such as asthma. Chemical emissions from common interior products are a major source of indoor pollution. According to a professor with the Mount Sinai School of Medicine, allergy sensitivities have doubled over the past 29 years, and the number of self-reported asthmatics has increased about 74 percent since 1980. Choosing low-emitting products significantly reduces the level of irritating contaminants in the indoor environment.

In the GreenHome, 95 percent of all interior products such as paint, carpet and Henkel adhesives and caulks contain little or no volatile organic compounds (VOC's). Adhesives can have VOC concentrations as high as 200 grams per liter and still be considered low-VOC, but most adhesives in Henkel's OSI Green Series™ used throughout the GreenHome have less than 5 grams per liter.

www.osisealants.com

In addition, the GREENGUARD Environmental Institute, an independent, nonprofit organization that certifies a broad range of interior products for their low emissions, awarded the GreenHome's flexible duct products from ATCO Rubber Products, Inc. with GREENGUARD Indoor Air Quality Certification®.

www.greenguard.com

www.atcoflex.com

The home's trim and crown mouldings are produced from ultralight Masisa MDF (medium density fiberboard) boards that have extremely low formaldehyde emissions, meeting the E-1 European standard and even stricter California EPA which will be implemented in 2009. MDF is a preferred, mainstream material in the building industry: it's easy to work with, light weight and easy to transport and affordable. Most homes in

the US are built using MDF, rather than solid grain wood, but often use resins with high amounts of formaldehyde.

www.masisa.com

The home features furniture that promotes better indoor air quality by using environmentally preferred Bio-foam, water based stains and sealants, green fabrics and materials as they become available.

www.metamorphousfurniture.com

The home uses Sherwin William's Harmony zero-VOC interior latex paint. It is designed with anti-microbial properties and offers low odor and silica-free coating that allows for immediate occupancy of newly painted spaces. The waterborne formula is available as both a primer and a topcoat in eggshell, flat and semi-gloss finishes. Harmony is certified with the GreenSure third-party certification that takes into consideration product performance and durability in addition to indoor air quality ratings for low VOC and low odor. www.sherwinwilliams.com

Radon Mitigation System – A passive radon mitigation system enables any potential radon gases to escape from the basement. The mitigation system consists of a three-inch plastic PVC pipe that protrudes from the basement slab. Radon follows the path of least resistance and will vent through the slab substrate into the pipe rather than through the concrete slab itself. Radon cannot be detected until the home is built and opportunity exists for radon to concentrate. Should radon ever concentrate in the basement, connecting the plastic PVC pipe to the outside of the house instantly activates the system. Radon is not a significant threat in North Carolina (therefore, there is no need to install an active system), but the EPA estimates that radon contributes to 20,000 lung cancer deaths per year in the United States.

Sealed Garage - The garage is completely sealed and insulated from the rest of the house with closed cell spray foam insulation to ensure that vehicular emissions, a leading cause of residential indoor air contamination, do not enter the home. In addition, a garage exhaust fan is triggered when vehicles enter or exit the home to remove potentially harmful air.

Air Testing - Indoor pollutant levels, such as volatile organic compounds (VOC's) and particulates, was tested by Mid-Atlantic Associates, Inc. prior to home occupancy to ensure superior indoor air quality.

www.maaonline.com

Security and Detection - Home security, smoke detection, carbon monoxide detection, and water intrusion detection are important elements of a sustainable home and indoor air quality. Smoke and carbon monoxide detectors are located on every level. Water detectors are located in the crawlspace and near the rainwater, solar thermal, geothermal systems to detect leaks or water intrusion.

www.brinks.com

Air Duct Cleaning – All return and supply vent openings were covered during construction to prevent debris from entering the duct system. At times these coverings were ripped away during construction and some amount of debris entered the system; to ensure fully clean ducts, the ducts were cleaned following construction by Absolute Air Duct Cleaning.

Central Vacuum System - A Beam® central vacuum system, up to five times more powerful than upright vacuums, ensures that contaminants are more readily expelled from the home. A Beam vacuum removes 100 percent of contacted dirt, dust mites, pollen, dander and other allergens vacuumed from living areas and delivers these to a collection unit in the garage, outside the home's thermal envelope. Research at the University of California at Davis has proven that a Beam system provides relief from major allergy symptoms by as much as 61 percent. Recent product enhancements include a more powerful, high-efficiency motor, a new secure seal system, and a new HEPA CleanStream™ Filtration System, which is five times stronger than other leading filtration media.

www.beamvac.com

Cleaning Services - The GreenHome utilizes a cleaning services that uses all natural, non-toxic cleaning products to ensure a healthy indoor environment for the cleaners and home occupants alike.

www.allnaturalcleaning.com

STANDARDS AND QUALITY CONTROL

Building Science – Cherokee developed a comprehensive set of guidelines to help it implement its vision. These guidelines draw heavily from building science work by Advanced Energy to build a more sustainable home.

<http://www.advancedenergy.org/>

Green Interior Design – Cline provided critical green interior design concepts for the home, helping to keep a “mainstream” look and feel throughout.

www.clinedesignassoc.com

Training – Third party tester employees are trained by Advanced Energy and the NC HealthyBuilt Homes Program. Local, regional and national experts were picked as partners and provided continued insight and guidance along the way. NAHB, PATH, McDonough green building experts particularly provided significant expertise. The GreenHome contractors attended educational seminars including HBH training and other training. Subcontractors were brought in to replace regular subs to perform energy-efficiency installations. Green building experts and consultants ran meetings to systematically integrate green systems with the contractors and subcontractors.

Testing – Third party performance tests include: (1) blower door test after insulation and again just before home occupancy to test building envelope leakage rate, (2) supply air flow testing to ensure actual air flows are within 10% of the designed air flows (manual D), (3) duct leakage test to ensure total leakage is below 5%, (4) air quality testing to look for items like carbon dioxide, carbon monoxide, mold, VOCs, PM, etc. that could have built up in a tight house like this.