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MATERIALS

INDOOR AIR QUALITY

WATER

ENERGY

SITE/LANDSCAPE

ARLINGTON COUNTY, VIRGINIA

BUILDING *Green* BUILDING *Smart*



WHAT IS GREEN BUILDING?

Green Building is a collection of design and construction strategies that significantly reduce or eliminate the negative environmental impacts of a building while providing healthy indoor space for its occupants. Building green requires an integrated design approach that looks at all components of the building project and evaluates the interrelationships among the building, its specific components, its surroundings, and its occupants. This approach means different things for each project—it can include thoughtfully siting the project to protect natural resources on the site, incorporating energy and water efficient components, creating healthy indoor environments with lots of daylight and ventilation and without toxic chemicals, reducing waste during construction and building operation, or using materials that minimize the impact on the regional environment.

Green buildings have many benefits including more efficient and cost effective use of building resources, significant energy and operational savings, increased productivity and reduced absenteeism among occupants, and reduced stormwater and air pollution impacts. Recent analysis of existing green buildings shows that the upfront cost of building green ranges from 0-5% of total construction cost, but these costs are recouped through reduced operational costs over the life of the building (and often within the first few years of operation).

Energy represents 30% of a typical office building's costs and is the property's single largest operational expense.

— USEPA, 2004



ON ANY SITE, REDUCING STORMWATER RUNOFF significantly reduces the impact on local streams and the Chesapeake Bay. Capturing rainwater for use on the site, either for landscape maintenance or for a grey water system in the building, reduces runoff, reduces the use of potable water, and recharges the groundwater table. Specific landscaping components such as shade trees, bioretention basins (rain gardens), vegetated roofs, and pervious pavement also reduce the impacts of stormwater runoff.

HOW DO YOU MEASURE “GREEN”?

The U.S. Green Building Council (USGBC) has developed a green building rating system called LEED™ (Leadership in Energy and Environmental Design). The LEED rating system allots points in the following categories:

LEED CATEGORY	AREAS OF IMPACT
Sustainable Sites	Project location, how building is situated on the property, and how it relates to the surrounding community
Water Efficiency	Water efficiency for landscaping and potable supply
Energy and Atmosphere	Energy efficiency and global warming issues
Materials and Resources	Reuse and recycling of materials, materials selection
Indoor Environmental Quality	Indoor air quality, ventilation, daylight
Innovation and Design	Creative green building applications

Using LEED as a guide, the project can strive for one of the following four LEED award levels:

- Certified (26-32 points)
- Silver (33-38 points)
- Gold (39-51 points)
- Platinum (52-69 points)

Integrated design is critical to the success of building green. The building team must work together throughout the entire design and construction process to ensure the successful implementation of LEED. To ensure LEED certification, the project team must document the specific credits that are to be achieved. Once the project is complete, the documentation package is submitted to the USGBC for review. This third-party certification ensures that all LEED components are appropriately incorporated into the project and that the project is indeed “green.”

LEED is very flexible and allows the project team to decide which points offer the greatest benefit for the project. It is important to realize that no two projects are the same and some LEED credits may not apply to a project. LEED also offers the option of developing four Innovation Credits that do not fit into a specific LEED category, but that enhance the environmental aspects of the specific project.



REDUCING WATER USAGE IN THE BUILDING and for landscape irrigation helps the environment and saves money. Faucet aerators, low-flow or dual-flush toilets, and water-free urinals can save significant amounts of water over the life of a building. Capturing rainwater and using it for landscape watering or for toilet flushing adds to the water savings.

TRAINING AND ACCREDITATION

The USGBC offers several levels of LEED training and a LEED professional accreditation exam for building professionals who seek certification. A full listing of LEED training courses, information on achieving professional LEED accreditation, and a listing of accredited LEED professionals is available at www.usgbc.org/leed.

Buildings consume 36% of the energy and more than 68% of the electricity used in the U.S. annually. Optimizing energy performance and installing ENERGY STAR® appliances and fixtures can reduce energy consumption, save money, and reduce greenhouse gas emissions by 20% or more.

— U.S. Green Building Council, 2004



SHADE TREES



CLERESTORY WINDOWS



SUNSHADES



ROOF



OPERABLE WINDOWS

ARLINGTON COUNTY GREEN BUILDING PROGRAMS

Arlington County has adopted LEED as a way to measure the energy and environmental performance of commercial and high-rise buildings in the County. Arlington is committed to building its own public facilities using LEED as a guide and the silver LEED award as the goal. In fact, Virginia's first Silver LEED certification was awarded to Arlington's Langston-Brown School and Community Center in September 2003.

Arlington County encourages private developers to evaluate the environmental impacts of all site plan projects. Requirements for site plan projects* include:

LEED Accredited Professional — Each project is encouraged to include a LEED accredited professional as part of the project team. This team member advises the project team on LEED issues and ensures that the specific LEED credits for the project are achieved.

LEED Scorecard — A LEED Scorecard must be submitted as part of the site plan application. The Scorecard must be accompanied by an explanation of how each credit will be achieved or why the credit cannot be achieved for the project. Prior to issuance of specific permits, reports must be submitted outlining progress on achieving LEED credits. A specific number of LEED credits will be negotiated and included in the project. Go to www.usgbc.org to download a LEED scorecard and guidelines.

* Site plan projects are those that apply for a special exception from the Zoning Ordinance, allowing more flexibility in building form, use, and density than is normally allowed in the specific zoning district.

OPTIMIZING ENERGY EFFICIENCY IN A BUILDING IS THE MOST EFFECTIVE WAY to save money in operating costs over the life of the project. Reducing energy usage also reduces air pollution in the region. Energy efficiency involves evaluation of many different building components, all of which must be evaluated as a holistic system to maximize energy savings. Building insulation, window size and glass type, roof type and color, exterior building color, and placement of shade trees all impact the size and type of heating/cooling system that will be required. Designing for optimal interior daylight — use of clerestory windows, light shelves, sunshades, and light-colored interior paint — reduces the need to turn on lights. Motion sensors for light fixtures also help reduce lighting demand.

Construction Waste Management Plan — All site plan projects are asked to prepare and implement a construction waste management plan. The plan outlines where waste will be sent for recycling, reuse, reprocessing, or disposal. Letters from each of the recipient facilities are to be included.



ENERGY STAR — Multi-family residential projects are asked to meet U.S. EPA's ENERGY STAR standards for appliances and fixtures. ENERGY STAR compliant components include clothes washers, dishwashers, refrigerators, ceiling fans, ventilation fans (including kitchen and bathroom fans), light fixtures (halls and common areas), and exit signs. To further enhance energy efficiency, projects are asked to choose and install two of the following ENERGY STAR components: programmable thermostats (in residential units); residential light fixtures; windows and doors; and HVAC systems.

Green Building Fund — All site plan projects that do not receive LEED certification from the U.S. Green Building Council are asked to contribute to the County's Green Building Fund, calculated at a rate of \$0.03 per square foot. This fund is used for education and outreach for the development community on green building issues. If the project achieves certification from the USGBC, the Green Building Fund contribution is refunded.

Additional information is available at www.arlingtonva.us.

ARLINGTON COUNTY'S GREEN BUILDING INCENTIVE PROGRAM

To encourage projects to achieve formal LEED certification from the U.S. Green Building Council, Arlington has established a green building density incentive program. The program allows developers to request a slightly larger building than would normally be allowed by County Code if the project receives official LEED certification from the USGBC at one of the four LEED award levels. The extra space allowed varies depending on the project and on the LEED award sought. For detailed information on Arlington's green building density program go to www.arlingtonva.us.

Studies show that the premium for green buildings is approximately 2 percent.

Return on the initial investment comes within the first few years of operation.

Financial benefits of green building include lower energy, water, and waste disposal costs.

— The Cost and Financial Benefits of Green Buildings:
A Report to California's Sustainability Task Force, 2003



CONCRETE FLOORS



SUSTAINABLY HARVESTED WOOD



LOW ODOR PAINTS

PEOPLE SPEND NEARLY 90 PERCENT OF THEIR TIME IN BUILDINGS. THUS, indoor air quality is a critical component of healthy, green buildings. Many building components contain volatile organic compounds (VOCs) and/or urea formaldehyde, both of which can be very irritating. Selection of materials such as paint, cabinetry, adhesives, composite wood, and flooring with very low levels of these compounds results in a healthier building. Protecting building components prior to and during installation reduces the risk of mold growth and dust contamination. Using natural cleaning supplies throughout the building also reduces exposure to potentially harmful toxins.

RESOURCES

www.arlingtonva.us — Detailed information on Arlington County's green building programs.

www.usgbc.org — The U.S. Green Building Council offers extensive on-line resources about LEED and green building technology.

www.buildinggreen.com — Specific product information, green building case studies, and technical information.

www.energystar.gov — The U.S. EPA's ENERGY STAR program provides technical support and specific ENERGY STAR qualified product information.

www.greenerbuildings.com — Extensive resources for environmentally responsible building development.

www.sbicouncil.org — The Sustainable Building Industries Council's website offers information on the design, affordability, energy performance, and environmental soundness of residential, institutional, and commercial buildings.

www.edcmag.com — Environmental Design and Construction Magazine offers up-to-date information on green building techniques, materials, and processes.

www.aceee.org — The American Council for an Energy Efficient Economy (ACEEE) promotes the development and widespread adoption of energy efficiency improvements for buildings, appliances, and other equipment.

Arlington's Green Home Choice program helps homeowners, homebuilders and renovators choose techniques and materials to make single family homes green. See www.arlingtonva.us for more information.



EXPOSED STEEL BEAMS



SOUND PANELS



CARPET



RECYCLED RUBBER FLOORING



BAMBOO FLOOR

BUILDING COMPONENTS CAN HAVE A MAJOR IMPACT ON THE QUALITY of the building. How and where the materials are produced also impacts the environment. Specifying local and regional materials reduces pollution generated by transporting building supplies long distances. Use of renewable resources

such as cork, bamboo, and natural linoleum flooring, and wheatboard cabinetry reduces the need to harvest valuable hardwoods. Using components made from recycled materials (rubber flooring, steel, carpet, etc.) also reduces the need to harvest and mine virgin materials.