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RALEIGH CONVENTION CENTER BUILT FOR SUSTAINABILITY

The Raleigh Convention Center, it is not only be the "Crown Jewel" of downtown but also the most sustainable building the City has ever built.

The goal of designing and constructing a "green" building was established early in the planning phase of the project. Once the schematic design phase was approved by the City Council, it was registered with the United States Green Building Council (USGBC) in 2004.

A sustainable building is more than one which conserves energy, it also has to combine other environmental and building elements such as its relationship to the site and community, water savings, selection of materials and local resources and indoor air quality. A green building with all of these features incorporated will realize added benefits which will reduce operating costs, enhance marketability, increase worker productivity and potential liability associated with indoor air quality problems.

According to the USGBC buildings account for:

- 70% of electricity consumption in the U.S.;
- 39% of energy use;
- 39% of all carbon dioxide (CO_2) emissions;
- 40% of raw materials use;
- 30% of waste output (136 million tons annually); and,
- 12% of potable water consumption.

One of the prerequisites of the Leadership in Energy and Environmental Design (LEED) program guidelines is to require that the project participate in a commissioning process. A commissioning consultant was employed in the project during the design phase with a focus reviewing the design and ensuring that the specifications had clear and concise commissioning requirements and instructions to the bidders.

During the construction phase the commissioning consultant's duties focused on ensuring that the buildings energy-related systems were installed, measured and calibrated as specified for maximum efficiency.

Another key element to the commissioning process is a comprehensive maintenance and operations staff-training effort on all of the building systems. This higher level of training will enable the staff to recognize and react more quickly to equipment problems which may present themselves once the facility is up and operating at full capacity.

The City of Raleigh is in the process of collecting data for the first submittal to the USGBC for the LEED credits for the building design phase. The final LEED certification submission for credits associated with the construction phase will be made in the fall.

The **3 R's – Reduce, Reuse, and Recycle**

All successfully designed sustainable buildings recognize and incorporate the three R's – reduce reuse, and recycle in the facility. The Raleigh Convention Center has many examples of these key "green" facets, a sampling of a few include:

- **Brownfield Redevelopment:** The excavation of the west block of the convention center site included the environmental remediation by Progress Energy of a former manufactured gas plant which was located at the southwestern corner of the intersection of Cabarrus and McDowell streets. When these plants were closed, surface structures were demolished and the sites were then covered and graded. Due to the age of the plant, which operated from the late 1870s until 1914, the original gasholder foundations existed below grade. Common abandonment practices of the day often involved backfilling of demolition debris and soil into these structures without removal of the residuals. The remediation work included removal and environmentally appropriate disposal of the contaminated soil. Additionally, the remnant of a former gasoline station on the east block of the site (at the corner of Salisbury and Lenoir) were removed with soil and groundwater remediation performed.
- **Water Recycling:** The Skanska Barnhill joint venture implemented a plan to recycle the water at the construction site for the 500,000-square-foot convention center. Water from the dewatering process and other construction activity was pumped into sediment ponds for holding and eventual reuse. Recycled water was used for caisson drilling operations, truck tire washdown and dust control on the site. An average of 55,000 gallons of water was used at the site each day. In all, the water-recycling plan saved the use of several million gallons of water from the City of Raleigh's system. An estimated 4.8 million gallons of water was kept out of the City's sewer system because of the recycling, according to Skanska-Barnhill.

- **Building Demolition Recycling**: In an effort to keep usable materials out of the landfill, contractors for Raleigh's new downtown convention center are recycling debris generated by construction of the facility.
- The construction team contracted with D.H. Griffin Wrecking Co. to demolish four buildings on the new convention center construction site on Salisbury Street and McDowell Street. As part of the agreement, D.H. Griffin recycled debris from the demolition that had an estimated value of $8,000. The materials were recycled at D.H. Griffin's recycling facility.
- In addition to the cost savings, demolition of the four buildings produced 239 tons of debris. Of that, 198 tons -- or 83 percent – were recycled by D.H. Griffin. The remaining 41 tons were non-recyclable materials. The 198 tons of recycled materials consisted of 135 tons of junk metal and steel and 63 tons of concrete, block and brick.

The construction manager has developed and implemented a construction waste management program during the construction phase which has been very successful in diverting waste materials from the landfill.

- **Water Efficiency:** Throughout the facility, water conserving plumbing fixtures are used to reduce water consumption.

- **Energy Efficiency:** A highly efficient heating ventilating and air condition (HVAC) system was installed that reduces energy consumption by 20 percent and reduces the use of ozone depleting equipment. A computerized building management systems monitors the HVAC system for more efficiency. To maintain the indoor air quality during and after construction, the air-handling vents are covered to prevent dust and debris from entering the system. To further reduce energy consumption, the lighting fixtures in the administrative and support areas use energy efficient T-8 lamps. In addition, metal halide light fixtures are used in the exhibit hall and lobbies to provide a very efficient light source. The use of light-emitting diode (LED) fixtures in accent lights, exit signs, exterior area lighting and street lights reduces energy usage. The LED fixtures not only use less energy than conventional lighting but also last much longer and will need less frequent replacement. The Convention Center's restrooms are equipped with occupancy sensors to turn off the light when not occupied. A light dimming system is in place for the exhibit hall, ballroom and meeting rooms to reduce energy costs.

- **Building Envelope Efficiency:** Energy efficient exterior wall and roofing system with heat transfer rating exceeding American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) energy standards were used. The construction of the exhibit hall function below street-level grade reduces summer heat gains and winter heat losses. The air-handling units are supplied with variable frequency drives that allow them to use less energy when cooling needs are low by operating the fans at reduced speeds. The gas-fired hot water boilers heating efficiencies exceed requirements of energy use according to ASHRAE standards.
- **Indoor Air Quality**: To promote healthy indoor air quality, this facility has been designated a non-smoking facility. Additionally, the design team specified the use of low volatile organic compounds (VOCs) emitting finish materials, carpet, paint, adhesives, and sealants that reduce the indoor air pollution. VOCs are organic chemical compounds that have high enough vapor pressures under normal conditions to significantly vaporize and enter the surrounding air and are an irritant to some people.

- **Green Cleaning Principles:** The convention center maintenance staff will receive training on "green" cleaning procedures and environmentally friendly cleaning products to be used to help keep the building "green" and indoor environment clean.