West Quad Case Study

- $30.9M project cost - $25M const. cost
- 177,000 SF - $141.24/sf
- SAME COST & Time
- 502 bed spaces – 4 buildings
- Residential, office, academic & retail spaces
- Goal of LEED Silver – Applied for LEED Gold

- Reduced Construction & Change Order Costs
- Additional Design Fees $90,640 (late negotiation)
- LEED Documentation costs $8,000 (now lower)
- Commissioning costs $91,100
West Quad at USC

Selected “Green” Project Particulars
- Designed to be 45%-55% more energy efficient and to use 20% less water
- “Green” roof on Learning Center
- Fuel Cell for supplemental electricity & hot water
- Solar pre-heating for domestic hot water
- Low VOC paints and carpets & 100% Fresh Air
- Daylighting in all buildings
  - Building orientation
  - Light shelves for shading and natural lighting on southern exposures
  - Light wells on Learning Center
- “Green” board in case good furnishings
- Total storm water management integration
- Goal of Silver LEED certification
Justifications

Key Issues and Benefits
- Institution
- Building Commissioning
- Air Quality
- Occupants productivity and well being
- Energy Conservation
- Water Conservation
- Storm Water Management
- Waste Management

Key Issues and Benefits
- State or Local Requirements
- Codes & Standards
- State & Local Programs
- Demand
- Education
- PR
Why at Your Institution?

- Green ethics / commitment
- Education for end users
- Higher education is an Innovation source
- Research and Grant opportunities
- Being a leader (as it should)
- Responsibility to show importance
Overall Financial Benefits

- Energy
- Water
- Wastewater
- Reduced Waste
- Improved Indoor Environmental Quality
- Greater Employee Comfort/Productivity
- Reduced Employee Health Costs
- Recruitment & Retention

- Lower Operation and Maintenance Costs
- Competitive First Costs
  - Through integrated design & synergies
- Increased Value & ROI
- Marketing Advantage
- Reduced Liability
  - Improve Risk Management
  - Insurance costs
Mythology About First Costs

- **Common Perception when we started was +20-30%**
- **Past & Current Trend**
- **Recent Studies**
  - Average Premium <2% or $3-$5 SF
  - Most of cost associated with increased architectural and engineering design, time, modeling and integration time
  - Earlier you integrate the lower the cost
Mythology About First Costs

Average Green Cost Premium vs. Level of Green Certification

Source: USGBC, Capital E Analysis
Mythology About First Costs

- Another recent study has shown the following average increase in project construction costs, on a percentage basis for LEED certification.
  - Certified: 0 – 2.5%
  - Silver: 0 – 3.3%
  - Gold: 0.3 – 5.0%
  - Platinum: 4.5 – 8.5%

- Start Early – Save Costs

Source: Sasaki Associates 2004
Mythology About First Costs

- Building green can be done for no additional cost
- Initial premium costs are entirely up to you and project specific
- LEED buildings average only a 2-3% increase in costs, but can be done for the same budget as traditional buildings with planning
- Savings from green building’s more than return any premium you may choose to put into it
- Design Fees will be higher but construction costs may be reduced
- Set Budget first then work fees within framework
Examples of First Costs in SC

<table>
<thead>
<tr>
<th>Construction Cost</th>
<th>Additional Design Fees</th>
<th>Commissioning Costs</th>
<th>Project Within Normal Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>$25 million</td>
<td>$91,000</td>
<td>$90,000</td>
<td>Yes</td>
</tr>
<tr>
<td>$14 million</td>
<td>$60,000</td>
<td>$60,000</td>
<td>Yes</td>
</tr>
<tr>
<td>$1.4 million</td>
<td>$27,000</td>
<td>$23,000</td>
<td>Yes</td>
</tr>
<tr>
<td>$35 million</td>
<td>$80,000</td>
<td>$110,000</td>
<td>Yes</td>
</tr>
<tr>
<td>$16 million</td>
<td>$115,000</td>
<td>$60,000</td>
<td>Yes</td>
</tr>
</tbody>
</table>

- All projects did fit into original budget
- Resources still limited in SC but additional costs drop each year
- Extra Design Fees average 5-10% increase in design costs but all projects saw a reduction in construction & equipment costs
- Continually Going Down
Reducing Costs

- **Design**
- **Specs**
- **Internal Resources**
- **Grants/Incentives**
- **Free Help**
- **Use experienced & committed Architect & Design Team**
- **Help Design Team get trained and/or educated**
  - **Yourself**
  - **Local USGBC Chapter**
  - **Upcoming LEED training**
  - **HOK Guidebook**
- **Do some work internally**
- **Design/Build**
- **Herman Miller Program**
- **Create your own guidelines in lieu of LEED or find one that works for your organization such as Green Globes**

- **Negotiation**
  - **Do not pay for education of design team**
  - **Excessive Fees**
    - **Extra meeting time** (integrate as many ‘green’ meetings into traditional design meetings as possible)
    - **Excessive Research**
    - **Acceptable extra fees**
      - **Certification paperwork**
      - **Analysis & Modeling**
      - **Some extra coordination, design, paperwork and meeting time costs can be absorbed into project**
      - **Evaluate if extra fees can be made up during construction from better design**
General Mythologies

- **Green Buildings do not have to look funny.**
  - You design it to look how you want. It can easily match traditional campus design or not.
  - Carpet, furniture and windows do not have to look different. They can look like traditional ones only they perform better and are healthier.
  - Does not need to be high tech to be green.

- **Time**
  - Green Buildings take the same amount of time to construct as regular buildings. More time may be required in the Design phase though.

- **Costs**
  - Green Buildings do not have to cost more. With planning they can be built at the same price or less.
  - Design fees may be higher in the beginning of the project but the extra design work will lower the actual construction costs. In the end the building costs the same and fits in the traditional budget.
    - **Normal:** $1 + 1 = 2$
    - **Green:** $1.5 + .5 = 2$
  - Long term maintenance and operations costs can be reduced by 20 – 50% with good planning.
Creating Usable Community Spaces

- Courtyard
- Turf Roof
- Lounges
- Laundry/Study Rooms
- Lobbies/Classrooms
- Café/C-Store
- Porches
- Backyard
- Learning Center
The Learning Center for Sustainable Futures

- Key component of the project for both University instruction and externally-focused environmental education
- $1.7M – 9,000+ sq ft
- Three seminar rooms, conference room, faculty offices, project rooms, kitchen
- Educational Displays
- Adjacent to Coffee Shop/Convenience Store
- Faculty Director

- 7,000 + Visitors/Year
- Local, National & International Conferences
- 100 + Articles
The Learning Center for Sustainable Futures

West Quad Learning Center for Sustainable Futures

Learning Center Mission

The Center promotes increased awareness and understanding of sustainability through fostering development, dissemination, investigation, and evaluation of sustainable policies, practices, and technologies. The Center supports the ongoing development of a sustainable living learning community for West Quad and the wider USC society.

The Learning Center for Sustainable Futures

The Learning Center is a high-tech, earth-friendly building that fosters the ongoing development of a sustainable living learning community for West Quad residents and the wider USC society.

The Learning Center’s meeting classrooms and conference facilities are available for students, faculty, community, and private sector groups working to create sustainable futures.

The living and learning community of West Quad is intended to be a beacon for the concept of sustainability at the University of South Carolina and to advance the education of our students and our nation’s citizens on issues of sustainability.
Ways We Teach

- Programming form
- Hall Government purchasing
- Incentive Plan
- West Quad tours
- Living-Learning Center
- Assessment
- Energy Monitoring Program
- One-on-One interactions
- Floor Gatherings
- Programs & Activities
- Community Service
- Judicial Conferences
- Passive Displays
- Conference/Seminars
- Research
Sustainability Programming

November and October 2004 Sustainability Practices Check
Sustainability practices, including electricity conservation, thermostat settings, and light switch use, were noted as part of Health and Safety Checks and the Incentive Program. Check out our stories on http://sustainability.asu.edu within the West Campus community page.

- Common Area Light Statistics
- Suite Light Statistics
- Average Temperature Statistics
- Rotative Progress: Energy Conservation
- Conclusions

Battery Recycling Collection Container

Technotrash Can
- A project initiated with the objective of reducing waste in the community
- Technotrash Can
- The project involves collecting electronic waste for recycling

Green Disk
Challenges of “Greening” West Quad at USC

- State Procurement
- Champions
- Backsliding
- Contracts/RFP’s
- Specs
- Education & Training
Opportunities for Vendors

- Interface
- Southwest Furniture
- Plug Power
- SCANA (SCE&G)
- Steelcase
- Herman Miller
- Siemens
- Johnson Controls
- SC Energy Office
- US DOE
- Internal Partners & State Agencies
- Utilize State Contracts
- Discount Pricing
- Educational Funding
- Beta Site
- Promotion in Company Literature
Lessons Learned

**Costs**
- Establish Fees Early
- Utilize Life Cycle Costs
- Plan in advance
  - Seek Alternatives
  - Seek Partnerships
  - Utilize Resources
  - PR Campaign

**Communication**
- Educate everyone, especially decision makers
- Obtain a Commitment
- Designate a Champion
- Gather input
- Promote
- Perception of new technologies
- Visit other campuses
- Training Sessions
Lessons Learned

- **Experience**
  - Architect
  - RFP’s
  - LEED Accreditation within your institution
  - ‘Experts’ within your institution
  - Research
  - Commitment – everyone will tell you what to do, get them to do it
  - Recruit from your local or state USGBC Chapter

- **Planning**
  - Commissioning
    - From the start
  - Allow Time
    - Research
    - Grants
    - Partnerships
  - Document
    - Everything
    - Paper
    - Pictures
    - Video
Impact of West Quad

- **Campus**
  - Honors College
  - Library
  - School of Public Health
  - Law School
  - Gamma Phi Beta Sorority
  - Student Health Center
  - LeConte College
  - Research Park
  - 18 green projects

- **Companies & Agencies**
  - State Agencies
  - Counties
  - Legislation
  - SCANA
  - Private Companies

- **Other Institutions**
  - In SC
  - Vermont
  - New York
  - Alabama
  - North Carolina
  - California
  - New Hampshire
  - Georgia
  - Massachusetts
  - California
  - New England
  - Canada
  - Florida
Recognition

- Over 120 and articles & growing
- Documentary
- Awards
  - CRA ‘Green Building of the Year’
  - NACAS – Innovative Achievement
  - NWF – Green Campus
  - Environmental Design & Construction
  - AIA
  - Columbia Green
  - Several pending
Next Steps for USC

- **Commitment**
  - **Campus Wide**
  - **Sustainable Design Guidelines**
  - **Master Plan**
- **Continue as Resource for other projects**
- **Expand Learning Center Programming & Community Outreach**
- **http://www.housing.sc.edu/sustainmain.asp**
Contact Info

Michael Koman
USC
1215 Blossom Street
Columbia, SC 29208
803-777-1986
komanmd@gwm.sc.edu