Green Building Under Fixed Project Budgets

Project Strategies

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Understanding the Needs
Occupant task parameters

Lighting, temperature, ventilation, humidity, vibration, etc.
Understanding the Needs
Historic Change
Understanding the Needs
Local Climate

Sacramento, CA Annual Temperatures

Degrees Fahrenheit

Data from: Climatezone.com
Understanding the Needs
Utility Use

Space A

Space B

0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0
VA/sf or W/sf

0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0
Time

Max VA/sf
Max W/sf
Avg W/sf

0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0
VA/sf or W/sf

0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0
Time
Understanding the Needs
Research Projects

Academic Links - Environmental Design, Engineering, Environmental sciences
Start Right
Design Team Selection

Clearly state intent in the Request for Proposal

“Demonstrated ability to design exemplary energy efficient and environmentally friendly buildings in an integrated design process.”

Use the selection process to verify ability in the integrated design process and confirm technical knowledge

Seek out the individuals in firms that will create internal drive

Describe the specifics of University support
# Start Right
## Design Team Selection

<table>
<thead>
<tr>
<th>Item (Note 1)</th>
<th>Description</th>
<th>UCD Baseline</th>
<th>DCD Baseline</th>
<th>Responsiblity</th>
<th>University</th>
<th>Design Professional</th>
<th>Contract</th>
<th>Phase when documentation is provided</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUSTAINABLE SITES</strong></td>
<td>Create and implement an Erosion and Sedimentation Control Plan, specific to the site that conforms to the 2003 United States Environmental Protection Agency (EPA) Construction General Permit (No. EPA 03R92005 Ch.3) OR local erosion and sedimentation control standards and codes, whichever is more stringent.</td>
<td>Y</td>
<td>U</td>
<td>CA, CD</td>
<td></td>
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</tr>
<tr>
<td>SS 4.1 - Alternative Transportation: Public Transportation Access</td>
<td>Locate project within 1/4 mile of one or more stops for two or more public or campus bus lines usable by building occupants.</td>
<td>1</td>
<td>U</td>
<td>DPF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bus service area map</td>
</tr>
<tr>
<td>SS 4.2 - Alternative Transportation: Bicycle Storage &amp; Changing Rooms</td>
<td>Provide secure bicycle racks and/or storage (within 200 yards of a building entrance) for 5% or more of all building users (measured at peak periods) AND provide shower and changing facilities in the building, or within 200 yards of a building entrance, for 0.5% of Full-Time Equivalent (FTE) occupants.</td>
<td>1</td>
<td>U, DP</td>
<td>DPF, CD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>University provides occupancy calculation. Reference site plan floor plan showing bike storage and showers.</td>
</tr>
<tr>
<td>SS 4.3 - Alternative Transportation: Low Emission &amp; Fuel Efficient Vehicles</td>
<td>Provide low-emitting and fuel-efficient vehicles for 3% of Full Time Equivalent occupants and provide preferred parking for these vehicles, OR provide preferred parking for low-emitting and fuel efficient vehicles for 3% of the total vehicle parking capacity of the site, OR install alternative-fuel refueling stations for 3% of the total vehicle parking capacity of the site.</td>
<td>1</td>
<td>U</td>
<td>DPF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>University report on bus ridership</td>
</tr>
</tbody>
</table>
Start Right
Programming

Avoid defaults or standard practice “rules of thumb.” Seek key data from existing or comparative uses.

Explicitly state desired change and expansion potential factors (plant, distribution, terminal).

Validate cost model choices and describe assumptions.

Integrate green building goals into functional program description.
Design Integration

Involve the whole team in design choices.

Seek design solutions at all levels that satisfy at least three needs.

- Drainage and Landscape Feature
- Pedestrian Spine, Fire Lane and Assembly Space
- Landscaping, Air intake Pre-cooling, Building Shading
Design
Integration

Structure – wearing surface, thermal mass

Skin – daylight fixture, ventilator, thermal interface
Design Integration

Ceilings, transoms and lightshelves – light fixture, glare control, scale device
Design

Wise resource use

Make decisions hierarchically. Fundamental decisions deserve more research.

   - Occupant needs - system choices - subsystems - detailing

Integrate cost control into the design process. Cost/value choices are fundamental to design. System characteristics are key.

Support decisions and avoid redesign with good research such as Life Cycle Cost Analysis and energy modeling.

Make “right-sizing” automatic by providing reference data and conscientiously choosing expansion potential and safety factors.
Finish Well
Construction Documents and Construction

Watch the last 5% - phasing, sequencing and details

Avoid bid alternates that “add on” sustainable design systems or features.

Avoid passing substantial responsibility for sustainable design performance to the contractor in areas that they do not have significant control over.

Explain specific expectations and process during the pre-bid process and show the level of the University’s support to their efforts.
Results
Intentional Buildings

Research-supported programming and the integrated design process are the most effective ways to deliver green buildings.