



■ Estimating for Green Design

Dekker/Perich/Sabatini

Jaynes Corporation

October 2008

How much does green/LEED design add to the cost of construction, and how can project teams best estimate these costs and benefits in advance?

- Typical soft costs
- Items priced by GC
- Material selections & cost impact
- Pricing challenges
- Pricing methods
- Case studies – quantifiable costs and benefits

■ Overview

Dekker/Perich/Sabatini

Jaynes Corporation

October 2008

- **Project Experience:**
 - First costs ranging from 0.5% to 5% premium
 - Payback ranging from 2 years to never
 - Public bid, design assist, design-build, fast-track
 - In-house estimates, professional estimators, contractors
- **Lessons Learned:**
 - Similar to estimating costs for any other type of project
 - Need to estimate/manage first costs
 - Need to factor in life cycle costs, payback periods
- **Numbers in this presentation are from different years, project scales, and locations: ROUGH GUIDELINE ONLY**

 Overview

Recent numbers from local projects:

- **Commissioning Agents**
 - \$0.80- \$1.10/sf for enhanced, depending on size and complexity
 - 0.4% - 0.5% of total construction cost
- **LEED management**
 - \$30,000 to \$60,000 for most projects
 - Depends on team experience and project complexity

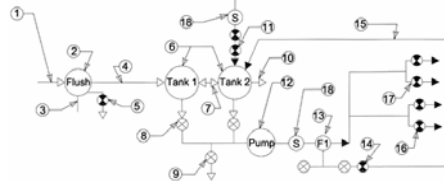
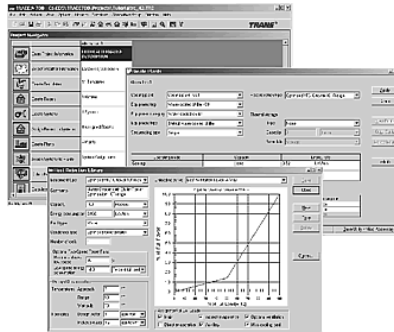


MY ACTION ITEMS		POTENTIAL LEED RATING	
<p>Display the next steps for the project. Depending on your project role, the project status and number of points anticipated or awarded, different action items will appear.</p> <ul style="list-style-type: none"> • Red items not completed and strongly visible. • To attempt credits, assign them to a member of your project team. 		<p>Display LEED level which is based on number of points attempted.</p> <p>  </p> <p>This Project has attempted enough points for Gold Rating.</p>	
<p>Points Documented: Tenants & use Justifications Points Available: 79</p>			
01	Prerequisite 1: Construction Activity Pollution Prevention	Cost Engineer	Attempted 0
02	Prerequisite 2: Environmental Site Assessment	Project Manager	Attempted 0
03	Credit 1: Site Selection	Cost Engineer	Attempted 1
04	Credit 2: Development Density & Community Connectivity	---Credit Not Attempted---	1
05	Credit 3: Brownfield Redevelopment	Owner	Attempted 1
06	Credit 4.1: Alternative Transportation: Public Transportation Access	---Credit Not Attempted---	1

 Typical Soft Costs

Recent numbers from local projects:

- Energy modeling
 - From \$4,000 to \$15,000 for most projects
 - Depends on team experience and project complexity
- Other
 - Daylight, acoustics, consultant documentation, cistern design, etc.



Typical Soft Costs

Dekker/Perich/Sabatini

Jaynes Corporation

October 2008

- Construction waste recycling
 - Cost varies by project
 - Need to educate local companies and get local pricing

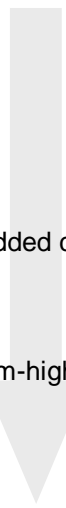



Items priced by GC

Dekker/Perich/Sabatini




Jaynes Corporation


October 2008

<p>No added cost</p>  <p>Low added cost</p> <p>Medium-high added cost</p>	<ul style="list-style-type: none"> • Aluminum with recycled content • Steel with recycled content • Reflective roof membrane • Things that are always regional (concrete, asphalt, rock mulch) <ul style="list-style-type: none"> • Low-emitting carpet with recycled content • Low-emitting materials <ul style="list-style-type: none"> • Pervious paving • Cistern water harvesting • Rapidly renewable materials • Certified wood
--	---

 Material Strategies – Cost Impact

Dekker/Perich/Sabatini Jaynes Corporation October 2008

<ul style="list-style-type: none"> • Recycled content <ul style="list-style-type: none"> – All major aluminum manufacturers: no cost – Steel (structural, studs, etc.) has it anyway – Some products add cost (\$1/sf for VCT with recycled content, upcharge for toilet compartments, etc.) • Reflective roof membrane <ul style="list-style-type: none"> – All major manufacturers have compliant membranes – May be limitations/costs for other types of roofs • Low-emitting materials <ul style="list-style-type: none"> – Carpet, paint, etc. is often no added cost – Wood products often a slight premium – Armstrong wood ceilings – 15% upcharge for uf-free 	  
--	---

 Material Strategies – Cost Impact

Dekker/Perich/Sabatini Jaynes Corporation October 2008

- Rapidly renewable materials
 - If need linoleum flooring for other reasons, no additional cost
 - Agrifiber casework has a premium, ranges in cost
 - Agrifiber doors (also uf-free) maybe 10-15% premium
- Certified wood
 - Premium keeps changing on doors, casework materials, etc.
- Pervious paving
 - Premium compared to asphalt, keeps changing
- Cistern water harvesting
 - Project-specific, may be significant
 - \$80,000 to \$110,000 for 30,000 to 50,000 gallons



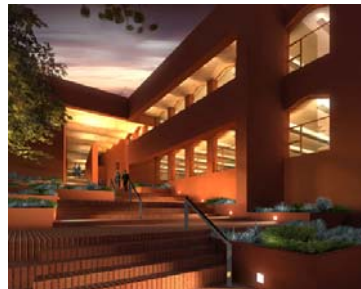
Material Strategies – Cost Impact

Dekker/Perich/Sabatini

Jaynes Corporation

October 2008

- “Adding LEED” to a design is the least effective way to get a sustainable building... but the easiest way to price the premium
- Integrated design – what is the comparison?
 - What would be done anyway?
 - Typical practice? Client requirements?
- Public bid projects
 - Balancing the spec to get the correct material, while allowing for options
 - Bid market fluctuations
 - Subcontractor LEED savviness is unknown



Pricing Challenges

Dekker/Perich/Sabatini

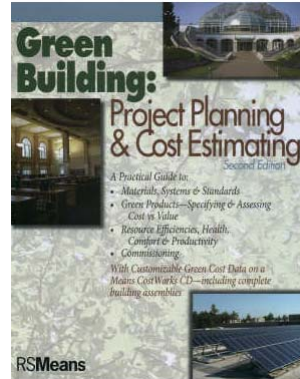
Jaynes Corporation

October 2008

- Design/Build or Design Assist
 - Contractor provides pricing
 - Experience team can educate contractor
 - Price locked in, little uncertainty

- Design – Bid- Build
 - Estimator or rep provides pricing
 - Uncertainty vs competition

- Publications
 - Green Building: Project Planning & Cost Estimating
 - 300 assemblies (systems, green roofs, gray water, etc.) and 7,000 unit prices
 - USGBC and independent studies



 Pricing Methods/Sources

Dekker/Perich/Sabatini

Jaynes Corporation

October 2008

- Translate LEED requirements
 - Don't say "achieve credit SSc4.3"
 - Hybrid parking credit = 28 extra pole signs = \$4,160 add
 - Outdoor air monitoring = 2 CO2 sensors = \$1,250 add
 - 22 doors with no urea formaldehyde instead of typical PC core
 - Allow options – uf-free wood, agrifiber, etc.
 - 12 pint urinals instead of 1gpf urinals

- Relate material credits to Div 2-10 cost
 - Total cost of Div 2-10 * 45% = LEED default material cost
 - 10% of this = recycled threshold, 2.5% of this = renewable threshold
 - Use to compare effect: linoleum vs VCT with recycled content

 Pricing Methods/Sources

Dekker/Perich/Sabatini

Jaynes Corporation

October 2008

- Variability
 - Reflective roof
 - \$0 additional on NM commercial projects: assume TPO
 - Additional on LV commercial projects: assume built-up
 - Increased Ventilation
 - \$0 additional on projects with evaporative cooling
 - \$1.5M additional on a 4-pipe system
 - MERV 13 filters
 - May require different system (if packaged RTU, heat pump, etc.)
 - May vary depending on # units: \$1,000 for 2 RTU filters, \$25,000 for 70 classroom terminal unit filters
 - Construction waste
 - May be \$0 in a large city and \$35,000 in a remote area

 Pricing Methods/Sources

- **What is possible in terms of performance?**
 - Energy 0-45%
 - Water 0-53%
 - Should be able to aim higher going forward...
- **What about cost and payback?**
 - Rio Rancho Schools
 - 1.3% premium, 2 year payback
 - Jefferson Green
 - 5% premium, 5 year payback
 - 0.70/sf/yr utility costs (\$2 avg)
 - 7 kWh/sf/yr electrical usage (17 avg)
- **Incentives?**
 - Federal Tax deduction: up to \$1.80/sf
 - State Tax credit: depends on size and LEED level
 - Ways to leverage these for owner and team benefit...



 Overall Cost and Performance

- Not very different from any other estimating
 - Need to quantify, not generalize
 - Numbers like cost/sf, % premium, % for next level are vast generalizations
 - Need to compare alternatives for premium
 - Toughest part is defining a realistic baseline

- Don't make the first cost the whole story:
 - Life cycle costing: operating cost, replacement timeline
 - Projects with lowest first cost/minimal system investment may never pay back
 - Maintenance required
 - Linoleum first cost is higher than VCT, but pays back in 1-12 months due to no stripping and waxing

Conclusions