



Puzzling Out Green Affordable Housing

Ann Arbor, MI

November 21/22, 2005

Student Notes and Handouts

Lead Trainer:

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AGENDA

STUDENT NOTES AND HANDOUTS BY UNIT

GREEN BUILDING FACT SHEETS

ADDITIONAL LOCAL INFORMATION AND OTHER INSERTS

This Resource Kit includes support materials for the “Puzzling Out Green Affordable Housing” Workshop. It is yours to keep as a reference and as a place to store additional resources to help you green your own housing developments.

- Any presentation hard copies and your notes can be stored here for review after the workshop.
- Handouts and worksheets for Unit Exercises are included at the end of each Unit tab.
- The Green Building Fact Sheets provide useful background information on green building strategies, along with references and resources for you to find more detailed information as you apply what you learn in this workshop.
- Additional case studies and other inserts may be provided by your instructors and any guest presenters in the last section of the binder.



Agenda

Day One

- 8.30am Registration
- 9.00 Introductions and warm-up
- 9.30 Green Building – Better for Everyone
- Overview -** Alistair Jackson – (20 mins)
A brief overview of the principles and intent of Green Building
 - The Big Picture -** Dave Konkle – (30 mins)
A look at global energy issues; the drivers of change
 - Local perspective -** Jason Bing – (20 mins)
Local green building initiative
 - John Barrie – (30 mins)
Maple View Project & Local innovation
 - Manage the Message -** Alistair Jackson – (20 mins)
- 11.30pm Discussion
- 12.00pm LUNCH
- 1.00 Site selection and development – the importance of place (including a short break)
- 2.30 Energy Efficiency and Conservation
- Including **Sean Reed**, City of Ann Arbor energy specialist, on affordable energy efficiency best practices in Washtenaw County (45 minutes)
- 4.30 Debrief Day One
- 4.45 Adjourn

Day Two

- 8.30am Review
- 9.00 Indoor Water Conservation
- 9.45 Indoor Air Quality
- Including **Sandy Santoro**, Washtenaw Green Building Coalition, on affordable indoor air quality best practices in Washtenaw County (30 minutes)
- 11.00 Materials choices for health and resource efficiency
- 12.00pm LUNCH
- 1.00 Sustainable Design Process
- 2.30 Operations & Maintenance
- 3.30 Synthesis and Debrief
- 4.00 Adjourn



Section 1: Student Notes and Handouts

- Presentation Handouts
- Store any notes you take here for review after the workshop.
- Handouts and worksheets for Unit Exercises are included in this section.



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EXERCISE HANDOUT: Energy conservation and efficiency

Task: Students break up into groups to explore and select envelope improvement choices to include in a 30 year old urban, multi-family rehab project. Project is located in your local market; consider heating and cooling loads.

Time allocated: Approximately 20 minutes.

Resources: Envelope Improvement options (See table below. These are fabricated numbers and should not be considered reliable cost or payback information)

Instructions: You have \$200,000 to spend. Select envelope improvement options for your rehab project, weighing costs against lifecycle savings, maintenance and replacement reserve impacts, etc. Use a flip chart and be prepared to give 2 minute presentations back to the class on your selections.

Feature	Description	Cost Estimate	Estimated simple payback (will vary by location)
Upgrade windows	Replace existing 30 year old, aluminum-framed, double-glazed windows - slide opening, with low-E, argon filled double glazed, double hung windows	\$150,000	20 years
Air-sealing	Perform envelope infiltration tests and seal all penetrations in envelope and between apartments and common areas	\$40,000	6 years
Wall insulation upgrade	Add rigid foam insulation to R- 23, from existing R-19	\$110,000	12 years
Roof insulation upgrade	Add roof insulation to R-48 from existing R-30	\$60,000	8 years
Exterior shading on south-facing windows	Add exterior shading to protect south-facing windows from high-elevation sun	\$30,000	Unknown



EXERCISE HANDOUT: Operations & Maintenance

Task: Develop an Operations and Maintenance Plan for the sample development

Time allocated: Approximately 20 minutes plus presentation time

Resources: Rebuild America Case Study: Riverwalk Point
Riverwalk Point Living Green Manual

Instructions: In your groups, review the Resources. Imagine you are the developers of a project similar to Riverwalk Point in design, equipment specifications, etc., but located in your region and climatic conditions.

Create an Operations and Maintenance plan to ensure that the design intent of your project is preserved over the full lifecycle of the development.

Nominate a “scribe” to write up your plan on flip chart paper, and one or two members of your group to make a **2 minute presentation** of your plan to the class.

- Consider what resources you will need to ensure that management, maintenance staff and residents will maintain and operate the development appropriately.
- How and when will these resources be developed and updated?
- How will you ensure the plan is being followed?
- What innovative approaches can you take to improve the performance of your property and the well-being of your residents over the long-term?



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EXERCISE HANDOUT:

Materials

Task:

Analyze and compare the lifecycle costs of the following flooring options using the calculator provided

Time allocated:

Approximately 20 minutes

Resources:

Cost data for Nylon 6 carpet, cork floor tiles and bamboo flooring (attached)
Cost Calculator Matrix

Instructions:

Enter cost data for the floor covering alternatives and compare lifecycle costs. Assume you are looking at flooring a 400 sqft room in a building with an expected service life of 40 years.

Cost Data

	Nylon 6 Carpet	Cork Floor Tiles	Bamboo
Installed cost per sqft	\$1.50	\$3.25	\$5.50
Average service life	10 years	40 yrs	50 yrs
Disposal costs	\$0.10 sqft (based on \$85/ton disposal, 2 hrs labor @ \$25/hour total cost)	\$0.25 (based on \$0 for recycling, 4 hrs labor @ \$25/hr total cost)	\$0.25 (based on \$0 for recycling, 4 hrs labor @ \$25/hr total cost)
Annual maintenance costs (per sq ft)	\$0.10 (1 annual deep cleaning)	\$0.05 (buffing as required)	\$0.05 (buffing as required)



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COST CALCULATOR

<u>Criteria</u>	<u>Description</u>	<u>Unit</u>	<u>Enter Value for Alternative</u>	<u>Calculation</u>	<u>Total for Alternative</u>
1 First cost	What is the purchase price of the alternative including installation (per sqft)	\$/sqft		Unit cost X 400 sqft	
2 Disposal cost	What is the anticipated cost to remove and dispose of this alternative at the end of its service life? (per sqft)	\$/sqft		Unit cost X 400 sqft	
3 Length of service	What is the anticipated useful life of the alternative?	years			
4 Annualized cost of purchase and disposal	Total cost of purchase and disposal, divided by anticipated service life	\$/yr		(Line 1 + Line 2)/ Line 3	
5 Maintenance	staff hours x pay rate	\$/yr		Unit cost X 400 sqft	
6 Total Annual Cost of ownership	Purchase, maintenance and disposal costs	\$		Line 4 + Line 5	



Section 2: Green Building Fact Sheets

- These Green Building Fact Sheets provide useful background information on green building strategies, along with references and resources for you to find more detailed information as you apply what you learn in this workshop.



Section 3: Additional Case Studies and Other Inserts

- Additional case studies and other inserts may be provided by your instructors and any guest presenters in this section of the binder.



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Personal Action Plan for _____

What are the three things I've learned in this workshop that can most help me in my role?

- 1.
- 2.
- 3.

What are the most important things I can do with this information?

- 1.
- 2.
- 3.

What action do I commit to take on each item, and by when?

- 1.
- 2.
- 3.

Signed: _____



Action	SeaGreen	Enterprise Green Communities	LEED Home
Integrated Design – Multi-disciplinary design team	X	X	X
Rehabs – deconstruction and salvage survey, lead, asbestos abatement	X		
Integrated Design – CDs include all planned/required green actions	X	X	
Smart Site Location – Infill or existing infrastructure		X	X
Smart Site – No sensitive sites (wetlands, farmland, steep slopes, floodplain etc.)		X	X
Smart Site – walking access to community and retail services		X	
Walkable, accessible neighborhoods – sidewalks and interconnections		X	
Provide secure bicycle storage	X		
Compact Development – SF - 6 upa, TH – 10 upa, Apts – 15 upa		X	
Environmental Remediation – Phase 1 ESA	X	X	
Erosion and Sedimentation Control – EPA BMPs	X	X	
Water Usage – Natives	X	X	
Water usage – Efficient or Reclaimed irrigation	X	X	X
Water Usage – Low flow fixtures	X	X	
Energy Star or HERS – 86 (or rehab – 10 yr payback strategies)		X	X
Document envelope improvements >10% beyond code	X		
Install accurate thermostats throughout	X		



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Ducts inside conditioned space or insulated to wall std or better	X		
Individual or sub-metering (except zero bedroom dwelling units)		X	
Energy Star labeled appliances and lighting	X	X	X
Daylight Sensors on outdoor lights - efficient lamps	X	X	
Air leakage test - ≤ 0.35 ACH/50	X		X
Duct leakage - $\leq 6\%$ of total flow	X		X
Select systems using LCCA	X		
		X	
Composite wood with no added formaldehyde		X	
CRI Green label carpet		X	
Low toxic/low VOC paints and coatings		X	
Bath fans vent to outside with humidistat, timer or low-speed control	XS	X	X
Kitchen hoods vent to outside	X	X	X
Avoid mold - no vinyl wallpaper or unsealed grout		X	
Insulate cold water pipes to prevent condensation problems		X	
Avoid moisture problems - tankless water heaters or proper drain for overflow and leaks		X	
Moisture resistant materials in tub/shower enclosures		X	
Size HVAC to prevent short-cycling and provide adequate dehumidification		X	
Proper drainage down to lowest level of concrete and vapor barriers under slabs		X	X
Surface drainage of water away from foundation	X	X	X
Ventilate under any floor slabs in Radon Zone 1		X	X
Fan with CO sensor in any enclosed garage space		X	



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Isolate garage			X
Adequate ventilation – 15cfm fresh air per occupant		X	X
Combustion Safety – Direct or power-vented exhaust			X
Combustion safety – fireplaces with outside air supply			X
Ventilation – Protect AHUs and ducts during construction			X
Interzonal pressure balance , 3 pascals	X		X
Use at least medium efficiency washable pleated filters	X		
Materials – Durable choices			X
Least toxic decay-resistant materials	X		
Construction Waste – 50% diversion –	80% subs to participate		X
No tropical hardwoods			X
Flyash in concrete, recycled aggregate	X		
Educate building owners/managers about intent to include green features, and their proper use and maintenance	X	X	
Green Home Guide for residents	X	X	X
Landscape O&M Plan	X		X
Ventilated storage area for chemicals and paints	X		