Rating Low Rise Multi-family Buildings

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Energy Star Labeled Homes

MaGrann Associates has labeled approximately 2500 multi-family units over the past 6 years.

New Jersey Case Study

- Applying the multi-family rating guidelines.
- Two Buildings originally rated as individual units
  - Re-rated as whole buildings for this study
- Gas & electric utility usage data obtained for each unit
  - Usages normalized for thirty year average weather

Inspections

- Every unit is inspected at the pre-drywall stage.
  - Installed components
  - Building shell sealing
  - Duct sealing

- Every unit is inspected at the finished home stage.
  - HVAC equipment
  - Blower door test
  - Duct Blaster test

Blower Door Testing

- Begin planning for blower door testing strategy at the rating from plans stage.
  - Unit by unit testing, or
  - How building may be sectionalized to test multiple units.
  - Number of blower doors needed.
  - Potential problems (i.e. elevators, plumbing shafts, etc.).
- Reinforce the blower door strategy at pre-drywall inspection.
- Testing of first building will set precedence for testing of similar buildings within the development.

Air Sealing

- Air sealing of partition walls is critical to reduce total building infiltration.

Moisture Management

- Water intrusion
- Mechanical Ventilation

Case Study Building #1

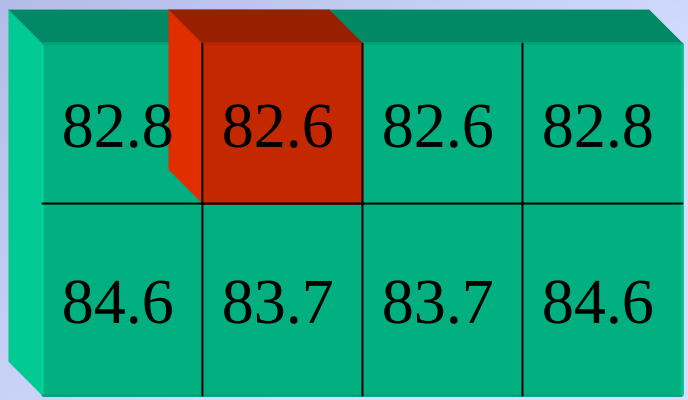
- Affordable Housing Apartments
- 6676 sq. ft.
- 4 units over 4
- Separate entrances
- Individual:
  - Heating
  - Cooling
  - Water Heating

Rating From Plans

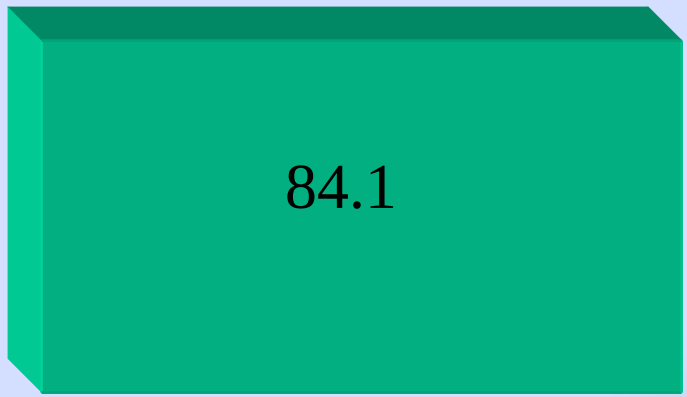
- Upgrades are based on worst case model
  - Unit by unit
    - 4 model types
  - Whole building
    - 1 building type

Proposed Ratings From Plans and Specs

Unit by Unit.



Whole Building



Proposed Upgrades

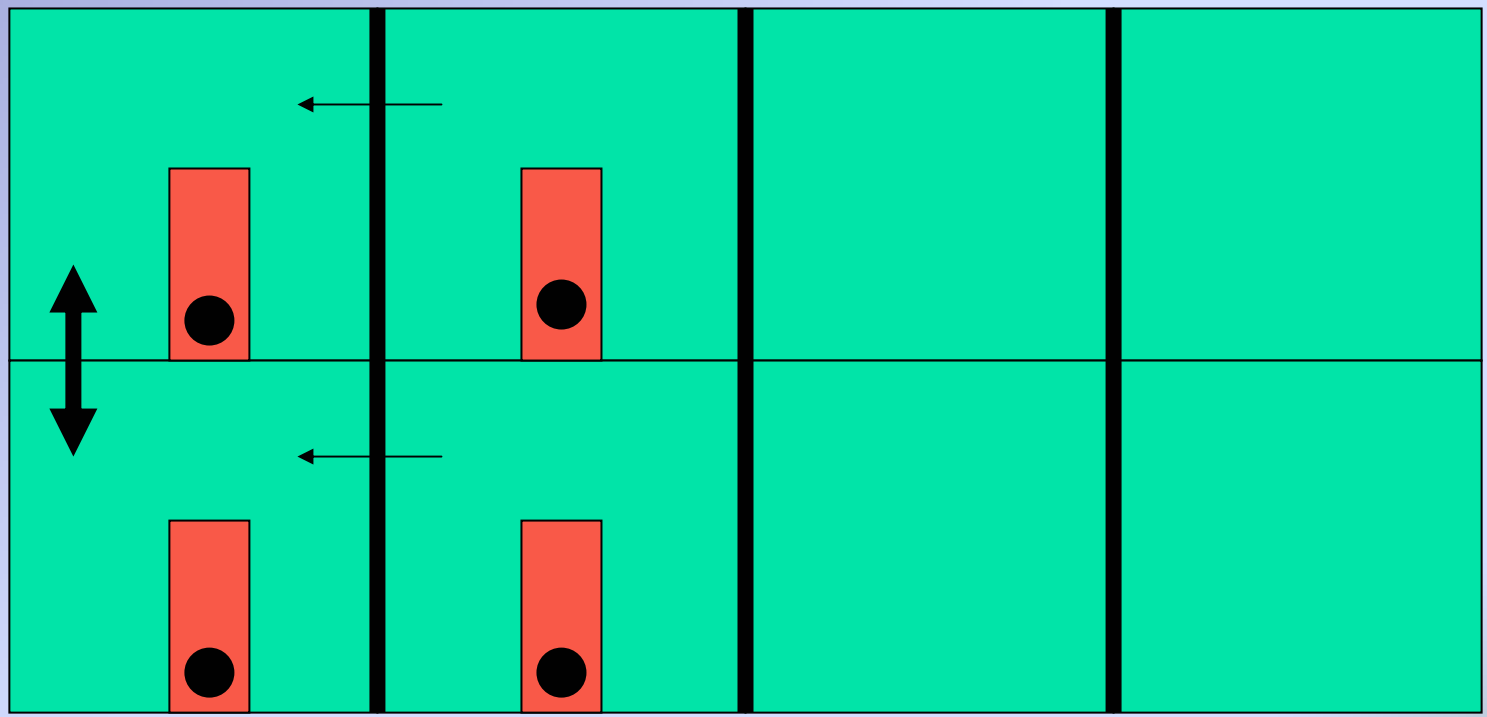
Based on unit by unit rating

Components:

Ceilings	R-30 batts
Walls	R-13 batts
Slab	R-5
Windows	U:0.53/ SHGC:0.54
Heat	92.6 AFUE/ Natural Gas Furnace
Cooling	13 SEER
Water Heater	.62 Energy Factor / Natural Gas
Control	Programmable Thermostat

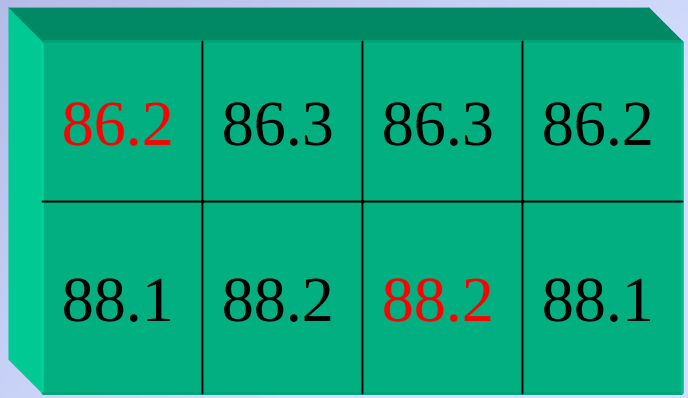
Testing of Building #1

- Major leakage path between floors.
  - Minor leakage at partition walls



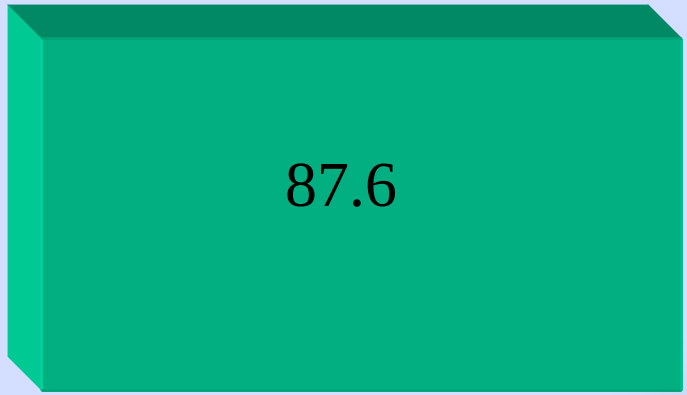
Final Rating Scores

Unit by Unit



128 Final Ratings for the project

Whole Building



16 Final Ratings

Whole Building Utility Billing Comparison

		HERS Reference	HERS Rating	Weather Adjusted Usages
Heating & W/H	Therms	3657	2598	2898
	Reduction		29.0%	20.8%
Cooling	Kwh	10496	4926	5154
	Reduction		53.1%	50.9%

Case Study Building #2

- Upscale Luxury Apartments
- 15944 sq. ft.
- 8 units over 8
- Separate entrances
- Individual:
  - Integrated Heating/ water heating
  - Cooling

Rating From Plans

- Upgrades are based on worst case model
  - Unit by unit
    - 6 model types / 3 variations of each
  - Whole building
    - 2 building types

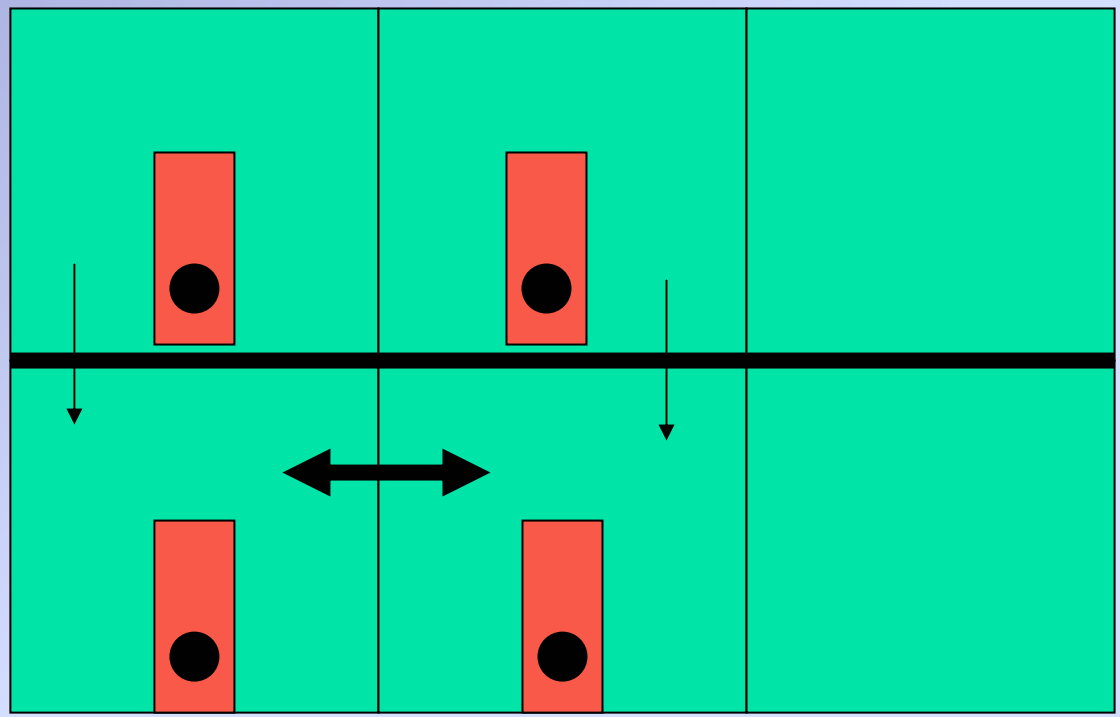
Proposed Upgrades

Components :

Ceilings	R-30 cellulous over ducts
Walls	R-13 batts
Slab	R-10
Windows	U:0.34/ SHGC:0.38
Heat/ water heating	80 CAFUE/ 0.62 CAEF
Cooling	12 SEER
Control	Programmable Thermostat

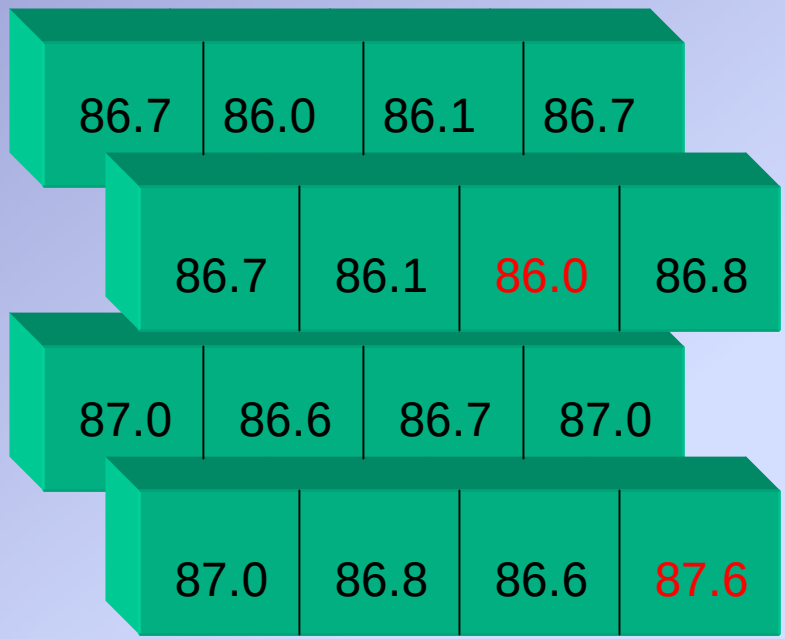
Testing of Building #2

- Major leakage paths at partition walls
  - Minor leakage between floors



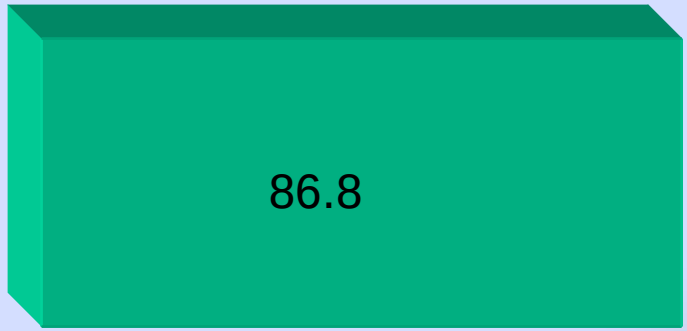
Final Rating Scores

Unit by Unit



400 Final Ratings for the project

Whole Building



20 Final Ratings

Whole Building Utility Billing Comparison

		HERS Reference	HERS Rating	Weather Adjusted Usages
Heating	Therms	8976	5520	5834
	Reduction		38.5%	35.0%
Cooling	Kwh	19642	8390	8160
	Reduction		57.3%	58.5%

Conclusions

- Benefits
  - Takeoffs and Ratings require less time
  - Avoids excessive upgrades that are based on worst case unit
- Drawbacks
  - Sizing of individual unit heating and air conditioning equipment

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Thank You!