

URBAN CONNECTIONS

Twelve West

The building, which opened in 2009, has taken the city by storm. It's a mix of housing and office space, with a focus on high-quality parking. All other buildings in the area are either parking lots or parking structures, offering only a few parking spaces. The building's design includes a central courtyard, a green roof, and a series of solar panels that generate energy for the building's systems. The building's design also includes a series of solar panels that generate energy for the building's systems.

Creating a Connection

The building's design is a mix of housing and office space, with a focus on high-quality parking. All other buildings in the area are either parking lots or parking structures, offering only a few parking spaces. The building's design includes a central courtyard, a green roof, and a series of solar panels that generate energy for the building's systems.

National Journal
WINNER: EXPANDING EXPORTS

How One Green City Is Going Global

Portland, Ore., realized that its brand—a modern and hyper-green city—was saleable abroad. By Naureen Khan

June 13, 2013 | 2:20 p.m.

Designed by ZGF; Indigo 12 West in Portland. (Courtesy of ZGF Architects)

JERRY YUDELSON | ULF MEYER

THE WORLD'S GREENEST BUILDINGS

PROMISE VERSUS PERFORMANCE IN SUSTAINABLE DESIGN

Foreword by Professor Alison G. Kwok

RAMONA APARTMENTS SITE

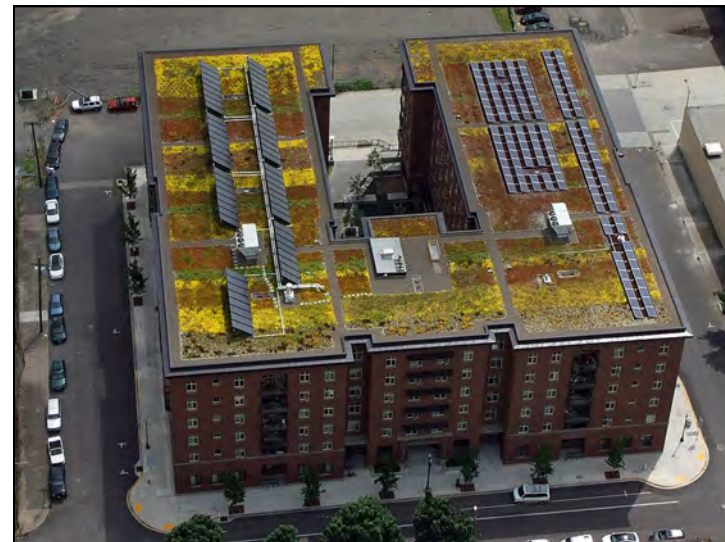
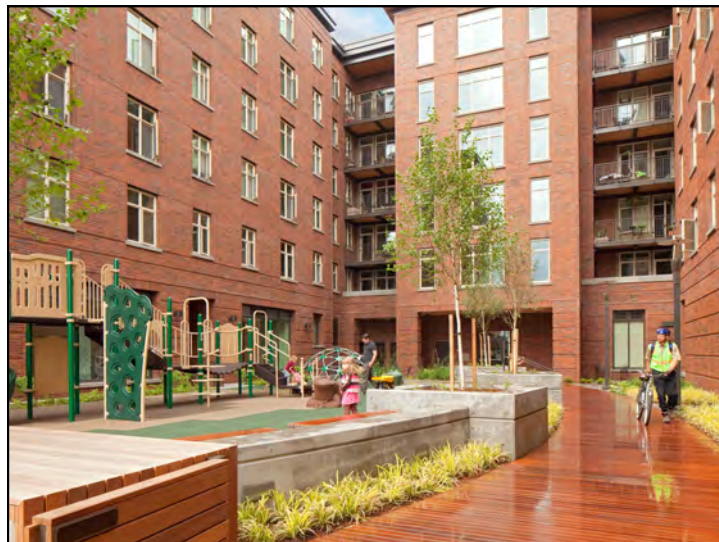
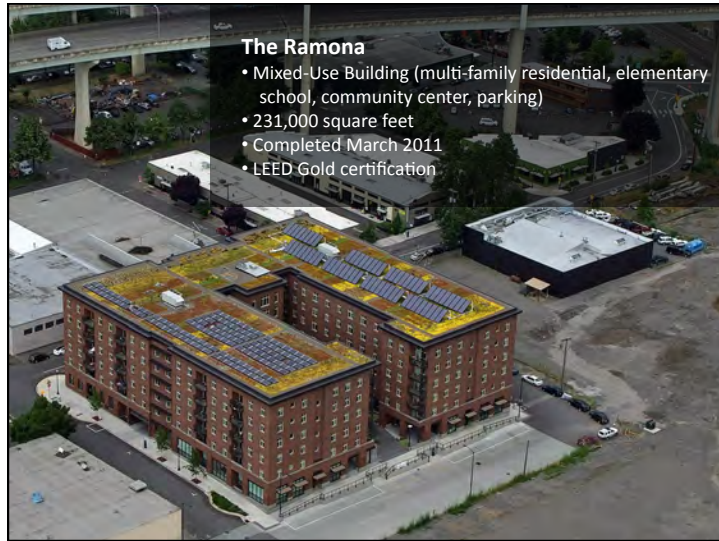
TWELVE WEST SITE

PEARL DISTRICT

DOWNTOWN PORTLAND

WILLAMETTE RIVER

KEY
PARKS
SAFEBWAY
SITE



Tale of Two Buildings		
Portland, Oregon		
Metrics	Twelve West	Ramona
Total Gross Square Footage	536,438 sf	230,760 sf
Residential Sq. Footage (% of total)	313,000 sf (59%)	167,655 sf (73%)
Commercial Sq. Footage (% of total)	98,911 sf (18%)	14,555 sf (6%)
Parking (% of total)	124,527 sf (23%)	48,550 sf (21%)
2030 Challenge Benchmark	39.5	23.0
Total Energy Use (Predicted Site EUI: kBtu/sf/yr)	33.8	22.9
Comparison of Predicted Use with Benchmark	14% lower	0.4% lower
Total Energy Use (Actual Site EUI: kBtu/sf/yr)	43.7	19.6*
Electricity	21.8	13.9*
Gas	11.6	5.7
Chilled Water	11.5	N.A.
Comparison of Actual Use with Benchmark	11% higher	15% lower
Total Energy Savings from National Average EUI for Building Type	56%	67%
Construction Cost (per Gross Square Footage)	\$97 million (\$181/sf)	\$29 million (\$127/sf)



Mike Steffen

From: Ed McNamara [ed@turtleislanddev.com]
Sent: Friday, June 20, 2008 1:27 PM
To: Mike Steffen
Subject: RE: Summer Camp / Invitations

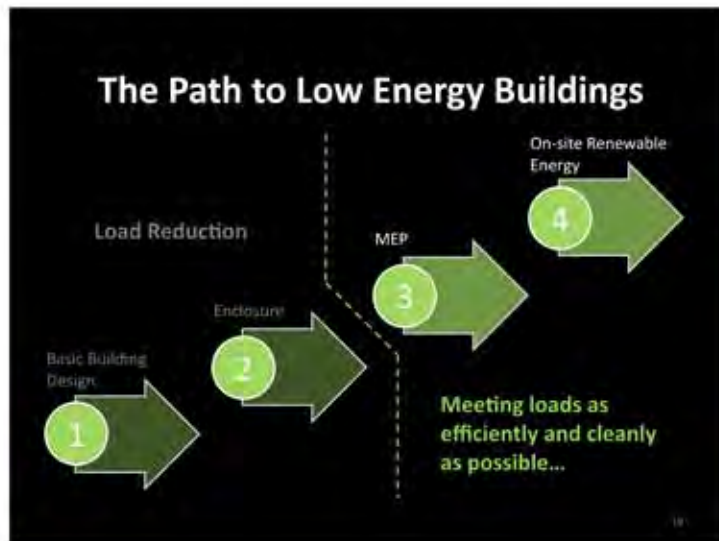
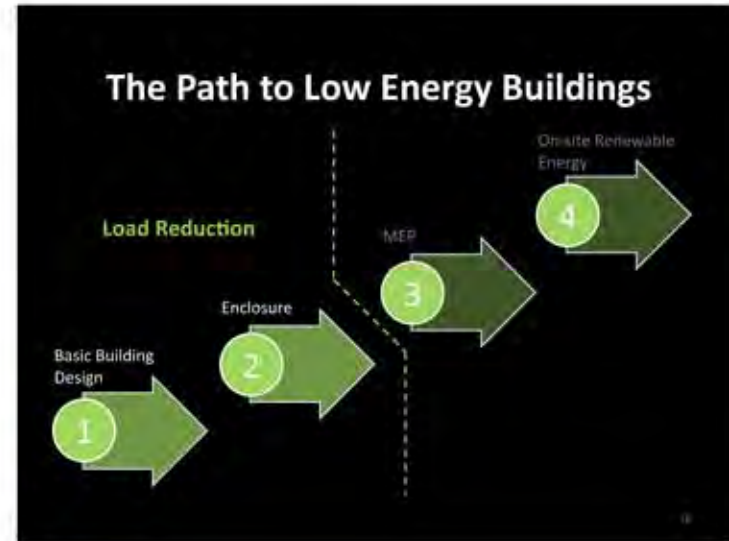
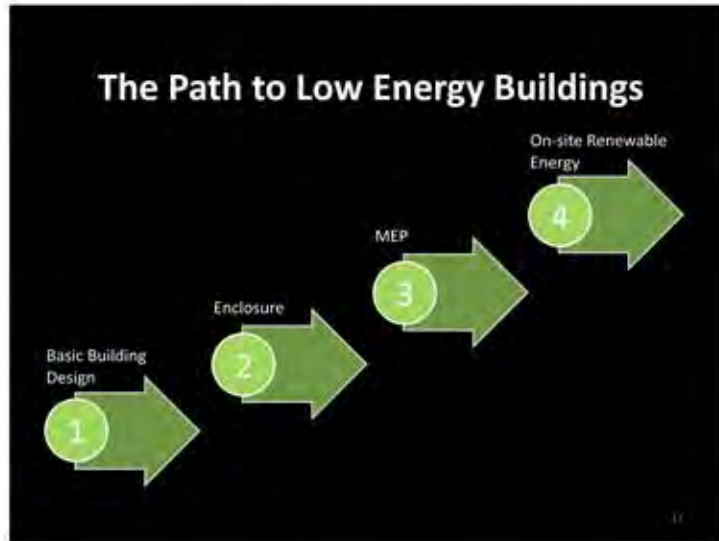
Mike -

Thanks. Got the initiation this morning.

The timing is great. Unless something really surprising happens in the next few hours, I'll be signing a contract with Ankrom next week for the next project.

Ed

Ed McNamara
 Turtle Island Development, LLC
 Phone: (503) 249-6560
 Fax: (503) 287-3272
 Mobile: (503) 314-8830



Building Form, Orientation, Expression

- Compact form and massing
- Facade design responsive to orientation
 - Larger expanses of south and west facing glass shaded by balconies or sunshading devices
- "Punched opening" facade expression
 - Well-managed WWR: 28%

A photograph of a brick building facade with balconies and windows, illustrating the building form and orientation discussed in the text.

RAMONA APARTMENTS - EARLY MASSING MODELS
OPTION 1

13' and 14' High Family Housing	3'7" Plan
Units/Floor	24 Units
SI Area	26,200 CSF
Efficiency	7
Stair	2
Core Length	137'
Floor Area - (Net Area Ratio)	29,300 SF (1,114 SF x 17' high) = 2.24
Quality of Units	Good. Front open, two main corners.
Quality of Outdoor Space	One larger and 2 smaller courtyards for food and storage use available to all units. Good landscaping.
Appearance to Site	Mid-rise. Units all 13' high, mostly. Good buffer from driveway.
Photo(s)	Pearl Court, Lincoln Square, 13' and 14' High

Source:
Ankrom Moisan

RAMONA APARTMENTS - EARLY MASSING MODELS
OPTION 2

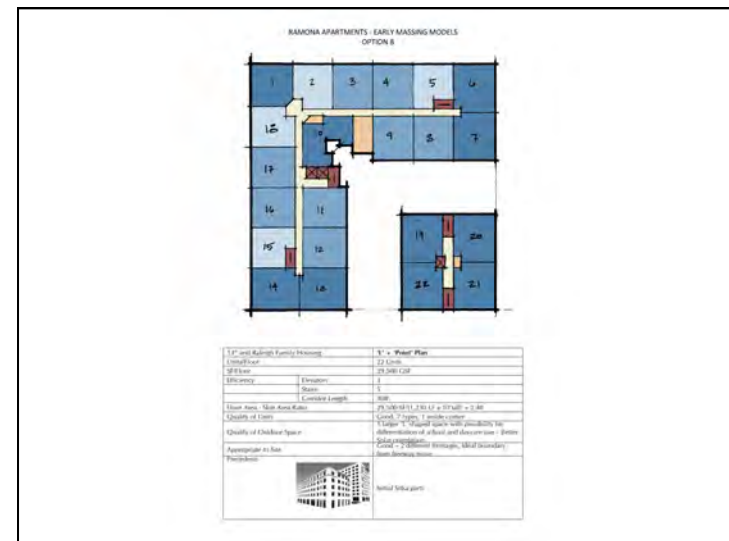
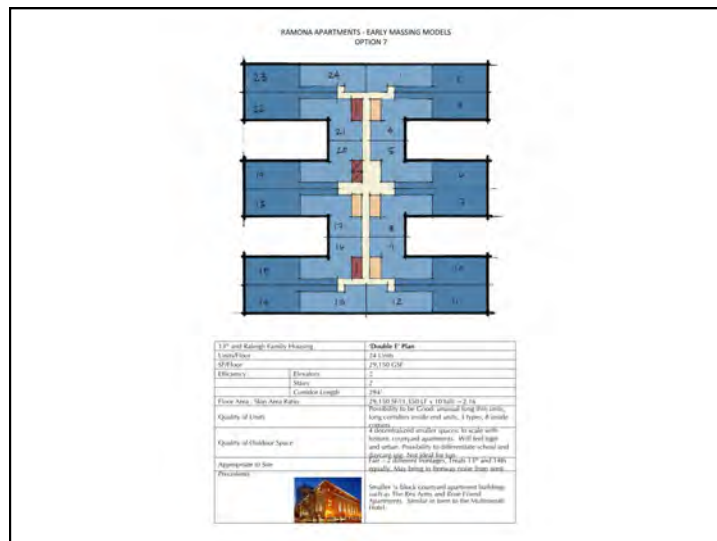
13' and 14' High Family Housing	3'7" Plan
Units/Floor	24 Units
SI Area	21,000 CSF
Efficiency	7
Stair	2 or 3
Core Length	170'
Floor Area - (Net Area Ratio)	21,000 SF (1,100 SF x 17' high) = 2.0
Quality of Units	Exp. 2 open, 2 small corners.
Quality of Outdoor Space	2 different outdoor spaces, photo-panoramic view. Possibility to differentiate for wheel and stroller use from common area. Not called for.
Appearance to Site	Mid-rise. Units mostly 13' high, mostly. Good buffer from driveway.
Photo(s)	Kismet Place

RAMONA APARTMENTS - EARLY MASSING MODELS
OPTION 3

13' and 14' High Family Housing	3'7" Plan
Units/Floor	24 Units
SI Area	26,200 CSF
Efficiency	7
Stair	2
Core Length	137'
Floor Area - (Net Area Ratio)	29,300 SF (1,114 SF x 17' high) = 2.24
Quality of Units	Good. 2 open, 2 small corners.
Quality of Outdoor Space	1 large outdoor space with panoramic view and another one which can be used for food and storage use. Good landscaping.
Appearance to Site	Mid-rise. Units all 13' high, mostly. Good buffer from driveway.
Photo(s)	Redwood Heights, Garden Place, The Lanes, Back of Commons

RAMONA APARTMENTS - EARLY MASSING MODELS
OPTION 4

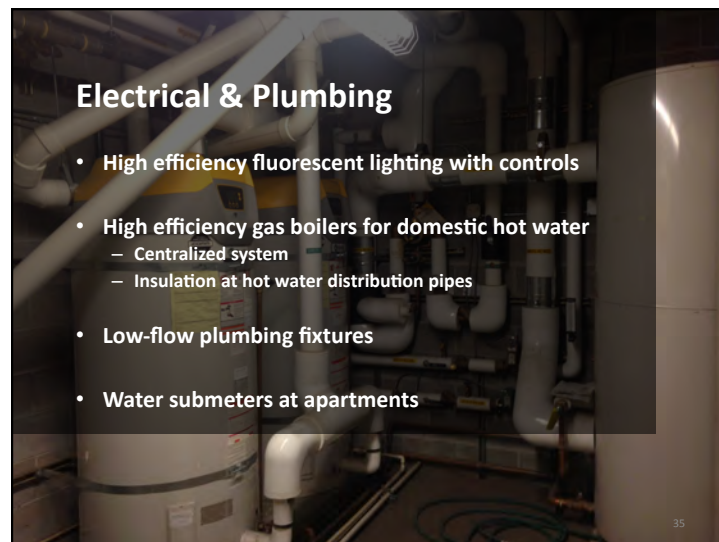
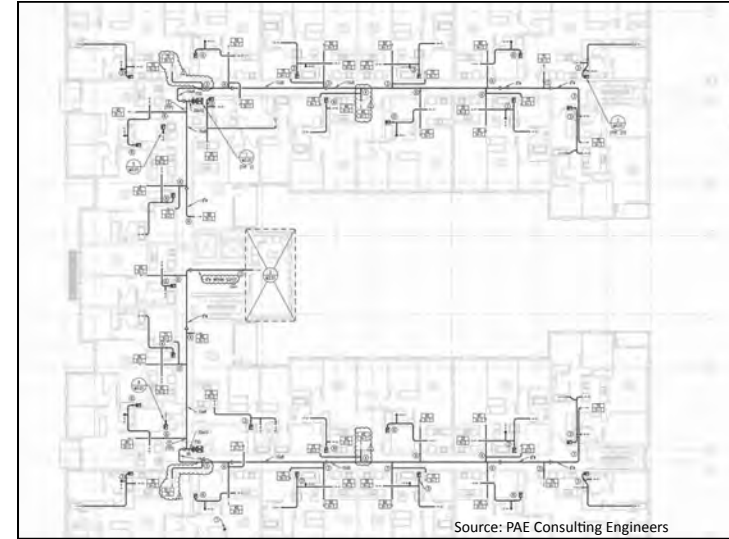
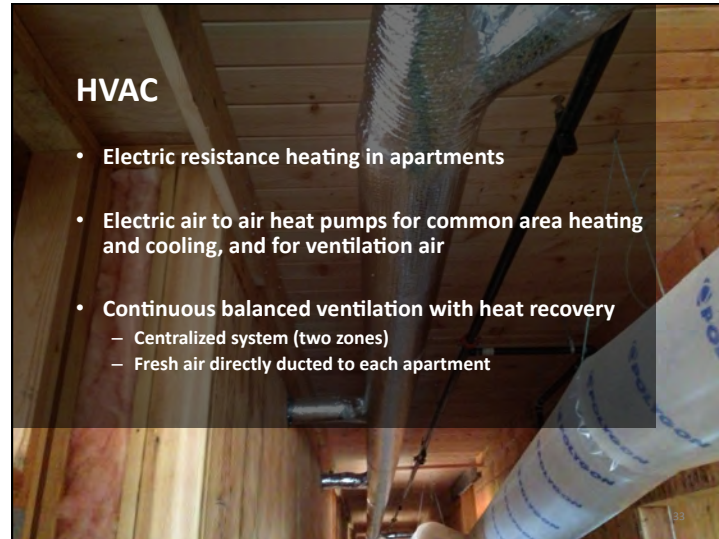
13' and 14' High Family Housing	3'7" Plan
Units/Floor	24 Units
SI Area	27,700 CSF
Efficiency	8
Stair	4
Core Length	160'
Floor Area - (Net Area Ratio)	37,300 SF (1,100 SF x 17' high) = 2.74
Quality of Units	Good. 3 open. No small corners.
Quality of Outdoor Space	2nd largest outdoor space with panoramic view of east and west ends. Possibility to differentiate wheel and stroller use from common area. Not called for.
Appearance to Site	Mid-rise. Units mostly 13' high, mostly. Good buffer from driveway.
Photo(s)	Greenway, Midway, 5'6



**RAMONA APARTMENTS
EARLY MASSING MODELS
SUMMARY STATISTICS**

Option	Shape	GSF/FL	Total Bldg. SF	FAR (40,000 SF site)	Hall SF/FL	Efficiency	Envelope Area	Fl. Area/Skin Ratio
1	O	29,500	177,000	4.43	2,600	91.2%	13,160	2.24
2	C	31,000	186,000	4.65	1,950	93.7%	11,980	2.61
3	U	30,750	184,500	4.61	2,020	93.4%	11,800	2.61
4	Double Bar	27,750	166,500	4.16	1,440	94.8%	12,800	2.17
5	H	31,500	189,000	4.73	2,050	93.5%	11,900	2.65
6	Crab	27,800	166,800	4.17	1,950	93.0%	12,900	2.16
7	Double E	29,150	174,900	4.37	1,470	95.0%	13,500	2.16
8	L + Point	29,500	177,000	4.43	1,540	94.8%	12,300	2.40







Ramona - Energy Modeling

- eQuest modeling of the design predicted energy performance 23% better than ASHRAE baseline
- **EUI = 26.9 (predicted)**
- 2030 Challenge 2009 benchmark = 28.3
- 2030 Challenge 2010 benchmark = 23

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Ramona - Energy Modeling

- Additional measures studied to push closer to 2030 Challenge benchmark:
 - Add solar thermal for DHW → **EUI = 22.96 (predicted)**
 - Add R-5 mineral wool exterior insulation
 - Add 30 kW photovoltaic array
 - Purchase green power

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On-Site Renewable Energy

- **Solar thermal system for domestic hot water (64 panels)**
- **Solar photovoltaic array for electricity (30 kWh system)**

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Commissioning

- Air Leakage Testing
- Infrared Thermography

Ramona Apartments WCC Quality



The Ramona Apartments Infrared Imaging Report

Air tightness testing and infrared imaging were conducted on Friday, March 4 and Saturday, March 5 at the Ramona Apartments on the corner of NW 14th and Quincy Streets in Portland, Oregon. The tests were conducted as part of a nationwide AIA/ASHRAE study to determine air leakage rates for commercial buildings in the United States. On Friday, March 4th, the Ramona was not pressurized, although the heat in the units was raised to 74 degrees to provide a significant temperature differential between the interior and exterior of the building. On Saturday, March 5th, the heat was returned to a setting of 68 degrees F, while negative and positive pressures were induced on the building to measure air leakage rates through the building envelope. The report documents qualitative information documenting areas of air leakage and thermal bridging as seen with an infrared camera.

The camera used for this imaging is a Flir BACO model which is capable of taking still and digital and "fusion" images, which combine both digital photographs and infrared images into one image. Examples of fusion images are found on pages 6 and 7 of this report.

Images on the following pages are first described by indicating the date and time the image was taken, the atmospheric temperature and whether or not pressurization was underway at the time of the image. A brief summary on what for future improvement can be found at the end of this report.

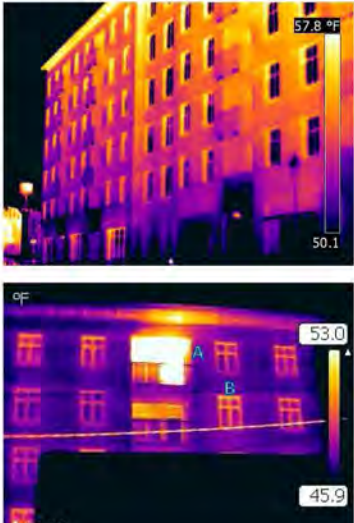


What information does an infrared image convey?

Infrared imaging works by providing a visual representation of the infrared energy emitted by objects. The images allow us to see how heat is distributed. Note on the scale on the right hand side of the image that cooler temperatures are shown as darker while warmer temperatures are lighter. In this particular image, one can see the natural stack effect in the building, as the temperature of the building exterior gets hotter at the upper floors as the heat from each floor continues to rise through the building, resulting in warmer temperatures on the upper floors.

Infrared imaging can help to highlight areas of air leakage and thermal bridging. It will locate areas that need further study. Infrared imaging does not, however, diagnose the cause of the problem.

Friday, March 4th 4:20 PM 55 degrees F West Elevation
Thermostats in the units were set to 74F.
Visible at the sixth floor deck on the north elevation is the location of one of 10 blower doors installed in the building, seen clearly as a bright area (A). The blower door is turned on and is discharging the heated air from the building, which is clearly heating the window system, the deck soffit and the building overhang. The window head on the fifth floor (B) shows heat transmission through the vinyl frame of the window. This is typical given that the vinyl frame has a lower U value than the glazing or the opaque wall and the vinyl frame acts to conduct the heat to the exterior.

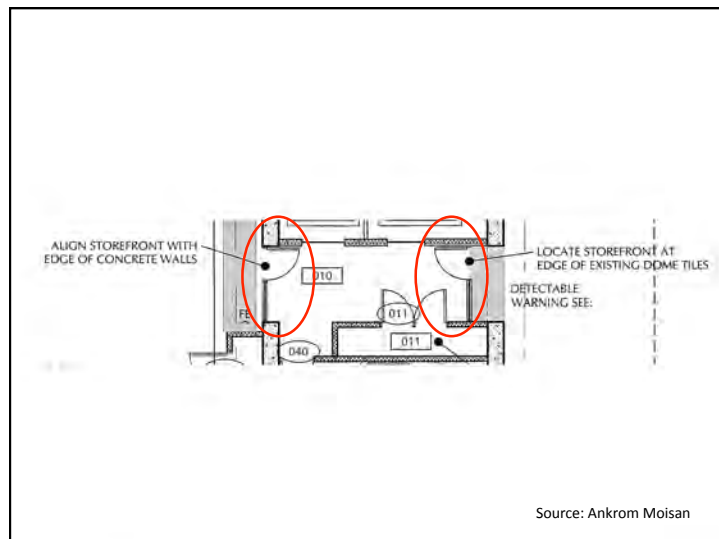
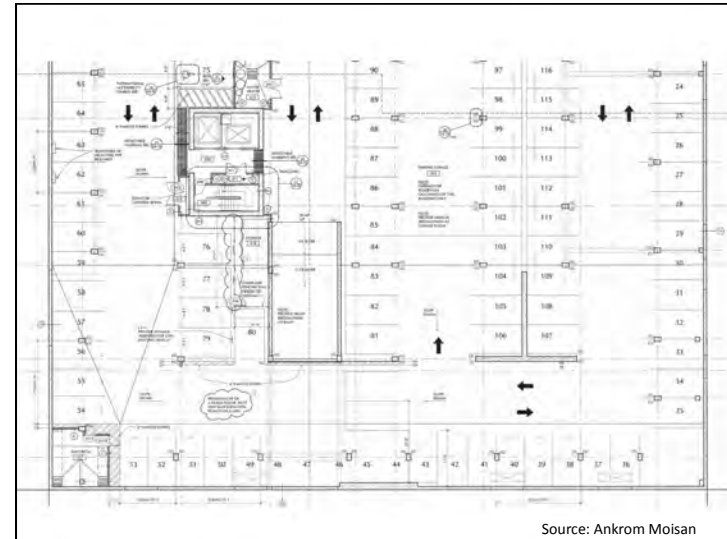
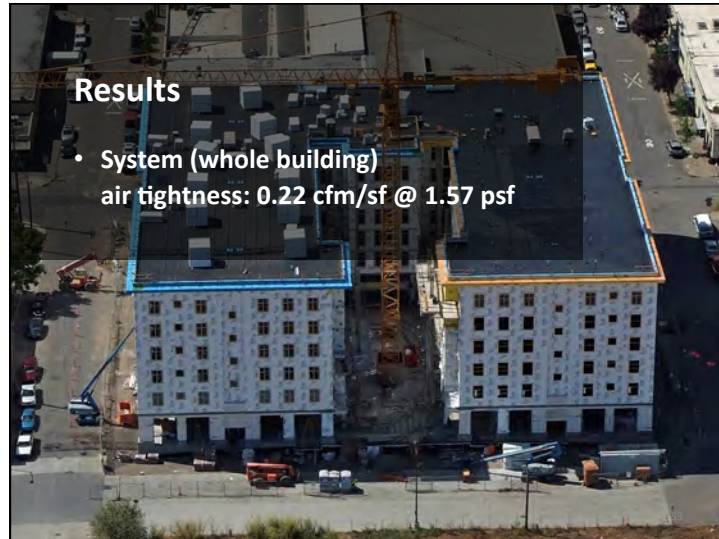


Friday, March 4th 4:20 PM 55 degrees F
South Wall of Courtyard
 Air leakage is visible at the roof to wall connection (A). It is not unusual to see air leakage at such intersections, especially at inside and outside building corners, as air barrier construction is difficult where the building geometry is complex. The brick ledger (B), is also visible as a clear thermal bridge, conducting heat through the building frame to the exterior. It is typical for brick ledgers to conduct heat unless thermally isolated from the building frame. Note the heat signature at the outside edge of the soffit (C). The roof-to-wall intersection is the likely source of this warm air leakage.



Friday, March 4th 4:20 PM 74 degrees F
Interior Fifth Floor Unit, West Elevation
 The baseboard heater (A) is clearly evident as a very bright heat signature below the window with warm air rising up toward the window. Note that convective looping and air stratification likely account for the cool spots at the floor level at the outside corners (B). Dark vertical lines on either side of the window (C) are evidence of the lack of thermal resistance of the large wood timbers that support the exterior sunshades at the west elevation.





Data

Month	YEAR 1 METER READINGS												YEAR 2 METER READINGS											
	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
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167	1700	1800	2070	2000	2000	1910	1880	1810	1740	1670	1600	1530	1600	1670	1740	1810	1880	1950	2020	2090	2160	2230	2300	2370
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170	1700	1800	2070	2000	2000	1910	1880	1810	1740	1670	1600	1530	1600	1670	1740	1810	1880	1950	2020	2090	2160	2230	2300	2370

ELECTRICITY ONLY					
Whole Building	Year 1	Year 2	Year 3	Year 4	Year 5
Total KWH	939,433	958,164	0	0	0
Avg. Monthly KWH	78,286	79,847	0	0	0
Total KWH/SF	4.03	4.11	0.00	0.00	0.00
Avg. Monthly KWH/SF	0.34	0.34	0.00	0.00	0.00

Whole Building - Res. Only					
Year 1	Year 2	Year 3	Year 4	Year 5	
Total KWH	812,761	832,836	0	0	0
Avg. Monthly KWH	67,730	69,403	0	0	0
Total KWH/SF	3.72	3.81	0.00	0.00	0.00
Avg. Monthly KWH/SF	0.31	0.32	0.00	0.00	0.00

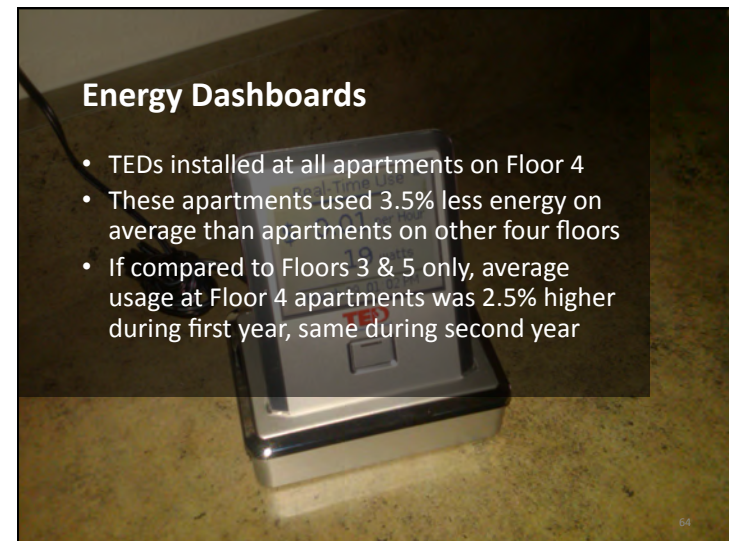
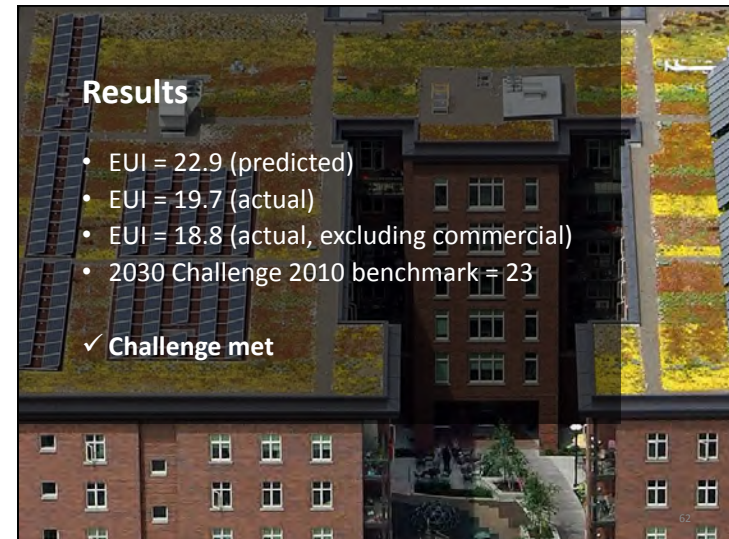
ELECTRICITY + GAS					
Whole Building - Res. Only	Year 1	Year 2	Year 3	Year 4	Year 5
Total KWH	1,198,258	1,211,248	0	0	0
Avg. Monthly KWH	99,855	100,937	0	0	0
Total KWH/SF	5.48	5.54	0.00	0.00	0.00
Avg. Monthly KWH/SF	0.46	0.46	0.00	0.00	0.00
Total kBtu	4,089,655	4,133,991	0	0	0
Avg. Monthly kBtu	340,805	344,499	0	0	0
Total kBtu/SF	18.71	18.91	0.00	0.00	0.00
Avg. Monthly kBtu/SF	1.56	1.58	0.00	0.00	0.00

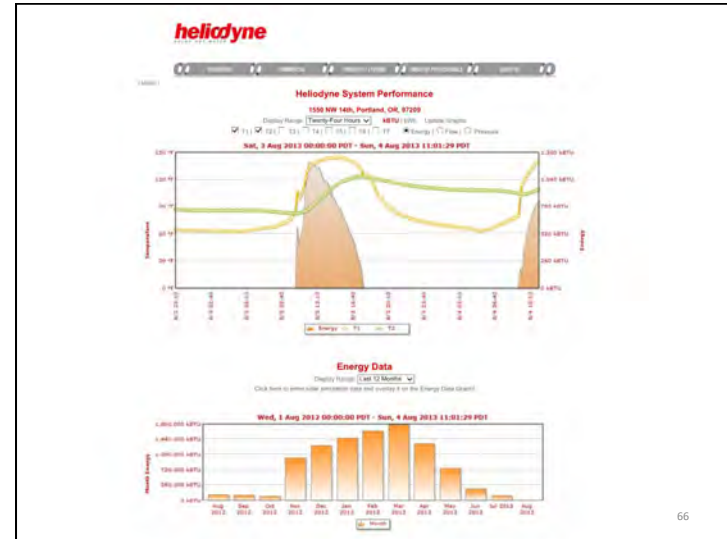
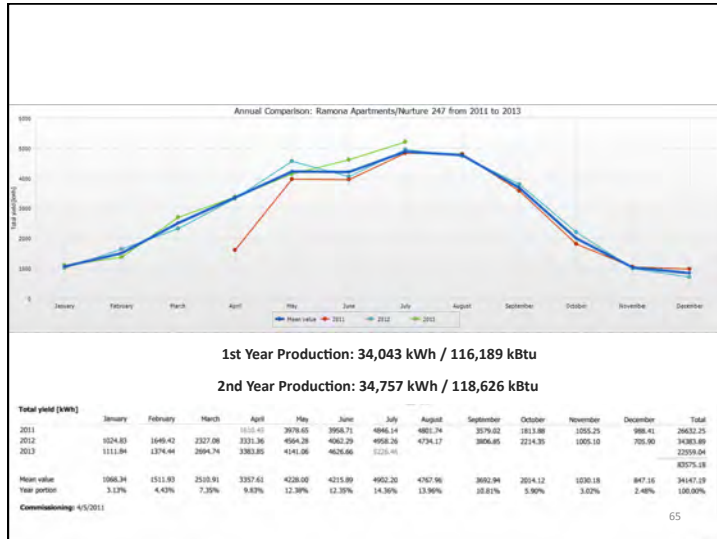
1 kWh = 3.413 kBtu

Electricity Usage (Btu) = TOTAL KWH x 3,413 Btu/kWh = _____ Btu

Ramona Apartments Energy Metrics
Portland, Oregon

First Year Energy Use (July 2011 – June 2012)	Total (kBtu)	Intensity (kBtu/sf)	Intensity (kWh/sf)
Electricity	3,206,284	13.9	4.0
Gas	1,315,701	5.7	1.7
Total Energy Use	4,521,985	19.6*	5.7
Solar PV Production (measured)	116,189	0.5	0.15
Solar Thermal Production (estimated)	644,693	2.8	-
Second Year Energy Use (July 2012 – June 2013)	Total (kBtu)	Intensity (kBtu/sf)	Intensity (kWh/sf)
Electricity	3,270,214	14.2	4.2
Gas	1,291,520	5.6	1.6
Total Energy Use	4,561,734	19.8*	5.8
Solar PV Production (measured)	118,626	0.5	0.15
Solar Thermal Production (estimated)	632,845	2.7	-





Ramona Apartments Energy Metrics

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APTS. ONLY	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12
Apartment Water Use - STA	235,460	244,210	235,740	252,410	235,890	241,180	255,540	239,110	252,820	248,130	261,080	243,510
Total Occupants	328	329	328	343	340	339	340	341	352	356	351	350
Days per month	31	30	31	30	31	31	29	31	30	31	30	31
Galls per occupant/day	23.16	24.74	23.31	24.83	22.3	22.9	25.9	22.0	24.0	22.5	24.6	22.8

WHOLE BLDG	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12
Total Building Use - PWB	413,262	279,752	273,758	314,838	332,860	287,232	266,208	268,784	290,304	317,152	380,080	340,594
- PPS - 1565	229	330	3380	3100	3210	2230	4100	4180	3140	4380	4220	530
- PPS - 1565	570	570	3,140	3,540	3,240	2,210	4,090	4,080	3,180	3,810	3,890	1,960
- ZCC	440	580	700	1,030	780	810	1,200	810	810	810	850	820
Total Occupants	328	329	328	343	340	339	340	341	352	356	351	350
Days per month	31	30	31	30	31	31	29	31	30	31	30	31
Galls per occupant/day	40.62	29.19	28.30	29.80	30.9	26.9	26.1	24.0	24.0	27.9	29.3	21.1

Integrat	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12
Common Area Water per occ./day	11.48	3.43	3.02	3.27	8.6	3.9	0.1	11.4	0.6	5.4	3.5	0.5

Notes

Apartment Use - STA Bill
STA Total Usage (Hot and Cold)
Apartment Total Usage

Whole Bldg - PWB Bill
PWB Usage
- PPS
- ZCC

Whole Bldg Total Usage

Common Area Water = Whole Bldg Total - Apartment Total
ZCC and PPS volumes on STA bill should be multiplied by 10

APTS ONLY	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13
Apartment Water Use - STA	240,450	247,500	244,150	251,640	243,100	248,060	206,480	232,380	251,270	232,000	257,100	0	0
Total Occupants	356	357	353	353	351	353	353	359	358	360	360	0	0
Days per month	31	30	31	30	31	31	28	31	30	31	30	31	31
Gals per occupant/day	21.6	23.1	22.3	23.6	22.3	22.7	27.0	25.9	23.4	25.9	23.6	#DIV/0!	#DIV/0!

WHOLE BLDG	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13
Total Building Water Use - PWB	382,228	358,292	330,412	252,460	371,758	287,788	332,324	291,720	397,704	412,898	4,890	0	0
+ PPS - 1545	520	820	4,930	4,880	4,050	2,520	4,790	4,450	3,910	4,650	4,890	0	0
+ PPS - 1545	2,150	1,020	4,240	4,470	3,320	2,410	4,740	4,340	4,020	4,890	5,040	0	0
+ ZCC	510	530	690	740	500	560	540	910	780	1,070	910	0	0
Total Occupants	398	387	350	353	351	353	354	358	358	360	360	0	0
Days per month	31	30	31	30	31	31	28	31	30	31	30	31	31
Gals per occupant/day	34.3	33.2	27.1	27.0	33.4	24.6	32.9	25.2	26.8	36.0	-1.0	#DIV/0!	#DIV/0!

Imperial	34770	32740	51080
Common Area Water per occupant	12.5	10.1	4.8

Notes
 Apartment Use - STA Bill
 (STA Total Usage (Hot and Cold)
 Apartment Total Usage
 Whole Bldg - PWB Bill
 PWB Usage
 PPS
 ZCC
 Whole Bldg Total Usage
 Common Area Water = Whole Bldg
 ZCC and PPS volumes (STA)

Water Use

- Average of 23 gallons per day per occupant at apartments
- 65% reduction in water use compared to average Portland residential customers
- Dual flush toilets
 - Installed at all apartments on Floor 3
 - Data shows these apartments used 14% more water on average than apartments on the other four floors

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PEARL FAMILY HOUSING COOPERATIVE

WHAT IS A HOUSING COOPERATIVE?

- Please see the attached description prepared by Kris Smock, Ph.D., of [Kristina Smock Consulting](#)

LOCATION

- NW 13th and Quimby in Portland's Pearl District
- 2 blocks from "The Fields" park
- 4 blocks from major grocery store
- 3-5 blocks from Portland Streetcar stops



KEY FEATURES

- 135 affordable 2 BR and 3 BR apartments
- Energy-efficient and healthy dwellings
- Ground floor daycare and early education
- Converting to tenant ownership at end of LHFC compliance

More Information?
 Contact Ed Michener at 503-249-0360 or ed@kristinasmock.com



Additional Information

- Ramona Apartments Website:
http://www.theramona.com/features_finishes/greenfull.php
- Architecture 2030 Database Submission Form:
http://www.walshconstructionco.com/whats_happening_detail.aspx?newsid=206
- Portland Green Investment Fund Final Report:
<http://www.portlandoregon.gov/bps/article/437423>
- Portland Bureau of Environmental Services Ecoroof Report:
<http://www.portlandoregon.gov/bes/article/348730>
- Ed McNamara talk at Portland Ecoroof Symposium 2012:
<http://www.youtube.com/watch?v=EYE0yivHy5Y>
- Profile at Greenroofs Blog:
<http://www.greenroofs.com/blog/2011/12/30/gpw-the-ramona-apartments/>

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