2009 Classroom Occupancy Sensor Installation
FINAL REPORT – July 22, 2011

I. Summary

- In 2009, the Student Sustainability Committee awarded $50,000 to Facilities & Services for installation of occupancy sensors to control lights in ten campus buildings: Animal Sciences Laboratory, Architecture Building, Bevier Hall, Chemistry Annex, Huff Hall, Materials Science and Engineering Building, Mumford Hall, Music Building, Noyes Laboratory and Transportation Building. The funds were used to install a total of 230 occupancy sensors in 223 rooms in these ten buildings.

II. Project Execution

- The majority of sensors installed are wall switch replacements, with ceiling sensors used in some areas where wall switch sensors were not applicable.
- In addition to classrooms, this year we also installed sensors in other areas such as lounges, restrooms, copy rooms, etc. Some of these (such as infrequently used restrooms) will yield savings of 50-90%.
- Lighting costs in these areas are expected to decrease by an average of 30%, with an annual savings of approximately $7,350 per year.
- At the Animal Sciences Laboratory, we cooperated with the F&S Retro-Commissioning team to connect the occupancy sensors to HVAC systems in 4100 square feet of basement area. This will result in an additional annual savings estimated at $6,600, since these systems had previously been running 24 hours/day. (See attached charts, but note that most RCx work was completed in 2010, but the occupancy sensors were not completed until 2/2011. Thus their savings are not fully captured in this data set.)
- F&S electricians executed the installation work. This allowed for the most efficient execution method and the best flexibility in installation schedules for high-use areas.
- On average, the cost was $217 per sensor. This includes materials and labor, as well as project costs such as engineering design and record keeping. This amount was slightly more than the initial projection of $200, primarily because of the extra work at Animal Sciences Lab. Material costs also increased somewhat over the previous year.
- Including both lighting and HVAC, we expect an annual energy cost savings of $13,950, for a simple payback of 3.6 years. Despite the higher per-sensor cost, this is slightly better than the results of the 2008 project, which achieved a payback period of 4.2 years.

III. Building Data Summary Table (see attachments for complete data)

Building Name	# of Rooms	# of Sensors	Lighting Wattage Controlled
Animal Science	54	60	35,646
Architecture Bldg.	8	8	1,738
Bevier Hall	16	17	1,992
Chemistry Annex	4	4	1,764
Huff Hall	3	3	1,092
MSEB	3	3	2,304
Mumford Hall	8	8	2,208
Music Building	103	103	6,048
Noyes Lab	13	13	5,328
Transportation	11	11	4,140
Total	223	230	62,260

IV. Energy, Environmental, Social and Economic Impact

- Energy and cost savings.
  The project should save $13,950 the first year, and $167,500 over a ten year period, based on an inflation rate of 4.0%. Annual electrical use will be cut by 81,800 kWH. Steam and chilled water use will also decrease at Animal Sciences.

- F&S has applied for incentive reimbursements of $8,100 from the Illinois Department of Commerce and Economic Opportunity (DCEO)'s Public Sector Electric Efficiency Program. This money will be used towards future energy saving projects on campus, most likely additional occupancy sensors.

- Environmental Impact
  This project will result in an annual reduction of greenhouse gases in the following amounts, including only the lighting component (HVAC associated reductions are difficult to calculate):
  32,000 lbs CO_2 emissions reduction
  118 lbs NO_x emissions reduction
  395 lbs SO_x emissions reduction

- Social Impact
  Lighting controls send a strong message to the community that the campus is serious about saving energy through lighting reduction. Community response has been very positive, and surprisingly, no serious malfunctions have been encountered.

V. Outreach and Education

These sensors were installed in some of the most highly visible classrooms on campus, and will be seen by over 50% of the freshman and sophomore classes.

A plaque (sticker) will be installed on each sensor, mentioning the Student Sustainability Committee and emphasizing the impact of reducing lighting usage.

VI. Lessons Learned and Future Outlook

- Occupancy sensors are a key component of the iCAP Climate Action Plan. F&S has established a goal of installing occupancy sensors in the top 80 energy-using buildings by 2015, and the remainder by 2020. Though we have made a start, an estimated $6.6 million is still needed to meet this commitment.

- Focusing deployment on classrooms and select areas has been a very cost efficient approach. However, to meet the iCAP goals this must be changed to a full coverage strategy. Installing occupancy sensors in most/all occupied spaces will net maximum savings and also improve installation efficiency.

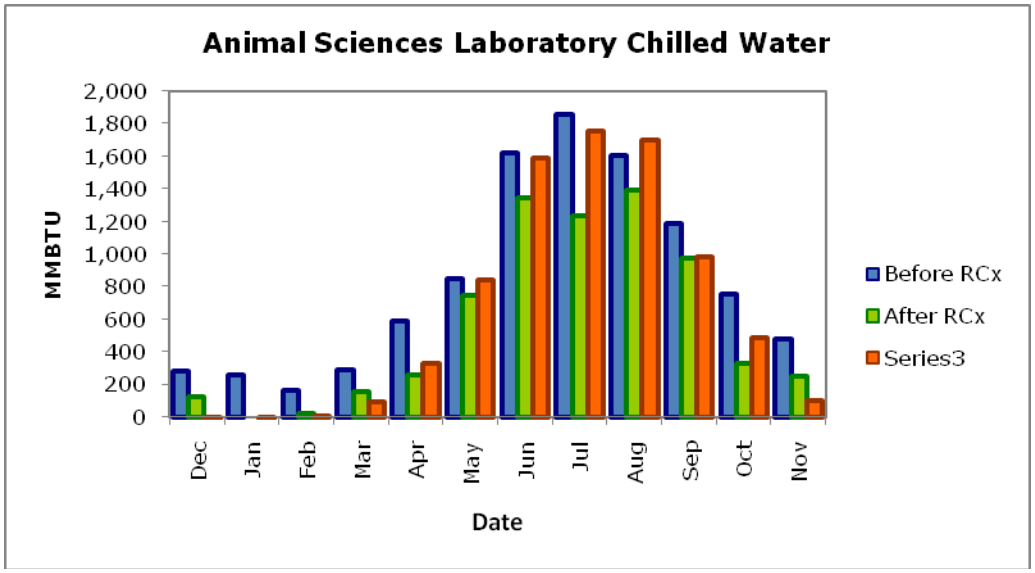
- As in the 2008 project, many classrooms initially targeted for occupancy sensors were not able to be completed. The most common problem was the existence of multiple switching locations, or special dimming controls. This requires low voltage ceiling sensor installation which is far more expensive.

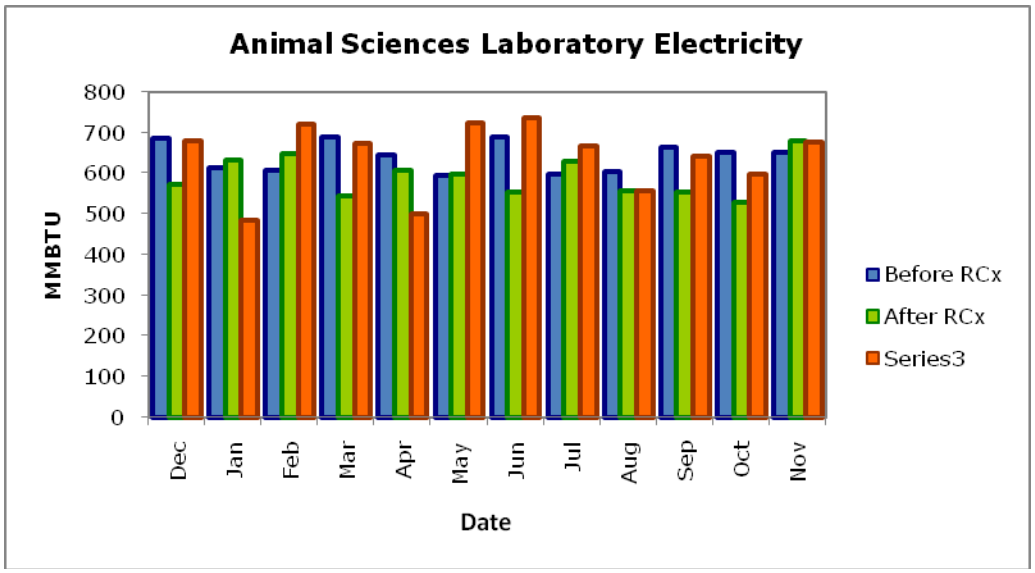
- Occupancy control of HVAC systems proved to be far more beneficial than expected. In fact, on a square foot basis, it seems that HVAC savings actually exceeded lighting savings! F&S Engineering and Retro-Commissioning teams were both surprised by this result. In future, we will continue to synergize our efforts as much as possible. (One example is the Retro-Commissioning work currently underway at Alice Campbell Alumni Center. Due to the very sporadic occupancy pattern in this facility, major savings are expected.)

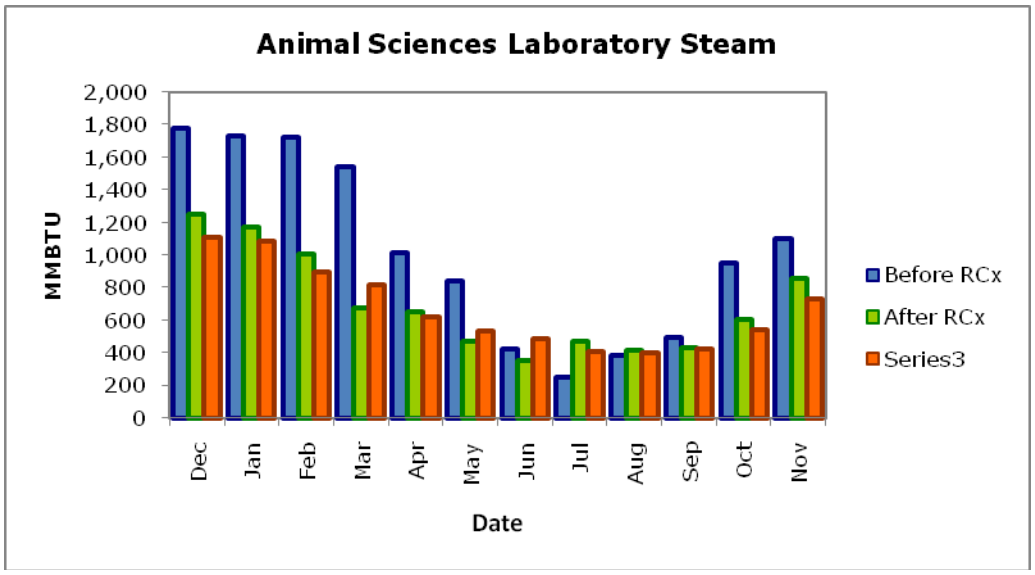
- Although our 2010 proposal was not accepted, we intend to submit a proposal to the SSC for the 2011 funding cycle in order to resume this installation program. This reflects our belief that occupancy sensors represent one of the best energy-saving strategies available. At present no other funding sources have been identified.

- F&S thanks the Student Sustainability Committee and the students of the Urbana-Champaign campus for their support of this project. It is always a pleasure to work with you.

Attachment I. Graphs – Animal Sciences







Occupancy Sensor - As Built

Building:	Animal Sciences							0
Location:	165							

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Controlled Wattage	Notes
2	Office	231.8	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		192.0	for VAV controls only
4	Office	221.79	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		192.0	for VAV controls only
6	Office	237.76	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		192.0	1) sw. leg; extra relay for VAV controls
7	Office	802.67	Ceiling	(3)ATD2000CRP	(1)CU300A, (1)AAR		672.0	1) sw. leg, room dividers (3 areas)
8	Office	238.6	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		192.0	1) sw. leg; extra relay for VAV controls
13	Women's Rm.	166.67	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		144.0	1) sw. leg; extra relay for VAV controls
18	Men's Rm.	179.58	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		144.0	1) sw. leg; extra relay for VAV controls
19	Office	837.19	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		864.0	1) sw. leg; extra relay for VAV controls
20	Lounge	187.83	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		144.0	1) sw. leg; extra relay for VAV controls
24	Conference Room	268.7	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		288.0	1) sw. leg; extra relay for VAV controls
0024A	Office	268.74	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		288.0	1) sw. leg; extra relay for VAV controls
28	Office	184.23	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		144.0	1) sw. leg; extra relay for VAV controls
29	Office	215.53	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		240.0	1) sw. leg; extra relay for VAV controls
0030B	Office	174.81	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		48.0	1) sw. leg; extra relay for VAV controls
34	Office	400.44	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		432.0	1) sw. leg, (3way); extra relay for VAV controls
36	Office	333.61	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		432.0	1) sw. leg, (3way); extra relay for VAV controls
63	Class Laboratory	1131.92	Ceiling	(2)ATD2000CRP	CU300A		2856.0	1) sw. leg
67	Class Laboratory	919.65	Ceiling	(1)ATD2000CRP	CU300A		420.0	1) sw. leg, dimmer sw.
103	Women's Rm.	174.48	Wall	(1)AD1277I1		NP26I	336.0	1) sw. leg
107	Classroom	651.11	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		1008.0	2) sw. legs (1-3way, + 1 dimr.)
122	Non-Class Laboratory	884.1	Ceiling	(1)ATD2000CRP	CU300A		2016.0	1) sw. leg
124	Office	289.08	Ceiling	(1)ATD2000CRP	CU300A		504.0	1) sw. leg
131	Classroom	1204.32	Ceiling	(1)ATD2000CRP	CU300A		1008.0	1) 3way sw. leg
150	Classroom	2055.48	Ceiling	(2)ATD2000CRP	(2)CU300A, (6)AAR		2520.0	8) sw. legs (2-3ways, 1-4way, 4 dimrs, + 1 sw. leg)
194	Lounge Service	201.93	Ceiling	(1)ATD2000CRP	CU300A		168.0	1) sw. leg
195	Women's Rm.	170.21	Wall	(1)AD1277I1		NP26I	336.0	1) sw. leg
196	Lounge	282.2	Ceiling	(1)ATD2000CRP	CU300A		336.0	1) sw. leg
197	Men's Rm.	267.35	Wall	(1)AD1277I1		NP26I	336.0	1) sw. leg
201	Women's Rm.	216.58	Wall	(1)AD1277I1		NP26I	336.0	1) sw. leg
205	Non-Class Laboratory	462.94	Ceiling	(1)ATD2000CRP	CU300A		1176.0	1) sw. leg
209	Non-Class Laboratory	456.84	Ceiling	(1)ATD2000CRP	CU300A		1176.0	1) sw. leg
210	Office	183.3	Ceiling	(1)ATD2000CRP	CU300A		378.0	1) sw. leg
212	Office	283.95	Wall	(1)AD1277I1		NP26I	504.0	1) sw. leg
224	Office	312.66	Wall	(1)AD1277I1		NP26I	504.0	DAYLIGHT HARVESTING, 1) sw. leg
227	Non-Class Laboratory	576.84	Ceiling	(1)ATD2000CRP	CU300A		0.0	1) sw. leg. Open ceiling.
234	Office	331.18	Ceiling	(1)ATD2000CRP	CU300A		504.0	1) sw. leg
235	Non-Class Laboratory	503.74	Ceiling	(1)ATD2000CRP	CU300A		1176.0	1) sw. leg. Open ceiling.
258	Office	330.42	Ceiling	1)ATD2000CRP	CU300A		756.0	1) sw. leg

Occupancy Sensor - As Built

Building:	Animal Sciences							0
Location:	165							

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Controlled Wattage	Notes
261	Non-Class Laboratory	512.93	Ceiling	1)ATD2000CRP	CU300A		1176.0	1) sw. leg. Open ceiling.
263	Non-Class Laboratory	563.78	Ceiling	1)ATD2000CRP	CU300A		1176.0	1) sw. leg. Open ceiling.
270	Non-Class Laboratory	794.02	Ceiling	(1)ATD2000CRP	CU300A		1512.0	1) sw. leg. Open ceiling.
278	Office	120.85	Ceiling	(2)ATD2000CRP	CU300A		0.0	1) sw. leg. Open ceiling.
292	Classroom	591.9	Ceiling	(1)ATD2000CRP	(1)CU300A, (1)AAR		1008.0	2) sw. legs (1 dimr.)
293	Non-Class Laboratory	472.93	Ceiling	(2)ATD2000CRP	CU300A		1260.0	1) sw. leg. Open ceiling.
299	Men's Rm.	262.69	Wall	(1)AD1277I1		NP26I	336.0	1) sw. leg
301	Women's Rm.	182.67	Wall	(1)AD1277I1		NP26I	420.0	1) sw. leg
314	Office	373.22	Ceiling	(1)ATD2000CRP	CU300A		420.0	1) sw. leg
319	Non-Class Lab Service	158.66	Wall	(1)AD1277I1		NP26I	504.0	1) sw. leg
371	Non-Class Laboratory	402.25	Ceiling	(1)ATD2000CRP	CU300A		0.0	1) sw. leg. Open ceiling.
380	Office	401.71	Ceiling	(1)ATD2000CRP	CU300A		1008.0	1) sw. leg
384	Office	385.32	Ceiling	(1)ATD2000CRP	CU300A		1008.0	1) sw. leg. Open ceiling.
398	Men's Rm.	175.57	Wall	(1)AD1277I1		NP26I	336.0	1) sw. leg
401	Men's Rm.	179.69	Wall	(1)AD1277I1		NP26I	336.0	1) sw. leg
403	Women's Rm.	183.2	Wall	(1)AD1277I1		NP26I	336.0	1) sw. leg
492	Office	296.24	Ceiling	(1)ATD2000CRP	CU300A		504.0	1) sw. leg

LEGEND

(1)ATD2000C	Ceiling Sensor (quantity)
CU300A	Control Unit
(1)CU300A, (6)AAR	CU + Add a relay (quantity)
(1)AD1277I1	Wall Sensor, 1 button (quantity)
(1)AD1277I2	Wall Sensor, 2 button (quantity)
(1)AD1277I1	Wall Sensor, 0 button (quantity)
NP26I	1 gang/décor plate
NP13I	blank plate
NP1226I	décor & dimr plate
NP1326I	décor/blank plate
Room name and number	Keyed wall switch in Restrooms

(1)AD1277I1	13.0
(1)ATD2000CRP	36.0
(2)ATD2000CRP	4.0
(3)ATD2000CRP	1.0
(1)AD1277I1N	0.0
(1)AD1277I2	0.0
TOTAL ROOMS	**54.0**
TOTAL AREA	**23,573.8**
TOTAL WATTAGE	**35,646.0**

Occupancy Sensors - As Built

Building:	Architecture							Reviewed By:
Location:	50				**do not delete rows,** sheet includes retrofit data/calcs			Audit Date:

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Controlled Wattage	Notes
1	Lounge	206.21	Wall	(1)AD1277I1		NP26I	0.0	
0004W	Classroom	662.28	Wall	(1)AD1277I2		NP26I	840.0	
101	Women's Rm.	173.93	Wall	(1)AD1277I1		NP26I	0.0	1) sw. leg
0101A	Women's Rm.	132.52	Wall	(1)AD1277I1		NP26I	84.0	1) sw. leg
0303A	Women's Rm.	147.01	Wall	(1)AD1277I1		NP26I	84.0	1) sw. leg
0403B	Office	125.24	Wall	(1)AD1277I1		NP26I	146.0	1) sw. leg
0403C	Office	120.78	Wall	(1)AD1277I1		NP26I	146.0	1) sw. leg
0403E	Office	337.74	Wall	(1)AD1277I1		NP26I	438.0	1) sw. leg

LEGEND

(1)ATD2000CRP	Ceiling Sensor (quantity)
CU300A	Control Unit
(1)CU300A, (6)AAR	CU + Add a relay (quantity)
(1)AD1277I1	Wall Sensor, 1 button (quantity)
(1)AD1277I2	Wall Sensor, 2 button (quantity)
(1)AD1277I1N	Wall Sensor, 0 button (quantity)
NP26I	1 gang/décor plate
NP13I	blank plate
NP1226I	décor & dimr plate
NP1326I	décor/blank plate
Room name and number	Keyed wall switch in Restrooms

(1)AD1277I1	7.0
(1)ATD2000CRP	0.0
(2)ATD2000CRP	0.0
(3)ATD2000CRP	0.0
(4)ATD2000CRP	0.0
(1)AD1277I1N	0.0
(1)AD1277I2	1.0
TOTAL ROOMS	**8.0**
TOTAL AREA	**1,905.7**
TOTAL WATTAGE	**1,738.0**

Building: Bevier Hall							Reviewed By:	
Location:	**158**						Audit Date:	

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Controlled Wattage	Notes
0108A	**Class Laboratory Service**	116.79	Wall	(1)AD1277I1		NP26I	168.0	1) sw. leg
0122	**Class Laboratory Service**	147.5	Wall	(1)AD1277I1		NP26I	144.0	1) sw. leg
0125	**Women's Rm Entry**	30.13	Wall	(1)AD1277I1		NP26I	48.0	1) sw. leg
0125A	**Women's Rm**	86.75	Wall				96.0	
0194	**Women's Rm.**	120.7	Wall	(1)AD1277I1		NP26I		1) sw. leg (room has shower; set timer accordingly)
0195	**Women's Rm. Entry**	183	Wall	(1)AD1277I1		NP26I	192.0	1) sw. leg
0198B	**Men's Rm.**	86.17	Wall	(2)AD1277I1		(2)NP26I		
0249A	**Lounge Service**	81.88	Wall	(1)AD1277I1		NP26I		1) sw. leg
0289	**Uni-sex Toilet**	63.3	Wall	(1)AD1277I1		NP26I	192.0	1) sw. leg
0333	**Women's Rm. Entry**	85	Wall	(1)AD1277I1		NP26I	48.0	1) sw. leg
0333A	**Women's Rm.**	216	Wall	(1)AD1277I1		NP26I	144.0	1) sw. leg
0333B	**Office**	188	Wall	(1)AD1277I1		NP26I	192.0	1) sw. leg
0391	**Men's Rm.**	73	Wall	(1)AD1277I1		NP26I	48.0	1) sw. leg
0435	**Office**	261	Wall	(1)AD1277I1		NP26I	288.0	1) sw. leg
0451	**Conference Room**	153.1	Wall	(1)AD1277I1		NP26I	96.0	1) sw. leg
0476B	**Non-Class Lab Service**	132.14	Wall	(1)AD1277I1		NP26I	144.0	1) sw. leg
0563	**Office**	194.5	Wall	(1)AD1277I1		NP26I	192.0	

LEGEND

(1)ATD2000CRP	Ceiling Sensor (quantity)
CU300A	Control Unit
(1)CU300A, (6)AAR	CU + Add a relay (quantity)
(1)AD1277I1	Wall Sensor, 1 button (quantity)
(1)AD1277I2	Wall Sensor, 2 button (quantity)
(1)AD1277I1N	Wall Sensor, 0 button (quantity)
NP26I	1 gang/décor plate
NP13I	blank plate
NP1226I	décor & dimr plate
NP1326I	décor/blank plate
Room name and number	Keyed wall switch in Restrooms

(1)AD1277I1	15.0
(2)AD1277I1	1.0
(1)ATD2000CRP	
(2)ATD2000CRP	
(3)ATD2000CRP	
(1)AD1277I1N	
(1)AD1277I2	
TOTAL ROOMS	**16.0**
TOTAL AREA	**2,219.0**
TOTAL WATTAGE	**1,992.0**

Building: Chemistry Annex
Location: 10

Reviewed By:
Audit Date:

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Controlled Wattage	Notes
8	Classroom	417.02	Wall	(1)AD1277I1		NP26I	756.0	1) sw. leg
106	Women's Rm.	116.44	Wall	(1)AD1277I1N		NP26I	unknown	2) sw. legs, both keyed
0301A	Class Laboratory Service	468.31	Wall	(1)AD1277I1		NP26I	1008.0	1) sw. leg
306	Men's Rm.	142.49	Wall	(1)AD1277I1N		NP26I	unknown	1) sw. leg, keyed

LEGEND	
(1)ATD2000CRP	Ceiling Sensor (quantity)
CU300A	Control Unit
(1)CU300A, (6)AAR	CU + Add a relay (quantity)
(1)AD1277I1	Wall Sensor, 1 button (quantity)
(1)AD1277I2	Wall Sensor, 2 button (quantity)
(1)AD1277I1N	Wall Sensor, 0 button (quantity)
NP26I	1 gang/décor plate
NP13I	blank plate
NP1226I	décor & dimr plate
NP1326I	décor/blank plate
Room name and number	Keyed wall switch in Restrooms

(1)AD1277I1	2.0
(1)ATD2000CRP	
(2)ATD2000CRP	
(3)ATD2000CRP	
(1)AD1277I1N	2.0
(1)AD1277I2	
TOTAL ROOMS	**4.0**
TOTAL AREA	**1,144.3**
TOTAL WATTAGE	**1,764.0**

Huff Hall
Bldg #0058

Occupancy Sensors - As Built

5/9/2011
Record Document

Building:	Huff Hall							Reviewed By:
Location:	58				**do not delete rows,** sheet includes retrofit data/calcs			Audit Date:

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Controlled Wattage	Notes
80	Office Service	49.69	Wall	(1)AD1277I1		NP26I	0.0	1) sw. leg
0080B	Office	239.95	Wall	(1)AD1277I1		NP26I	336.0	1) sw. leg
118	Office	335.26	Wall	(1)AD1277I1		NP26I	756.0	1) sw. leg

LEGEND

(1)ATD2000CRP	Ceiling Sensor (quantity)		(1)AD1277I1	3.0
CU300A	Control Unit		(1)ATD2000CRP	0.0
(1)CU300A, (6)AAR	CU + Add a relay (quantity)		(2)ATD2000CRP	0.0
(1)AD1277I1	Wall Sensor, 1 button (quantity)		(3)ATD2000CRP	0.0
(1)AD1277I2	Wall Sensor, 2 button (quantity)		(4)ATD2000CRP	0.0
(1)AD1277I1N	Wall Sensor, 0 button (quantity) used for keyed sw		(1)AD1277I1N	0.0
NP26I	1 gang/décor plate		(1)AD1277I2	0.0
NP13I	blank plate		**TOTAL ROOMS**	**3.0**
NP1226I	décor & dimr plate		**TOTAL AREA**	**624.9**
NP1326I	décor & blank plate		**TOTAL WATTAGE**	**1,092.0**
Room name and number	Keyed wall switch in Restrooms			

Building:	MATERIALS SCIENCE AND ENG BLDG						EMS
Location:	34				**do not delete rows,** sheet includes retrofit data/calcs		00.00.2010
Room No.	**Room Type**	**Area**	**Control Type**	**Quantity/ Model #**	**Accessory**	**Wall Plate Hubbell #**	**Notes**
0123B	**Lounge**	358.84	Wall	(1)AD1277I1		NP26I	1) sw. leg
2212	Office (student)	166.93	Wall	(1)AD1277I1		NP26I	1) sw. leg
316	Women's Rm.Custodial Area	163.33	Wall	(1)AD1277I1		NP26I	1) sw. leg

LEGEND

(1)ATD2000CRP	Ceiling Sensor (quantity)	(1)AD1277I1	3.0
CU300A	Control Unit	(1)ATD2000CRP	0.0
(1)CU300A, (6)AAR	CU + Add a relay (quantity)	(2)ATD2000CRP	0.0
(1)AD1277I1	Wall Sensor, 1 button (quantity)	(1)AD1277I1N	0.0
(1)AD1277I2	Wall Sensor, 2 button (quantity)	(1)AD1277I2	0.0
NP26I	1 gang/décor plate	**TOTAL ROOMS**	**3.0**
NP13I	blank plate	**TOTAL AREA**	**689.1**
NP1226I	décor & dimr plate	**TOTAL WATTAGE**	**2,304.0**

Building:	Mumford Hall						
Location:	69						
Room No.	**Room Type**	**Area**	**Control Type**	**Quantity/ Model #**	**Accessory**	**Wall Plate Hubbell #**	**Notes**
106	**Women's room**	133.11	Wall	(1)AD1277I1		NP26I	
201	Office	210.88	Wall	(1)AD1277I1		NP26I	For Access to 200, 201 & 202 See Land Arch Business office in **Temple Buell Hall,** rm 101 (South End, 1st floor)
206	**Women's room**	133.11	Wall	(1)AD1277I1		NP26I	
223	**Men's room**	161.52	Wall	(1)AD1277I1		NP26I	
308	**Women's room**	133.11	Wall	(1)AD1277I1		NP26I	1) sw. leg, main room only not entry
0316N	**Classroom**	457.72	Wall	(1)AD1277I1		NP26I	1) sw. leg
0316S	**Classroom**	468.42	Wall	(1)AD1277I1		NP26I	1) sw. leg
320	**Classroom**	507.36	Wall	(1)AD1277I1		NP26I	1) sw. leg

LEGEND

(1)ATD2000CRP	Ceiling Sensor (quantity)		(1)AD1277I1	8.0	
CU300A	Control Unit		(1)ATD2000CRP		
(1)CU300A, (6)AAR	CU + Add a relay (quantity)		(2)ATD2000CRP		
(1)AD1277I1	Wall Sensor, 1 button (quantity)		(1)AD1277I1N		
(1)AD1277I2	Wall Sensor, 2 button (quantity)		(1)AD1277I2		
(1)AD1277I1N	Wall Sensor, 0 button (quantity)		**TOTAL ROOMS**	**8.0**	
NP26I	1 gang/décor plate		**TOTAL AREA**	**2,205.2**	
NP13I	blank plate		**TOTAL WATTAGE**	**2,208.0**	
NP1226I	décor & dimr plate				
NP1326I	décor/blank plate				
Room name and number	Keyed wall switch in Restrooms				

Occupancy Sensor Project

As Built

Building: Music Building
Location: 39

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Controlled Wattage	Notes
1013	**Open Laboratory**	77.44	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
1014	**Open Laboratory**	54.6	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
1160	**Class Laboratory Service**	234.46	Wall	(1)AD1277I1		NP26I	288.0	1) sw. leg
1168	**Class Laboratory Service**	222.43	Wall	(1)AD1277I1		NP26I	192.0	1) sw. leg
3086	**Open Laboratory**	87.64	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3088	**Open Laboratory**	84.97	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3090	**Open Laboratory**	87.44	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3092	**Office Service**	84.72	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3094	**Office**	81.82	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3096	**Open Laboratory**	87.81	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3098	**Office**	79.86	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3099	**Open Laboratory**	73.94	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3101	**Open Laboratory**	83.17	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3102	**Open Laboratory**	67.87	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3103	**Open Laboratory**	78.56	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3104	**Open Laboratory**	71.22	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3105	**Open Laboratory**	80.55	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3106	**Open Laboratory**	79.53	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3107	**Open Laboratory**	79.86	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3108	**Open Laboratory**	75.88	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3109	**Open Laboratory**	82.78	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3111	**Open Laboratory**	80.09	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3113	**Open Laboratory**	70.33	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3117	**Open Laboratory**	84.76	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3118	**Open Laboratory**	89.21	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3119	**Open Laboratory**	87.61	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3121	**Open Laboratory**	84.52	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3122	**Open Laboratory**	83.33	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3123	**Open Laboratory**	85.25	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3124	**Open Laboratory**	79.81	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3125	**Open Laboratory**	83.13	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
3144A	**Study Room**	29.64	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144B	**Study Room**	27.63	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144C	**Study Room**	32.11	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144D	**Study Room**	33.93	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144E	**Study Room**	32.48	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144F	**Study Room**	39.81	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144G	**Study Room**	155.43	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144H	**Study Room**	142.39	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144K	**Study Room**	142.9	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144L	**Study Room**	140.74	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.

Occupancy Sensor Project

As Built

Building: Music Building
Location: 39

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Controlled Wattage	Notes
3144M	**Study Room**	150.77	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144N	**Study Room**	157.26	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144T	**Study Service**	38.1	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144U	**Study Service**	44.67	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
3144V	**Study Service**	48.82	Wall	(1)AD1277I1		NP26I	unknown	program sensor for 5 min.
4065	**Open Laboratory**	126.21	Wall	(1)AD1277I1		NP26I	96.0	
4071	**Office**	79.74	Wall	(1)AD1277I1		NP26I	48.0	
4073	**Office**	82.93	Wall	(1)AD1277I1		NP26I	48.0	
4086	**Office**	87.64	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4088	**Office**	84.97	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4090	**Office**	87.44	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4092	**Open Laboratory Service**	84.72	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4096	**Office**	87.81	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4098	**Office**	79.86	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4099	**Office**	73.94	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4100	**Open Laboratory**	73.83	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4101	**Office**	83.17	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4102	**Open Laboratory**	67.87	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4103	**Office**	78.56	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4104	**Open Laboratory**	71.22	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4105	**Open Laboratory**	80.55	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4106	**Open Laboratory**	79.53	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4107	**Open Laboratory**	79.86	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4108	**Open Laboratory**	75.88	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4109	**Open Laboratory**	82.78	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4110	**Office**	60.6	Wall	(1)AD1277I1		NP26I	96.0	program sensor for 5 min.
4111	**Open Laboratory**	80.09	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4113	**Open Laboratory**	70.33	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4115	**Open Laboratory**	74.43	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4116	**Open Laboratory**	70.91	Wall	(1)AD1277I1		NP26I	96.0	program sensor for 5 min.
4117	**Open Laboratory**	84.76	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4118	**Open Laboratory**	89.21	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4119	**Open Laboratory**	87.61	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4120	**Open Laboratory**	93.06	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4121	**Open Laboratory**	84.52	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4122	**Open Laboratory**	83.33	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4123	**Open Laboratory**	85.25	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4124	**Open Laboratory**	79.81	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4125	**Open Laboratory**	83.13	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4126	**Office**	86.39	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
4127	**Office**	88.01	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.

Occupancy Sensor Project

As Built

Building: Music Building
Location: 39

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Controlled Wattage	Notes
4129	**Office**	78.25	Wall	(1)AD1277I1		NP26I	48.0	program sensor for 5 min.
5004	**Office**	106.27	Wall	(1)AD1277I1		NP26I	96.0	program sensor for 5 min.
5006	**Office**	114.87	Wall	(1)AD1277I1		NP26I	96.0	program sensor for 5 min.
5019	Office	81.64	Wall	(1)AD1277I1		NP26I	48.0	1) sw. leg
5045C	Non-Class Laboratory	248.08	Wall	(1)AD1277I2			unknown	2) sw. legs
5065	**Open Laboratory**	224.56	Wall	(1)AD1277I1		NP26I	288.0	1) sw. leg
5081	Non-Class Lab Service	173.79	Wall	(1)AD1277I1		NP26I	96.0	1) 3 way sw. leg
5083	**Open Laboratory**	119.4	Wall	(1)AD1277I1		NP26I	96.0	1) sw. leg
5084	Non-Class Lab Service	109.33	Wall	(1)AD1277I1		NP26I	96.0	program sensor for 5 min.
5085	**Class Laboratory Service**	65.4	Wall	(1)AD1277I1		NP26I	96.0	1) sw. leg
5086	Office	107	Wall	(1)AD1277I1		NP26I	96.0	program sensor for 5 min.
5088	Office	124.51	Wall	(1)AD1277I1		NP26I	96.0	program sensor for 5 min.
5090	**Class Laboratory Service**	95.2	Wall	(1)AD1277I1		NP26I	96.0	program sensor for 5 min.
5091	**Class Laboratory Service**	93.54	Wall	(1)AD1277I1		NP26I	unknown	1) 3 way sw. leg
5093	Non-Class Laboratory	126.16	Wall	(1)AD1277I1		NP26I	96.0	1) sw. leg
5094	Non-Class Lab Service	105.52	Wall	(1)AD1277I1		NP26I	96.0	program sensor for 5 min.
5095	Non-Class Laboratory	126.96	Wall	(1)AD1277I1		NP26I	96.0	1) sw. leg
5098	**Office**	117.68	Wall	(1)AD1277I1		NP26I	96.0	program sensor for 5 min.
5131A	**Lounge**	122.13	Wall	(1)AD1277I1		NP26I	336.0	program sensor for 5 min.
5136	Women's Rm.	161.45	Wall	(1)AD1277I1N		NP26I	288.0	1) sw. leg Keyed.
5136A	Women's Rm. Entry	24.04	Wall	(1)AD1277I1N		NP26I	48.0	1) sw. leg Keyed.
		9477					**6048.0**	

LEGEND	
(1)ATD2000CRP	Ceiling Sensor (quantity)
CU300A	Control Unit
(1)CU300A, (6)AAR	CU + Add a relay (quantity)
(1)AD1277I1	Wall Sensor, 1 button (quantity)
(1)AD1277I2	Wall Sensor, 2 button (quantity)
(1)AD1277I1N	Wall Sensor, 0 button (quantity) used for keyed sw
NP26I	1 gang/décor plate
NP13I	blank plate
NP1226I	décor & dimr plate
NP1326I	décor & blank plate
Room name and number	Keyed wall switch in Restrooms

(1)AD1277I1	100.0
(1)ATD2000CI	0.0
(2)ATD2000CI	0.0
(1)AD1277I1N	2.0
(1)AD1277I2	1.0
TOTAL ROOM	**103.0**
TOTAL AREA (sq	**9477**
TOTAL WATTA	**6048.0**

Building:	Noyes Lab						
Location:	0012						

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Notes
19	**Classroom**	599.48	wall	(1)AD1277I1		NP26I	
111	**Classroom**	587.29	wall	(1)AD1277I1		?	no entry
159	Office Service	145.35	wall	(1)AD1277I1		NP26I, NP13I	1) 3way. Blank off 1 switch plate
0159A	Office	133.09	wall	(1)AD1277I1		NP26I	
203	**Classroom**	541.46	wall	(1)AD1277I1		NP1226I	1) Switch Leg (& clg fan)
204	**Classroom**	584.2	wall	(1)AD1277I1		NP1226I	1) Switch Leg (& clg fan)
209	**Classroom**	582.71	wall	(1)AD1277I1		?	no entry
300	**Classroom**	390.33	wall	(1)AD1277I1		NP1226I	1 gang + dimr
301	**Classroom**	377.66	wall	(1)AD1277I1		NP1226I	1 gang + dimr
303	**Classroom**	371.33	wall	(1)AD1277I1		NP1226I	1 gang + dimr
323	**Men's Rm. Custodial Area**	129.98	wall	(1)AD1277I1		NP26I	
335	**Class Laboratory Service**	227.1	wall	(1)AD1277I1		NP26I	
469	**Class Laboratory Service**	243.49	wall	(1)AD1277I1		NP26I	

LEGEND

NP26I	1 gang/décor plate
NP13I	blank plate
NP1226I	décor & dimr plate
(1)CU300A, (6)AAR	CU + Add a relay (quantity)
(1)ATD2000CRP	Ceiling Sensor (quantity)
CU300A	Control Unit
(1)AD1277I1	Wall Sensor, 1 button (quantity)
(1)AD1277I2	Wall Sensor, 2 button (quantity)

(1)AD1277I1	13.0
(1)ATD2000CRP	
(2)ATD2000CRP	
(3)ATD2000CRP	
(4)ATD2000CRP	
(1)AD1277I1N	
(1)AD1277I2	
TOTAL ROOMS	**13.0**
TOTAL AREA	**4,913.5**
TOTAL WATTAGE	**5,328.0**

Building *	Transportation							0
Location:	42							

Room No.	Room Type	Area	Control Type	Quantity/ Model #	Accessory	Wall Plate Hubbell #	Controlled Wattag *	Notes
8	Office	184.69	Wall	(1)AD1277I1		NP26I	504.0	1) sw. leg *
10	Office	196.78	Wall	(1)AD1277I1		NP26I	504.0	1) sw. leg *
11	Office	182.09	Wall	(1)AD1277I1		NP26I	504.0	1) sw. leg *
13	Office	182.43	Wall	(1)AD1277I1		NP26I	504.0	1) sw. leg *
14	Office	185.59	Wall	(1)AD1277I1		NP26I	504.0	1) sw. leg *
17	Office	333.51	Wall	(1)AD1277I1		NP26I	588.0	1) sw. leg *
21	Office	215.13	Wall	(1)AD1277I1		NP26I	672.0	1) sw. leg *
108	Building Service Area	180.03	Wall	(1)AD1277I1		NP26I	0.0	1) sw. leg
213	Women's room	203.61	Wall	(1)AD1277I1		NP26I	0.0	1) sw. leg
307	Class Laboratory	156.88	Wall	(1)AD1277I1		NP26I	192.0	1) sw. leg, alarmed
311	Men's Rm	186.46	Wall	(1)AD1277I1		NP26I	168.0	

LEGEND

(1)ATD2000CRP	Ceiling Sensor (quantity)
CU300A	Control Unit
(1)CU300A, (6)AAR	CU + Add a relay (quantity)
(1)AD1277I1	Wall Sensor, 1 button (quantity)
(1)AD1277I2	Wall Sensor, 2 button (quantity)
(1)AD1277I1N	Wall Sensor, 0 button (quantity)
NP26I	1 gang/décor plate
NP13I	blank plate
NP1226I	décor & dimr plate
NP1326I	décor/blank plate
Room name and number	Keyed wall switch in Restrooms

(1)AD1277I1	11.0
(1)ATD2000CRP	0.0
(2)ATD2000CRP	0.0
(1)AD1277I1N	0.0
(1)AD1277I2	0.0
TOTAL ROOMS	**11.0**
TOTAL AREA	**2,207.2**
TOTAL WATTAGE	**4,140.0**