

# GET REAL WITH BIM DELIVERING PROFOUNDLY IMPROVED FACILITIES

NWCC Conference  
Tulalip, WA - 11/17/10



Kimon Onuma, FAIA  
President - Onuma, Inc.

ONUMA.com  
626 793 7400

Animation #1

Play Here:

<http://vimeo.com/16687982>



# ONUMA Inc. GSA BIM IDIQ Team

“8A Status”



All GSA Regions

Booz | Allen | Hamilton



BECK

BROADDUS  
& ASSOCIATES  
*INNOVATIVE PROJECT MANAGEMENT AND PLANNING*

LEO A DALY

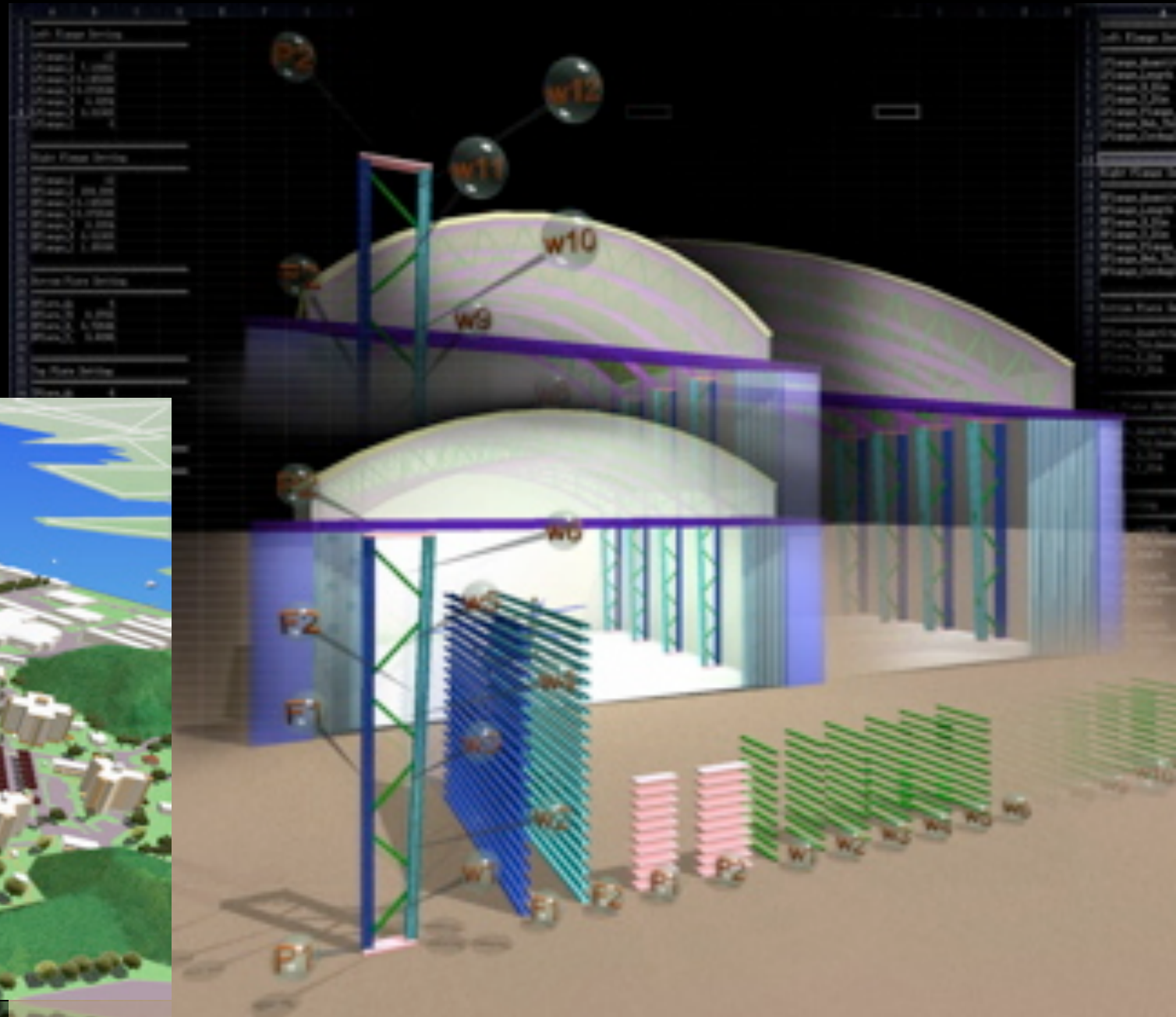




# BIM 1993

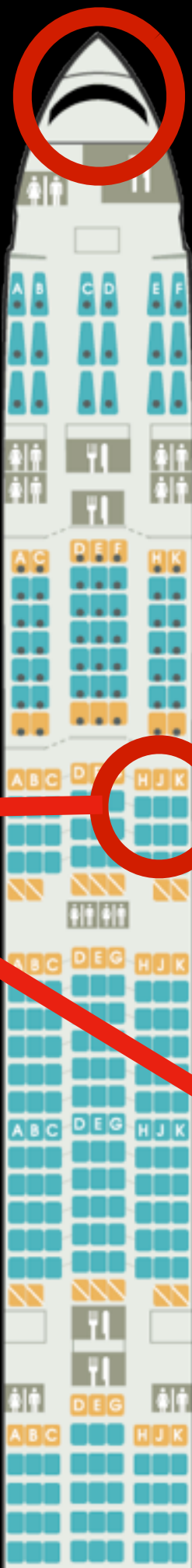


Navy



Army





**Mandarin Oriental, Washington D.C.**  
 Asian opulence overlooking the Tidal Basin  
 ★★★★★ Star Rating

[Continue to Booking](#)  
 (Rates from \$270.00)

Virtual Tours | Photos

Click on thumbnails to view large photos

home flights hot

Welcome, Kimon

[Start search over](#)

Change your search

Departure airport:

Destination airport:

Travel Dates:  
 Specific | [Flexible](#)

Departing: (mm/dd/yy)

Returning: (mm/dd/yy)



[Saratoga National Hotel](#)  
 Just off Interstate 395 one mile from the subway ...  
 ★★½ Arlington

[Price details](#)

[Washington Photo Safari](#)

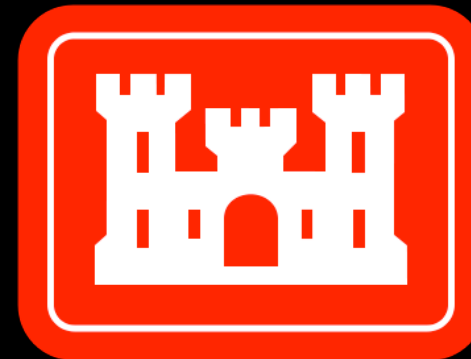


To the amateur photographer professional architectural photo the nation's capital. [More...](#)

**\$1351**



# Public Owners





“The data about our facilities, is more valuable than the physical facility itself”

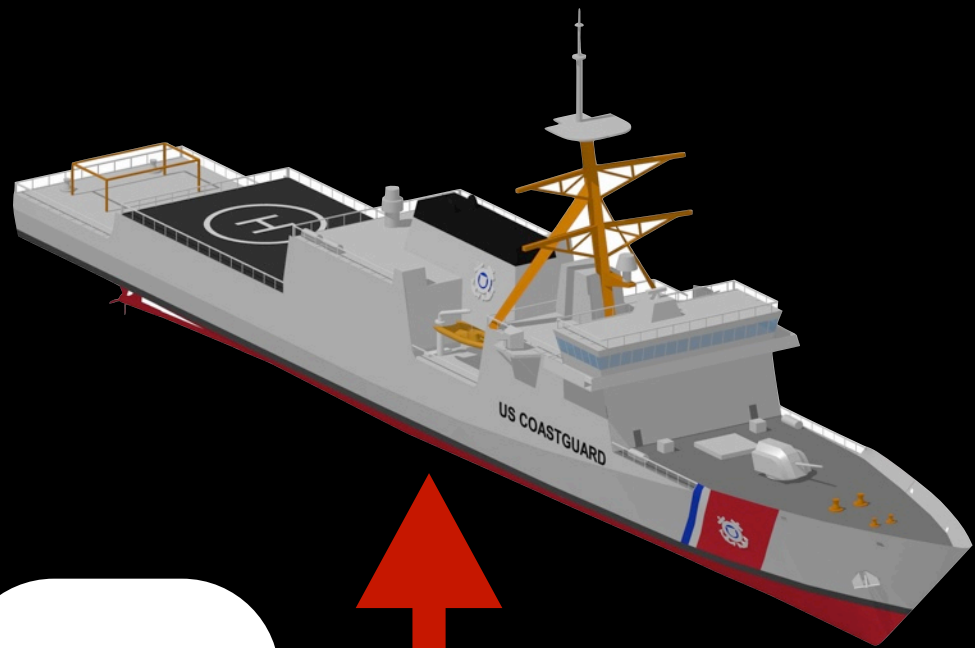
The image is a collage of software interfaces related to facility planning for the USCGC. It includes Google Earth showing a 3D model of a shipyard with a red circle highlighting a specific building labeled "San Diego Blast 1". Overlaid on this is the "USCGC OCCSU PLANNER" software interface, which displays a 2D site plan, a 3D model of a ship, and various data tables. A "USCGC OCCSU PLANNER" logo is in the bottom left, and an "ONUMA" logo is in the bottom right.

SUI	MDI	FCI	Note
1.42	95.61	82.00	
0.00	95.61	82.00	partial vinyl flooring Due for update in floorplan See drawing into reading room
1.03	95.61	82.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	95.61	82.00	Has small luncheon table and micro wave
1.03	95.61	82.00	
0.00	95.61	82.00	
1.03	95.61	82.00	not
0.00	80.00	82.00	
0.00	95.61	82.00	
0.00	95.61	82.00	Smy
1.03	95.61	82.00	Priv
0.00	95.61	82.00	Sea
1.03	95.61	82.00	stag pers
0.00	95.61	82.00	
1.03	95.61	82.00	
1.03	95.61	82.00	
1.03	95.61	82.00	
1.03	95.61	82.00	

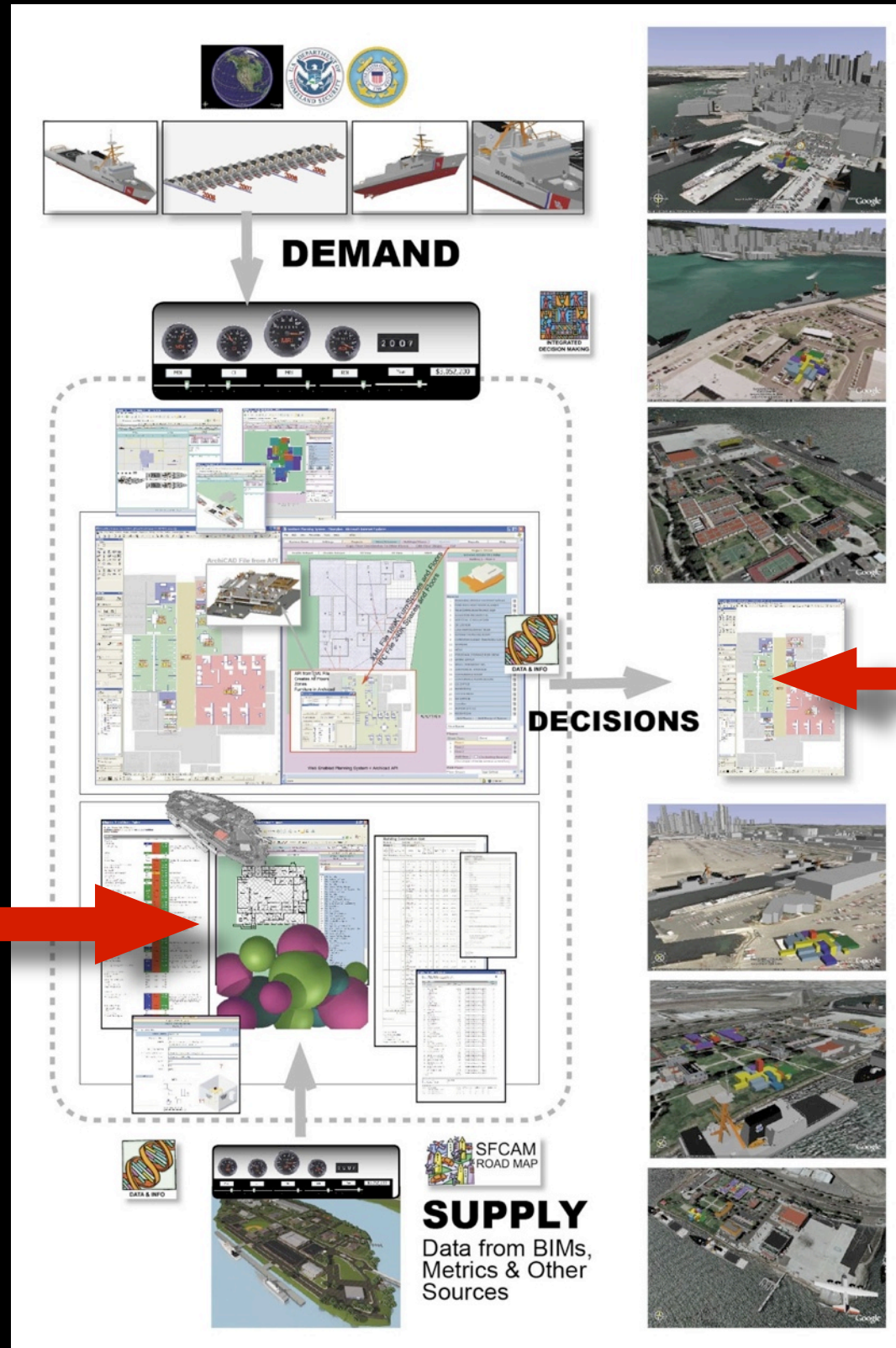




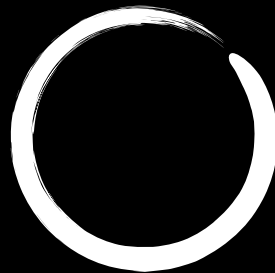
# US Coast Guard - Excel to BIM



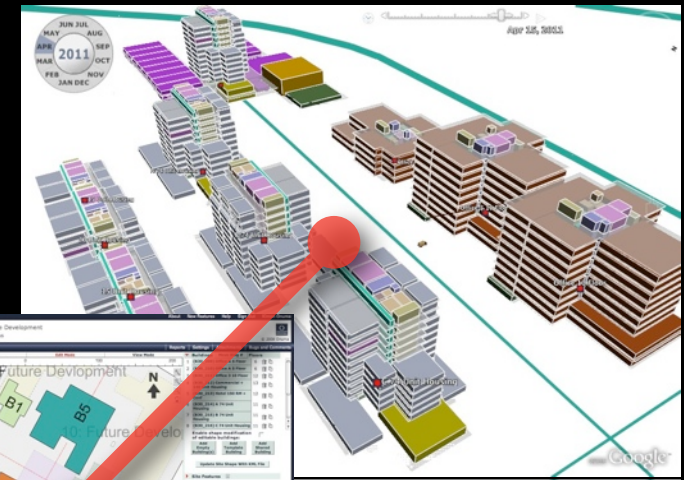
MISSIONS  
LINKED TO  
FACILITIES







ID	Space Name	Floor	Space	X	Y	Capacity	Occupancy	Surge	C	Space I	Space E	Depart	Vertical	MDI	SUI	FCI
Office	4	1010	21	24	3	4	0	10	0	3	0	90	0.1	0.1		
Conference Room	3	1011	25	16	4	4	0	10	0	3	0	60	0.1	0.1		
Lobby	3	1012	24	33	0	0	0	12	0	8	0	90	0	0		
Women	3	1013			0	0	0	10	0	4	0	70	0.05	0.05		
Mechanical	3	1014	19.9	14	0	0	0	10	0	9	0	100	0.16	0.16		
Stairs	3	1015			0	0	0	12	0	6	0	90	0	0		
Men	3	1016			0	0	0	10	0	4	0	70	0.05	0.05		
Elevator Lobby	3	1017			0	0	0	10	0	1	0	50	0	0		
Elevator	3	1018	11.7	9.88	0	0	0	12	0	8	0	90	0	0		
Mechanical	3	1019	11.7	3.56	0	0	0	10	0	9	0	100	0.1	0.1		
Corridor	3	1020			0	0	0	10	0	7	0	60	0	0		
Corridor	3	1021			0	0	0	10	0	7	0	60	0	0		
Break Room	3	1022			3	3	12	10	0	1	0	60	0	0		
Corridor	3	1025			0	0	0	10	0	11	0	60	0	0		
Lobby	3	1026			0	0	0	10	0	7	0	60	0	0		
Office	3	1027	48.2	89.9	38	38	0	10	0	3	0	50	0	0		
Elevator	2	1001	19.9	7.54	0	0	0	12	0	2	0	90	0	0		
Open Office	2	1002	48.9	107	23	20	14	10	0	3	0	70	0.1	0.1		
Office	2	1003	38	2.1	9	6	0	10	0	3	0	100	0.05	0.05		
Stairs 1	2	1004	9.27	2.8	0	0	0	10	0	0	0	100	0	0		
Electrical	2	1005	13.3	2.8	0	0	0	10	0	0	0	100	0	0		
Mechanical	2	1006	19.9	14.5	0	0	0	10	0	0	0	100	0	0		
Women	2	1007			0	0	0	10	0	0	0	100	0	0		
Men	2	1008			0	0	0	10	0	0	0	100	0	0		
Office	2	1010	19.9	19.2	4	4	0	10	0	0	0	100	0	0		
Office	2	1011	19.9	29.7	4	4	0	10	0	0	0	100	0	0		
Elevator	2	1012	19.9	9.46	0	0	0	10	0	0	0	100	0	0		
Women	2	1013			0	0	0	10	0	0	0	100	0	0		
Mechanical	2	1014	19.9	14	0	0	0	10	0	0	0	100	0	0		
Stairs	2	1015			0	0	0	10	0	0	0	100	0	0		

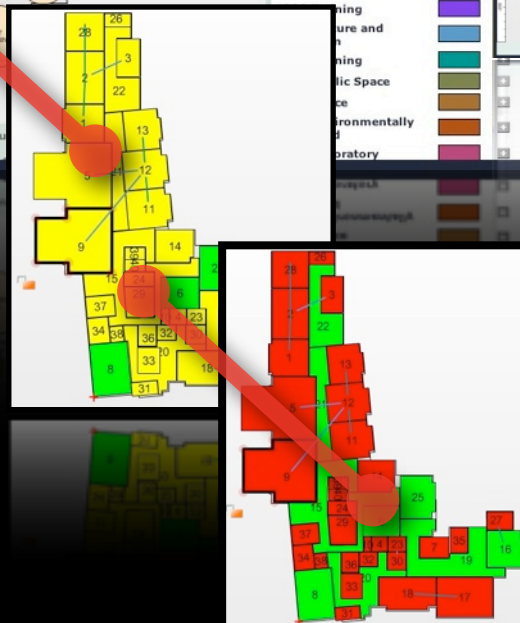
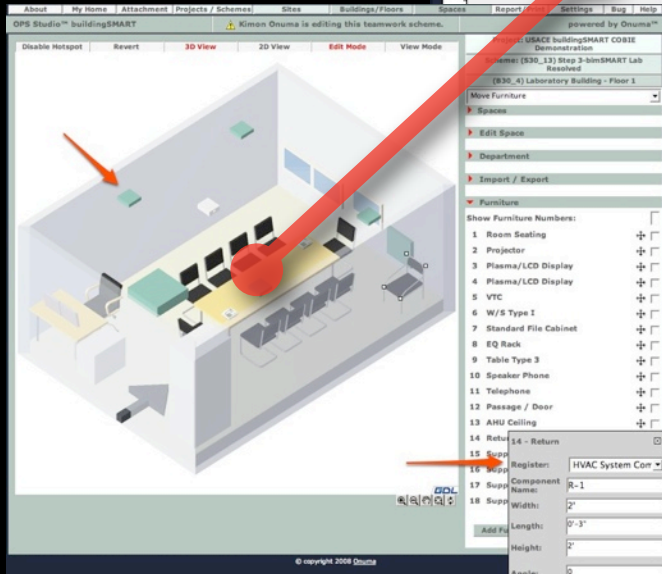


buildingSMARTalliance™ Project: Portfolio of bimSMART Labs Worldwide  
Scheme: bimSMART Lab-Dubai + Conference Center

buildingSMARTalliance™ Project: Lab West One Development  
Scheme: West One Development

Space Attributes

Department	Color
(none)	
1300 Interior Parking	
1400 Vertical Penetration	
1500 Void	
2100 Core Building Service	
2130 Restroom	
2140 Utility Room	
2200 Primary Circulation	
3100 Encroachment	
3200 Expansion	
3300 Secondary Circulation	
4100 Business Support	
4110 Auditorium	
4115 Lobby	
4130 Meeting	
4200 Personnel Service	
4220 Food Service	



Building Attributes

LEED Rating	Color	Selection
Gold		+ -
Silver		+ -
Bronze		+ -
Platinum		+ -
Not Rated		+ -

Space Attributes

Space Name	Color
ADP	
ANT	
AUD	
CFT	
CLD	
CON	
CRH	
CRJ	
CRV	
CST	
FDS	
FIT	
HUT	
LND	
INS	
JCC	
JHR	
LAB	
MCH	
PTL	
QRR	
STP	
STC	
TFC	
TLT	
TTO	
UFO	
WRH	

# BIM MODEL SERVER





# GIS

Boston

Utilities

Lat: 42.36  
Lon: -71.05

Carpet Source:  
458 Miles

Joe

Joe's  
Chair

Joe

98 Buildings  
43,554,958 SF

Building  
#23

1,809,139  
kWh

Carpet:  
InterfaceFLOR

# BIM





# Case Study: BIMStorm





# LOS ANGELES 24 hrs.

arcutt|winslow PERKINS + WILL buildingSMARTalliance Autodesk Gensler HOK HNTBSCHNEIDER + WITZ



# 420 BUILDINGS



# ONE BUILDING





**Estimate**

Recipes | Methods | Resources |

Specification

**SHELL**

**SUPERSTRUCTURE**

Structure

10.00 10.01 Precast Beam 20R  
 10.00 10.02 Precast Beams 20R Span (PreCast Structure)  
 410.0002 Precast Beams 20R Span (PreCast Structure)

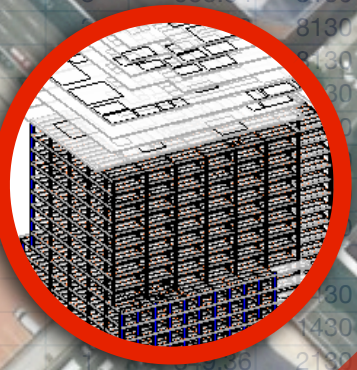
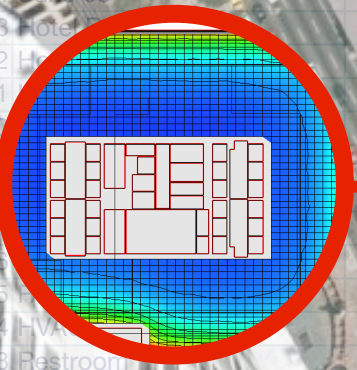
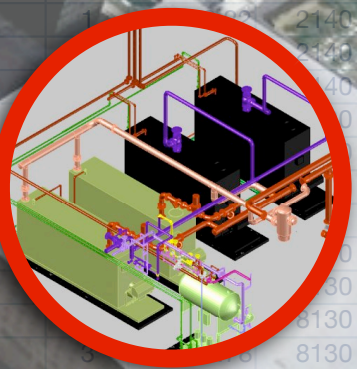
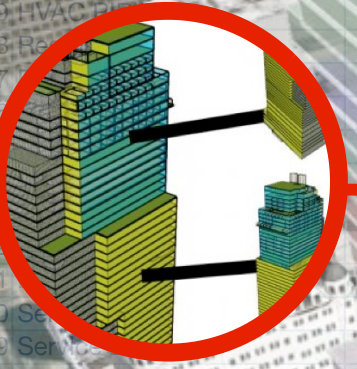
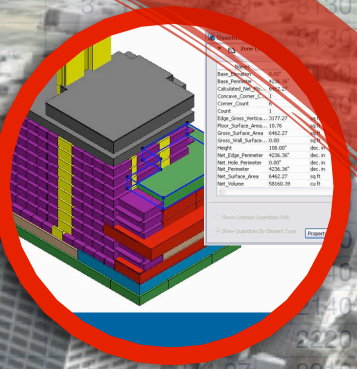
10.00 10.01 Precast Column  
 10.00 10.08 Precast Columns 12R (PreCast Structure)  
 410.0008 Precast Columns 12R (PreCast Structure)

Floor Decks

10.00 10.01 Slab on Deck Capsoil  
 10.00 10.01 Concrete Reinforcing (Slab on Composite Deck)  
 410.0001 Concrete Reinforcing (Slab on Composite Deck)

3500 psi Concrete Material (Slab on Composite Deck)  
 2500 psi Concrete Material (Slab on Composite Deck)

Place 500 w/Pumped Concrete (Slab on Composite Deck)  
 2500 w/Pumped Concrete (Slab on Composite Deck)



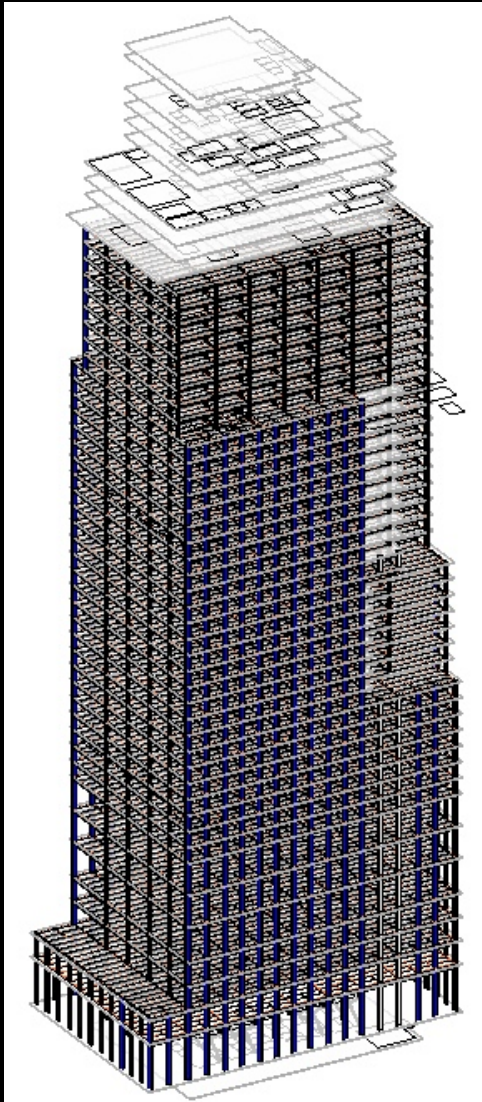
**BIM  
STORM**



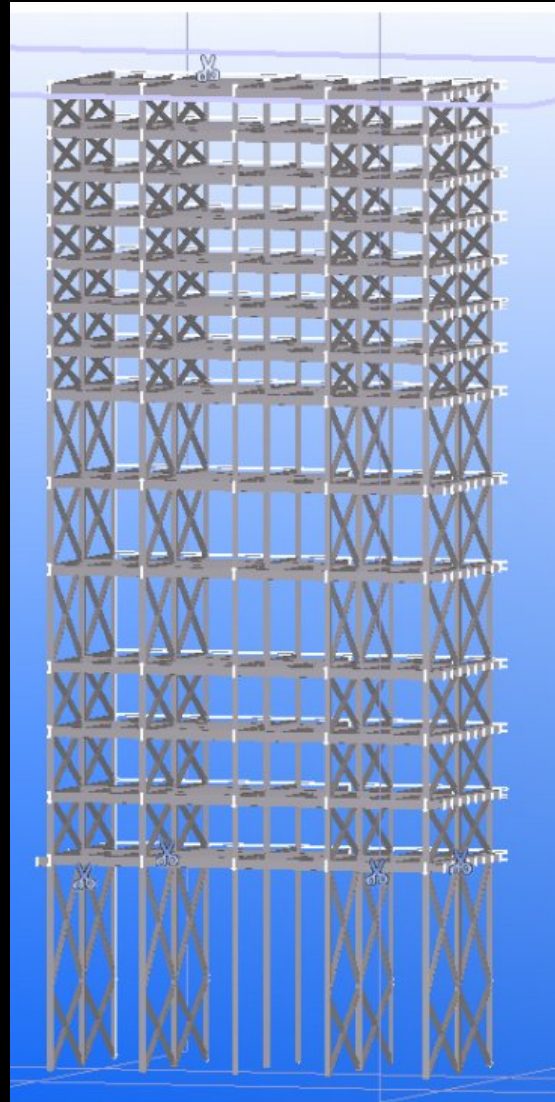
Google



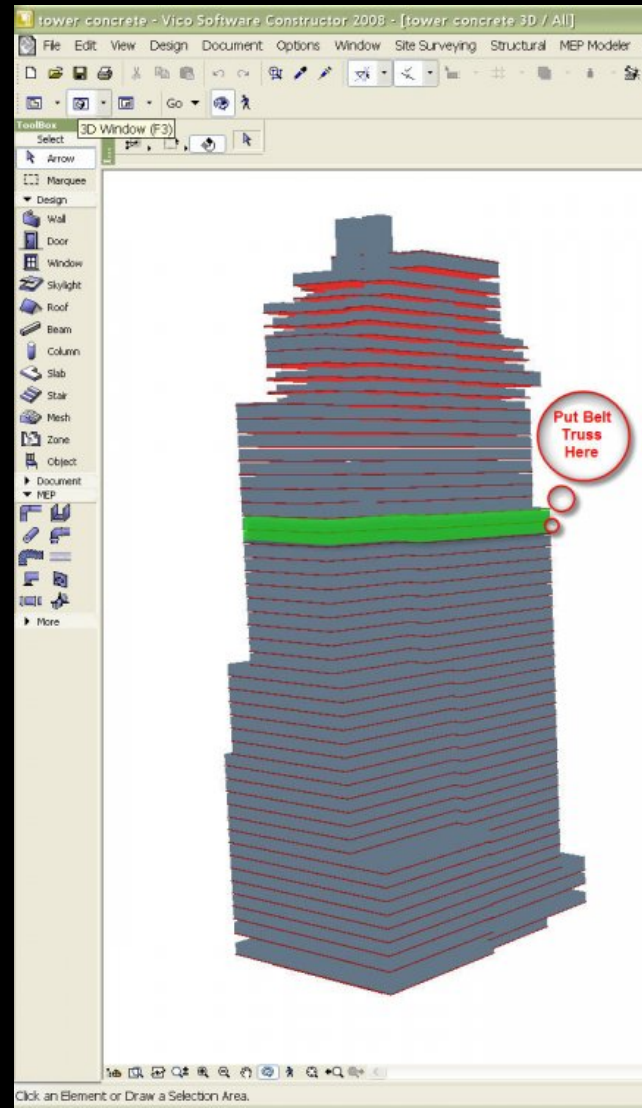
# ○ DETAILED STUDIES



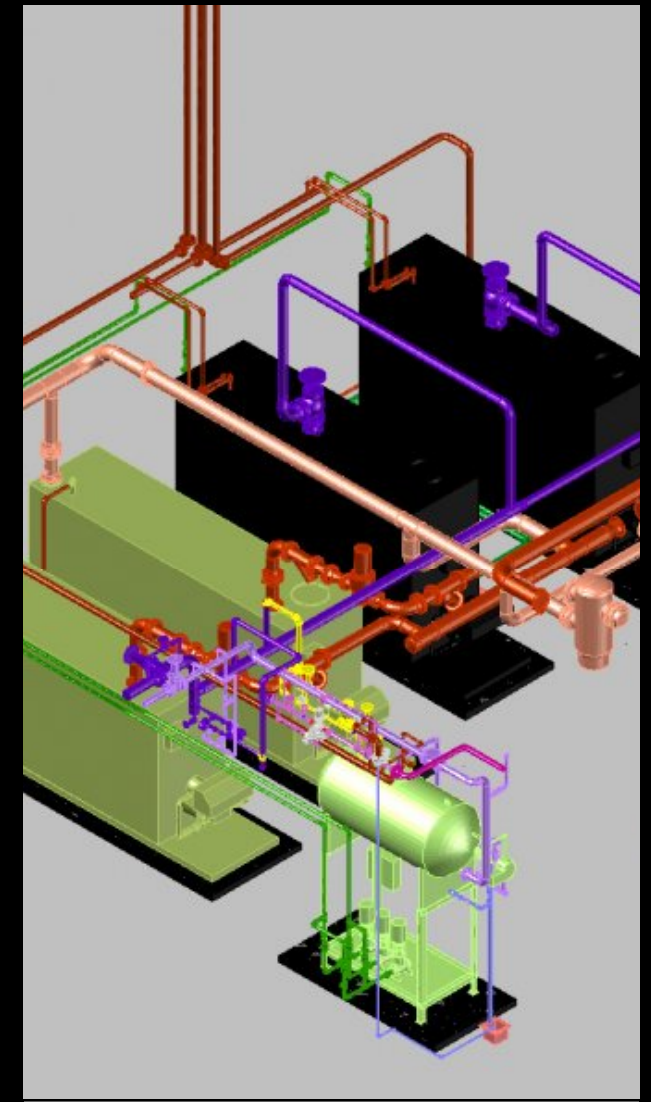
REVIT  
Structure



TEKLA  
Structure



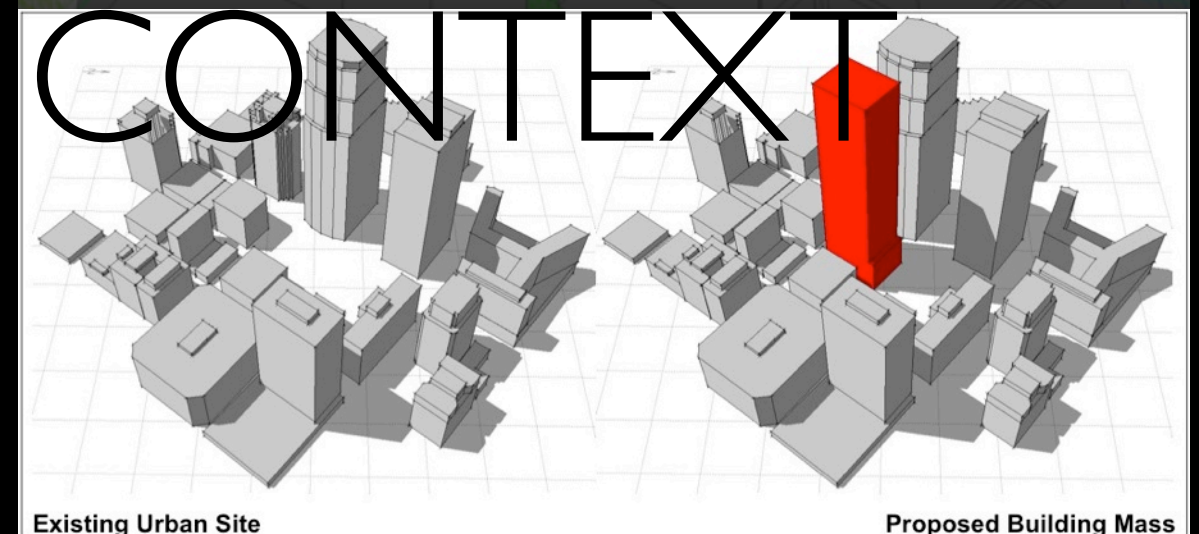
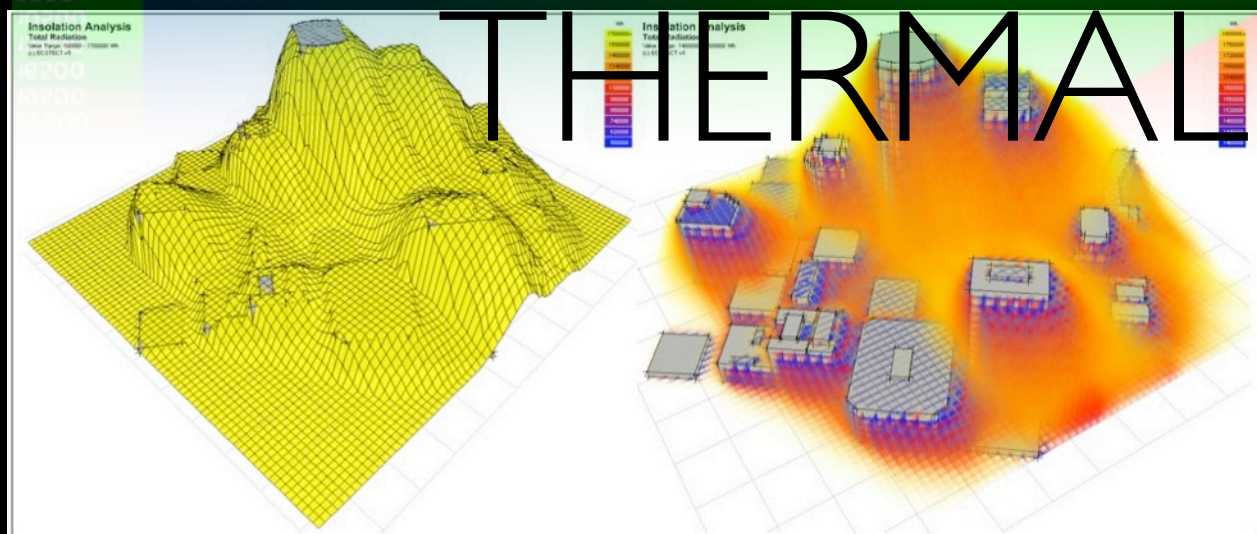
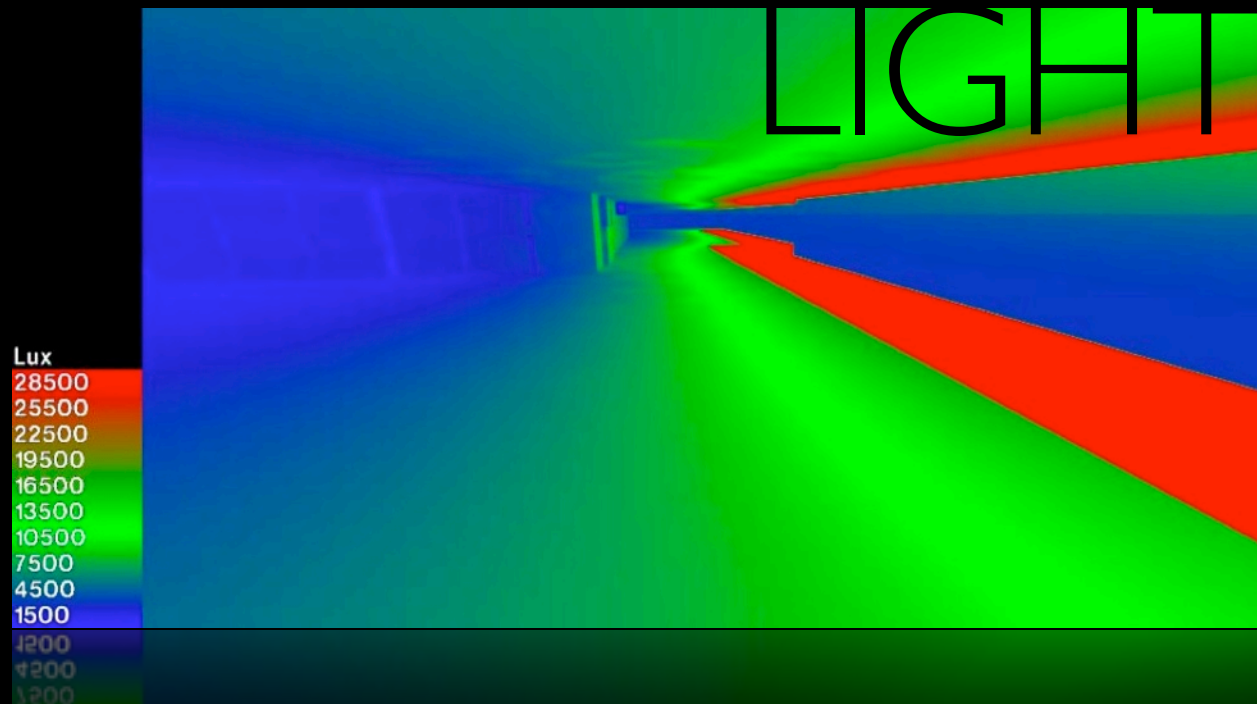
VICO  
Cost Estimate



AUTOCAD MEP  
Mechanical



# ENERGY STUDIES

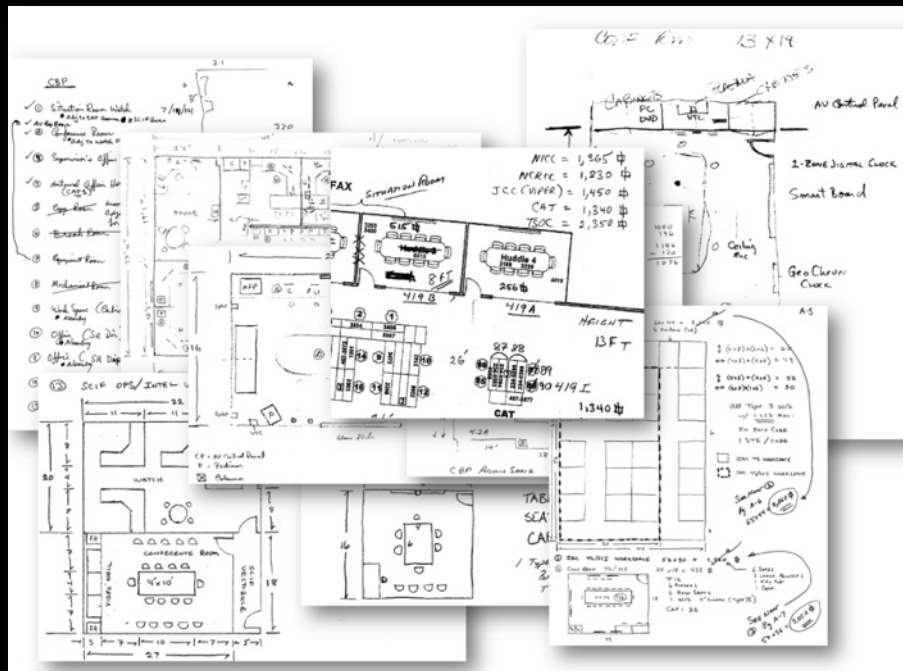


ECOTECH

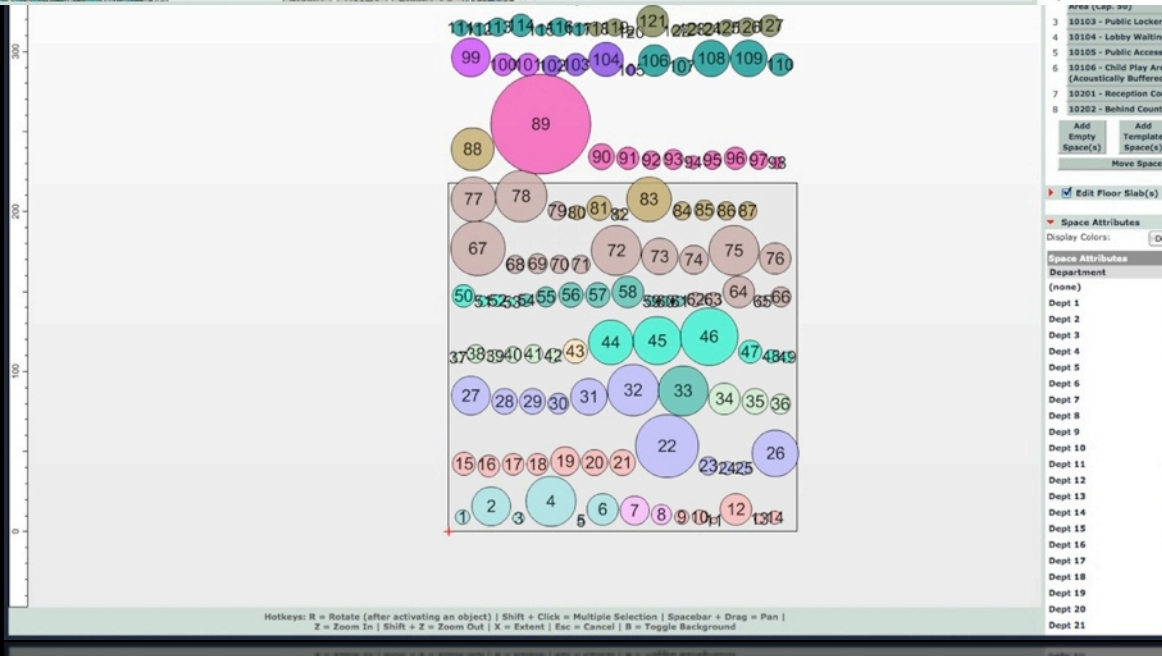
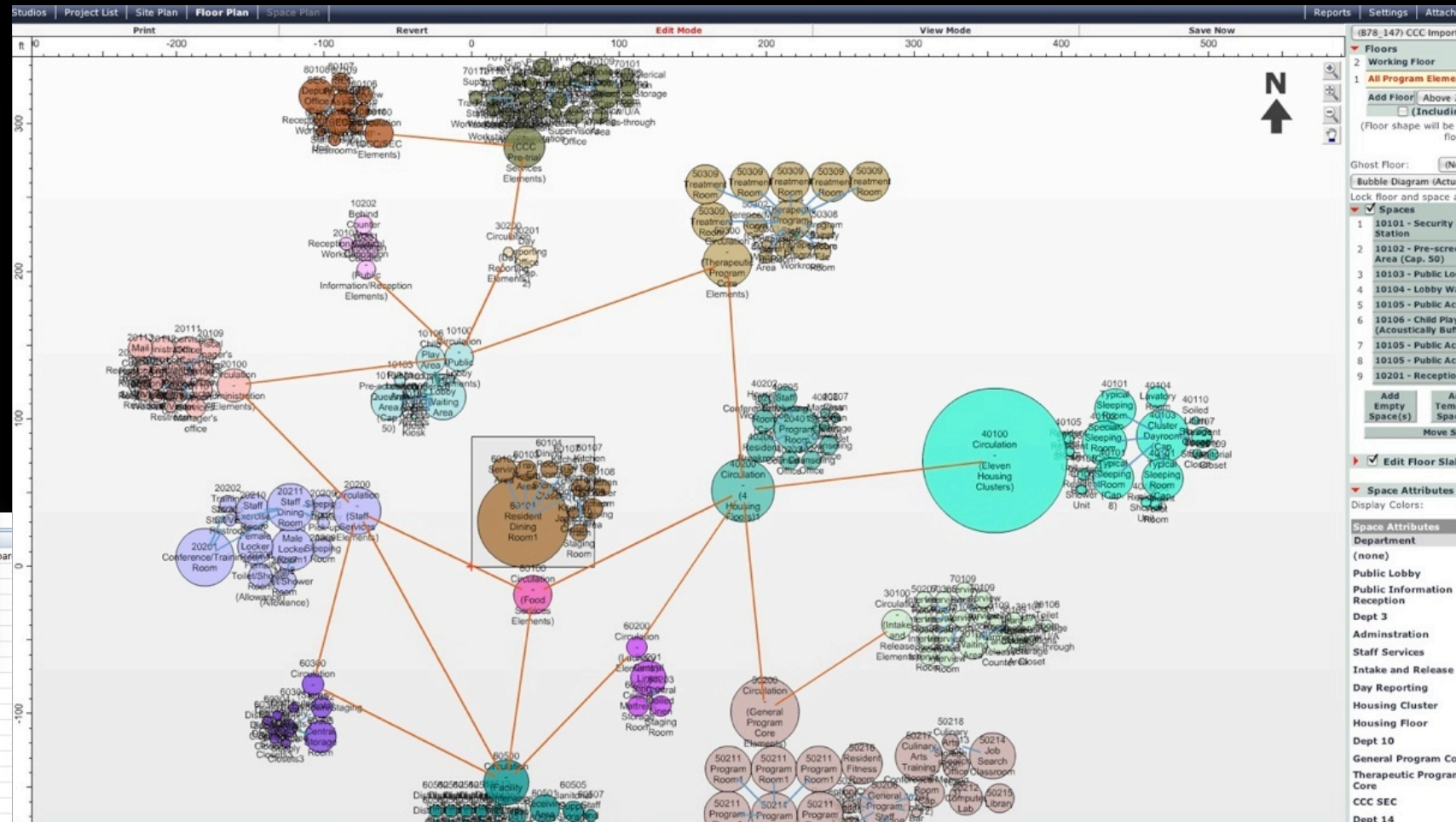
# OPEN STANDARDS



# From Sketch to Excel to BIM



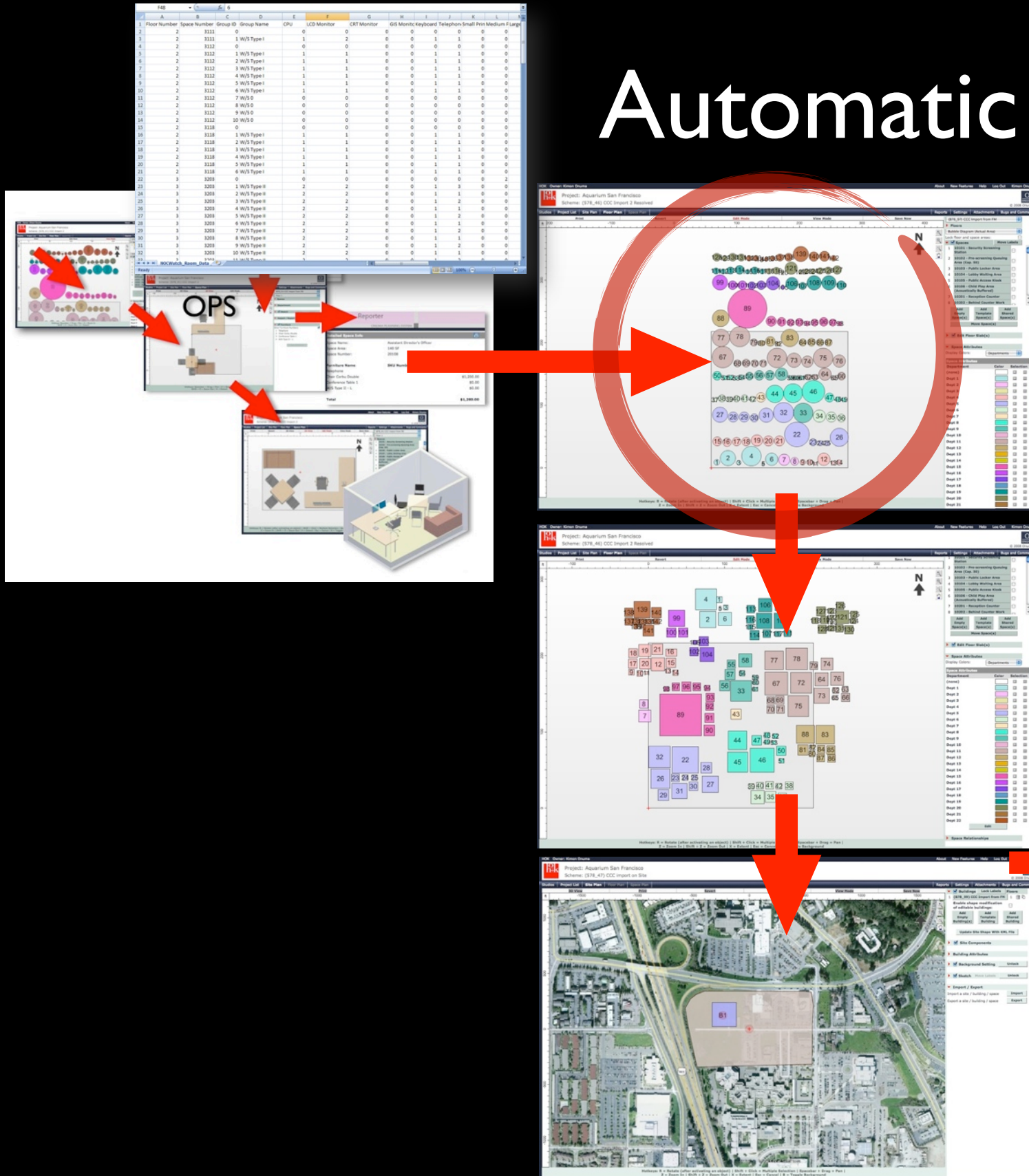
8	2	3112	4 W/S Type I	1	1	0	0	0	0	0	0	0
9	2	3112	5 W/S Type I	1	1	0	0	0	0	0	0	0
10	2	3112	6 W/S Type I	1	1	0	0	0	0	0	0	0
11	2	3112	7 W/S 0	0	0	0	0	0	0	0	0	0
12	2	3112	8 W/S 0	0	0	0	0	0	0	0	0	0
13	2	3112	9 W/S 0	0	0	0	0	0	0	0	0	0
14	2	3112	10 W/S 0	0	0	0	0	0	0	0	0	0
15	2	3118	0	0	0	0	0	0	0	0	0	0
16	2	3118	1 W/S Type I	1	1	0	0	0	0	0	0	0
17	2	3118	2 W/S Type I	1	1	0	0	0	0	0	0	0
18	2	3118	3 W/S Type I	1	1	0	0	0	0	0	0	0
19	2	3118	4 W/S Type I	1	1	0	0	0	0	0	0	0
20	2	3118	5 W/S Type I	1	1	0	0	0	0	0	0	0
21	2	3118	6 W/S Type I	1	1	0	0	0	0	0	0	0
22	3	3203	0	0	0	0	0	0	0	0	0	0
23	3	3203	1 W/S Type II	2	2	0	0	0	0	0	0	0
24	3	3203	2 W/S Type II	2	2	0	0	0	0	0	0	0
25	3	3203	3 W/S Type II	2	2	0	0	0	0	0	0	0
26	3	3203	4 W/S Type II	2	2	0	0	0	0	0	0	0
27	3	3203	5 W/S Type II	2	2	0	0	0	0	0	0	0
28	3	3203	6 W/S Type II	2	2	0	0	0	0	0	0	0
29	3	3203	7 W/S Type II	2	2	0	0	0	0	0	0	0
30	3	3203	8 W/S Type II	2	2	0	0	0	0	0	0	0
31	3	3203	9 W/S Type II	2	2	0	0	0	0	0	0	0
32	3	3203	10 W/S Type II	2	2	0	0	0	0	0	0	0
33	3	3203	11 W/S Type II	2	2	0	0	0	0	0	0	0



Note: Sample data, not from actual GSA Project



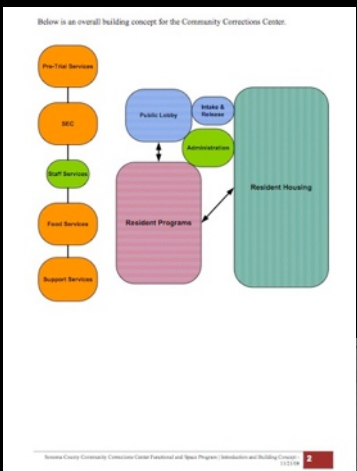
# Automatic BIM from Data



Note: Sample data, not from actual GSA Project



# Room Data



Std Code	Assn Std	Qty	Usn Sq Ft	% Circ	Net Sq Ft
OS-9	180	1	180	20%	216
OS-8	30	1	30	25%	38

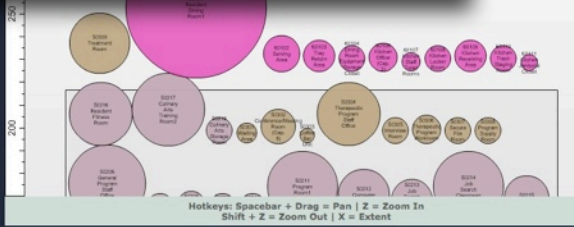
Component Name	Default Cost	Cost (user defined)	SKU Number	URL
CB-1	160	350	123456	http://cabinets.com
CB-2	160	350	123456	http://cabinets.com
CB-3	160	350	123456	http://cabinets.com

List of Spaces to Import Furniture

Number	Space Num...	How Many?	Office	Ho
20401				30
20201		1	Computer	12
20205				8
20206				8
20102				4
20104		1	Telephone	4
20112		4	Telephone	4
20113		1	Copier	3
20111				2
20107		1	Telephone	1
20108		1	Telephone	1
20109		1	Telephone	1
20110		1	Telephone	1
20111		1	Telephone	1
20101		1	Telephone	1
20104		1	Computer	
20105				
20106				
20106				

Reporter  
ONUMA PLANNING SYSTEM  
Detailed Space Info  
Space Name: Assistant Director's Office  
Space Area: 140 SF  
Space Number: 20108  
SKU Number: [Red Arrow points to 20108 in table]

Excel or dB Spaces



Space Attributes  
Department: (none)  
Dept 1: [Color]  
Dept 2: [Color]  
Dept 3: [Color]  
Dept 4: [Color]

Furniture Name	SKU Number	Cost
Telephone		\$80.00
Chair Corbu Double		\$1,200.00
Conference Table 1		\$0.00
W/S Type II - L		\$0.00
<b>Total</b>		<b>\$1,280.00</b>

Quick Confirm in Onuma Layout of Space

Hotkeys: R = Rotate (after activating an object) | Shift + Click = Multiple Selection | Spacebar + Drag = Pan | Z = Zoom In | Shift + Z = Zoom Out | X = Extent | Esc = Cancel | B = Toggle Background



# Reports

Print Revert Edit Mode View Mode Save Now

ft 0 50 100 150

250  
200  
150  
100

Hotkeys: R = Rotate (after activating an object) | Shift + Click = Multiple Selection | Spacebar + Drag = Pan | Z = Zoom In | Shift + Z = Zoom Out | X = Extent | Esc = Cancel | B = Toggle Background

(B78\_148) 11 Housing Clusters Expanded

Floors

- 5 Level 5 Housing
- 4 Level 4 Housing
- 3 Level 3 Housing
- 2 Level 2
- 1 Level 1

Add Floor Above 5: Level 5 Hous

(Including Spaces)

(Floor shape will be the same as current floor)

Ghost Floor: Level 1

Normal View

Lock floor and space areas:

Spaces Move Labels

- 40101 - Typical Sleeping Room (Cap. 8)
- 40102 - Special Sleeping Room (Cap. 8)
- 40103 - Cluster Dayroom (Cap. 32)
- 40104 - Lavatory Room
- 40105 - Resident Toilet Room
- 40106 - Resident Shower Unit
- 40107 - Resident Laundry Room
- 40108 - Storage Closet
- 40109 - Janitorial Closet

Add Empty Space(s) Add Template Space(s) Add Shared Space(s)

Move Space(s)

Edit Floor Slab(s)

Space Attributes

Display Colors: User Groups

Space Attributes

User Groups	Color	Selection
1 Housing Cluster CCC	Light Blue	+
2 Housing Cluste CCC	Pink	+
3 Housing Cluster CCC	Yellow	+
4 Housing Cluster CCC	Light Orange	+
5 Housing Cluster CCC	Light Purple	+
6 Housing Cluster CCC	Light Green	+
7 Housing Cluster CCC	Light Yellow	+
8 Housing Cluster CCC	Light Cyan	+
9 Housing Cluster CCC	Light Blue	+
10 Housing Cluster CCC	Light Purple	+
11 Housing Cluster CCC	Light Orange	+
Circulation	Yellow	+
Booking and Releases	Blue	+

Project Name: USACE buildingSMART COBIE Demonstration  
Scheme Name: Step 3-bimSMART Lab Resolved

Force Protection Scenario 1  
Division / Unit / Staff Impact Analysis

Building Name	Space Name	SQFT	Staff
Laboratory Building	Elevator PH	248	(No Staff associated with this Space)
Laboratory Building	Stair 1	208	(No Staff associated with this Space)
Laboratory Building	Stair 2	208	(No Staff associated with this Space)
Laboratory Building	Mech	518	(No Staff associated with this Space)
Sub-total		1,182	

LEED for New Construction

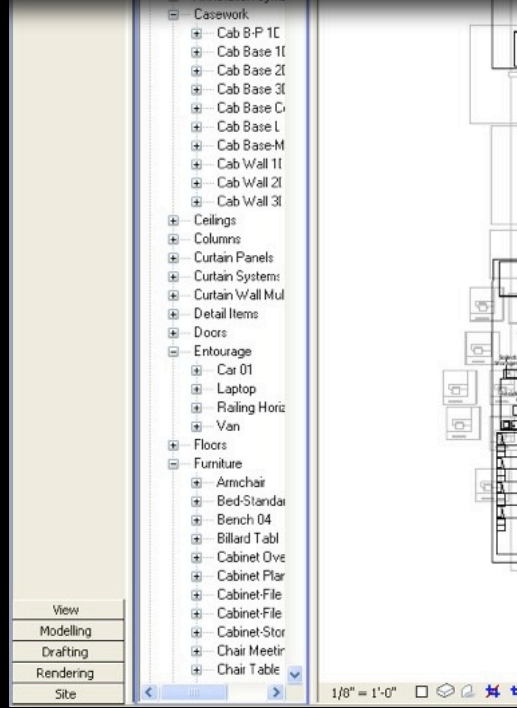
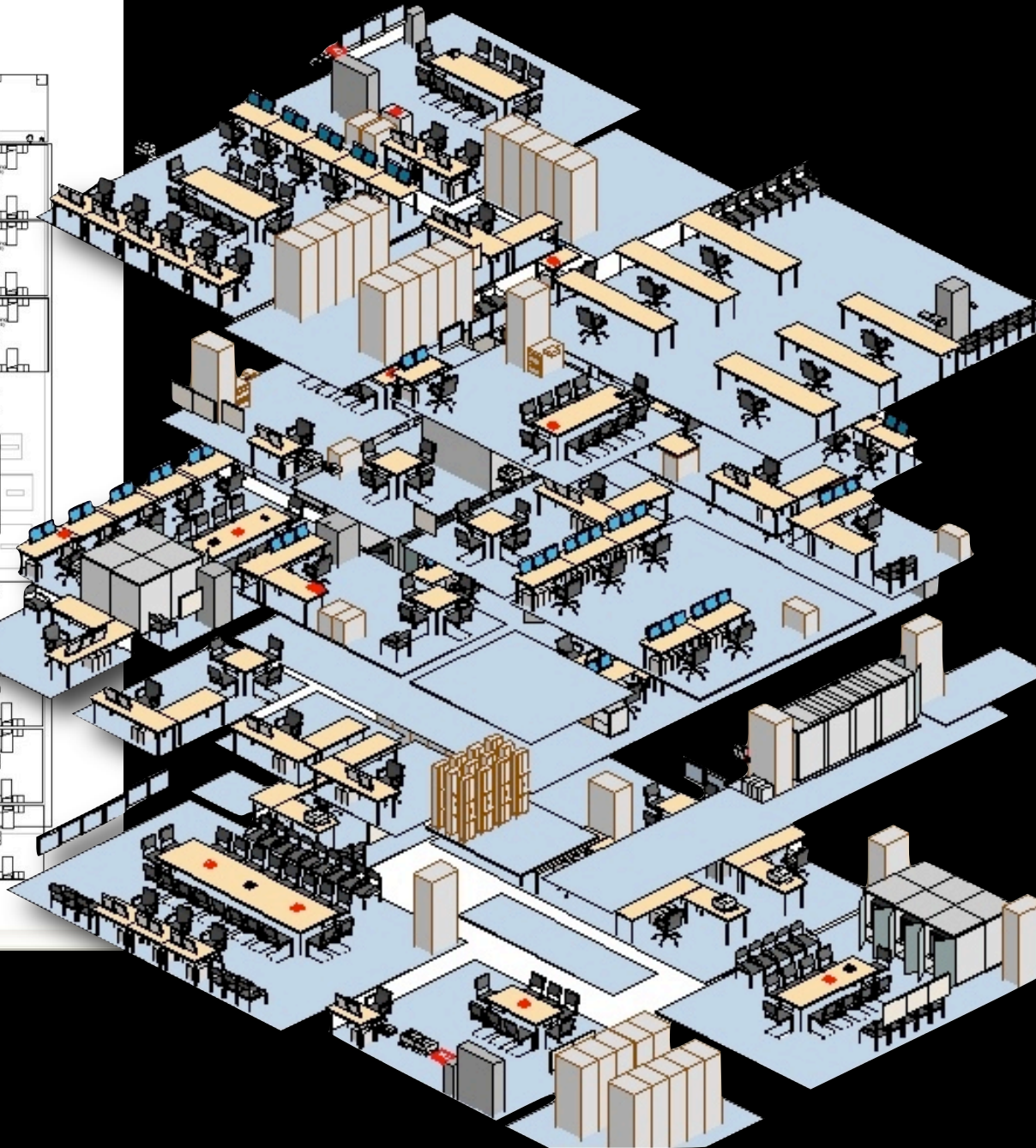
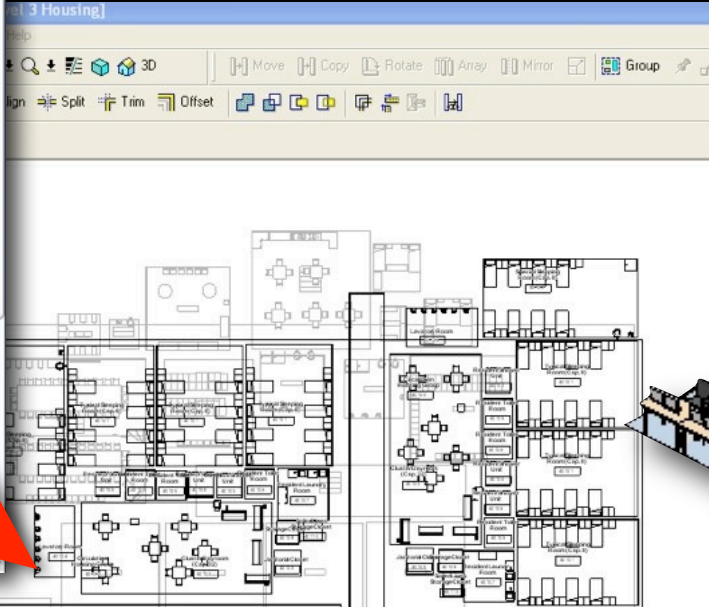
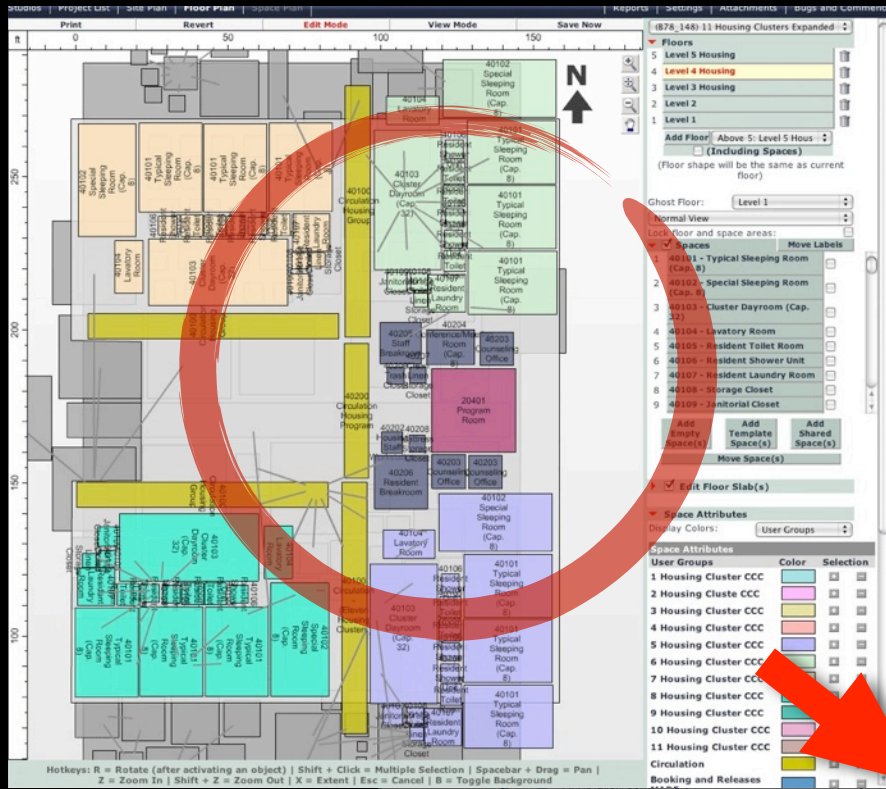
Admin Settings	General Settings	Site Settings	Building Settings	Space Settings	
Bldg Settings	Floor Matrix	PPD Uniformat	LEED	COBIE	Cost Est
Sustainable Sites (Credits: 9 / Possible: 0 / No: 0) 14 Points					
Yes	Prereq 1	Construction Activity Pollution Prevention	Required		
Yes	Credit 1	Site Selection			1
Yes	Credit 2	Development Density & Community Connectivity			1
Yes	Credit 3	Brownfield Redevelopment			1
Yes	Credit 4.1	Alternative Transportation, Public Transportation Access			1
Yes	Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms			1
Yes	Credit 4.3	Alternative Transportation, Low-Emitting & Fuel-Efficient Vehicles			1
Yes	Credit 4.4	Alternative Transportation, Parking Capacity			1
Yes	Credit 5.1	Site Development, Protect of Restore Habitat			1
Yes	Credit 5.2	Site Development, Maximize Open Space			1
Yes	Credit 6.1	Stormwater Design, Quantity Control			1
Yes	Credit 6.2	Stormwater Design, Quality Control			1
Yes	Credit 7.1	Heat Island Effect, Non-Roof			1
Yes	Credit 7.2	Heat Island Effect, Roof			1
Yes	Credit 8	Light Pollution Reduction			1
Water Efficiency (Credits: 4 / Possible: 0 / No: 0) 5 Points					

Note: Sample data, not from actual GSA Project





# Create BIM



Note: Sample data, not from actual GSA Project





# Drill Down to Equipment Data

The screenshot displays a BIM software interface for a conference room. On the left is a 2D floor plan in 'Edit Mode' showing workstations (WS154-157) and conference rooms (CONF17, CONF33). On the right is a 3D perspective view in 'View Mode' showing the room with desks, chairs, and people. The right-hand panel contains the following sections:

- Add Object(s):**
  - 1. Select category: Conference Tables
  - 2. Click on the images below to add furniture and equipment or select [Copy Furniture](#) to copy components from other locations into this space.
  - 1 Conference Table 1
  - 1 Conference Table 2
  - 1 Conference Table 3
  - 1 Conference Table 4
  - 1 Conference Table 5
  - 1 Conference Table 6
- Space Level Data:**
  - Space Relationships:**

1	1001 - Elevator	(None)
2	1002 - Open Office	(None)
3	1003 - Office	(None)
4	1004 - Stairs	(None)
5	1005 - Electrical	(None)
6	1006 - Mechanical	(None)
7	1007 - Women	(None)
8	1008 - Men	(None)
9	1009 - Office	(None)
  - Furniture:**

Show Furniture Numbers:

1	Conference Table 3	<input type="checkbox"/>
2	W/S Type II - C	<input type="checkbox"/>
3	W/S Type II - C	<input type="checkbox"/>
4	W/S Type II - C	<input type="checkbox"/>
5	W/S Type II - C	<input type="checkbox"/>
6	W/S Type II - C	<input type="checkbox"/>
7	W/S Type II - C	<input type="checkbox"/>
8	Passage / Door	<input type="checkbox"/>
9	Passage / Door	<input type="checkbox"/>
10	Return	<input type="checkbox"/>
  - Sketch:**
  - Preset Views:**
    - 1 Room 1009 (URL)

Right-click on the '(URL)' and select 'Copy Link Location' (or 'Copy Shortcut') to forward a link to the preset view. No Onuma account is needed to view preset views.

Link to BIMGallery

(Preset View Name)
  - Import / Export:**
    - Import a site / building / space
    - Export a site / building / space



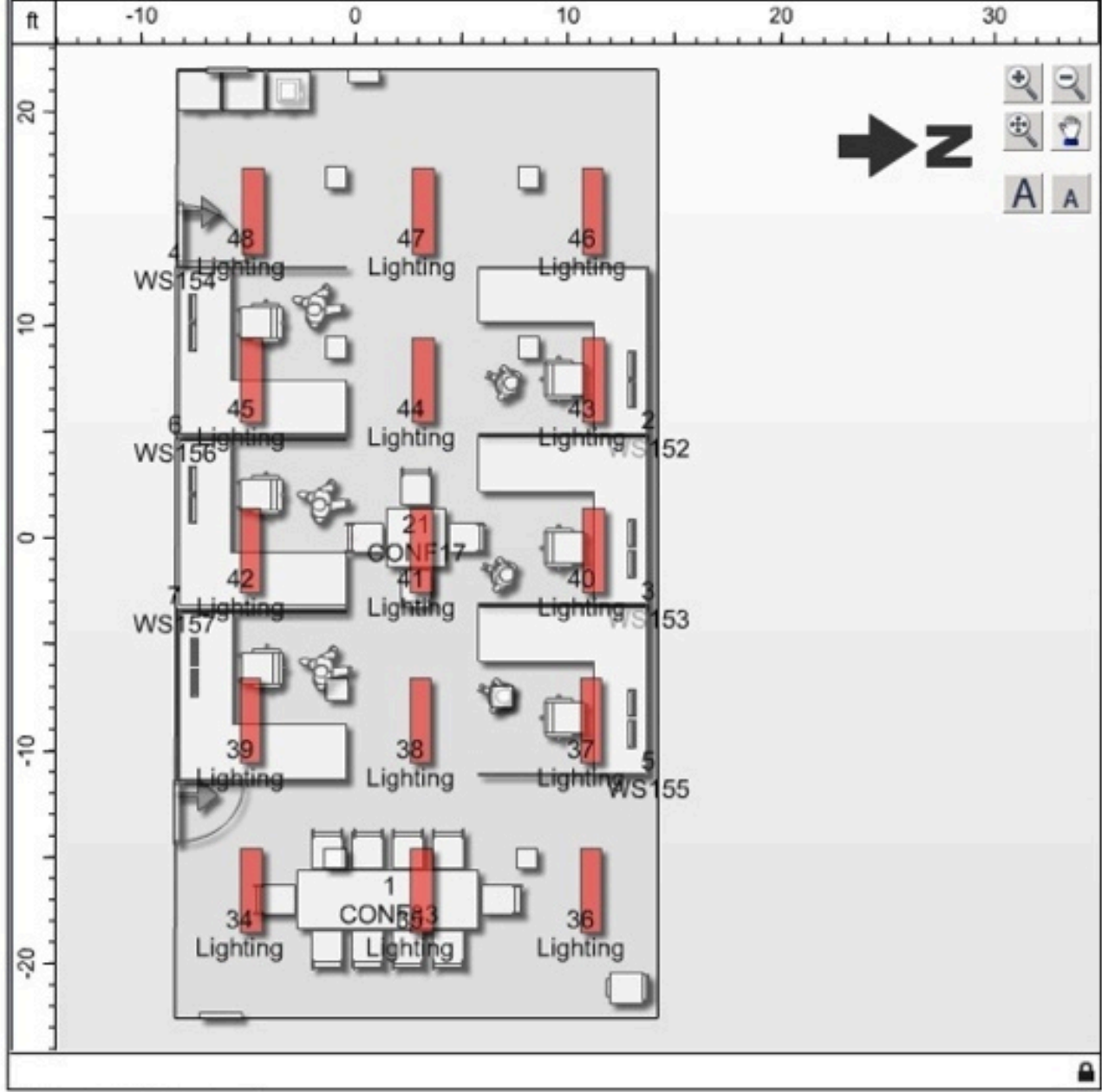
# Room Data Worksheet

Project - Site: Lenfant Plaza Area Study  
Bldg: Lenfant Wing C

Space Name	Office		
Space Number	1009	ID	8420
GUID	pcCPobALgKeHY5BNIUyumW		
Department			
Space Area	1005.16 sqft		
X	22.59 ft	Y	44.49 ft
Capacity	6		
Space Height	10.00		
Group	0		
Security Zone	Restricted		
Project Specific Zone			
HVAC	Conditioned		
Last Modified	06/16/2010 13:40:00		
Occupancy	8		
GSA Space Areas	1005.16 sqft		
GSA STAR Space Type	CFT		
GSA Star Space Category	01		
OSCRE Code	5110		
GSA Preservation Zone	Renovation		
Privacy Zone	Non-Public		
Occupant Organization Code	4731		
Occupant Billing ID			

Equipment List for: Lenfant Wing C

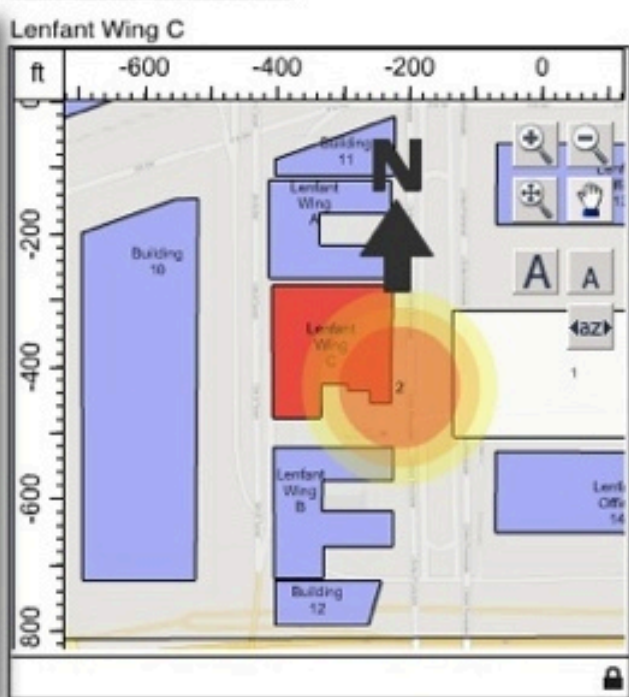
ID	Number	Space	Equip ID	Equipment Name
<b>Total</b> 19 Equipment				
8420	1009	Office	249669	Cab Base-MultiDr
8420	1009	Office	249670	Cab Base-MultiDr
8420	1009	Office	249671	Cab Base-MultiDr
<b>Subtotal</b> 3 Cab Base-MultiDr				
8420	1009	Office	249668	Conference Table
<b>Subtotal</b> 1 Conference Table				
8420	1009	Office	249648	Conference Table
<b>Subtotal</b> 1 Conference Table				
8420	1009	Office	249667	Copier
<b>Subtotal</b> 1 Copier				
8420	1009	Office	249672	Door
8420	1009	Office	249673	Door
<b>Subtotal</b> 2 Door				
8420	1009	Office	297869	Man Walking
8420	1009	Office	297870	Man Walking
8420	1009	Office	297871	Man Walking
<b>Subtotal</b> 3 Man Walking				
8420	1009	Office	249656	Passage / Door
8420	1009	Office	249655	Passage / Door
<b>Subtotal</b> 2 Passage / Door				
8420	1009	Office	297895	Power Router
<b>Subtotal</b> 1 Power Router				
8420	1009	Office	249658	Return
8420	1009	Office	249657	Return
<b>Subtotal</b> 2 Return				
8420	1009	Office	278681	Single Duct VAV
<b>Subtotal</b> 1 Single Duct VAV				
8420	1009	Office	249660	Supply Diffuser
8420	1009	Office	249661	Supply Diffuser
8420	1009	Office	249662	Supply Diffuser
8420	1009	Office	249663	Supply Diffuser
8420	1009	Office	249664	Supply Diffuser
8420	1009	Office	249665	Supply Diffuser
8420	1009	Office	249666	Supply Diffuser
8420	1009	Office	249659	Supply Diffuser
<b>Subtotal</b> 8 Supply Diffuser				



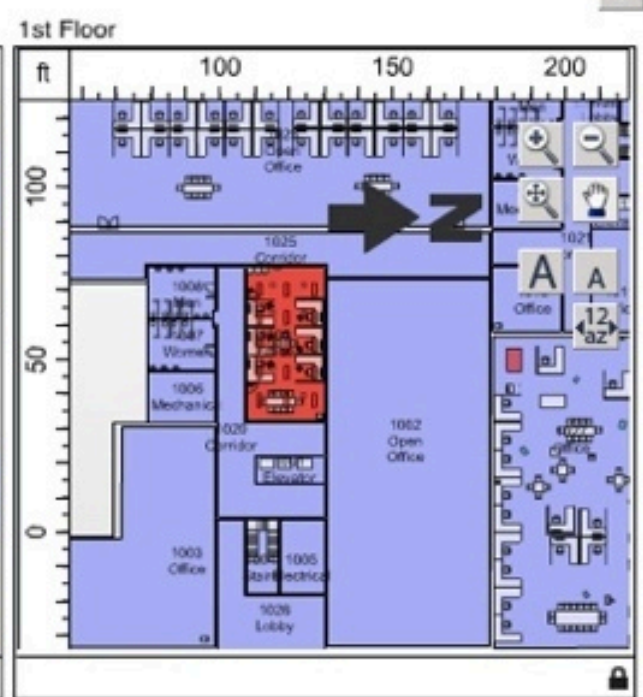
Open Space in Browser

## Room Data List

ID	Space Name	Number	Area	sqft	X	Y	ft	ft	Height	Capacity	Department	Floor Finish	Energy Use	Hours of Operation	Ceiling Type	Wainscot	Natural Lighting	Noise Criteria
8474	Office	3009	381.89	19.92	19.18	10.00	3	Dept 3	Carpet 2	16.1-18 kWh	7am-8pm	Acoustical Panel	Wood	Required	NC-40			
8475	Office	3010	591.31	19.93	29.68	10.00	4	Dept 3	Carpet 2	16.1-18 kWh	7am-8pm	Acoustical Panel	Wood	Required	NC-30			
8476	Elevator	3011	188.55	19.93	9.46	12.00	0	Dept 8	Vinyl Composite	24.1-26 kWh	24 Hours	Concrete	Vinyl	Not Required	NC-50			
8477	Women	3012	289.09	10.00	0	10.00	0	Dept 4	Ceramic Tile	24.1-26 kWh	24 Hours	GWB Moisture	Vinyl	Optional	NC-50			
8478	Mechanical	3013	279.43	19.92	14.03	10.00	0	Dept 9	Sealed Concrete	40.1-44 kWh	24 Hours	Concrete	Vinyl	Not Desired	NC-30			
8479	Stairs	3014	187.10	10.00	0	12.00	0	Dept 6	Sealed Concrete	6.1-7 kWh	24 Hours	Concrete	Vinyl	Optional	NC-20			
8480	Men	3015	289.09	10.00	0	10.00	0	Dept 4	Ceramic Tile	24.1-26 kWh	24 Hours	GWB Moisture	Vinyl	Optional	NC-60			
8481	Elevator Lobby	3016	108.76	10.00	0	10.00	0	Dept 1	Vinyl Composite	12.1-14 kWh	24 Hours	Acoustical Panel	Vinyl	Optional	NC-60			
8482	Elevator	3017	115.25	11.67	9.88	12.00	0	Dept 8	Vinyl Composite	24.1-26 kWh	24 Hours	Concrete	Vinyl	Not Required	NC-50			
8483	Mechanical	3018	41.55	11.67	3.56	10.00	0	Dept 9	Sealed Concrete	40.1-44 kWh	24 Hours	Concrete	Vinyl	Not Desired	NC-40			
8484	Corridor	3019	1043.00	10.00	0	10.00	0	Dept 7	Vinyl Composite	12.1-14 kWh	7am-11pm	GWB	Vinyl	Not Required	NC-30			
8485	Corridor	3020	1003.16	10.00	0	10.00	0	Dept 7	Vinyl Composite	12.1-14 kWh	7am-11pm	GWB	Vinyl	Not Required	NC-50			
8486	Break Room	3021	653.45	10.00	3	10.00	3	Dept 1	Vinyl Composite	10.1-12 kWh	24 Hours	GWB	Wood	Optional	NC-40			
8487	Open Office	3022	6658.92	? 45.21	10.00	37	Dept 3	Carpet 3	18.1-20 kWh	9am-5pm	Acoustical Panel	Vinyl	Required	NC-30				
8488	Open Office	3023	1775.05	10.00	10	10.00	10	Dept 3	Carpet 3	18.1-20 kWh	9am-5pm	Acoustical Panel	Vinyl	Required	NC-40			
8489	Corridor	3024	1775.59	10.00	0	10.00	0	Dept 11	Granite	30.1-34 kWh	24 Hours	GWB	Granite	Optional	NC-50			
8490	Lobby	3025	662.20	10.00	0	10.00	0	Dept 7	Vinyl Composite	12.1-14 kWh	7am-11pm	GWB	Vinyl	Not Required	NC-30			
8491	Office	3026	4332.03	48.18	89.92	10.00	38	Dept 3	Vinyl Composite	12.1-14 kWh	7am-11pm	GWB	Vinyl	Not Required	NC-30			
8492	Elevator	2001	150.26	19.93	7.54	12.00	0	Dept 2	Vinyl Composite	24.1-26 kWh	24 Hours	Concrete	Vinyl	Not Required	NC-60			
8493	Office	2002	1307.65	19.96	65.50	12.00	0	Dept 3	Carpet 1 Bentley	16.1-18 kWh	7am-8pm	Acoustical Panel	Wood	Required	NC-40			
8494	Stairs	2003	201.74	9.27	21.76	12.00	0	Dept 6	Sealed Concrete	6.1-7 kWh	24 Hours	Concrete	Vinyl	Not Required	NC-40			
8495	Electrical	2004	289.56	13.33	21.72	10.00	0	Dept 10	Sealed Concrete	40.1-44 kWh	24 Hours	Concrete	Vinyl	Not Desired	NC-30			
8496	Mechanical	2005	287.73	19.92	14.45	10.00	0	Dept 9	Sealed Concrete	40.1-44 kWh	24 Hours	Concrete	Vinyl	Not Desired	NC-30			
8497	Women	2006	289.09	10.00	0	10.00	0	Dept 4	Ceramic Tile	24.1-26 kWh	24 Hours	GWB Moisture	Vinyl	Optional	NC-30			
8498	Men	2007	299.39	10.00	0	10.00	0	Dept 4	Ceramic Tile	24.1-26 kWh	24 Hours	GWB Moisture	Vinyl	Optional	NC-40			
8499	Office	2008	1007.65	22.59	44.60	10.00	6	Dept 3	Carpet 1 Bentley	16.1-18 kWh	7am-8pm	Acoustical Panel	Wood	Required	NC-40			
8500	Office	2009	381.89	19.92	19.18	10.00	3	Dept 3	Carpet 2	16.1-18 kWh	7am-8pm	Acoustical Panel	Wood	Required	NC-40			
8501	Office	2010	591.31	19.93	29.68	10.00	4	Dept 3	Carpet 2	16.1-18 kWh	7am-8pm	Acoustical Panel	Wood	Required	NC-30			
8502	Elevator	2011	188.55	19.93	9.46	12.00	0	Dept 8	Vinyl Composite	24.1-26 kWh	24 Hours	Concrete	Vinyl	Not Required	NC-50			
8503	Women	2012	289.09	10.00	0	10.00	0	Dept 4	Ceramic Tile	24.1-26 kWh	24 Hours	GWB Moisture	Vinyl	Optional	NC-50			
8504	Mechanical	2013	279.43	19.92	14.03	10.00	0	Dept 9	Sealed Concrete	40.1-44 kWh	24 Hours	Concrete	Vinyl	Not Desired	NC-30			
8505	Stairs	2014	187.10	10.00	0	12.00	0	Dept 6	Sealed Concrete	6.1-7 kWh	24 Hours	Concrete	Vinyl	Optional	NC-20			
8506	Men	2015	289.09	10.00	0	10.00	0	Dept 4	Ceramic Tile	24.1-26 kWh	24 Hours	GWB Moisture	Vinyl	Optional	NC-60			
8507	Elevator Lobby	2016	108.76	10.00	0	10.00	0	Dept 1	Vinyl Composite	12.1-14 kWh	24 Hours	Acoustical Panel	Vinyl	Optional	NC-60			
8508	Elevator	2017	115.25	11.67	9.88	12.00	0	Dept 8	Vinyl Composite	24.1-26 kWh	24 Hours	Concrete	Vinyl	Not Required	NC-50			
8509	Mechanical	2018	41.55	11.67	3.56	10.00	0	Dept 9	Sealed Concrete	40.1-44 kWh	24 Hours	Concrete	Vinyl	Not Desired	NC-40			
8510	Corridor	2019	1043.00	10.00	0	10.00	0	Dept 7	Vinyl Composite	12.1-14 kWh	7am-11pm	GWB	Vinyl	Not Required	NC-30			
8511	Corridor	2020	1003.16	10.00	0	10.00	0	Dept 7	Vinyl Composite	12.1-14 kWh	7am-11pm	GWB	Vinyl	Not Required	NC-50			
8512	Break Room	2021	653.45	10.00	3	10.00	3	Dept 1	Vinyl Composite	10.1-12 kWh	24 Hours	GWB	Wood	Optional	NC-40			



Open Site in Browser

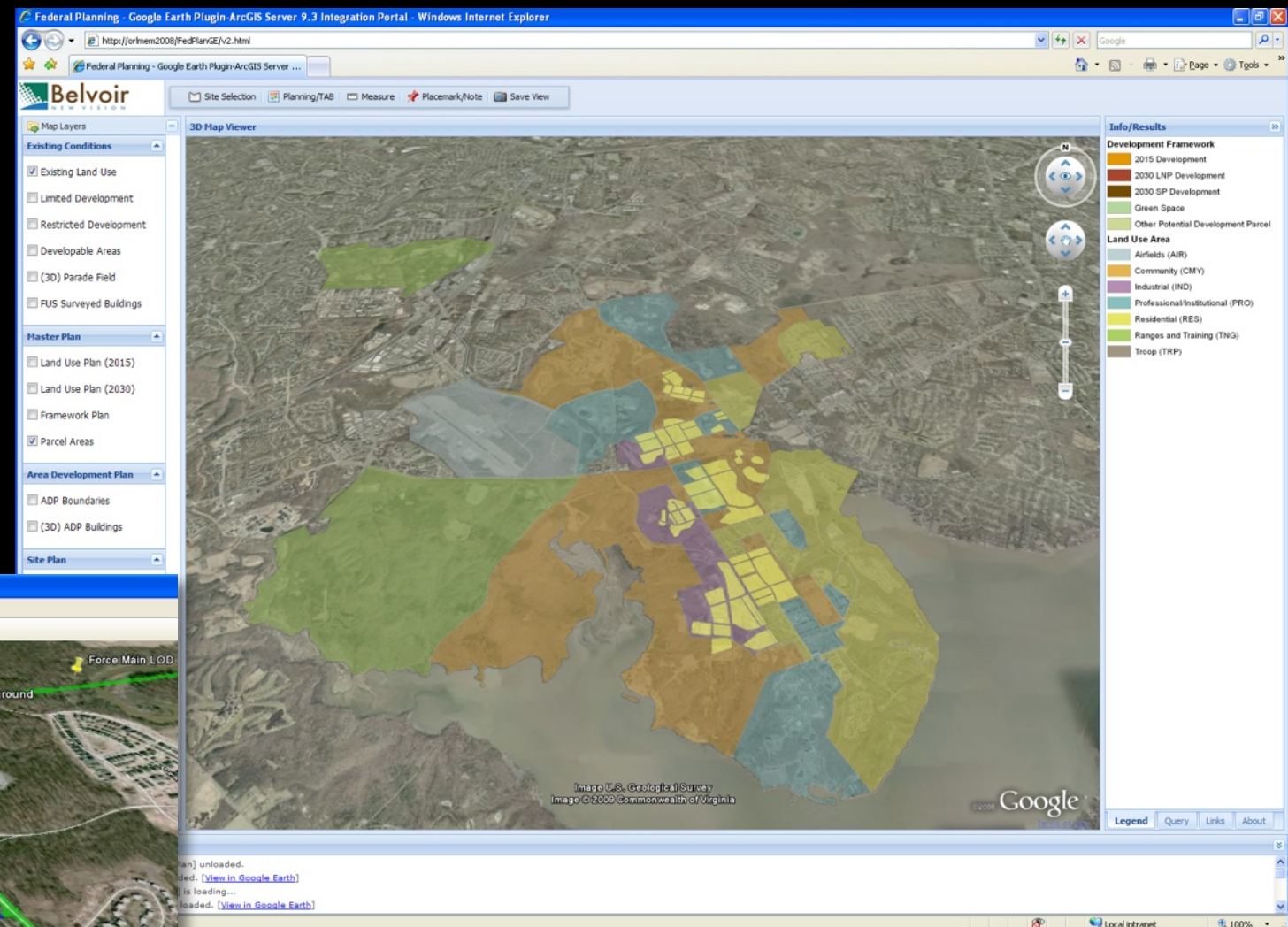
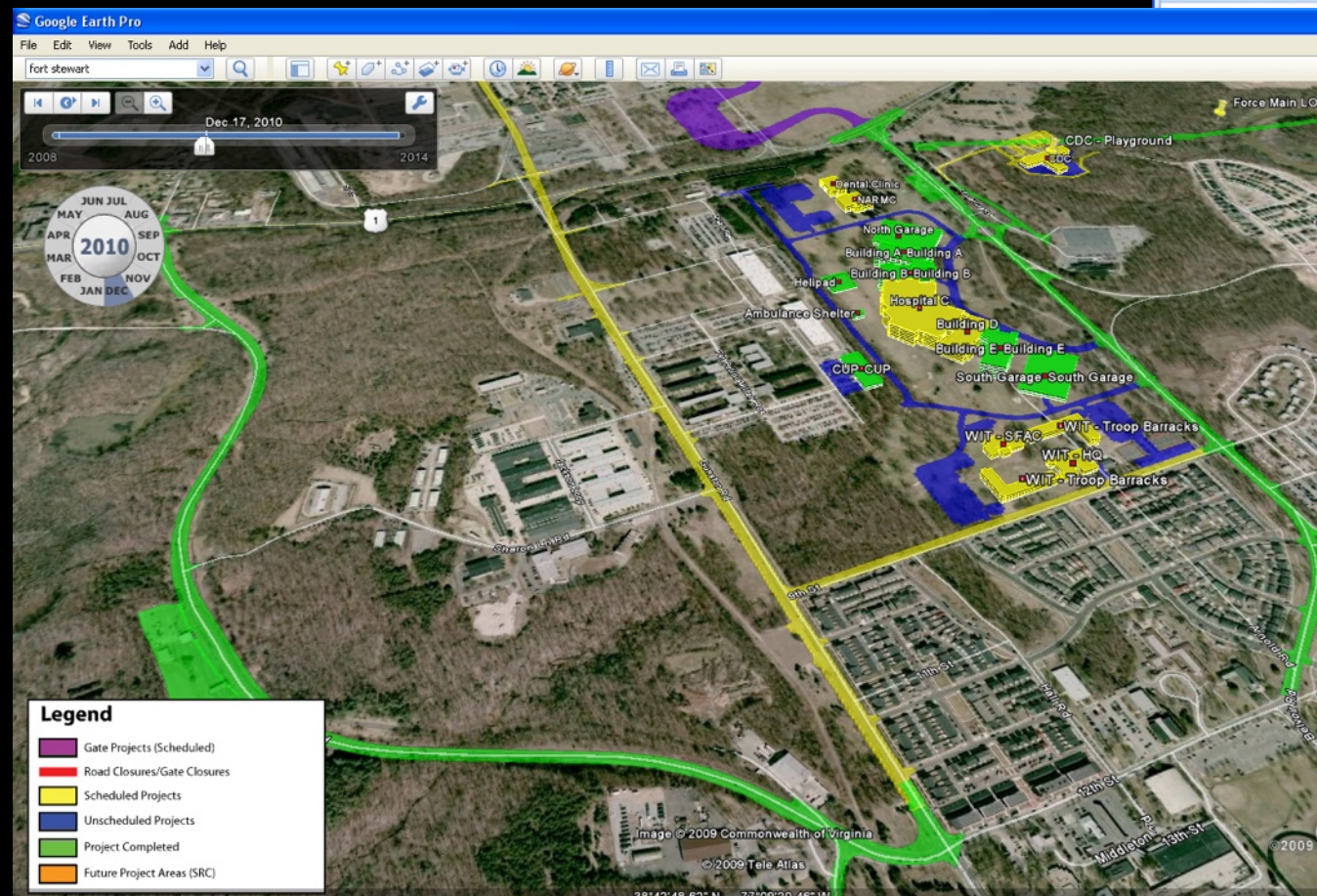


Open Floor in Browser



# Technology Overview: Data Portals

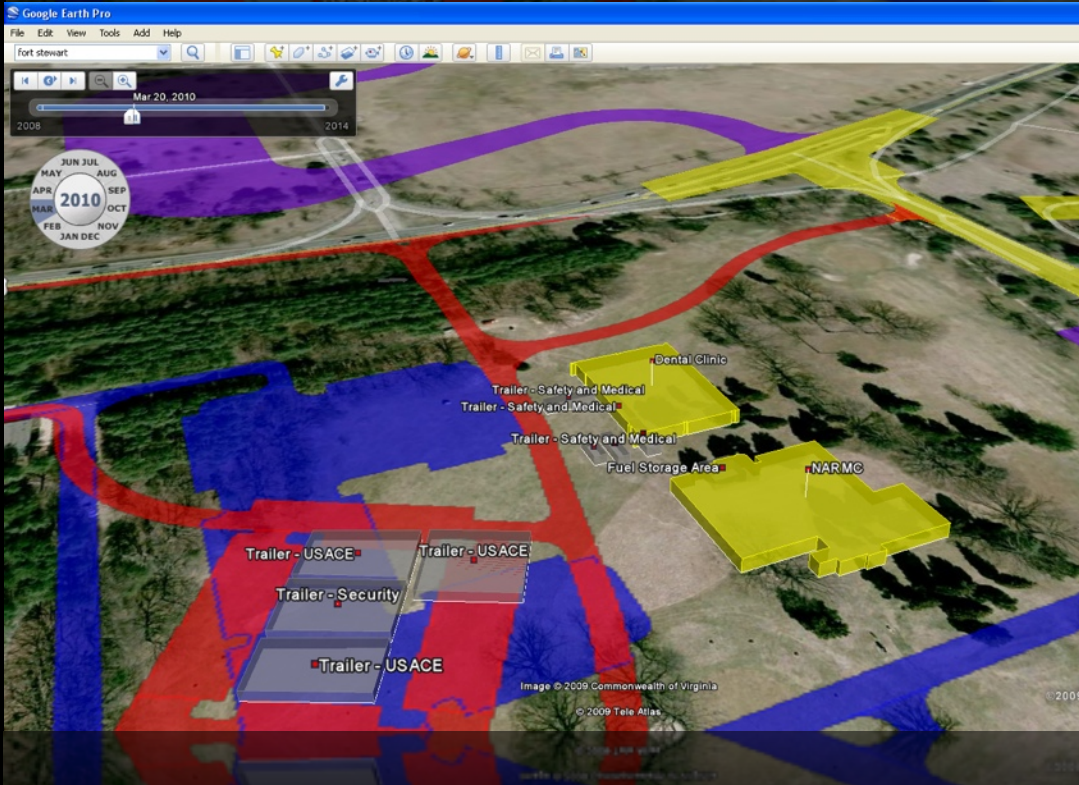
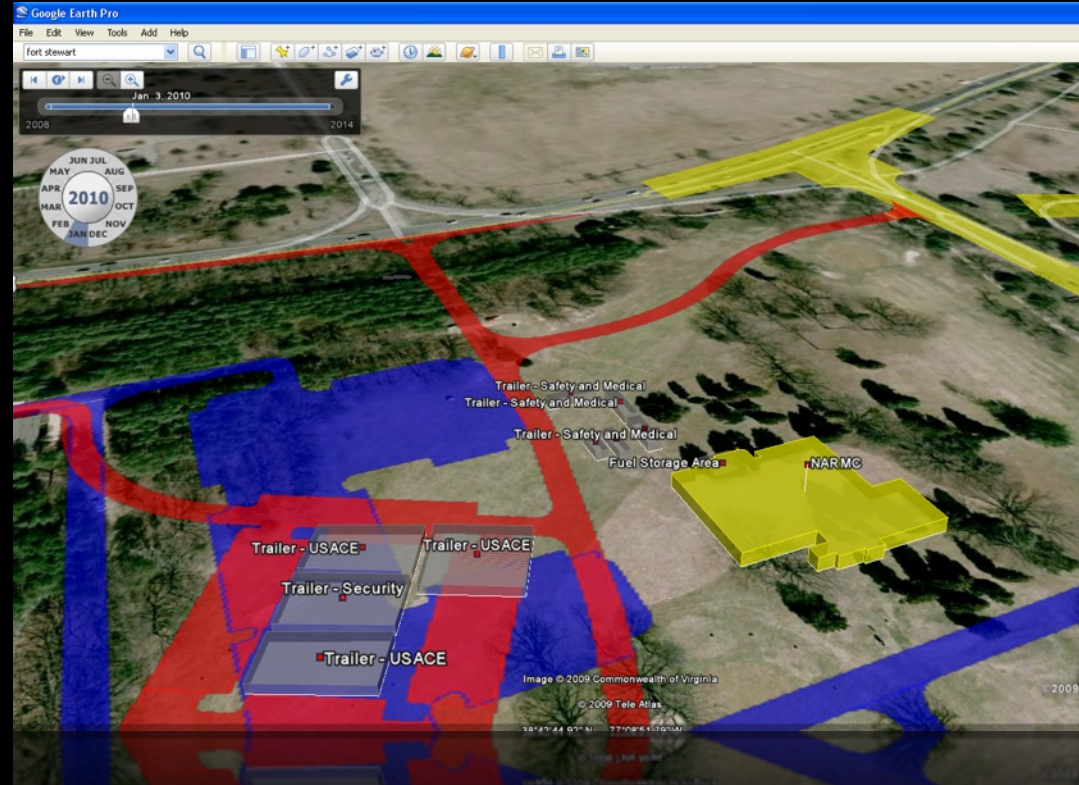
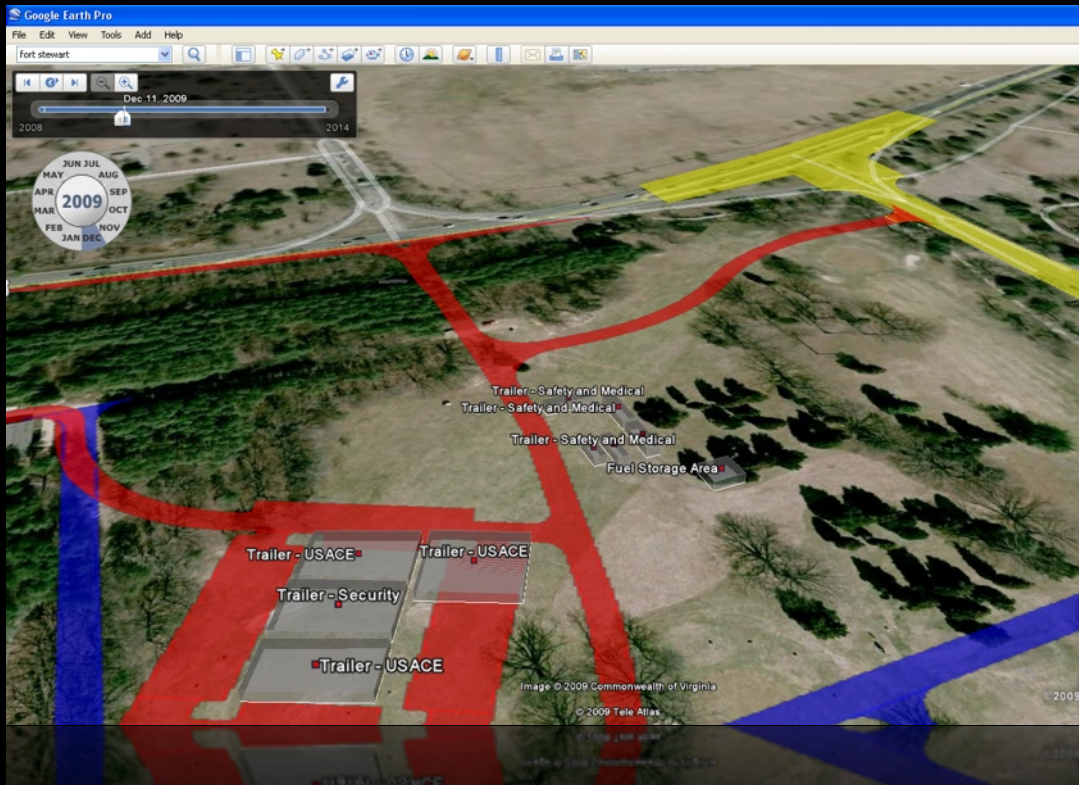
## Google Earth Desktop



## PBS&J Web Portal with Google Earth API



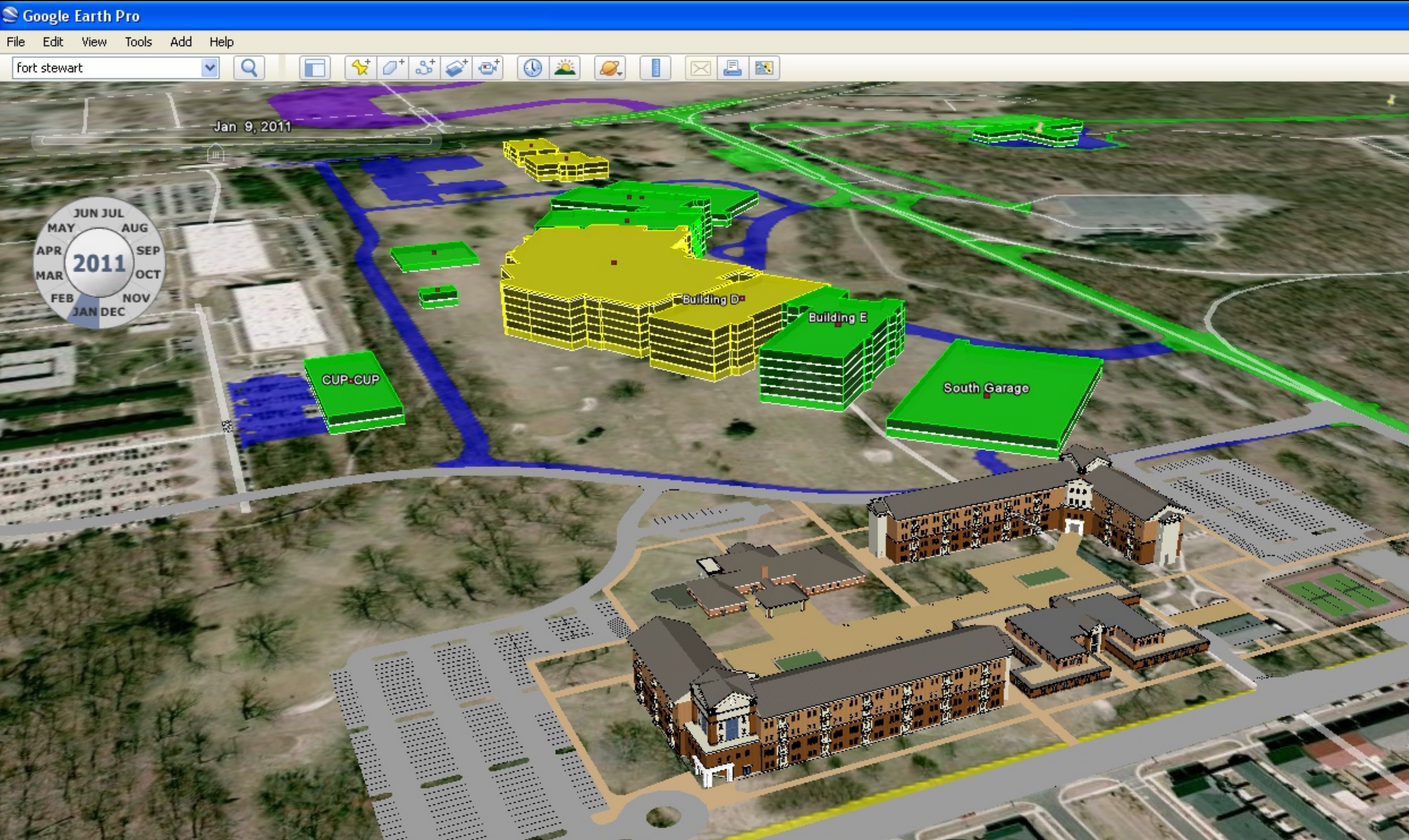
# Visual Conflict





# Collaboration Enabling/Data Sharing and Integration

## Data Mash-Up: Onuma System/BIM, SketchUp, ArcGIS Server, CAD, External Resources/Databases





# Input

- AutoCAD
- Google SketchUp
- Primavera Schedule
- GRAPHISOFT ARCHICAD
- Revit
- Excel

- PBSJ 4D Planner
- esri ArcGIS



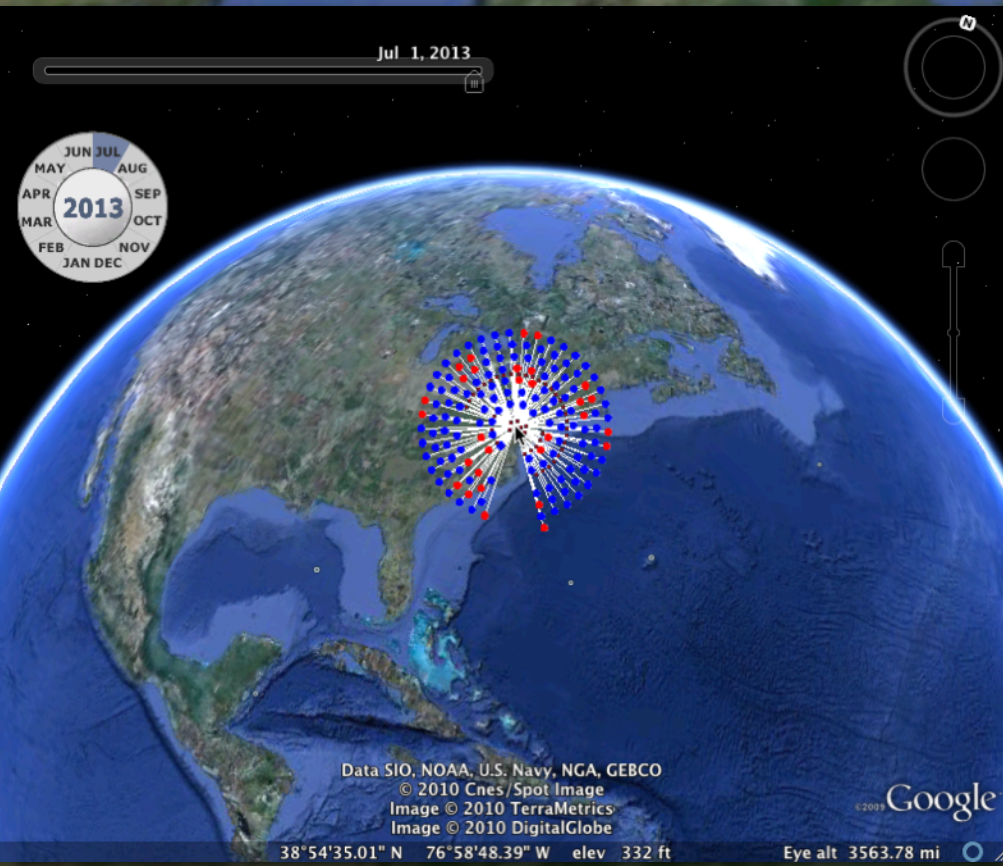
# Output

- Google earth
- Google SketchUp
- GRAPHISOFT ARCHICAD
- Revit
- Excel
- IFC
- BIMXML
- COBIE2

Layering BIM & GIS in the Cloud

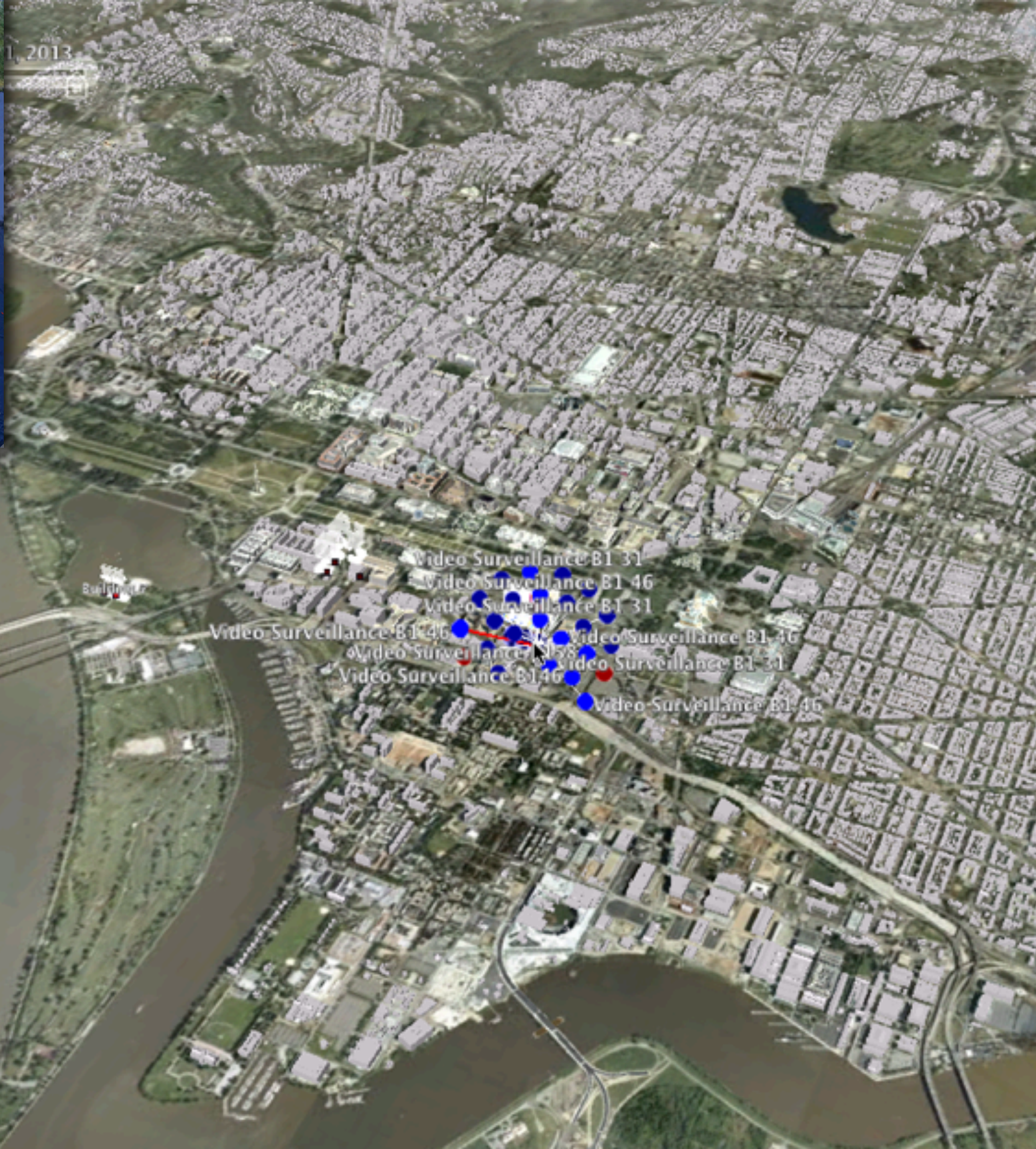
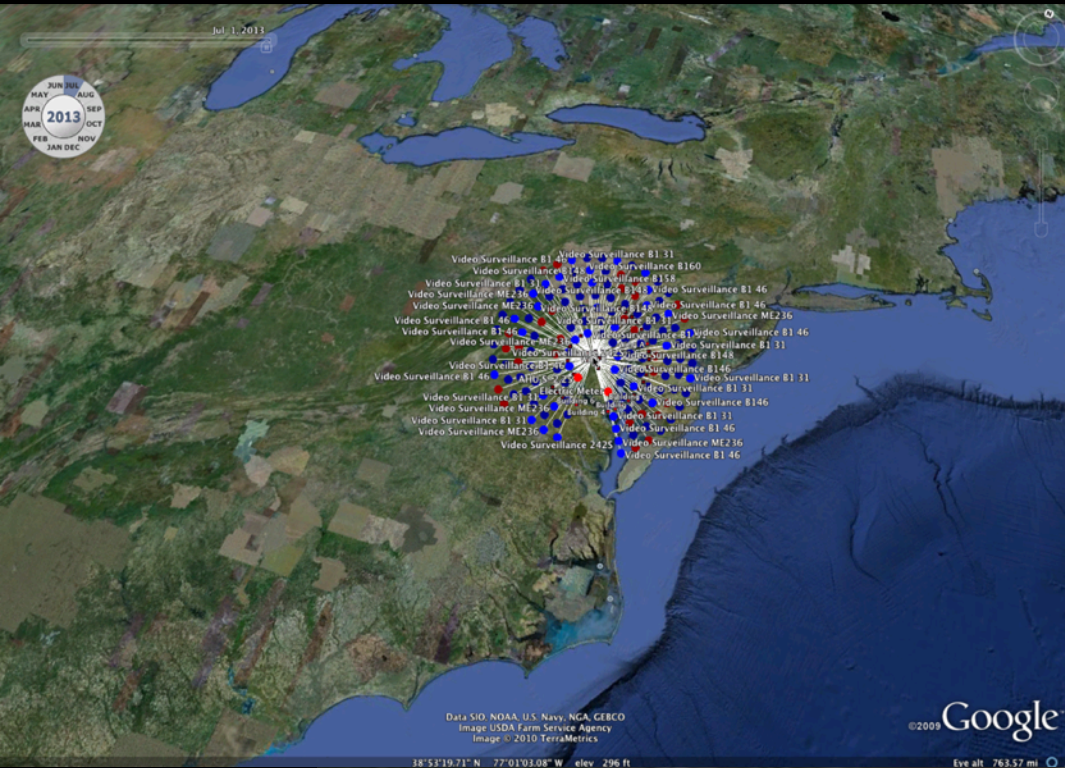


# Geospatial Energy Data





# Geospatial Energy Data





# Geospatial Building Data

GSA Owner: Kimon Onuma About New Features Help Log Out Accounts Kimon Onuma

**GSA** U.S. General Services Administration © 2010 Onuma

Project: NCPC - DC Southwest Rectangle  
Scheme: (S13\_228) Southwest Scheme 1 All Sample Data

Studios Project List **Site Plan** Floor Plan Space Plan Reports Settings Attachments BIM Mail Share Bugs and Comments

**Edit Mode**

2D Site Plan View

3D View

http://www.onuma.com/plan/OPS/viewSite3d.php?sysID=13&ID=228&bldgColorCoding=EXISTING

Jan 1, 2013

Sample Data

3D View

**Objects**

- Site
- Floor Slabs
- Space Volume
- Site Components
- Sketches

**Color Coding**

Space: Departments

Department	Color
(none)	
Dept 1	Green
Dept 2	Blue
Dept 3	Red
Dept 4	Orange
Dept 5	Grey
Dept 6	Light Green
Dept 7	Light Blue
Dept 8	Light Orange
Dept 9	Light Purple
Dept 10	Light Yellow
Dept 11	Light Blue
Dept 12	Light Orange
Dept 13	Light Yellow

**3D Navigation**

- Drag with left mouse click to Pan
- Use the scroll wheel to Zoom
- Drag with left mouse click in combination with the Shift key or the Control key to Rotate and Tilt

For more information, review the user manual for Google Earth:

- [3D Viewer Navigation](#)
- [Navigating in Google Earth](#)

Image District of Columbia (DC GIS)  
Image © 2010 Sanborn

ONUMA

Find: purchase Next Previous Highlight all Match case



Jul 1, 2013

# Real Time BIM Data in Google Earth



Video Surveillance B1 31 Video Surveillance B1 46  
 Video Surveillance B1 46 Video Surveillance B1 46  
 Video Surveillance B1 46 Video Surveillance ME236  
 Video Surveillance B1 46 Video Surveillance B160 AHU S-2.25  
 Video Surveillance B148 Video Surveillance 2425  
 Video Surveillance B158 Electric Meter  
 Video Surveillance 2425 Electric Meter  
 Video Surveillance 2425 Electric Me.  
 Video Surveillance ME236 Electric Me.  
 Video Surveillance 2425 Electric Me.  
 Video Surveillance 2425 Electric Me.

**Southwest Scheme 1 All Sample Data**

- Site Area: 4.04 Acres
- Building Total Net SF: 412,914
- Building Total Gross SF: 1,447,634
- Total Cost: \$464,133,221
- Total Energy Use: 7,804,071 kWh
- Rentable Area, BOMA/IFMA: 358,259 SF
- Roof Runoff Total Area All Buildings: 241,272 SF
- Last Edited: 04/29/2010 - 10:43 AM
- Scheme Owner: Kimon Onuma
- Scheme ID: (S13\_228)
- Studio: GSA

This Google Earth file is generated from the ONUMA Planning System (OPS) - Model Server. Changes the owner makes to this project will be visible in this Google Earth file in real time.

For creating other Network Linked Google Earth files or for outputting other file formats such as Excel, BIM, and SketchUp from OPS:

<http://onuma.com/products/WebFeatureServices.php>

[View](#) or [modify](#) this scheme/site in OPS  
 (Note: an OPS Editor account is required to modify projects in OPS)

For More information on OPS:  
<http://onuma.com/products/OnumaPlanningSystem.php>

Wing C



Sample Data

Image District of Columbia (DC GIS)  
 Gray Buildings © District of Columbia (DC GIS) & CyberCity  
 Gray Buildings © 2008 Sanborn



Imagery Date: Dec 31, 2007

38°53'07.46" N 77°00'57.69" W elev. 18 ft

Eye alt. 291 ft



# Real Time Web Cams Linked to BIM

Jul 1, 2013



**Video Surveillance B148**  
Video Surveillance B148

Lawson Computer Science Building Rm. B1 48 05/07/2010 18:39:29

Directions: [To here](#) - [From here](#)

- Video Surveillance B1 31
- Video Surveillance B1 46
- Video Surveillance B1 46
- Video Surveillance B1 46
- Video Surveillance B1 48
- Video Surveillance B1 58
- Video Surveillance 242S
- Video Surveillance 242S
- Video Surveillance ME236
- Video Surveillance 242S
- Video Surveillance 242S
- Video Surveillance B1 46
- Video Surveillance ME236
- Video Surveillance B146
- Video Surveillance ME236
- Video Surveillance B160
- AHU S-2.25
- Video Surveillance 242S
- Electric Meter
- Electric Meter
- Electric Me.
- Electric Me.
- Electric Me.



Sample Data

Image District of Columbia (DC GIS)  
Gray Buildings © District of Columbia (DC GIS) & CyberCity  
Gray Buildings © 2008 Sanborn



Imagery Date: Dec 31, 2007

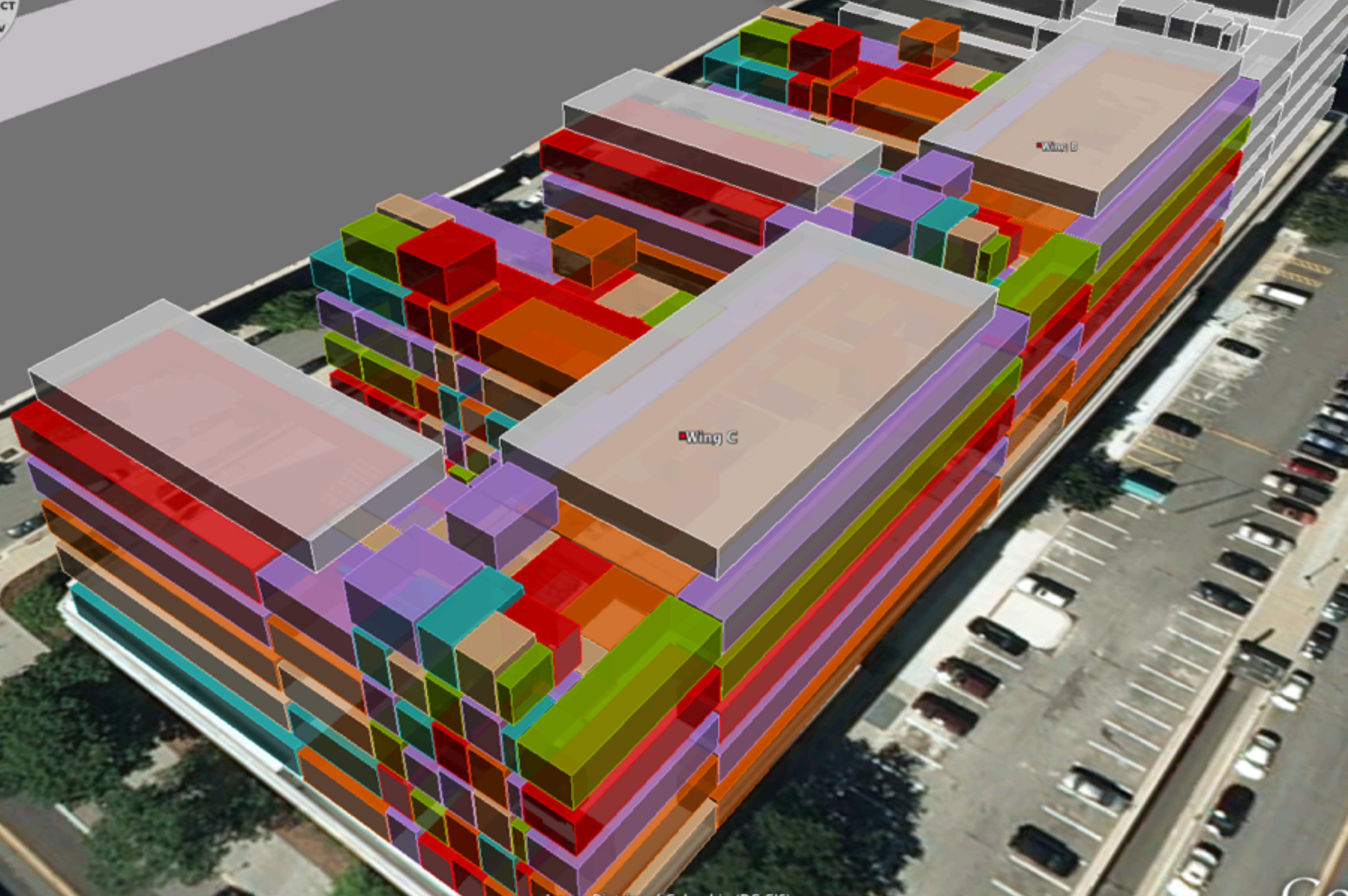
38°53'07.46" N 77°00'57.69" W elev. 18 ft

Eye alt. 291 ft



# Lighting Schedules

Jul 1, 2013



Sample Data

Image District of Columbia (DC GIS)  
Gray Buildings © District of Columbia (DC GIS) & CyberCity  
Gray Buildings © 2008 Sanborn

©2009 Google

Imagery Date: Dec 31, 2007

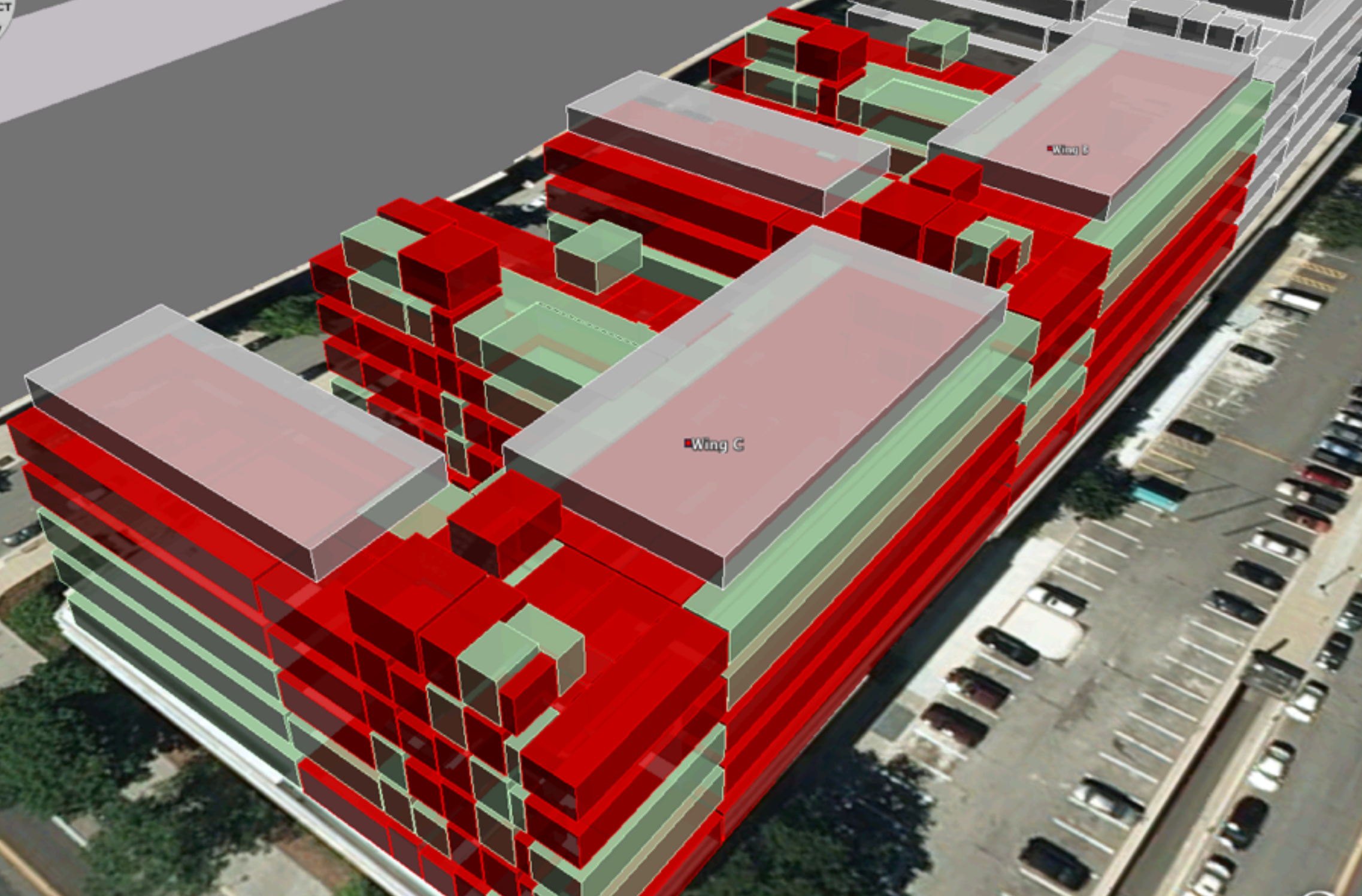
38°52'07.16" N 77°00'57.60" W elev: 18 ft

Eye alt: 201 ft



# Real Time Occupancy Sensors

Jul 1, 2013



Sample Data

Image District of Columbia (DC GIS)  
Gray Buildings © District of Columbia (DC GIS) & CyberCity  
Gray Buildings © 2008 Sanborn

©2009 Google

38° 52' 07.16" N 77° 00' 57.60" W alt: 18.4

Foot: 201.6



# Real Time Energy Sensors

**Office**  
Office 4332.03 sf Capacity: 38 Occupancy: 38

Sub Function: Vinyl Composite Tile  
Energy Use: 12.1-14 kWh  
Hours of Operation: 7am-11pm  
Natural Lighting Levels: Not Required

**Discharge\_Air\_Temp 61.4**

**Return\_Air\_Temp 72.0**

**Air\_Handler\_CFM 9941.2**





# Real Time Sensor Data

buildingSMART Owner: Kimon Onuma About New Features Help Log Out Accounts Kimon Onuma

buildingSMARTalliance™ Project: BIM in Practice 2 - Oslo Norway March 2010  
Scheme: (S30\_240) 12 - Site In Norway for BIM in Practice Live

© 2010 Onuma

Studios Project List Site Plan Floor Plan Space Plan Reports Settings Attachments BIM Mail Share Bugs and Comments

**BIM Navigation**

- (S30\_240) 12 - Site In Norway
  - (\*) = Referenced object
  - (B30\_605) Building 1
    - 5th Floor
    - 4th Floor
    - 3rd Floor
    - 2nd Floor
    - 1st Floor
      - (32) 10.7 - Team 1 12 pl.
      - (18) 16 - Stillerom
      - (13) 20.1 - Kopi / Rel
      - (26) 20.2 - Arkiv / Kc
      - (19) 21.11 - Resepsj
      - (27) 21.12 - Felles /
      - (30) 21.13 - Felles /
      - (33) 21.14 - Felles /
      - (2) 21.8 - Lounge
      - (14) 21.9 - Felles / L
      - (4) 22.14 - BK
      - (10) 22.15 - WC
      - (11) 22.16 - RWC
      - (12) 22.17 - WC
      - (15) 22.18 - BK
      - (20) 22.19 - Toaletter
      - (29) 22.2 - Toaletter
      - (3) 23.4 - Workroom
      - (5) 23.5 - Workroom
      - (6) 23.6 - Workroom
      - (7) 23.7 - Workroom
      - (8) 23.8 - Workroom
      - (22) 23.9 - Materom
      - (16) 24.12 - Teknisk
      - (17) 24.13 - Teknisk
      - (21) 24.14 - Teknisk
      - (34) 24.15 - IKT. Ron
      - (23) 28 - Kontor
      - (24) 29.14 - Kontor
      - (28) 29.15 - Kontor
      - (31) 29.16 - Kontor
      - (1) 3 - Work Room
      - (25) 31.9 - Kontor
      - (9) 4 - Computer Lab
    - Basement

**VIEW MODE**

Space Settings: 32 - Team 1 12 pl.

Team 1 12 pl. 149.87 m2 Capacity: 19 Occupancy: 19

Sub Function: n/a  
Energy Use: n/a  
Hours of Operation: n/a  
Natural Lighting Levels: n/a

Discharge\_Air\_Temp 55.1

Return\_Air\_Temp 72.5

Air\_Handler\_CFM 10187.7

Close Settings

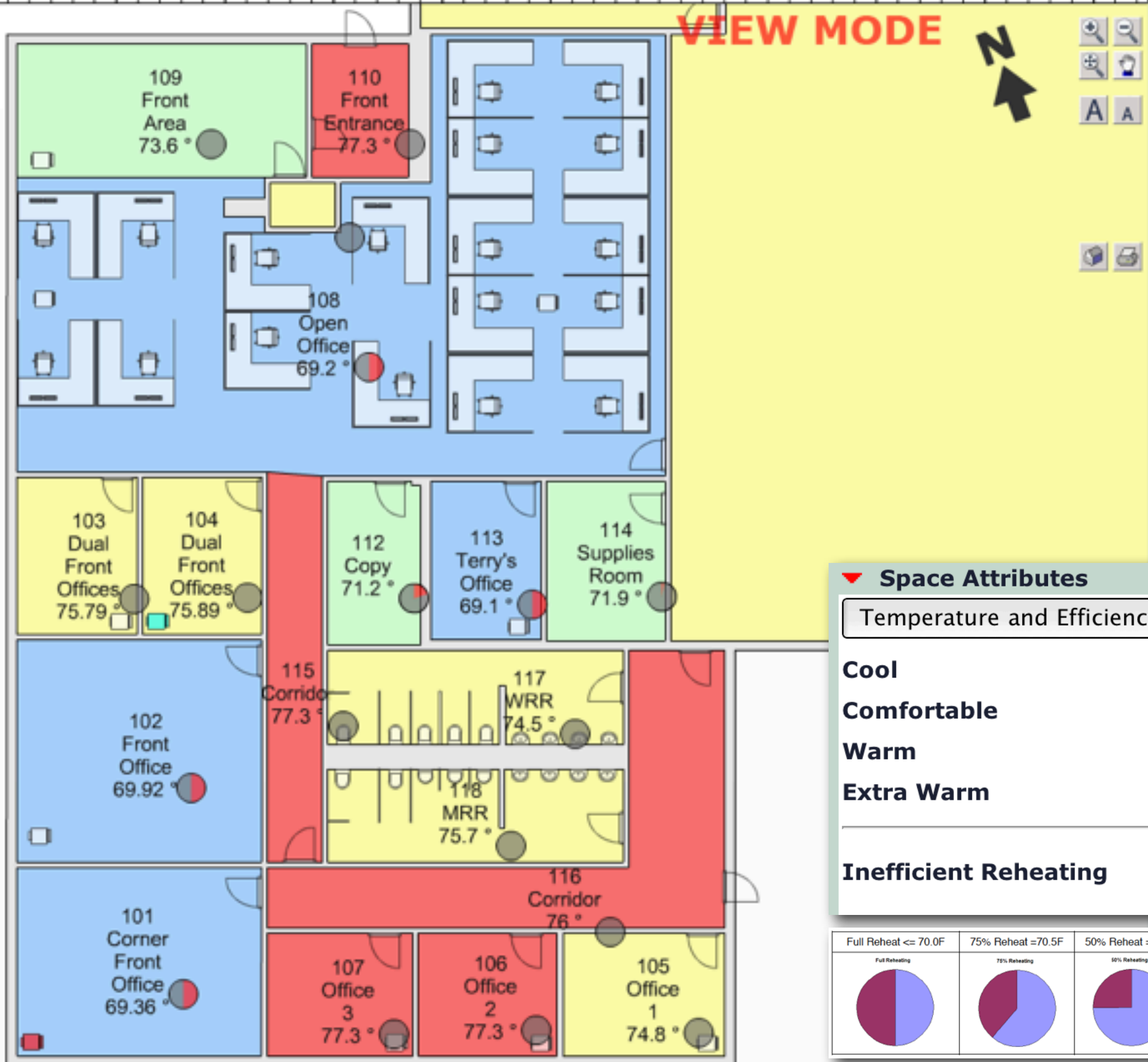
**Floor Level Data**

- Spaces
- Space Attributes
  - Target Temperature
    - (None)
    - 69 Degrees
    - 70 Degrees
    - 71 Degrees
    - 72 Degrees
    - 73 Degrees
    - 74 Degrees
  - Space Relationships
  - Space Furniture
  - Background Setting  Unlock
  - Sketch
  - Preset Views
  - Import / Export
    - Import a site / building / space
    - Export a site / building / space

ONUMA by space number

Keyboard Shortcuts





**Floor Level Data**

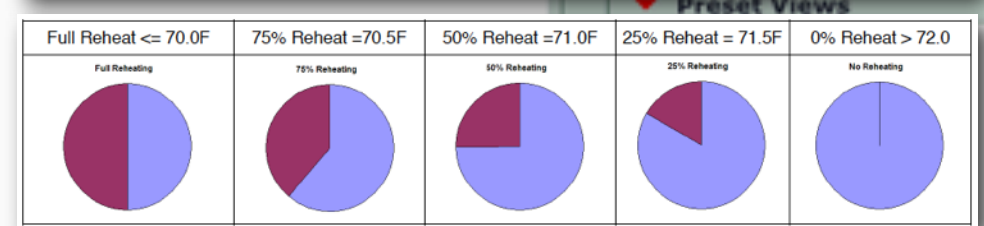
- Spaces
- Space Attributes
  - Temperature and Efficiency
  - Cool
  - Comfortable
  - Warm
  - Extra Warm
- Space Relationships
- Space Furniture
  - General
  - Indoor/Outdoor Element
  - Building Elements
  - Circulation
  - Equip - Bathroom
  - Equip - Kitchen
  - Equip - Leisure

**Space Attributes**

Temperature and Efficiency

- Cool
- Comfortable
- Warm
- Extra Warm

Inefficient Reheating





119  
Small  
Work  
Room

# VIEW MODE



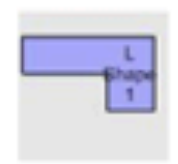
### Add Object(s)

READ/WRITE access is required to add additional spaces.

Basic Shapes



300 SF  
Rectangular



L-Shape 1

### Floor Level Data

- Spaces
- Space Attributes**
  - Temperature and Efficiency
  - Cool
  - Comfortable
  - Warm
  - Extra Warm
- Space Relationships
- Space Furniture**
  - General
  - Indoor/Outdoor Ele
  - Building Elements
  - Circulation
  - Equip - Bathroom

## Lenfant Plaza - Building 9

### Temperature



### Energy Demand



powered by **pachube** pachube.com

### Space Settings: 30 - Open Office

- General
- Attributes
- Display**

Unit Operating Mode: **HVAC\_HEAT**

Space Temp:	73.1 °
Setpoint Adjust:	2.1 °
Effective Setpoint:	72.9 °
Discharge Temp:	84.9 °
EFF Disch Temp Stpt:	99.9 °

Fan Override:

Heating Output: 71 %  
Cooling Output: 0 %  
Outdoor Damper c: 30 %  
Coil Damper c: 71 %

Schedule Override:

Schedule Mode:	Occupied
Fan Start/Stop:	Enabled
Fan Status:	On
Fan Speed:	75 %
Coil Temperature:	123 °
Unit Alarm:	Okay

Occ Heat Stpt:	71.0 °
Occ Cool Stpt:	74.0 °
Unocc Heat Stpt:	65.0 °
Unocc Cool Stpt:	82.0 °

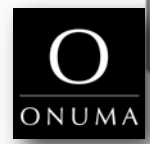
CO2: 533 ppm

CO2 Setpoint:	1000
Min DAT Stpt:	54.9 °
Max DAT Stpt:	99.9 °
Min OA Damp Stpt:	30 %
Override Time Stpt:	3600

3 Administration RT Temp

[Link to BIMGallery](#)

Office 74.81 °	Office 3 71.7 °	Office 2 71.6 °	Office 1 73.4 °
-------------------	-----------------------	-----------------------	-----------------------





# ONUMA and COBIE

BIMstorm COBIE Owner: Kimon Onuma About New Features Help Log Out Accounts Kimon Onuma

**BIM STORM COBIE** Project: COBIE2 March 17 LIVE  
Scheme: (S57\_81) Step 3 Plot J - augmented product install

Note: the BIM navigation has been moved to the left side in your browser.

© 2008 Onuma

Studios Project List Site Plan Floor Plan Space Plan Reports Settings Attachments BIM Mail Share Bugs and Comments

**Edit Mode** | **View Mode**

**Space Settings: 3 - Lounge in flat 2**

General Attributes **Display**

F1-201 - Lounge in flat 2  
Area: 31.70 m2 m2

Space\_Air\_Temp 72.8

**Space Settings: 6 - Entrance**

General Attributes **Display**

F1-104 - Entrance  
Area: 19.72 m2 m2

Space\_Air\_Temp 72.8

**Furniture Settings: 12 - Video Surveillance**

General **Display**

Live BIM Web CAM

Close

**BIMstorm COBIE**

Studios Project List Site Plan

Scheme (preplanning): Lot J-blocking and stacking  
Date created: 02/27/2010  
[Download Google Earth of Site in KML format](#)  
[Download GML standard \(building envelope\)](#)  
[Download GML spaces \(envelope removed\)](#)  
[Go to this scheme/site](#)

ONUMA

Block & Stack BIM

Hotkeys: Spacebar + Drag = Pan | Z = Zoom In  
Shift + Z = Zoom Out | X = Extent

Geo Reference





# BIMStorm™ Washington DC

Join Watch Sponsor BIMStorms™

- Join
- Watch
- Sponsor
- About BIMStorm
- Southwest EcoDistrict
- Boston
- BIMStorm Hong Kong
- Los Angeles
- Rotterdam
- New Orleans
- Vancouver
- San Diego
- BIMStorm Washington DC**
- Pasadena
- London Live
- BIMStorm™ AGC
- Capital Alliance Tshwane
- BIMStorm™ BuildingSMART™
- BIMStorm™
- LowCarbonCollaboration
- BIMStorm™ Tokyo
- Build Hospital Live Oslo

## BIMStorm Washington DC



### BIMStorm™ Connects the World

In a world where we must make decisions that impact our environment, the only way to connect the dots is through collaboration. This requires a different way of thinking and process. BIMStorms™ are part of the answer to this challenge. They allow global teams to collaborate in real time. Get Real with BIM at BIMStorm.

### BIMStorm™ Returns Live at the Ecobuild Conference in Washington DC.

- December 6-10, 2010
- [Information here.](#)



- Several thousand people regardless of technical expertise have participated in BIMStorms and created 4,000 buildings totaling 485 million square feet.
- Live demonstration of BIM using Low Carbon Collaboration techniques featuring speaker Kimon Onuma, FAIA, Principal, Onuma, Inc.
- Live from the show floor with the BIMStorm Teams.
- Some of the tools that are used in a BIMStorm include: Archicad, Excel, Elite Cad, ESRI, Google Earth, Google Maps, Google SketchUp, Onuma Planning System, Revit, Solibri, Trelligence Affinity, VectorWorks, Paper and Pencil and other tools

### BIMStorm™ Theater at the Conference on Dec. 6-10, 2010



- On the show floor
- Live projects were run for the duration of the show
- [Sign Up here to participate with us in Washington DC or Virtually.](#)



# <http://BIMStorm.com>





# GET REAL WITH BIM DELIVERING PROFOUNDLY IMPROVED FACILITIES

NWCC Conference  
Tulalip, WA - 11/17/10



Kimon Onuma, FAIA  
President - Onuma, Inc.

ONUMA.com  
626 793 7400



©2010 ONUMA.com

for:

NWCC

Tulalip, WA

10/21/10

No Use Without Written Permission



Kimon Onuma, FAIA  
President - Onuma, Inc.

[Onuma.com](http://Onuma.com)  
626 793 7400