



# AIA Technology in Architectural Practice

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**BIG BIM Bang – Enterprise BIM and  
BIG Data – Sharing Data  
Interoperability**

# BIG BIM Bang – Enterprise BIM

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

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## AIA/CES Learning Objectives

1. Learn what type of BIM data owners are providing to AEC teams and what type of results they are hoping for.
2. Learn how interoperability will enable sharing of data across any tool and how you can help to accelerate the capability of the BIM tools.
3. Learn how sharing of data with remote teams can foster collaboration in a charrette environment.
4. Learn what is possible today using BIM to collaborate. See how obstacles in sharing of data are overcome.

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## AIA TAP Leadership 2012



**David  
Scheer**  
Chair - 2012



**Kimon  
Onuma**  
Chair - 2013



Calvin  
Kam



Stephen  
Hagan



Kristine  
Fallon



Tony  
Rinella

### Active Past Chairs



Brian  
Skripac



Jeffrey  
Ouellette



Karen  
Kensek



Luciana  
Burdi



Marty  
Doscher



Mike  
Kenig



Pete  
Evans

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## TAP Upcoming Events

- **9 May 2012, TAP Local Discussion Groups Webinar**
  - Discussion group leaders from around nation
  - Those wanting to start new groups
- **16 May 2012, Connect with Technology Workshop @ AIA 2012**
  - Full-day pre-convention CE Workshop
  - Help architects with integrating technologies into their practices
- **25 April 2012, BIMForum and AIA TAP Present: 2012 Professionals' Choice BIM Award (free)**
  - This session will present the five AIA TAP 2012 BIM Award winners
  - Online webinar and live in San Antonio at the BIMForum

<http://AIA.org/TAP>

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**Q & A** Please use the Chat box in the GoToWebinar app pane to submit a question.



Timothy Blatner, AIA  
FitzGerald  
Associates Architects



Finith Jernigan, FAIA  
Design Atlantic Ltd



Kimon Onuma, FAIA  
Onuma Inc



John Roach  
Foundation for California  
Community Colleges



Kurt Maldovan  
Balfour Beatty



Andreas Phelps  
Balfour Beatty



Jesse Whalen  
Balfour Beatty

Questions will be answered at the end of the webinar as time allows. When able, all questions will be sent to the speakers for written response and published on the TAP website.

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# BIG BIM Bang – Enterprise BIM

## Schedule - Eastern Standard Time (EST)

**1:00 - 1:05 pm** Introduction- TAP upcoming events

Kimon Onuma, FAIA AIA TAP

**1:05 - 1:10 pm** BIG BIM and BIG Data

Finith Jernigan, FAIA

**1:10 - 1:30 pm** Owner's Perspective & BIMStorm

Kimon Onuma, FAIA and John Roach

**1:30 - 1:40 pm** Architect's use of BIM data

Timothy Blatner, AIA

**1:40 - 1:55 pm** Design to Construction, Engineering, Energy, Cost

Balfour Beatty - Kurt Maldovan, Jesse Whalen

**1:55 - 2:10 pm** Scenario Planning

Balfour Beatty - Andreas Phelps

**2:10 - 2:20 pm** BIG BIM for the Lifecycle and Standards

Kimon Onuma & Finith Jernigan

**2:20 - 2:30 pm** Q&A and final comments

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Finith Jernigan FAIA

Author of *BIG BIM little bim* and  
*Makers of the Environment*

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<http://www.aia.org/tap>



# GLOBAL



COUNTRIES  
14



SITES  
2,458

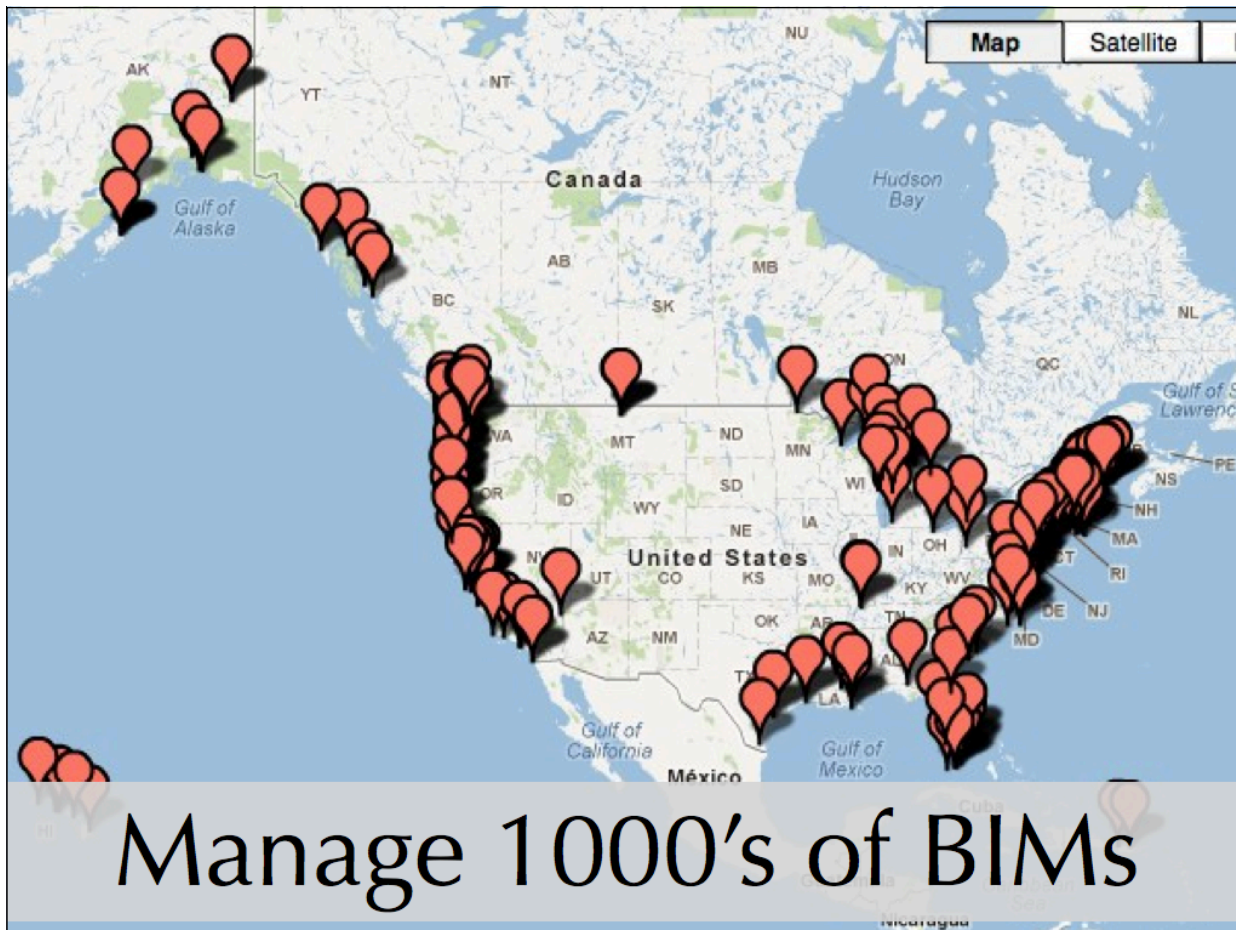


BUILDINGS  
3,964

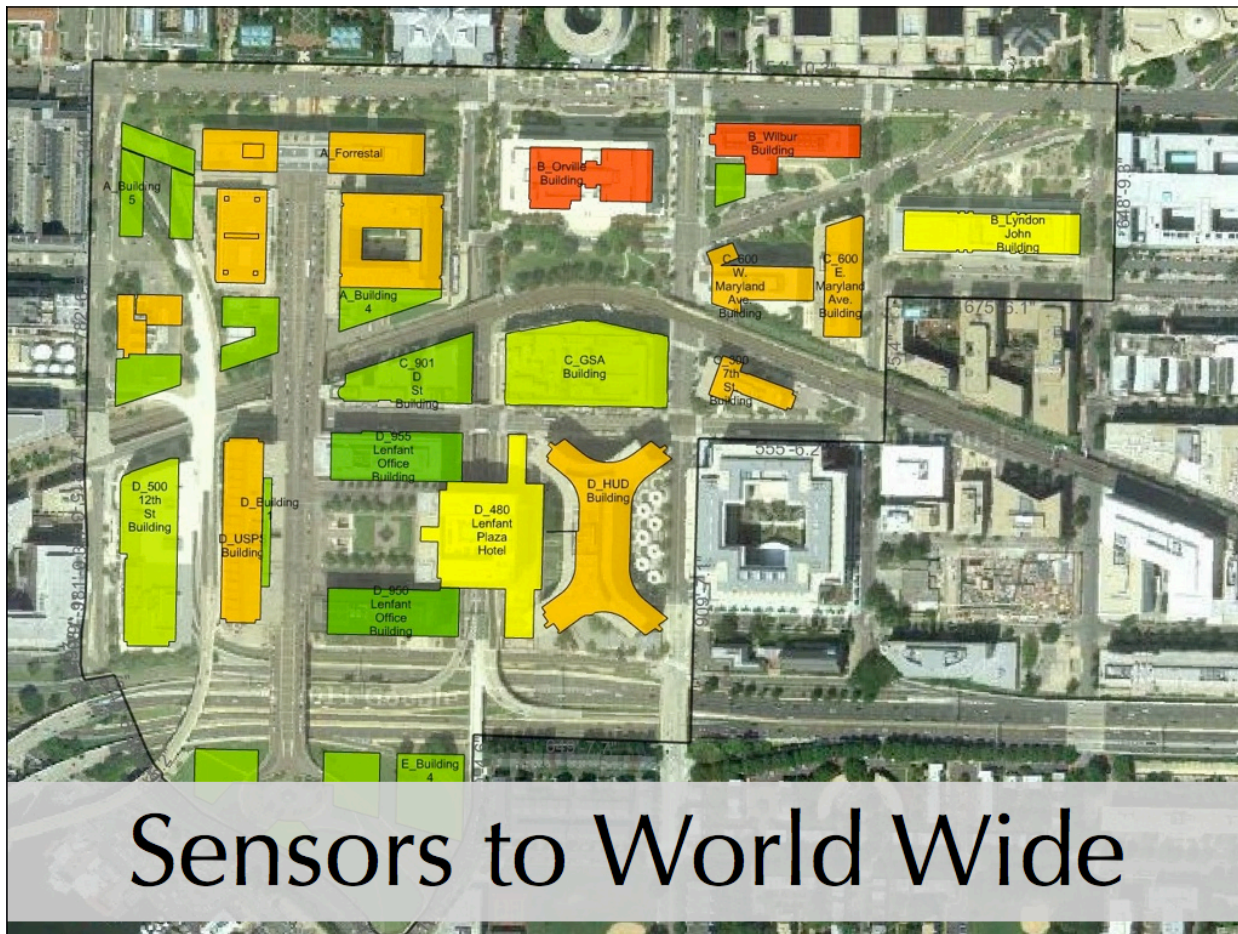


ROOMS  
493,914

485,883,744 sf





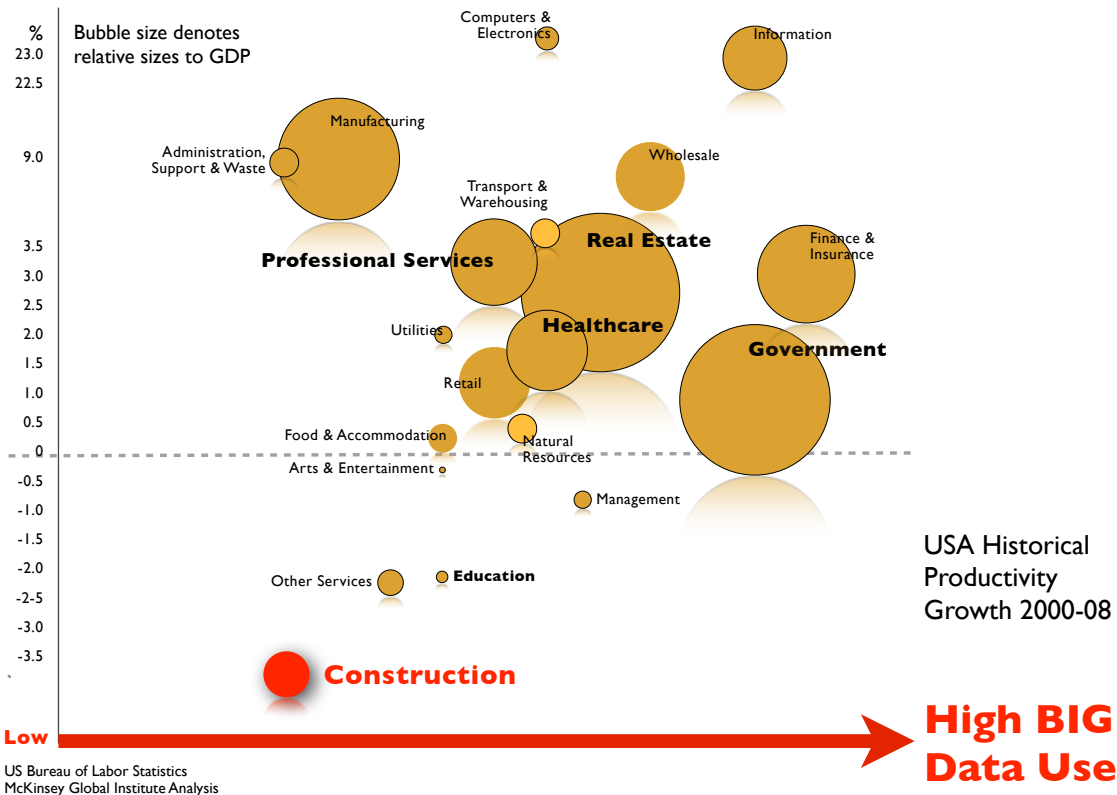


## Entire State of California Community College System

Largest System of Public Higher  
Education in World

- 71 Million Square Feet
- 2.75 Million Students
- 112 California Locations

# Cloud Computing



# Value Potential Index

## BIG BIM Bang – Enterprise BIM

Owner's Perspective & BIMStorm

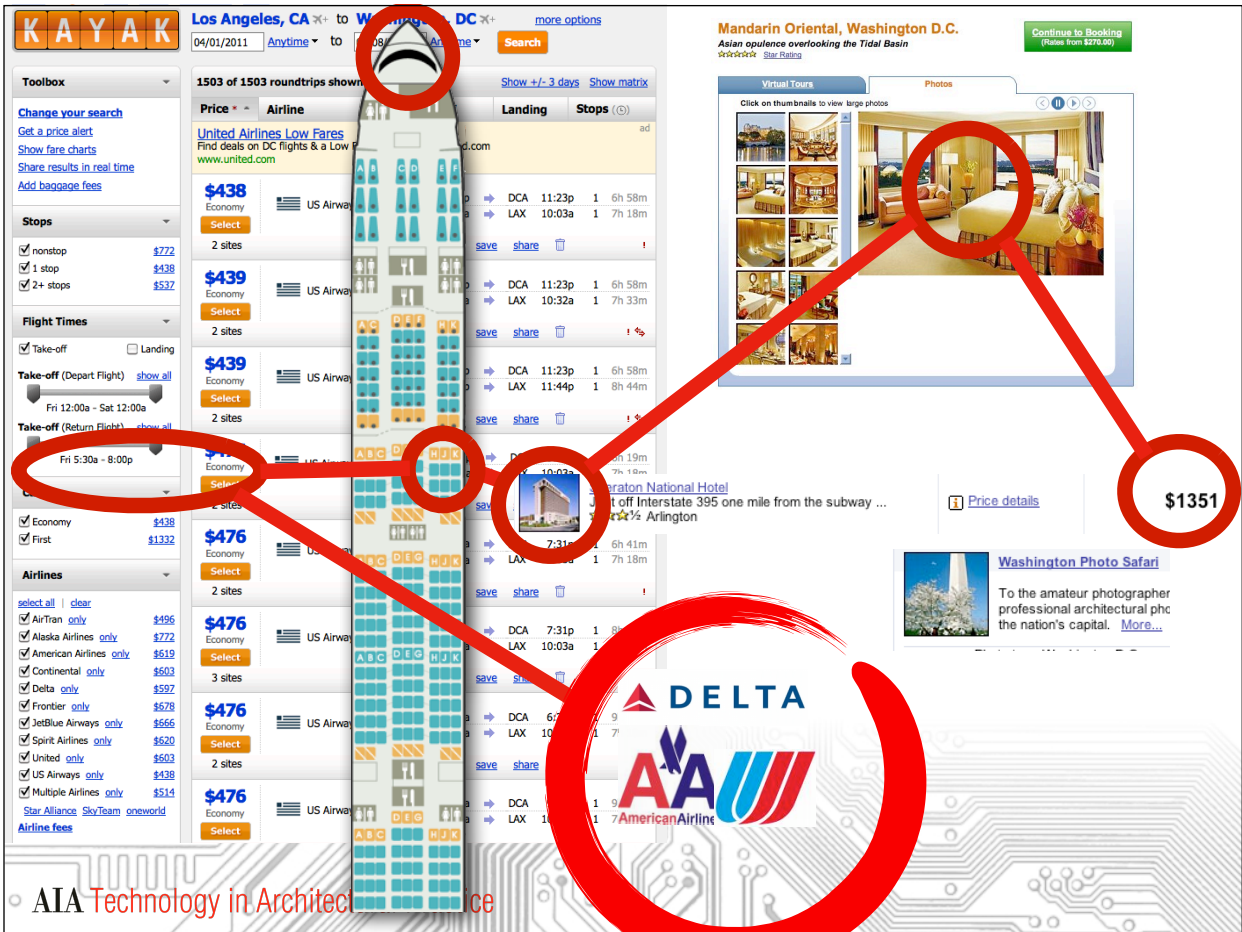


Kimon Onuma, FAIA  
Onuma Inc



John Roach  
Foundation for California  
Community Colleges





# “Disruptive Technologies”

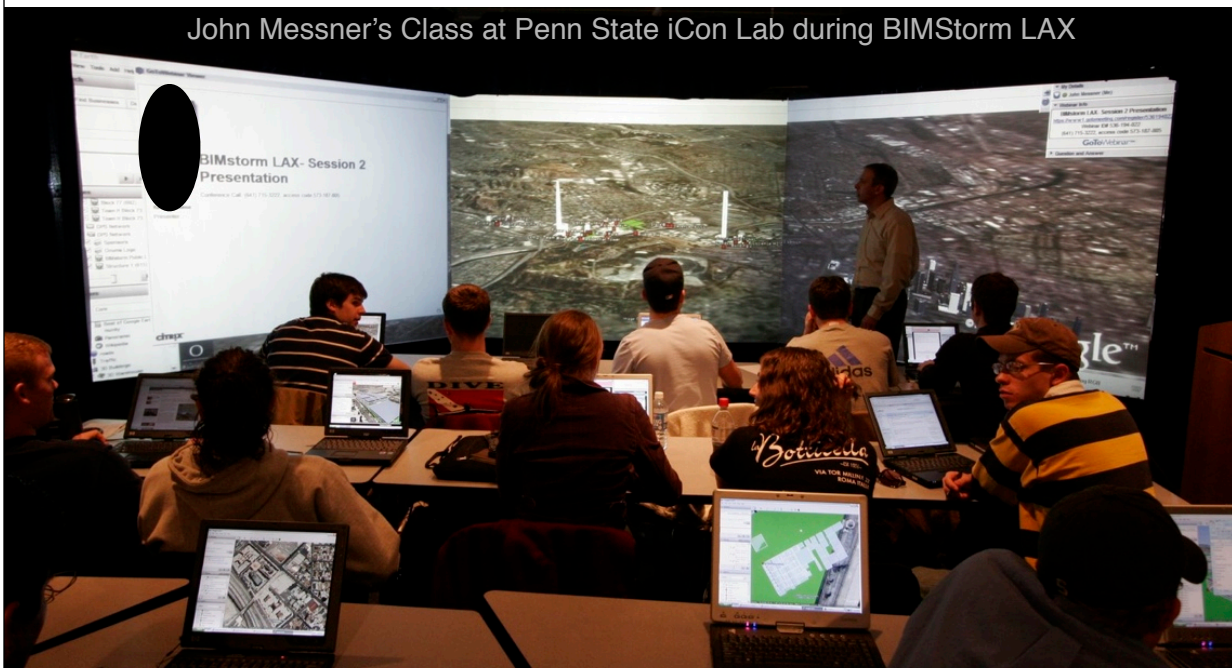
Philip A. Pizzo  
Dean of the Stanford  
University School of Medicine

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## BIG BIM Bang – Enterprise BIM

BIMStorm

John Messner's Class at Penn State iCon Lab during BIMStorm LAX



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3,4,5,6,7 - California Community College

### 3 -Miracosta Master Plan

## 4,5,6 -Miracosta Projects

## I- Kaiser Permanente Gwinnett

## 2 - Kaiser Permanente Glenlake

### 3 -Miracosta Master Plan

## 7 - LACCD Mission College - COBie

## MAINTENANCE

## OPERATIONS

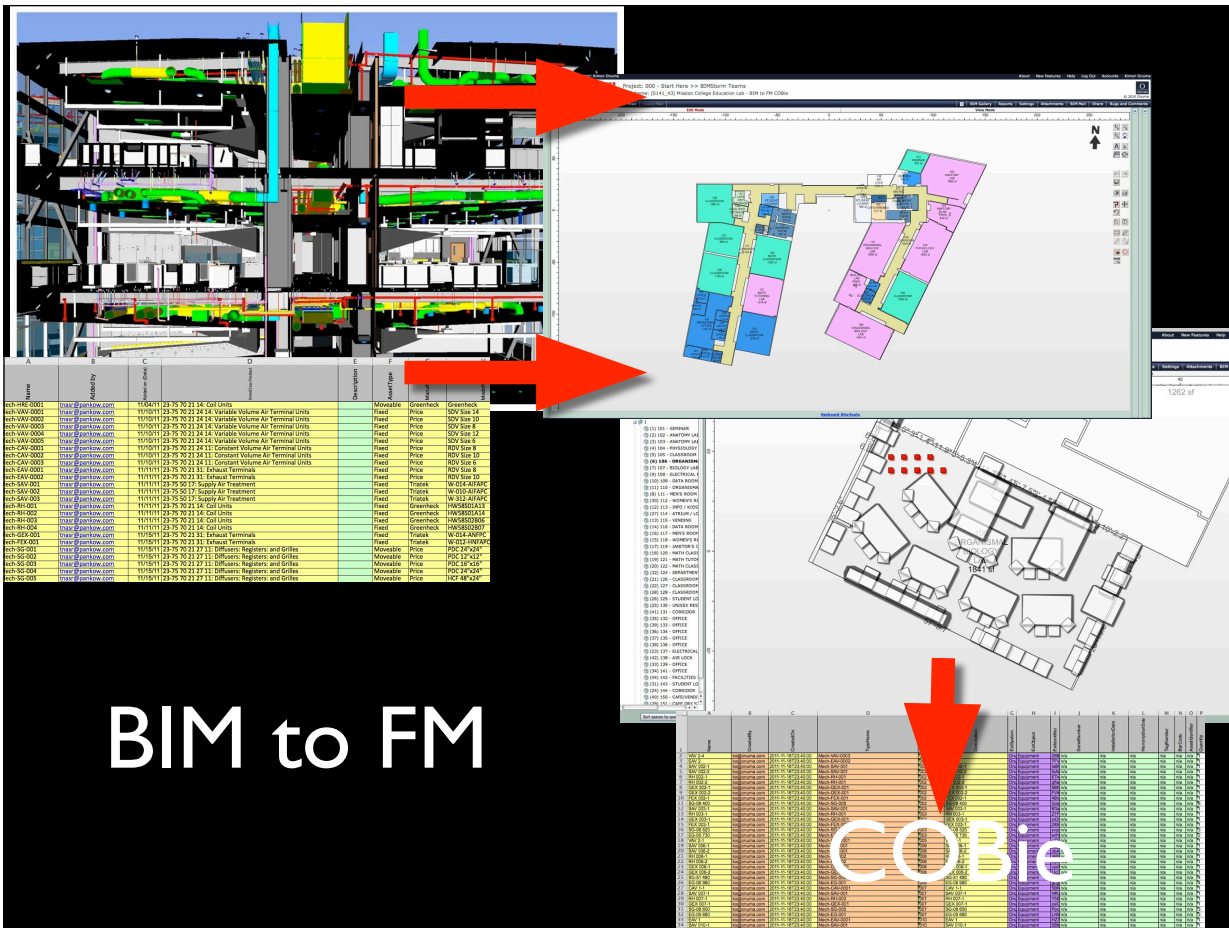
## COMMISSIONING

## CONSTRUCTION

## FINAL DESIGN

## DESIGN

## EARLY PLANNING





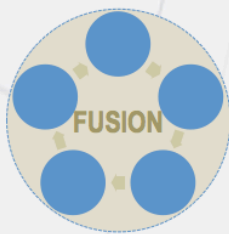
# BIG BIM Bang – Enterprise BIM

## Some of the Software used in BIMStorm

- Autodesk Architectural Desktop
- Autodesk Navisworks
- Autodesk Revit
- Autodesk Vasari
- BIMScore
- CCC GIS
- DDS
- Drofus
- Ecodomus
- Ecotect
- Energle Byucksan
- ESRI ArcGIS
- Fastbridge
- Filemaker
- 4Projects
- FUSION+GIS+ONUMA
- Gehry Technologies GTX
- Google Docs
- Google Earth
- Google SketchUp
- Graphisoft Archicad
- Green Building Studio
- IES
- InfoComm
- Microsoft Bing
- Microsoft Excel
- Onuma System
- PowerSmiths
- Synchro
- Tekla
- TMA
- Trelligence Affinity
- Vela

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## FUSION Program



On-site Building Assessments



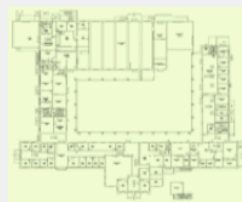
Web portal



Classroom training



Summaries & Analysis



Architectural drawings database

# FUSION + CCC GIS + ONUMA

The Entire State of  
California Community College System  
in a Cloud Computing Environment  
Linking FUSION with GIS and BIM

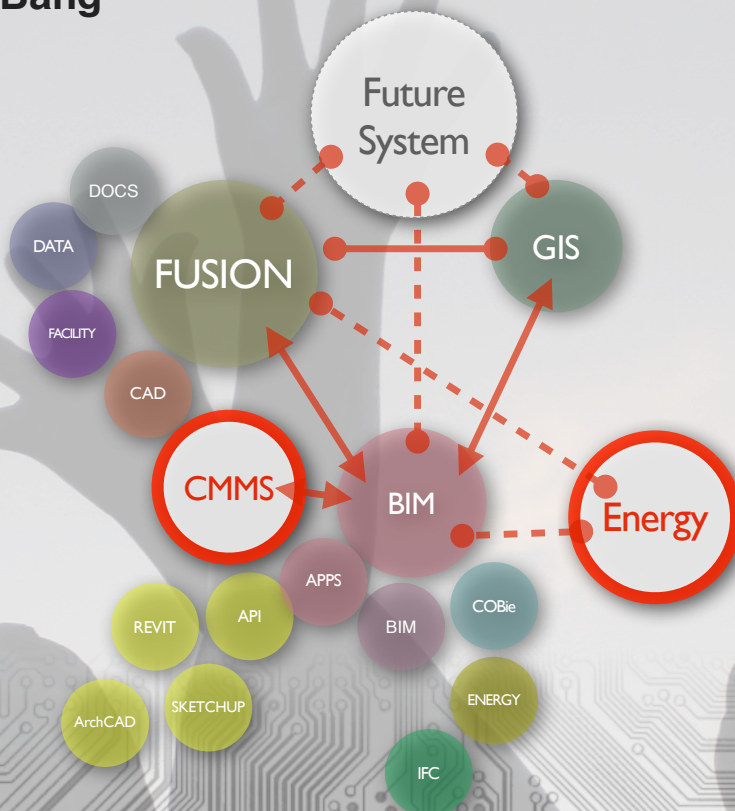


71 million square feet  
2.75 million students  
112 California locations

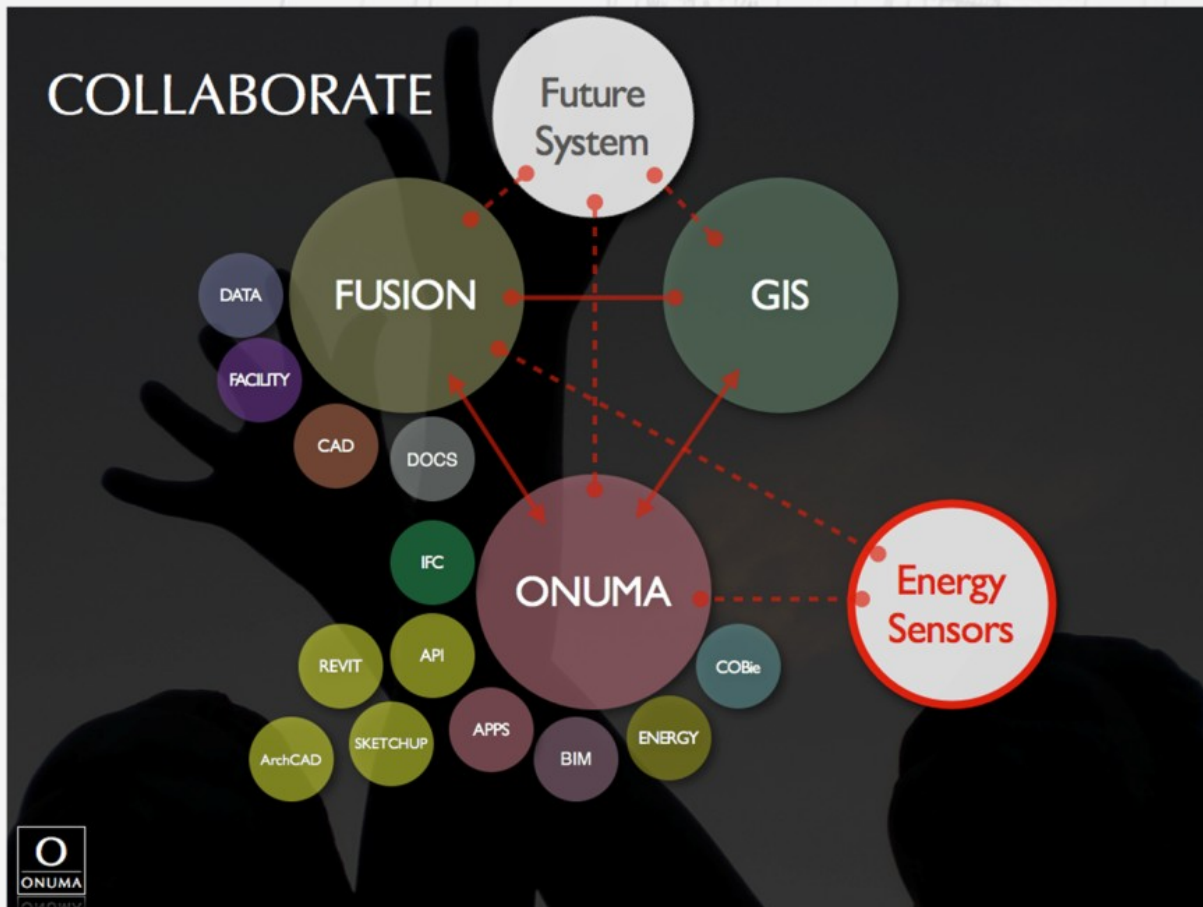
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## BIG BIM Bang

CONNECT



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## Topics

- About the California Community Colleges and the Foundation
- Our Integrated Facilities Platform
  - FUSION for Facilities Reporting
  - CCC GIS for location and map information
  - Onuma for building information modeling
- How It Is Used
- Why It Works...Shared Data on the Web

An architectural drawing of a building floor plan, showing various rooms, corridors, and structural elements. The drawing is in a light, faded style, serving as a background for the text.

About the

## **CALIFORNIA COMMUNITY COLLEGE SYSTEM**

An architectural drawing of a building floor plan, showing various rooms, corridors, and structural elements. The drawing is in a light, faded style, serving as a background for the text.

**The California Community Colleges make up the largest higher education system in the nation**

- 72 Districts
- 112 Colleges
- Nearly 300 sites
- 24,000 acres
- 5,000 buildings
- 71 million square feet
- 2.75 million students



- Official foundation of the California Community Colleges' Board of Governors and Chancellor's Office
- \$40 million annual revenues
- Programs in
  - Facilities & GIS
  - College Buys Purchasing Program
  - Health Care Education
  - Workforce Development
  - Fiscal Services & Resource Development

- College Buys, Microsoft, Adobe
- Statewide facility condition assessments
- FUSION Space Inventory, Planning, Project
- Architectural Drawings Database (ADDB)
- Nursing student placement (CCPS)
- Automotive smog abatement (HERO, VRRRM)
- Nursing faculty recruitment (CFRC, NRC)
- Geographic information systems (CCC GIS)
- Affinity Magazine Online and web design awards (40+)
- FUSION + CCC GIS + Onuma Collaboration Platform





About Annual Reporting & Workflow of

# FUSION

## FUSION: Facilities Maintenance & Reporting On The Web Using Interlinked Modules

The screenshot displays the FUSION web application interface. At the top, a navigation bar includes links for Home, Assessment, Space Inventory, Planning, Project, and Emanuel. Below this, a user login bar shows "John Roach - FPU Admin is signed in: Access Your Info | Sign Out" and a "Change Planning Year" dropdown set to "2013-14, SI 10-11". The main content area is titled "Welcome to California Community Colleges" and features a photograph of a building. A sidebar on the left lists various colleges, including Allan Hancock, Antelope Valley, Barstow, Butte-Glenn, and Cabrillo. A modal window is open, showing a detailed view of the "California Community College System" with contact information for the Chancellor's Office and a notice regarding campus and building names. The bottom of the screen shows a status bar with "Done", "Internet | Protected Mode: Off", and a zoom level of "125%".

**FUSION**

John Roach - FPU Admin is signed in: Access Your Info | Sign Out

Change Planning Year: 2013-14, SI 10-11

**Assessment** | 1.0 Facility | 2.0 Deficiencies

**Welcome to California Community Colleges**

Sunday, December 11, 2011

**California Community Colleges**

- California Community Colleges
  - Allan Hancock
  - Antelope Valley
  - Barstow
  - Butte-Glenn
  - Cabrillo

**Home** | **Assessment** | **Space Inventory** | **Planning** | **Project** | **Emanuel**

Change Planning Year: 2013-14, SI 10-11

**California Community College System**

California Community Colleges, Chancellor's Office  
1102 Q Street Sacramento, California 95811-6549  
916.445.8752

Notice: The campus and building names used in the Assessments module tree view may not match those used in the Space Inventory module. In addition, some districts did not include all facilities in their condition assessments. These issues will be addressed in later versions of FUSION. If you have questions or need further assistance, please contact the FUSION User Support Coordinator using the link on the News section of the FUSION Home page.

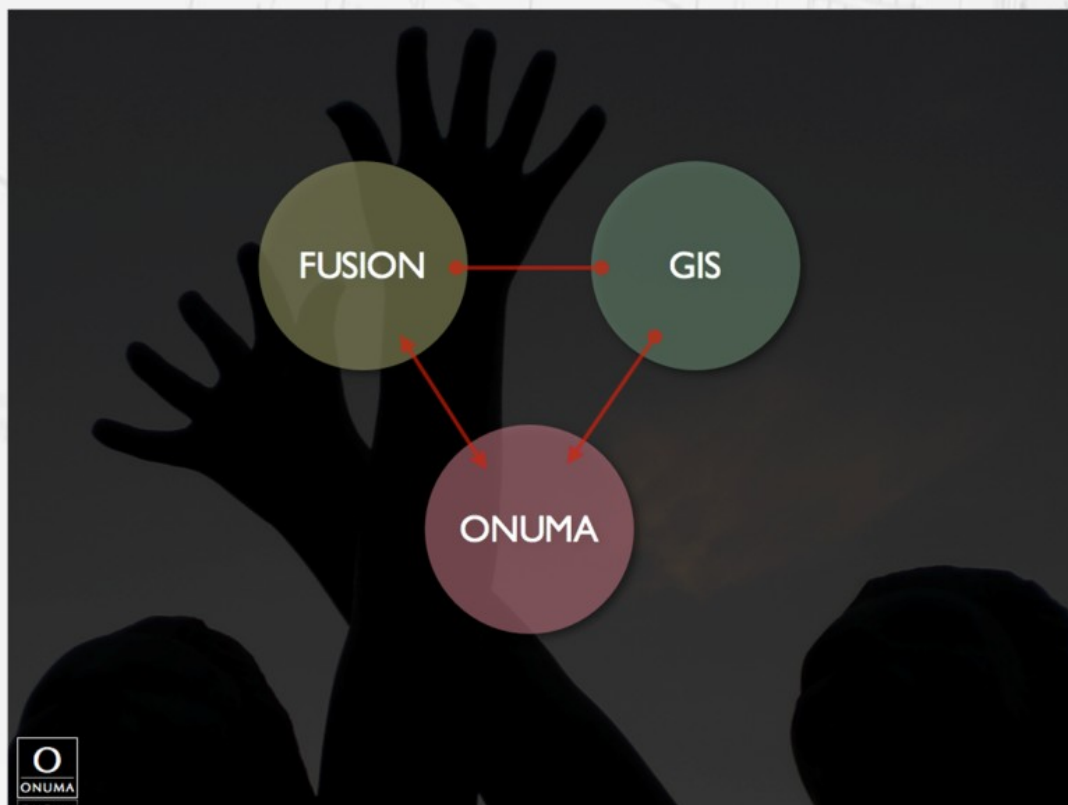
Done | Internet | Protected Mode: Off | 125%

## Sixteen Community College Districts Funded The Original Development Of FUSION

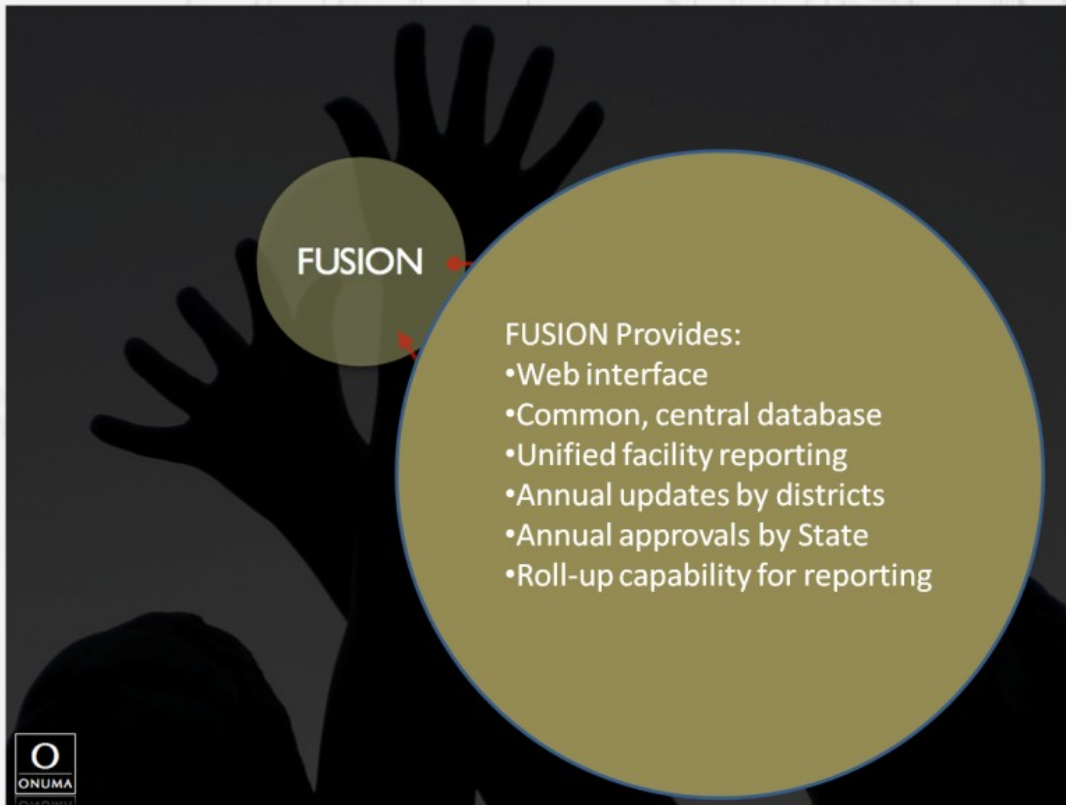
- Chaffey
- Citrus
- Contra Costa
- Foothill-De Anza
- Los Angeles
- Los Rios
- Marin
- Mt. San Antonio
- Peralta
- Riverside
- San Francisco
- San Joaquin Delta
- San Jose-Evergreen
- San Mateo County
- Santa Clarita
- Sonoma County

**Ongoing Annual O&M Funded by all 72 Districts**

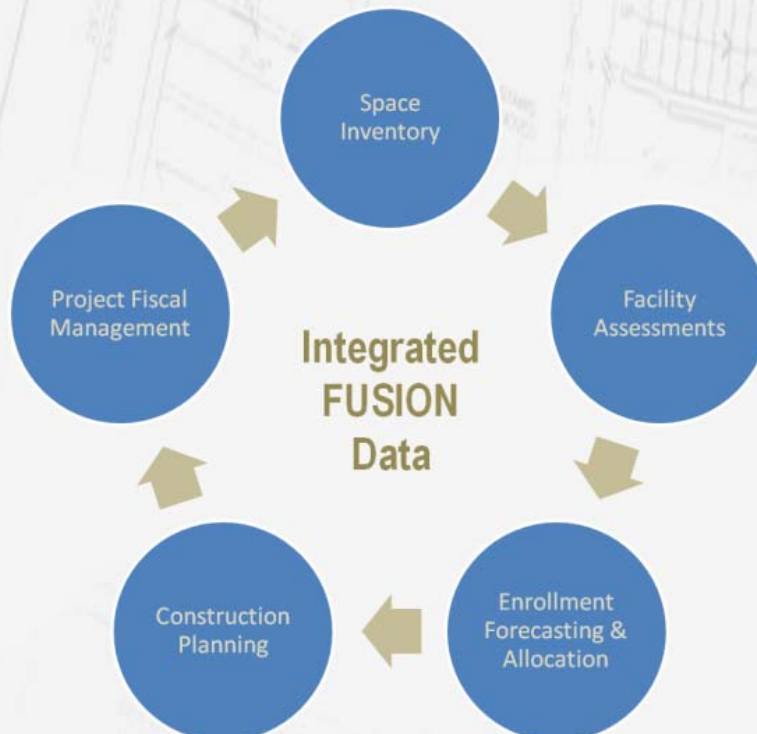
## FUSION+CCCGIS+Onuma



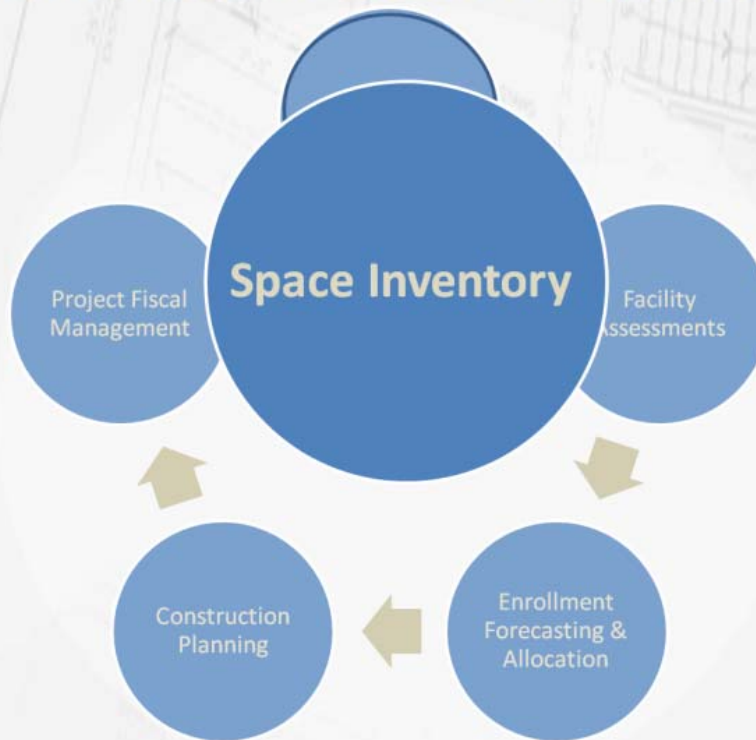
# FUSION+CCCGIS+Onuma



## FUSION Workflow with Interlinked Modules on the Web



# FUSION Workflow with Interlinked Modules on the Web



**FUSION** John Roach - District Level is signed in: Access Your Info | Sign Out

Home Assessment Space Inventory Planning Project Emanuel

Change Planning Year: 2015-16, SI 12-13

### Space Inventory

Hide Tree

- Ohlone (2012-13)
- Palo Verde (2012-13)
- Palomar (2012-13)
- Pasadena (2012-13)
- Peralta (2012-13)
- Rancho Santiago (2012-13)
- Redwoods (2012-13)
- Rio Hondo (2012-13)
- Riverside (2012-13)
- San Bernardino (2012-13)
- San Diego (2012-13)
- San Francisco (2012-13)
- San Joaquin Delta (2012-13)
- San Joaquin Delta College
  - ADMINISTRATIVE WING (55)
  - AUDITORIUM (60)
  - Baseball Dugout Storage (139)
  - BASEBALL SCORE BOOTH (64)
  - Belarmino Data Center (159)
  - BUDD CENTER (52)
  - CENTER OF MICROSCOPY & A ( )
  - CENTRAL PLANT (79)
  - CHILD DEVEL CENTER (68)
  - CITY FIRE STATION (99)
  - COTTAGE (75)
  - Cottage Garage (76)
  - CUNNINGHAM CENTER (51)
  - DANNER HALL (59)
  - DERICCO (Gateway) (156)
  - EQUIPMENT WAREHOUSE (78)
  - FIELD BUILDING (62)
  - FOOTBALL SCORE BOOTH (63)
  - FORUM HALL (57)
  - GOLEMAN LIBRARY (54)
  - HOLT CENTER (53)
  - LOCKE CENTER (58)
  - MANETCA CTR (FARM OFC) (80)
  - MANETCA CTR (FARM BARN) (81)
  - MANETCA CTR (FARM DMGRG) (82)
  - MANETCA CTR (FARM DORM) (157)

### CUNNINGHAM CENTER

Building Profile

Building No.:	51	Year Built:	1973
Name:	CUNNINGHAM CENTER	Last Addition:	
Abbrev:	CUNN	Building Status:	A
Plan Type:	Permanent	Total Outside Gross Sq Ft:	92,504
Location Code:	College/Campus	Total Rooms:	171
Ownership Code:	Owned in fee simple	Total Assign Stations:	1877
Condition Code:	1 - Satisfactory	Total Assignable Sq Ft:	63,574
Construction Code:	Fire resistive - Concrete		
Efficiency:	68.73%		

Rooms ASF Summary

Prfx	Rm No.	Sufx	Room Use#	Room Use	Top/CSS #
	101		110	Classroom	0099
	102		110	Classroom	0099
	103		620	Exhibition	6140
	103 A		625	Exhibition Service	0099
	103 B		625	Exhibition Service	6140
	104		625	Exhibition Service	6140
	105		620	Exhibition	6140
	107		310	Office	0099
	108		210	Class Lab	0401
	110		210	Class Lab	0401
	111		215	Class Lab Service	0401
	111 A		215	Class Lab Service	0401
	111 B		215	Class Lab Service	0401
	112		210	Class Lab	0401
	114		210	Class Lab	0401
	114 A		215	Class Lab Service	0401
	115		210	Class Lab	0401
	115 A		215	Class Lab Service	0401

[Edit Room Profile]

Room Prefix: Room Status: A

Room No.: 108

Room Suffix:

Description:

Department No.: 45

Assignable Stations: 30

Sq. Ft.: 1231

Program No.: 11 General Academic Instruction

Room Use: 210 Class Lab

TOP/CSS: 0401 Biology, General

Assessment Note: Clear Note

Non-assignable Deactivate Save Cancel

Room Use	Top/CSS #	Program No.	Room Use	Top/CSS #	Program No.	Room Use	Top/CSS #	Program No.	Room Use	Top/CSS #	Program No.
Biology, General	30	1,240	45	General Academic Instruction	A						
Biology, General	0	203	45	General Academic Instruction	A						
Biology, General	32	1,348	45	General Academic Instruction	A						
Biology, General	1	311	45	General Academic Instruction	A						

Contains commands for working with the selected items.

100%



# FUSION Workflow with Interlinked Modules on the Web



**FUSION** Home Assessment Space Inventory Planning Project Manual

John Roach - District Level is signed in. Access Your Info | Sign Out

Assessment 1.0 Facility 2.0 Deficiencies

ASSESSMENT > Facility > 0051 CUNNINGHAM CENTER

**General Info:**

Type: Building  
Gross Area: 92504 S. F.  
Year Built: 1973  
Last Renovation:

**Facility Description:**

51 Cunningham Center is located on the San Joaquin Delta Campus of the San Joaquin Delta Community College District in Stockton, CA. The four story with partial basement, 92,504 square foot building contains classrooms, class labs and offices. Originally constructed in 1973.

**Facility Condition - Window**

<http://fusion.deltacollege.edu/code/contents>

**Facility Condition:**

Estimate Cost:	\$5,425,768.52
Additional Cost:	\$5,514,119.02
Repair Cost:	\$10,939,887.54
Replacement Value:	\$33,558,601.12
FCI%:	32.60%

Internet | Protected 100%

ASSESSMENT > Deficiencies > 51 CUNNINGHAM CENTER

Major Class	Deficiency	Estimated Amt
Asphalt Roof Shingles	Asphalt Shingle Roof: Damaged or Failing	\$157,201.20
Carpet Tile	Carpet: Damaged or Failing	\$8,921.44
Carpet Tile	Carpet: Damaged or Failing	\$3,202.28
Carpet Tile	Carpet: Damaged or Failing	\$3,812.75
Carpet Tile	Carpet: Damaged or Failing	\$8,474.47
Carpet Tile	Carpet: Damaged or Failing	\$6,955.29
Carpet Tile	Carpet: Damaged or Failing	\$8,870.61
Ceiling Tile	Glue on ceiling tile: Damaged or failing	\$606,826.24
Double Hung	{L1} Windows beyond expected useful life	\$9,899.54
Drinking Water Fountains,	Drinking Fountain: Damaged or failing	\$43,708.14
Entrance Doors And Frames	{L1} Exterior doors beyond expected useful life	\$10,034.69
Flooring	Concrete Floor Finish: Damaged or Failing	\$654,928.32
Framing, Stud Walls	{L1} Wall framing past useful life	\$228,484.88
Hydrants	{L1} Fire Protection System Past useful Life	\$4,812.60
Partitions, Toilet	Toilet Partition: Damaged	\$4,812.60
Partitions, Toilet	Toilet Partition: Damaged	\$21,090.91
Roof Hatch Options	{L1} Roof openings beyond expected useful life	\$1,130,398.88
Water Closets	{L1} Plumbing fixtures past useful life	\$1,859,330.40
Wiring Devices Elements	{L1} Electrical System Beyond Expected Useful Lif	\$654,003.28
Wood Doors Decorator	{L1} Interior doors past useful life	

Filter | Total: 19 (19 Shown) | Amt: \$5,425,768.52

Code	Description	Estimate	Additional	Repair	Replacement	FCI%
D1010	Elevators and Lifts	\$0.00	25	75%	80%	1
D2010	Plumbing Fixtures	\$0.00	35	90%	100%	1
D3020	Heat Generating Systems	\$0.00	35	90%	34%	1
D3030	Cooling Generation Systems	\$0.00	35	90%	34%	1

Internet | Protected Mode: Off 100%



# FUSION Workflow with Interlinked Modules on the Web



**FUSION** | Home | Assessment | Space Inventory | Planning | Project | Emanuel

John Roach - District Level is signed in. Access Your Info | Sign Out | Change Planning Year: 2014-15, SI 11-12

**Planning** | Hide Tree | 1.0 Capital Outlay SYP | 2.0 Local Assistance

PLANNING > District 5 Year Plan > **San Joaquin Delta Community College District - 2014/2015**

Projects | Forecast | Reports | Attachments

**WSCH Forecast** | First Year: 2012 | Total Years To Plan: 5 | Go

		2012	2013	2014	2015	2016	2017	2018
<b>District Forecast</b>		241,273	248,773	256,507	264,480	272,702	281,179	289,920
San Joaquin Delta College	% of Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	Campus Forecast	241,273	248,773	256,507	264,480	272,702	281,179	289,920
South Center Campus at Mountain House	% of Total							
	Campus Forecast							
<b>Total:</b>	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	Forecast	241,273	248,773	256,507	264,480	272,702	281,179	289,920

Save | Reset

Done | Internet | Protected Mode: Off | 100%

# FUSION Workflow with Interlinked Modules on the Web



**FUSION** | Home | Assessment | Space Inventory | Planning | Project | Manual

John Roach - District Level is signed in: Access Your Info | Sign Out | Change Planning Year: 2014-15, SI 11-12

Planning | Hide Tree | 1.0 Capital Outlay SYP | 2.0 Local Assistance

PLANNING > District 5 Year Plan > San Joaquin Delta Community College District - 2014/2015

Projects | Forecast | Reports | Attachments

Save Priority Arrangement

Priority	Project Title	Campus	Cat.	Occupy Date	Status	I	31	32	33	Funded	Att Cnt
											I F C
<input type="checkbox"/>	1 Goleman Learning Resource Center Modernization	San Joaquin Delta College	C	2008/2009	FPP-Approved	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2
<input checked="" type="checkbox"/>	2 Cunningham Mathematics / Science Replacement	San Joaquin Delta College	B	2009/2010	FPP-Approved	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6 3
<input type="checkbox"/>	3 Manteca Renovation										
<input type="checkbox"/>	4 Shima/CAT										
<input type="checkbox"/>	5 Planetarium										
<input type="checkbox"/>	6 Holt Bldg / Budd Shops M										
<input type="checkbox"/>	7 Establish Center in Lodig										
<input type="checkbox"/>	8 Business Service Reloca										
<input type="checkbox"/>	9 Restroom Modernization										
<input type="checkbox"/>	10 Danner Safety - Site Infr										
<input type="checkbox"/>	11 Forum Modernization										
<input type="checkbox"/>	12 South Center Campus @ Repurposing										

[ Add Project ] [ View/Edit Project ]

Project Details - Windows Internet Explorer

http://fusion.deltacollege.edu/code/planning/project/main.asp?id=1506

### Cunningham Mathematics / Science Replacement

Project Details

Campus: San Joaquin Delta College | CFIS #: 40.49.109

Project Title: Cunningham Mathematics / Science Replacement

Occupy Date: 2009/2010 | Building No: 51 - CUNNINGHAM CENTER

Project Type: New Construction

Project Category: B

CCI Index: 4421

Project Description: The laboratory spaces (originally built in 1974) in the existing Cunningham building cannot support modern science programs. The laboratories were built with what is a restrictive ceiling to floor height (13 feet) to meet the infrastructure needs of a modern laboratory. Due to the presence of asbestos, the delivery of technology to the building has been minor and not enough to meet program need. The layout of the laboratories (spread out over four stories) means that the science and math program is fractured among

Status: FPP-Approved

Project Phase | Distribution of Space | Score | Forms | Reports

Project Phase	Funding Date	State Funds Requested	Non State Funds	Project Cost
Land Acquisition				
Preliminary Plans	2007/2008	\$1,048,000	\$1,048,000	\$2,096,000
Working Drawings	2007/2008	\$1,254,000	\$1,254,000	\$2,508,000

Done

# FUSION Workflow with Interlinked Modules on the Web



**FUSION** Home Assessment Space Inventory Planning Project Manual

John Roach - District Level is signed in: Access Your Info | Sign Out

Capital Outlay Projects >> 1.0 Capital Planning Projects >> 2.0 Local Assistance Projects

Change Planning Year: 2013-14, SI 10-11

Project > Capital Outlay Project >

**Cunningham Mathematics / Science Replacement**

Project Detail

Project Details:

Campus: San Joaquin Delta College

Project: 2

Priority: 2

Project Title: Cunningham Mathematics

Occupy Date: 2009/2010

Project Description: The laboratory spaces (originally built in 1974) in the existing Cunningham building cannot support modern science programs. The laboratories were built what is a restrictive ceiling to floor height (13 feet) to meet the infrastructure needs of a modern laboratory. Due to the presence of asbestos, the delivery technology to the building has been minor and not enough to meet program need. The layout of the laboratories (spread out over four stories) means the science and math program is fractured among instructional spaces. Additionally there is a safety hazard as chemicals are transported between floors. Additionally, there are not enough suitable instructional spaces to fit the growing program. The campus is currently has a capacity load of 73% in the laboratory category.

The project includes the demolition of the existing Cunningham building (63,702 ASF) and the construction of a new Cunningham building (ASF) near the Shima center. This location is just northwest of the existing location. The new building will provide for a combined math and science academic program in a modern laboratory environment. It will also provide a learning resource area devoted to math and science to help meet the need for Library space on campus as well as strengthen the current academic program. The new building and its adjacency to the Shima building (that houses programs dependent upon math science) will support improved instructional delivery methods.

The College plans to support this project with 50% of the cost.

Funding Information:	Phase	State Fund	Local Fund	Appropriation Amt	Encumber Amt	Fund No.	Fund Year	Encumber By	Rev
P		\$1,048,000	\$1,048,000	\$1,048,000	\$1,048,000	6870-301-6049 (38)	2007	6/30/2008	6/30
W		\$1,254,000	\$1,254,000	\$1,254,000	\$1,254,000	6870-301-6049 (38)	2007	6/30/2008	6/30
C		\$19,172,000	\$20,923,000	\$19,172,000	\$19,172,000	6870-301-6049 (18)	2008	To Bid	6/30/2013
								Bid Award	6/30/2013
E		\$804,000	\$853,000	\$804,000	\$804,000	6870-490/09-Reappropriation 6870-301-0705 (2) 6870-491-Reappropriation	2008	6/30/2014	6/30

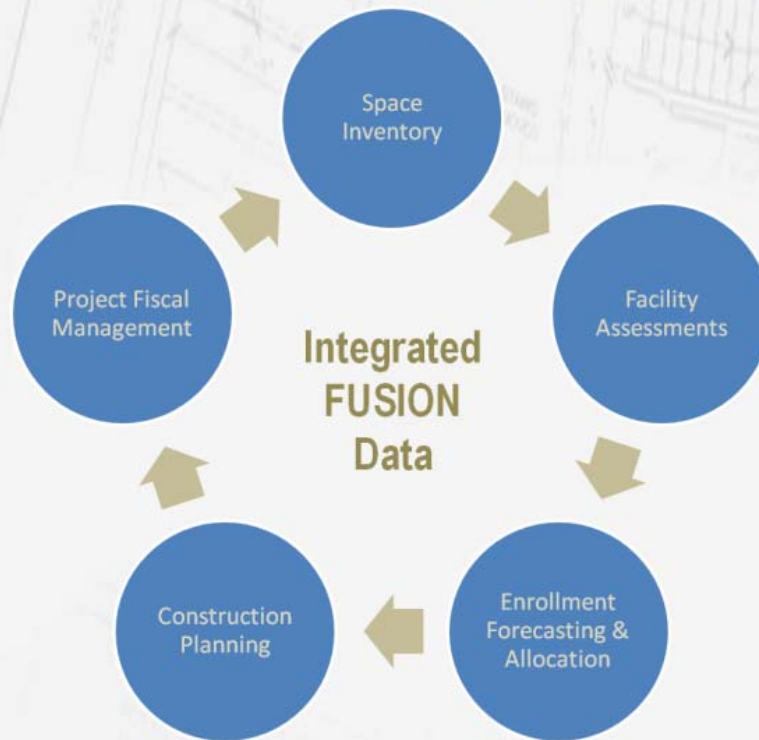
DOF Approval: 1

No	Action	Request Date	Approve Date
1	Encumber and Release Preliminary Plans	8/27/2007	8/29/2007

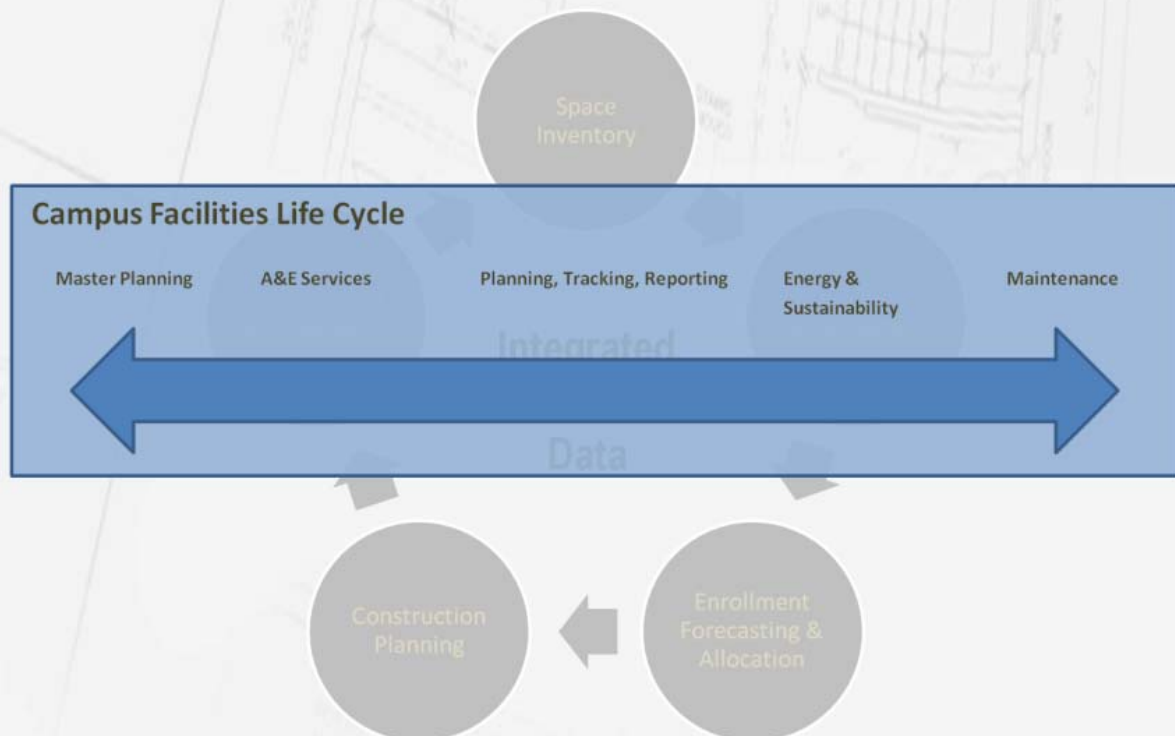
Internet | Protected Mode: Off



# FUSION Workflow with Interlinked Modules on the Web



## The Facility Asset Management Life Cycle





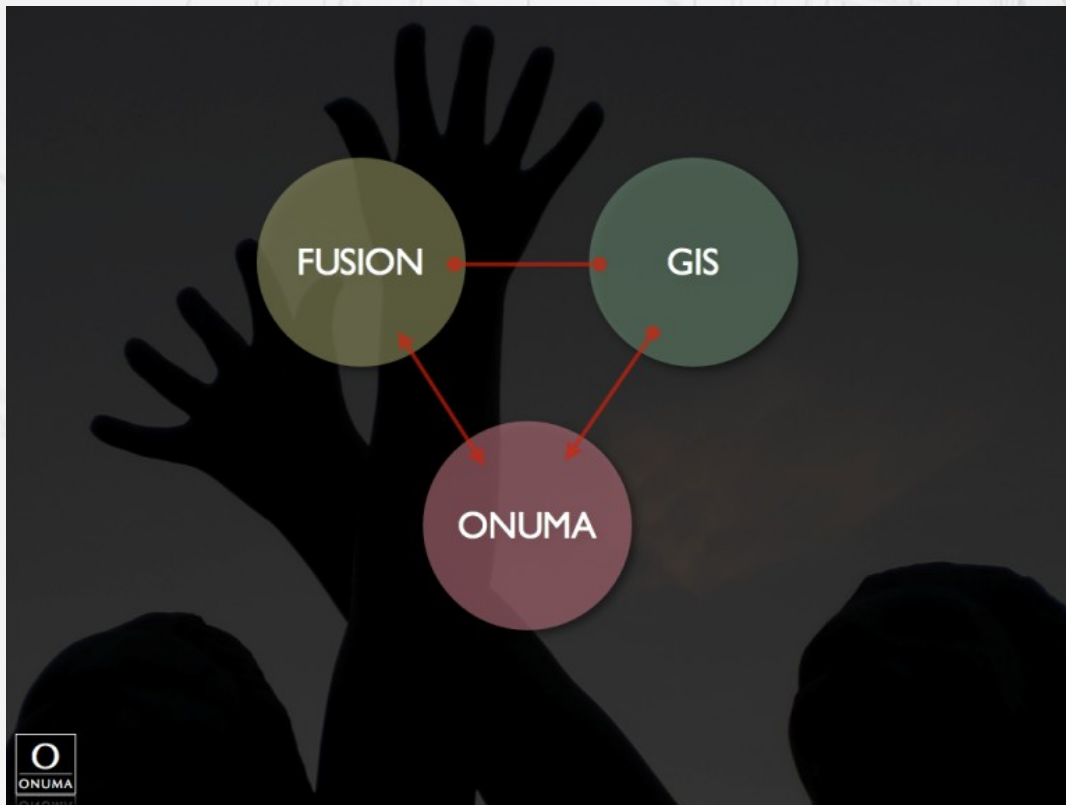
# FUSION's Original Capability



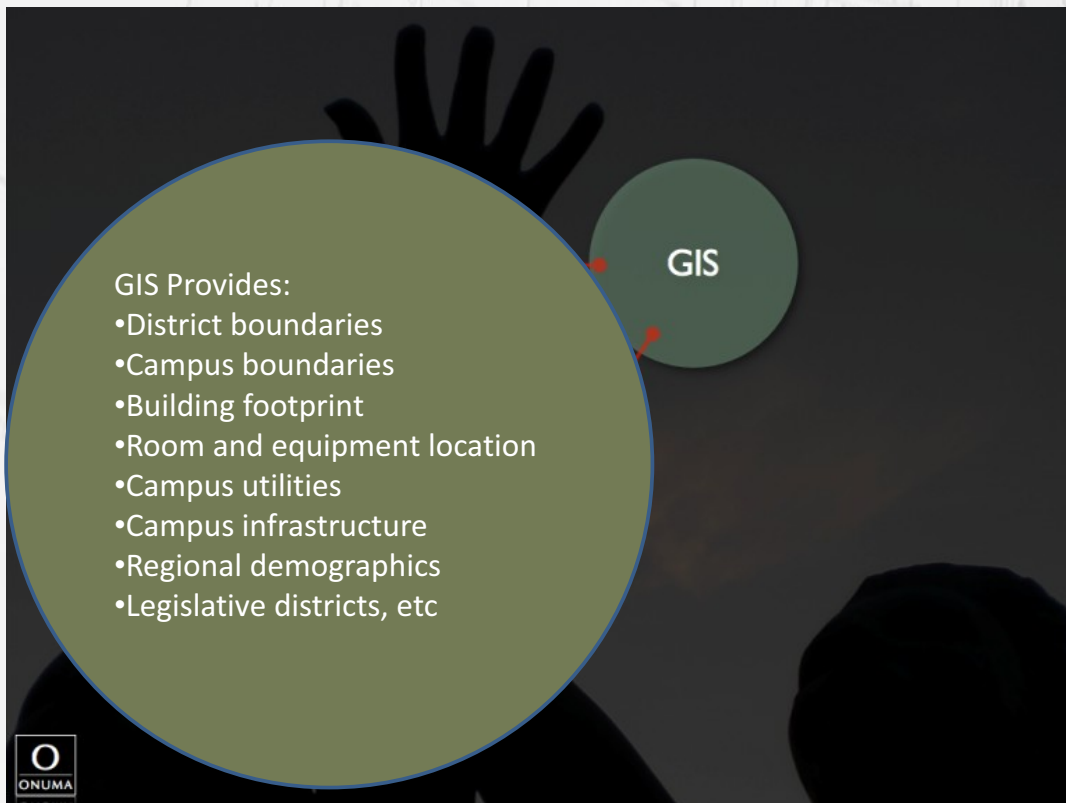
About Geographic Information Systems from the

## CCC GIS COLLABORATIVE

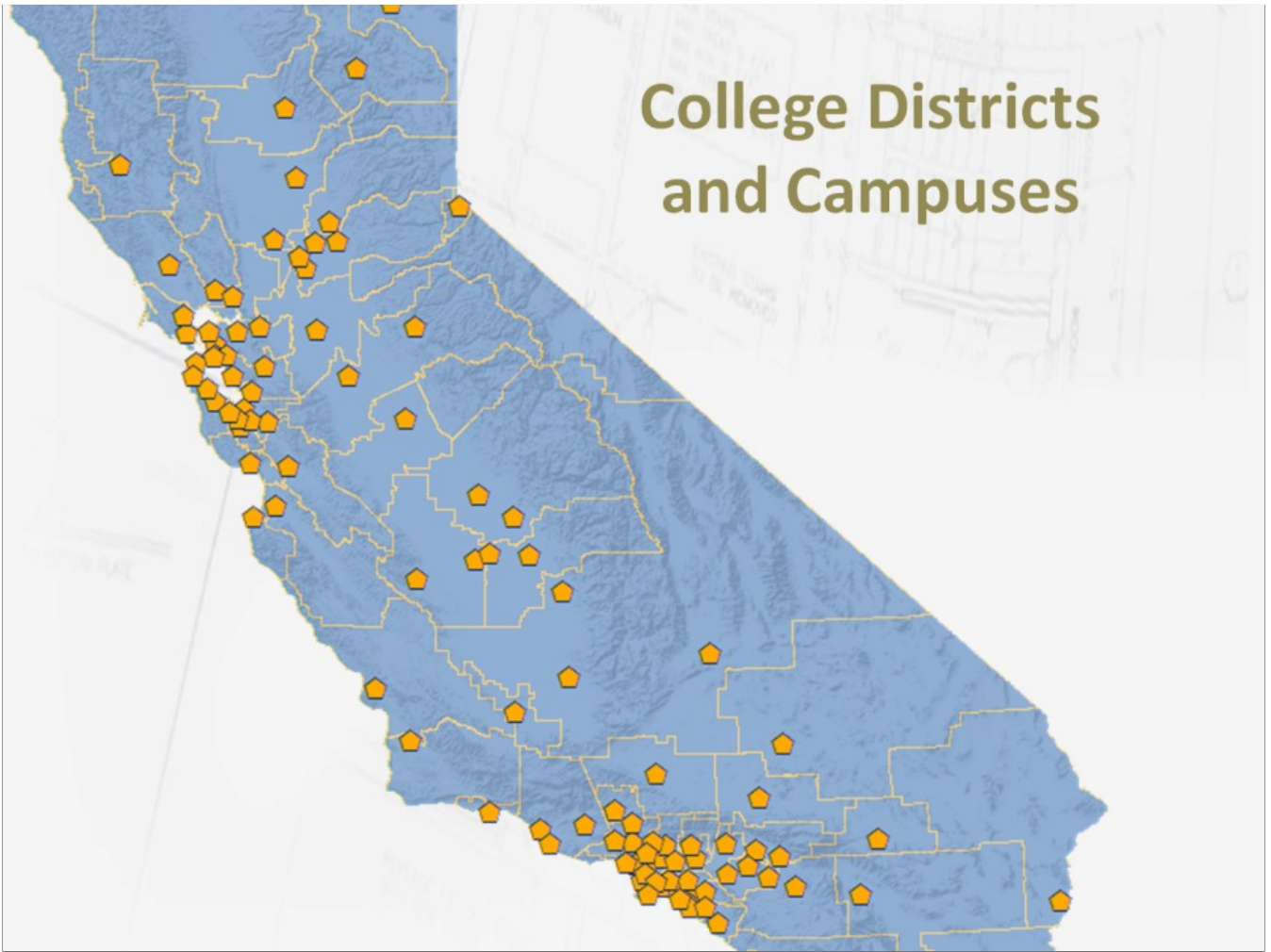
# FUSION+CCCGIS+Onuma



# FUSION+CCCGIS+Onuma

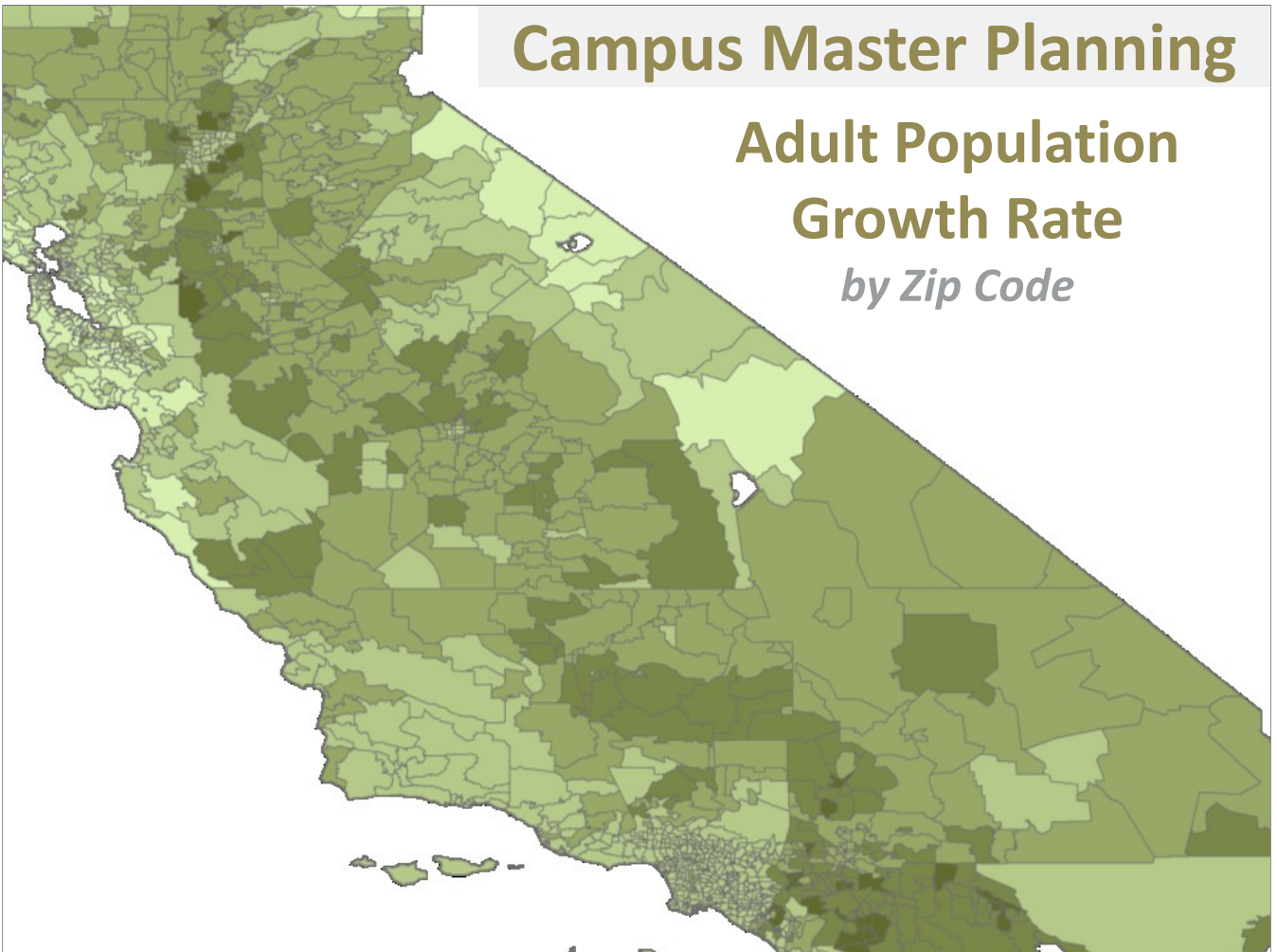


## College Districts and Campuses



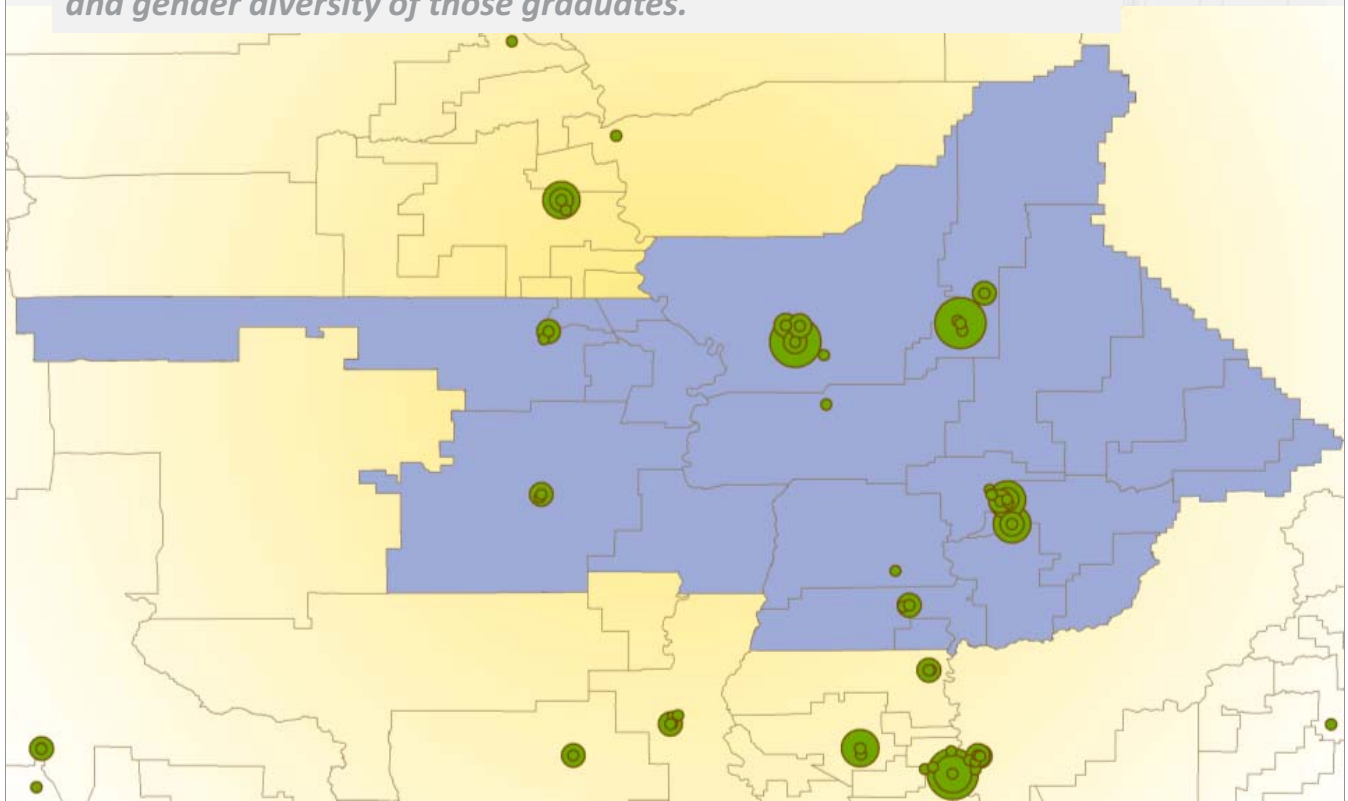
## Campus Master Planning

Adult Population  
Growth Rate  
*by Zip Code*

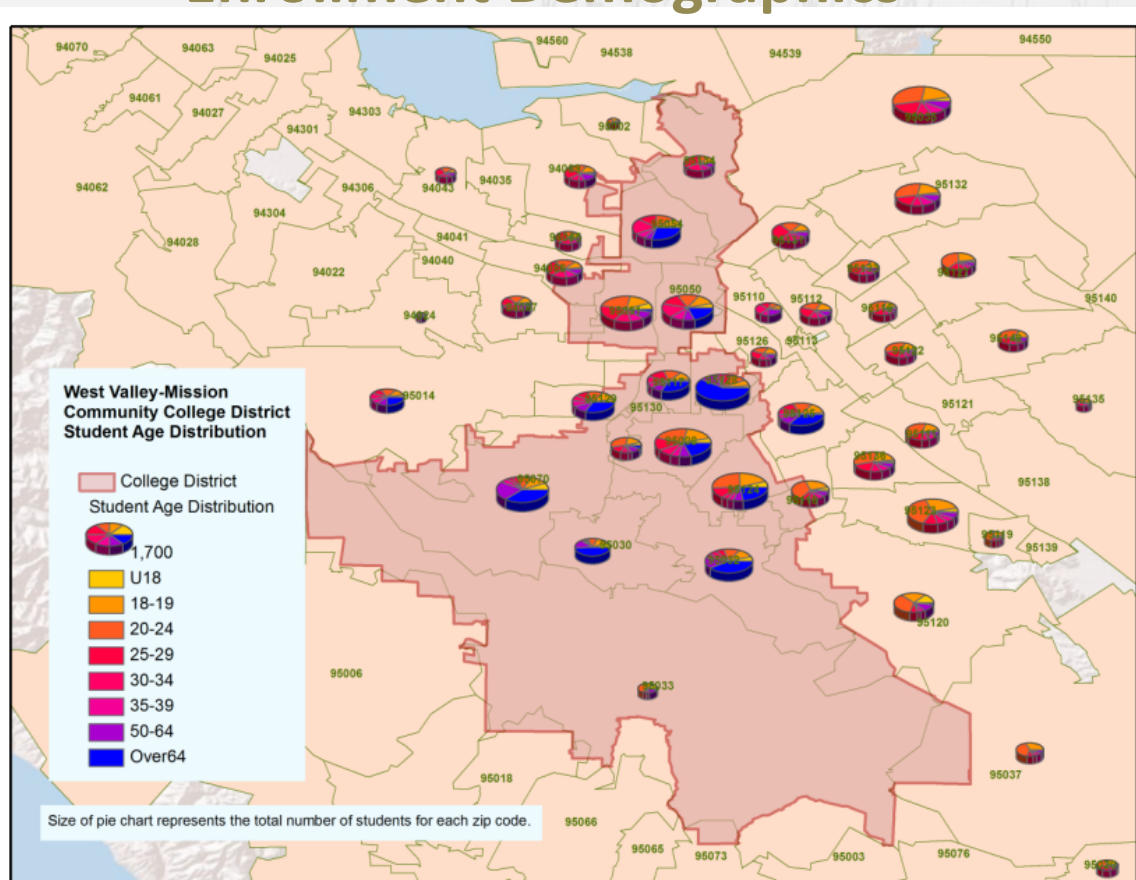


# High School Graduation Rates

*Large circles identify schools near Butte-Glenn Community College District with more graduates. Concentric circles represent the racial and gender diversity of those graduates.*



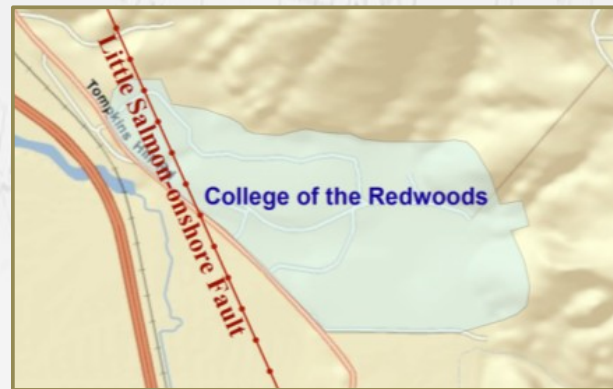
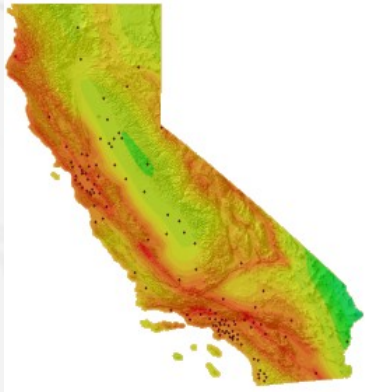
# Enrollment Demographics



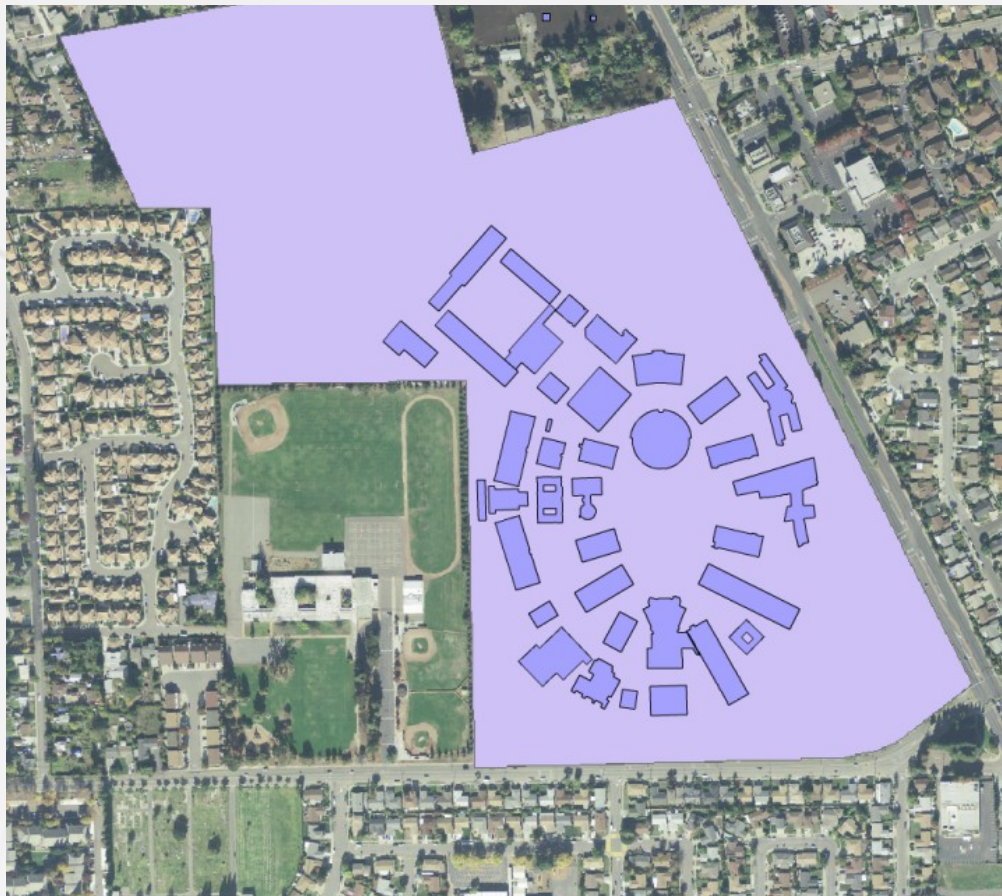


# Campus Master Planning

## Seismic Hazards

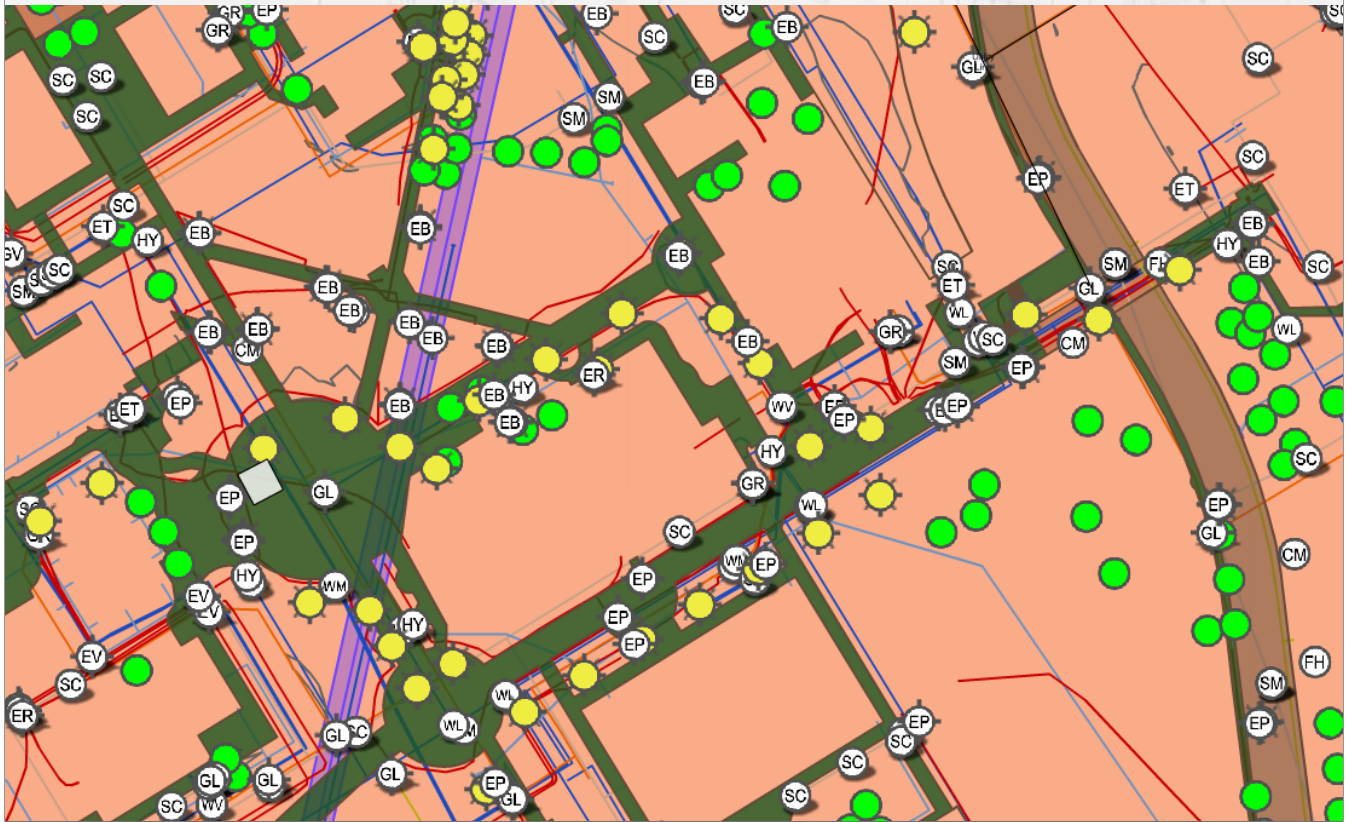


## Campus Boundaries & Building Footprints



## Campus Infrastructure

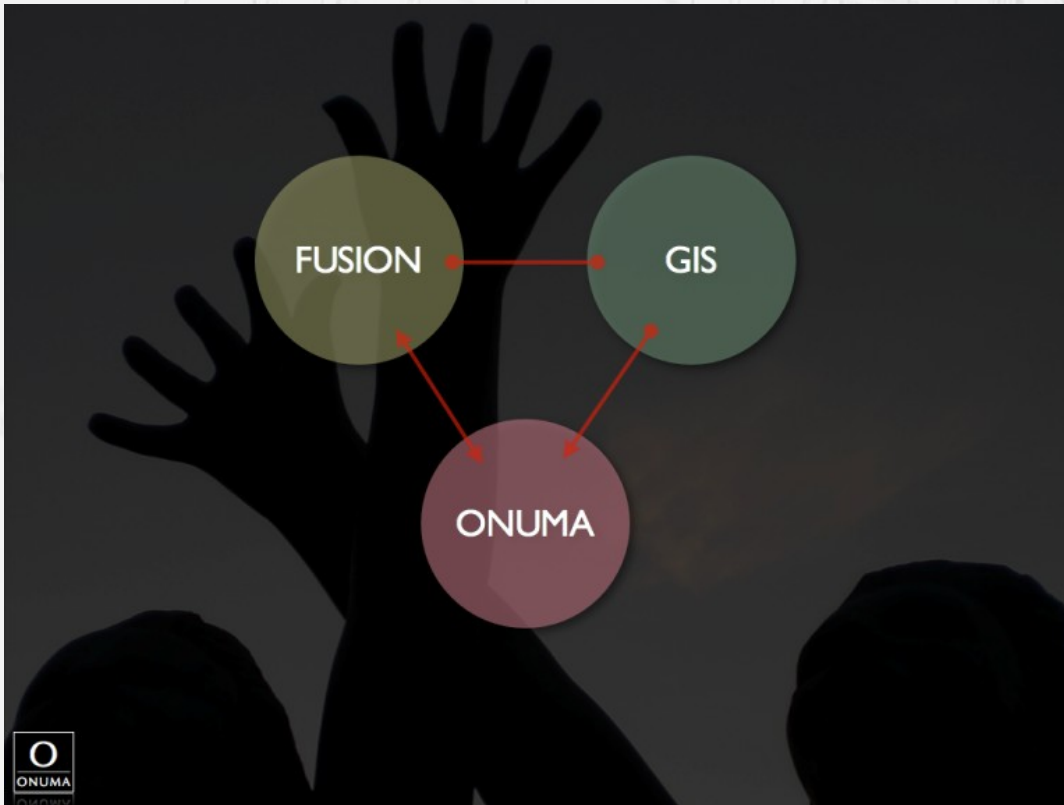
*Utilities, sidewalks, roads, easements....*



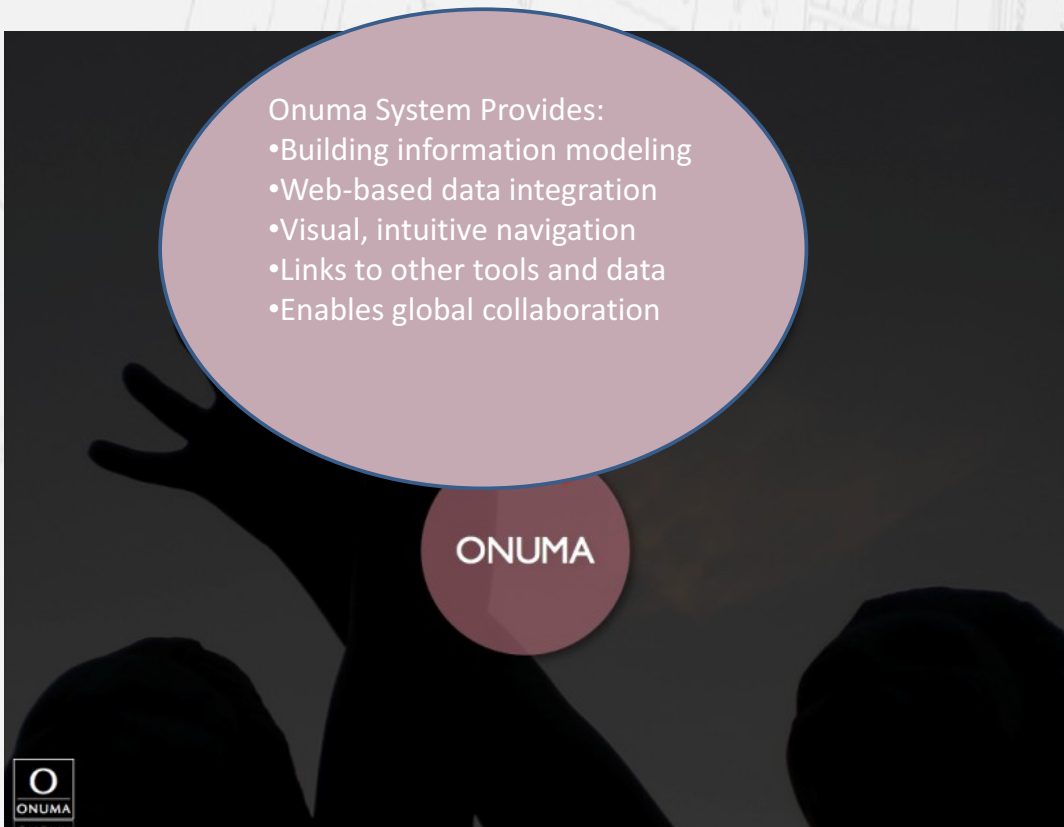
## Web Integration and Building Information Modeling

# ONUMA SYSTEMS

# FUSION+CCCGIS+Onuma



# FUSION+CCCGIS+Onuma





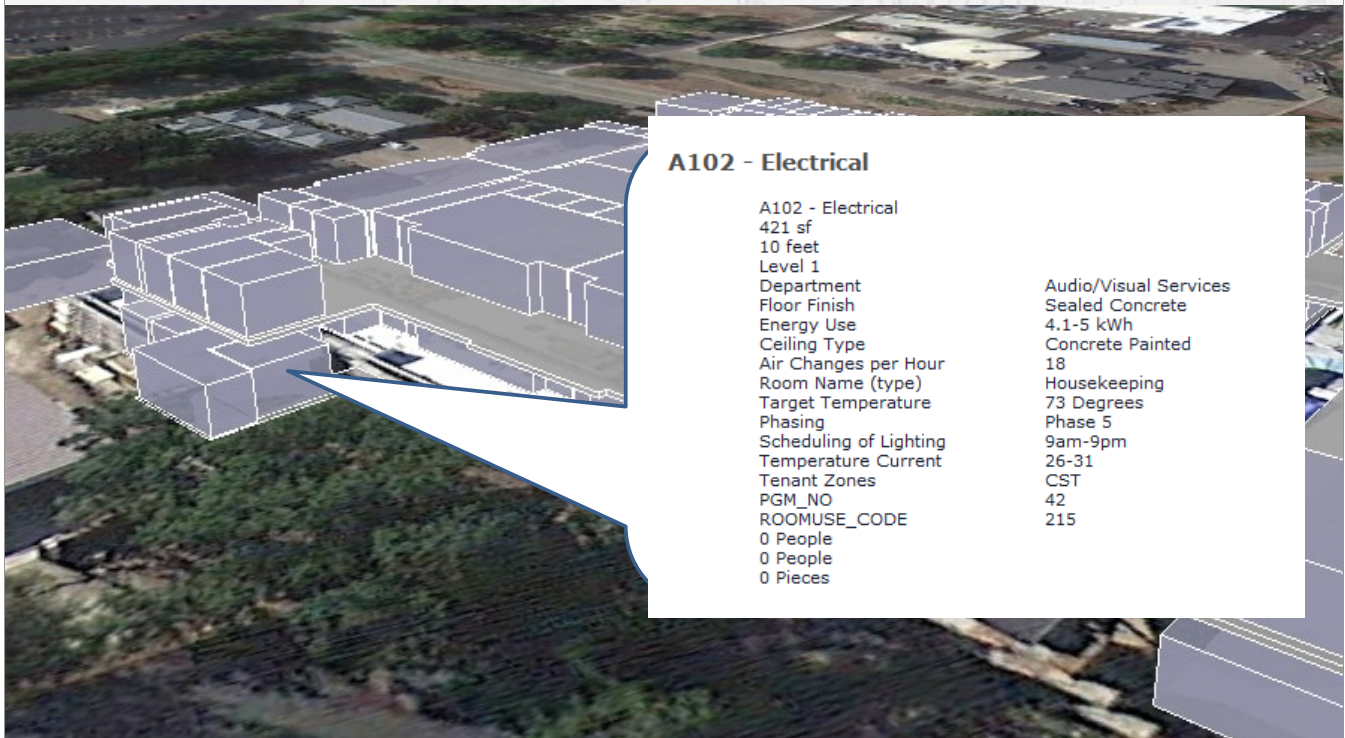
## Dec 31, 2014

The diagram illustrates a data integration ecosystem. At the center is a tablet labeled "Data from Fusion" which lists various data sources and their integration status. Surrounding this central hub are several software and data sources, each represented by a tablet icon. Blue arrows indicate the flow of data from these sources into the central "Data from Fusion" hub.

- San Joaquin Delta College District Tools:** A tablet showing the college's website with the text "Committed to Educational Excellence and Student Success for over 75 Years".
- Autodesk Navisworks Manage 2011:** A tablet showing the software's logo and name.
- GIS:** A tablet showing a 3D map of a city with a red overlay.
- Contractor Data:** A tablet showing a document with the title "STATE OF THE PROJECT" and a table of data.
- CAD Files:** A tablet showing a 3D model of a building.
- ARCHICAD:** A tablet showing the software's logo and the text "a Virtual Building Solution".
- Data Mart:** A tablet showing a database icon and the text "Data Mart".
- Revit Architecture 2009:** A tablet showing the software's logo and the text "Architecture 2009".

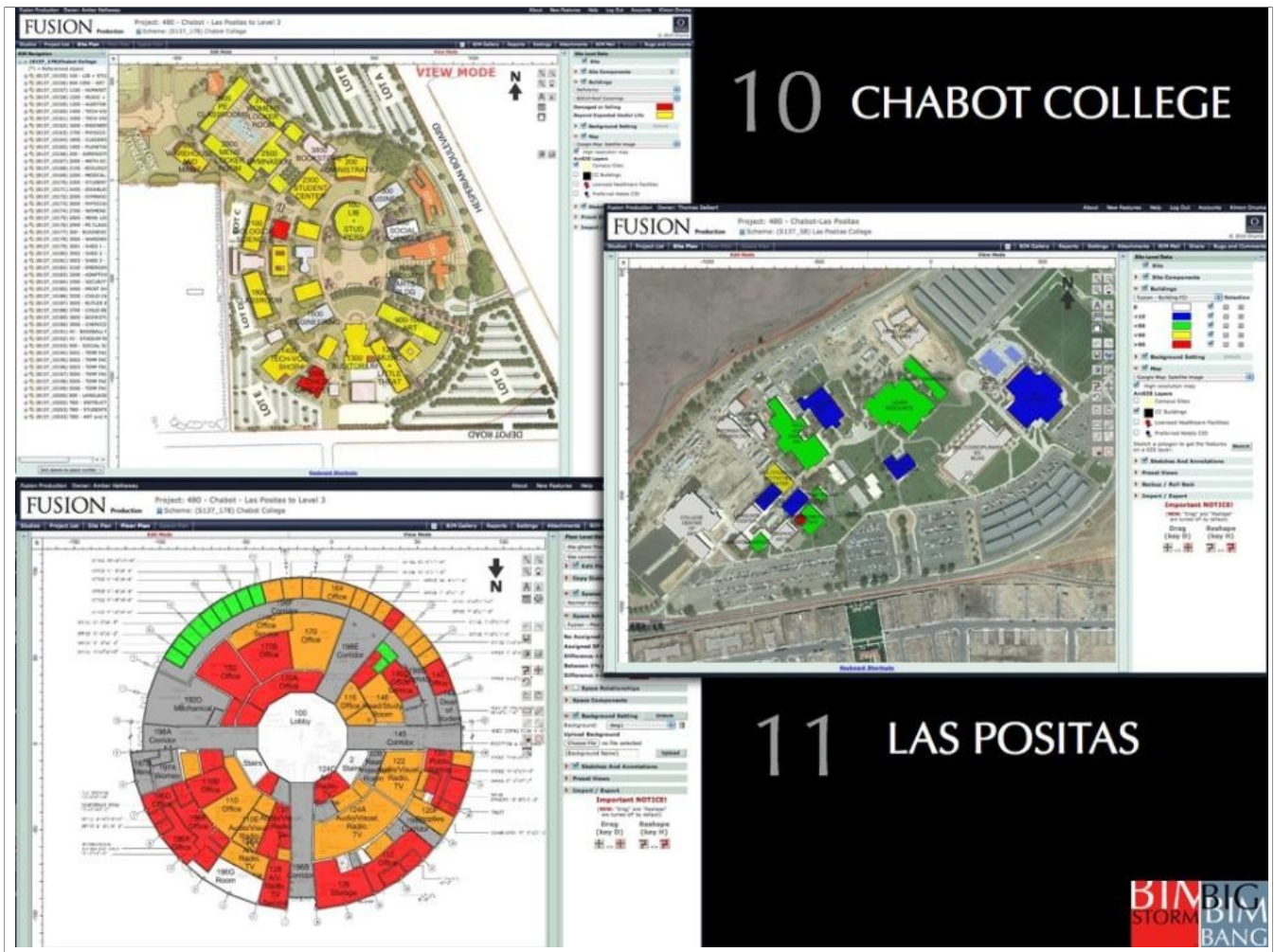


# San Joaquin Delta College New Science & Math Building



## A102 - Electrical

A102 - Electrical	
421 sf	
10 feet	
Level 1	
Department	Audio/Visual Services
Floor Finish	Sealed Concrete
Energy Use	4.1-5 kWh
Ceiling Type	Concrete Painted
Air Changes per Hour	18
Room Name (type)	Housekeeping
Target Temperature	73 Degrees
Phasing	Phase 5
Scheduling of Lighting	9am-9pm
Temperature Current	26-31
Tenant Zones	CST
PGM_NO	42
ROOMUSE_CODE	215
0 People	
0 People	
0 Pieces	

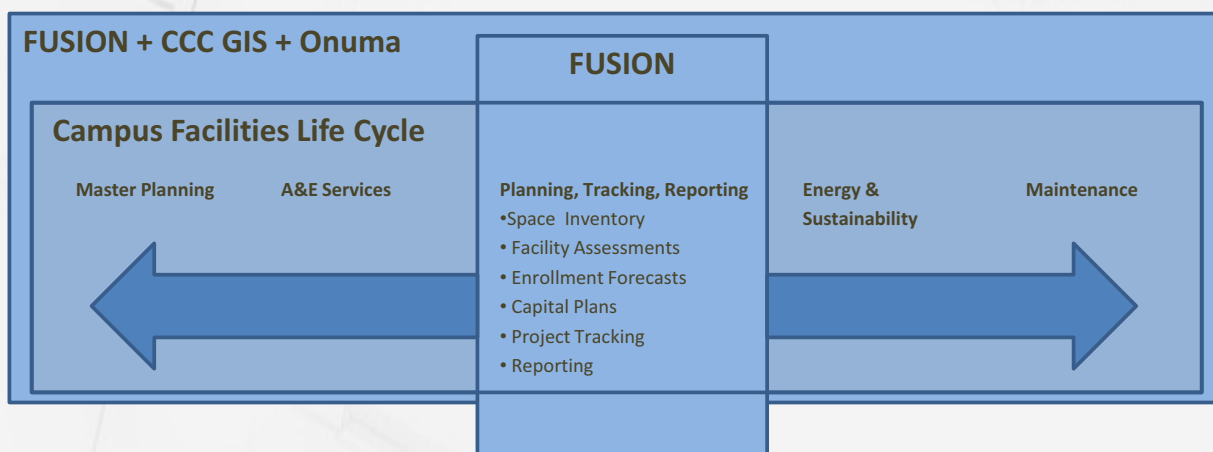


All together...

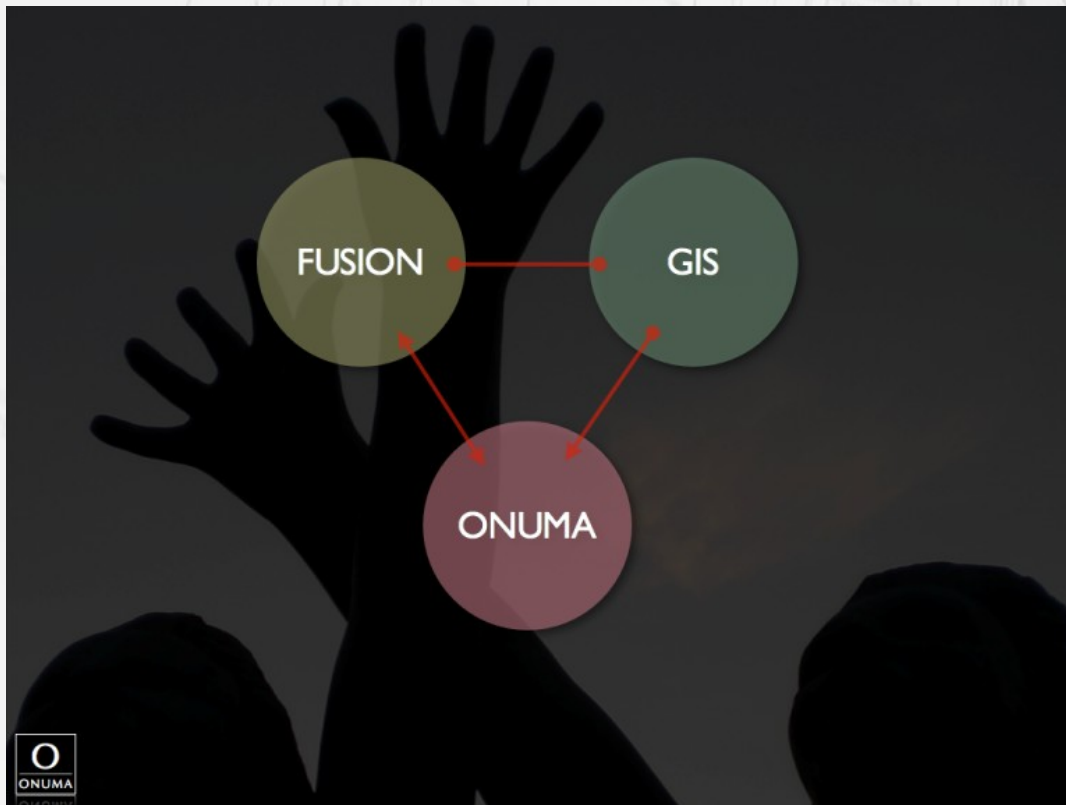
## FUSION+CCCGIS+ONUMA

### Linking FUSION + CCCGIS + Onuma

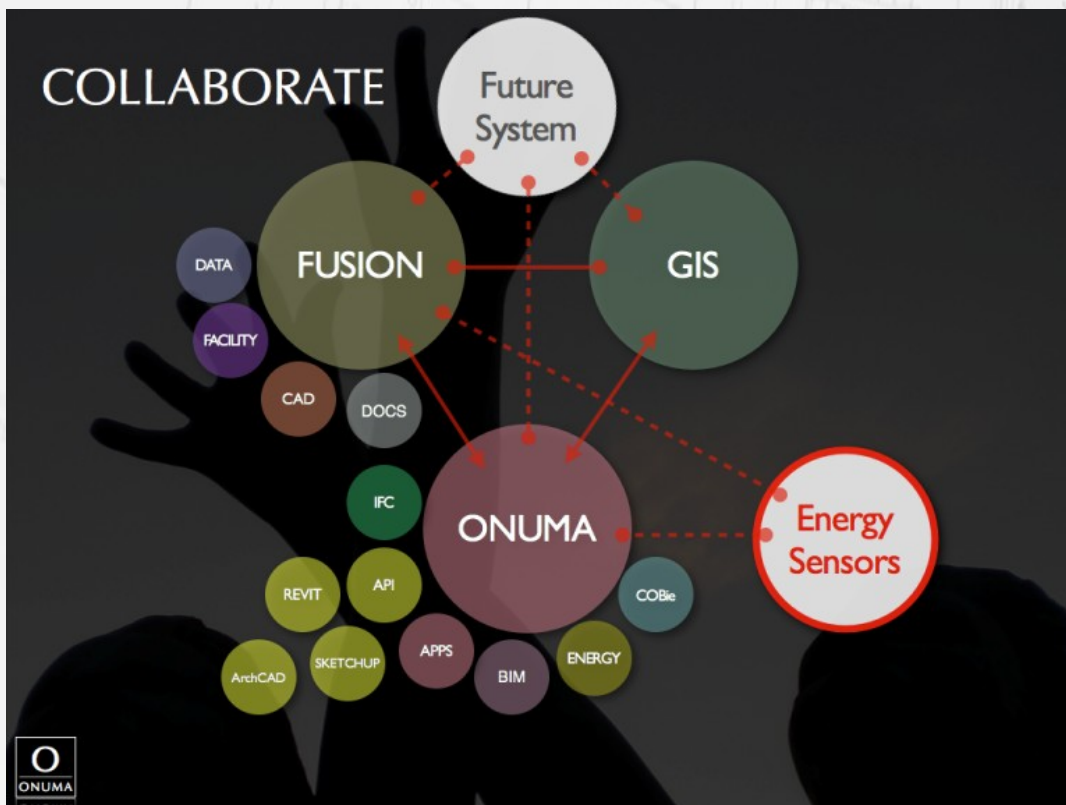
...the facilitator making FUSION data accessible



# FUSION+CCCGIS+Onuma

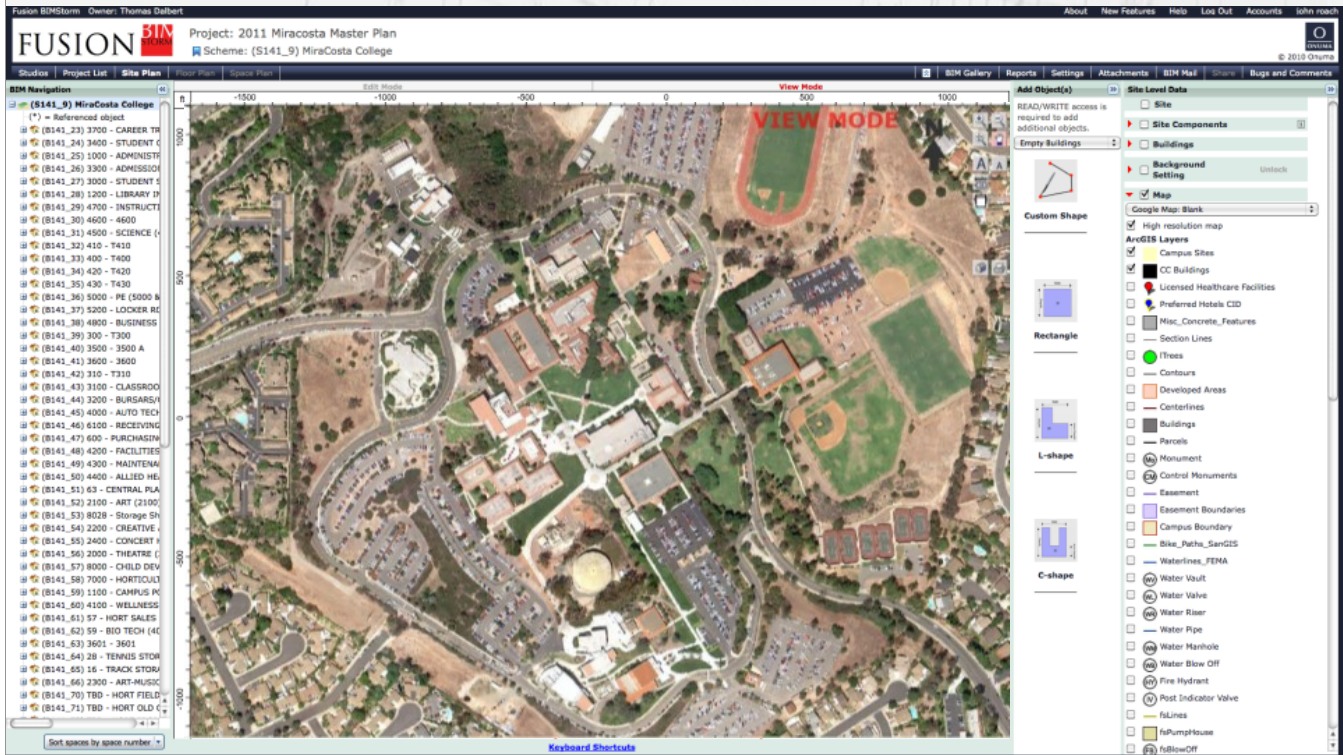


# FUSION+CCCGIS+Onuma

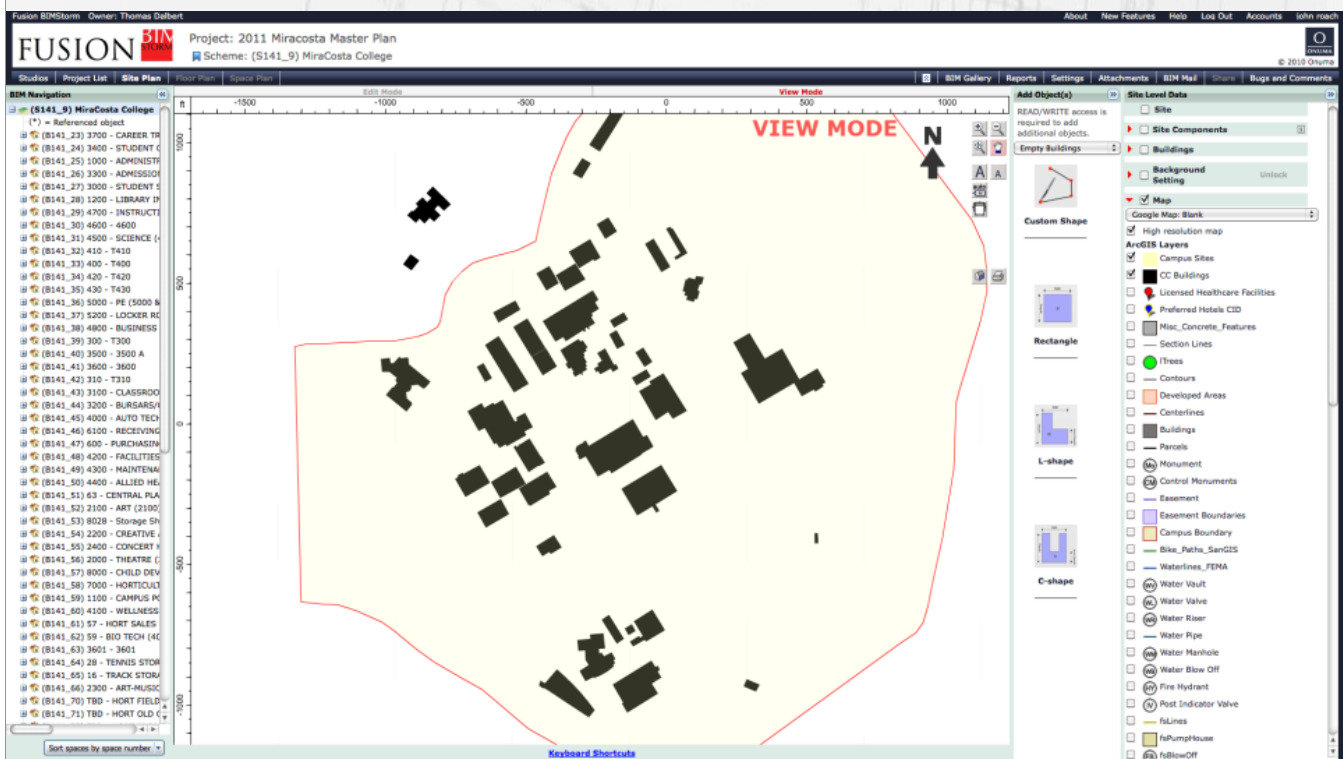




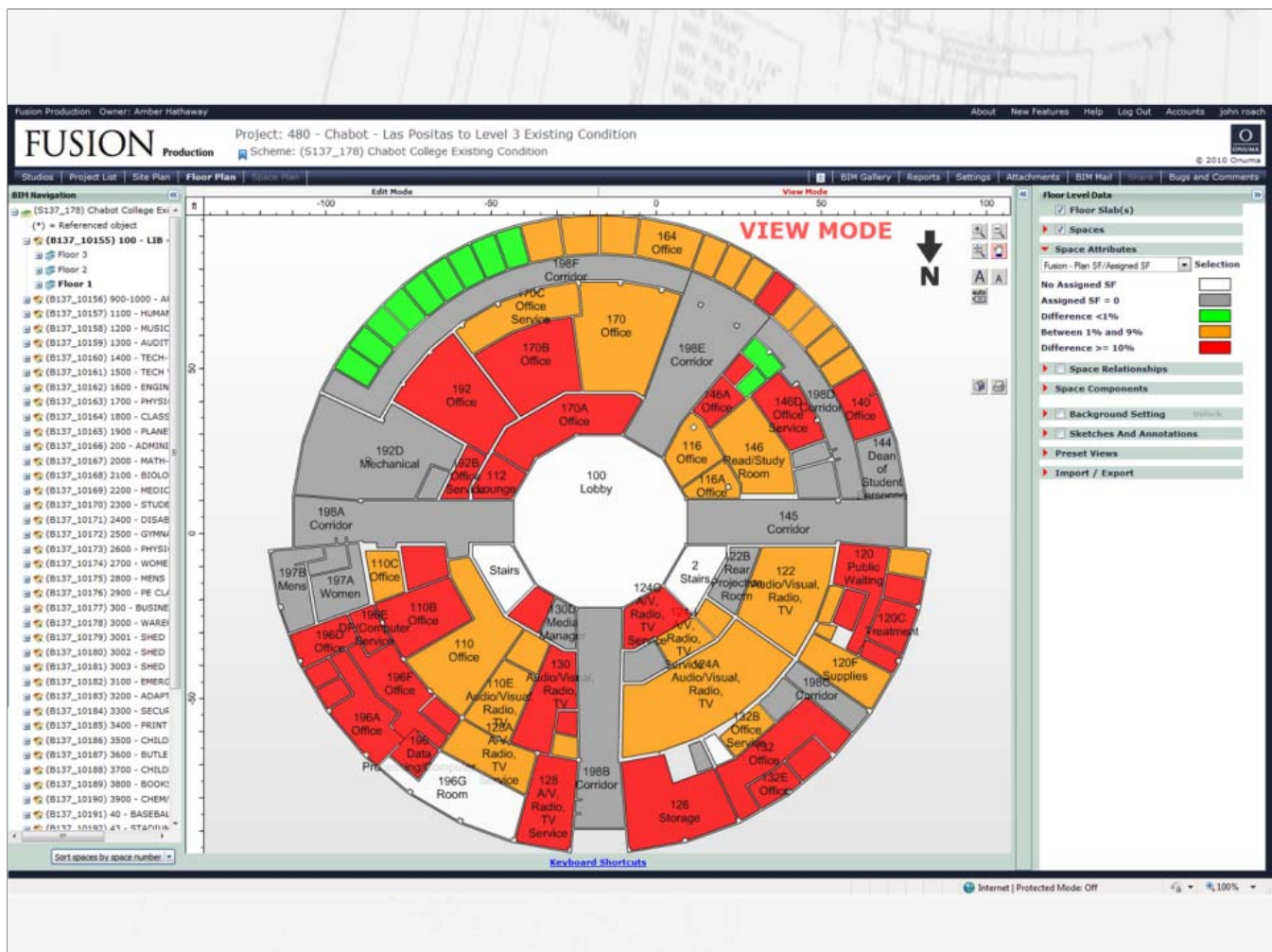
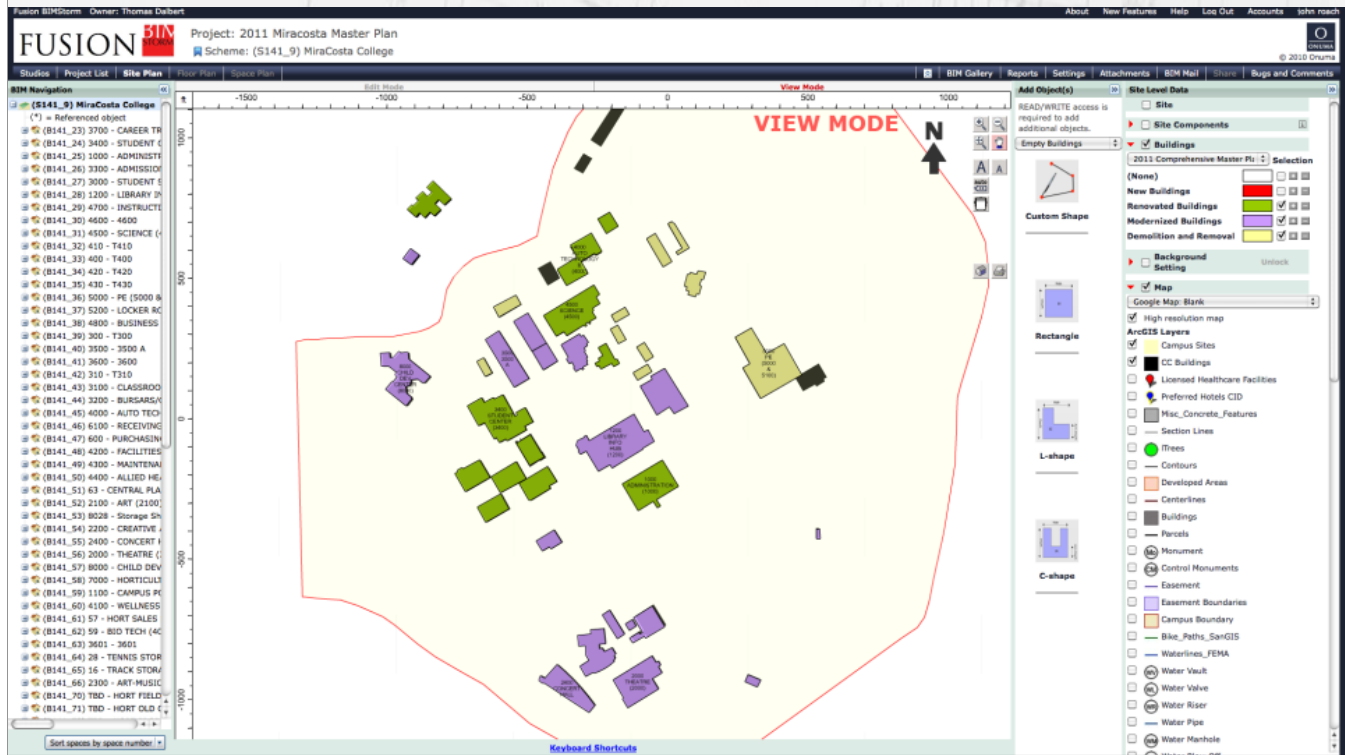
# BIMStorm Featuring MiraCosta Community College District



# BIMStorm Featuring MiraCosta Community College District



# BIMStorm Featuring MiraCosta Community College District









# BIMStorm Featuring MiraCosta Community College District



## Topics

- ✓ About the California Community Colleges
- ✓ Our Integrated Facilities Platform
  - ✓ FUSION for Facilities Reporting
  - ✓ CCC GIS for location and map information
  - ✓ Onuma for building information modeling
- How It Is Used
- Why It Works...Shared Data on the Web

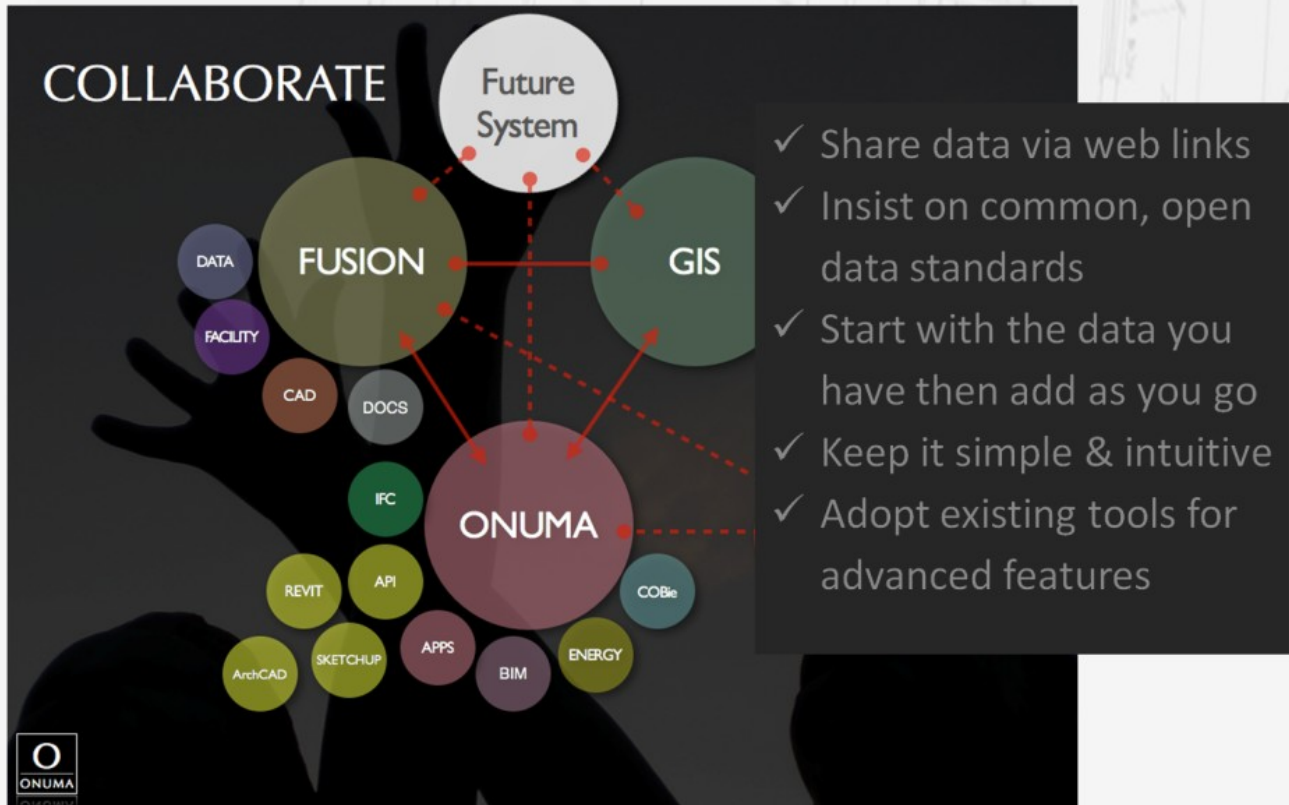
## How the California Community Colleges Use FUSION+CCCCGIS+Onuma

- All 72 districts with 5,000 simple buildings models
- 6 districts completed pilots or demonstrations
- 4 districts for master planning
- 3 districts for energy assessments
- Import detailed design BIM
- Export space requirements for detailed design
- Room sensors
- Evaluating links to CMMS, ERP, job ticketing, class scheduling, space utilization, asset inventory...

## Topics

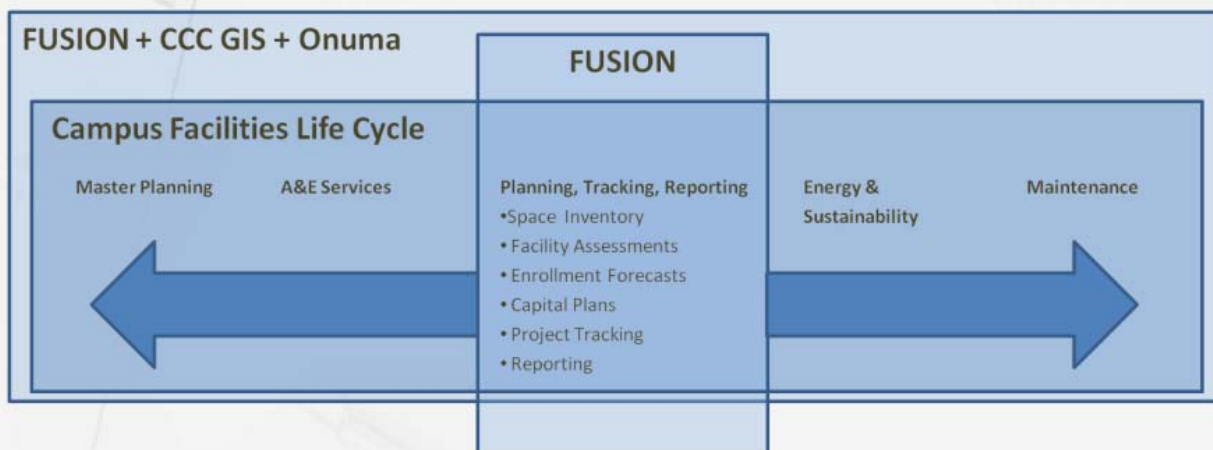
- ✓ About the California Community Colleges
- ✓ Our Integrated Facilities Platform
  - ✓ FUSION for Facilities Reporting
  - ✓ CCC GIS for location and map information
  - ✓ Onuma for building information modeling
- ✓ How It Is Used
- Why It Works...Shared Data on the Web

# Why It Works...Shared Data on the Web



## Linking FUSION + CCCGIS + Onuma

...the facilitator making FUSION data accessible





# BIG BIM Bang – Enterprise BIM

Architect's use of BIM data

**Timothy Blatner, AIA**

- **FitzGerald Associates**



• AIA Technology in Architectural Practice



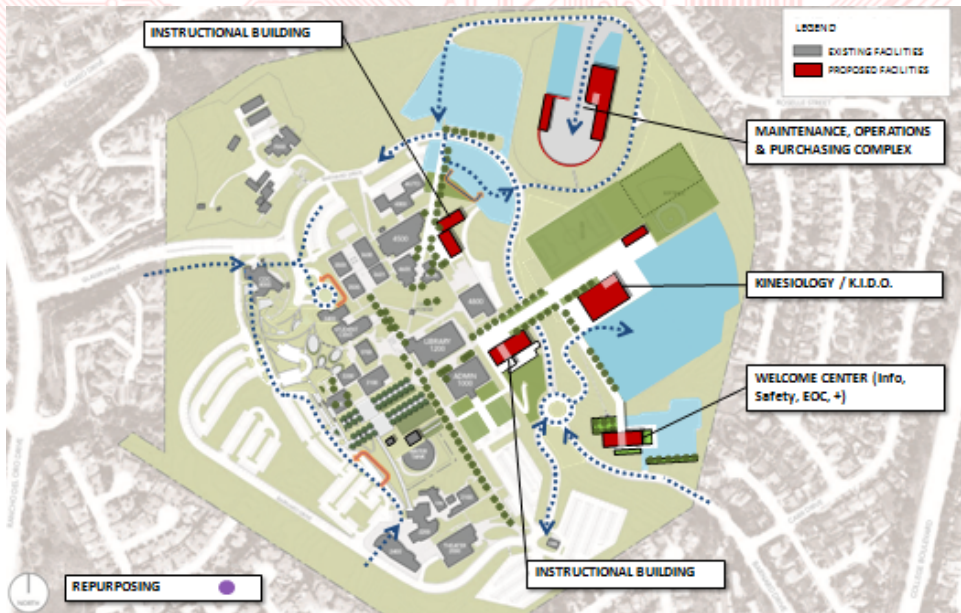
**MiraCosta College, Oceanside, California**

Aerial View of Campus

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• AIA Technology in Architectural Practice

<http://www.aia.org/tap>



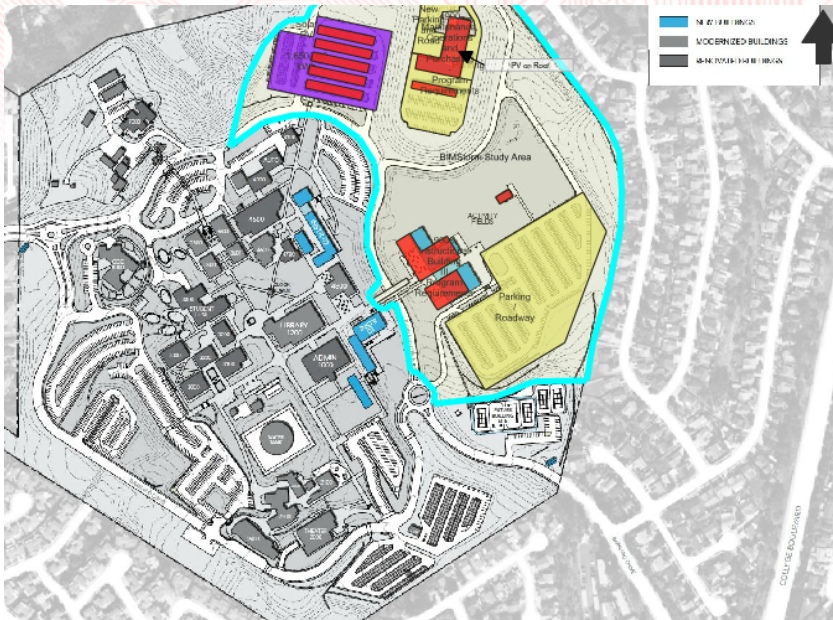
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## MiraCosta College, Oceanside, California

### 2011 Comprehensive Master Plan - Preferred Option

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## MiraCosta College, Oceanside, California

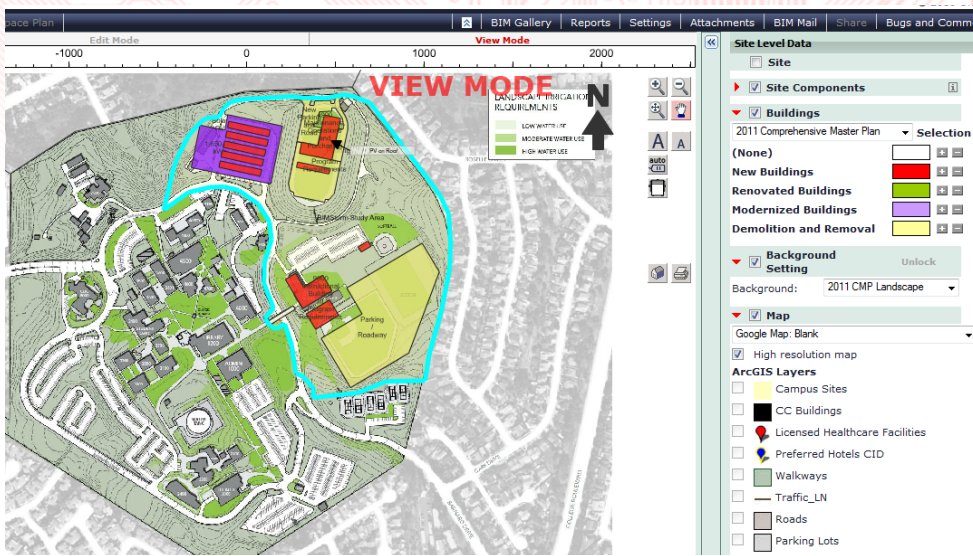
### 2011 Comprehensive Master Plan - Proposed Buildings in Blue

### BIMStorm BIG BIM BANG Study Area within Aqua Border

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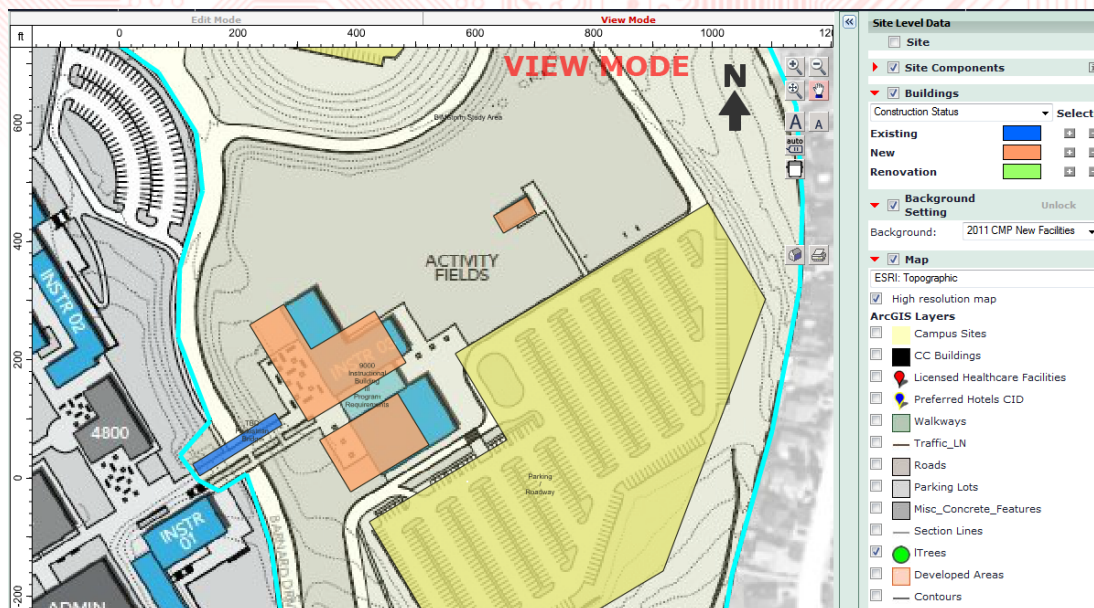
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## MiraCosta College, Oceanside, California

### BIMstorm BIG BIM BANG – Projects in Red

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## MiraCosta College, Oceanside, California

### 2011 Comprehensive Master Plan – Proposed Instructional Building III – Athletic Facility

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<http://www.aia.org/tap>



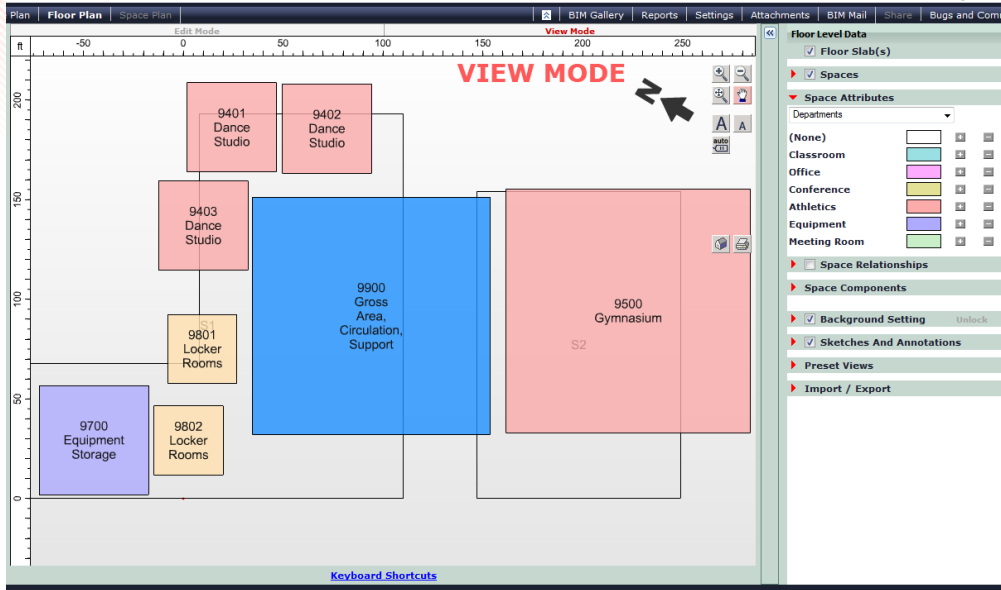


## 2011 Comprehensive Master Plan – Proposed Instructional Building III – Athletic Facility

<http://www.aia.org/tap>



<http://www.aia.org/tap>



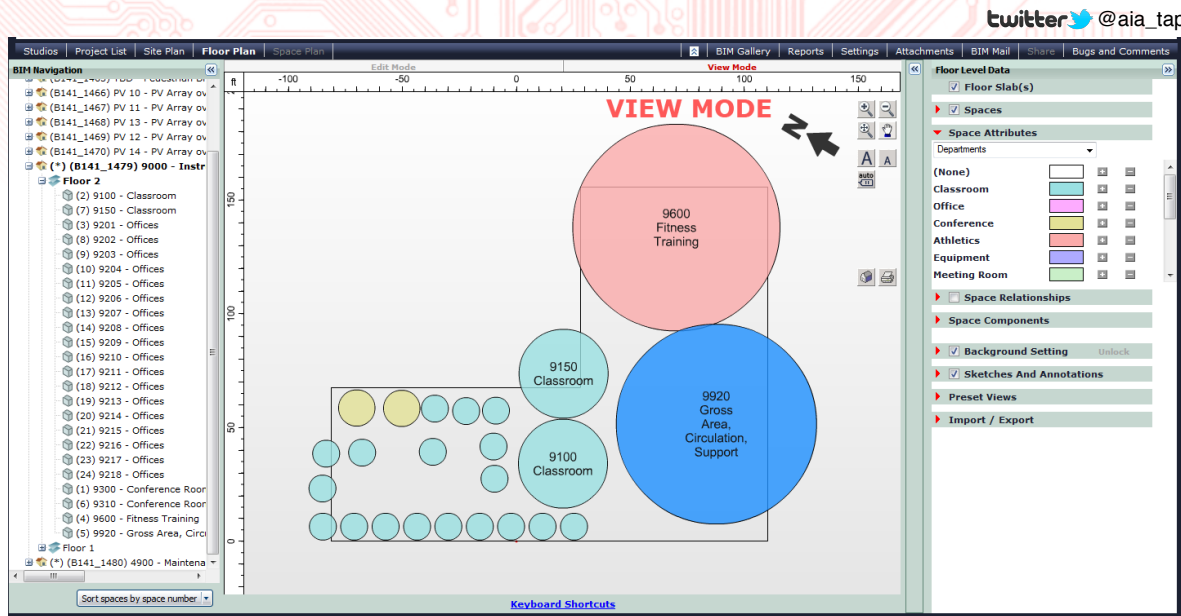
## MiraCosta College, Oceanside, California

### Proposed Instructional Building III – Athletic Facility

#### First Floor Program of Spaces with Department Designations

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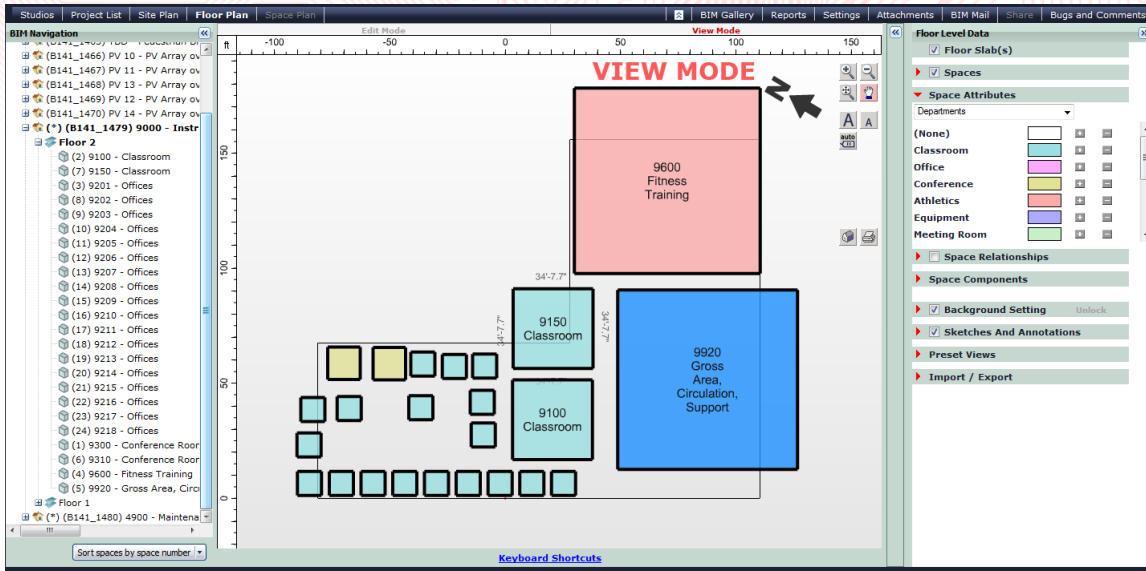
## MiraCosta College, Oceanside, California

### Proposed Instructional Building III – Athletic Facility

#### Second Floor Program of Spaces as Bubble Diagram

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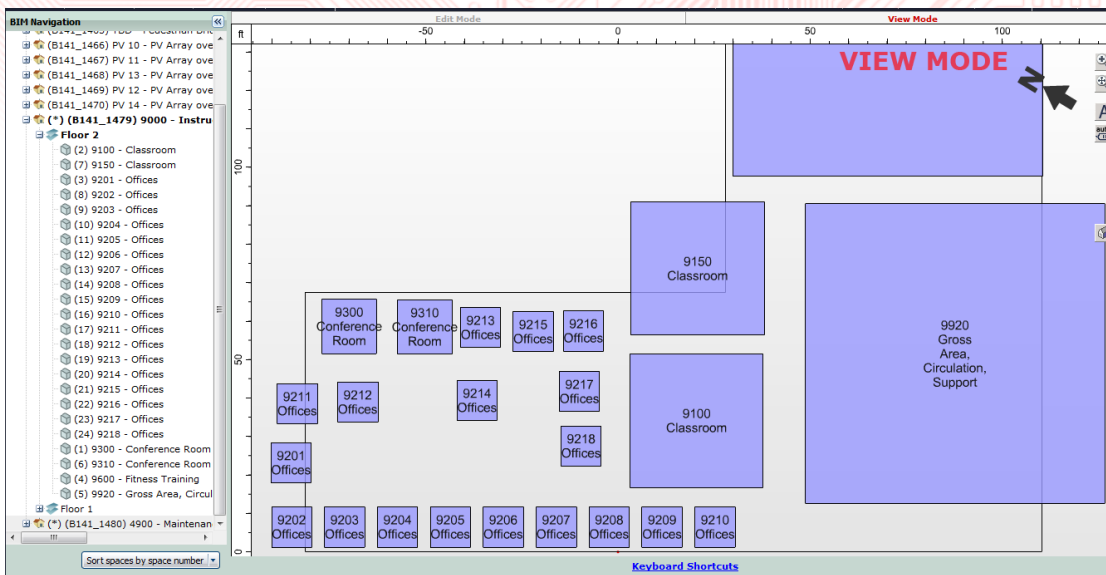
## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

### Second Floor Program of Spaces with Department Designations

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## MiraCosta College, Oceanside, California

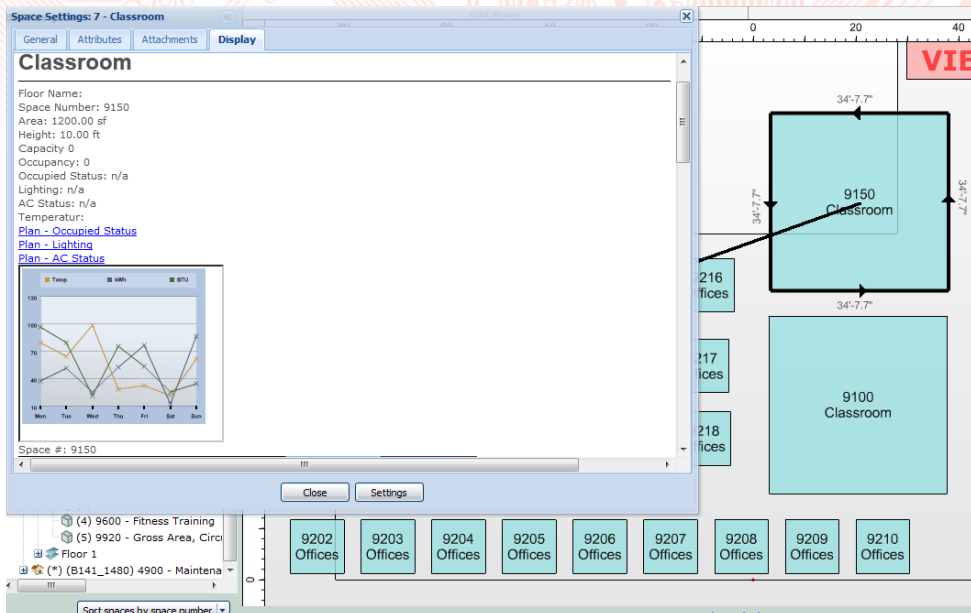
### Instructional Building III – Athletic Facility

### Second Floor Program of Spaces

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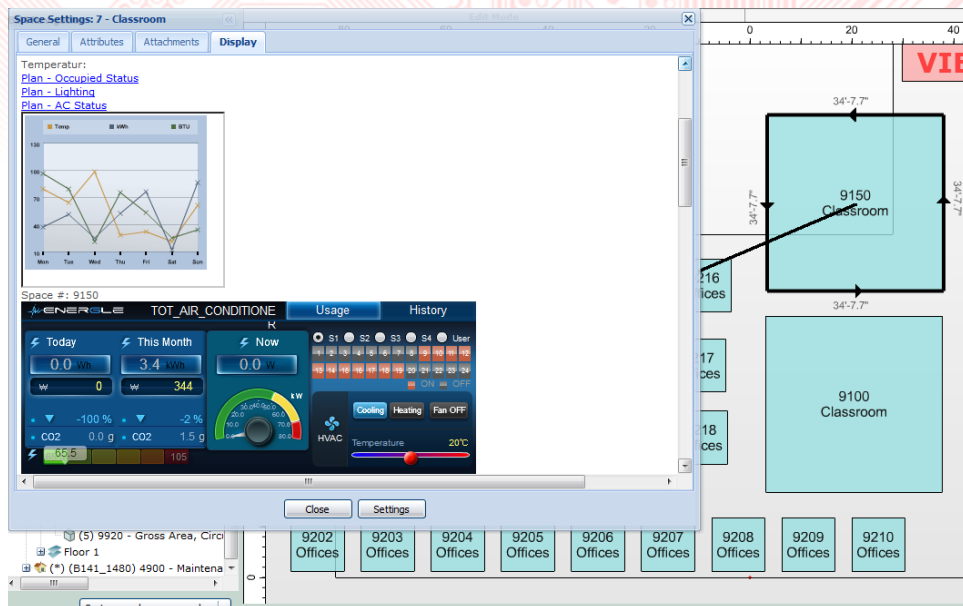
## MiraCosta College, Oceanside, California

Instructional Building III – Athletic Facility

Classroom Data

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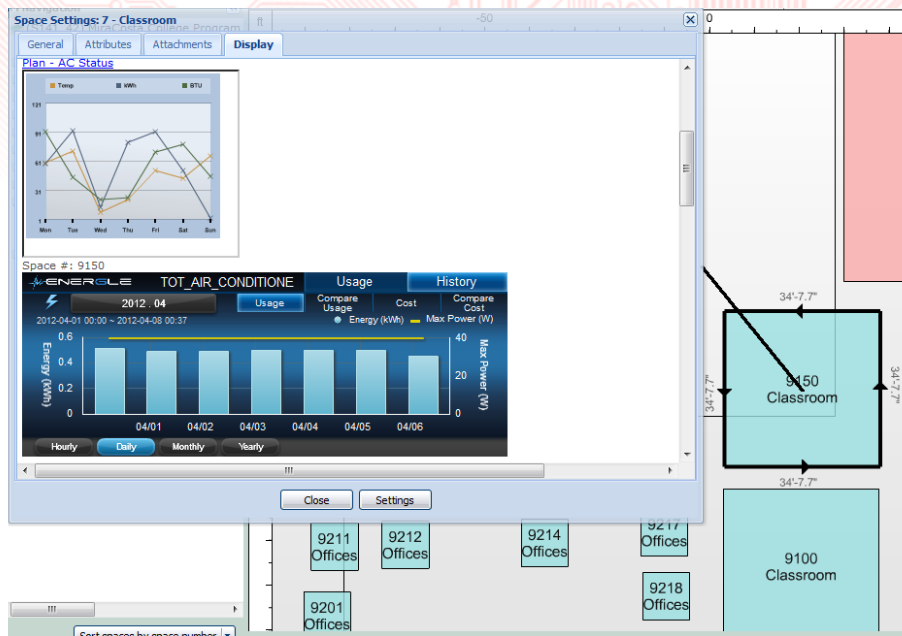
## MiraCosta College, Oceanside, California

Instructional Building III – Athletic Facility

Classroom Energy Usage Meters

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## MiraCosta College, Oceanside, California

Instructional Building III – Athletic Facility

Classroom Energy Usage Trending Graph

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## MiraCosta College, Oceanside, California

Instructional Building III – Athletic Facility

Scheme 1 – Conceptual Aerial View

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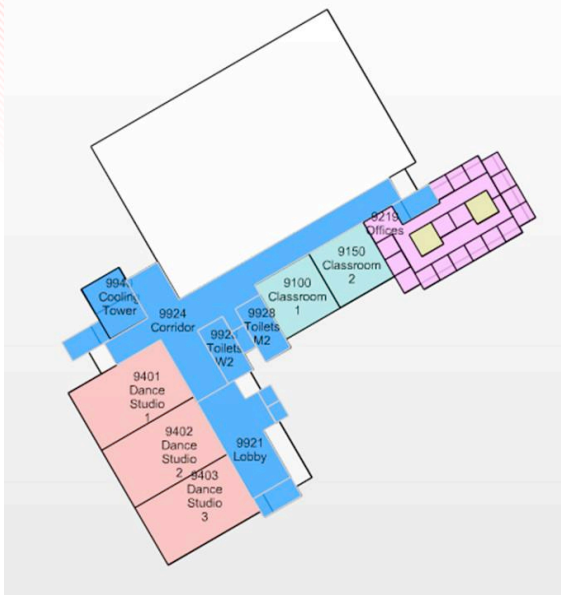
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## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 1 – First Floor Conceptual Plan



## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 1 – Second Floor Conceptual Plan

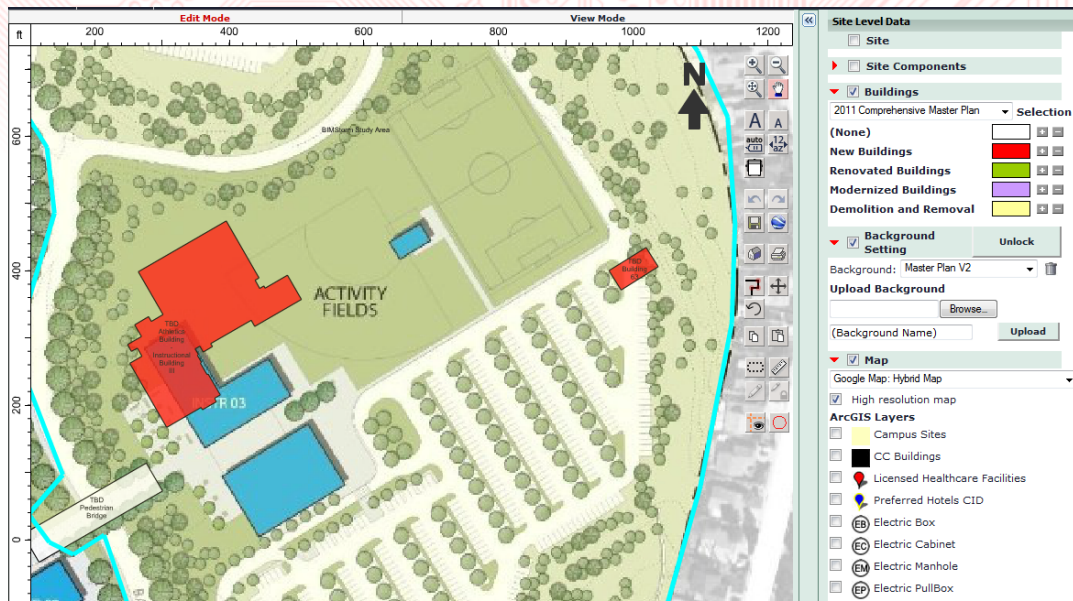




## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 1 – Third Floor Conceptual Plan



## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 1 – Conceptual Site Plan



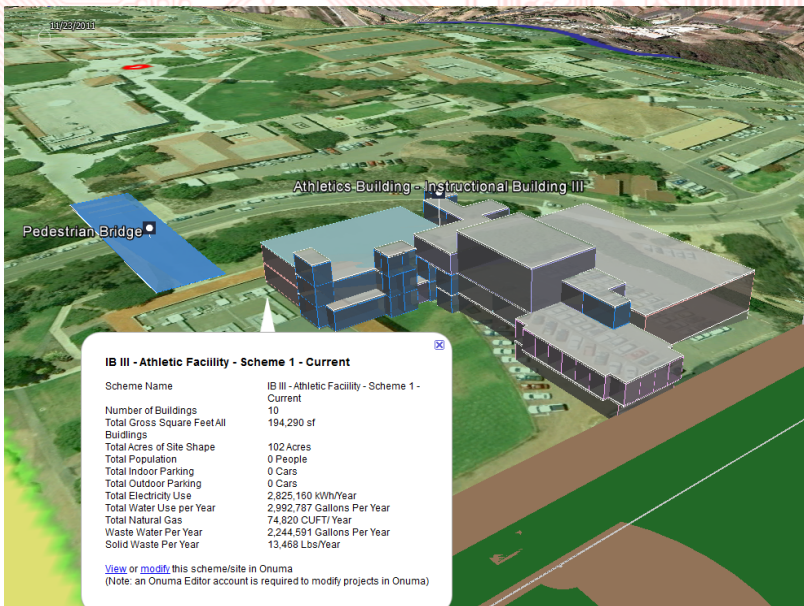
## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 1 – Conceptual Massing

AIA Technology in Architectural Practice

<http://www.aia.org/tap>



## MiraCosta College, Oceanside, California

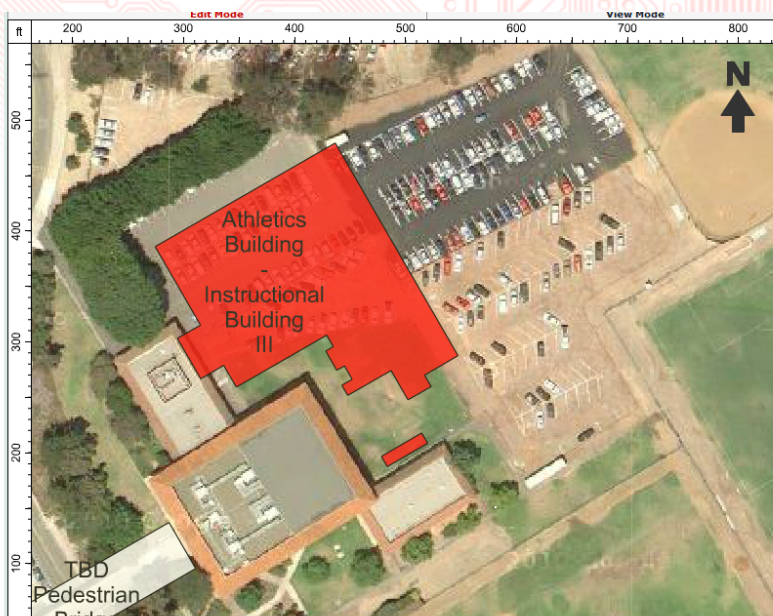
### Instructional Building III – Athletic Facility

#### Scheme 1 – Conceptual Massing with Data

AIA Technology in Architectural Practice

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## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 2 – Conceptual Aerial View

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## MiraCosta College, Oceanside, California

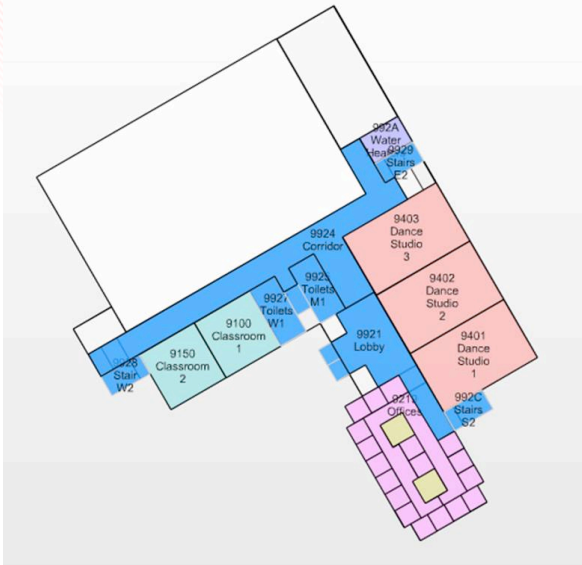
### Instructional Building III – Athletic Facility

#### Scheme 2 – First Floor Conceptual Plan

AIA Technology in Architectural Practice

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## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 2 – Second Floor Conceptual Plan



## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 2 – Third Floor Conceptual Plan



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## MiraCosta College, Oceanside, California

Instructional Building III – Athletic Facility

Scheme 2 – Conceptual Site Plan

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## MiraCosta College, Oceanside, California

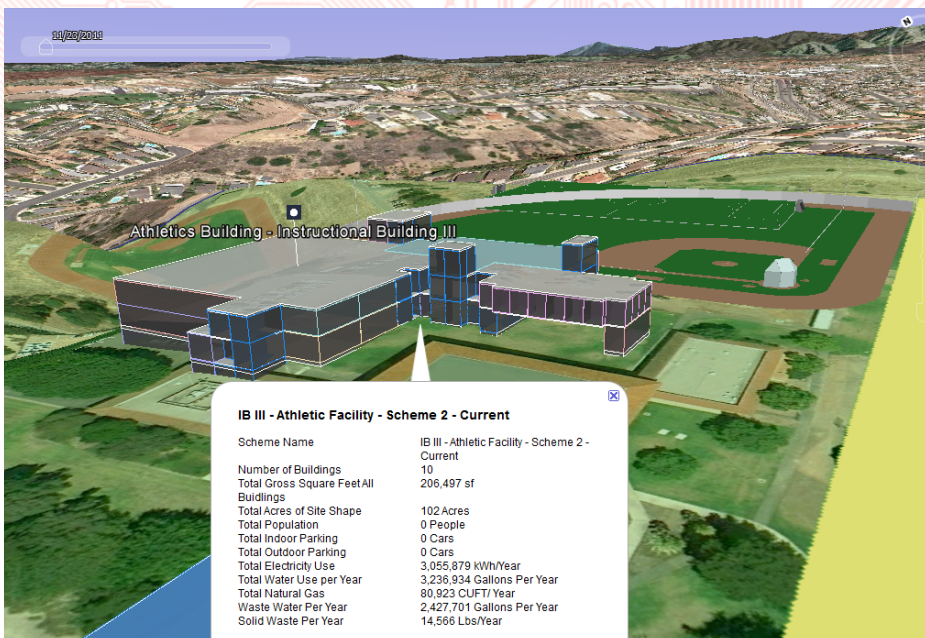
Instructional Building III – Athletic Facility

Scheme 2 – Conceptual Massing

AIA Technology in Architectural Practice

<http://www.aia.org/tap>





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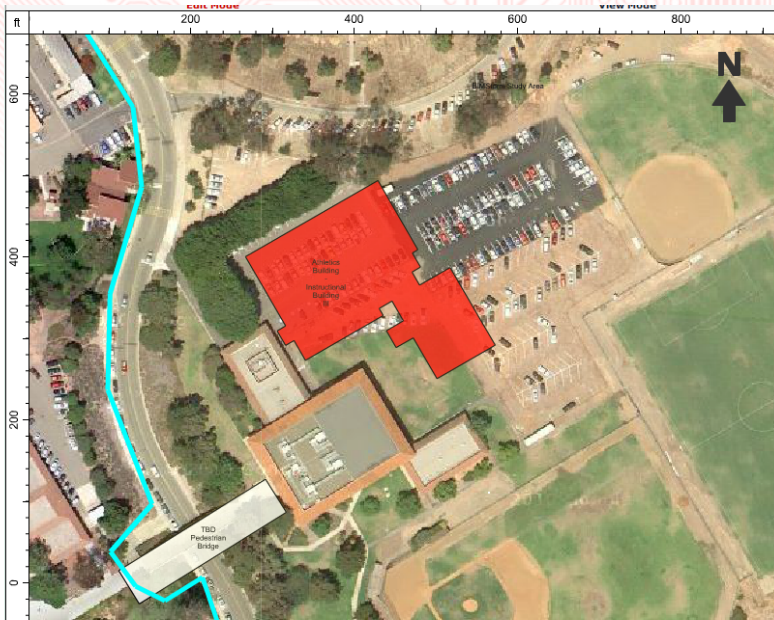
## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 2 – Conceptual Massing with Data

AIA Technology in Architectural Practice

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## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 3 – Conceptual Aerial View

AIA Technology in Architectural Practice

<http://www.aia.org/tap>





## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

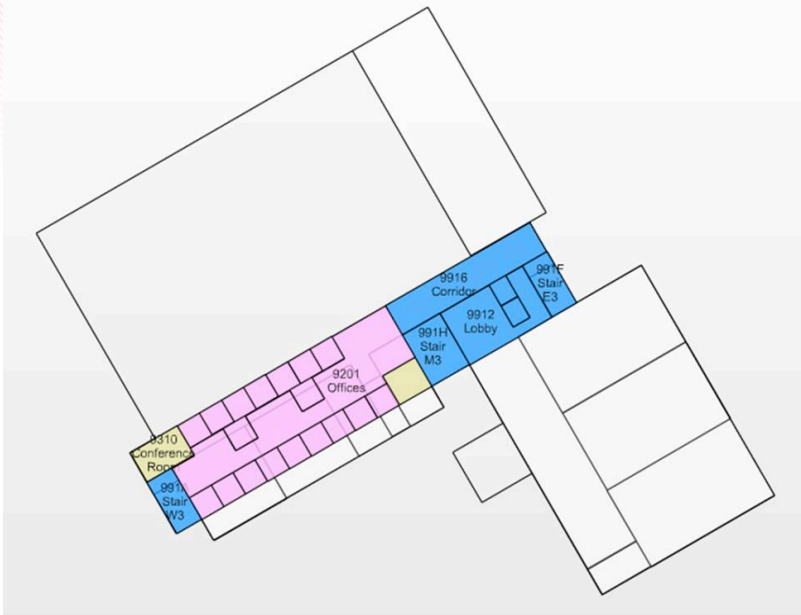
#### Scheme 3 – First Floor Conceptual Plan



## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 3 – Second Floor Conceptual Plan



## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

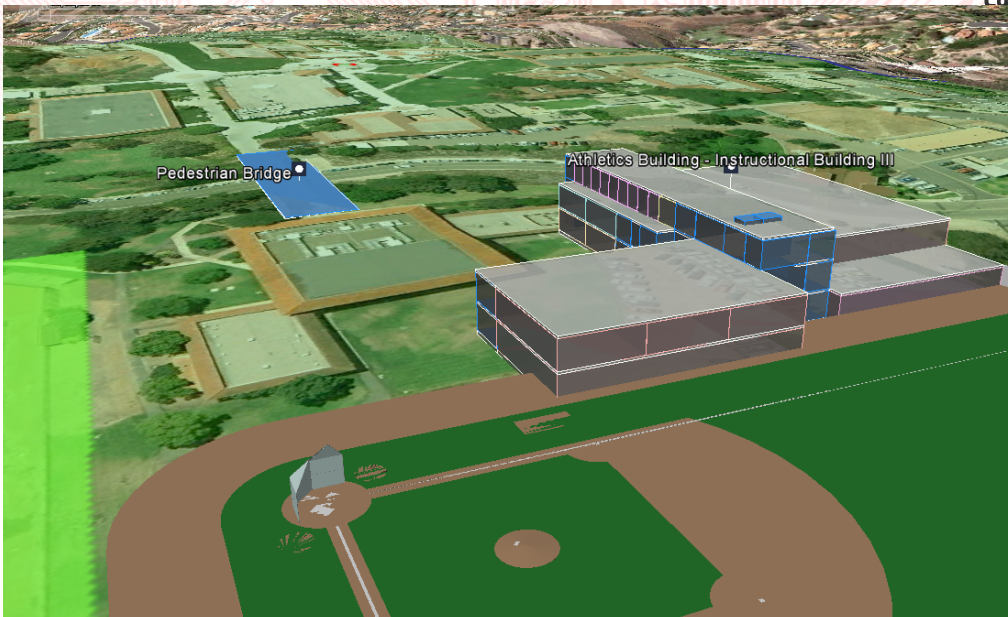
#### Scheme 3 – Third Floor Conceptual Plan



## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 3 – Conceptual Site Plan



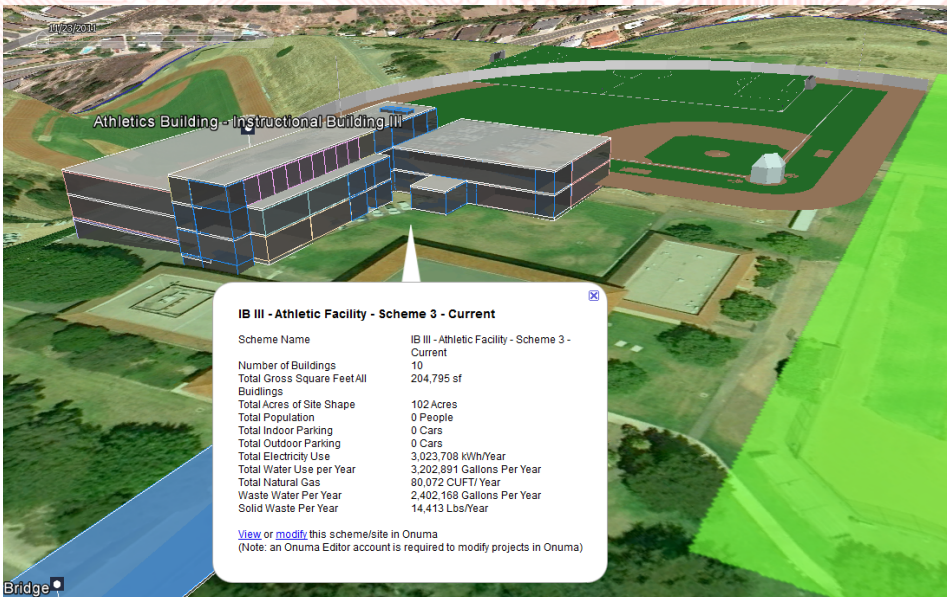
## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 3 – Conceptual Massing

AIA Technology in Architectural Practice

<http://www.aia.org/tap>



## MiraCosta College, Oceanside, California

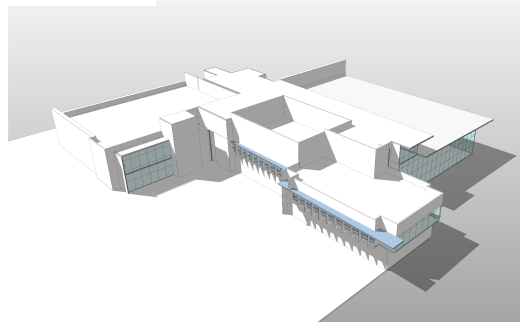
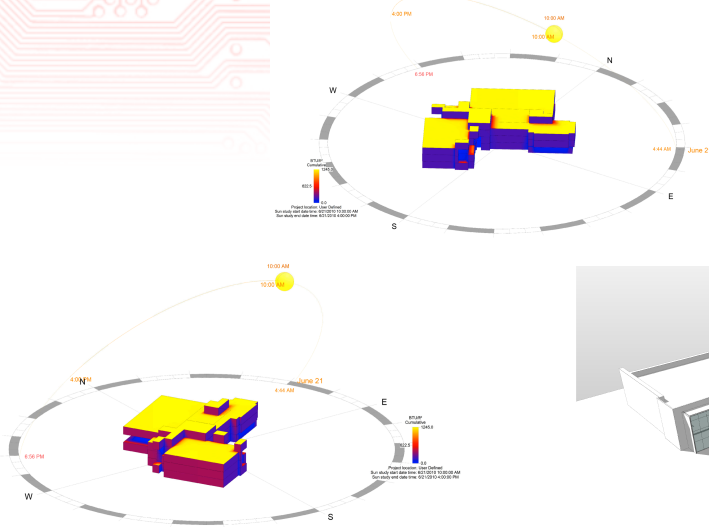
### Instructional Building III – Athletic Facility

#### Scheme 3 – Conceptual Massing with Data

AIA Technology in Architectural Practice

<http://www.aia.org/tap>

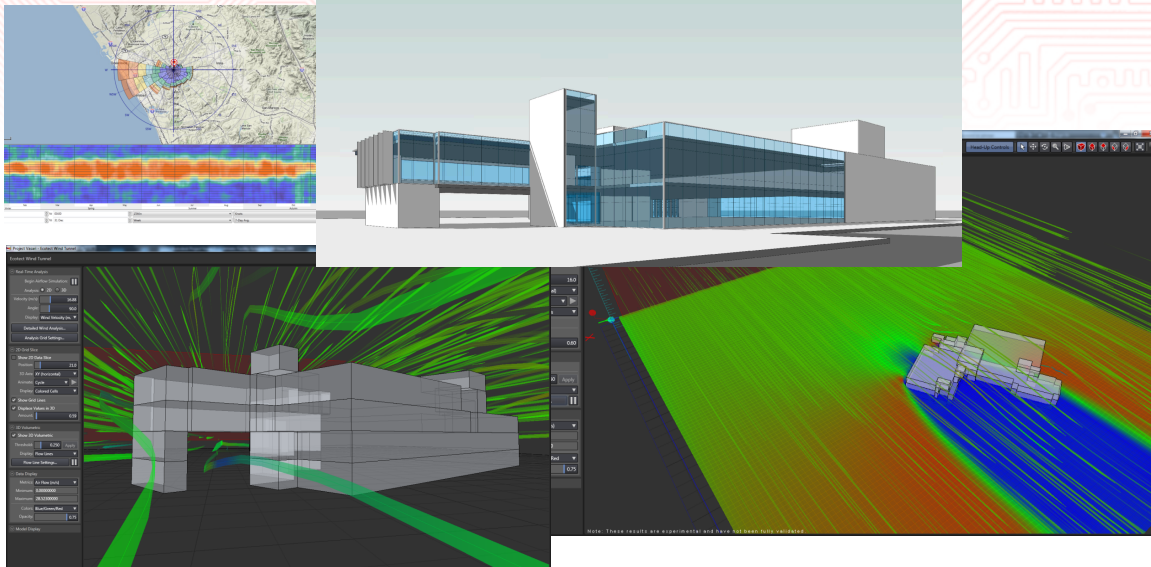




## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 1 – Shared Massing for Model Development / Solar Analysis



## MiraCosta College, Oceanside, California

### Instructional Building III – Athletic Facility

#### Scheme 2 – Shared Massing for Model Development / Wind Analysis

## **BIG BIM Bang – Enterprise BIM**

Design to Construction, Engineering, Energy, Cost



Kurt Maldovan  
Balfour Beatty



Jesse Whalen  
Balfour Beatty

AIA Technology in Architectural Practice

## BIMStorm DC 2011

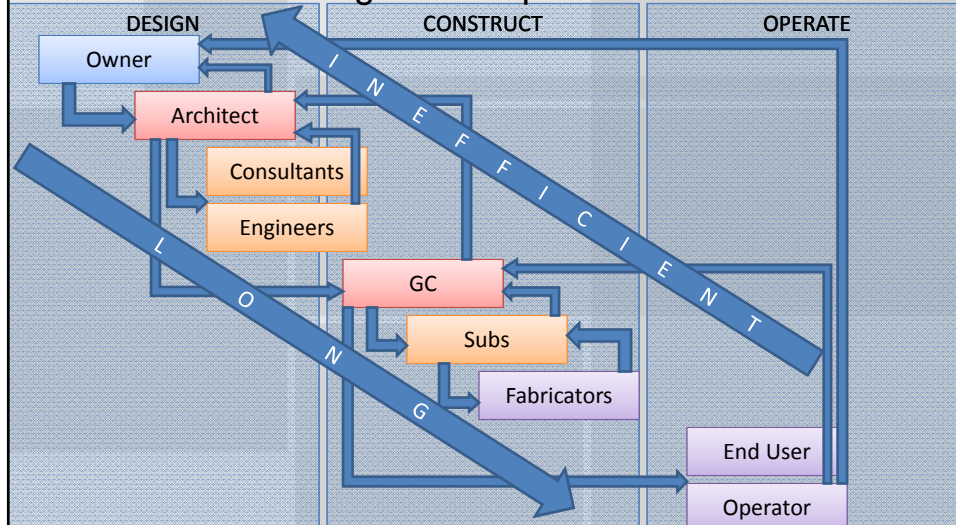
### “Traditional BIMStorm Approach”

Collaborative Team  
+  
Collaborative Environment

0 → Schematic Design  
(in a short time)

## BIMStorm DC 2011

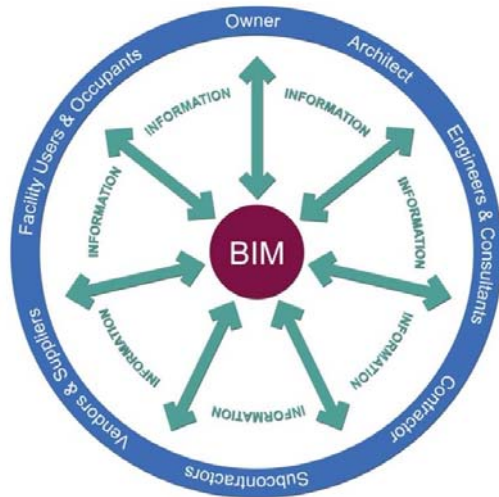
### BIMStorm for Design Development – WHY?





## BIMStorm DC 2011

### BIMStorm for Design Development – WHY?



Onuma

## Traditional BIMStorm Approach

### Kaiser Permanente: Glenlake



#### New:

- Medical Center Addition
- Add'l Parking Structure

#### Existing:

- Medical Center
- Parking Structure

## Traditional BIMStorm Approach

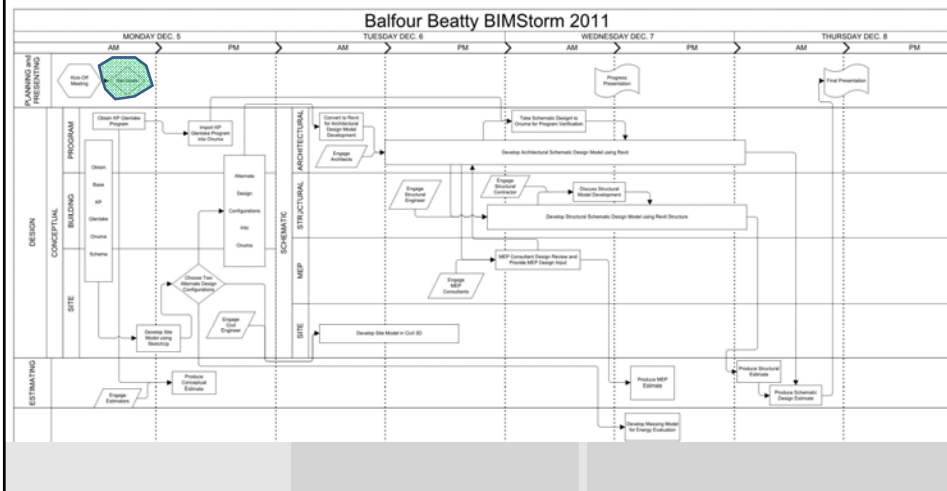
### KP Glenlake – Goals

- Get program data into Onuma
- Develop two different design options
  - Configuration A
  - Configuration B
- Schematic design Architectural
- Schematic design Structural
- Cost estimate of schematic design
- Get early MEP input on schematic designs
- Energy evaluation for both options
- Civil / Site evaluation for both options

## Traditional BIMStorm Approach

### KP Glenlake – Set Goals

1



## KP Glenlake – Starting Point

[illegible]

# Traditional BIMStorm Approach

## KP Glenlake – Starting Point

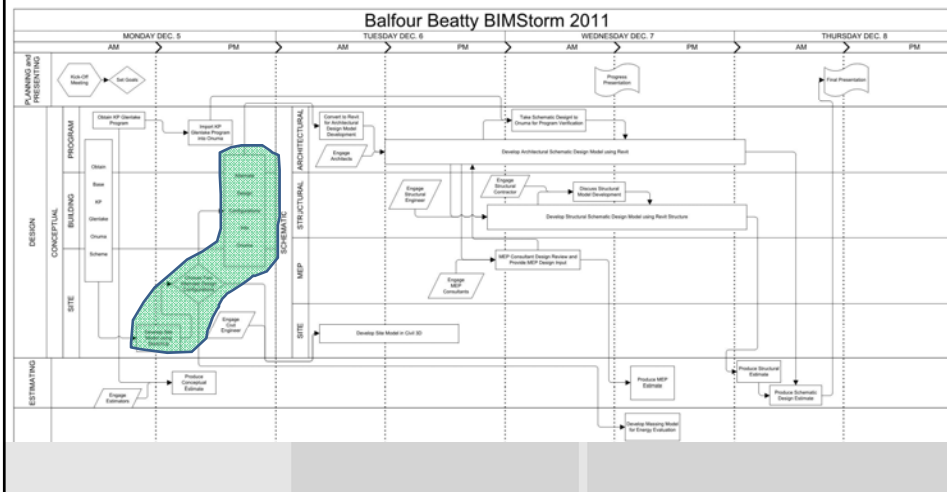




# Traditional BIMStorm Approach

## KP Glenlake – Onuma to SketchUp for Site

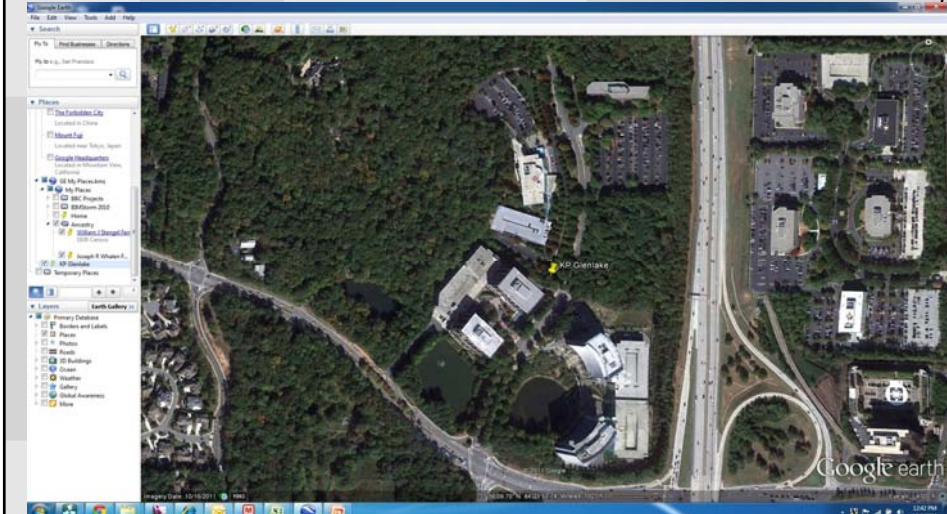
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# Traditional BIMStorm Approach

## KP Glenlake – Onuma to SketchUp for Site

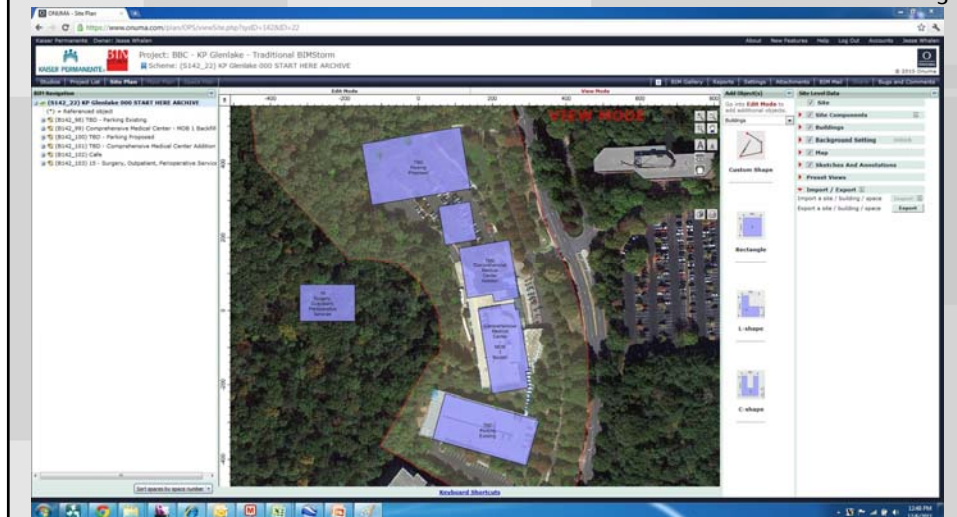
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## Traditional BIMStorm Approach

### KP Glenlake – Onuma to SketchUp for Site

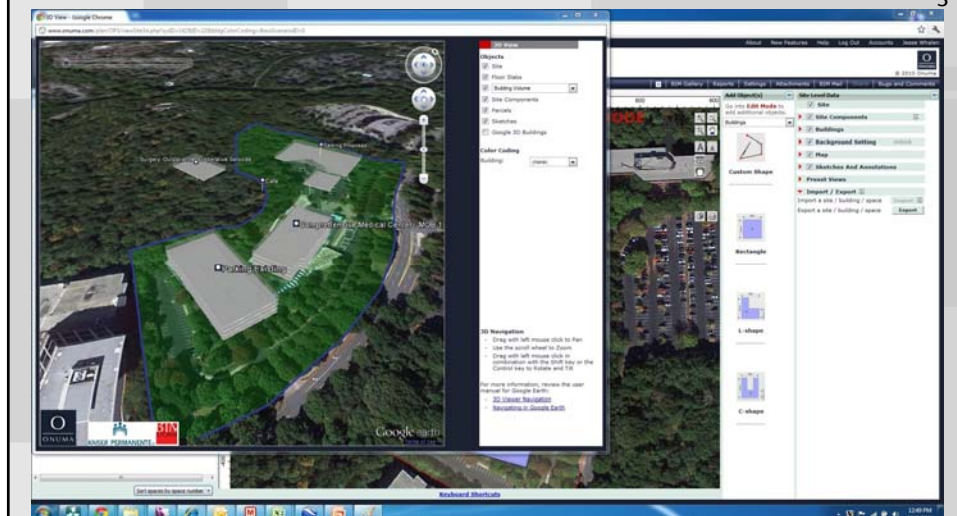
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## Traditional BIMStorm Approach

### KP Glenlake – Onuma to SketchUp for Site

3



## Traditional BIMStorm Approach

KP Glenlake – Onuma to SketchUp for Site

3



## Traditional BIMStorm Approach

KP Glenlake – Onuma to SketchUp for Site

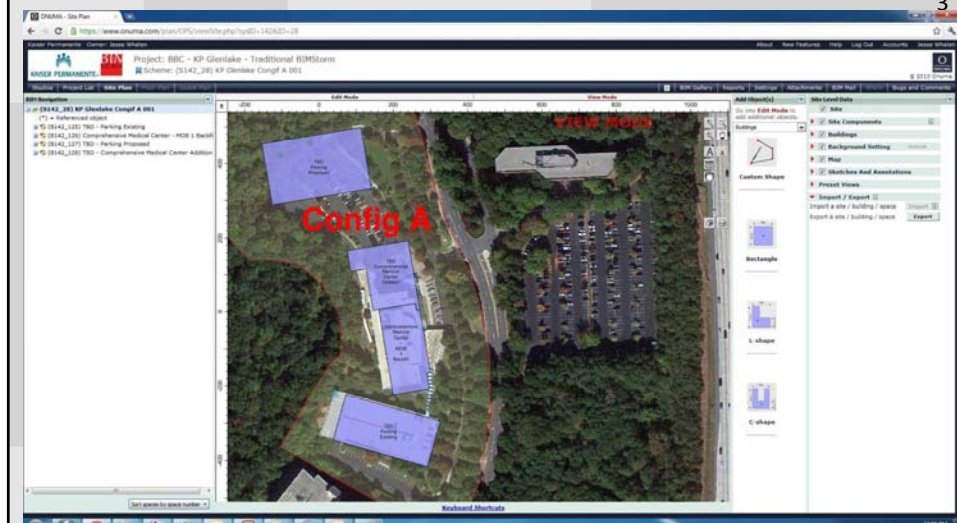
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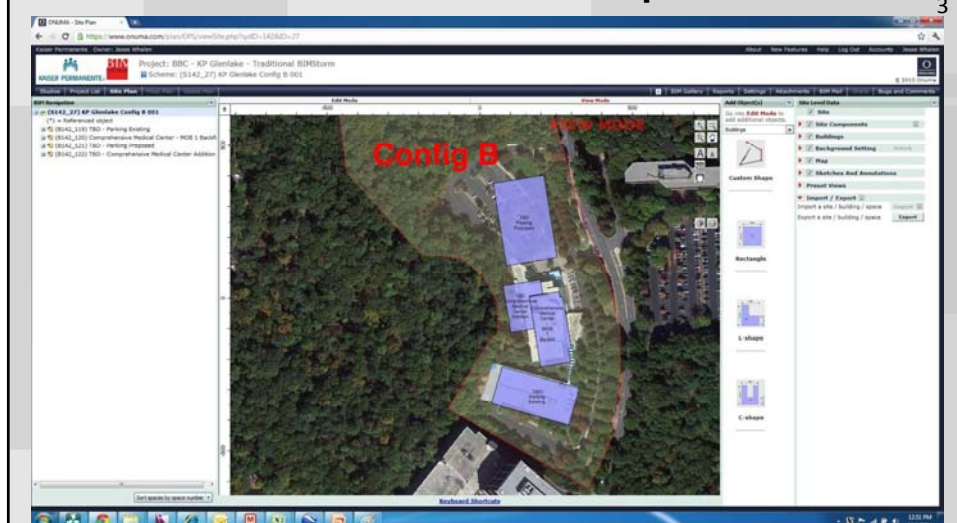
# Traditional BIMStorm Approach

## KP Glenlake – Onuma to SketchUp for Site



# Traditional BIMStorm Approach

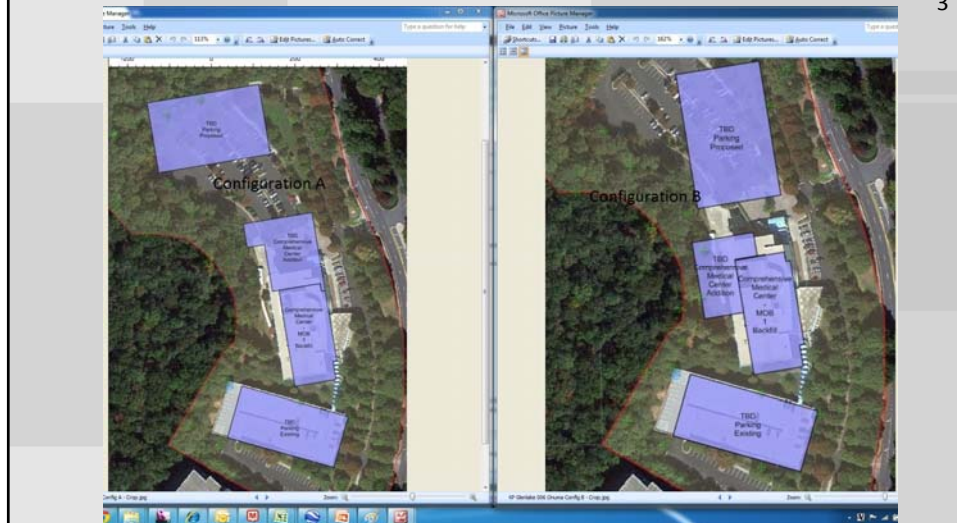
## KP Glenlake – Onuma to SketchUp for Site



## Traditional BIMStorm Approach

### KP Glenlake – Onuma to SketchUp for Site

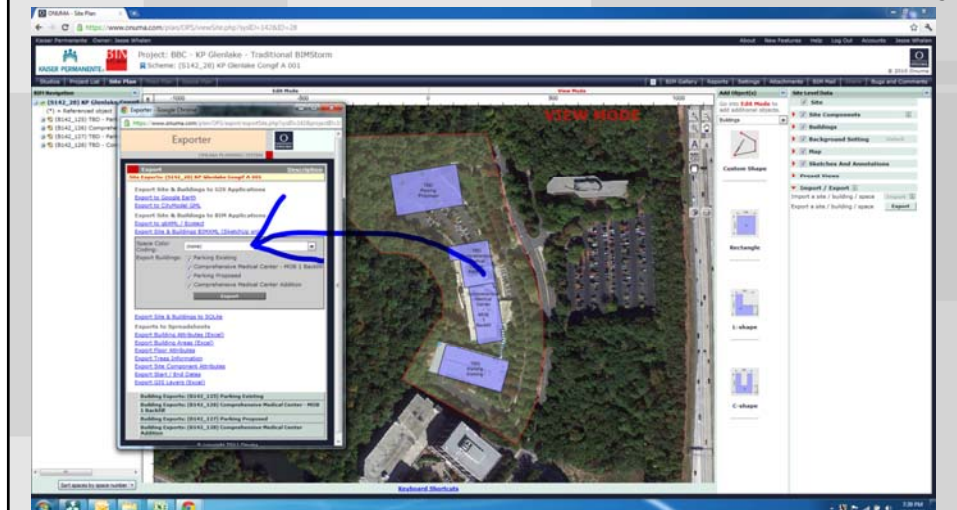
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## Traditional BIMStorm Approach

### KP Glenlake – Onuma to SketchUp for Site

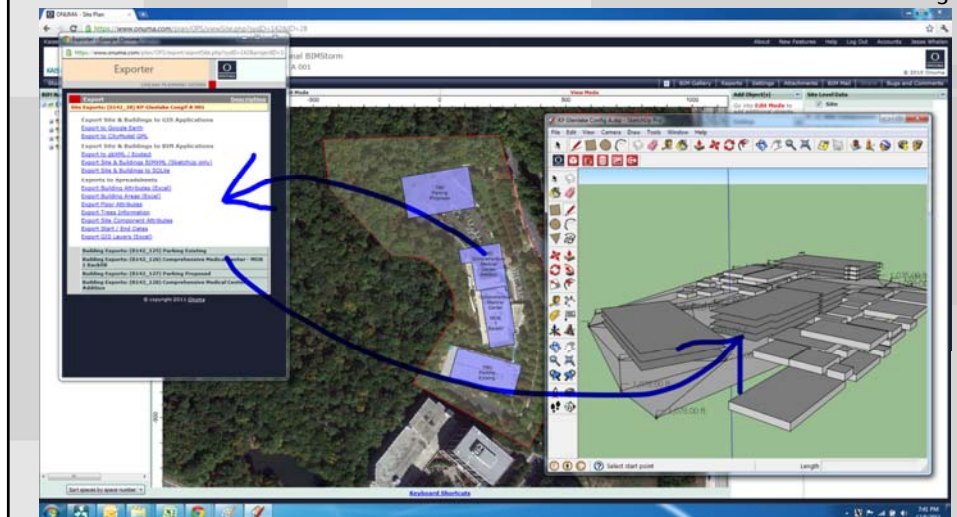
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## Traditional BIMStorm Approach

### KP Glenlake – Onuma to SketchUp for Site

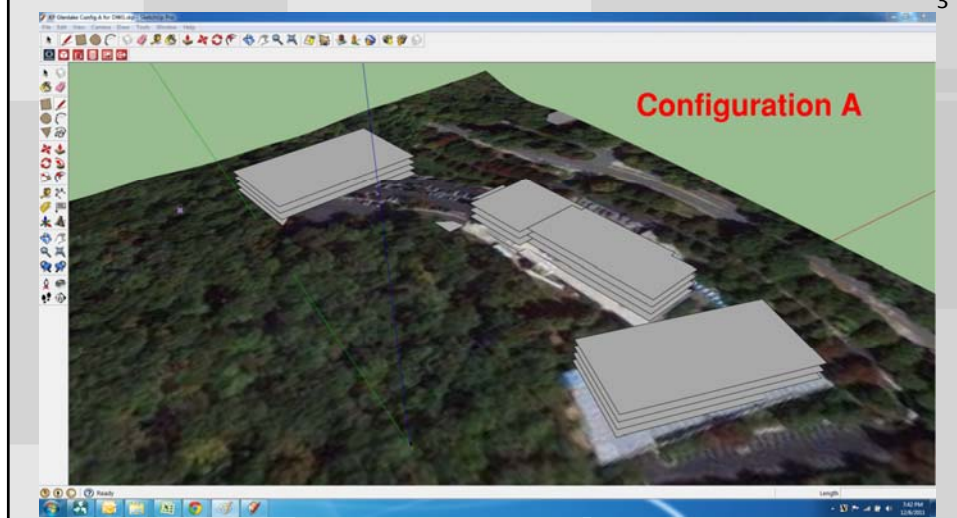
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## Traditional BIMStorm Approach

### KP Glenlake – Onuma to SketchUp for Site

3

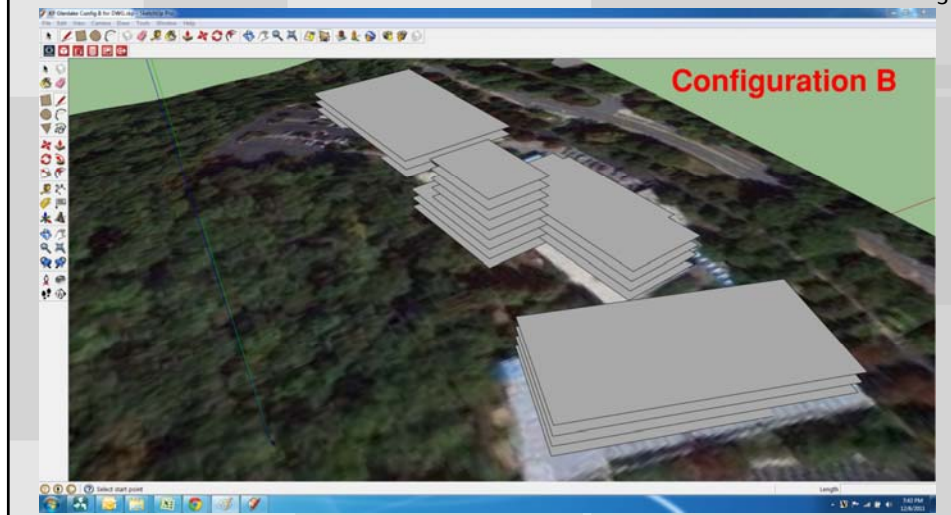




## Traditional BIMStorm Approach

### KP Glenlake – Onuma to SketchUp for Site

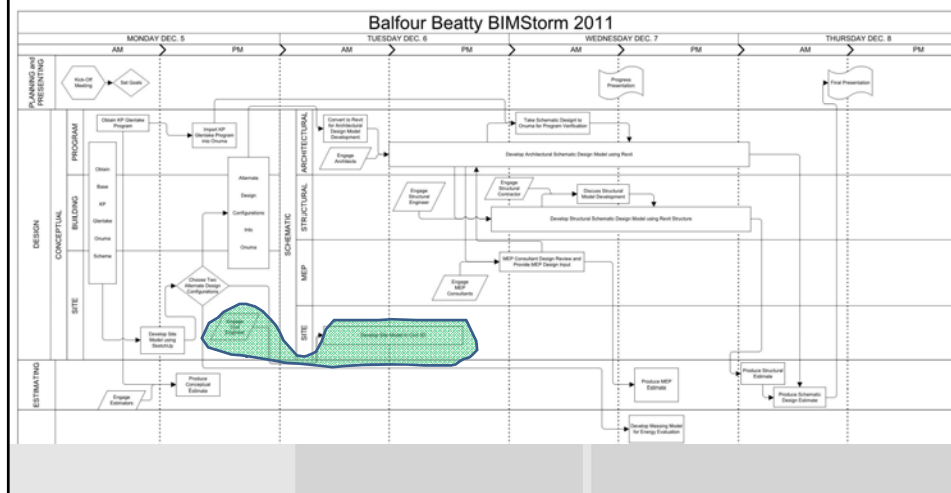
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## Traditional BIMStorm Approach

### KP Glenlake – Civil 3D for Site Evaluation

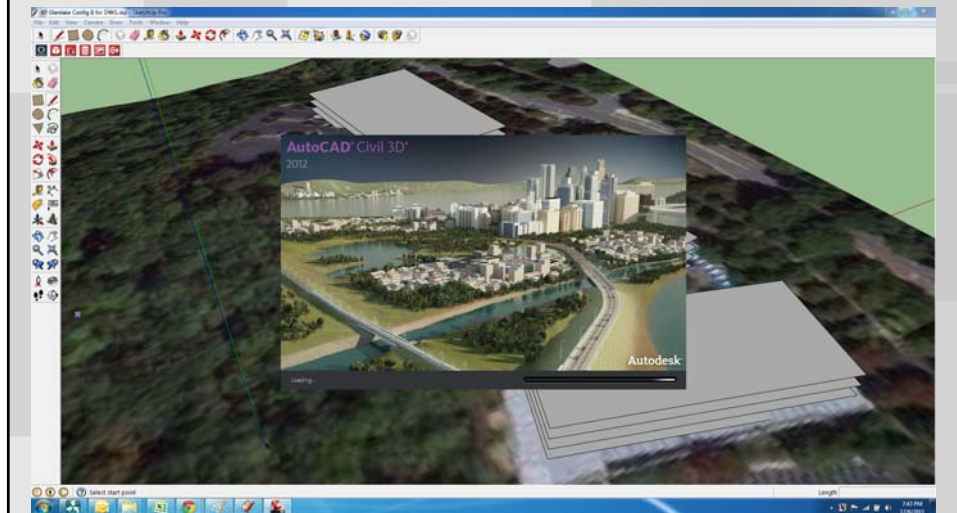
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## Traditional BIMStorm Approach

### KP Glenlake – Civil 3D for Site Evaluation

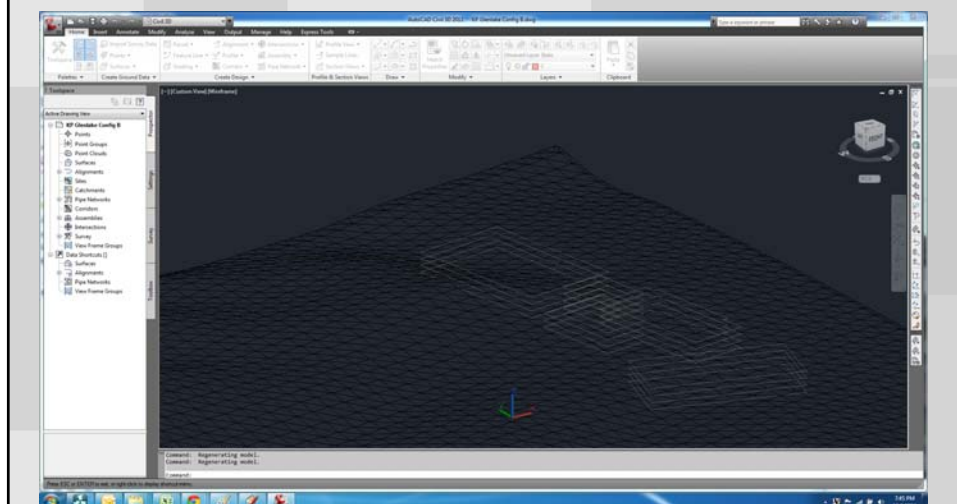
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## Traditional BIMStorm Approach

### KP Glenlake – Civil 3D for Site Evaluation

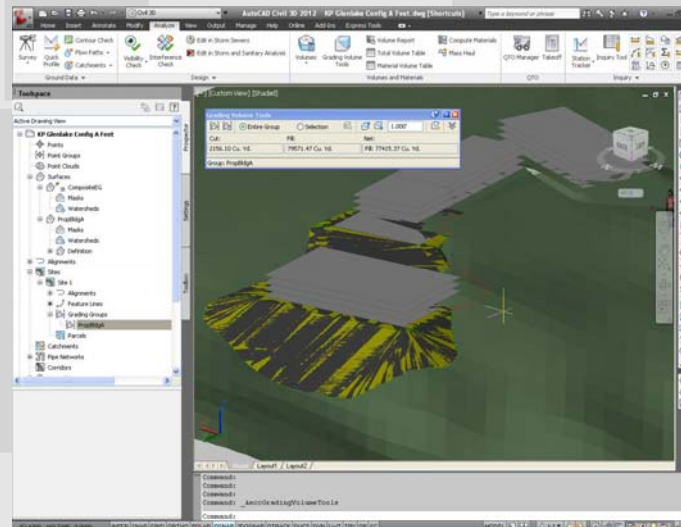
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## Traditional BIMStorm Approach

### KP Glenlake – Civil 3D for Site Evaluation

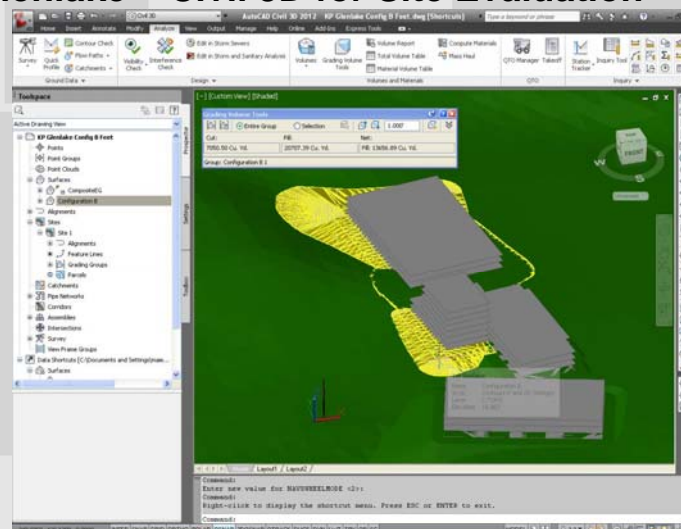
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## Traditional BIMStorm Approach

### KP Glenlake – Civil 3D for Site Evaluation

4

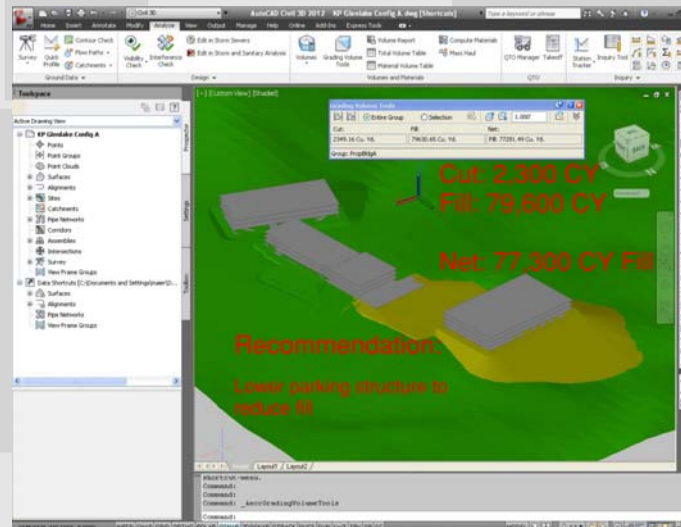




## Traditional BIMStorm Approach

### KP Glenlake – Civil 3D for Site Evaluation

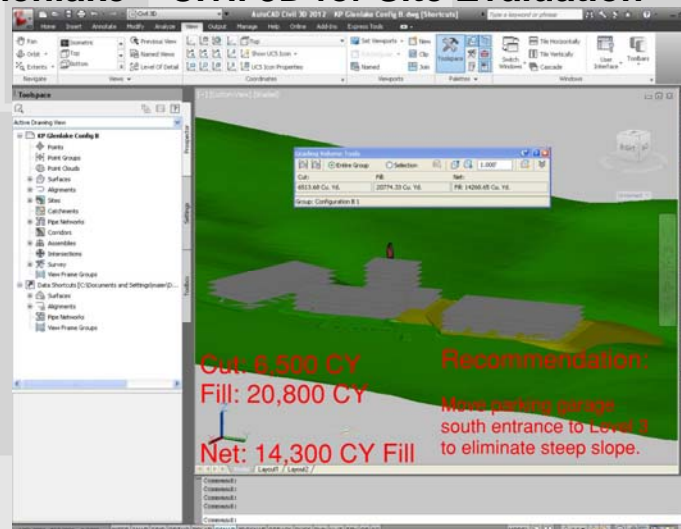
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## Traditional BIMStorm Approach

### KP Glenlake – Civil 3D for Site Evaluation

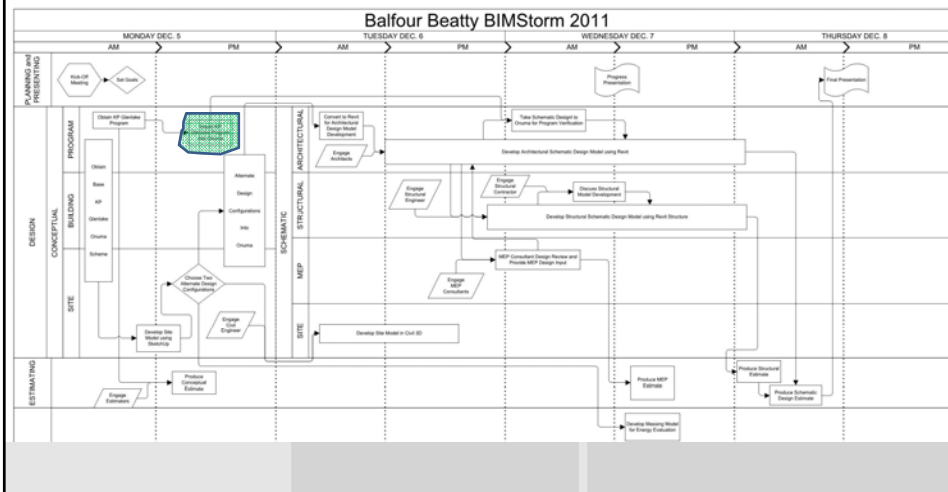
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# Traditional BIMStorm Approach

## KP Glenlake – Program into Onuma

5



# Traditional BIMStorm Approach

## KP Glenlake – Program into Onuma

[illegible]

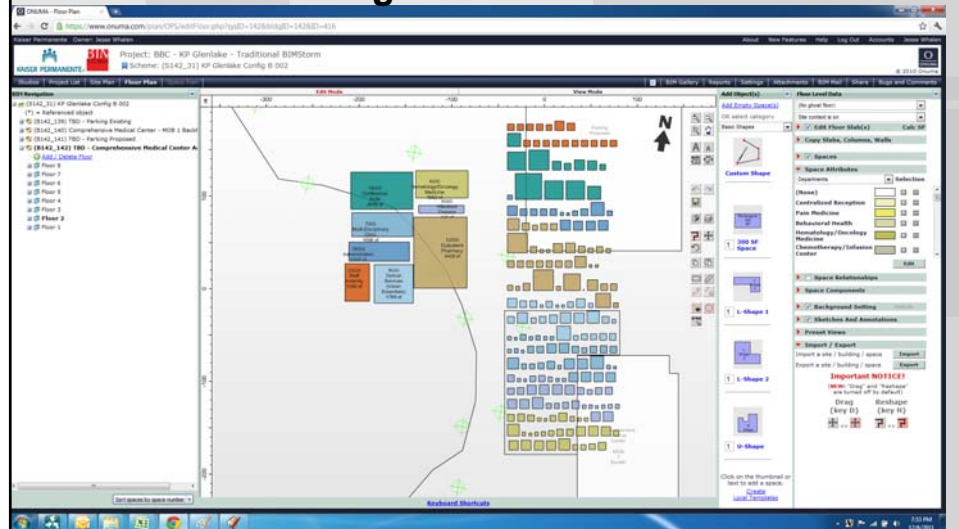
# Traditional BIMStorm Approach

[illegible]



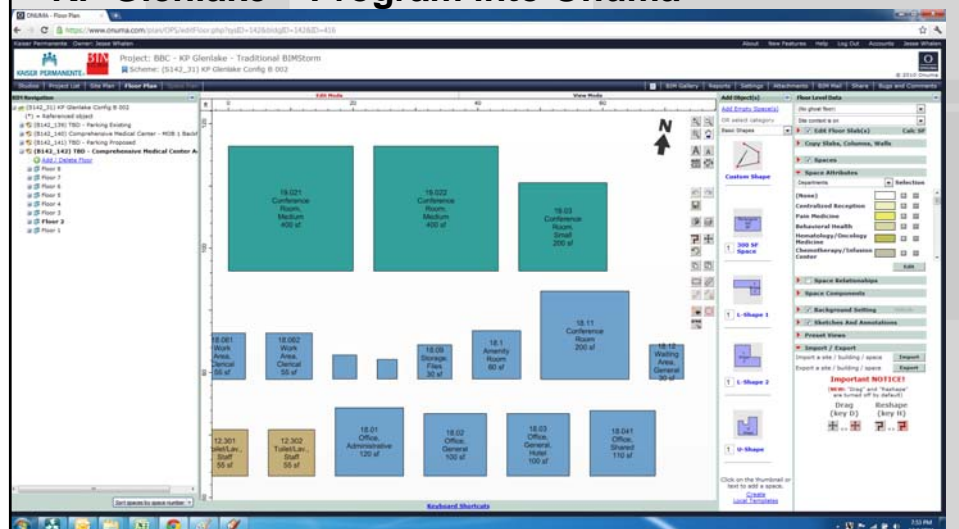
# Traditional BIMStorm Approach

## KP Glenlake – Program into Onuma



# Traditional BIMStorm Approach

## KP Glenlake – Program into Onuma



## Traditional BIMStorm Approach

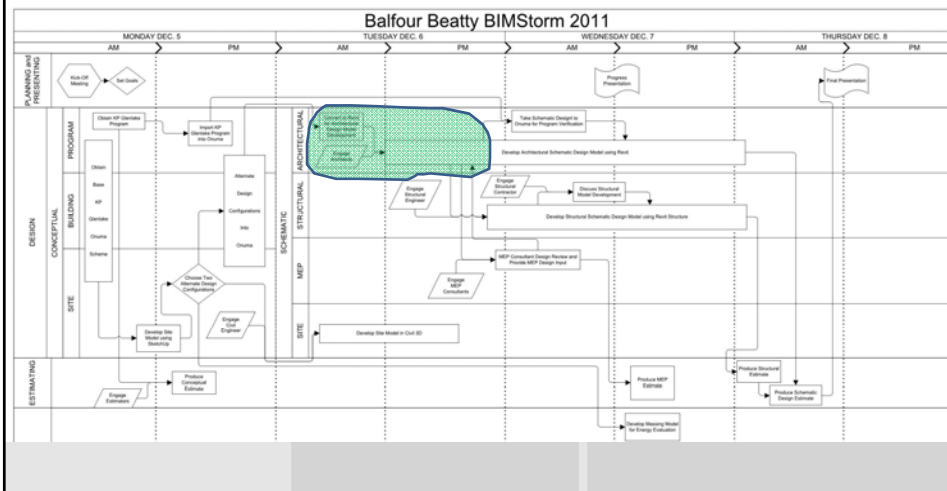
Glenlake Team – Program into Onuma

Onuma Live

## Traditional BIMStorm Approach

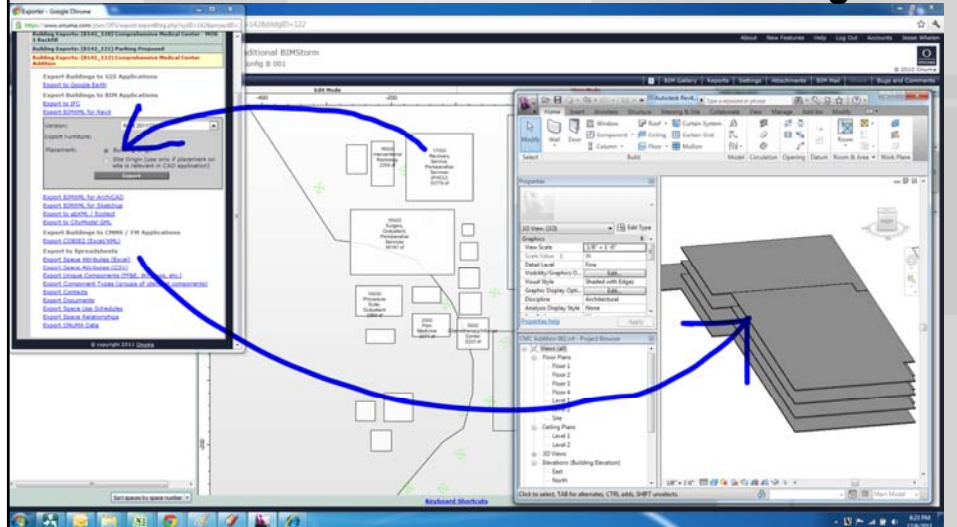
KP Glenlake – Onuma to Revit for Arch Design

6



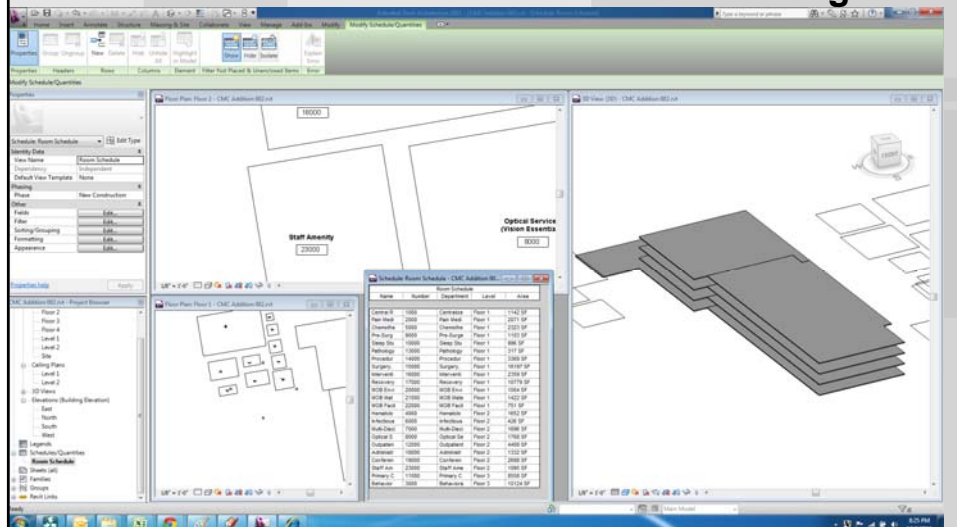
## Traditional BIMStorm Approach

### KP Glenlake – Onuma to Revit for Arch Design



## Traditional BIMStorm Approach

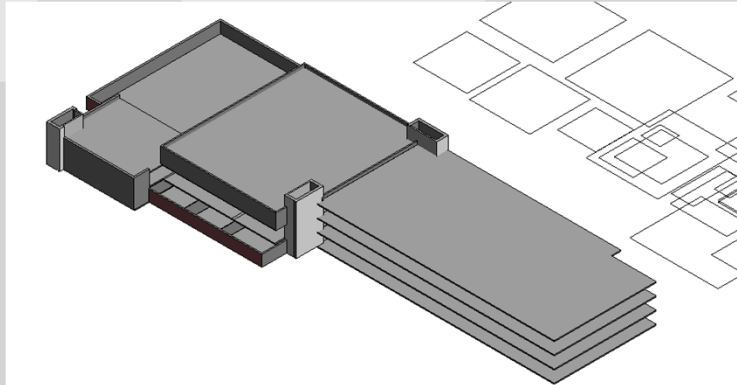
### KP Glenlake – Onuma to Revit for Arch Design





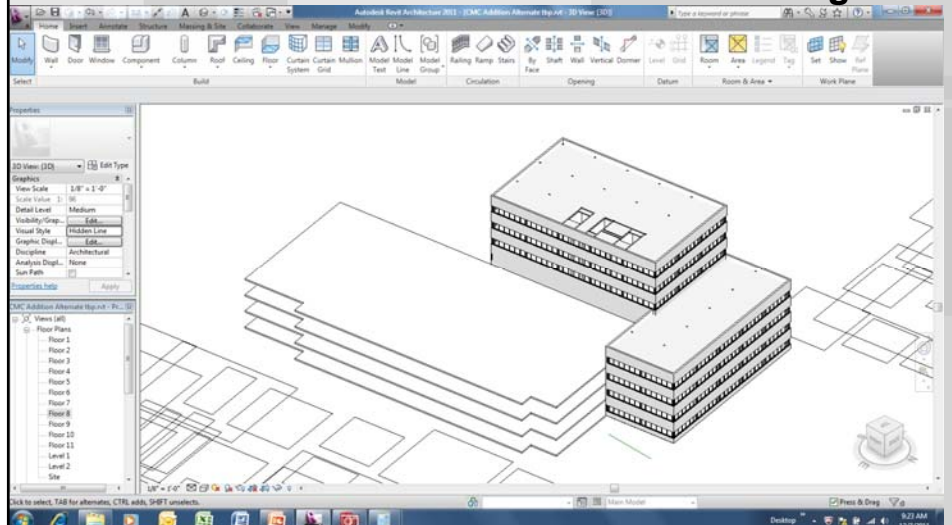
## Traditional BIMStorm Approach

### KP Glenlake – Onuma to Revit for Arch Design



## Traditional BIMStorm Approach

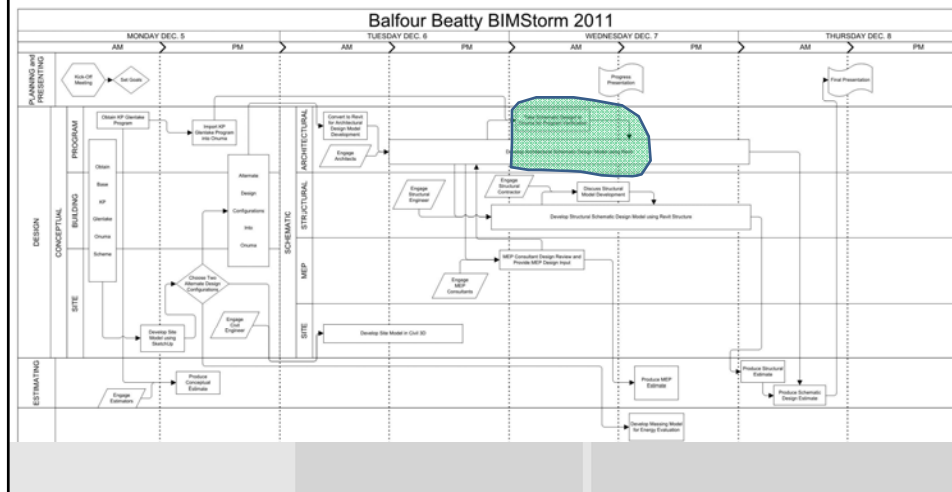
### KP Glenlake – Onuma to Revit for Arch Design



# Traditional BIMStorm Approach

## KP Glenlake – Revit to Onuma for Area Check

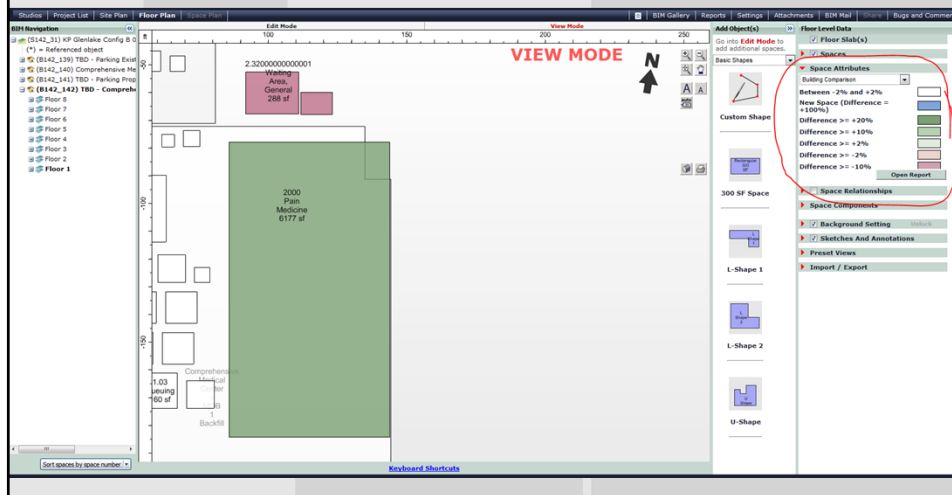
7



# Traditional BIMStorm Approach

## KP Glenlake – Revit to Onuma for Area Check

7



## Traditional BIMStorm Approach

### KP Glenlake – Revit to Onuma for Area Check

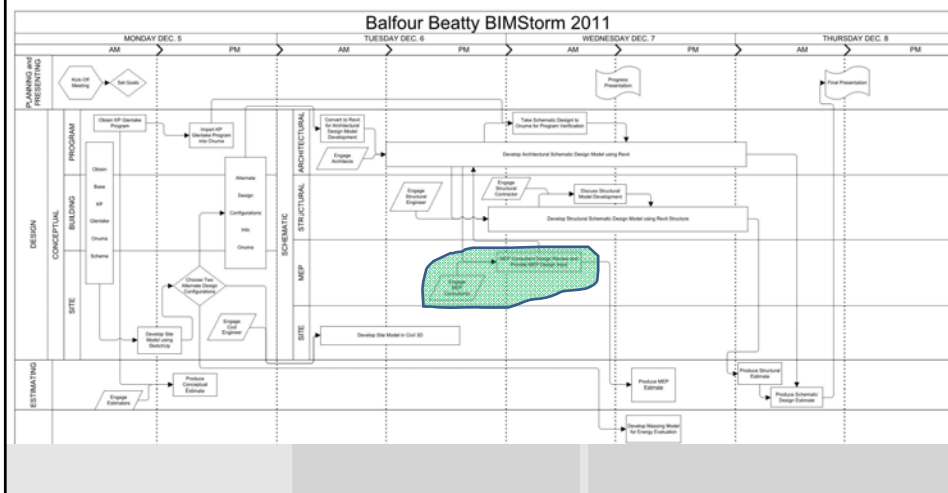
7

### Area Check – Go Live

## Traditional BIMStorm Approach

### KP Glenlake – MEP Evaluation

8





# Traditional BIMStorm Approach

## KP Glenlake – MEP Evaluation

Respond Actions Junk E-mail Options Find

You replied on 12/6/2011 11:10 PM

From: Soner Unver [Soner.Unver@MCDEAN.COM]  
 To: Whalen, Jesse; 'CTaylor@Southlandind.com'  
 Cc:  
 Subject: Re: BIMStorm: KP 'New Project' Team

Sent: Tue 12/6/2011 11:07 PM

Jesse,

I will be out of office tied up with meetings all day tomorrow. I looked over the revit files you and Marina uploaded. I would ask you at this point to figure 12X16 electrical and telecom closets for every 18 to 20,000 sqft of floor space plus one more additional slightly bigger room for main electrical room in the first floor. I will try to jump in tomorrow evening to do some sketches for electrical risers. I will also try to get you some sqft base electrical equipment and labor budget numbers.

-Soner

To: Whalen, Jesse  
 From: RE: BIMStorm: KP 'New Project' Team  
 Subject: RE: BIMStorm: KP 'New Project' Team

Jesse, there are a lot of questions I would have before we could make a system some thoughts:

Note: I didn't have much time to look at the Revit file - I don't have Revit on 6 for about 3 minutes over the shoulder of one of our engineers. So from what I've been copied on, this project is:

- An addition to a KP building
- The scope includes an athletic training facility (gymnasium, locker rooms, classrooms, dance studio, training facility, and misc spaces), small athletic storage facility, concessions, and a parking garage with PV on the roof. (from Andreas Phelps email)
- Net Zero Goal
- If I'm way off on these assumptions, let me know.

- 1) Architectural Layout - Again, didn't have a chance to dig into Revit file long, so I'm not sure how the different space types break down and where each space type is located so I can't comment on this without further research.
- 2) Systems Selection - In general, for the high activity type spaces (Gym, training areas), I would recommend a traditional system (maybe VAV). For the other spaces that are low activity and/or spaces that go from many people to zero people frequently, I would recommend a more specialized system like a 100% OA Unit with FPD boxes. Some sort of heat recovery could be done on both space types.
- 3) For rough cost data for this facility and system type, I would use \$35/SF for HVAC and \$18/SF for Plumbing.

Some questions for you to make sure the team considers:

- How is Net Zero going to be achieved? Buying green power? Solely PV?
- Will the project use utilities from the existing facilities CUP? Assume existing facility has enough capacity to cool and heat the added space?
- If the addition is Net Zero, but the existing facility isn't, and they share a CUP, how do you re-define Net Zero?

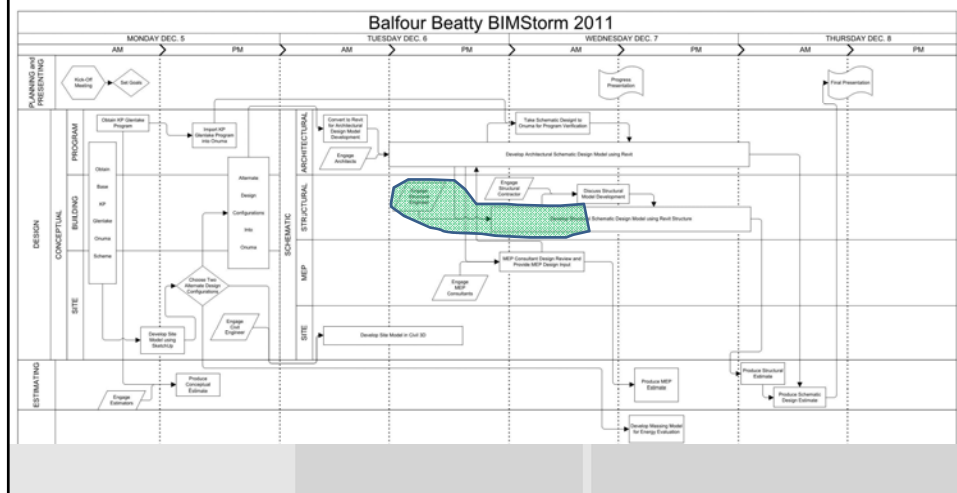
Sorry I haven't been able to make much time into this project. Hope this helps. Let me know if you have questions.

CHRIS TAYLOR  
 Operations Manager  
 Southland Industries

# Traditional BIMStorm Approach

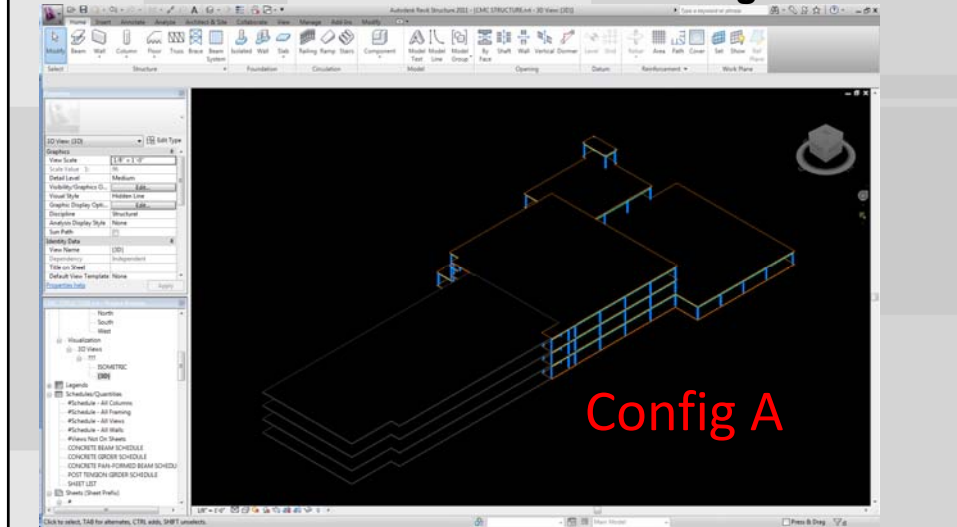
## KP Glenlake – Revit for Structural Design

9



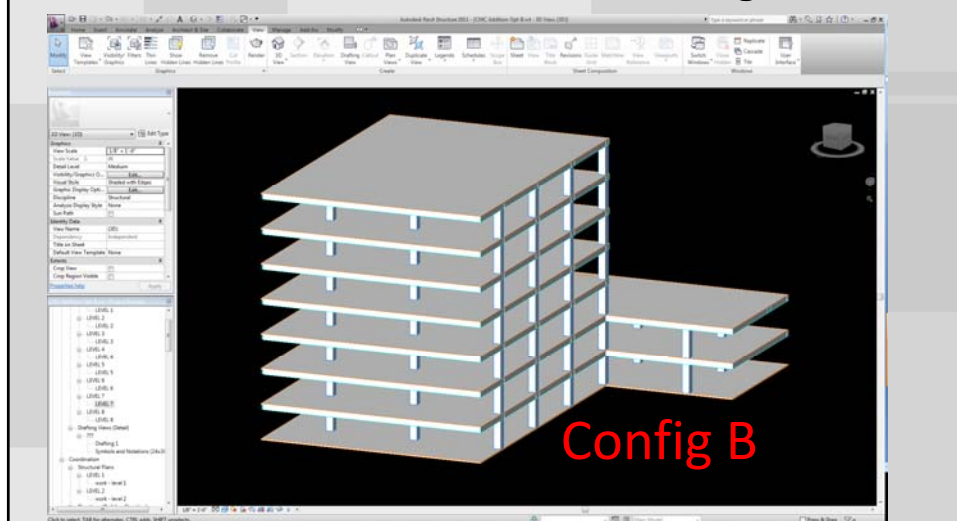
## Traditional BIMStorm Approach

### KP Glenlake – Revit for Structural Design



## Traditional BIMStorm Approach

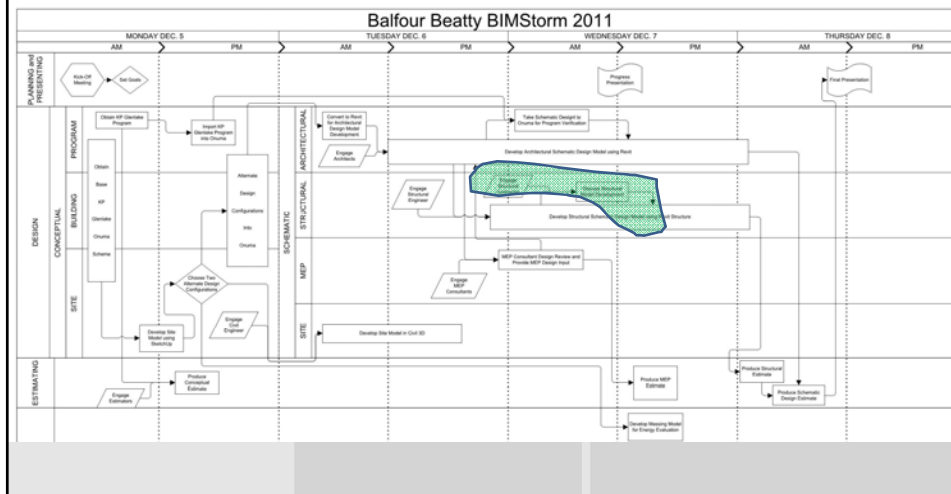
### KP Glenlake – Revit for Structural Design



# Traditional BIMStorm Approach

## KP Glenlake – Structural Modeling Sidebar

10



# Traditional BIMStorm Approach

## KP Glenlake – Structural Modeling Sidebar

10

From: Pete Whitehead [Pete@smconcrete.com]  
 To: Whalen, Jesse  
 Cc:  
 Subject: RE: BIMStorm: KP 'New Project' Team

Sent: Wed 12/7/2011 8:26 AM

Jesse-

Here are some preliminary thoughts on using Revit at the construction end of things. Part of my interest and indeed intrigue in BIM was that it opens up the possibility of a freer cross flow of ideas throughout the industry than is now possible given the historical traditional participant roles (mainly vertically and hierarchical) and current management styles. I think BIM offers the possibility of blowing that wide open but only if participants are willing to let go of the past! With this in mind I would expect that the next generation would be as open to input from the construction end of things as the design end. I don't think we are there yet but I have faith we can get there.

These thoughts are preliminary, meant to stimulate thought, and not necessarily in order but I do think they are appropriate for a BIM approach and have content for designers to consider:

### IMPLICATIONS ON FRAMING IN CONCRETE:

1. Modeling in Revit one can't modify a slab (e.g. slope to drain) and then break the slab into pours. The corollary: If one breaks a slab into pours in Revit one can't modify the parts (e.g. slope to drain). If both are necessary it might require 2 models.
2. Minimize sloping soffits
3. Minimize sloping columns (ever try to slope a column in Revit?)
4. Maximize placing column drop heads on the same surface- i.e. minimize steps in soffits or changes in slope of soffit in the middle of column drop heads.





## Traditional BIMStorm Approach

### “Traditional BIMStorm Approach”

#### KP Glenlake Team – Results

- Get program data into Onuma - **DONE**
- Develop two different design options - **DONE**
  - Configuration A
  - Configuration B
- Schematic design Architectural - **DONE**
- Schematic design Structural - **DONE**
- Cost estimate of schematic design - **PARTIAL**
- Get early MEP input on schematic designs - **PARTIAL**
- Energy evaluation for both options – **DID NOT REACH**
- Civil / Site evaluation for both options - **DONE**

## Traditional BIMStorm Approach

### Glenlake Team – Traditional BIMStorm Approach

Site Evaluation

Energy

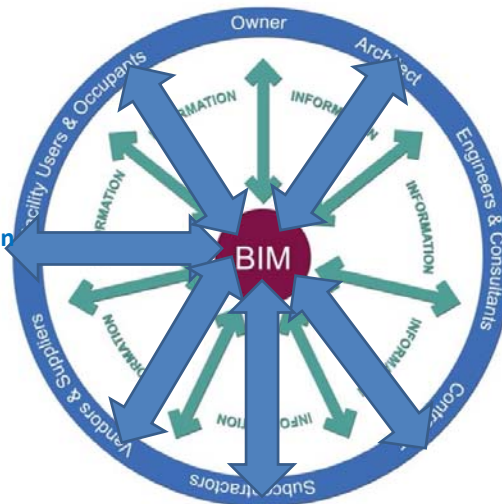
MEP Evaluation

Structural Evaluation

Arch Design

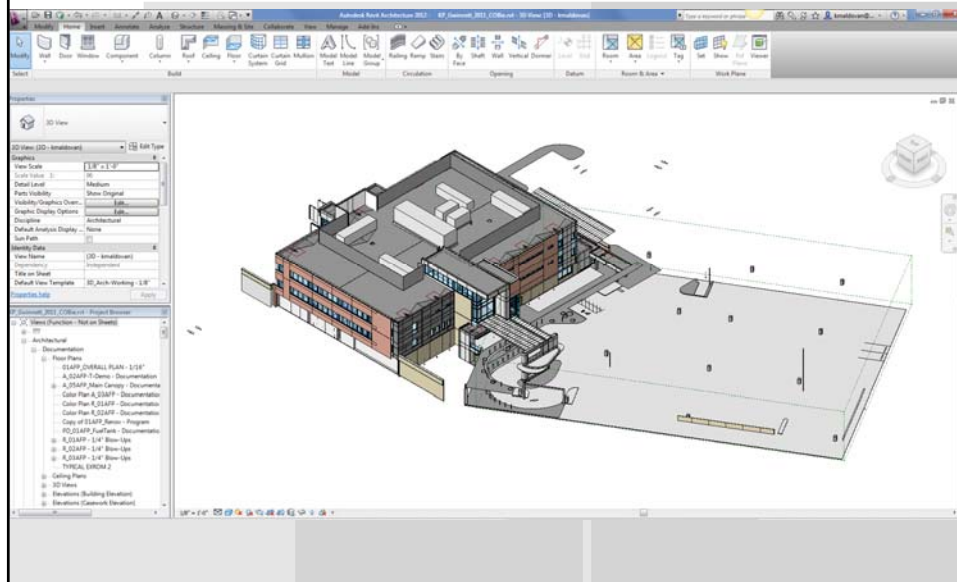
Cost Estimate

Etc.



4 days

## COBie BIMStorm- Gwinnett Revit Model



## Team

- Kaiser Permanente
- Skanska
- Vela
- Onuma
- Broaddus and Associates
- Jacobs
- PB

76 hrs total

16 hrs prior to BIMStorm

9 people

**Balfour Beatty**



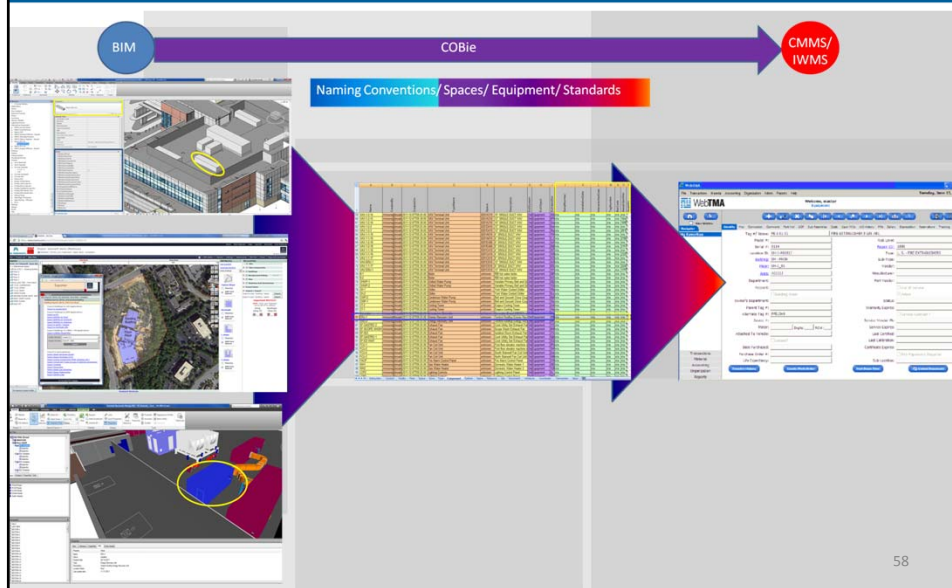
## Goals

1. Produce **COBie** (Construction Operations Building information exchange)
2. View **Vela** in **Onuma** and Onuma in Vela
  - a. Vela-Export
  - b. Web Services
3. Create guidelines for a repeatable process to inform the Glenlake team of how to model to support FIM.

<http://www.wbdg.org/resources/cobie.php>

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## BIM to COBie to CMMS

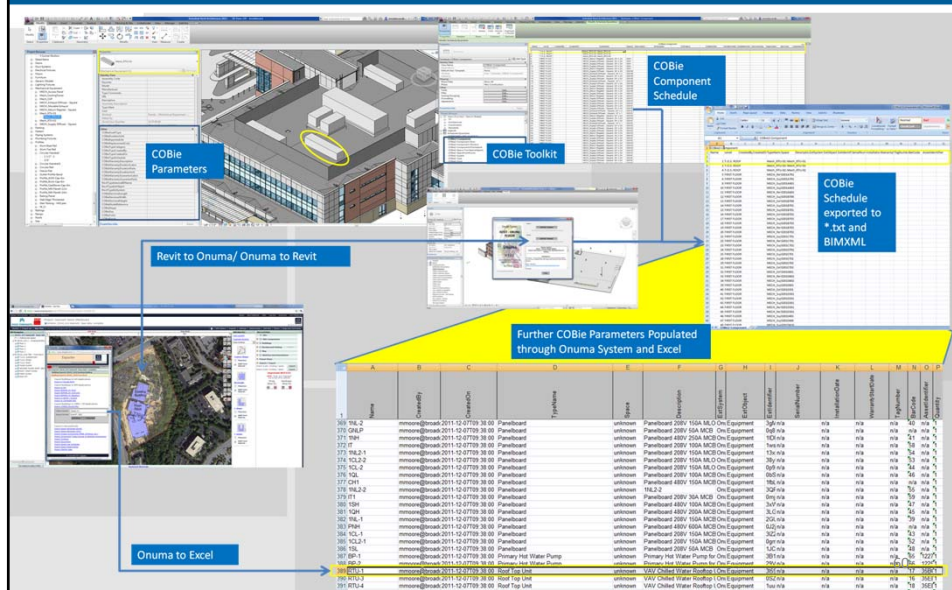


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## Review Project Data Received

- Remove Duplicate Spaces
- Expand spaces to include Equipment/ Doors

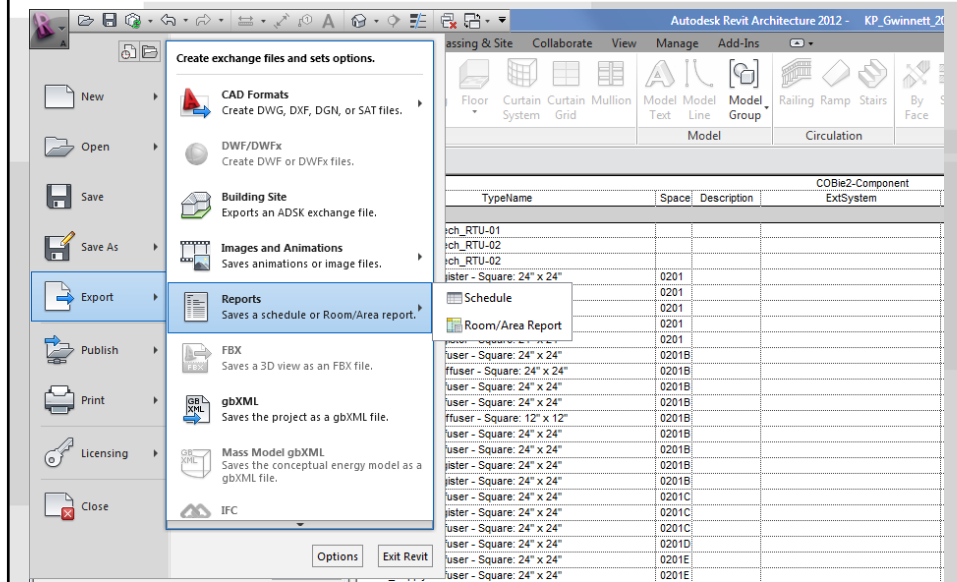
## Revit to COBie



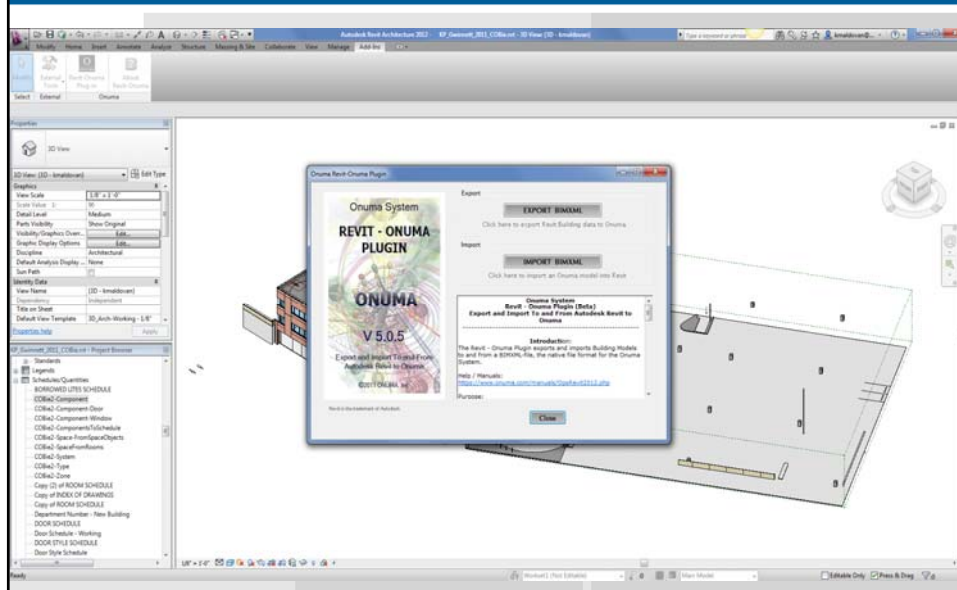
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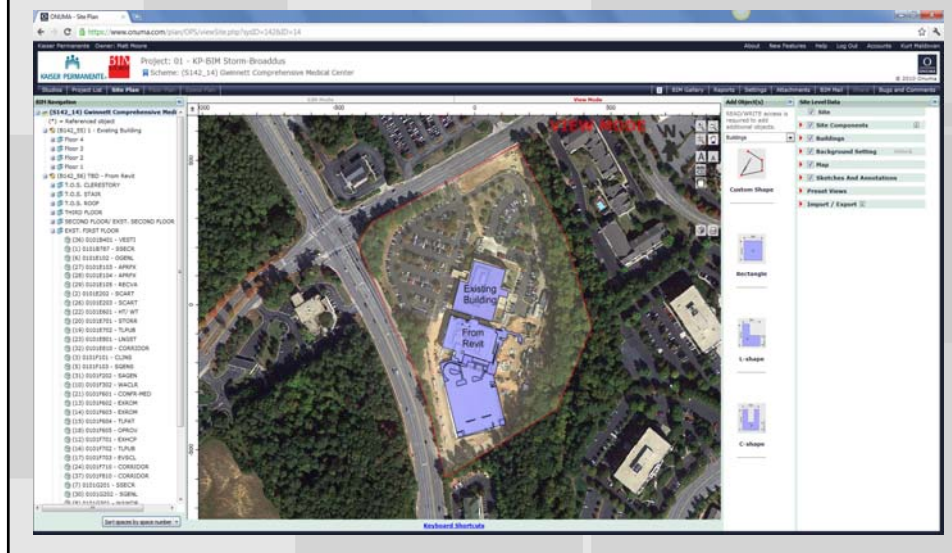
# Export Revit COBie Component Schedule as \*.txt



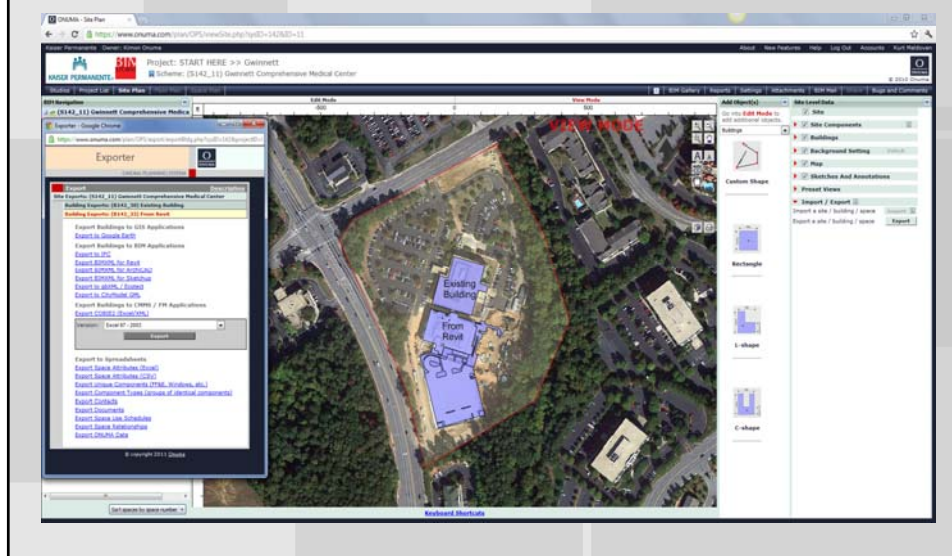
# Export BIMXML from RVT



# Open Exported BIMXML in Onuma



# Export Onuma Scheme (S142\_11) to COBie



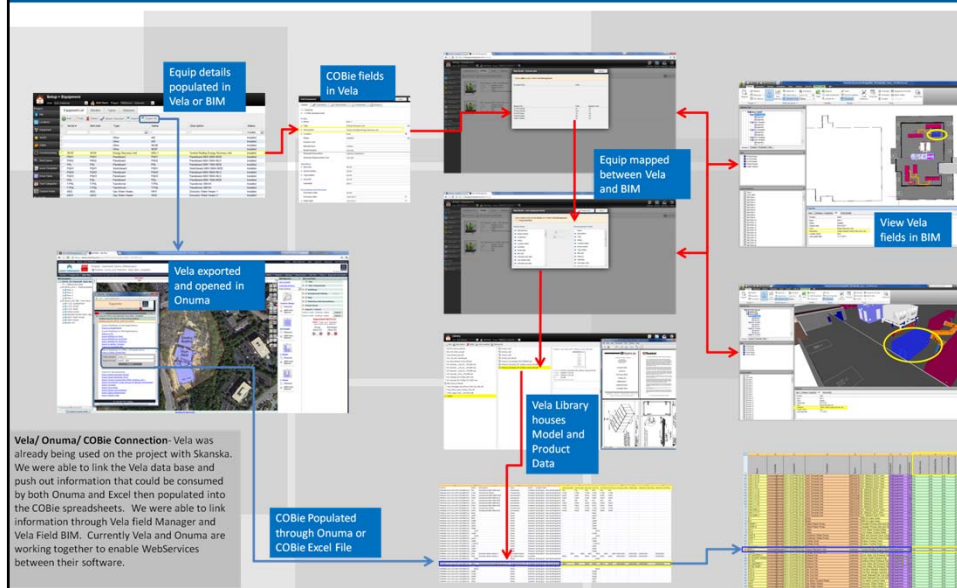
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
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11	VAW-1-1.1	rmmon@ibraz.com	2011-12-07 09:25:00	VAW Terminal Unit	0201A601	8" SINGLE DUCT VAV	On@equipment	25/n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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18	ATS-IQH	rmmon@ibraz.com	2011-12-07 09:25:00	Automatic Transfer Switch	0201D503	Automatic Transfer Switch 25	On@equipment	18/n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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20	ATS-IQH	rmmon@ibraz.com	2011-12-07 09:25:00	Automatic Transfer Switch	0201D503	Automatic Transfer Switch 25	On@equipment	18/n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21	ATS-IQH	rmmon@ibraz.com	2011-12-07 09:25:00	Automatic Transfer Switch	0201D503	Automatic Transfer Switch 25	On@equipment	18/n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22	ATS-IQH	rmmon@ibraz.com	2011-12-07 09:25:00	Automatic Transfer Switch	0201D503	Automatic Transfer Switch 25	On@equipment	18/n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23	ATS-IQH	rmmon@ibraz.com	2011-12-07 09:25:00	Automatic Transfer Switch	0201D503	Automatic Transfer Switch 25	On@equipment	18/n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24	ATS-IQH	rmmon@ibraz.com	2011-12-07 09:25:00	Automatic Transfer Switch	0201D503	Automatic Transfer Switch 25	On@equipment	18/n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25	ATS-IQH	rmmon@ibraz.com	2011-12-07 09:25:00	Automatic Transfer Switch	0201D503	Automatic Transfer Switch 25	On@equipment	18/n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26	ATS-IQH	rmmon@ibraz.com	2011-12-07 09:25:00	Automatic Transfer Switch	0201D503	Automatic Transfer Switch 25	On@equipment	18/n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27	ATS-IQH	rmmon@ibraz.com	2011-12-07 09:25:00	Automatic Transfer Switch	0201D503	Automatic Transfer Switch 25	On@equipment	18/n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28	ATS-IQH	rmmon@ibraz.com	2011-12-07 09:25:00	Automatic Transfer Switch	0201D503	Automatic Transfer Switch 25	On@equipment	18/n/a	n/a	n/a	n/a	n/a	n/a		



## Multiple Paths/ Teams/ Schemes

- Broaddus
  - Taking original Revit data and modifying adding COBie information through Onuma/ COBie spreadsheets
- PB/BBC
  - Modeling new Equipment/ Spaces in Revit, populating COBie Toolkit, exporting BIMXML
- Vela/ BBC
  - Creating Vela Equipment and pushing to Onuma
- Jacobs
  - Pushing model to EcoDomus and analyzing COBie

## Vela to COBie



## COBie

### **A multi-software workflow**

- Core worksheets pulling information from models are Component, Space, System, Type
- Could use Vela to create sheets for Spare
- Use Onuma to create sheet for Space

## Learning Lessons-2

- Need integrator amongst project team
  - Assign division of responsibility for data sources and expected output (who originates space data)
  - Limit/add incoming data (non PM/category)
  - Necessitates a staged acceptance of data (mitigate rework and time)
- Need CMMS in place for mock-uploads
- Need FM plan for PM integration with data

## **BIG BIM Bang – Enterprise BIM**

Scenario Planning



**Andreas Phelps**  
**Balfour Beatty**

◦ AIA Technology in Architectural Practice



# BIMStorm 2011

## MiraCosta College BIMstorm Team



**BIMstorm Goals – Net Zero Energy**

- Good Design – capitalize on good passive and active systems
- Reduce long-term operational costs and environmental impact
- Explore cost-effective sustainability strategies
- Generate more value and less waste for clients
- Develop a process for evaluating multiple options simultaneously

## Process



## MiraCosta Community College Net Zero Energy Challenge

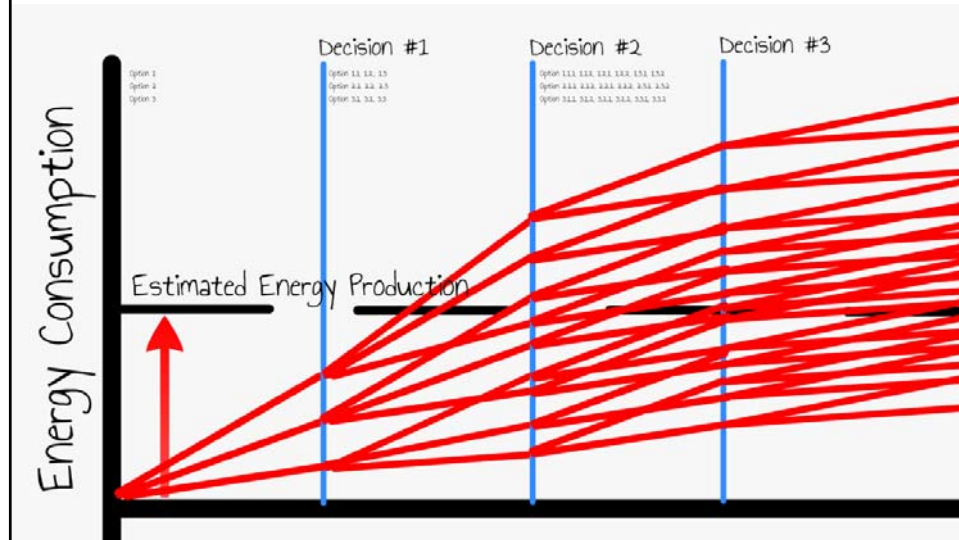
### High Performance Sustainability



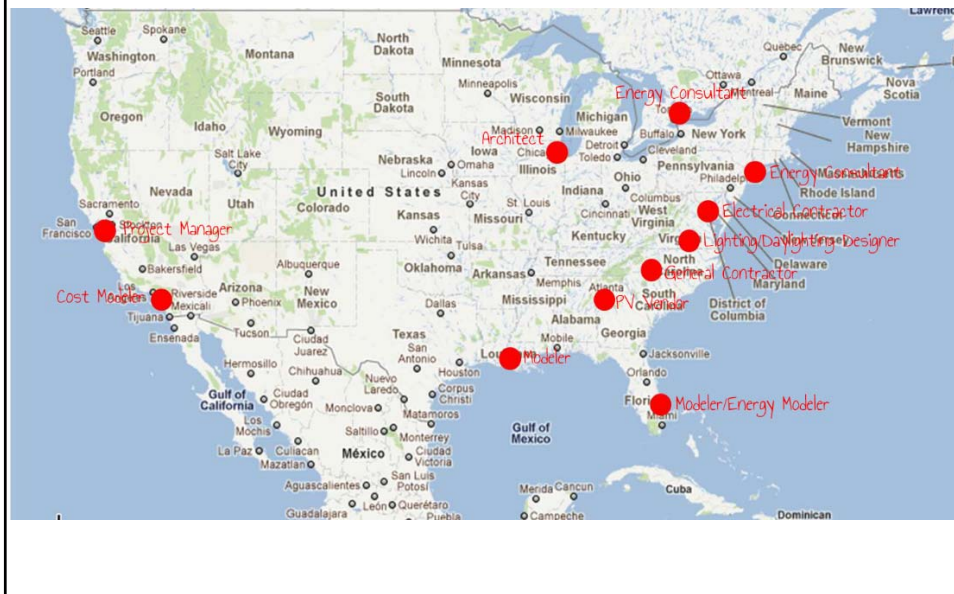
### Drivers

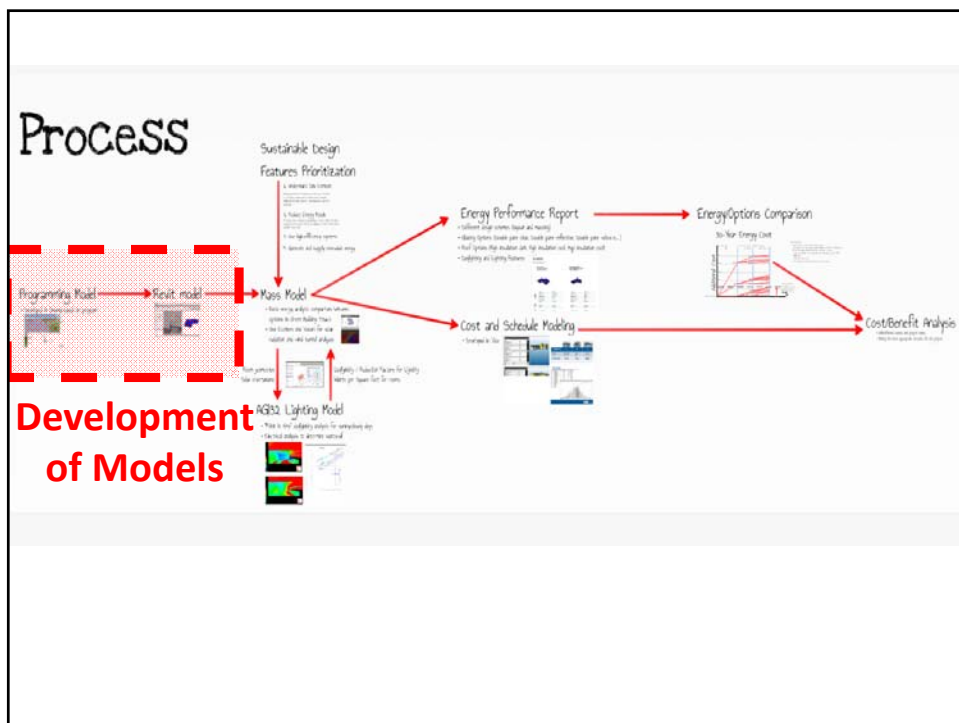
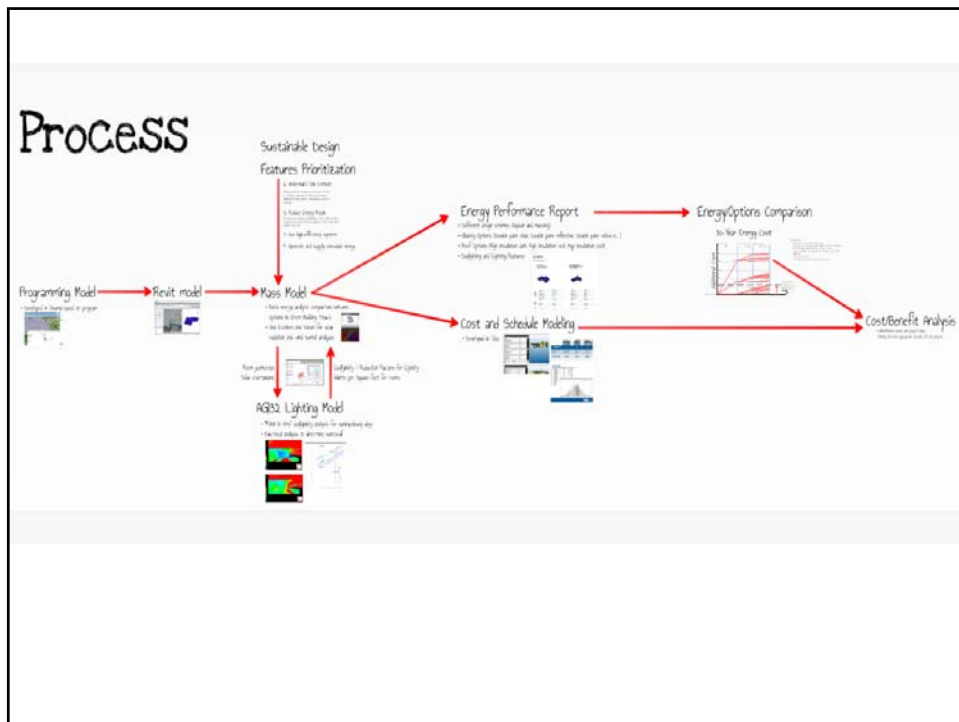
- Good Design – capitalize on good passive and active systems
- Reduce long-term operational costs and environmental impact
- Explore cost-effective sustainability strategies
- Generate more value and less waste for clients
- Develop a process for evaluating multiple options simultaneously

## Thinking & Methodology

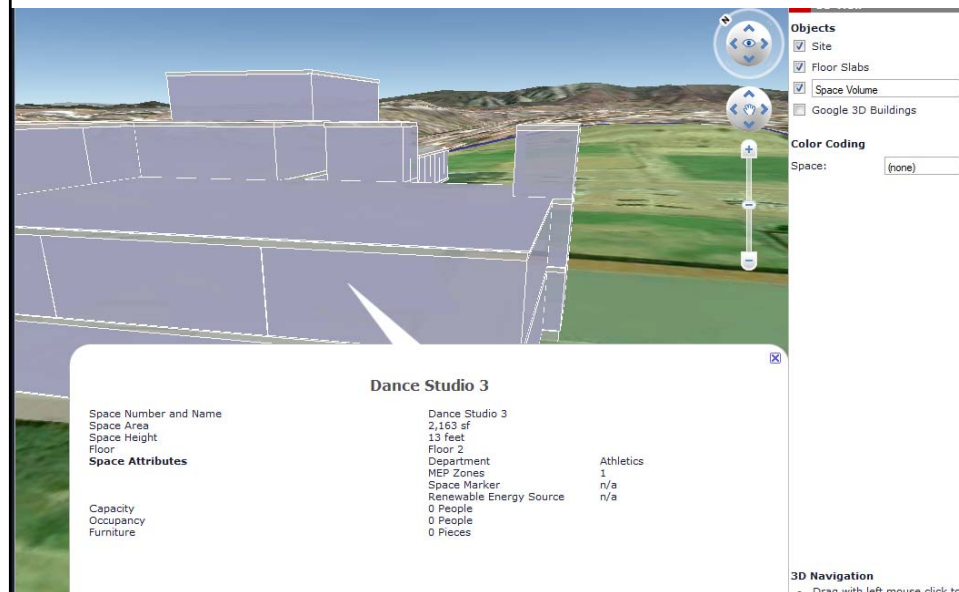


## The Team

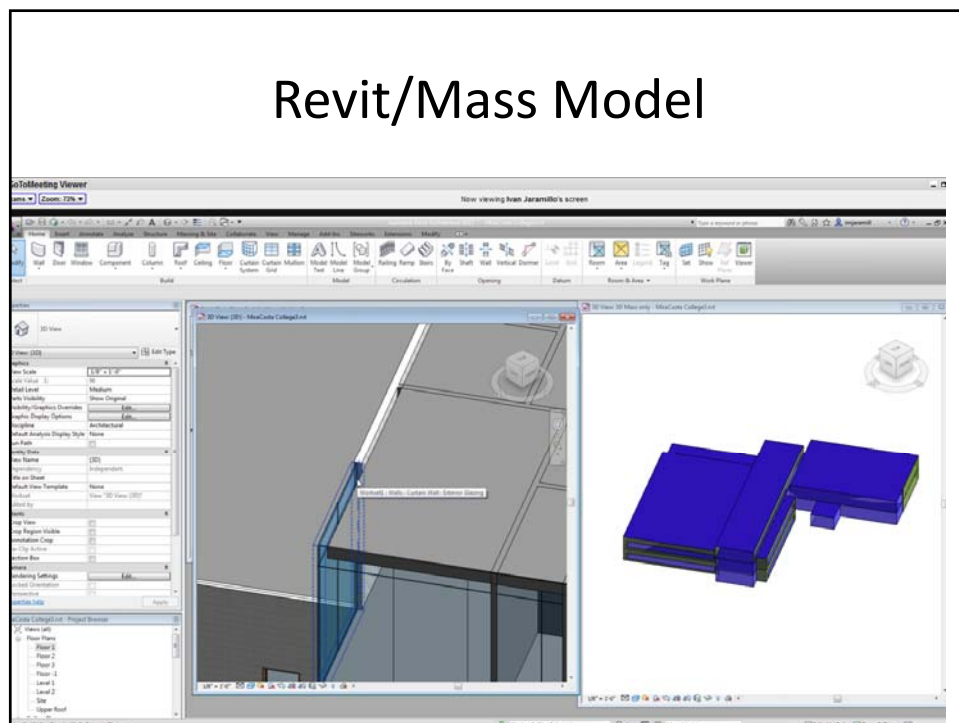




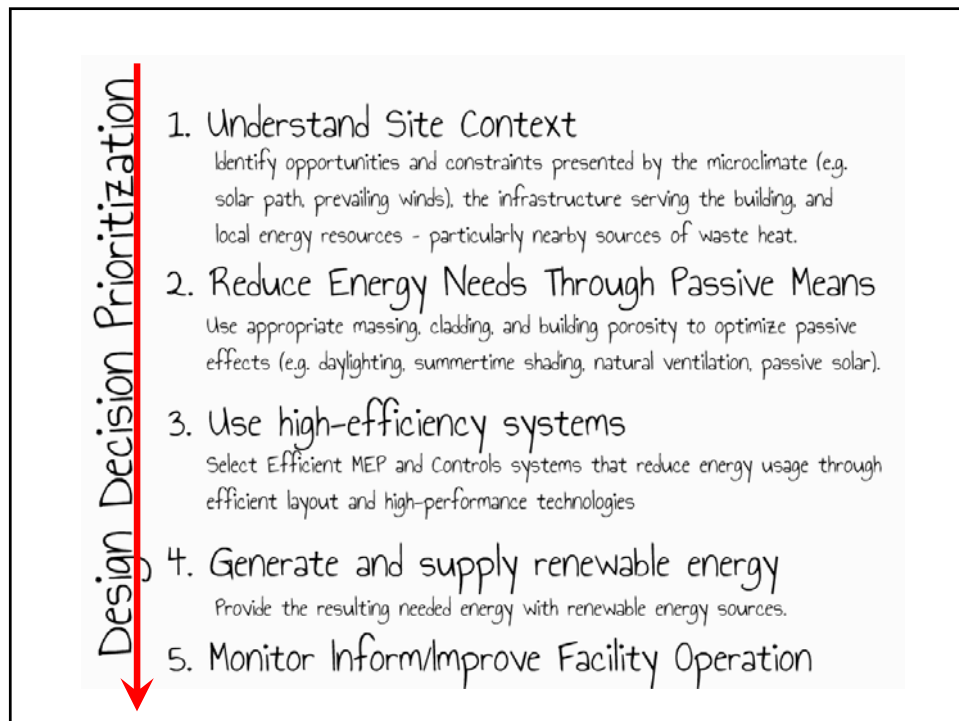
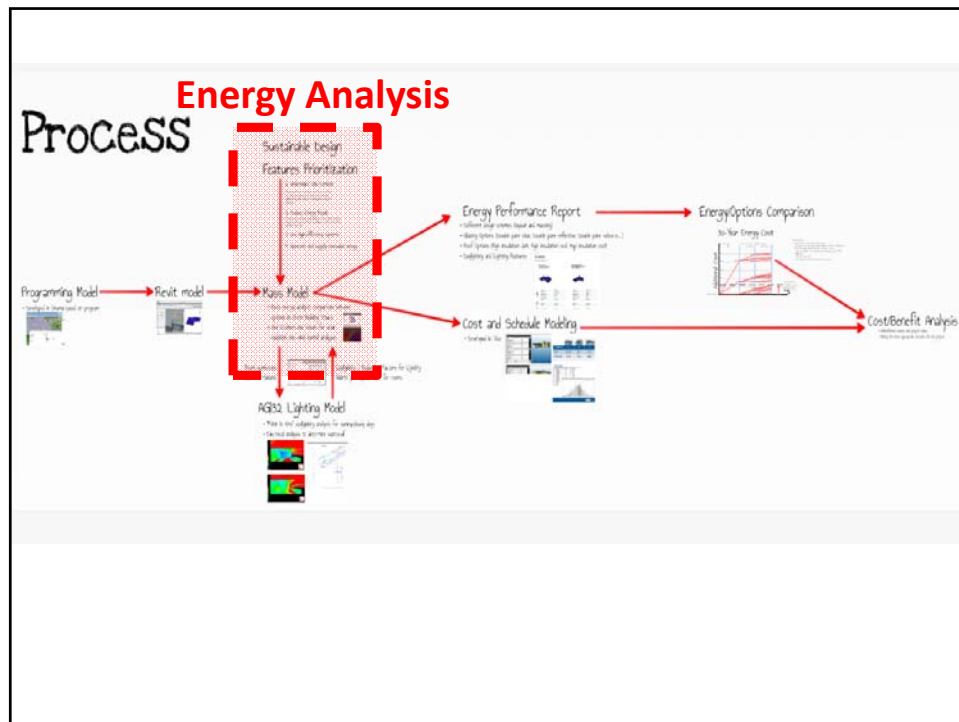
## Schemes – Tim Blatner



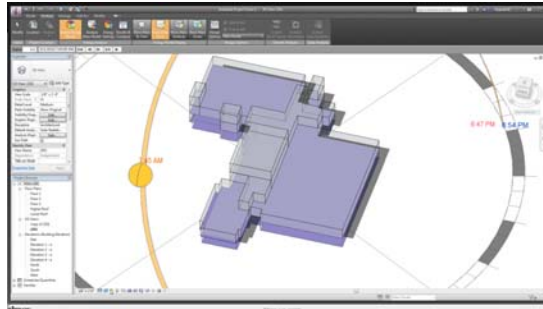
## Revit/Mass Model



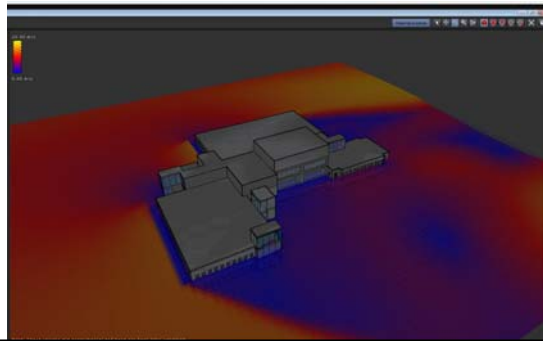




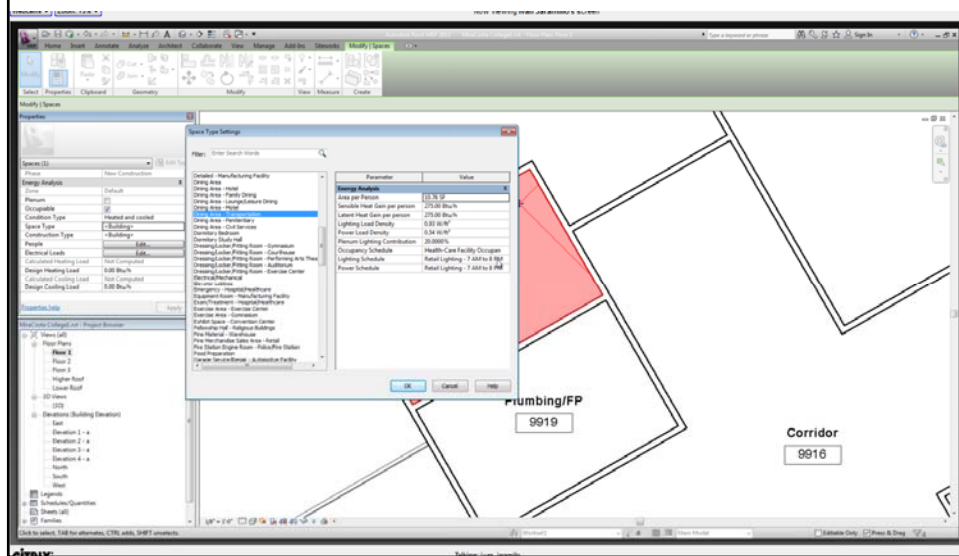
## Solar Angle

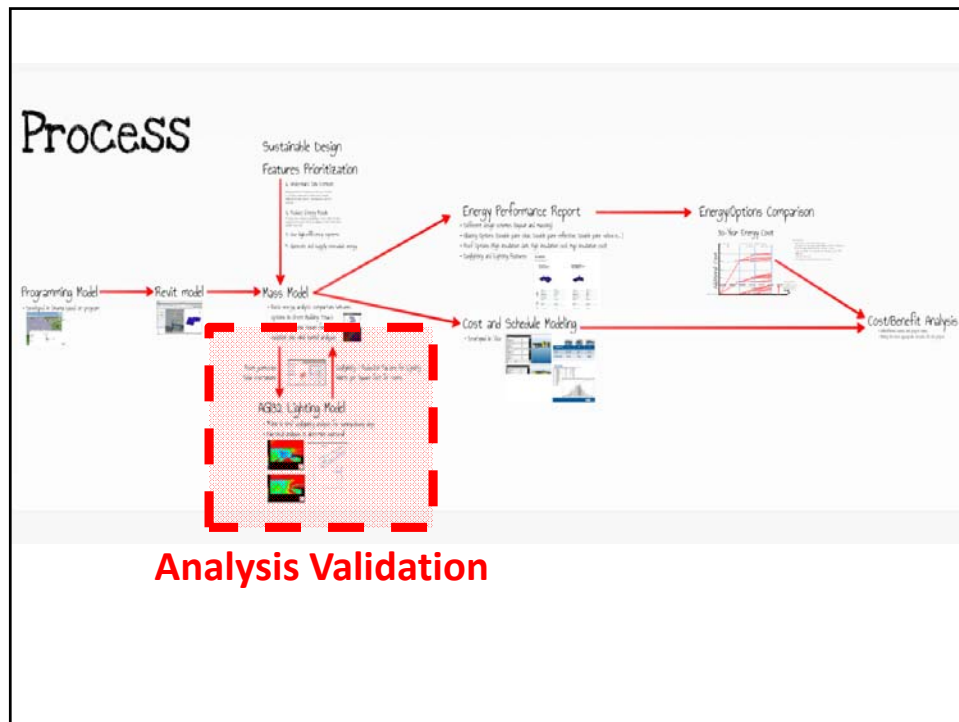


## Wind Study

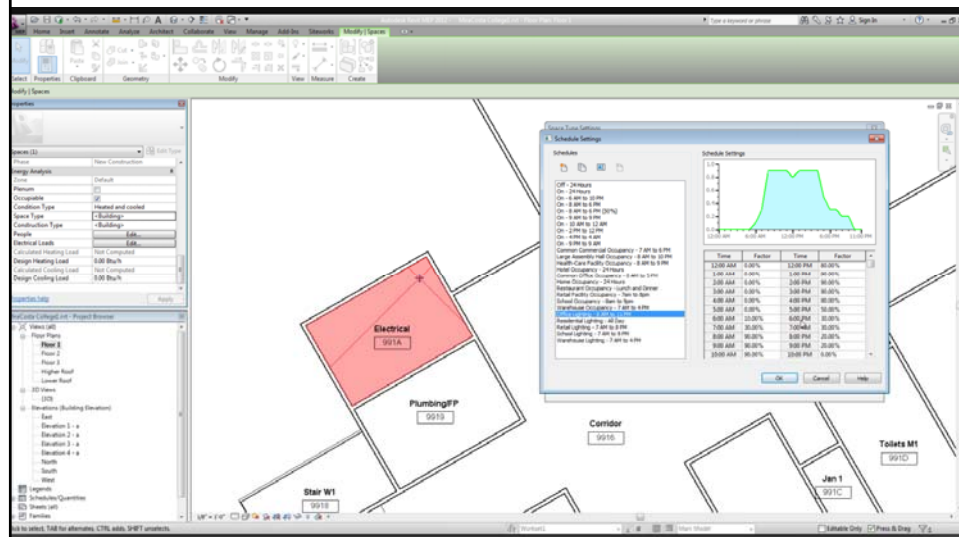


## Spaces

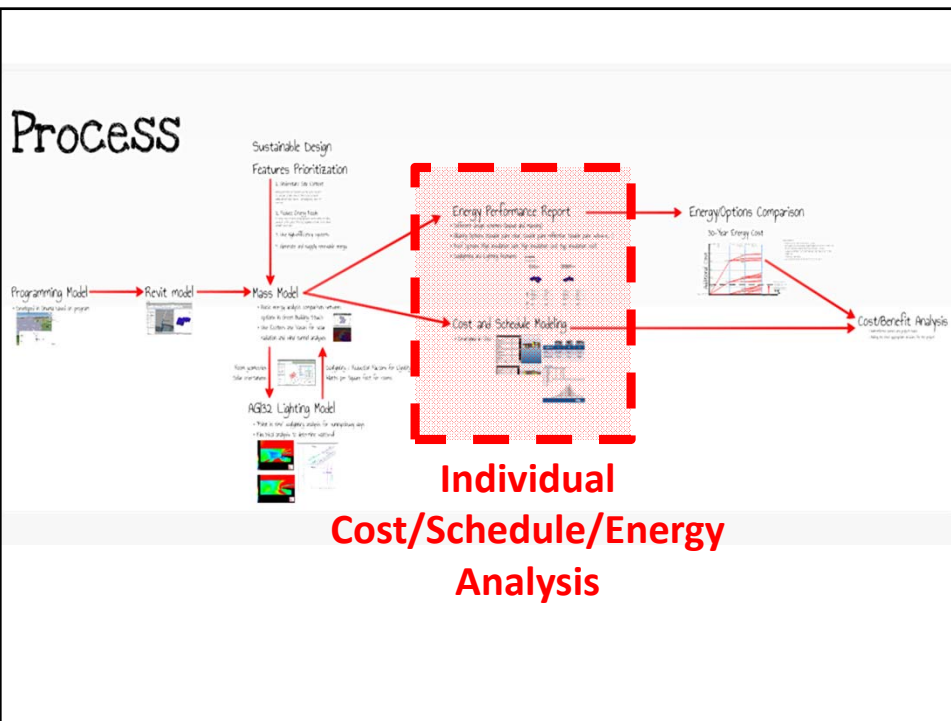
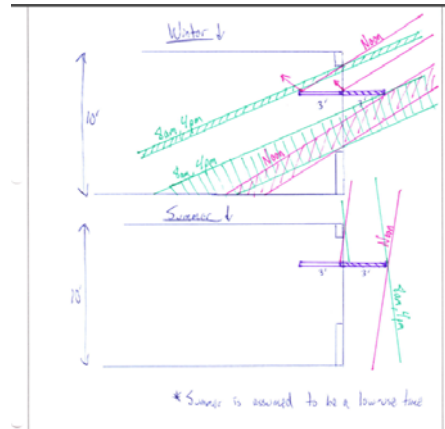
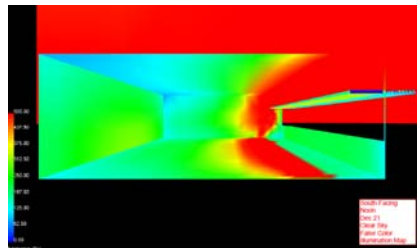
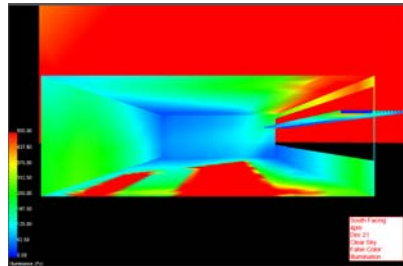




## Daylighting/Light Reduction Levels



## Daylighting Analysis – Lam Partners





# Scheme Comparisons

Green Building Studio (LEED Daylight) - Windows Internet Explorer

My Projects - **Fibragg energy model/Recovery1**

Project Name: Project Defaults | Project Details | Project Members

Run Name: Fibragg energy model REVT MEP QDMA\_v01

Energy and Carbon Results | US EPA Energy Star | Water Usage | Production Analysis | **LEED Daylight** | Weather | 3D Visual View | Export and Download Data Files | Design Alternatives

**LEED Daylight**

Percentage of building area with glazing factor over 2%: **8.8%**. No LEED Credit

LEED requires your project achieve a minimum glazing factor of 2% in a minimum of 75% of all regularly occupied areas.

**LEED Daylight Spec Analysis**

Space ID	Space Name	Translating Vision Glazing		Translating Daylight Glazing		Translating Skyglaze Member		Translating Vertical Member		Translating Horizontal Member		Glazing Factor
		Area (sq ft)	VT (%)	Area (sq ft)	VT (%)	Area (sq ft)	VT (%)	Area (sq ft)	VT (%)	Area (sq ft)	VT (%)	
sp-0406-COR	Pharmacy/Commissary	6,390	40	0.07	0	0	0	0	0	0	0	0%
sp-0310-CATERINA	Dormitory	4,702	374	0.07	391	0.07	0	0	0	0	0	0.2%
sp-0408-KITCHEN	FoodPreparation	4,515	120	0.07	0	0	0	0	0	0	0	0%
sp-0204-03_BNL_CORRIDOR	Corridor/Transition	3,768	0	0	0	0	0	0	0	0	0	0%
sp-0308-MULTIPURPOSE_SPACE	Audience/Seating/Assembly/Forum	3,768	168	0.07	168	0.07	0	0	0	0	0	0.1%
sp-0208-CORE_BNL_CORRIDOR	Corridor/Transition	3,768	0	0	0	0	0	0	0	0	0	0%
sp-0409-CATERINA	Dormitory	3,690	340	0.07	327	0.07	0	0	0	0	0	0.2%
sp-0205-04_BNL_CORRIDOR	Laboratory/Workshop/Assembly/Forum	3,681	167	0.07	167	0.07	0	0	0	0	0	0.1%
sp-0405-04_BNL_CORRIDOR	Corridor/Transition	3,681	0	0	0	0	0	0	0	0	0	0%
sp-0100-CORL_ENTRANCE	Unspecified	2,209	201	0.07	188	0.07	0	0	0	0	0	0.2%
sp-0309-CORRIDOR	Corridor/Transition	2,208	0	0	0	0	0	0	0	0	0	0%
sp-0309-CORRIDOR	Corridor/Transition	2,208	0	0	0	0	0	0	0	0	0	0%
sp-0309-CORRIDOR	Corridor/Transition	2,170	0	0	0	0	0	0	0	0	0	0%
sp-0309-CORRIDOR	Corridor/Transition	2,038	0	0	0	0	0	0	0	0	0	0%
sp-0405-04_BNL_CORRIDOR	Corridor/Transition	2,032	168	0.07	168	0.07	0	0	0	0	0	0.1%
sp-0405-04_BNL_CORRIDOR	Corridor/Transition	2,038	0	0	0	0	0	0	0	0	0	0%
sp-0405-04_BNL_CORRIDOR	Corridor/Transition	1,884	0	0	0	0	0	0	0	0	0	0%
sp-0100-CORL_ENTRANCE	Unspecified	1,884	0	0	0	0	0	0	0	0	0	0%

2011-12-07 10:11 AM

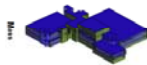
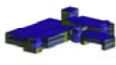
# Scheme Comparisons

Results and Comparisons

Autodesk

**Energy Analysis Compare Report**

Report created at 2011-12-07 10:11 AM

	MiraCosta College1 MiraCosta College1 Analysis (2) Created at: 12/07/11 10:11 AM Version: 2011.2.21 (20110221.2.2.4440)	MiraCosta College2_Jaramillo MiraCosta College2_Jaramillo Analysis (3) Created at: 12/07/11 10:11 AM Version: 2011.2.21 (20110221.2.2.4440)
<b>Building</b>		
<b>Location</b>	User Defined	User Defined
<b>Weather Station</b>	52108	52108
<b>Outdoor Temperature</b>	Max: 82°F Min: -10°F	Max: 82°F Min: -10°F
<b>Zone Area</b>	82,887 sq ft	86,164 sq ft
<b>Exterior Wall Area</b>	38,315 sq ft	32,084 sq ft
<b>Average Lighting Power</b>	1.81 w/sq ft	1.81 w/sq ft
<b>People</b>	270 people	270 people
<b>Exterior Window Ratio</b>	0.40	0.50
<b>Electrical Load</b>	80.13 / 1000	80.13 / 1000
<b>Fuel Cost</b>	\$0.79 / Therms	\$0.79 / Therms
<b>Energy</b>	Electricity EUI: 10.608 / sq ft yr Fuel EUI: 21.486 / sq ft yr Total EUI: 32.094 / sq ft yr	Electricity EUI: 10.608 / sq ft yr Fuel EUI: 21.486 / sq ft yr Total EUI: 32.094 / sq ft yr
<b>Life Cycle</b>	Life Cycle Electricity Use: 28,718,833 kWh	Life Cycle Electricity Use: 28,292,457 kWh

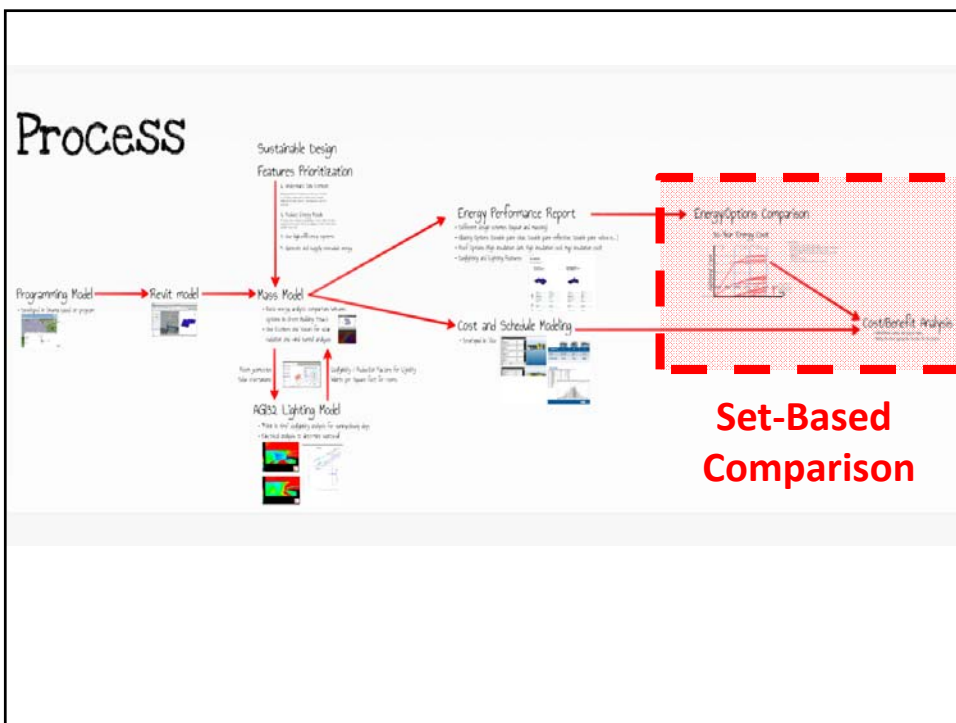
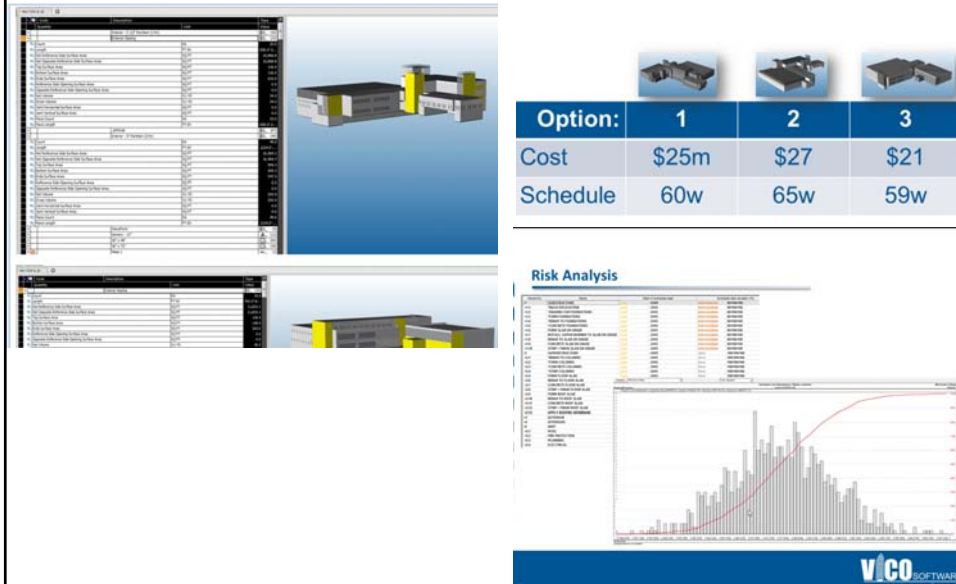
## Set-Based Design

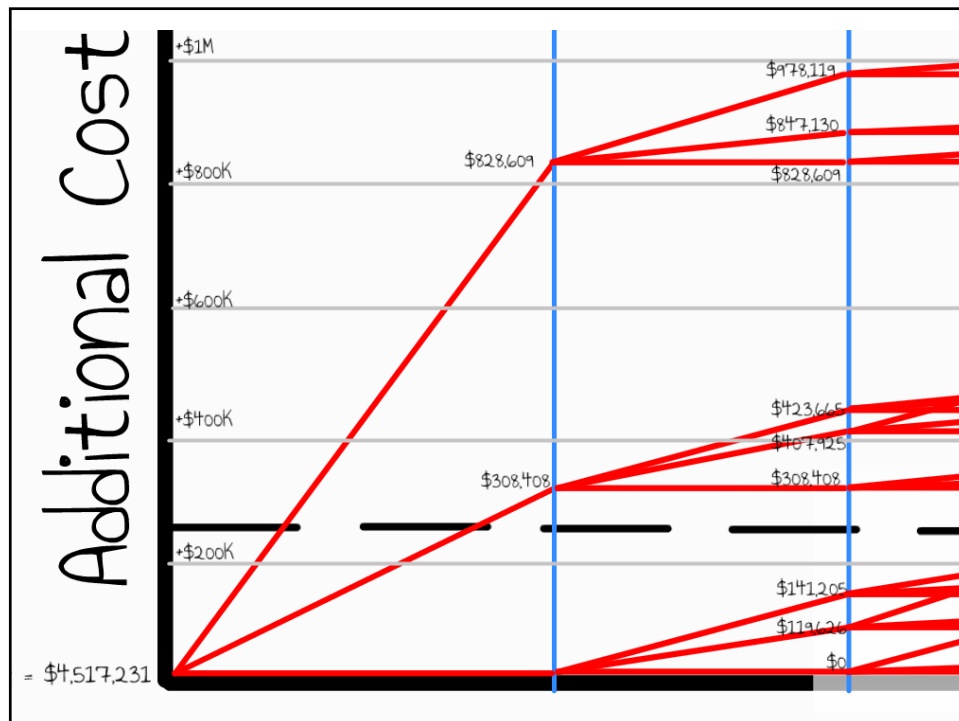
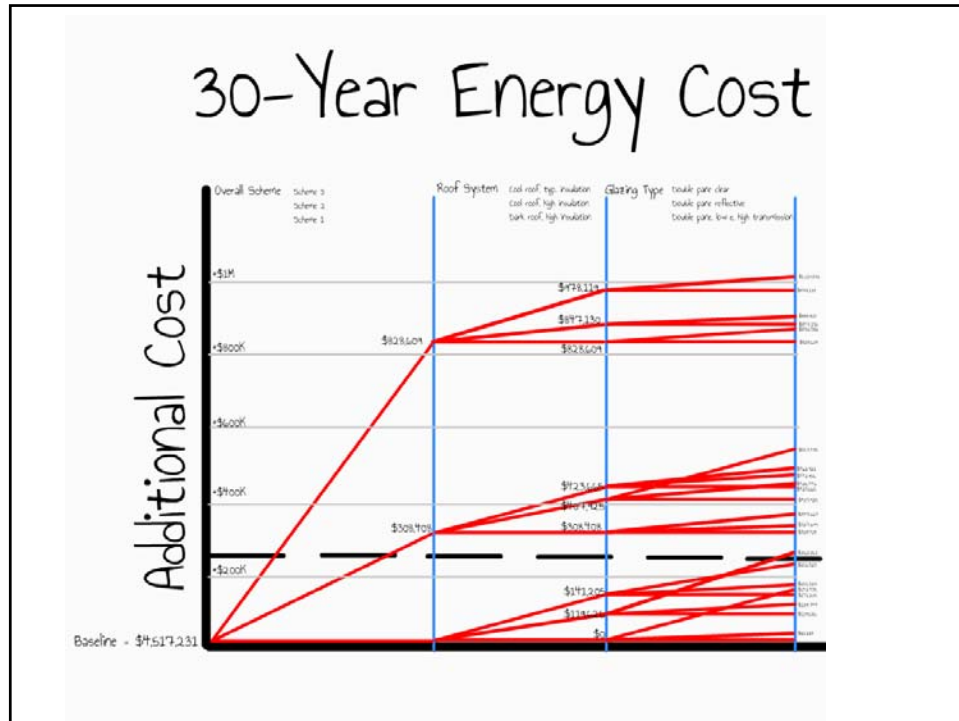
- 3 Schemes
- 3 Roofing Options
  - Standard Roof
  - Cool Roof
  - Green Roof
- 3 Types of Glazing
  - Double paned flat glass
  - Double paned reflective
  - Double paned low-e coating, High Vis Trans

## Set-Based Design

- Mechanical Options – Parsons Brickerhoff
  - Cogen integrated into solar thermal for domestic hot water.
  - DOAS system with as much CO<sub>2</sub>/space condition feedback to ramp down this centralized unit
  - All other sensible loads handled by localized FCU or chilled beam – no re-heat!
  - Localized de-humidification in the high latent load areas (probably liquid dessicant to handle people's sweat)
  - Total energy air heat recovery
  - Heat recovery from showers and sinks through the grey water system
- Daylighting/Lighting Innovation

# VICO Cost Modeling

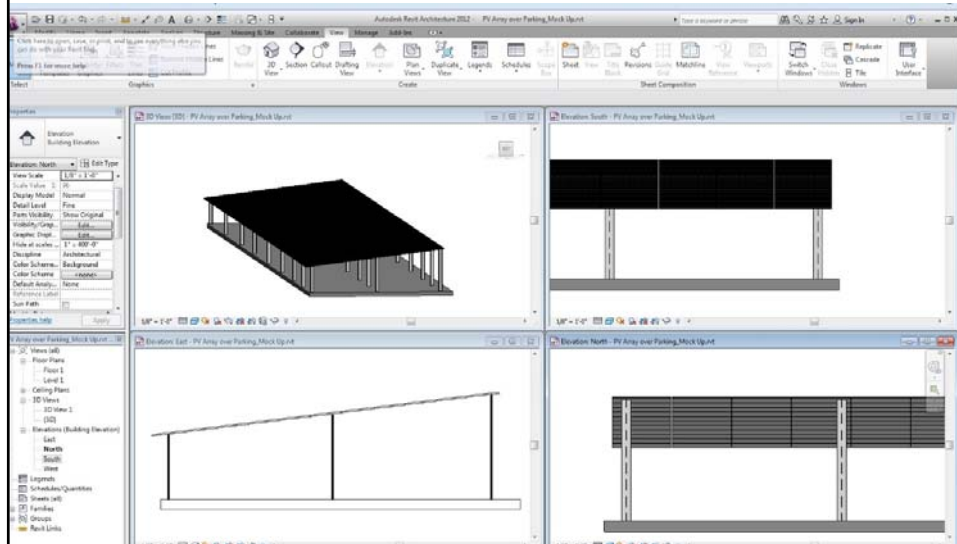




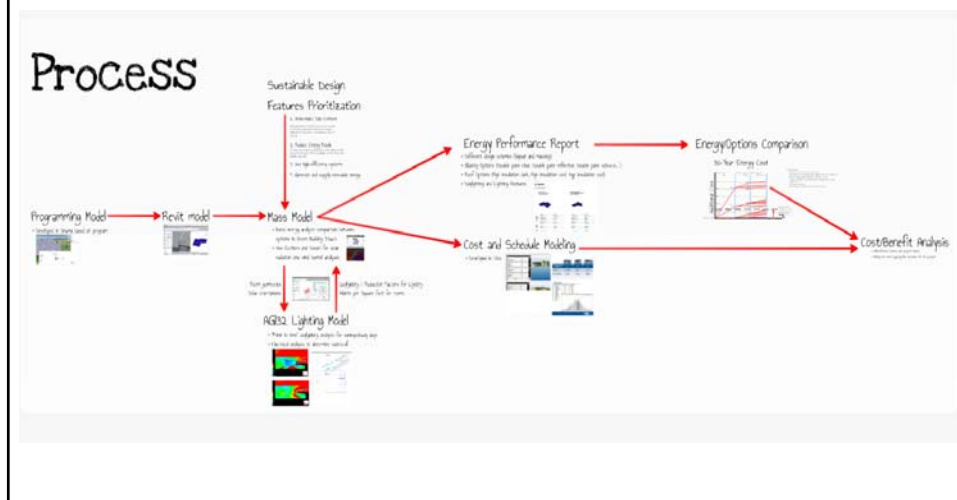


# PV Production – Juba Aluminum

800,000 kWh annually = 600 tons of CO2 offset



## BIM-Enabled Set-Based Design for Net-Zero Energy Buildings



The logo for Balfour Beatty is a blue rectangle with a thin black border. It is divided into three horizontal sections. The top section is dark blue and contains the text "Balfour Beatty" in white. The middle section is a lighter blue gradient and contains the text "Platinum Sponsor of BIMStorm" in dark blue. The bottom section is dark blue and is empty.

# **Balfour Beatty**

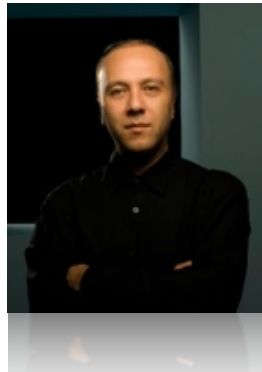
Platinum Sponsor of BIMStorm

# BIG BIM Bang – Enterprise BIM

Owners' BIG BIM for the Lifecycle and Standards



Finith Jernigan, FAIA  
Design Atlantic Ltd

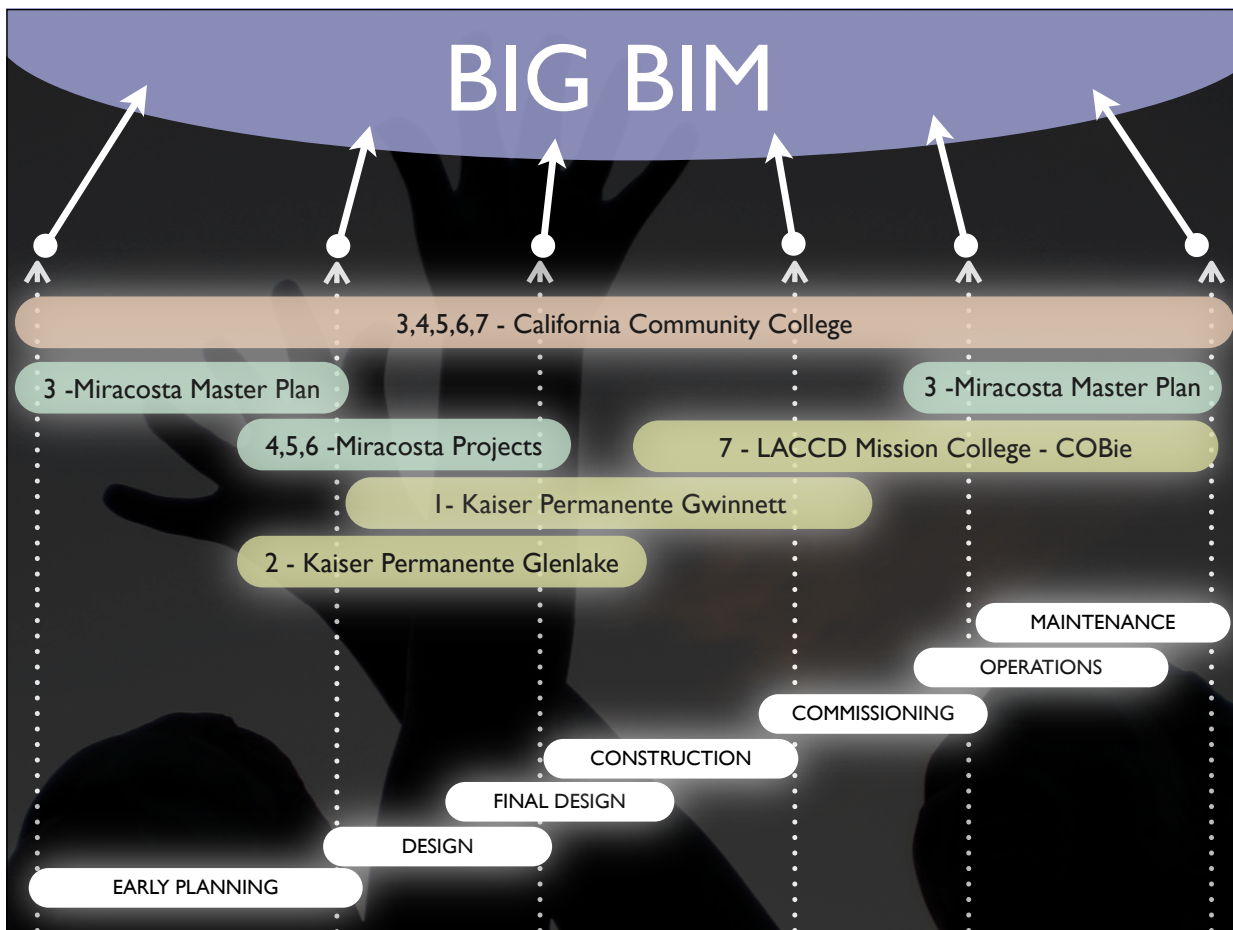


Kimon Onuma, FAIA  
Onuma Inc



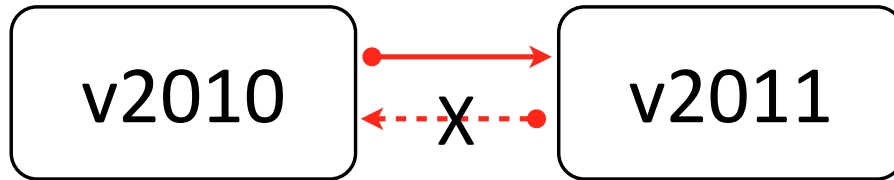
John Roach  
Foundation for California  
Community Colleges

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## BIG BIM Bang – Enterprise BIM

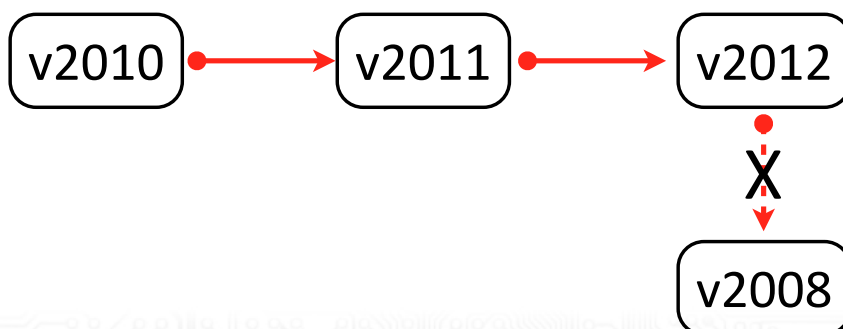
Interoperability between the same software



Challenge to go  
backward even in  
same software

## BIG BIM Bang – Enterprise BIM

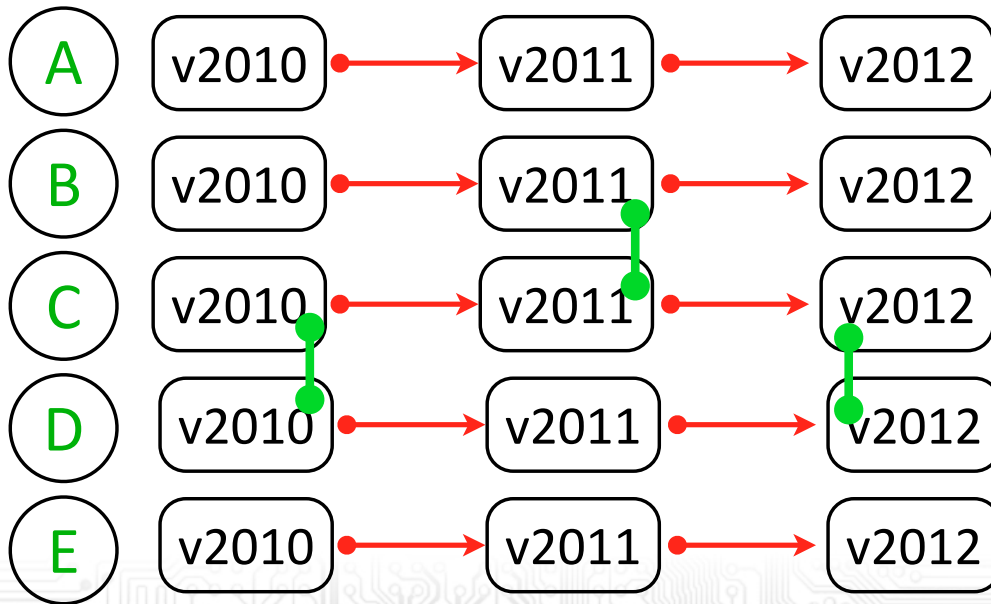
Interoperability between the same software





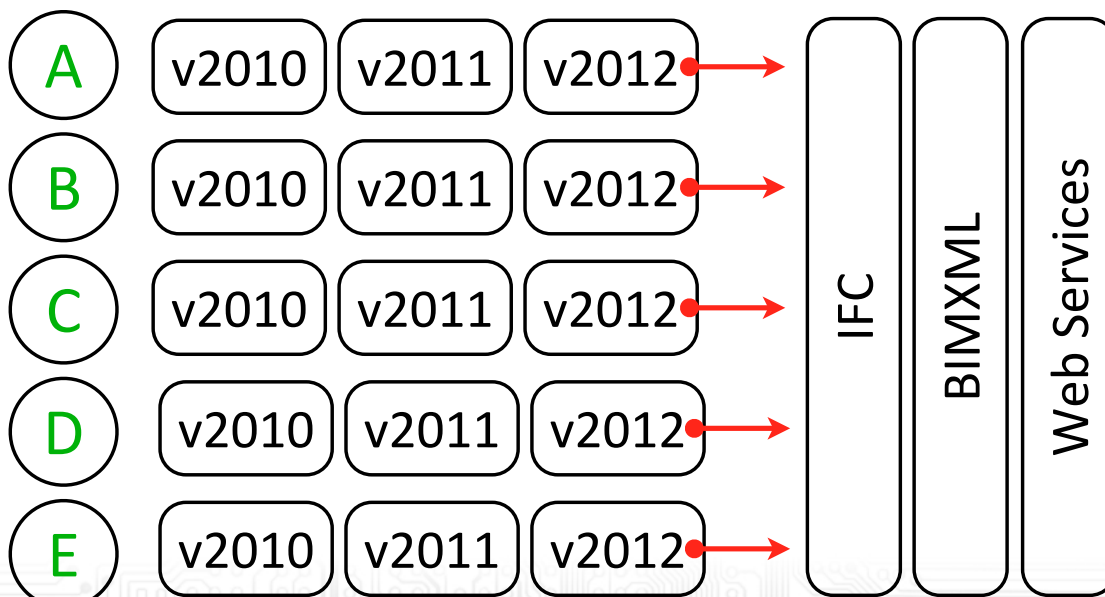
## BIG BIM Bang – Enterprise BIM

Interoperability across multiple applications



## BIG BIM Bang – Enterprise BIM

Interoperability across multiple applications



building**SMART**alliance™

<http://BuildingSmartAlliance.org>

**IFC  
COBIE  
XML**

• **AIA** Technology in Architectural Practice

**AIA** Technology in Architectural Practice  
[AIA.org/TAP](http://AIA.org/TAP)

## BIG BIM Bang – Enterprise BIM

**Q & A** Please use the Chat box in the GoToWebinar app pane to submit a question.



Timothy Blatner, AIA  
FitzGerald  
Associates Architects



Finith Jernigan, FAIA  
Design Atlantic Ltd



Kimon Onuma, FAIA  
Onuma Inc



John Roach  
Foundation for California  
Community Colleges



Kurt Maldovan  
Balfour Beatty



Andreas Phelps  
Balfour Beatty



Jesse Whalen  
Balfour Beatty

Questions will be answered at the end of the webinar as time allows. When able, all questions will be sent to the speakers for written response and published on the TAP website.

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## BIG BIM Bang – Enterprise BIM

This concludes the AIA/CES Course #T12004.

The **webinar survey/report form URL is listed in the chat box** and will be included in the follow-up email sent to you in the next few hours.

Report credit for all attendees at your site by completing the webinar survey/report form **within the next 24 hours**. You will be prompted to download a certificate of completion at the end of the survey.

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• AIA Technology in Architectural Practice

# BIG BIM Bang – Enterprise BIM

## Contact Information

If you have a question about TAP programming, please feel free to contact us at: [tap@aia.org](mailto:tap@aia.org)

Contact with the 10,000+ members of TAP on the AIA KnowledgeNet [TAP Discussion Forum](#).

Did you know anyone can join AIA TAP Knowledge Community for free? [Create an AIA.org account](#) and add TAP under “My Knowledge Communities.”