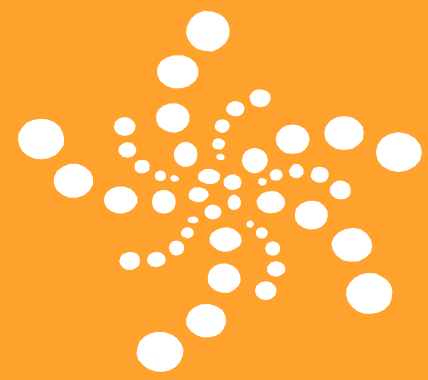


ACEC CAD AND BIM FOR SENIOR FIRM LEADERS



Michael DeLacey
President
Microdesk, Inc.
mdelacey@Microdesk.com

Steve Zocco
Business Development
Microdesk, Inc.
Szocco@Microdesk.com

Agenda



- Changing Expectations
- CAD and the BIM Process
- The Business of BIM
- Why Now?
 - Technology and People
- Industry Trends
 - Relevant Examples
- Resources
- Discussion



About Microdesk



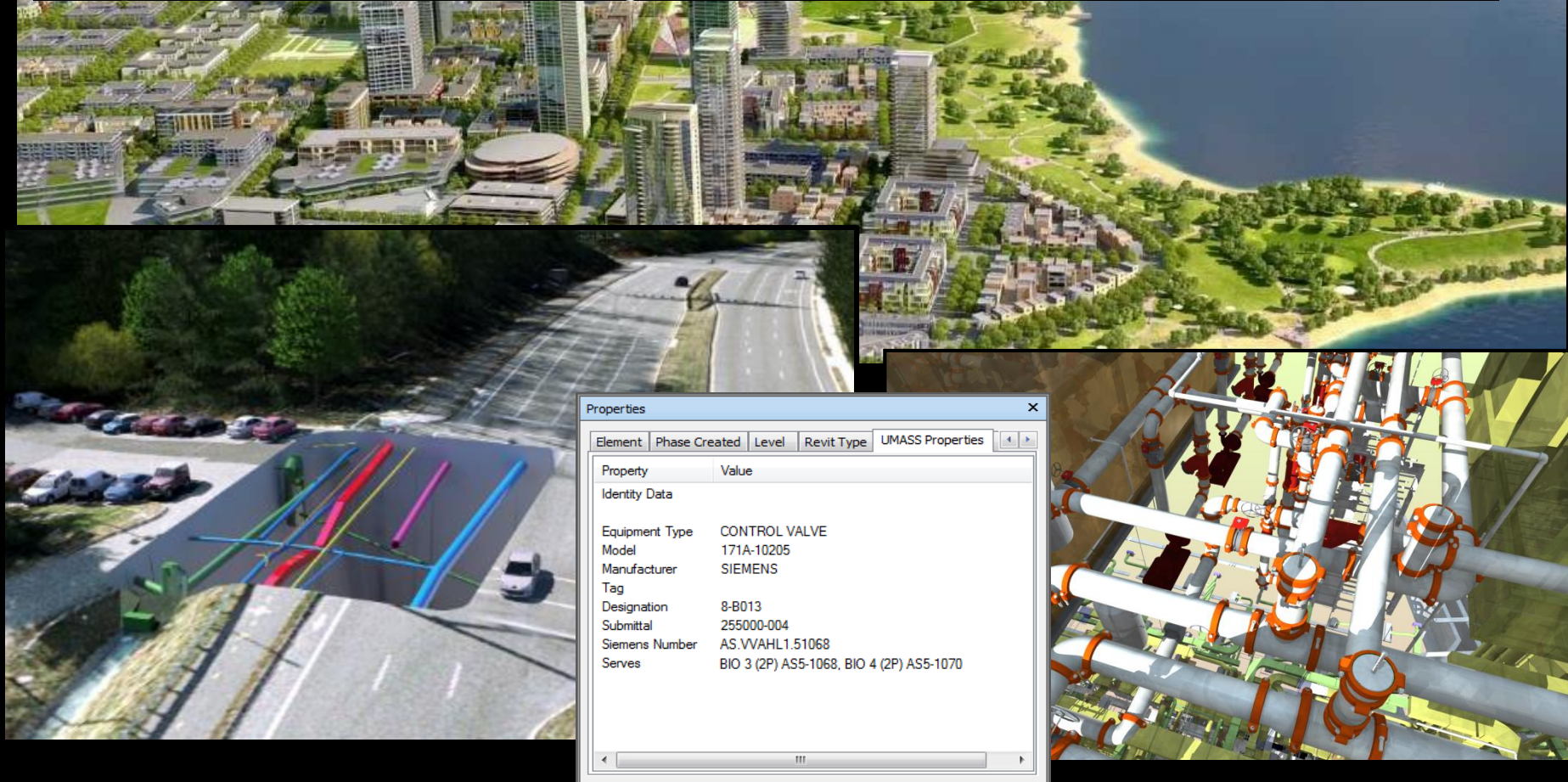
- AECO Industry Consulting Firm
- Founded in 1994
- 11 U.S. locations
- 1 London location
- Largest team of AECO Consulting Specialists and Software Developers



In a Nutshell



An organized and accurate digital asset that represents the physical asset



Changing Expectations



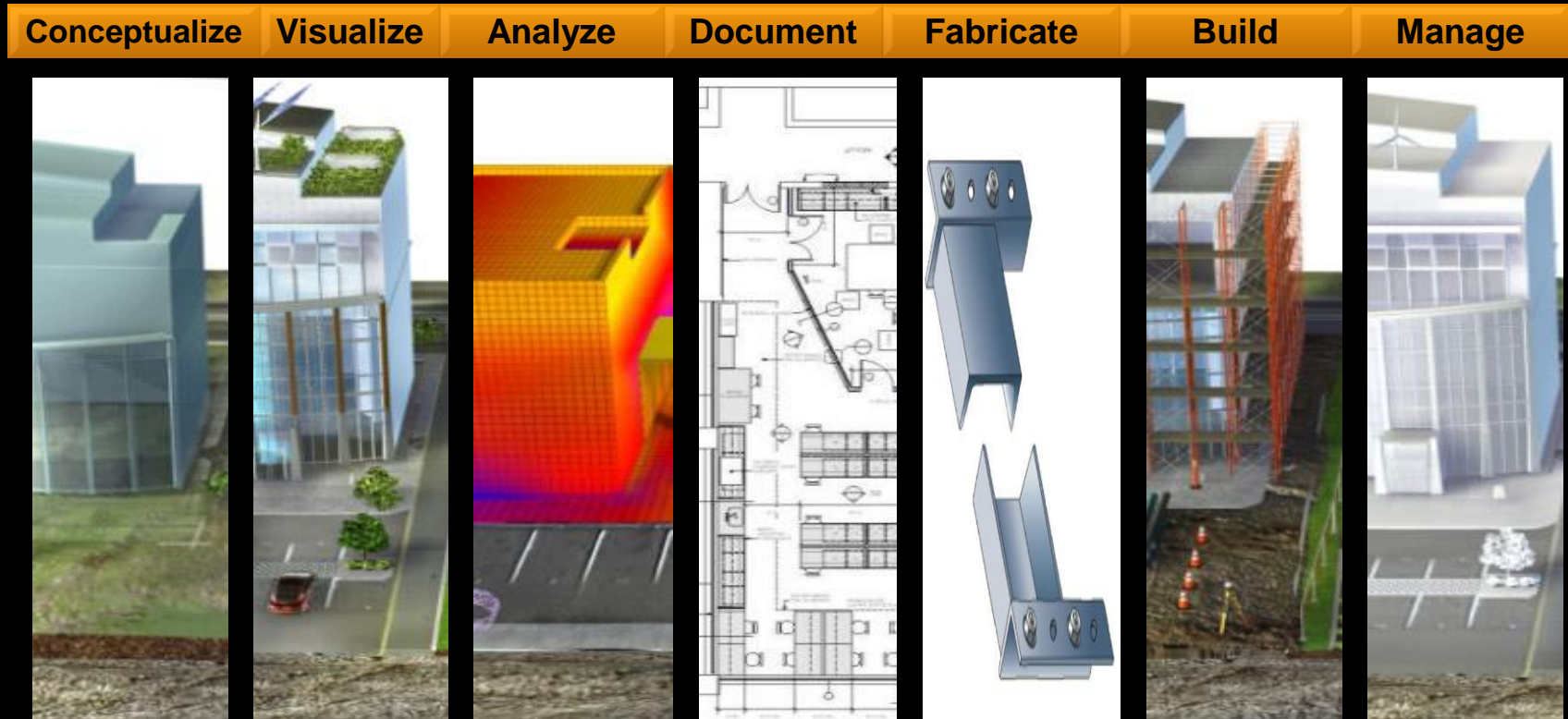
...shall use Autodesk's AutoCAD Civil3D 2015, Revit 2015, Navisworks Manage 2015 and BIM 360 Glue, unless approved otherwise by the Construction Manager, as follows:

- a. Revit Architecture to develop and update Master Discipline Models and As-Built Models for Architectural discipline
- b. Revit Structure to develop and update Master Discipline Models and As-Built Models for Structural discipline
- c. Revit MEP to develop and update Master Discipline Models and As-Built Models for Mechanical, Electrical, Plumbing, IT/COMM, and Fire Protection disciplines
- d. Civil3D to develop and update Master Discipline Models and As-Built Models for Civil discipline
- e. Navisworks Manage or BIM 360 Glue to develop and update federated Master Model and perform 3D Coordination/Clash Detection

CAD and BIM



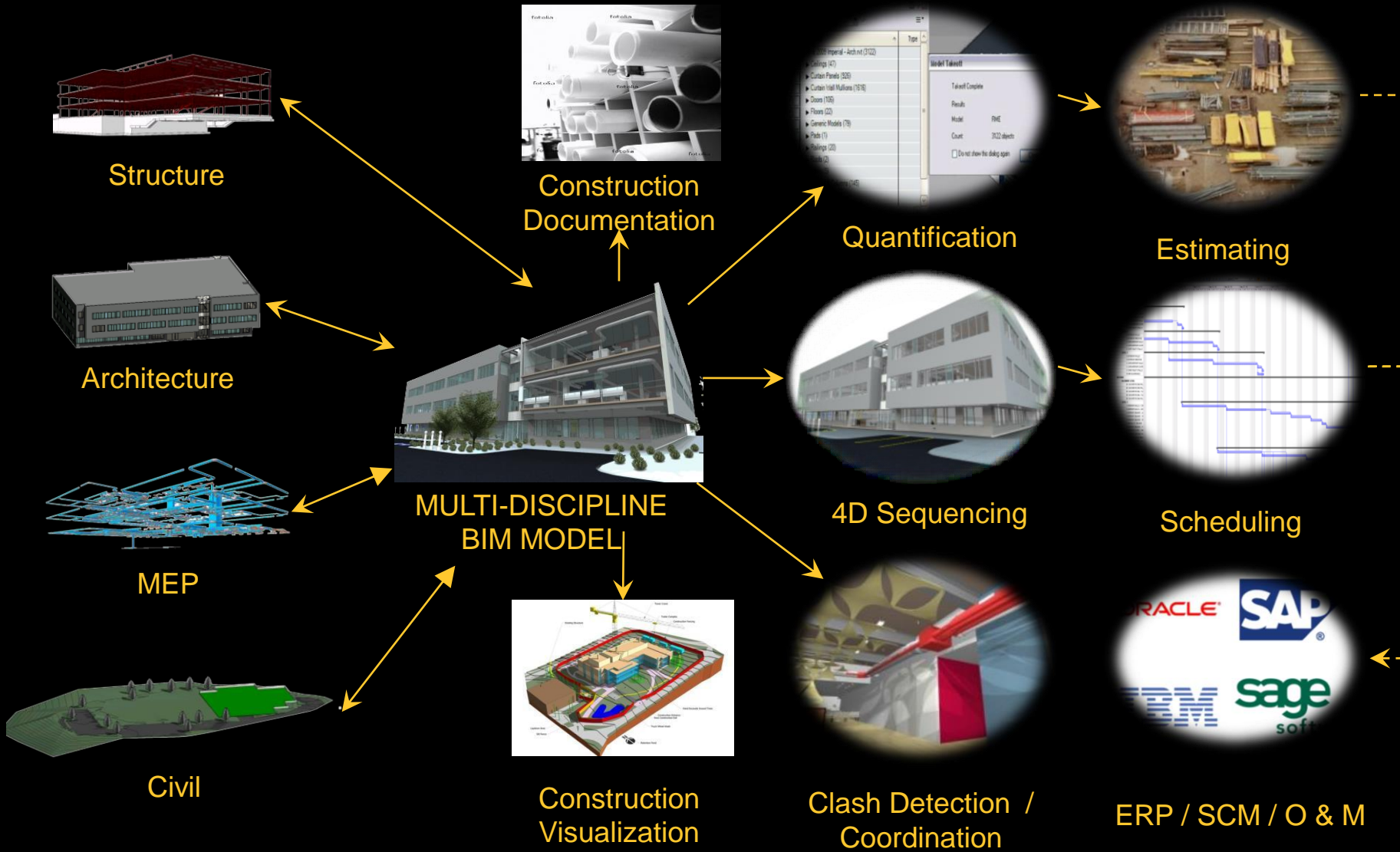
- CAD commonly refers to a Software Product (AutoCAD)
- BIM is a Process





- BIM Authoring Tools
 - AutoCAD, AutoCAD Architecture, MEP, Advance Steel
 - Civil 3D
 - Revit
- BIM Analysis Tools
 - Navisworks, Robot, Insight 360
- BIM Distribution Tools
 - BIM 360 Team, Doc's, Glue, Field, Layout, Plan
- Visualization
 - Max Design, Unity, Real 3D

BIM Process

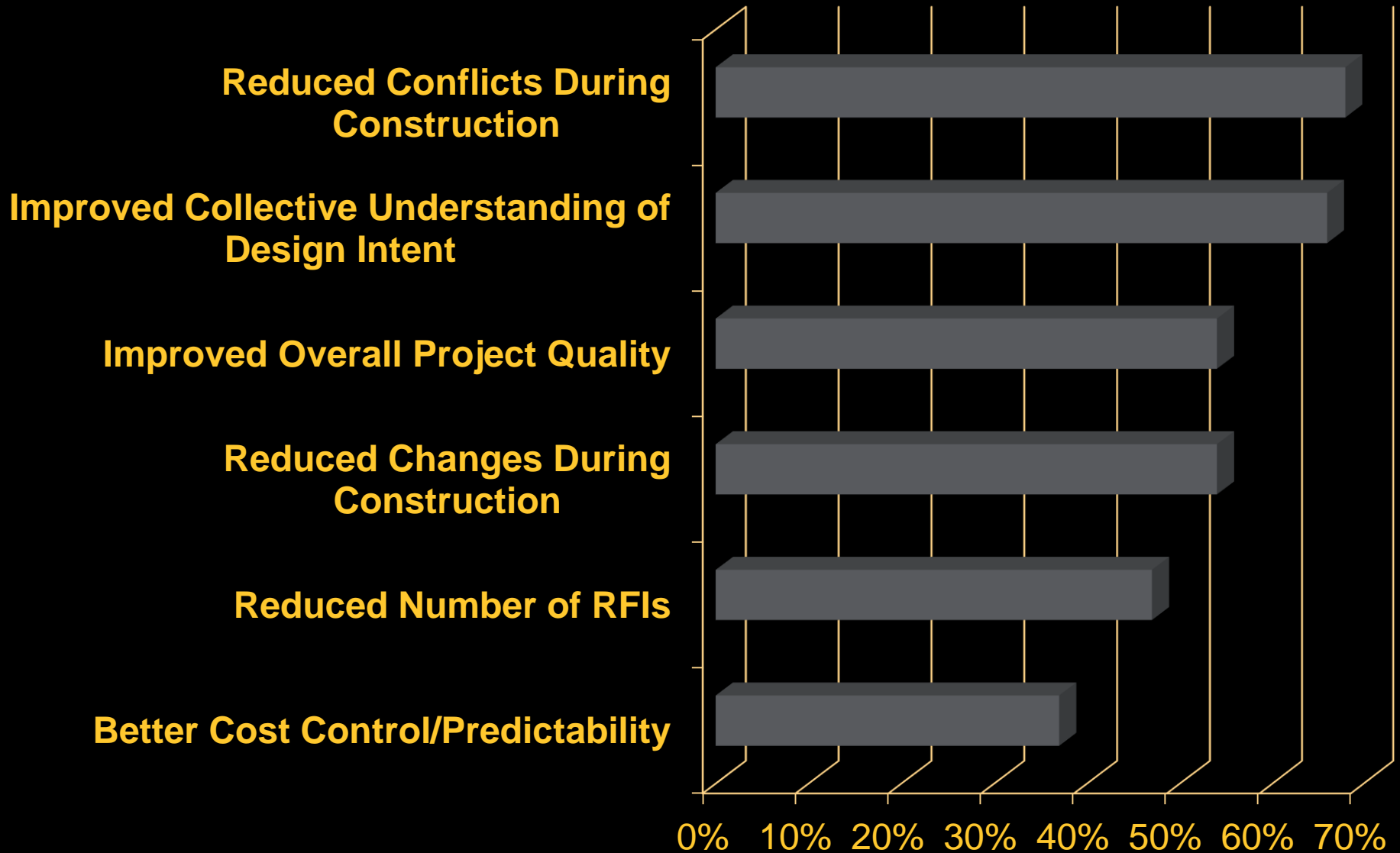




- Up to 40% of unbudgeted change orders eliminated
- Up to 80% reduction in time taken to generate a cost estimates
- Cost estimation accuracy within 3%
- A savings of up to 10% of the contract value through clash detections
- Up to 7% reduction in project time

Stanford University Center for Integrated Facilities Engineering (CIFE)
figures based on 32 major projects using BIM

Building Information Modeling



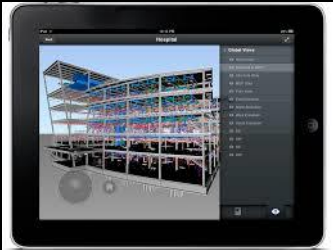


- 10 cents per square foot understanding project closeout packages
U.S. General Services Administration
- 23 cents per square foot wasted annually based on the lack of access to accurate information
Burcu Akinci, Carnegie Mellon University
- 6% reduction in annual O&M costs
Stanford Hospital and Clinics

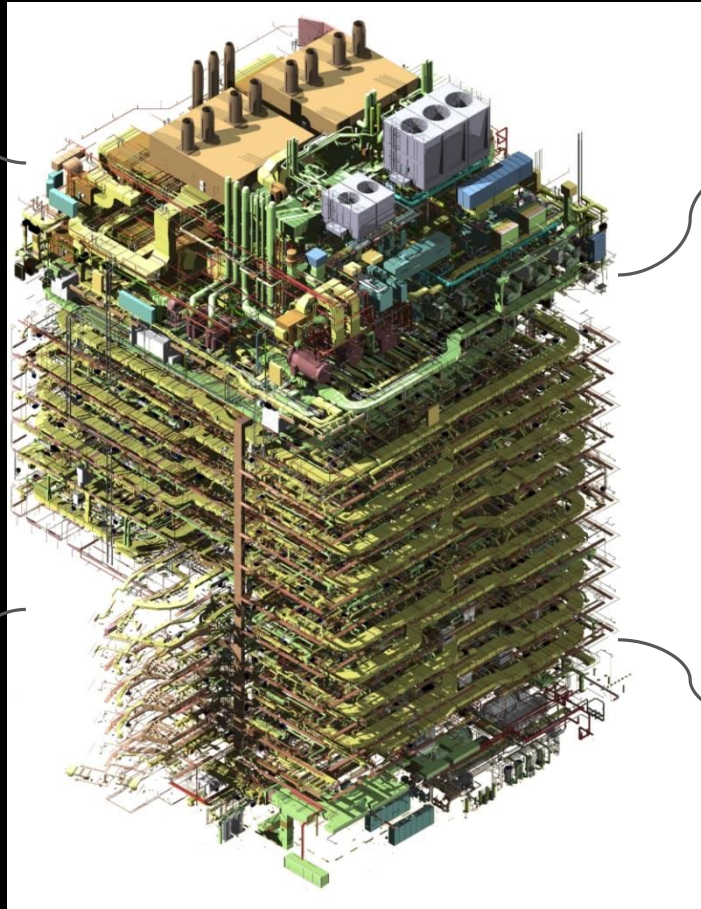
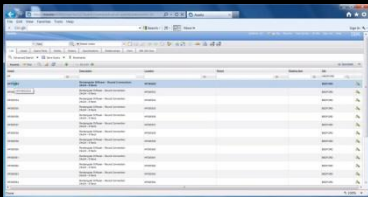
BIM for Owners

Holistic Turnover Package

Lightweight Model for Mobile Devices Cloud Viewing



Asset Management Records Linked



Warranties and Maintenance Manuals Linked



Editable Model for Designing and Plotting



Revit to Maximo Integrator

Map Revit Families to Maximo Classifications

Revit Families

- Fire Alarm Control Panel [Mapped to "FIRE"]
- Fire Booster Power Supply [Mapped to "FIRE"]
- Manual Pull Station
- Smoke Detector
- Speaker Strobe
- Strobe
- Generic Annotations
- Generic Models
- ▾ Lighting Devices
 - Sensors Ceiling Mounted [Mapped to "OCCUPANCYSE"]
 - Switches Wall Non Hosted
- ▾ Lighting Fixtures
 - LightFixture-A,A1,A2 [Mapped to "LIGHTFIXTURE"]
 - LightFixture-B,B1,B2 [Mapped to "LIGHTFIXTURE"]
 - LightFixture-C,C1-DIM,C2,C2-DIM_P4D [Mapped to "L"]
 - LightFixture-D,D1_PV45
 - LightFixture-F1,F2
 - LightFixture-F4,F5_SLS
 - LightFixture-G_W4
 - LightFixture-H_WGH84F
 - LightFixture-I_KL4

Map to Maximo Classification

- ▾ Maximo Classifications
 - ▾ Electrical
 - Daylight Sensor
 - Occupancy Sensor (1)
 - Generator (1)
 - Junction Box (1)
 - Light Control
 - Light Fixture (3)
 - Light Relay Panel
 - Electrical Panel (1)
 - Receptacle (1)
 - Switch Gear
 - Switch Board

Add New Delete Rename

Mapped Revit Families

- Lighting Fixtures > LightFixture-A,A1,A2
- Lighting Fixtures > LightFixture-B,B1,B2
- Lighting Fixtures > LightFixture-C,C1-DIM,C2,C2-DIM_P

Unmap

Back Next Save Close

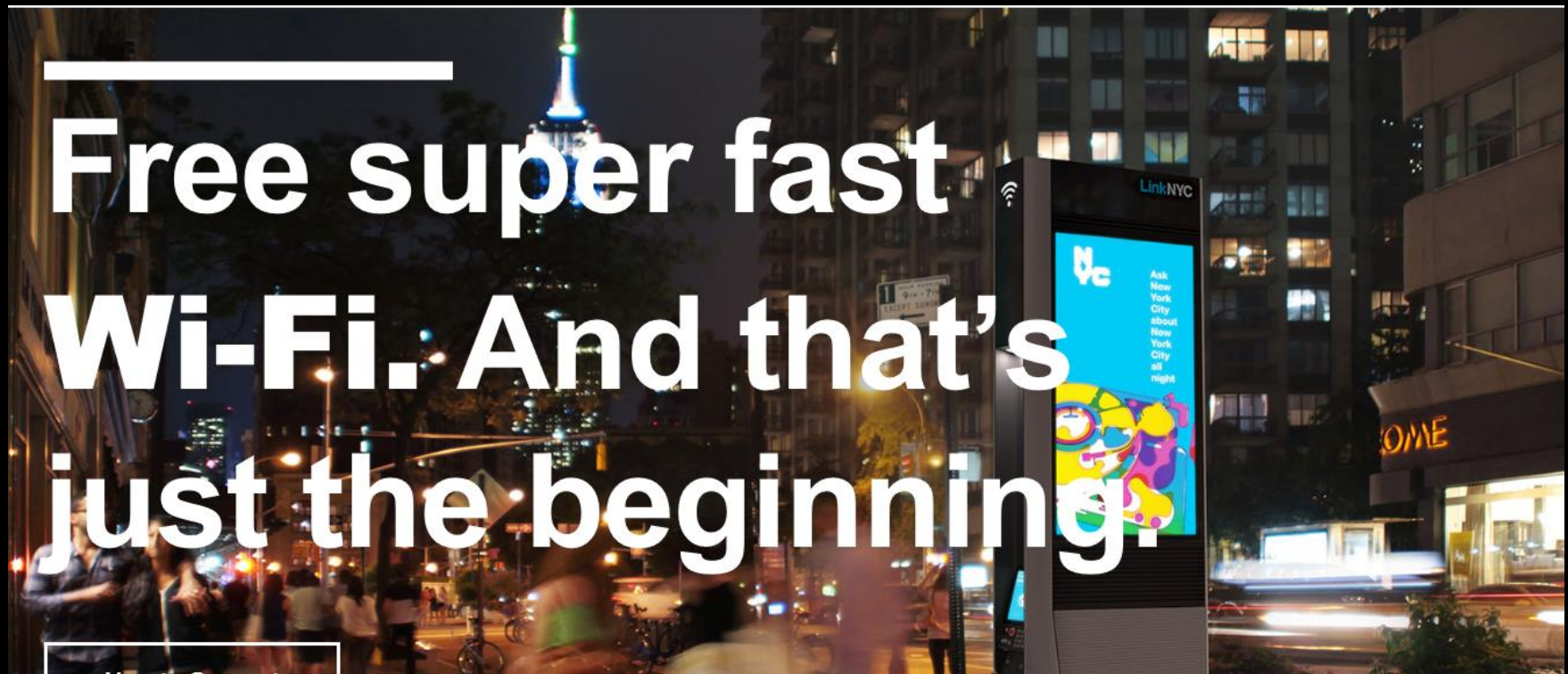


Why Now?

Why Now?



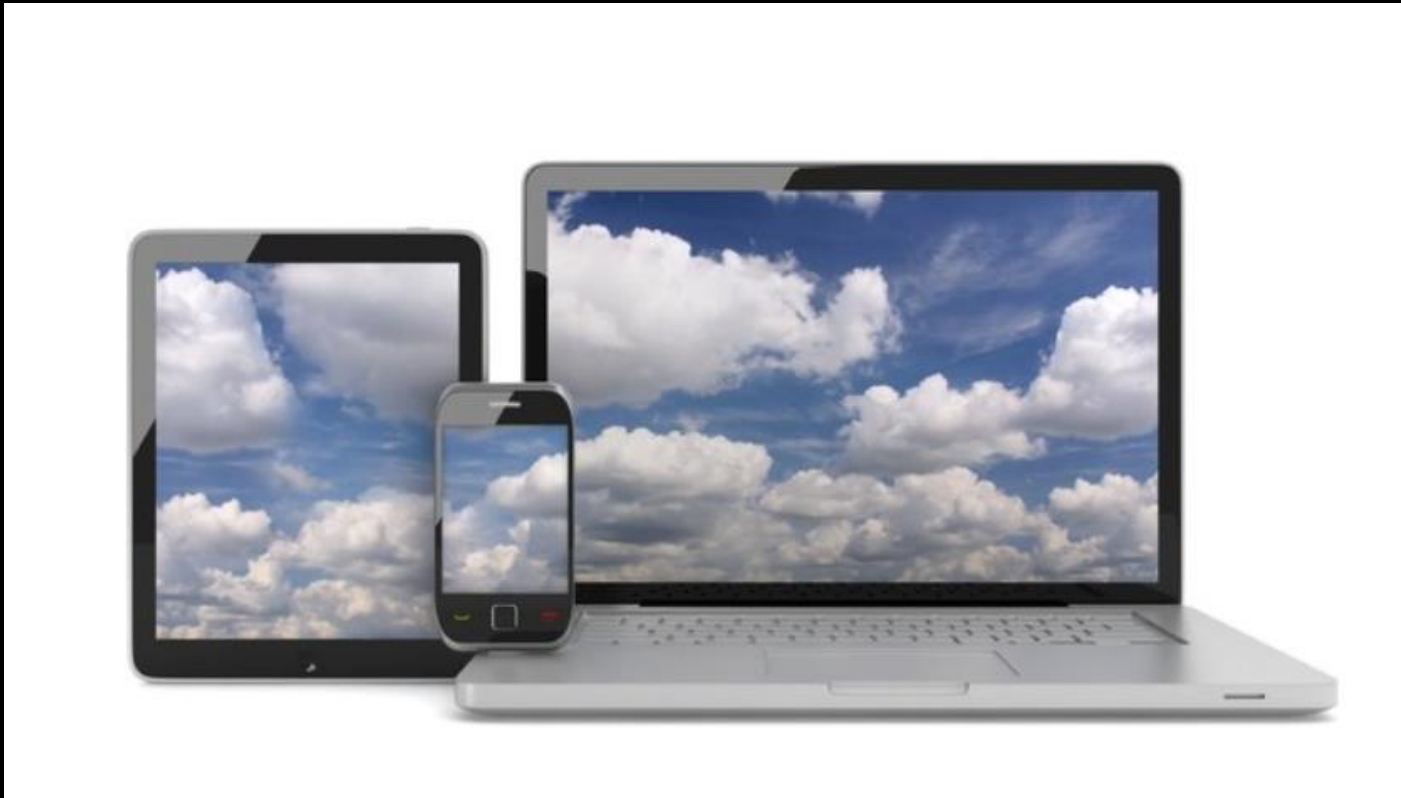
- We have the connectivity
 - WiFi is becoming ubiquitous



Why Now?



- We have the Devices
- On average, children get smart phones at 10!



Why Now?



- **We have the Cloud**
 - All of your data, anywhere, all the time!



Why Now?



- The Workforce is Changing

MILLENNIALS

COMING OF AGE

One of the largest generations in history is about to move into its prime spending years. Millennials are poised to reshape the economy; their unique experiences will change the ways we buy and sell, forcing companies to examine how they do business for decades to come.

Why Now?



- The People
- Larger Generation than the Baby Boomers

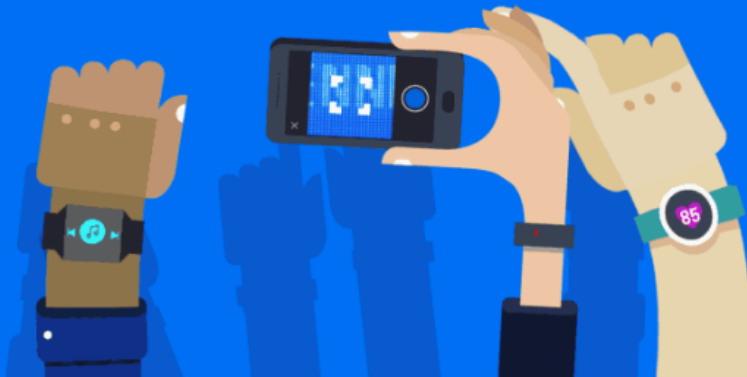
Who are they?

A different world, a different worldview. Millennials have grown up in a time of rapid change, giving them a set of priorities and expectations sharply different from previous generations.

BORN BETWEEN

1980 → 2000

Source: Goldman Sachs Global Investment Research



Millennials



- They Are Motivated by Meaning
 - They Are Worried About Safety
 - They Want to Be Seen as Equals
 - They Are Lost Without Technology
 - They Need to Keep Learning
-
- 56% of Millennials wouldn't accept a job from a company that bans social media

iSqFt a Constructconnect company

Why Now?



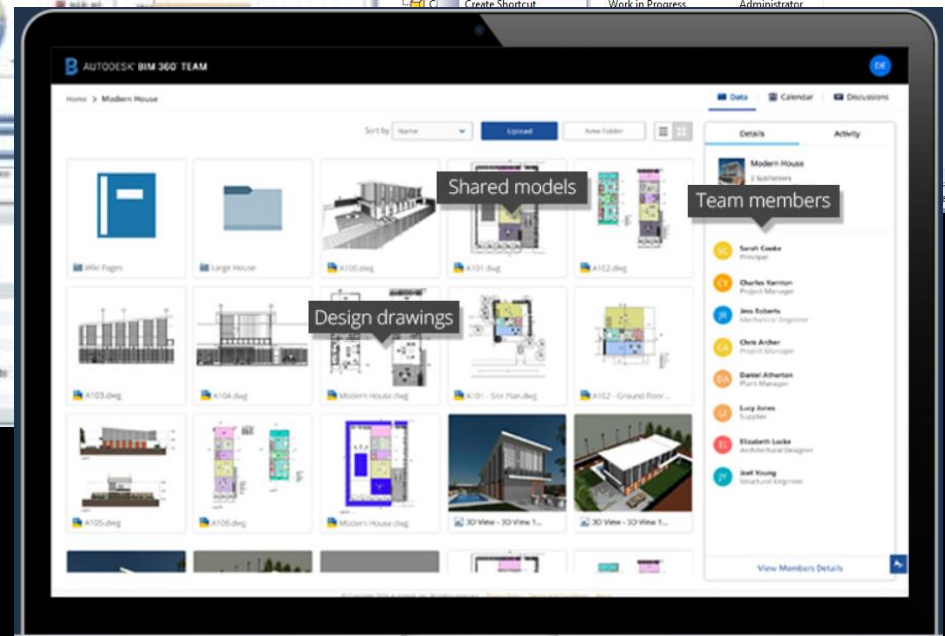
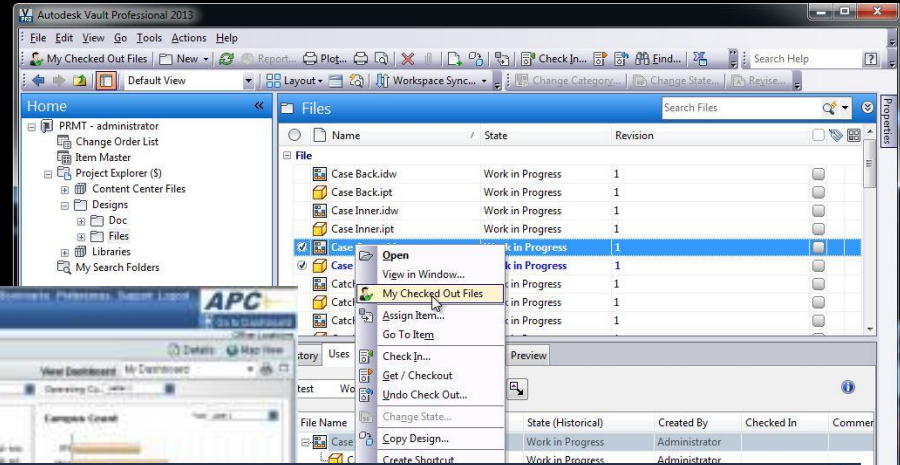
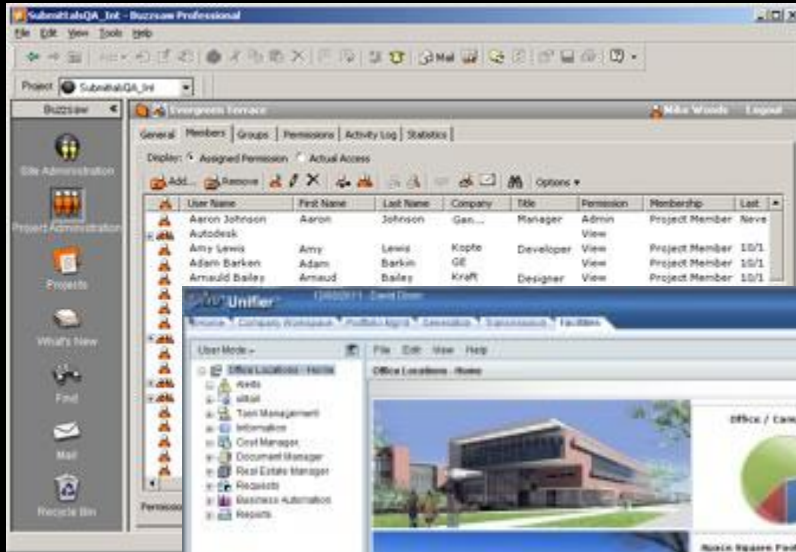
- We have the Market Economics
 - Urbanization
 - Climate Change
 - Failing Infrastructure
 - Global Economy
 - Costly to build and maintain
 - Conventional methods are inadequate





- Existing Condition Data Capture and Modeling
- Design
- Construction
- Commissioning
- Operations and Maintenance Models
- CMMS and O&M Systems Integration

Data Management



Laser Scanning



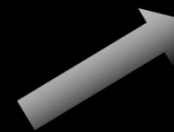
Benefits

- Value
- Accuracy
- Efficiency
- Non-Invasiveness
- Flexibility

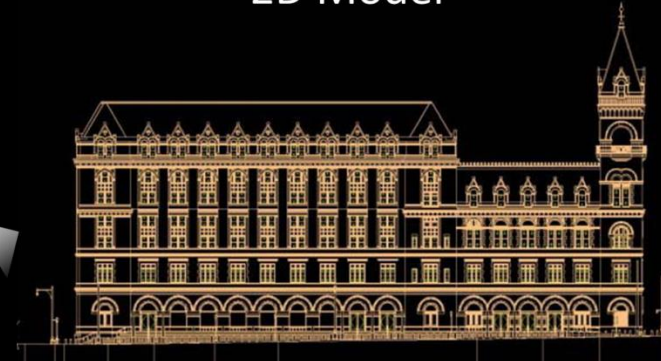
Building Features



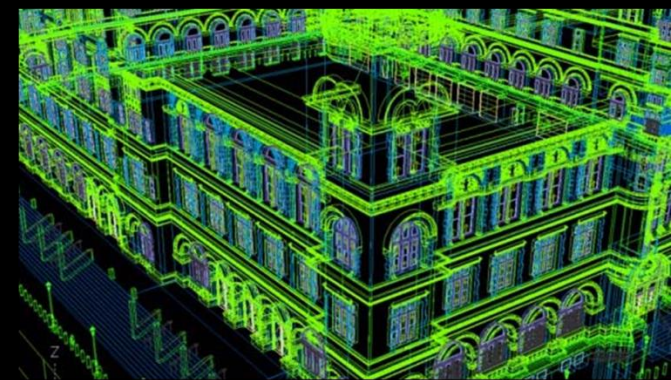
Point Cloud



2D Model



3D Model



Reality Capture



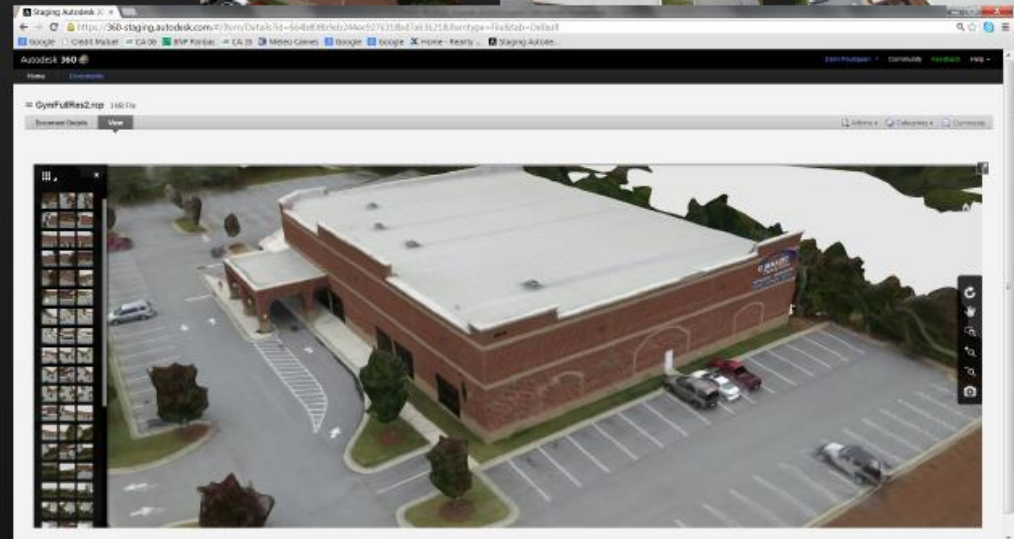
Aerial shooting of a building



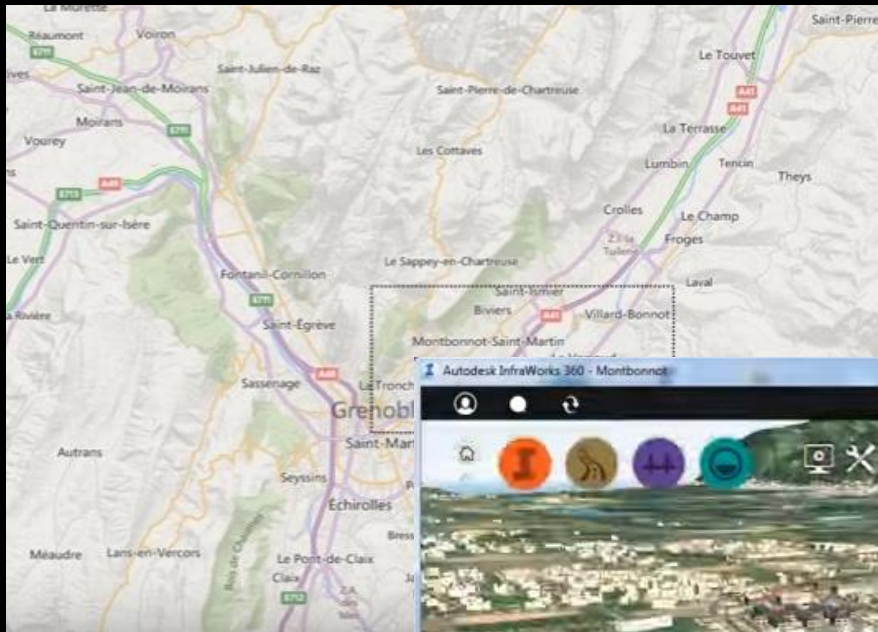
Hexacopter



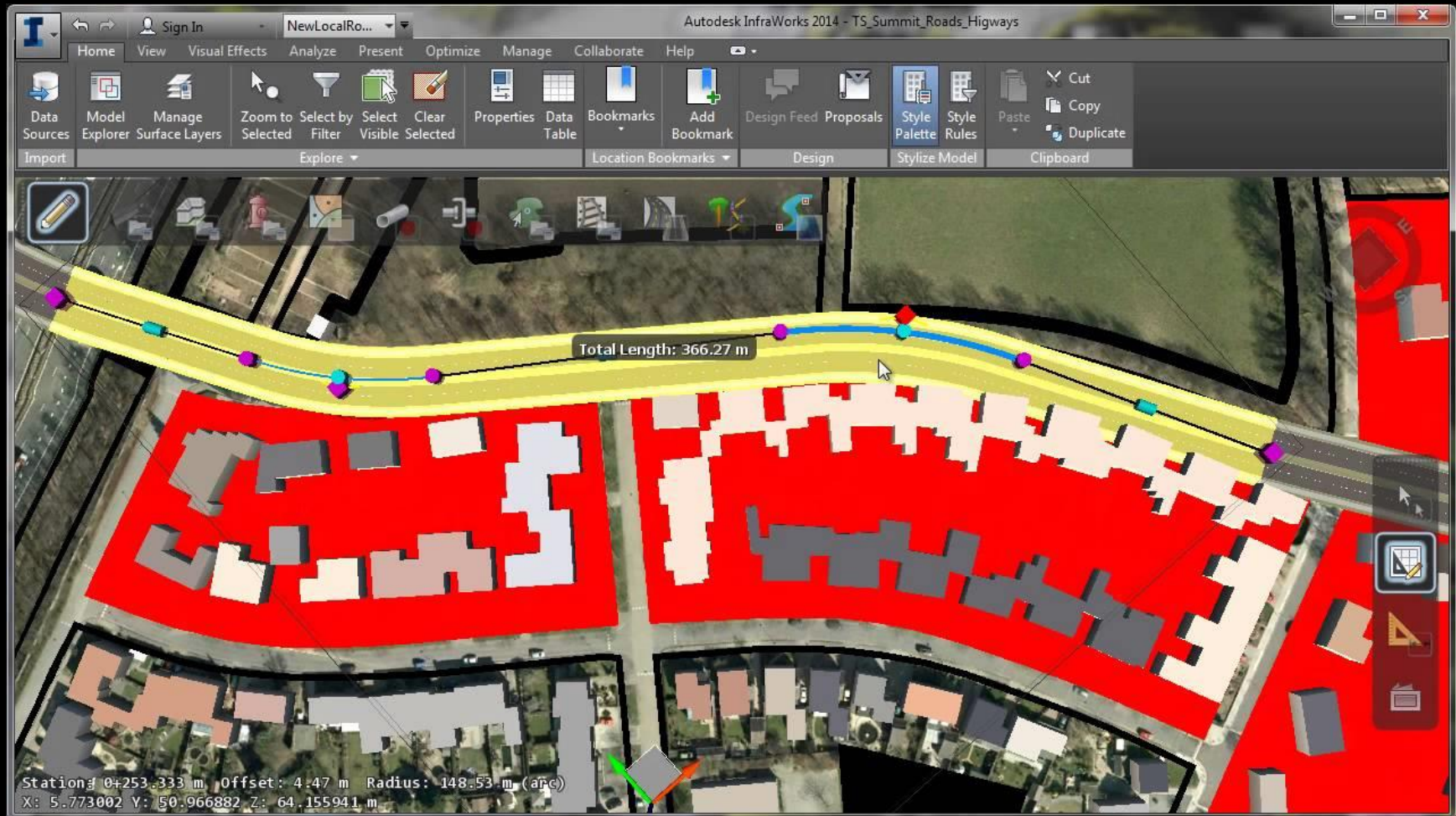
Canon
Powershot S100



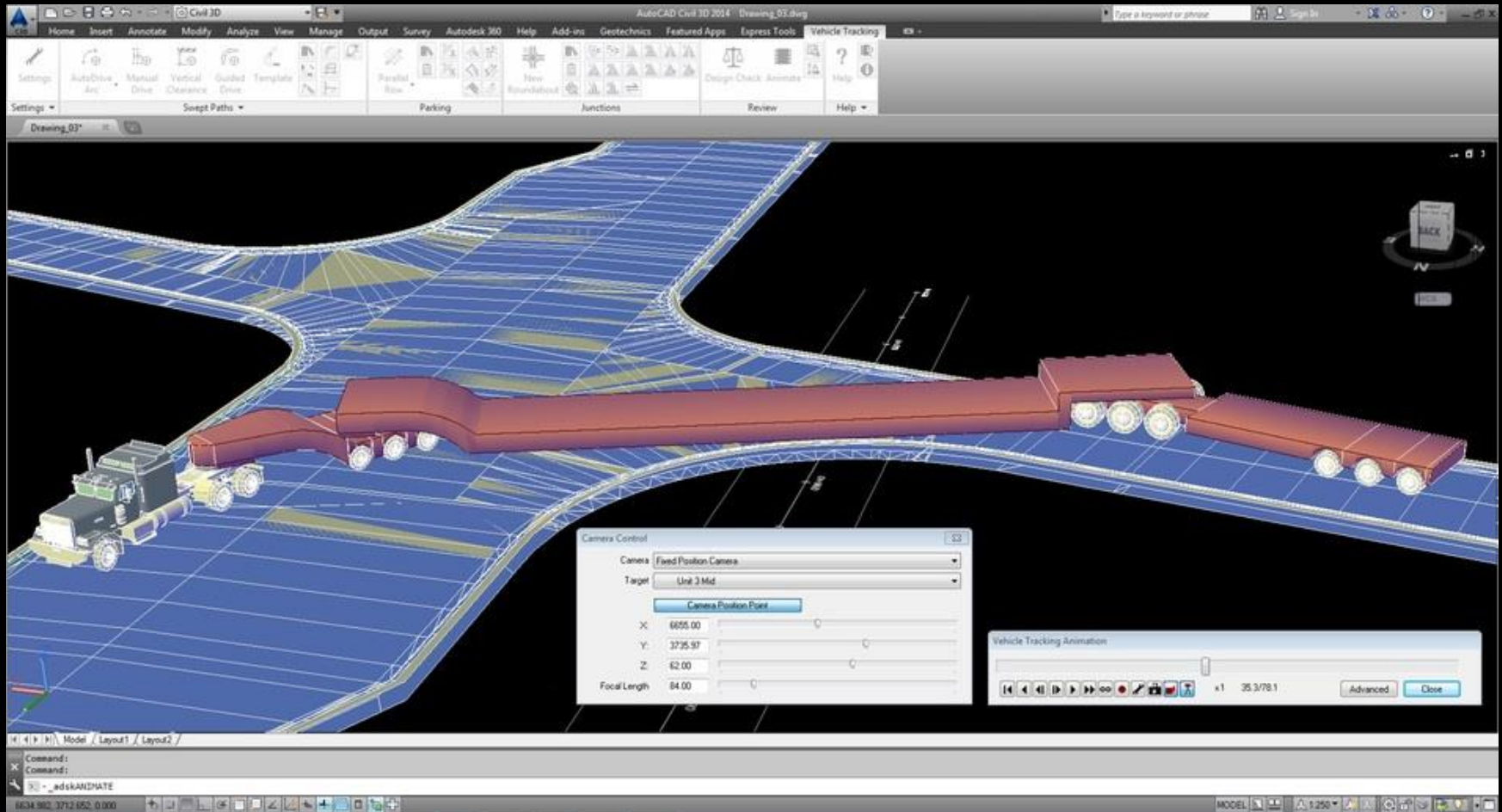
Preliminary Design and Design



Preliminary Design and Design



Design Analysis



Analysis



Estimated Energy & Cost Summary

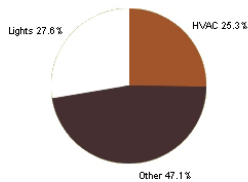
Annual Energy Cost	\$16,612
Lifecycle* Cost	\$226,257
Annual CO ₂ Emissions	
	Electric† 125.5 tons
	Onsite Fuel 19.4 tons
	Large SUV Equivalent 13.2 Large SUV's
Annual Energy	
	Electric 158,535 kWh
	Fuel 3,351 Therms
Annual Peak Electric Demand	54.8 kW
Lifecycle* Energy	
	Electric 4,756,056 kWh
	Fuel 100,525 Therms

* 30-year life and 6.1% discount rate for costs. † Does not include electric transmission losses.

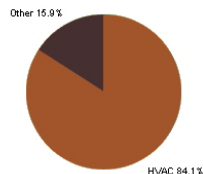
Energy End-Use Charts

Click on chart for more or less detail.

Annual Electric End Use



Annual Fuel End Use



Carbon Neutral Potential¹ (CO₂ Emissions)

Base Run:	264.3 tons
This Run:	216.7 tons
Onsite Renewable Potential:	-6.3 tons
Natural Ventilation Potential:	-19.8 tons
Onsite Fuel Offset/Biofuel Use:	-30.9 tons

Net CO₂ Emissions: 159.7 tons

Large SUV Equivalent: 14.5 Large SUV's

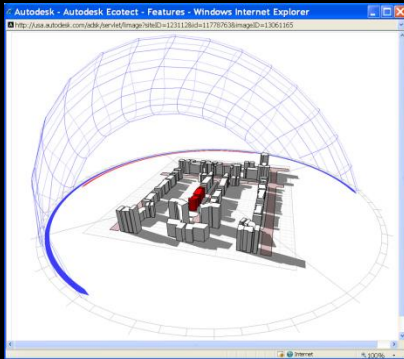
1. Carbon neutrality is defined here as eliminating or offsetting fossil based electricity and fuel use. For example, if the electricity grid is 60% fossil fuel and 40% hydroelectric, reducing grid electricity use by 60% from the base run and eliminating/offsetting on-site fuel use make the project carbon neutral. Use any combination of efficiency, natural ventilation, renewable energy, carbon credits and biofuels to reach this goal. Renewable potential is the sum of photovoltaic and wind potential shown below.

Electric Power Plant Sources²

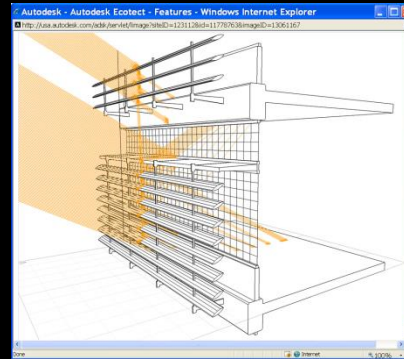
Fossil:	55%
Nuclear:	42%
Hydroelectric:	1%
Renewable:	2%
Other:	0%

2. Based on US EPA EGRID 2006 Data (2004 Plant Level Data).

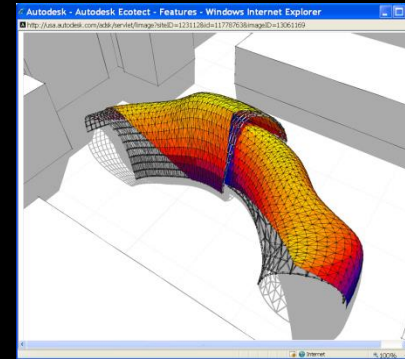
Analysis



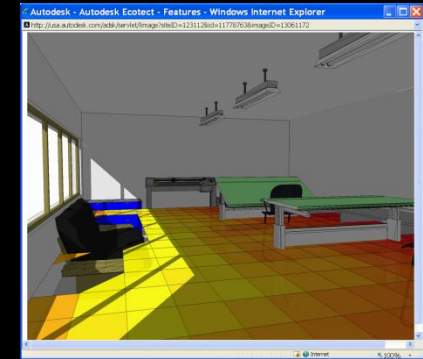
Shadows & Reflections



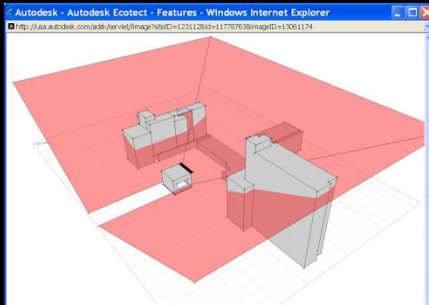
Shading Design



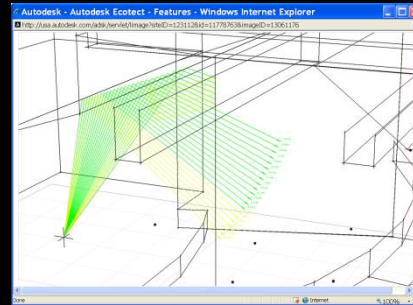
Solar Analysis



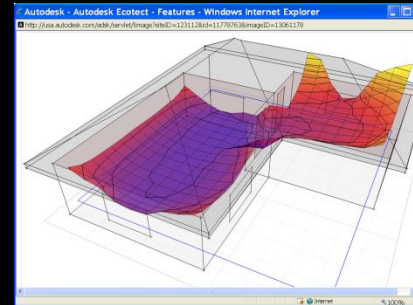
Lighting Design



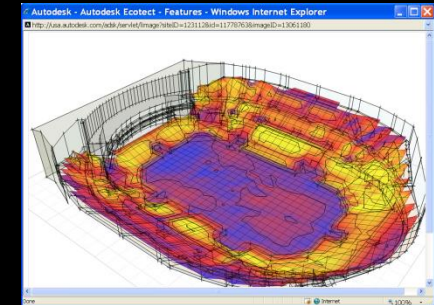
Right to Light



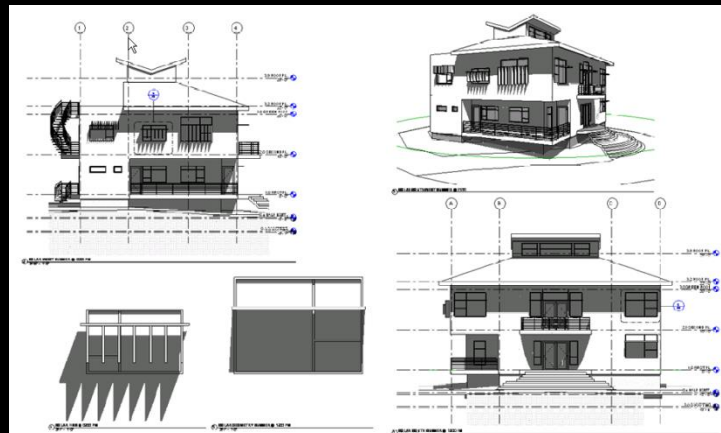
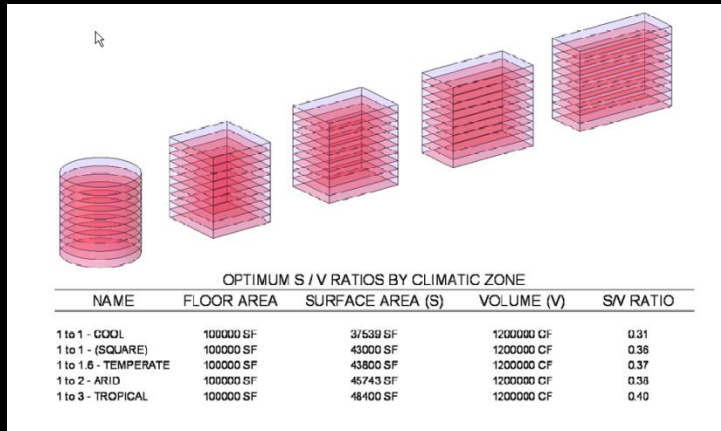
Acoustic Analysis



Thermal Analysis

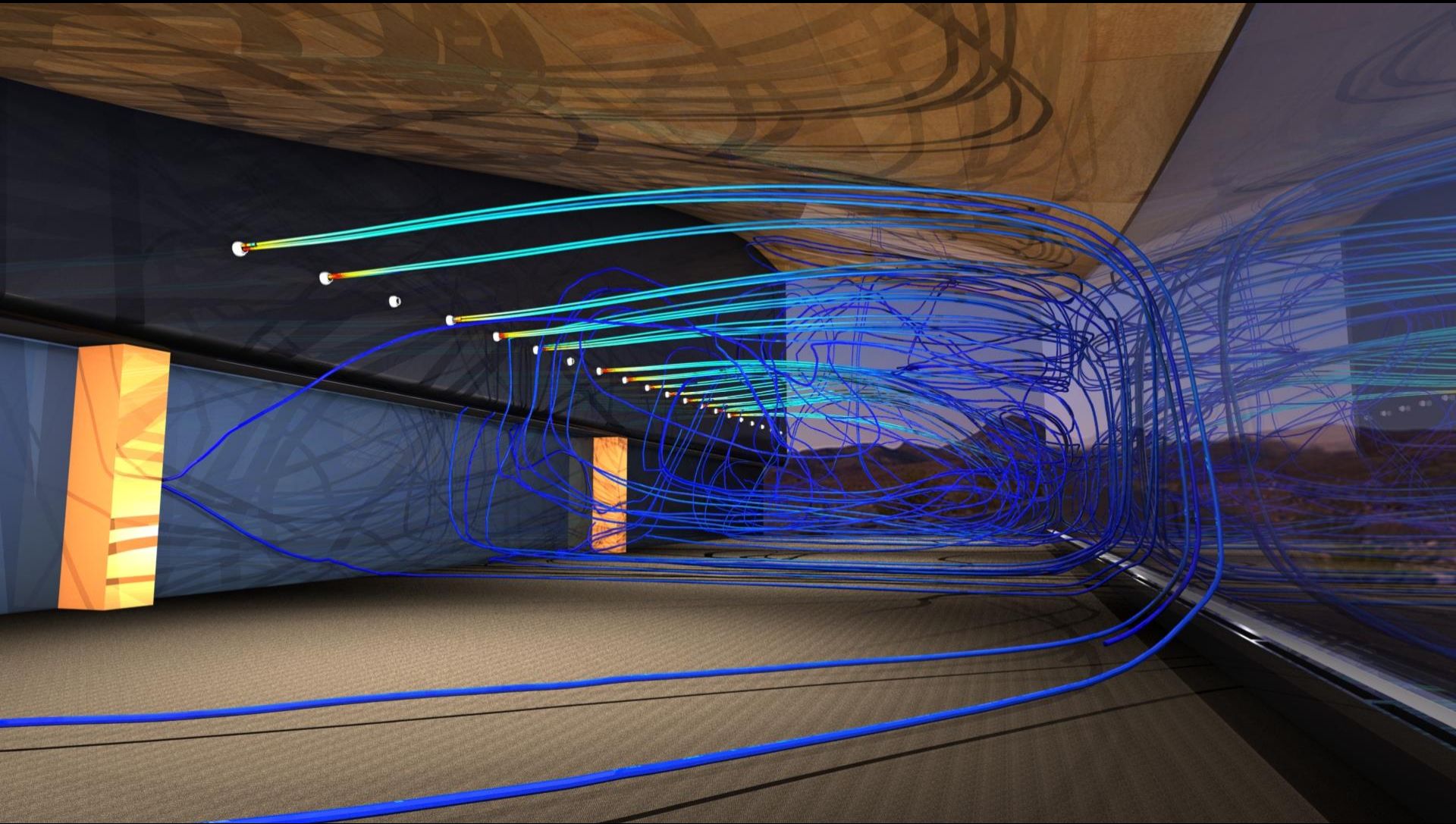


Ventilation & Airflow

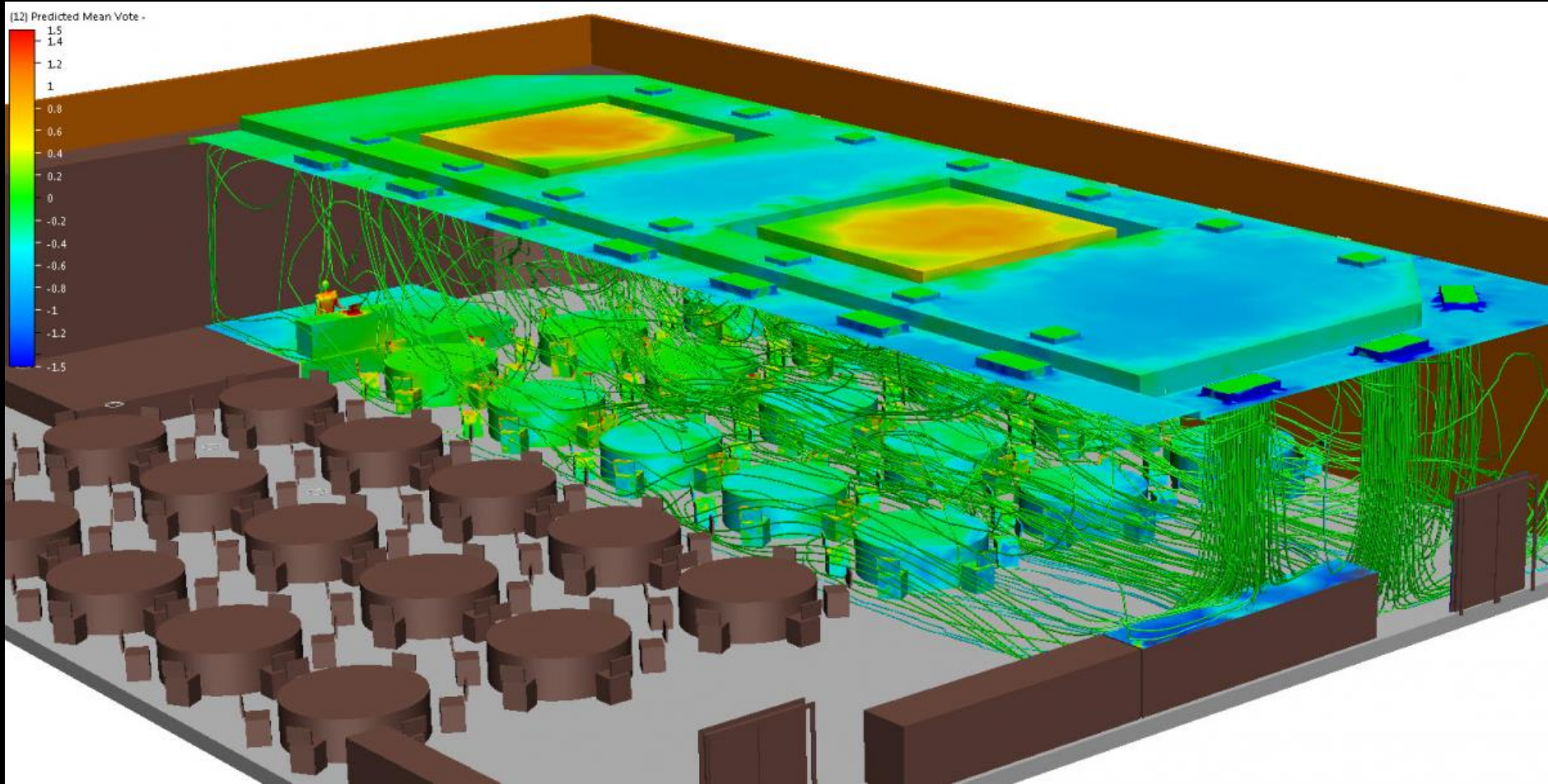


- Legends**
- Schedules/Quantities
 - Door Schedule
 - LEED EA Credit 2-Onsite Renewable Energy
 - LEED EA Prerequisite 3-HVAC&R Equipment Schedule
 - LEED IEQ Credit 4.1-Low Emitting Material Schedule-Adhesives and Sealants
 - LEED IEQ Credit 4.2-Low Emitting Material Schedule-Paints and Coatings
 - LEED IEQ Credit 4.3-Low Emitting Material Schedule-Carpet Systems
 - LEED IEQ Credit 4.4-Low Emitting Material Schedule-Composite Wood and Agrifiber
 - LEED IEQ Credit 6.1-Controllability of Lighting Systems
 - LEED IEQ Credit 6.2-Controllability of Thermal Comfort Systems
 - LEED IEQ Credit 8.1-Daylighting and Views-Glazing Factor
 - LEED MR Credit 3-Material Reuse Percentage Schedule
 - LEED MR Credit 4-Fly Ash Material Takeoff
 - LEED MR Credit 4-Recycled Material Percentage Floors
 - LEED MR Credit 5-Local/Regional Material Percentage Wall Schedule
 - LEED MR Credit 6-Floor Rapidly Renewable Material Schedule
 - LEED MR Credit 7-FSC Certified Wood
 - LEED MR Prerequisite 1-Area Schedule (Gross Building)
 - LEED Optimum S/V Ratios by Climatic Zone
 - LEED SS 4.2-Bicycle Storage and Changing Rooms
 - LEED SS 4.3-Alternative Fuel Parking Space
 - LEED SS 4.4-Parking Capacity
 - LEED SS 5.1-Site Development Building Footprint Area
 - LEED SS 5.1-Site Development Grade Restored Site Area
 - LEED SS 5.1-Site Development Site Area
 - LEED SS 5.2-Site Development Open Space
 - LEED WE Credit 2-3-Gray Water Schedule
 - LEED WE Credit 2-Blackwater Water Schedule
 - LEED WE Credit 3-Water Use Schedule
 - LEED WE-Building Water Load
 - LEED WE-Plumbing Fixture Daily Use
 - LEED WE-Plumbing Fixture Schedule
 - LEED WE-Rain Water Collection Schedule

Interior - CFD



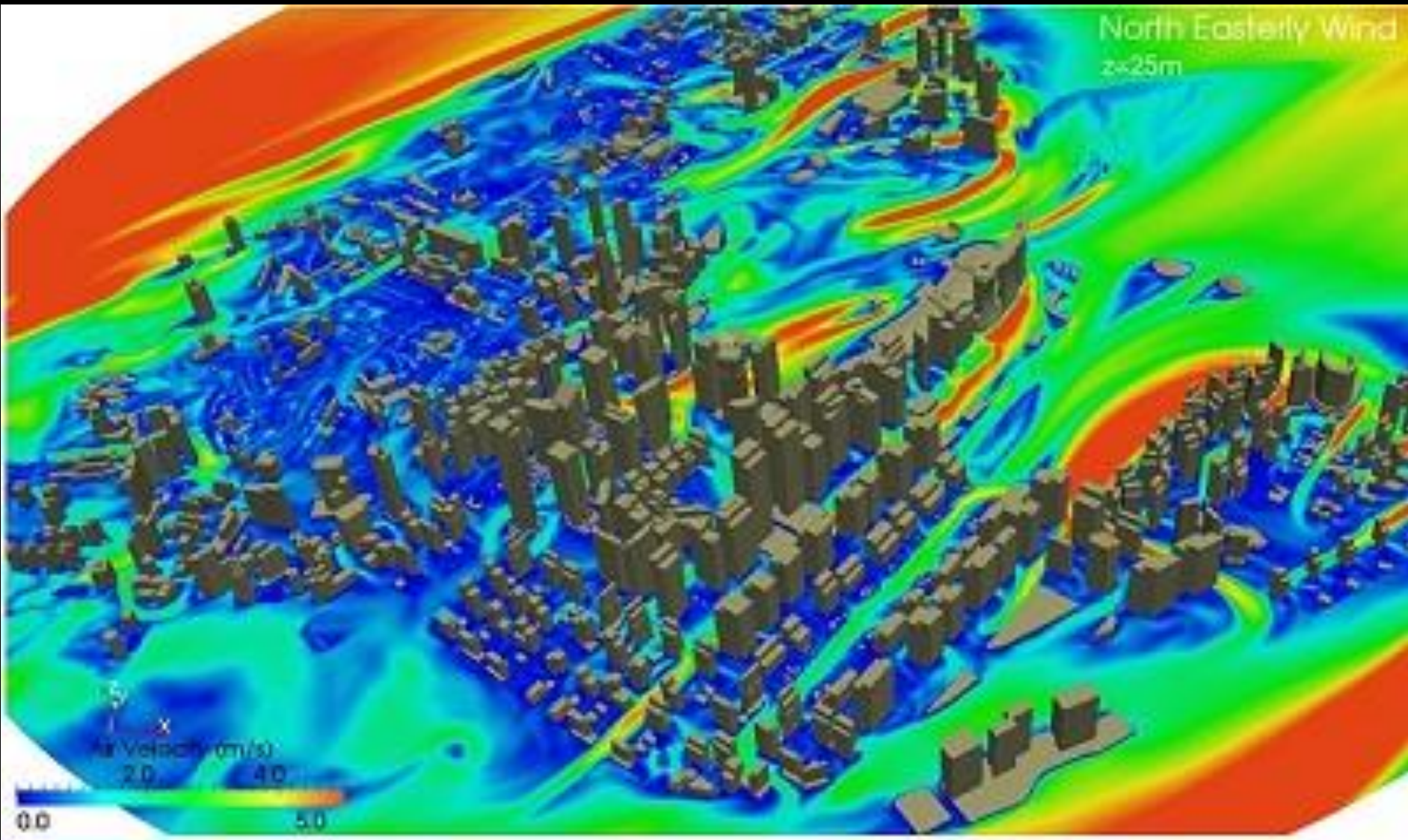
Interior - CFD



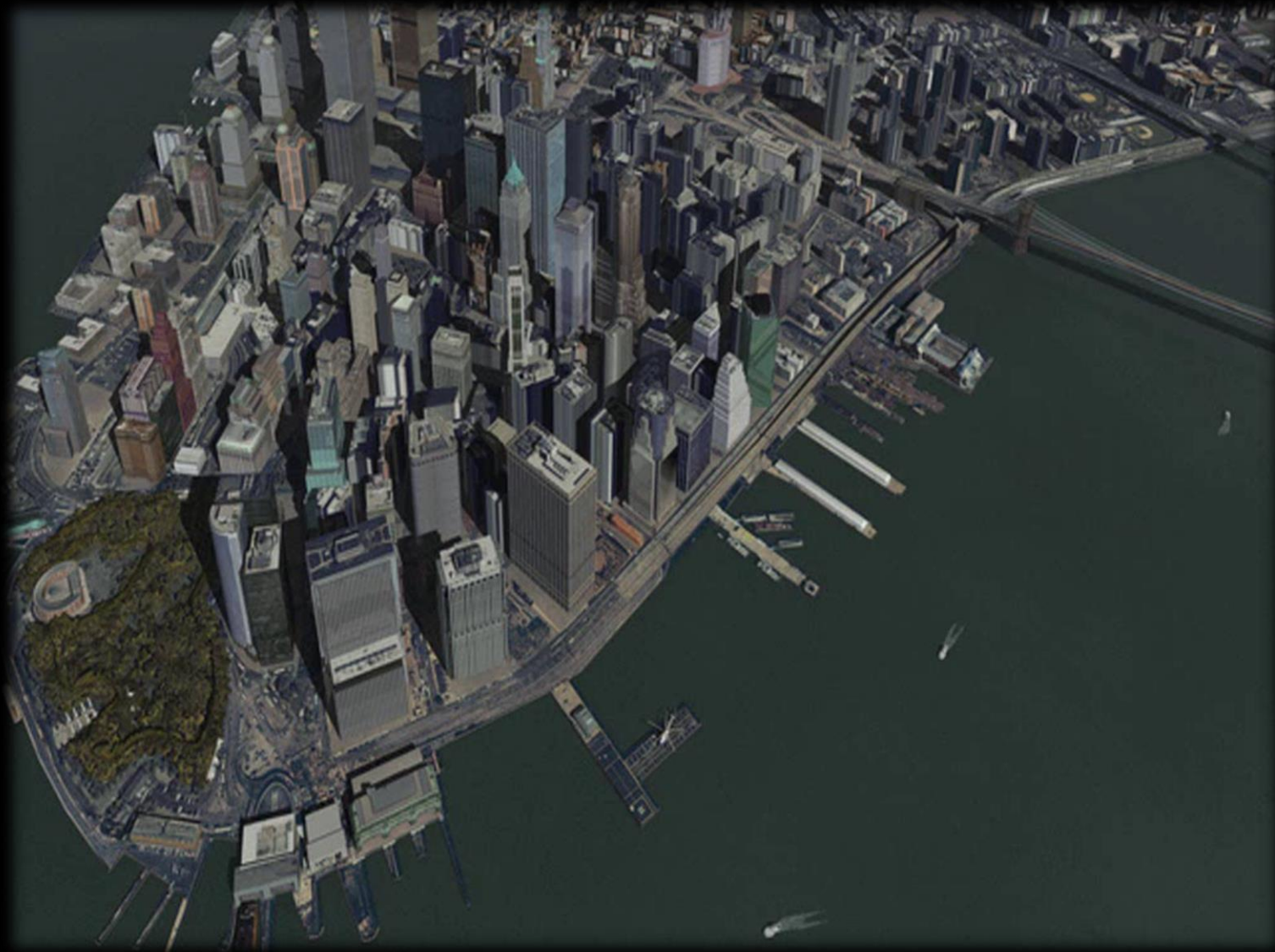
Site Analysis CFD



North Easterly Wind
z=25m



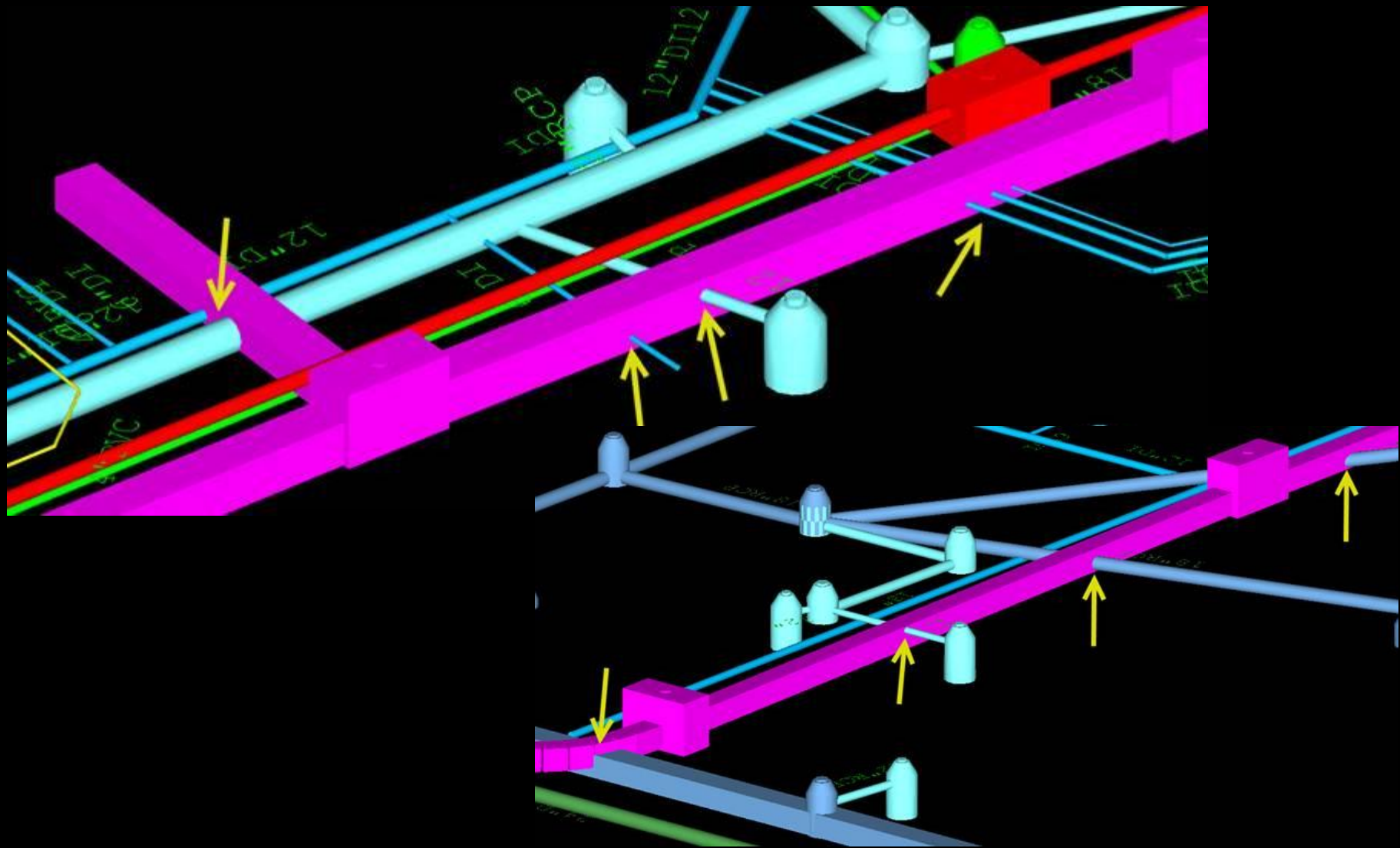
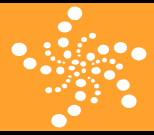
Site Analysis CFD



4D/5D Analysis



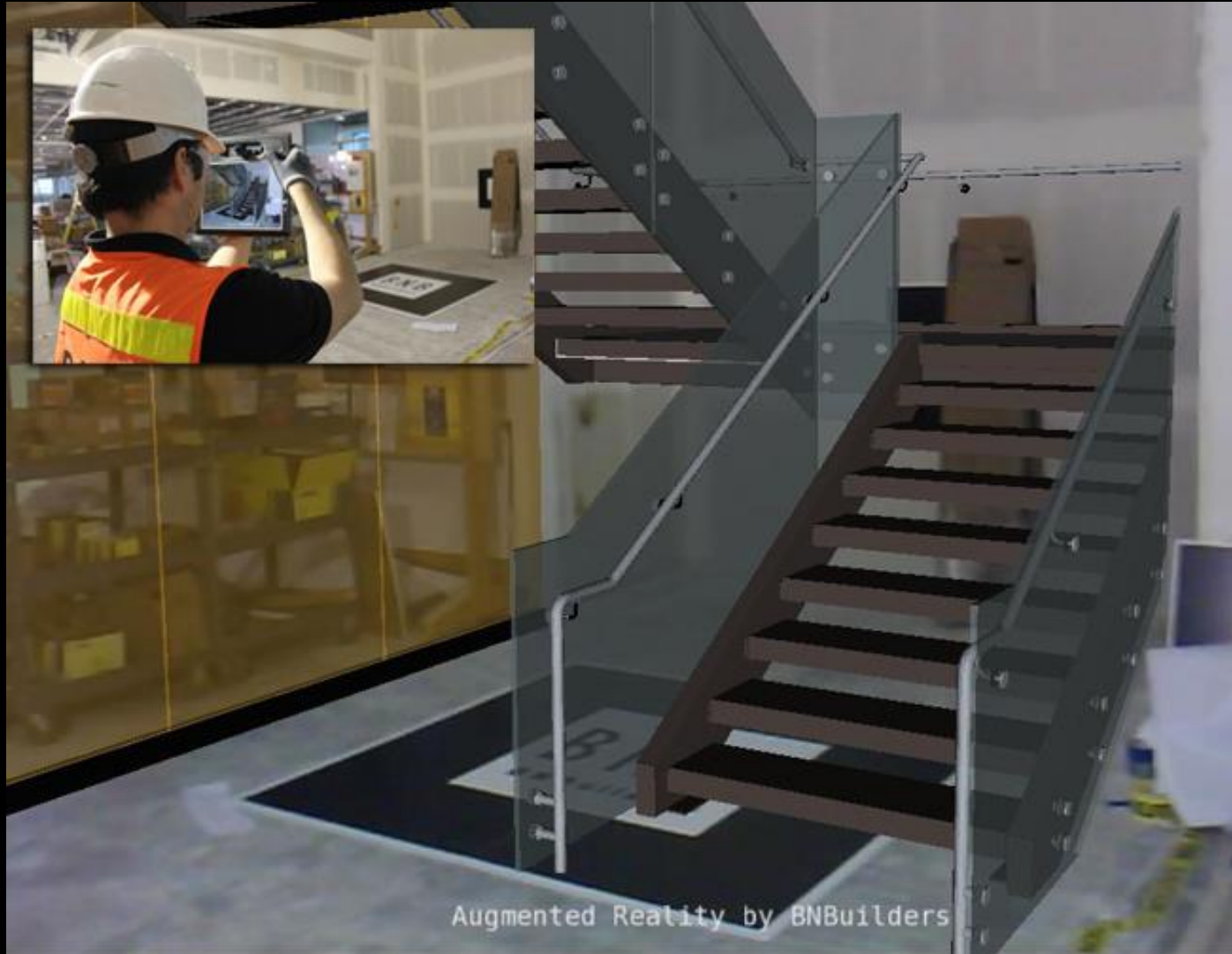
Coordination and Clash Detection



View, Engage, Understand



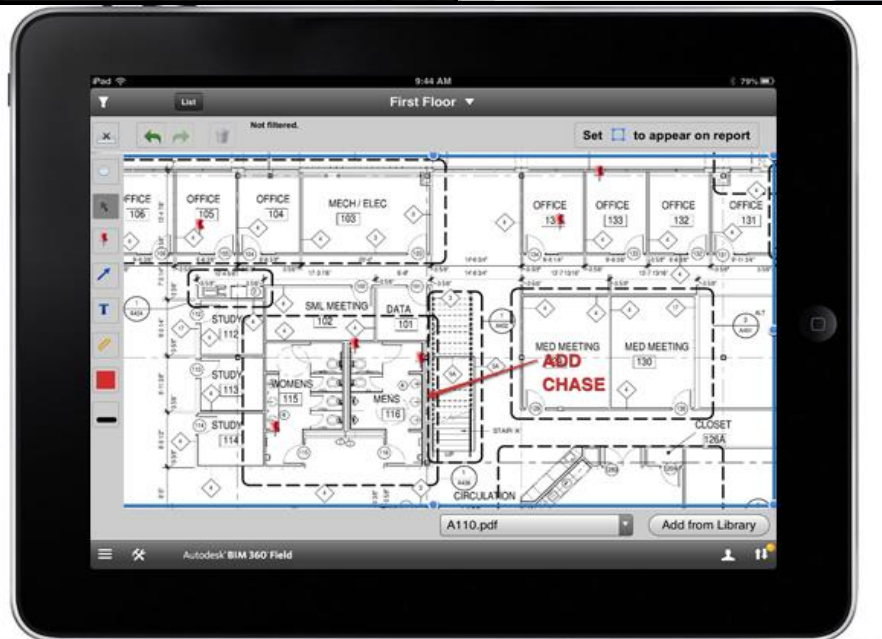
Augmented Reality



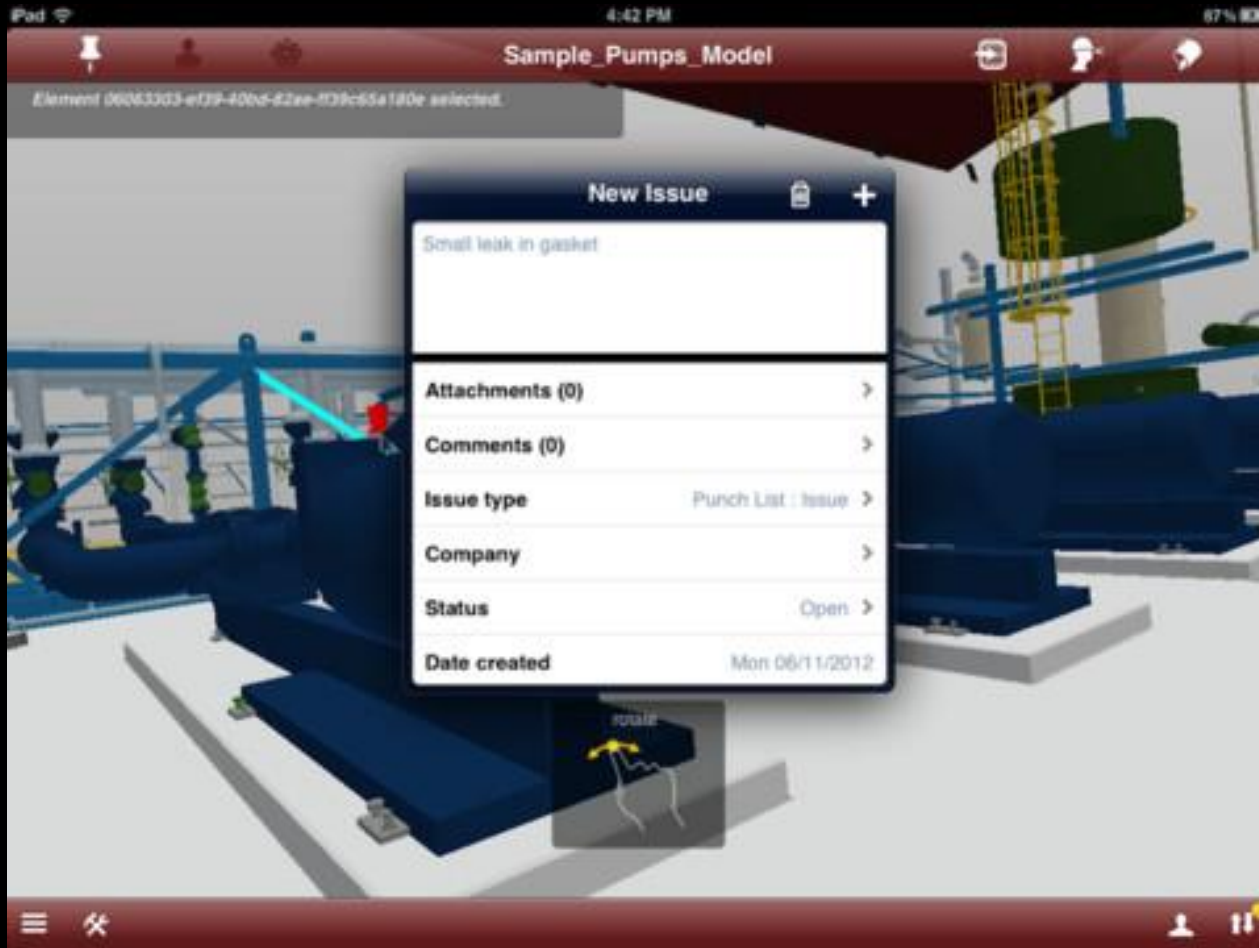
Data Access in the Field



The screenshot displays the Microdesk BIM 360 Field software interface. On the left, a 'CLUE' sidebar contains a 'Save View Refresh More Clear' toolbar and an 'OBJECTS' list with categories like 'Merged Models', 'Clash Reports', and 'bldg all for review'. The central area shows a 3D perspective view of a multi-story building model. To the right, a 'Views' sidebar includes 'Standard Views', 'Private Views', and 'Global Views'. Below it, a 'Markups' section offers tools like 'Rectangle', 'Circle', 'Freehand', and 'Text'. A vertical toolbar on the far right includes 'REVIEW', 'TRANSFORM', 'SECTION', and 'SEARCH' options.



Inspection and Commissioning



Revit to Maximo Integrator

Map Revit Families to Maximo Classifications

Revit Families

- Fire Alarm Control Panel [Mapped to "FIRE"]
- Fire Booster Power Supply [Mapped to "FIRE"]
- Manual Pull Station
- Smoke Detector
- Speaker Strobe
- Strobe
- Generic Annotations
- Generic Models
- ▾ Lighting Devices
 - Sensors Ceiling Mounted [Mapped to "OCCUPANCYSE"]
 - Switches Wall Non Hosted
- ▾ Lighting Fixtures
 - LightFixture-A,A1,A2 [Mapped to "LIGHTFIXTURE"]
 - LightFixture-B,B1,B2 [Mapped to "LIGHTFIXTURE"]
 - LightFixture-C,C1-DIM,C2,C2-DIM_P4D [Mapped to "L"]
 - LightFixture-D,D1_PV45
 - LightFixture-F1,F2
 - LightFixture-F4,F5_SLS
 - LightFixture-G_W4
 - LightFixture-H_WGH84F
 - LightFixture-I_KL4

Map to Maximo Classification

- ▾ Maximo Classifications
 - ▾ Electrical
 - Daylight Sensor
 - Occupancy Sensor (1)
 - Generator (1)
 - Junction Box (1)
 - Light Control
 - Light Fixture (3)
 - Light Relay Panel
 - Electrical Panel (1)
 - Receptacle (1)
 - Switch Gear
 - Switch Board

Add New Delete Rename

Mapped Revit Families

- Lighting Fixtures > LightFixture-A,A1,A2
- Lighting Fixtures > LightFixture-B,B1,B2
- Lighting Fixtures > LightFixture-C,C1-DIM,C2,C2-DIM_P

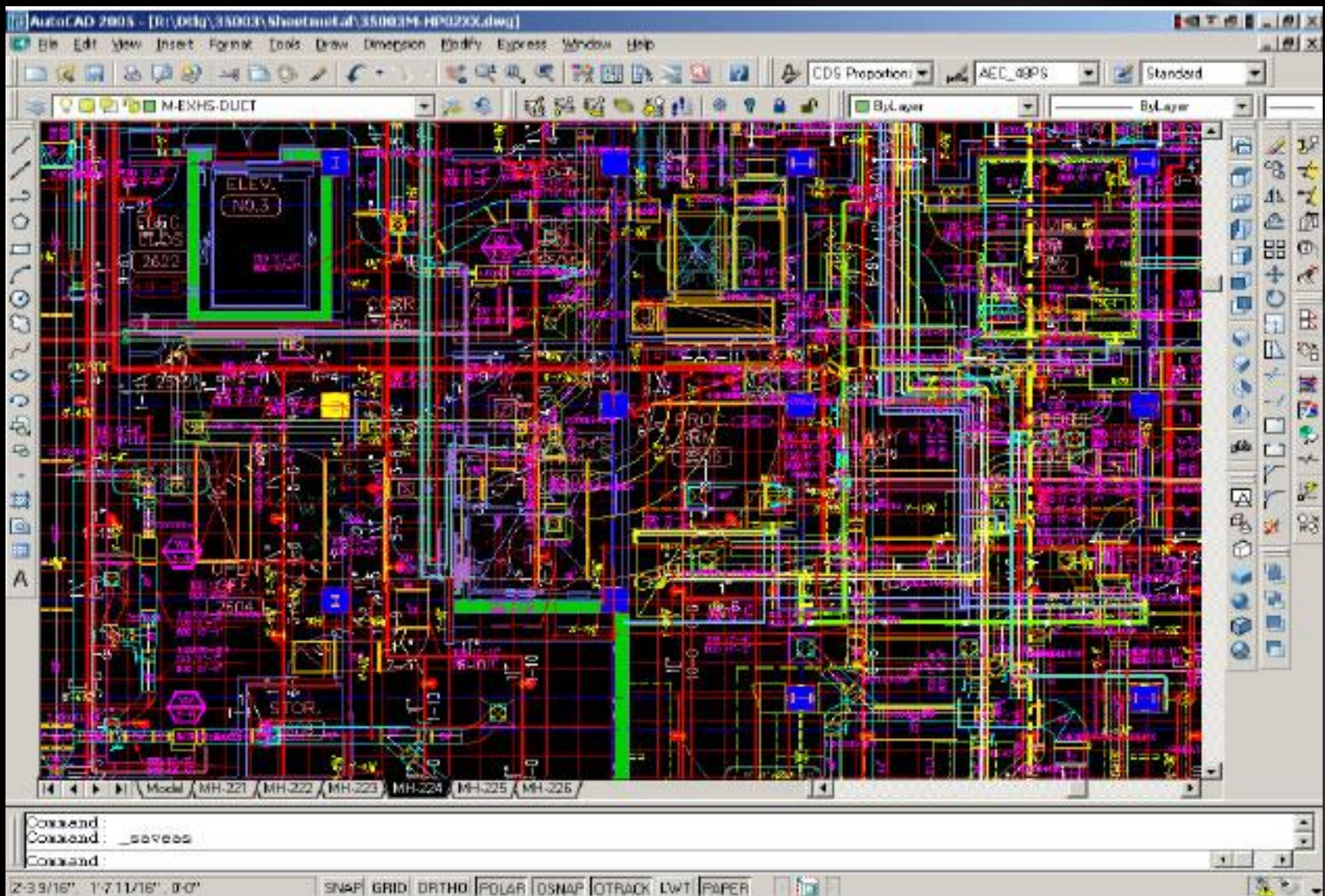
Unmap

Back Next Save Close

Operations and Maintenance



Operations and Maintenance



Operations and Maintenance

The image displays a 3D CAD model of an industrial facility, likely a power plant or refinery, with various pipes, tanks, and structures. The model is rendered in a multi-colored style (cyan, yellow, green, red, orange). Overlaid on the bottom left is a 'Properties' window, and on the bottom right is a file browser window.

Properties Window

Property	Value
Identity Data	
Equipment Type	CONTROL VALVE
Model	171A-10205
Manufacturer	SIEMENS
Tag	
Designation	8-B013
Submittal	255000-004
Siemens Number	AS.VVAHL1.51068
Serves	BIO 3 (2P) AS5-1068, BIO 4 (2P) AS5-1070

File Browser Window

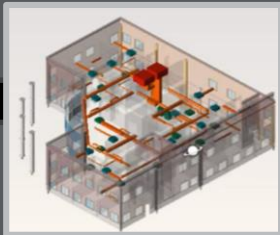
Type	Name
Folder	00 - Asset Tag
Folder	01 - Warranty
Folder	02 - Submittal Data
Folder	03 - Operation and Maintenance Information
Folder	04 - Commissioning Data
Folder	05 - Power Feed Diagram
Folder	06 - Asbuilts - Dwgs and PDFs
Folder	07 - Maintenance and Inspections
Folder	08 - Open
Folder	09 - Open
Folder	10 - Open

CMMS Integration

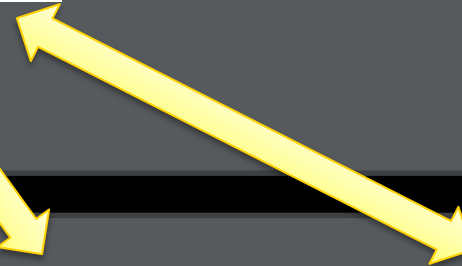


Asset Data

Extract &
Load



Revit Model



Infraworks



Navisworks



Visualization

Publish



Model Visualized in Maximo



The screenshot displays the Maximo Work Order Tracking interface. The browser address bar shows the URL: `10.5.1.40/maximo/ui/maximo.jsp?event=render&targetid=wotrack&value=rerender&uisessionid=192&csrftoken=lp3056lph6p60pv3d87q0jib45`. The page title is "Work Order Tracking". The navigation bar includes "Bullets: (0)", "Go To", "Reports", "Start Center", "Profile", "Sign Out", and "Help". The main toolbar contains various icons for actions like "Find", "Select Action", and "Print".

The interface is divided into several sections:

- Work Order #2629**: Located at the top left, with a dropdown menu for "AC Units" and a "Location:" field.
- Site: NEWYORK**: Located at the top right.
- Maximo Revit**: A sidebar on the left with tabs for "Maximo" and "Revit".
- Description**: "AC Units".
- Assets**: A list of five "Air Conditioning Unit" entries. The second entry is highlighted with a mouse cursor.
- Maximo Asset Info**: A section below the assets list showing "Air Conditioning U", "Asset Number 4711", and "Status ACTIVE".
- 3D Model**: The central area displays a detailed 3D visualization of the AC units, showing complex piping, ductwork, and structural supports in a multi-level industrial setting.

The bottom left corner of the browser window shows the URL: `10.5.1.81/modelviewer/#`.



- What
- When
- Where
- Why
- How

AIA Level of Development



- Design Intent Models
 - LOD 100 to LOD 350
- Construction Models
 - LOD 400
- O&M Models
 - LOD 500

2016 LEVEL OF DEVELOPMENT SPECIFICATION **BIMFORUM**
October 19, 2016

Milestones/Deliverables

Model Elements	100	200	300	350	400	500	Client Count	Fabrication
Structure								
MEP								
Interior								
Exterior								
Site								
Systems								
Other								

PARTICIPATING ORGANIZATIONS

COBie and...



- Common Object Building information exchange
- Uniformat
- Unique Element ID
- CSI

COBie-UK-2012-example-drop1.xls

	A	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	Email	CreationID	Category	Company	Phone	ExternalSystem	ExternalObject	ExternalIdentifier	Department	OrganisationCode	GivenName	FamilyName	Street	PostOffice	Town
2	johnston@rydenwood.co.uk	2012-03-20T12:27:24	C06 : Production information	Brylen Wood Limited	020 7253 4772	Autodesk R/P/PersonA		johnstonj	design	BW	Jerrie	Johnston	99 Charlton	n/a	London
3	no@aec3.com	2012-03-20T09:46:33	C12 : Quality management	AEC3	05496 754933				sa	AEC3	Nick	Niobet	46 St Marg	n/a	High Wycombe
4	sales@walgate.co.uk	2012-02-15T16:03:03	C3891 : Manufacturers	Walgate Ltd	01722 744 594				sales	Walgate	sales	team	Crow Lane	n/a	Salisbury
5	no@buildingSMART.org.uk	2012-02-15T16:03:03	C12 : Quality management	buildingSMART UK	05494 754933				product templates	buUK	Nick	Niobet	46 St Marg	n/a	High Wycombe
6	James.Brayshaw@cdnacontractors.co.uk	2012-02-15T16:03:03	C12 : Quality management	OS	0 23 8005 6002				sales and marketing	OS	James	Brayshaw	Adanac Dr	n/a	Southampton
7	support@contractor.co.uk	2012-06-17T15:15:15	C3881 : Contractors	Contractor	01 11111 1111				support	Contractor	n/a	n/a	n/a	n/a	n/a
8	service@doorproducts.co.uk	2012-06-17T15:15:15	C3891 : Manufacturers	Door Products	02 11111 1111				service	DoorProduct	n/a	n/a	n/a	n/a	n/a
9	warranty@walgate.co.uk	2012-06-17T15:15:15	C3891 : Manufacturers	Walgate Ltd	01722 744 594				warranty	Walgate	warranty	team	Crow Lane	n/a	Salisbury
10	support@ffsupplies.co.uk	2012-06-17T15:15:15	C3891 : Manufacturers	Furniture Ltd	01 11111 1111				support	FFCSupplies	n/a	n/a	n/a	n/a	n/a
11	support@mepproducts.co.uk	2012-06-17T15:15:15	C3891 : Manufacturers	MEP services Ltd	04 11111 1111				support	MEPProduct	n/a	n/a	n/a	n/a	n/a
12	sales@doorproducts.co.uk	2012-06-17T15:15:15	C3891 : Manufacturers	Door Products	02 11111 1111				sales	DoorProduct	n/a	n/a	n/a	n/a	n/a



Major Metropolitan Transportation Project

- 10 Days: BIM Manager Resume
- 15 Days: BIM Execution Plan (BEP)
- 30 Days: completed Electronic Data Disclaimer, Model Quality Control Plan (MQCP) Reports
- 60 Days: Contractor Discipline, Master Contractor Discipline and Contractor Master Models Minutes of 3D Coordination Meetings along with an updated clash status matrix
- Weekly: Contractor Discipline, Master Contractor Discipline and Contractor Master Models
- Minutes of 3D Coordination Meetings along with an updated clash status matrix
- Monthly: Model Quality Control Plan (MQCP) Reports
- Completion: COBie spreadsheet?



Deliverables

A. Contractor BIMs: Beginning 60 days after Notice to Proceed and at intervals of 1 week thereafter until Milestone 8 or Substantial Completion, whichever is earlier, Contractor shall submit current versions of Contractor Discipline, Master Contractor Discipline and Contractor Master Models.

B. Model Quality Control Plan (MQCP) Reports: Within 30 days after NTP and at intervals of 1 month thereafter until Milestone 8 or Substantial Completion, whichever is earlier, Contractor shall submit Model Quality Control Plan Reports as detailed by the Contractor in his BEP.

C. 3D Coordination Meeting Minutes and clash status matrix: Beginning 60 days after Notice to Proceed and at intervals of 1 week thereafter until Milestone 8 or Substantial Completion, whichever is earlier, Contractor shall submit within two business days of meeting date, minutes of 3D Coordination Meetings along with an updated clash status matrix.

D. Contractor As-Built BIMs: The Contractor shall ensure that the Contractor As-Built and Contractor Master As-Built Models are continuously updated and provided to the Construction Manager with the record drawings at the intervals required by Specification Section 1330.

E. COBie Spreadsheet: Contractor shall provide a completed COBie spreadsheet for the assets defined in Specification Section 1750.

Changing Expectations



The Contractor shall use Autodesk's AutoCAD Civil3D 2015, Revit 2015, Navisworks Manage 2015 and BIM 360 Glue, unless approved otherwise by the Construction Manager, as follows:

- a. Revit Architecture to develop and update Contractor Discipline, Master Discipline Models and As-Built Models for Architectural discipline
- b. Revit Structure to develop and update Contractor Discipline, Master Discipline Models and As-Built Models for Structural discipline
- c. Revit MEP to develop and update Contractor Discipline, Master Discipline Models and As-Built Models for Mechanical, Electrical, Plumbing, IT/COMM, and Fire Protection disciplines
- d. Civil3D to develop and update Contractor Discipline, Master Discipline Models and As-Built Models for Civil discipline
- e. Navisworks Manage or BIM 360 Glue to develop and update federated Contractor Master Model and perform 3D Coordination/Clash Detection

Expectations for Everyone



- C. The General Construction Contractor will be provided with hard copy signed and sealed Drawings and Specifications prepared by the A/E as the basis for their Contract and for Construction of the Work. The General Construction Contractor will be provided with the REVIT/BIM Design Intent Model prepared by the A/E. The General Construction Contractor shall create a Construction Model (a detached version of the Design Intent Model) prior to any construction work, and continue building this Construction Model ahead of any actual construction progress. The Design Intent Model can be used for reference only and all dimensions must be retrieved from the hard copy drawings and verified by the General Construction Contractor.
- D. The A/E shall maintain and update the Record Model throughout construction and submit a record copy at the end of construction. Updates to include all RFI's, Change Orders, Bulletins, and ASI's.
- E. The A/E will turn over a Record Drawing Model for all building systems at construction completion which incorporates contract design change to the project.
- F. The A/E will turn over a record Civil 3D drawing model and associated files for all civil work at construction completion which incorporates contract design change to the project.
- G. The A/E will turn over landscape record drawings and any associated files at construction completion which incorporates contract design change to the project.

Confusing Expectations



- LOD 400
- Field Verified = LOD 500

78A. BUILDING INFORMATION MODELING REQUIREMENTS

The Contractor shall develop a Building Information Modeling (BIM) Construction Model, and maintain and update the model throughout the construction to reflect the as-constructed conditions. The Authority will make available to the Contractor electronic BIM files developed for preparation of the Contract Drawings solely for informational purposes. The Contractor shall ensure that the final BIM Construction Model accurately reflects the Contract Drawings and any future changes therein, actual field conditions and the as-constructed conditions.

- A. Prepare the BIM Construction Model in compliance with the Port Authority of NY & NJ's *E/A Design Division BIM Standard Manual* (hereinafter called "the BIM Standard Manual"), available online at <http://www.panynj-cadstandards.com>, and using the Autodesk Revit software version currently in use by the Authority as identified in the BIM Standard Manual.
- B. Level of Development (LoD) of the modeled elements in the BIM Construction Model shall be at a level of development of 400 (LoD 400), as defined in the BIM Standard Manual.
- C. Within 30 calendar days of the acceptance of the Contractor's Proposal, prepare and submit to the Engineer a BIM implementation plan which shall include at a minimum the following:
 - 1.) Name and contact information for Contractor's designated BIM Coordinator.
 - 2.) BIM expectations and goals.
 - 3.) Coordination process between all parties involved during construction.
 - 4.) File naming and versioning.
 - 5.) Name and contact information for each subcontractor BIM Coordinator.
 - 6.) Coordination/Clash detection process.
 - 7.) Coordination/Clash detection schedule and reporting.
 - 8.) Matrix template of clashes to be run.
 - 9.) 4D analysis of construction.
- D. Within 60 calendar days of the acceptance of the Contractor's Proposal, submit to the Engineer an initial BIM Construction Model for the Engineer's review for compliance with the BIM Standard Manual. Submit updates to the model every 2 weeks throughout the construction. Updates shall include approved shop drawings pertaining to the physical changes in the constructed elements at an LoD 400.

ACCEPTANCE ON
(9/11/13)



BIM execution plan

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How?



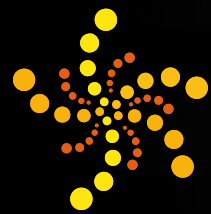
- Clear Roadmap
- Set Expectations
- Internal Expertise
- Support Channel
- No Excuses



- 10% Savings in the cost of construction
- 7% reduction in schedule
- 10 cents per square foot navigating the project closeout package
- 23 cents per square foot annual savings based on simple access to accurate information
- A digital asset for planning, design and future construction



- **Business Benefits**
- **Technology**
- **Process**
- **Market Demands**
- **People**



MICRODESK