



Autodesk® InfraWorks™ 2014: Realizing the Potential of a Fully Integrated BIM Process

How many Autodesk products does it take to change a light bulb?

Mark I Hughes AIA, LEED AP

BIM Program Manager – Denver International Airport - AECOM

HINT:

- We are specifying the light
- We are analyzing/optimizing the light performance
- We are locating the light
- We are purchasing, scheduling and installing the light
- We are tracking performance and life cycle of the light
- We are changing the light bulb (with LED fixtures, because the contractor VE'd these out this first go round)

Panel Presenters

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Class summary

- We will explore the process of integrated planning, design, construction, commissioning, and as-built delivery for Large Programs

Key learning objectives

- Describe a comprehensive BIM process - Will
- Plan deliverables that translate into model content - Mark
- Assess the potential of a planning with BIM process - Chris
- Evaluate the value of accurate as-built documents - Dennis



Denver International Airport: By the Numbers



Denver International Airport: *by the numbers...*

- 53 million in passenger traffic in 2012
- 5th Busiest airport in the US
- 24 hour/365 day operation
- 53 square miles
- 19.2 million square feet of facilities
- 30,000 (approx.) people employed
- Economic Impact to Colorado: \$26.3 Billion dollars annually



Why BIM at DIA?

You Know WHY!

- ✓ Poor or no As-builts – Poor visibility of assets and systems across entire campus
- ✓ 9 Million CAD Files to date
- ✓ Dysfunctional maintenance program due to lack of information
- ✓ Cross department silos and redundancies
- ✓ Subjective budget justification battles
- ✓ Incomplete physical/financial picture
- ✓ No vertical to horizontal integration
- ✓ Inconsistent naming – way finding, security, asset location issues
- ✓ Etc.....



Current Projects Listing

	2011	2012	2013	2014	2015	2016	Total (2011-2016)
Airfield*	\$27,658	\$9,599	\$9,488	\$15,016	\$15,995	\$8,660	\$86,416
Roads	9,103	4,510	3,325	1,125	1,125	1,125	\$20,313
Environmental/ Utilities	18,113	95	-	-	-	-	\$18,208
Technologies	14,464	4,085	1,690	990	3,550	3,850	\$28,629
Terminal Complex	24,100	23,449	20,420	27,618	16,128	19,833	\$131,548
Baggage/AGTS	1,600	12,700	19,700	13,000	16,500	16,500	\$80,000
Cargo/Support	4,977	700	5,106	-	-	-	\$10,783
South Terminal Redevelopment	117,051	111,803	206,640	32,004	-	-	\$467,498
Miscellaneous/Art	6,031	6,098	5,203	4,561	3,866	3,795	\$29,554
TOTAL	\$223,097	\$173,039	\$271,572	\$94,314	\$57,164	\$53,763	\$872,949

Note: Dollars in thousands; Beyond 2016, an annual allowance of \$139M was used for analysis; \$80M in projects will also be carried over from previous year's plans
 *Airfield costs are mostly eligible for FAA grants but reflect full cost here

Chris' Awesome project planning description

- Field Capture
 - Geological Reports
 - Survey / Utility
- Planning interpretation
 - Platt documents
 - GIS Data
 - Zoning descriptions
- Existing Document
 - Plans
 - Program information

The image is a composite. The top half features a clear blue sky above a city skyline with several tall, modern skyscrapers. The bottom half shows an aerial perspective of a multi-lane bridge crossing a wide river. The bridge has a rainbow-colored line along its edge. On the left side of the bridge, a red car is visible. The riverbanks are landscaped with green grass, trees, and a small garden bed with purple flowers. The overall scene is a digital rendering, likely from a BIM software.

Comprehensive BIM Process Will Lineberry - HNTB

Program Overview

- 519-room Westin hotel and conference center 433,000 sf
- Public Transit Center / RTD Commuter Rail Station 212,000 sf
- Open air plaza 82,000sf
- Improvements to existing baggage and train systems
- New Restaurants

Program Challenges

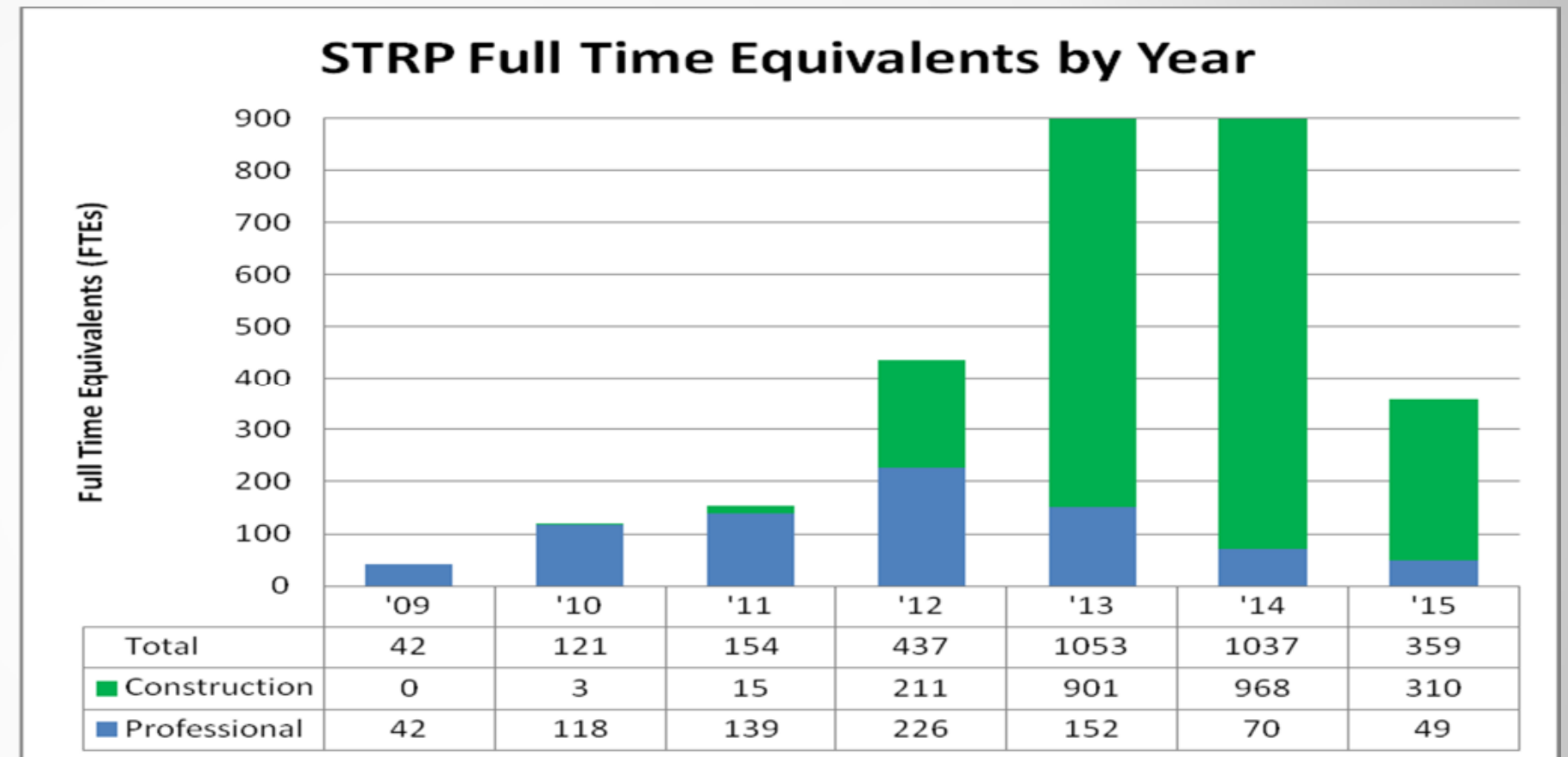
Large and diverse team

Firm facts:

- **260** firms are working on the Program
- **227** firms are local
- **107** are minority/women-owned businesses
- **28%** of budget is MWBE

BIM content:

- **25** firms creating BIM content for Design efforts
- **10** firms creating BIM content for construction efforts.

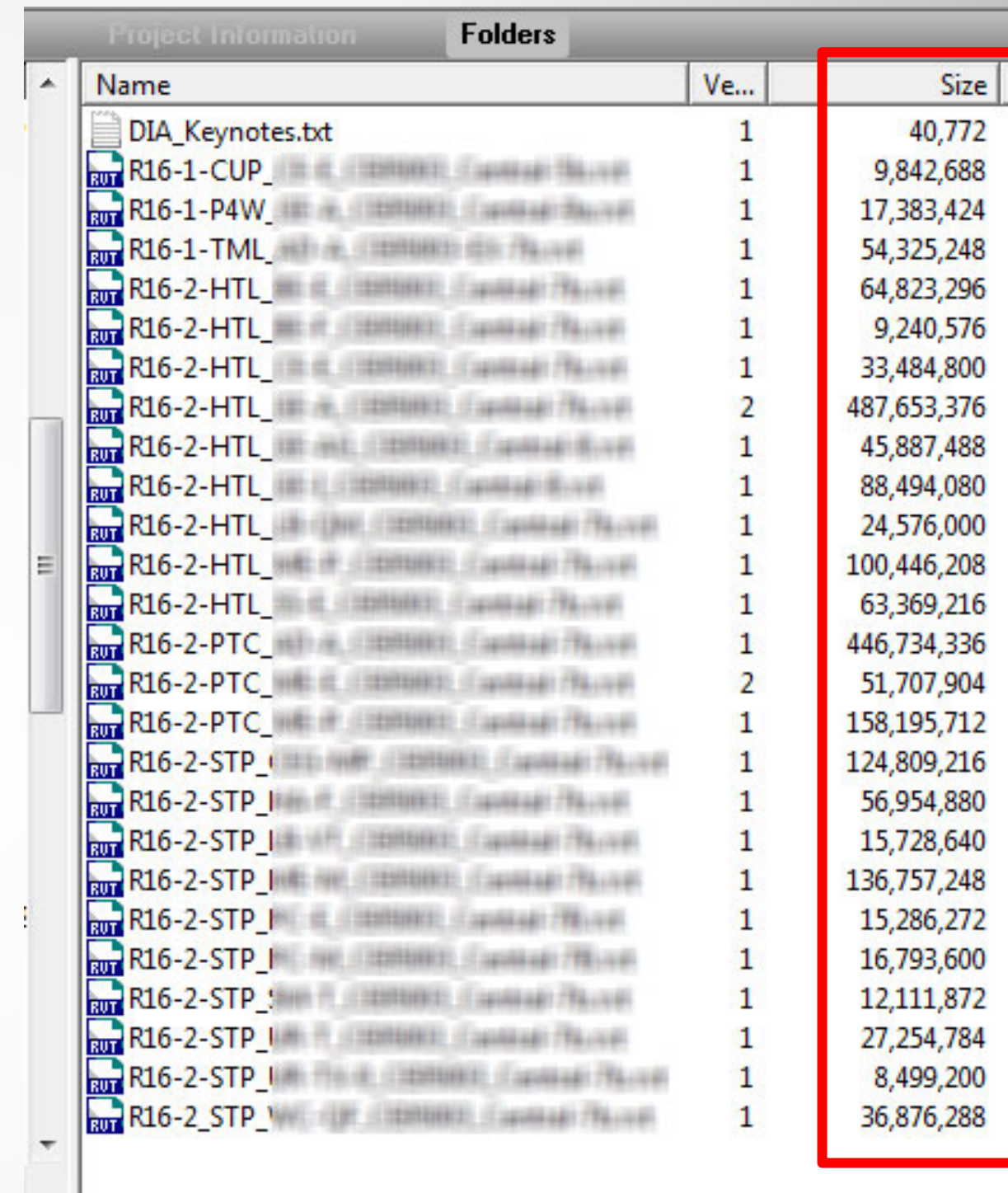


Peak Manpower projection for 2013 is
1,053 full-time equivalents

Program Challenges

Managing large data sets

- Many LARGE Models
- Software interoperability
- Sharing data
- Design Review
- QA/QC procedures
- Document Control
- Managing deliverables

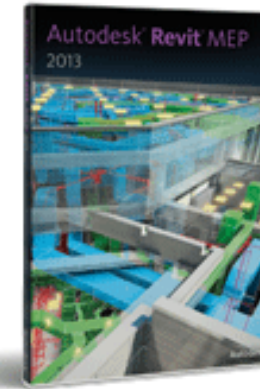
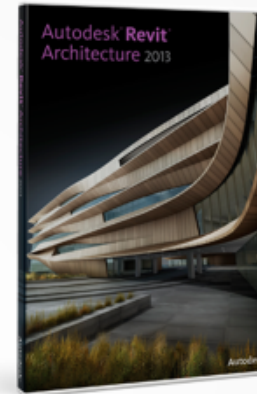


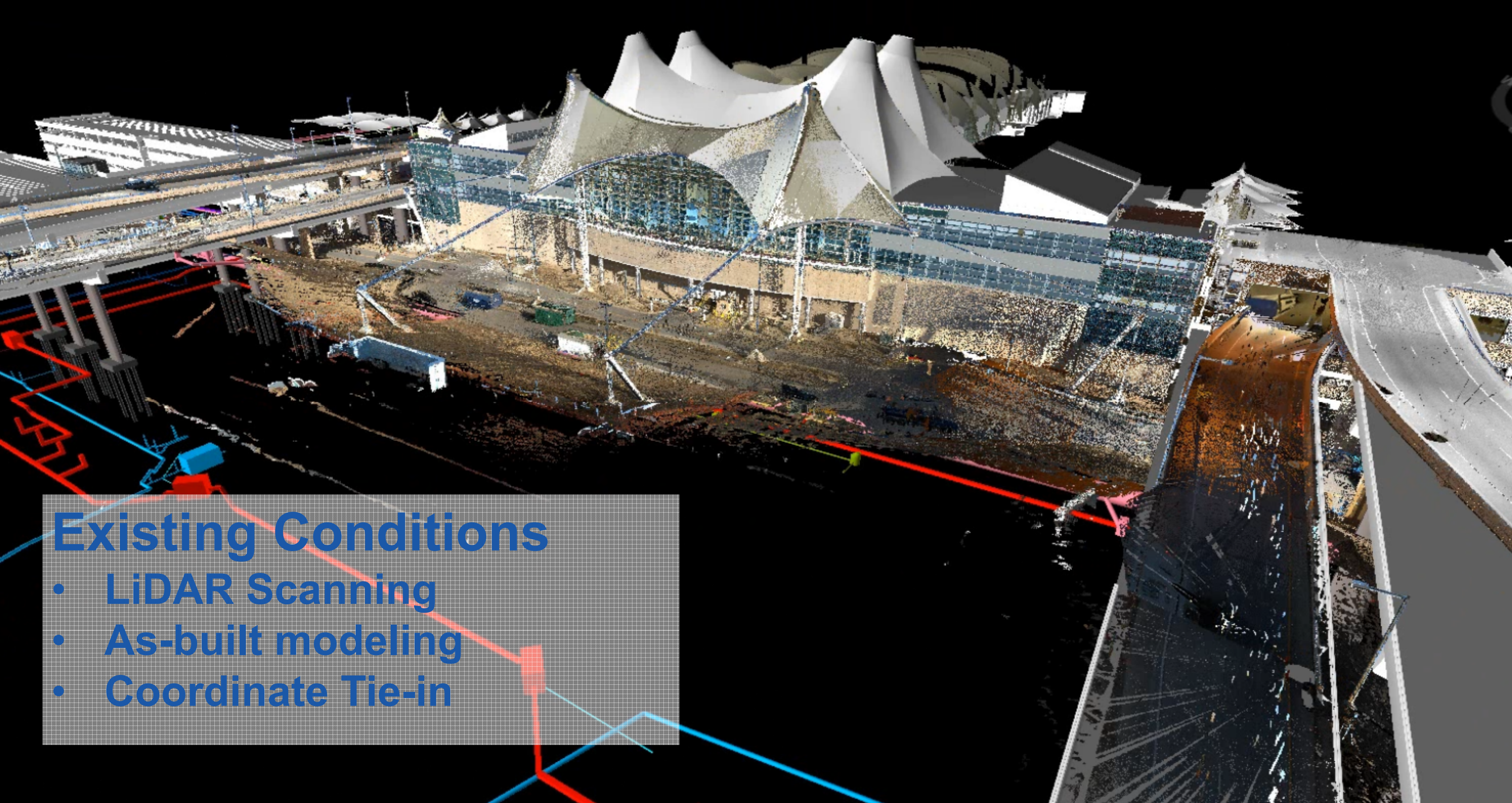
Name	Ve...	Size
DIA_Keynotes.txt	1	40,772
R16-1-CUP_...	1	9,842,688
R16-1-P4W_...	1	17,383,424
R16-1-TML_...	1	54,325,248
R16-2-HTL_...	1	64,823,296
R16-2-HTL_...	1	9,240,576
R16-2-HTL_...	1	33,484,800
R16-2-HTL_...	2	487,653,376
R16-2-HTL_...	1	45,887,488
R16-2-HTL_...	1	88,494,080
R16-2-HTL_...	1	24,576,000
R16-2-HTL_...	1	100,446,208
R16-2-HTL_...	1	63,369,216
R16-2-PTC_...	1	446,734,336
R16-2-PTC_...	2	51,707,904
R16-2-PTC_...	1	158,195,712
R16-2-STP_...	1	124,809,216
R16-2-STP_...	1	56,954,880
R16-2-STP_...	1	15,728,640
R16-2-STP_...	1	136,757,248
R16-2-STP_...	1	15,286,272
R16-2-STP_...	1	16,793,600
R16-2-STP_...	1	12,111,872
R16-2-STP_...	1	27,254,784
R16-2-STP_...	1	8,499,200
R16-2-STP_...	1	36,876,288

Communication and Documentation is critical

Specified Software

- **Authoring (Design):**
 - Autodesk Revit Architecture
 - Autodesk Revit Structure
 - Autodesk Revit MEP
 - Autodesk Civil 3D
- **Collaboration:**
 - Autodesk Navisworks
 - Autodesk Buzzsaw
 - Autodesk Design Review





Existing Conditions

- LiDAR Scanning
- As-built modeling
- Coordinate Tie-in

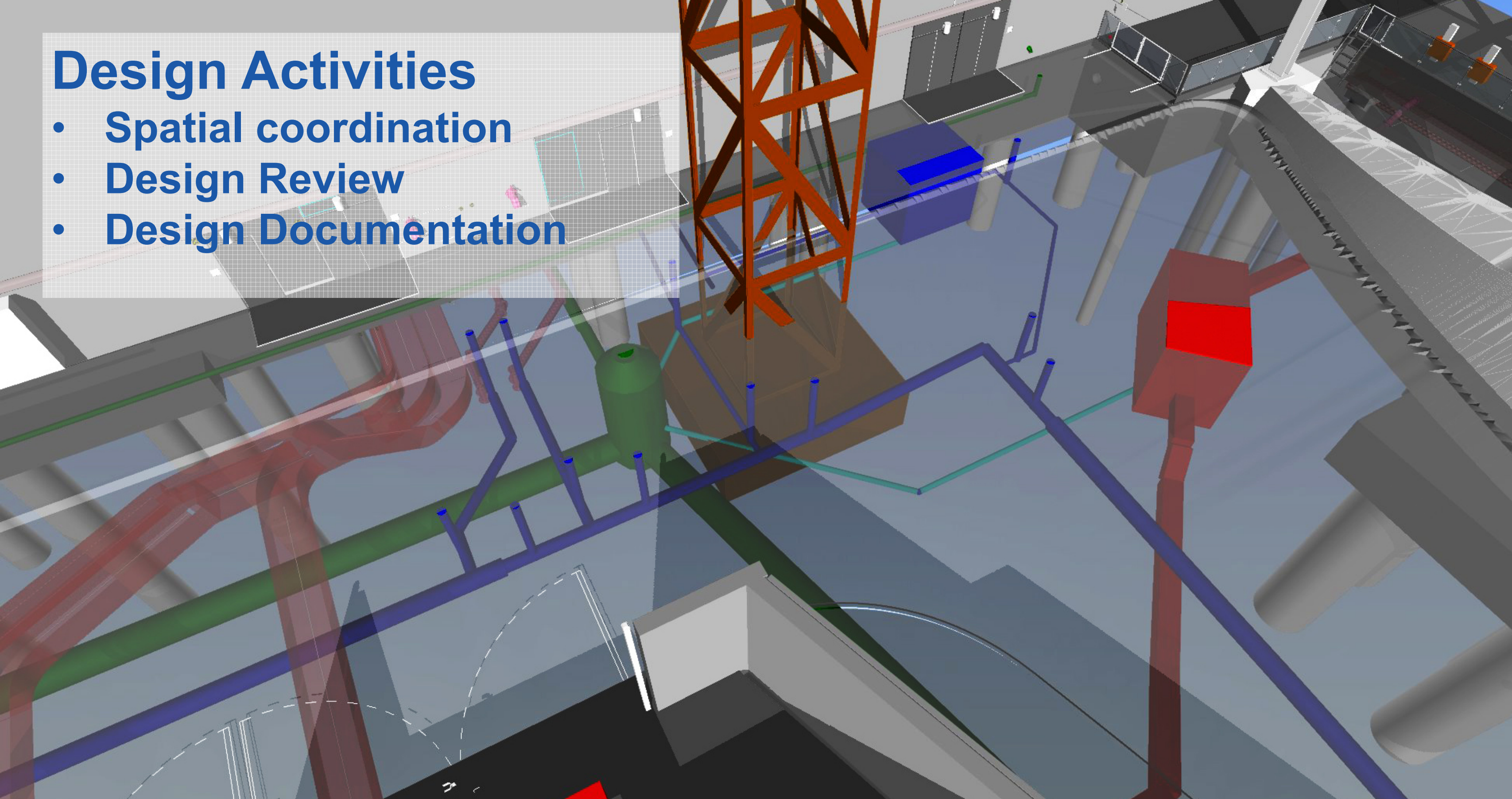
Enabling and Planning

- Analysis
- Sequencing
- Visualization



Design Activities

- Spatial coordination
- Design Review
- Design Documentation



Construction Activities

- Issue tracking
- Document access
- Commissioning



Construction Coordination

- Clash detection
- RFI content
- Communication

JCI to RFI 8" duct/comm rack conflict

W8 (E)(5)-XS1(-13) : LEVEL 02 (5293)

Clearly specifying deliverables

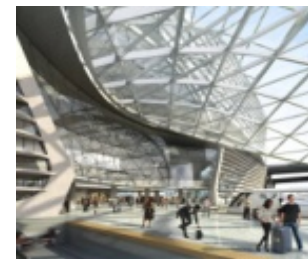
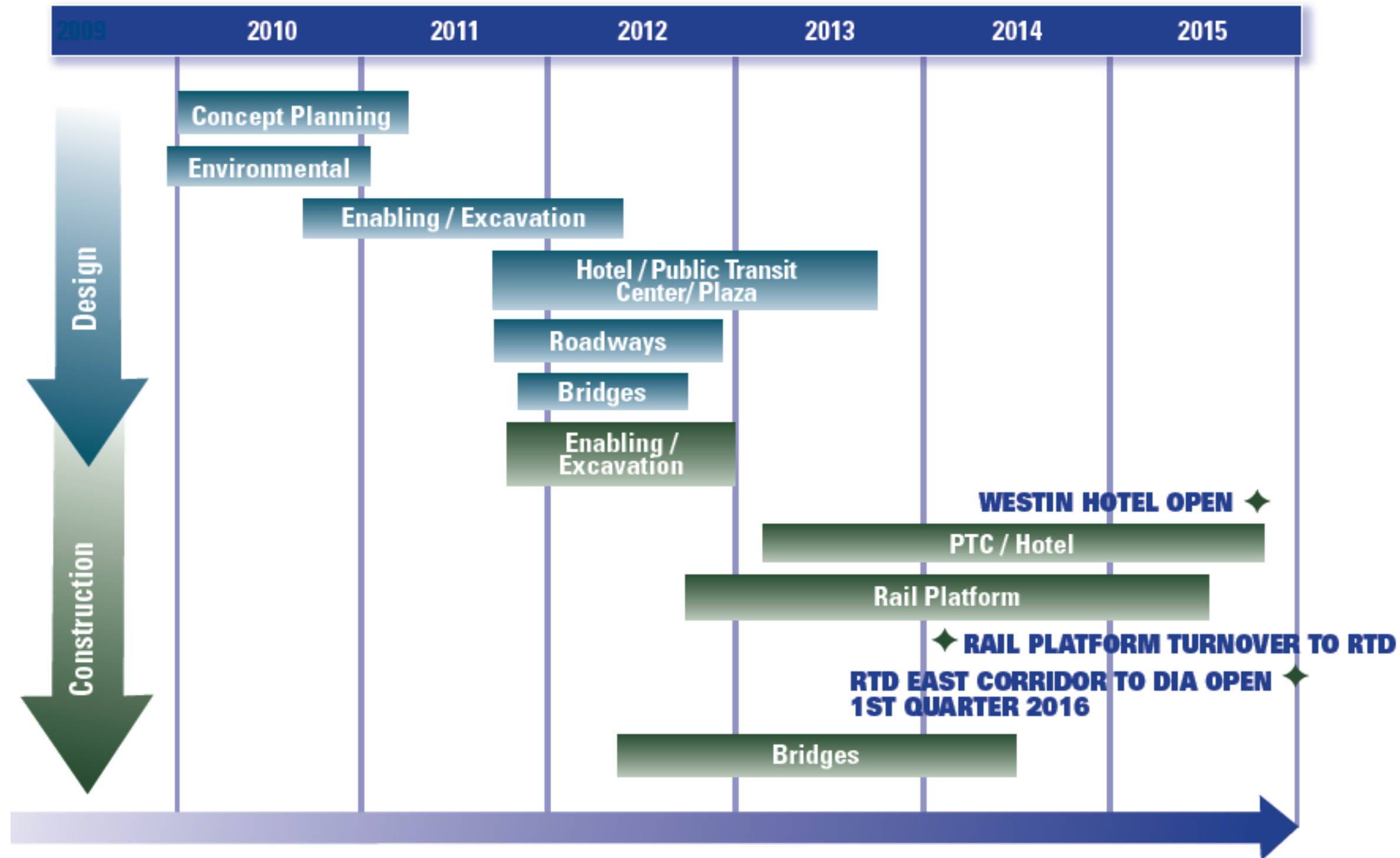
Figure 1 - ASTM UNIFORMAT II Classification of Building Elements (E1557-97)										DESIGN MODELS										CONSTRUCTION MODELS					
Level 1 Major Group		Level 2 Group Elements		Level 3 Individual Elements		Level 4 Sub-Elements		Programming / Design Analysis Report		Preliminary Design / Schematic Design		Design Development / GMP		Construction Documents (Design)		Record Design Model		Construction / Fabrication Model		As-Built Model					
								LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA	LOD	MEA				
A	Substructure	A10	Foundations	A1010	Standard Foundations																				
						A1011	Wall Foundations	100	D - SF	200	D - SF	250	D - SF	300	D - SF	300	D - SF	400	C - GC	500	C - GC				
						A1012	Column Foundations & Pile Caps	100	D - SF	200	D - SF	250	D - SF	300	D - SF	300	D - SF	400	C - GC	500	C - GC				
				A1013	Perimeter Drainage & Insulation	100	D - SF	200	D - SF	250	D - SF	300	D - SF	300	D - SF	400	C - GC	500	C - GC						
				A1020	Special Foundations																				
						A1021	Pile Foundations	100	D - SF	200	D - SF	250	D - SF	300	D - SF	300	D - SF	400	C - GC	400	C - GC				
						A1022	Grade Beams	100	D - SF	200	D - SF	250	D - SF	300	D - SF	300	D - SF	400	C - GC	400	C - GC				
						A1023	Caissons	100	D - SF	200	D - SF	250	D - SF	300	D - SF	300	D - SF	400	C - GC	400	C - GC				
						A1024	Underpinning	100	D - SF	200	D - SF	250	D - SF	300	D - SF	300	D - SF	400	C - GC	400	C - GC				
						A1025	Dewatering	100	D - SF	200	D - SF	250	D - SF	300	D - SF	300	D - SF	400	C - GC	400	C - GC				
						A1026	Raft Foundations	100	D - SF	200	D - SF	250	D - SF	300	D - SF	300	D - SF	400	C - GC	400	C - GC				
						A1027	Pressure Injected Grouting	0	NM	0	NM	0	NM	0	NM	0	NM	0	NM	0	NM				
						A1029	Other Special Conditions	100	D - SF	200	D - SF	250	D - SF	300	D - SF	300	D - SF	400	C - GC	400	C - GC				
				A1030	Slab on Grade																				
						A1031	Standard Slab on Grade	100	D - A	200	D - A	250	D - SF	300	D - SF	300	D - SF	400	C - GC	500	C - GC				
						A1032	Structural Slab on Grade	100	D - A	200	D - A	250	D - SF	300	D - SF	300	D - SF	400	C - GC	500	C - GC				
						A1033	Inclined Slab on Grade (Sloped Surface Grading)	100	D - A	200	D - A	250	D - SF	300	D - SF	300	D - SF	400	C - GC	500	C - GC				
						A1034	Trenches, Pits & Bases	100	D - A	200	D - A	250	D - SF	300	D - SF	300	D - SF	400	C - GC	0	C - GC				
						A1035	Under-Slab Drainage & Insulation	0	D - A	100	D - A	200	D - P	300	D - SF	300	D - SF	400	C - GC	500	C - GC				
				A2010	Basement Excavation																				
						A2011	Excavation for Basements	100	D - SF	200	D - SF	200	D - SF	200	D - SF	200	D - SF	200	C - GC	500	C - GC				
						A2012	Structure Back Fill & Compaction	100	D - SF	200	D - SF	200	D - SF	200	D - SF	0	D - SF	0	NM	0	NM				
						A2013	Permanent Shoring	100	D - SF	200	D - SF	200	D - SF	200	D - SF	0	D - SF	0	NM	0	NM				
						A2014	Temporary Shoring	100	D - SF	100	D - SF	200	D - SF	200	D - SF	0	D - SF	0	NM	0	NM				
				A2020	Basement Walls																				
						A2021	Basement Wall Construction	100	D - A	200	D - A	250	D - S	300	D - S	300	D - S	400	C - GC	500	C - GC				
						A2022	Moisture Protection	0	D - A	100	D - A	200	D - A	300	D - A	300	D - A	400	C - GC	0	NM/ESD				
						A2023	Basement Wall Insulation	0	D - A	100	D - A	200	D - A	300	D - A	300	D - A	400	C - GC	0	NM/ESD				
						A2024	Interior Skin	100	D - A	200	D - A	300	D - A	300	D - A	300	D - A	400	C - GC	0	NM/ESD				
B	Shell	B10	Superstructure	B1010	Floor Construction																				
						B1011	Suspended Basement Floors Construction	0	NM	200	D - A	250	D - S	300	D - S	300	D - S	400	C - GC	500	C - GC				
						B1012	Upper Floors Construction	100	D - A	200	D - A	250	D - S	300	D - S	300	D - S	400	C - GC	500	C - GC				
						B1013	Balcony Floors Construction	0	NM	200	D - A	250	D - S	300	D - S	300	D - S	400	C - GC	500	C - GC				
						B1014	Ramps	0	NM	200	D - A	250	D - S	300	D - S	300	D - S	400	C - GC	500	C - GC				
						B1015	Exterior Stairs and Fire Escapes	0	NM	200	D - A	250	D - A	300	D - A	300	D - A	400	C - GC	500	C - GC				
						B1016	Floor Raceway Systems	0	NM	200	D - A	200	D - A	300	D - A	300	D - A	400	C - GC	500	C - GC				
						B1019	Other Floor Construction	0	NM	200	D - A	200	D - A	300	D - A	300	D - A	400	C - GC	500	C - GC				
				B1020	Roof Construction																				
						B1021	Flat Roof Construction	0	NM	100	D - A	200	D - S	300	D - S	300	D - S	400	C - GC	500	C - GC				
						B1022	Pitched Roof Construction	0	NM	100	D - A	200	D - S	300	D - S	300	D - S	400	C - GC	500	C - GC				
						B1023	Canopies (Plaza and PTC, not Train Platform)	0	NM	100	D - A/S	200	D - A/S	300	D - A/S	300	D - A/S	400	C - GC	500	C - GC				
						B1029	Other Roof Systems	0	NM	100	D - A/S	200	D - A/S	300	D - A/S	300	D - A/S	0	NM/ESD	0	NM/ESD				

Progress Tracking

- 4D Animation
- RFI BIM Checks
- Regular Model Reviews



Program Timeline







Deliverables for BIM Content

Mark Hughes - AECOM



End in Mind

Standards

BIM Content

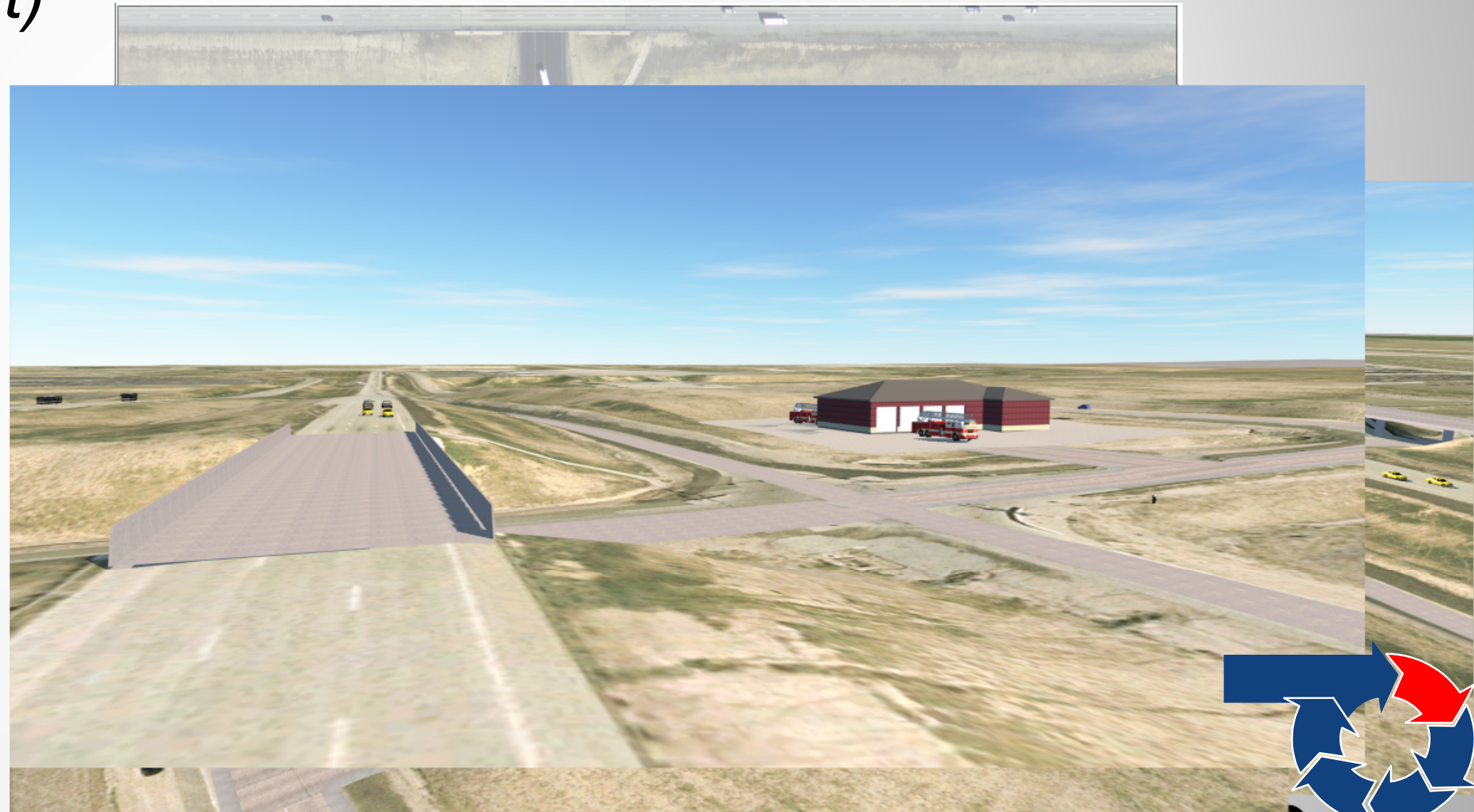
Communicate

Implement

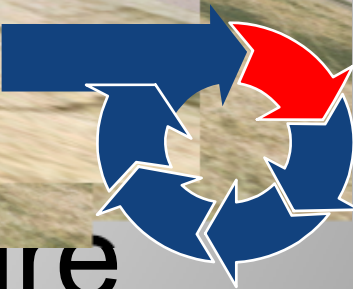


End in Mind

- *Providing Solutions to Existing Needs before Future wants (i.e. – Low Hanging Fruit)*
- Planning
- Visualization



■ Genstier Architecture

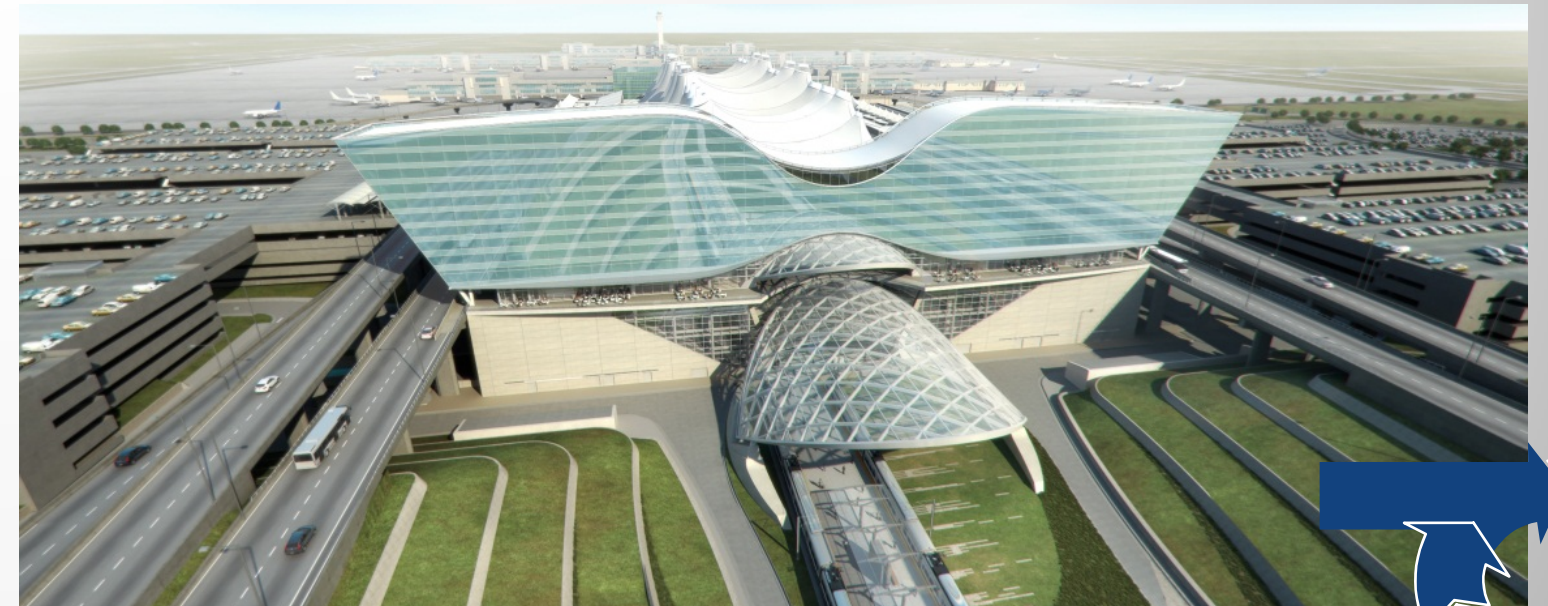


End in Mind: Size

- Better Asset data Collection/Management/Flow
- Lifecycle maintenance (As-Builts to Asset Management)



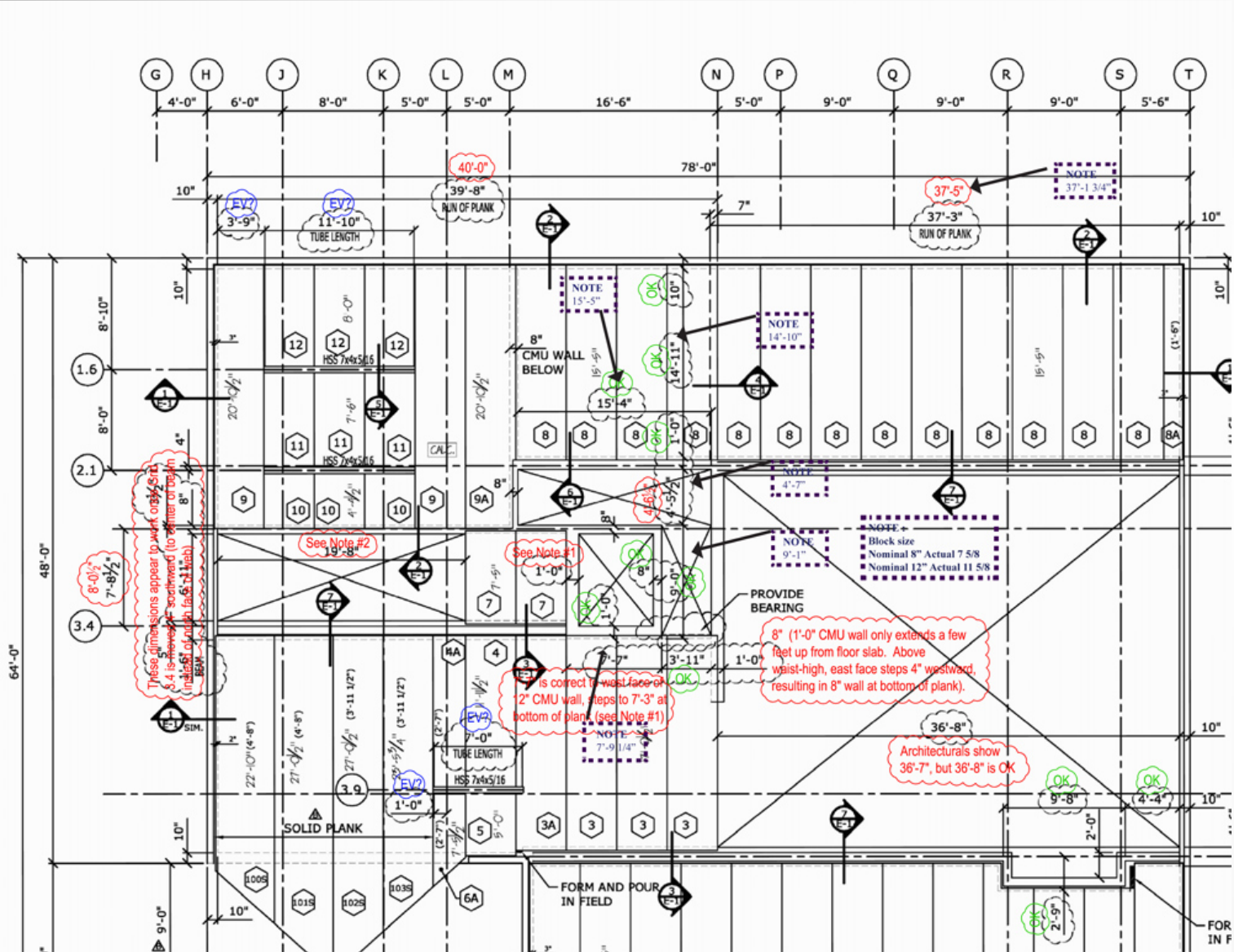
HNTB Architecture



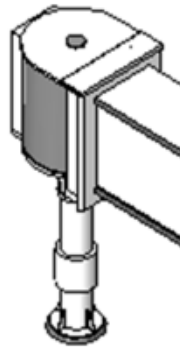
Gensler Architecture



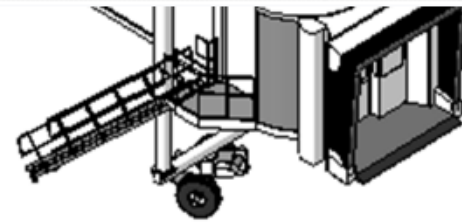
End in Mind: As-Built



End in Mind: CMMS



Identity Data	
Type Comments	2 year warranty
Serial Number	30875
Model	60/119
Manufacturer	Jetway
Keynote	Service Date: 8/11/07
Cost	723000.00
Assembly Code	E1090900
URL	
Description	



Locations

Drilldown

Select to show children. Select to hide children. Select to return location / asset.

LocationsAssets

Location CCA_02_8W_GGATE A60 AIRSIDEStatus OPERATINGSite DIA

Asset in Location

System PRIMARY

Show All SystemsShow Path to TopView Work Details

CCA:Con Course A

- GT-AIR_[D19]:GATE AIRSIDE
 - 02_[L43]:CONCOURSE LEVEL
 - CCA_02_7W_GTA55AS_[R186]:GATE A54 AIRSIDE
 - CCA_02_8W_GTA60AS_[R184]:GATE A60 AIRSIDE

Children in the System

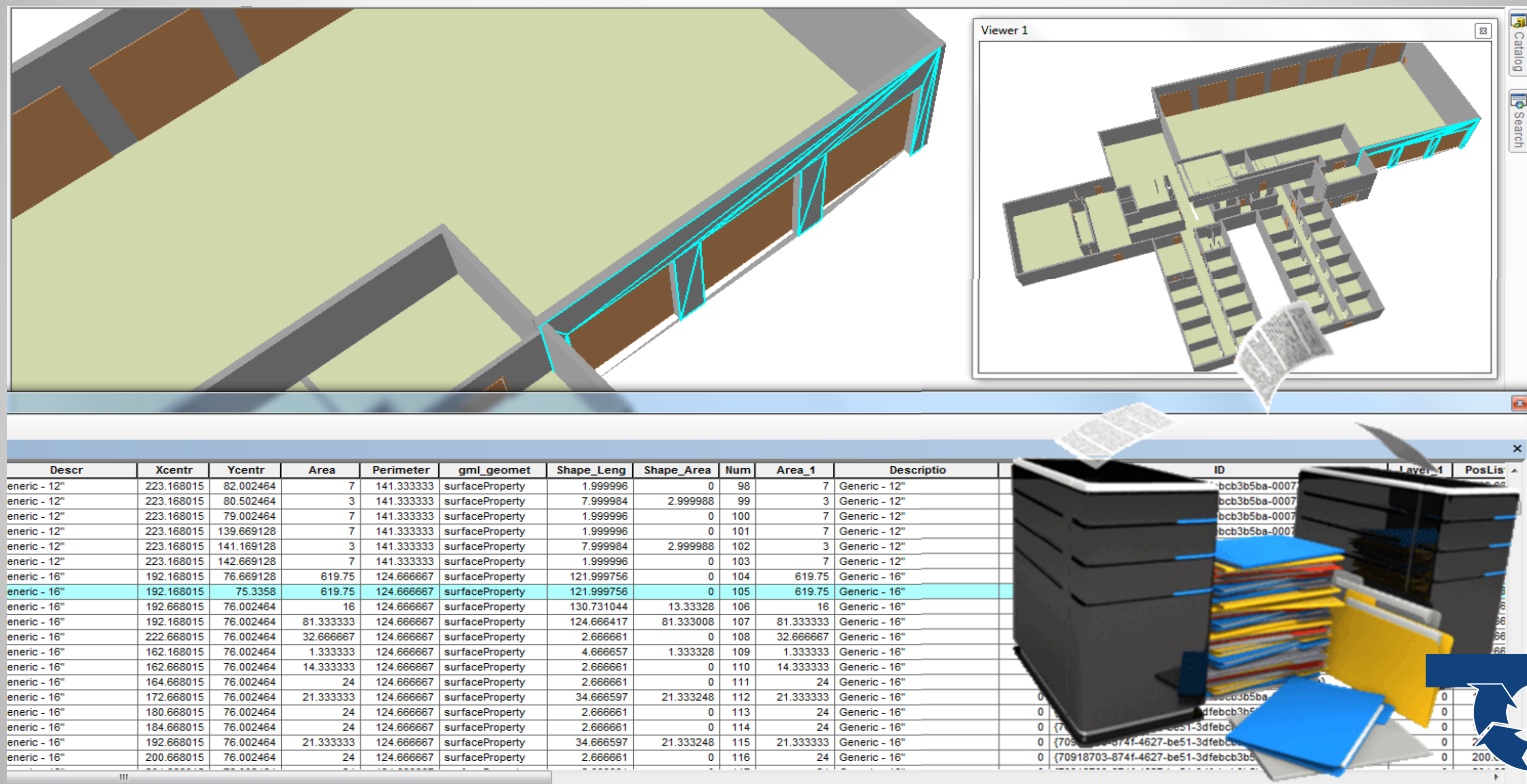
- CCA_02_7W_GGATE A54 AIRSIDE
- CCA_02_8W_GGATE A60 AIRSIDE

Details

Location CCA_02_7W_GGATE A54 AIRSIDE

Item

End in Mind: GIS



Standards:

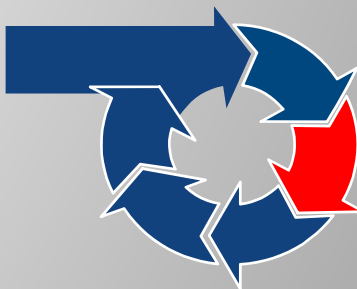
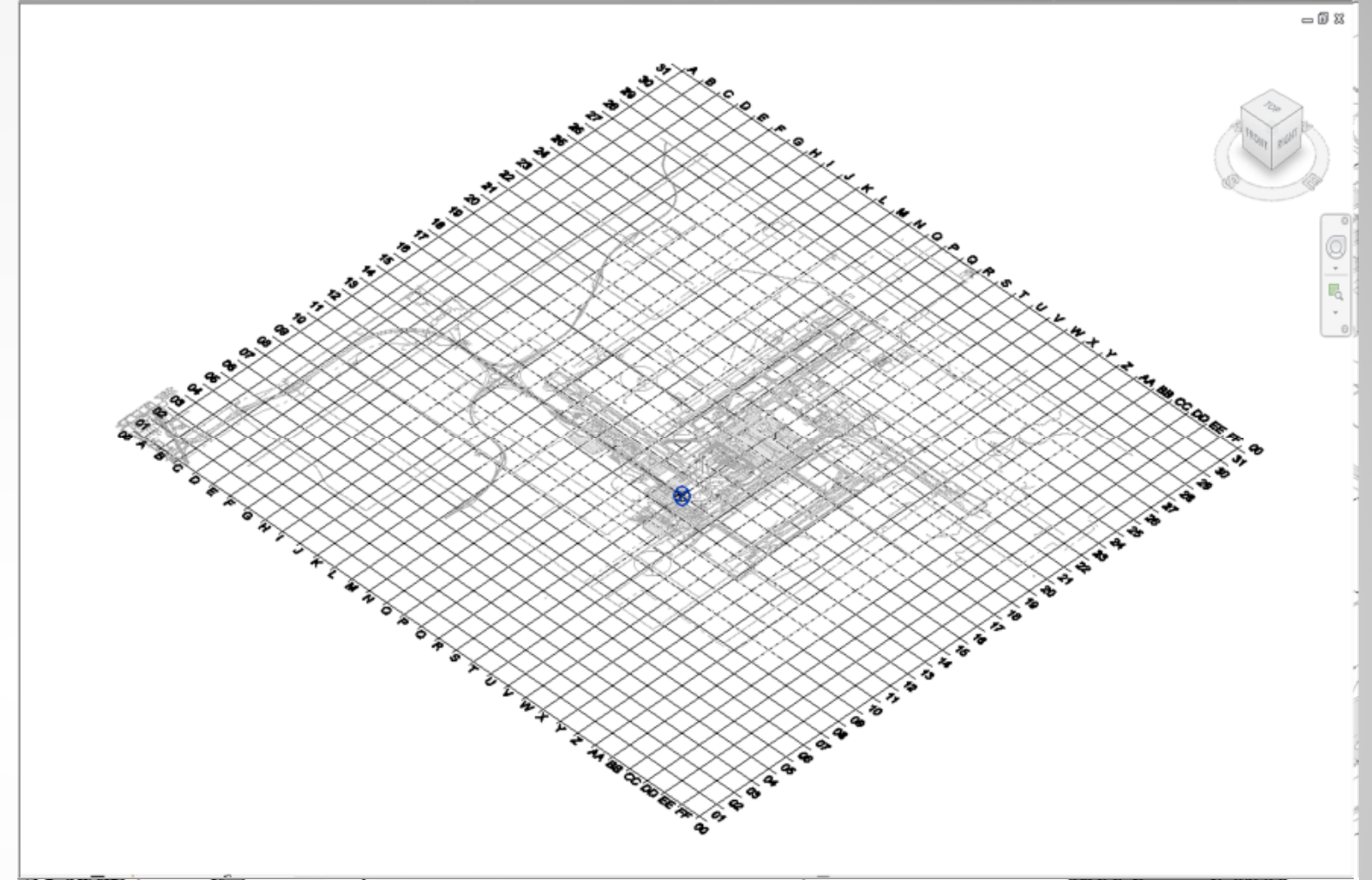
- “The approach to standards has to change. A global intergalactic interoperability super standard that all data somehow adheres to will never work.”

Source: Phillip G. Bernstein, FAIA, RIBA, LEED AP
Vice President, Strategic Industry Relations, Autodesk, Inc.



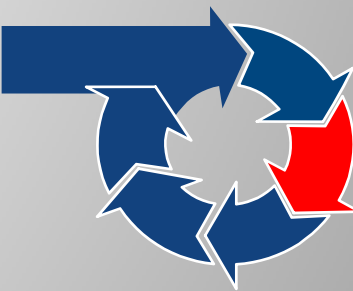
Standards: Platforms

- *Templates / Data Normalization*
 - Continuous Data & Process Management
 - FM/OM ready BIM and Current Relational Data Structures.
 - Collecting & Validating Data
 - real “As-Built” deliveries that transcend typical O&M Deliveries



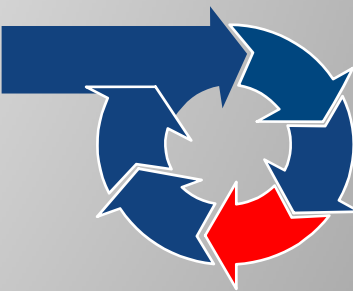
Standards:

Know your platforms
Know the integrations
Know the quirks
Know the Data Structures



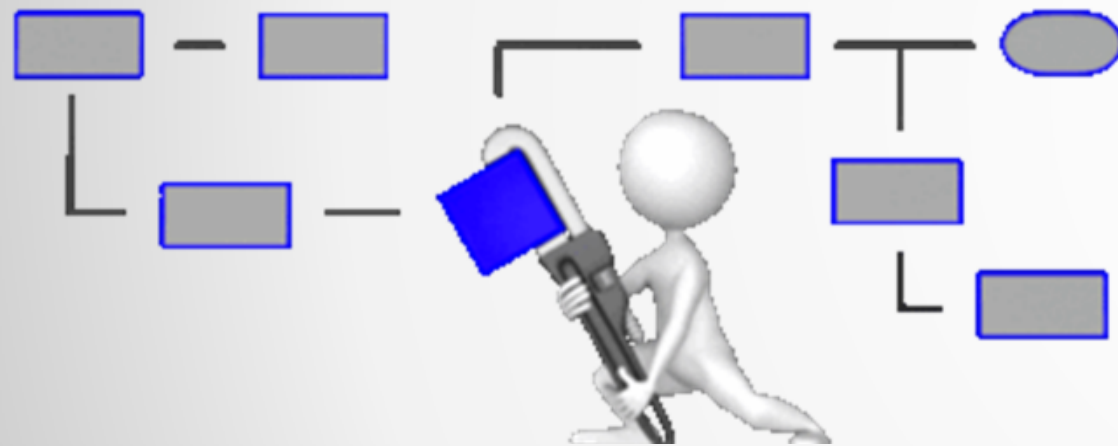
Implement:

- What size project requires a comprehensive BIM Process?
- What Delivery method is best for a BIM Process?
- Is it only for Vertical Projects?
- Change Management Plan - starts with Management and managing the fear of change



Implement: Delivery Method

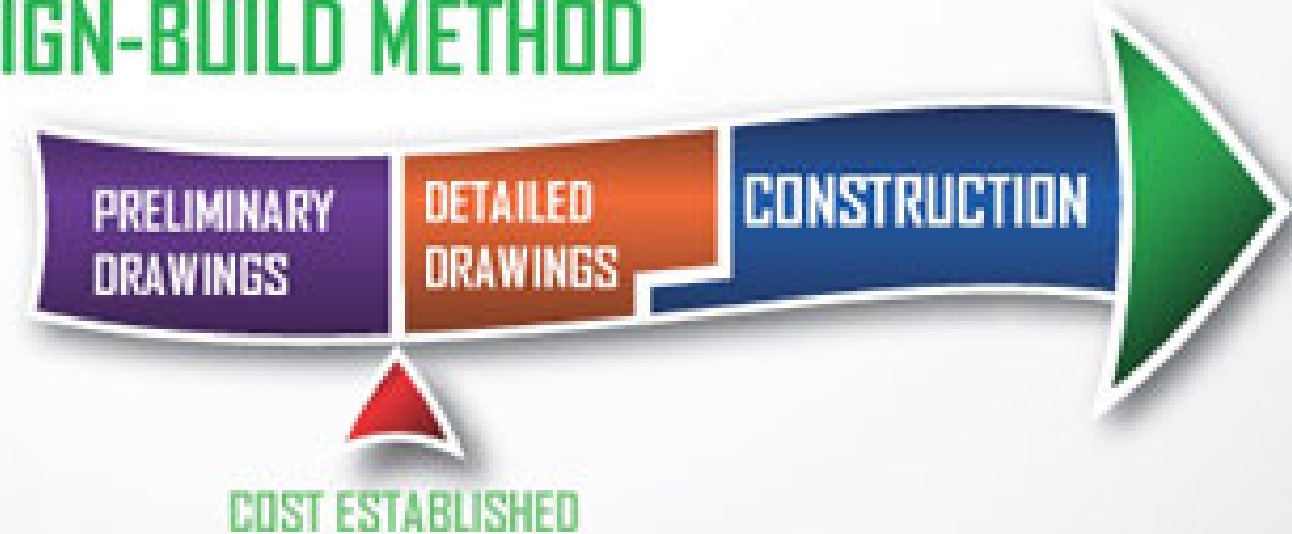
- Contract / Specification Language: Building a better process



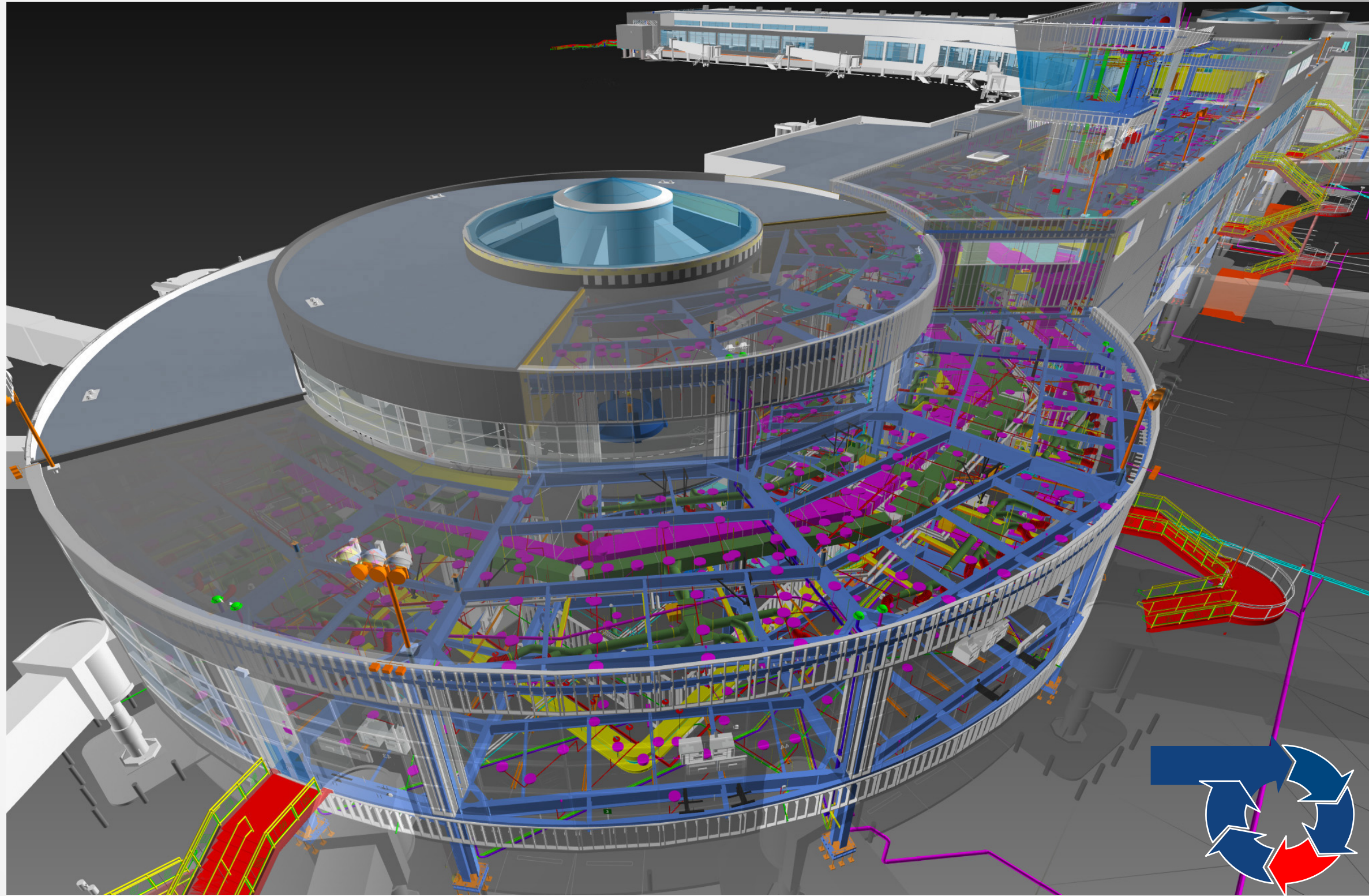
TRADITIONAL METHOD



DESIGN-BUILD METHOD

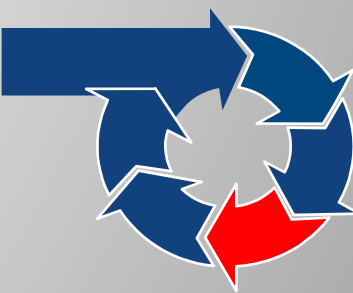


Implement: Vertical



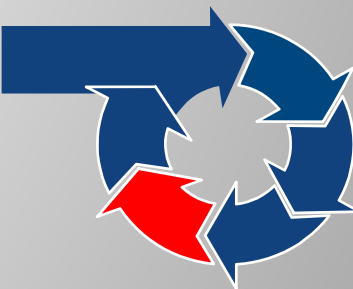
Implement: Civil

- Flat CADD
- .imx Data source
- GIS Data source
- Civil 3D content



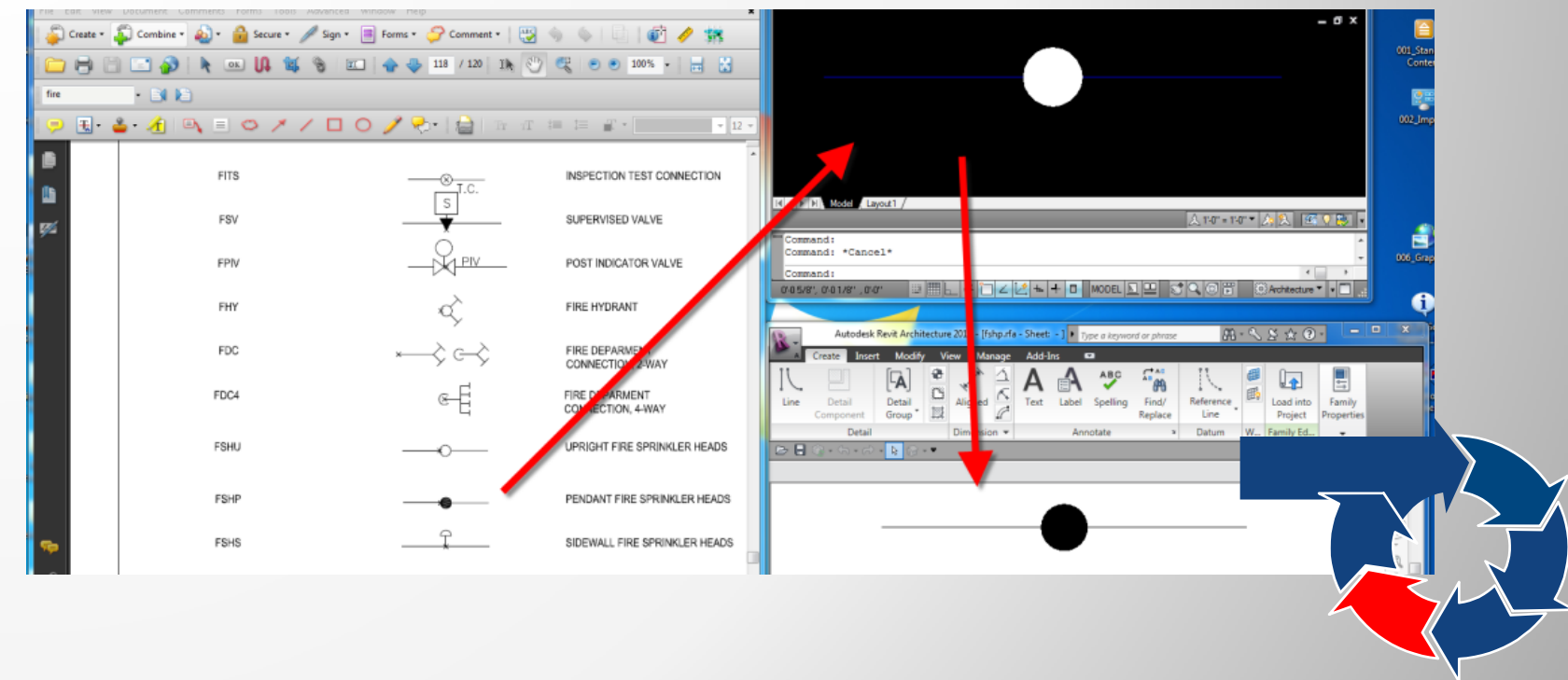
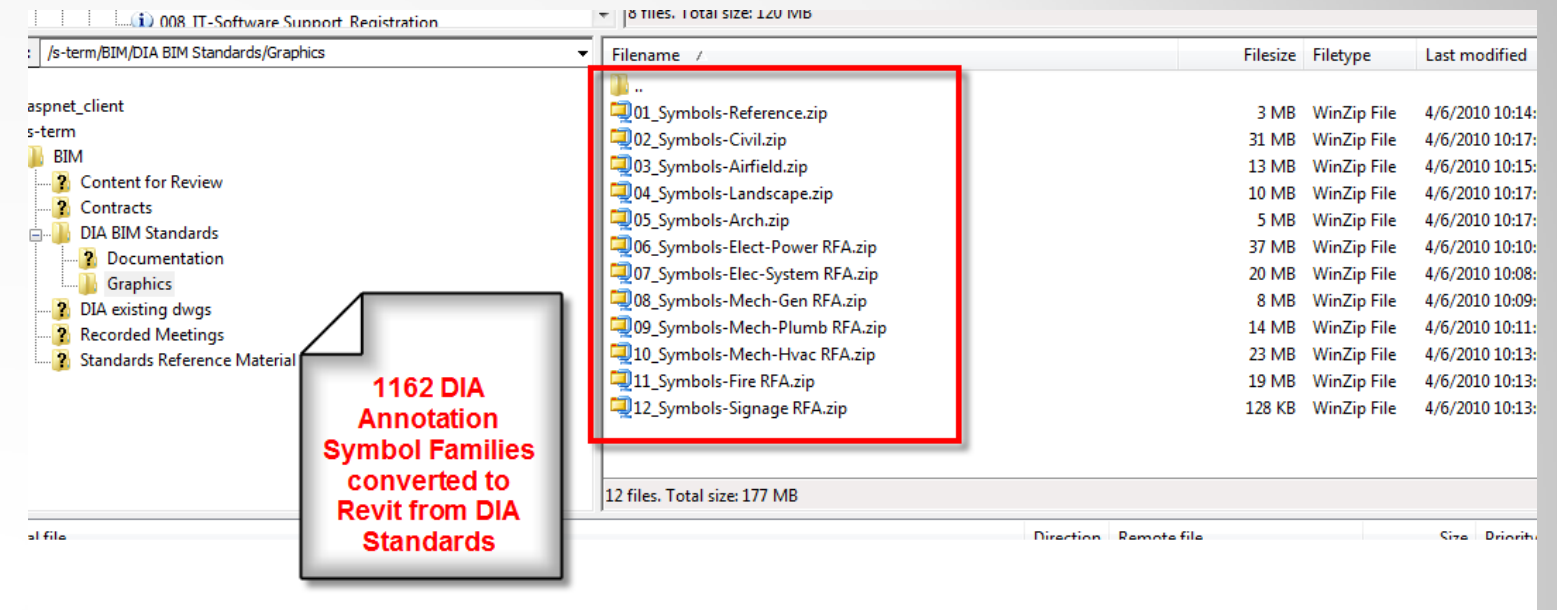
Communicate: Training

- *Implementation must be Cross-Cultural*
 - Top Down – bottom up support
 - Internal - department to department
 - External - discipline to discipline



Communicate: Outreach

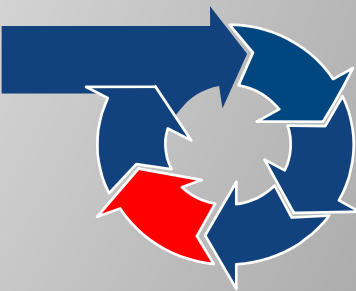
- Implementing a *technological solution as a cultural change*
 - Provide guidance and access to templates
 - Inform consultants of the reasons for compliance





Communicate: Check and Re-Check

- *Provide clear direction for compliance*
 - Provide guidance and access to templates
 - Inform consultants of the reasons for compliance



BIM Content: Design Model

Properties

233616-FPB-HWC-3-10in
233616-Titus_DTQP-HWC_Size 3-277V-1PH-10in

Mechanical Equipment (1) Edit Type

Electrical - Loads

Motor Full Load Amps	2.40 A
Apparent Power	664.80 VA
Panel	
Circuit Number	

Mechanical

Mech Heating Coil WPD (ft)	0.200000
Mech Heating Coil MBH	14.600000
Mech Heating Coil M.A.T.	65.60 °F
Mech Heating Coil GPM	2 GPM
System Classification	Power, Supply Air, Hydronic Retu...
System Name	Mechanical Supply Air 49, Me...
Type of Drive	
Pump Motor Speed	
Pump Head	
Minimum Efficiency	
Fluid Temperature	
Pump Power	
Power Supply Voltage	
Power Supply Phase	
Power Supply - HZ	
Pump Type	
Service	MEETING A

Mechanical - Airflow

Supply Air Flow	930 CFM
Static Pressure	0.0000 in-wg
Primary To Supply Ratio	0.000000
Primary Air Flow	0 CFM
Mech_Air Flow	560 CFM
Mech Heating Coil APD	0.1000 in-wg
Mech Fan S.P. "W.C."	0.3000 in-wg
Mech Design Air S.P. "W.C."	0.3000 in-wg
Mech Design Air Min. CFM	230 CFM
Mech Design Air Max. CFM	930 CFM

Mechanical - Loads

Pressure	0.000 psi
Heating Total Capacity	0.00 Btu/h
Gallons Per Minute	0 GPM

Dimensions

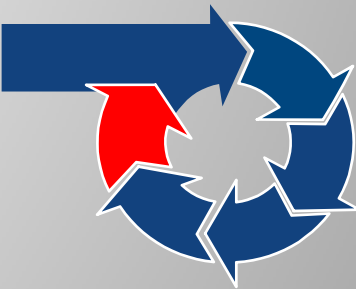
Properties help

Apply

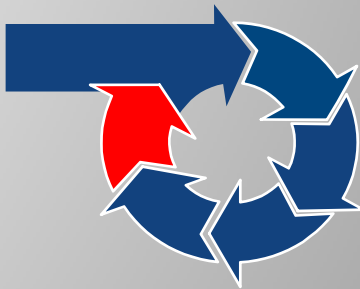
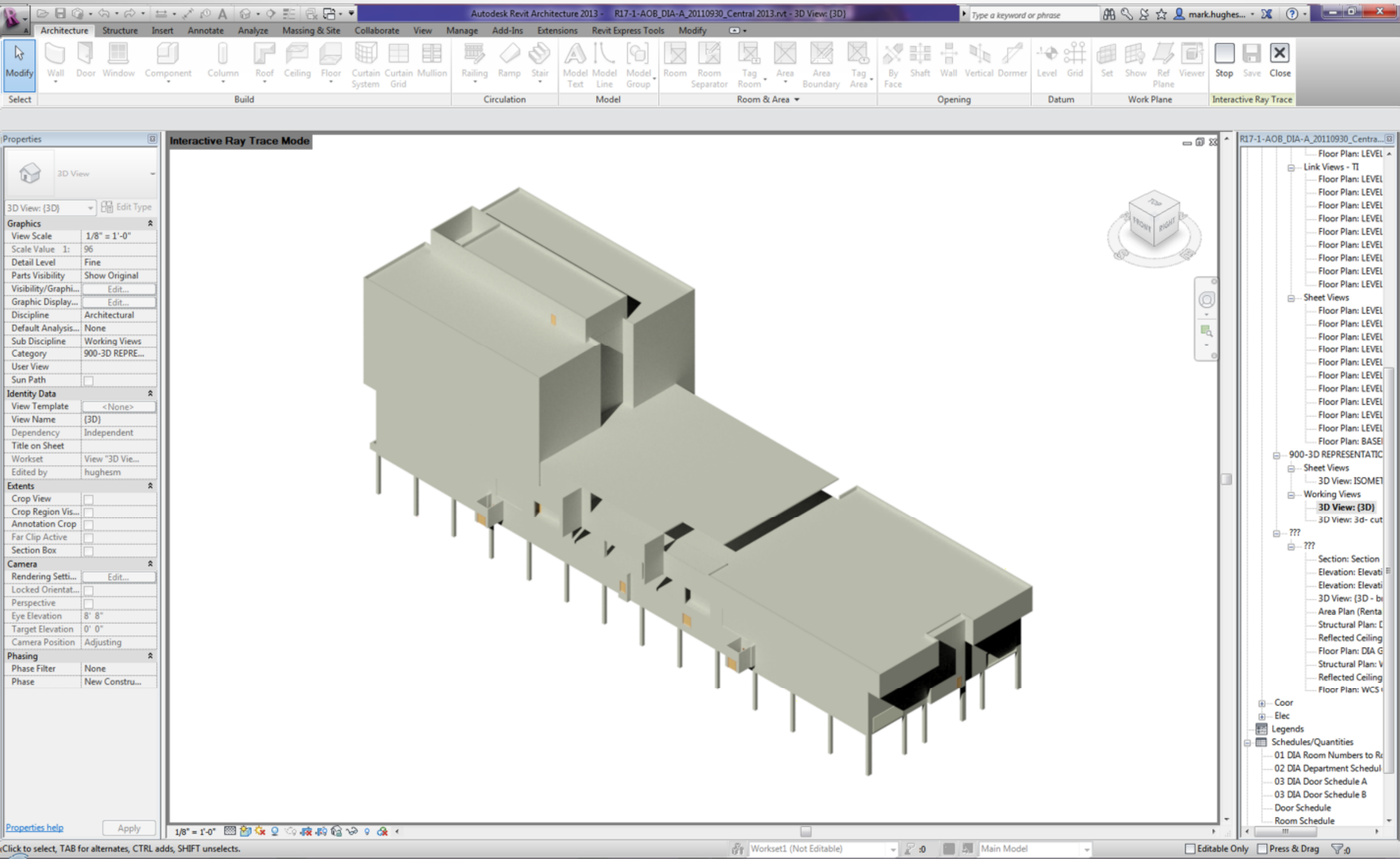
1/8" = 1'-0"

Diagram Labels:

- FSD
- 14"x12" SMOKE EXHAUST UP&DN
- SE-2
- EL202
- 2000-30"X16" SA-G-35(H)
- CORRIDOR
- CR210
- RA-E-(H)
- RA-E-(V)
- FIRE SERVICE ELEV LOBBY



BIM Content: Extraction



BIM Content: CxDMa

TRINITY™

Asset List

Item

23700-AHU-900_Indoor Air Handling Unit

Model

Solution Indoor 84x84

Serial Number

XTI-72x108

Internal Asset ID

AHU-12345

h

w

l

Length

13'-5"

Width

9'-0"

Height

6'-0"

Category

HVAC

Purchased From

Johnson Controls, York

Purchased Date

Aug 1, 2012

In Service Date

Aug 1, 2013

Cost

\$55,000.00

Depreciation Years

5

Book Value

\$42,161.90

Remaining Years

3.8329

Depreciation

\$12,838.10

Scan

Generate

Assigned To

Mechanical

Location

R17-1-HTL-15-2W-ME05

Signature

Signature

Date Checked Out

Aug 1, 2013

Days Till Due

216

Due Date

May 5, 2014

Assigned

Date Checked In

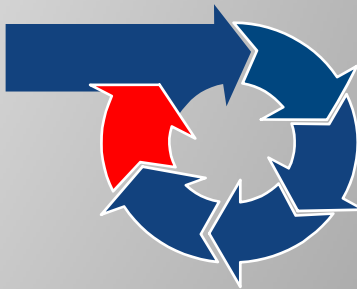
O & M Manual

YORK

YORK SOLUTION
AIR HANDLING UNITS

YORK SOLUTION INDOOR AND OUTDOOR MODELS
27X27 THROUGH 132X138

Return Parts
From 102-20-RP1
With P/N Contact Book, Parts
(800) 833-1701
Manufactured to specialty parts
in Canada (514) 343-5414



BIM Content: DATA

Properties

237300-AHU-900
AHU-900

Mechanical Equipment (1)

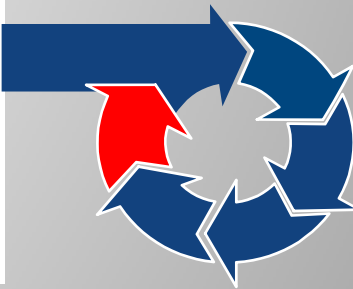
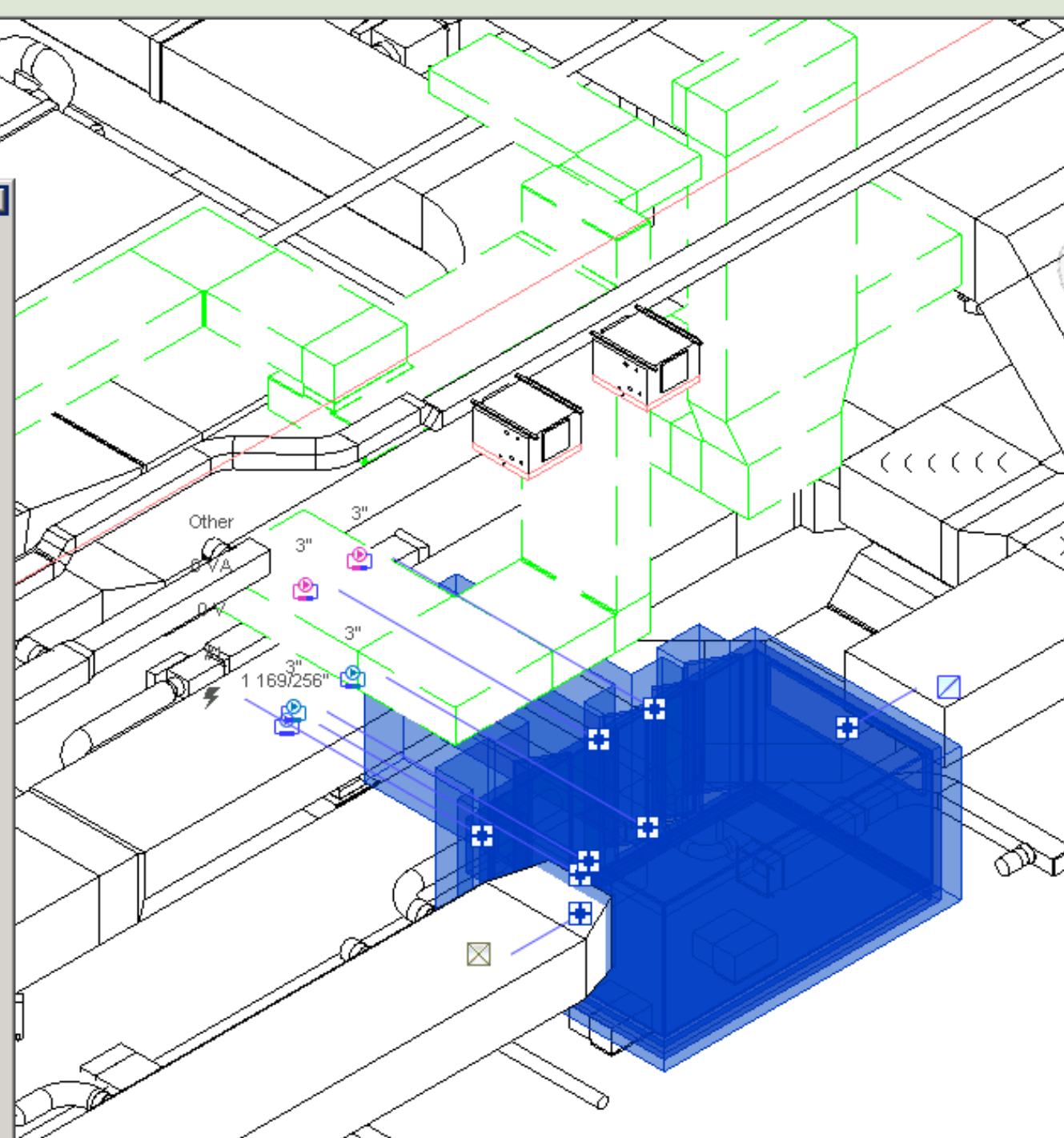
PERCENT OA (OA/SA)
DESIGN OA (CFM)
EA EQUIPMENT
EXHAUST AIR (CFM)
Electrical - Loads
Panel
Circuit Number
Mechanical
Mech Heating Coil MBH 1500.000000
Mech Heating Coil GPM 79.000 GPM
Mech Cooling Coil WPD (ft) 16.000000
Mech Cooling Coil Total MBH 615.600000
Mech Cooling Coil Sensible MBH 615.600000
Mech Cooling Coil GPM 83.200 GPM
System Classification Return Air, Hydronic Re
System Name SA 369
Type of Drive
Pump Motor Speed
Pump Head
Minimum Efficiency
Fluid Temperature
Pump Power
Power Supply Voltage
Power Supply Phase
Power Supply - HZ
Pump Type
Service HOTEL
Mechanical - Flow
Mech Air Flow 18000.00 CFM
Mech OA CFM 18000.00 CFM
PURGE CFM
Dimensions
Plenum Box Depth
Identity Data
Tag
Mech Area Served 2ND LEVEL KITCHEN
Mechanical Equipment Style (none)

Type Properties

Family: 237300-AHU-900 Load...
Type: AHU-900 Duplicate...
Rename...

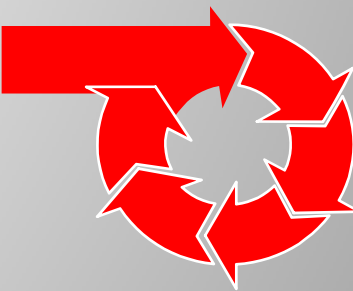
Type Parameters

Parameter	Value
Electrical	
Number Of Poles	3
Mech Voltage	480.00 V
Mech FLA	31.00 A
Load Classification	HVAC
Mechanical	
WHEEL_DATA_TYPE	Air Foil
SUPPLY_FAN_SP_INWG_TOTAL_WIT	3.1300 in-wg
SUPPLY_FAN_SP_INWG_EXTERNAL	1.5000 in-wg
SUPPLY_FAN_MOTOR_HP	14914.00 W
SUPPLY_FAN_MOTOR_BHP	9925.27 W
SUPPLY_FAN_CFM_TOTAL	20000.00 CFM
MOTOR_V	460.00 V
MOTOR_RPM	1223
MOTOR_PH	3
MOTOR_HP	14914.00 W
MOTOR_BHP	9925.27 W
Heating Coil 1 Min Rows	2.000000
Heating Coil 1 Max Water Pressure D	8.000000
Heating Coil 1 Max Face Velocity	500.00 FPM
Heating Coil 1 Max Air Pressure Drop	0.2000 in-wg
Heating Coil 1 MBH	1431.000000
Heating Coil 1 Leaving Water Temper	135.70 °F
Heating Coil 1 Leaving Air Temperatu	70.00 °F
Heating Coil 1 Flow Rate	68.000 GPM
Heating Coil 1 Entering Water Tempe	180.00 °F
Heating Coil 1 Entering Air Temperat	10.00 °F



BIM Content

- End in Mind
- Standards
- Implement
- Communicate



An aerial view of a city skyline with a bridge and a rainbow. The skyline features several tall buildings of varying heights and styles, including some with distinctive architectural details like domes and spires. The bridge is a multi-lane highway with a red car driving on it. A vibrant rainbow is visible on the bridge's surface, stretching from the foreground towards the city. The surrounding landscape includes green grass, trees, and a body of water in the background.

Planning with a BIM Process

Chris Herrera - Kiewit



- Not out of the box
- What your end use is
- Electronically capture data
- Integrate Data from multiple sources
- New planning tools
- New As-built

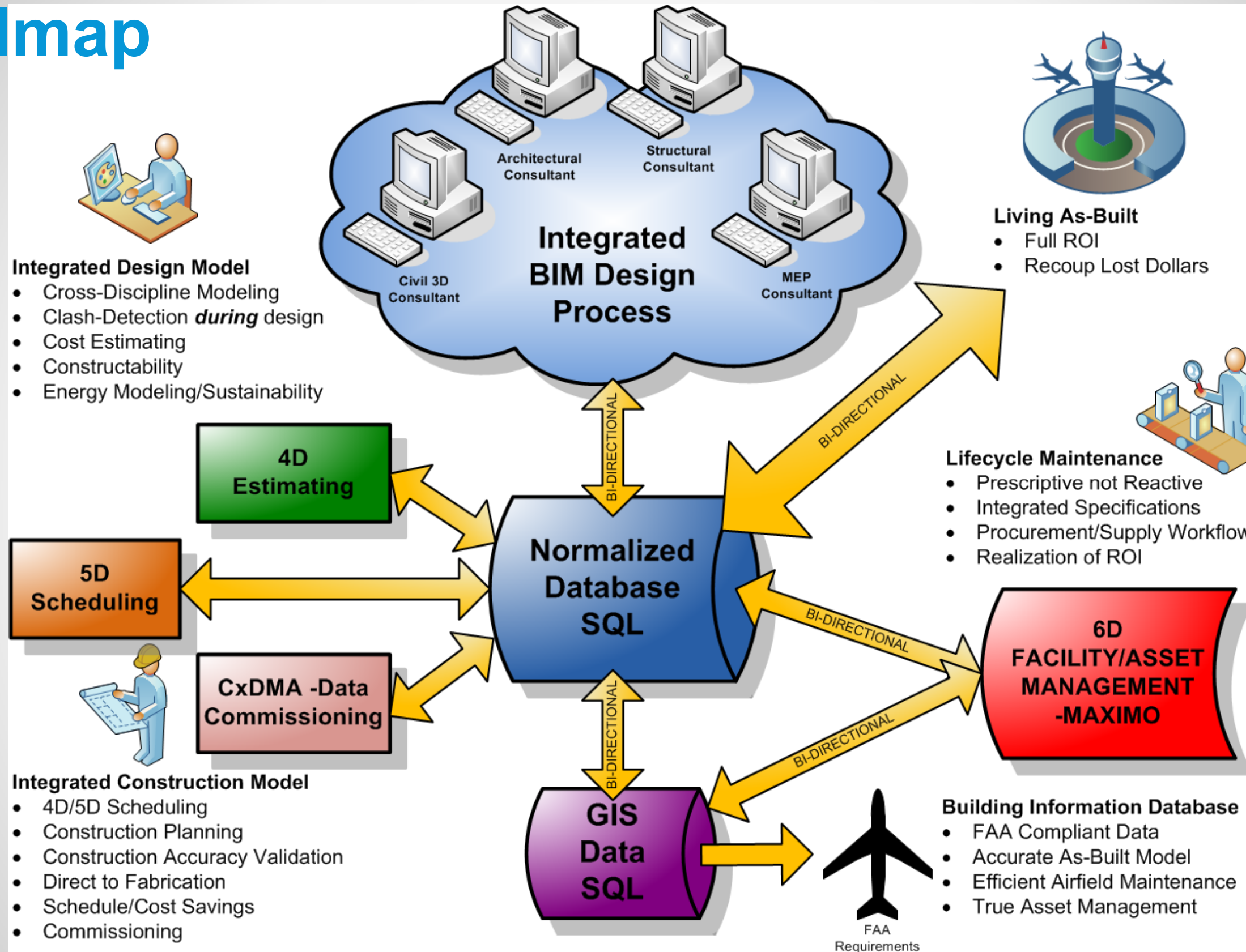
A wide-angle photograph of a city skyline with various skyscrapers under a clear blue sky.

The Value of the Owner's data

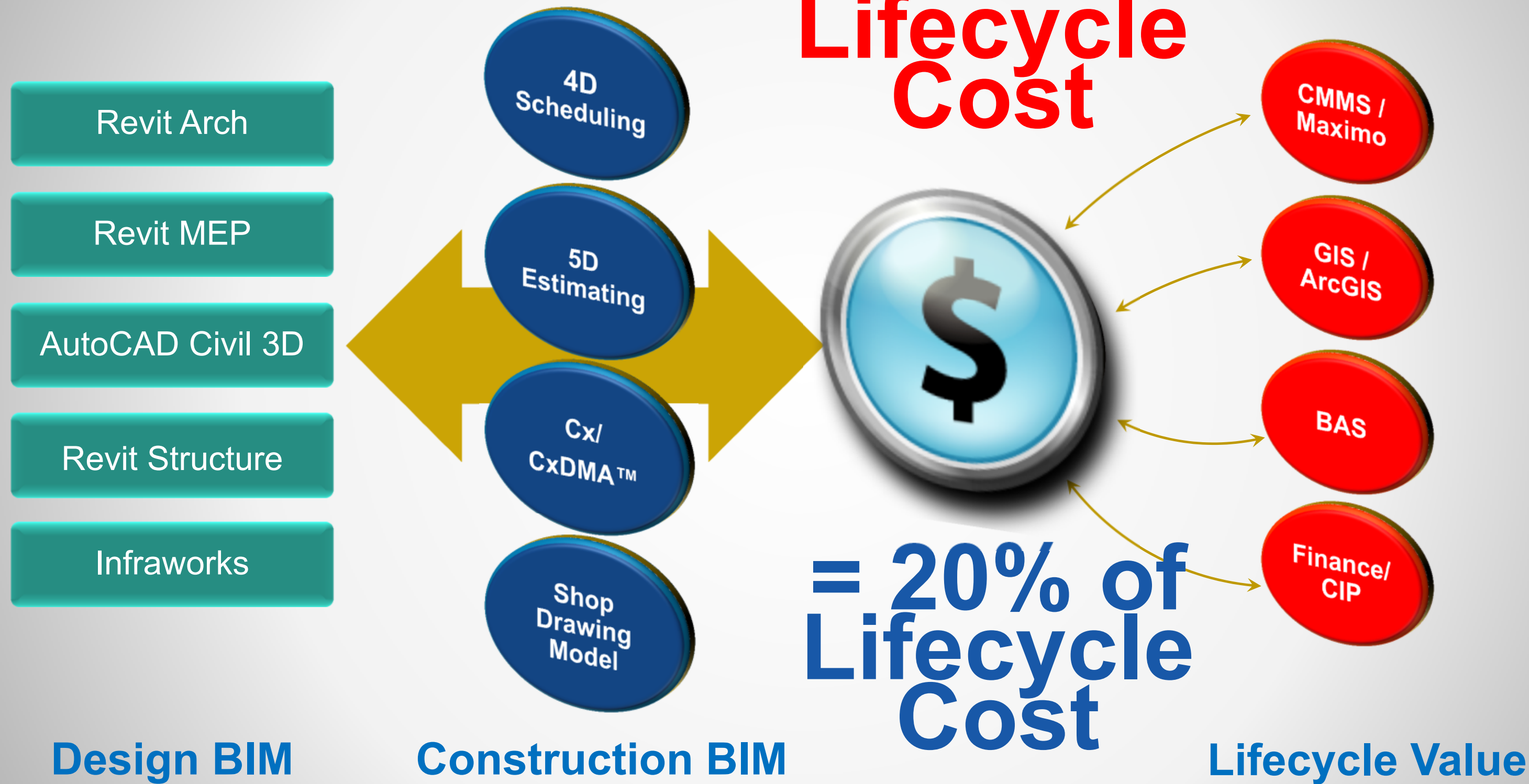
Dennis Rodriguez - AECOM



A Roadmap



The Real Value



Guidance of a Standard

402.1.1

Denver International Airport's Vision

Denver International Airport (DIA) recognizes that Building Information Modeling (BIM) represents a fundamental change to the industry. This change affects the traditional processes and deliverables for planning, architecture, engineering, construction and facilities management.

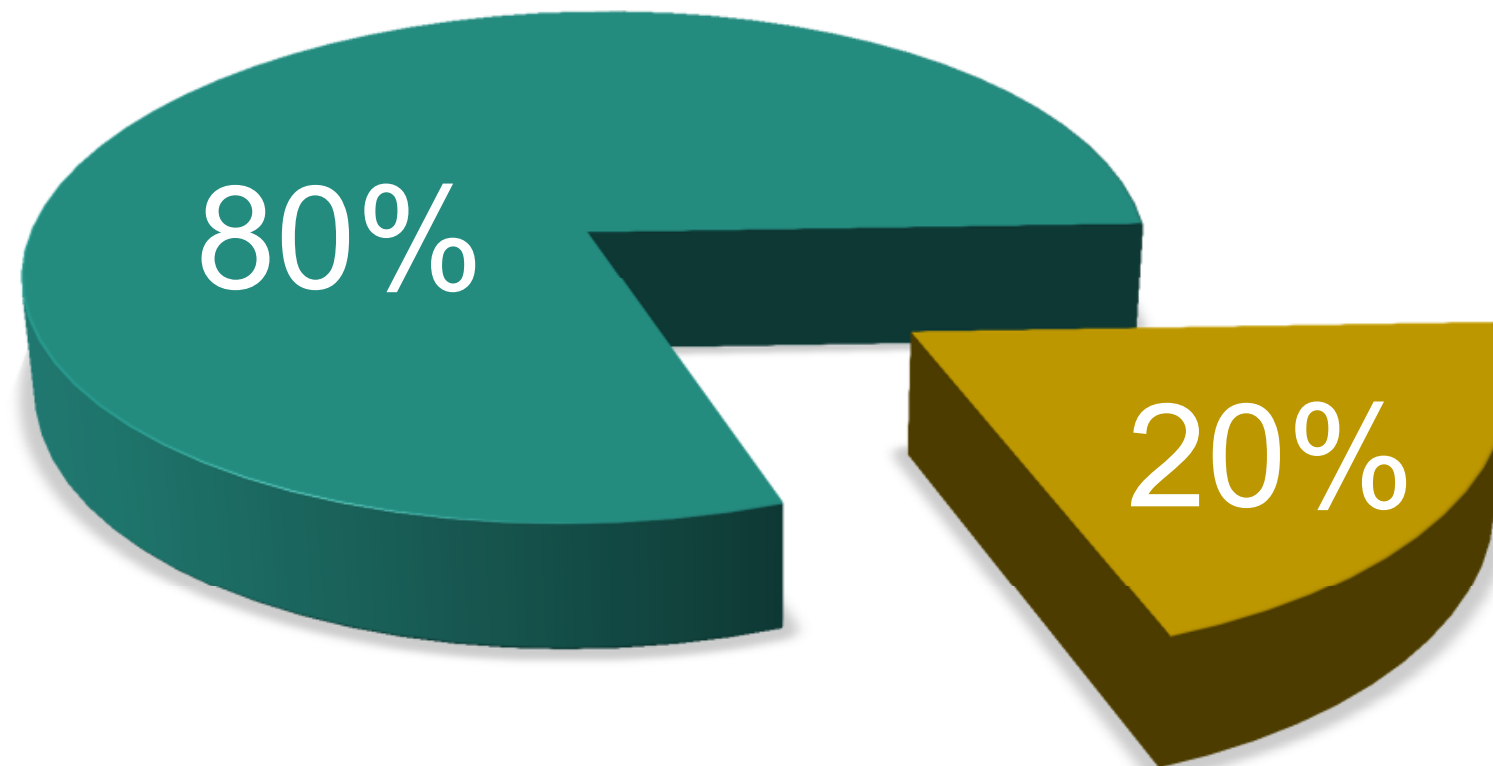
This new accessibility to the data of the building allows the FM and GIS programs to be *more productive* with the overall management and *preventive maintenance* of the facility. This in turn allows exposure to other management benefits including improvement of building *sustainability, schedulable maintenance* and overall *predictable behavior* of the facility

Keep in mind also, that these processes will update as newer technology and software updates become available that alter or enhance these workflows, processes and requirements.

The Difference in Cost = Value

DIA Lifecycle Costs

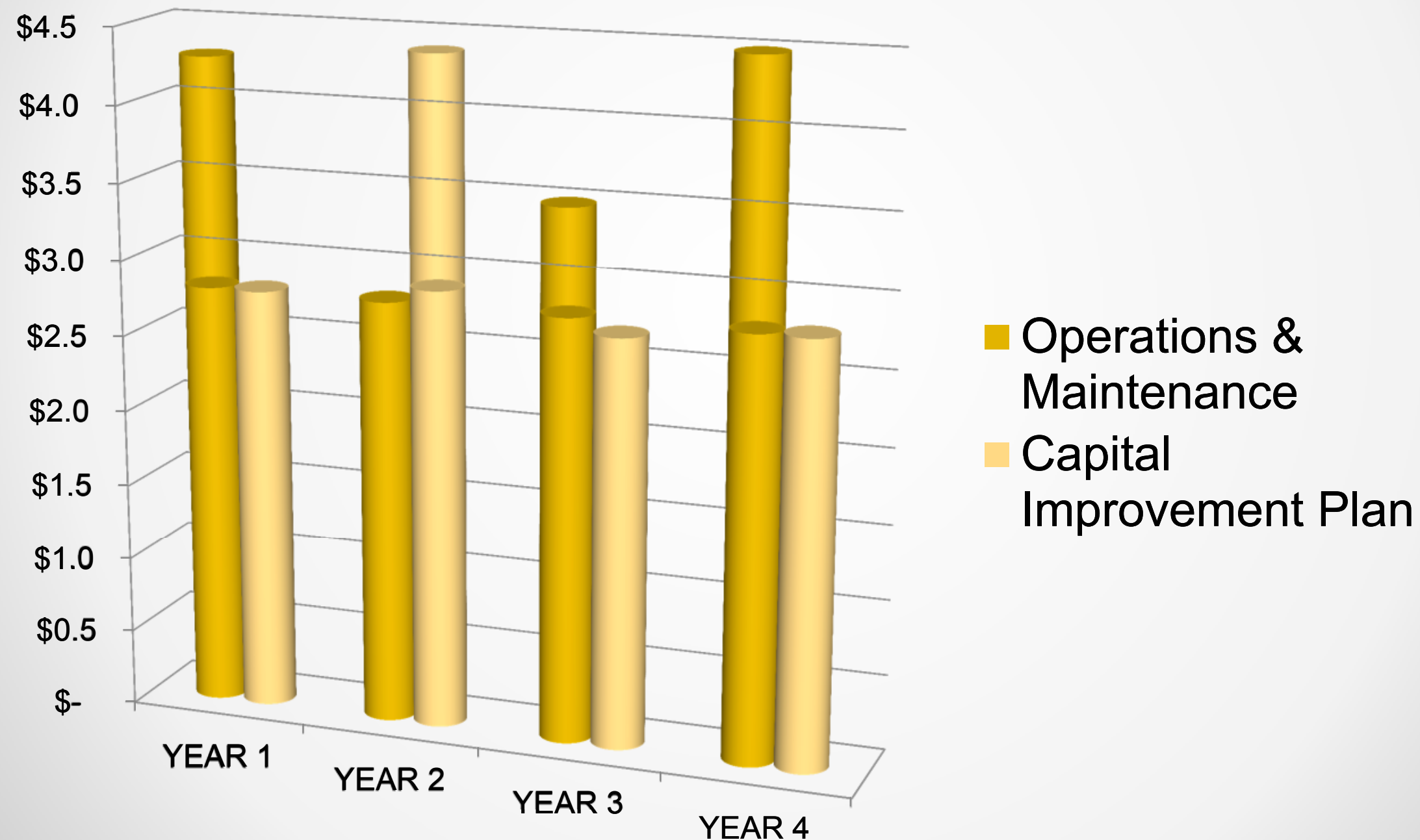
■ Design & Construction ■ Operations & Maintenance



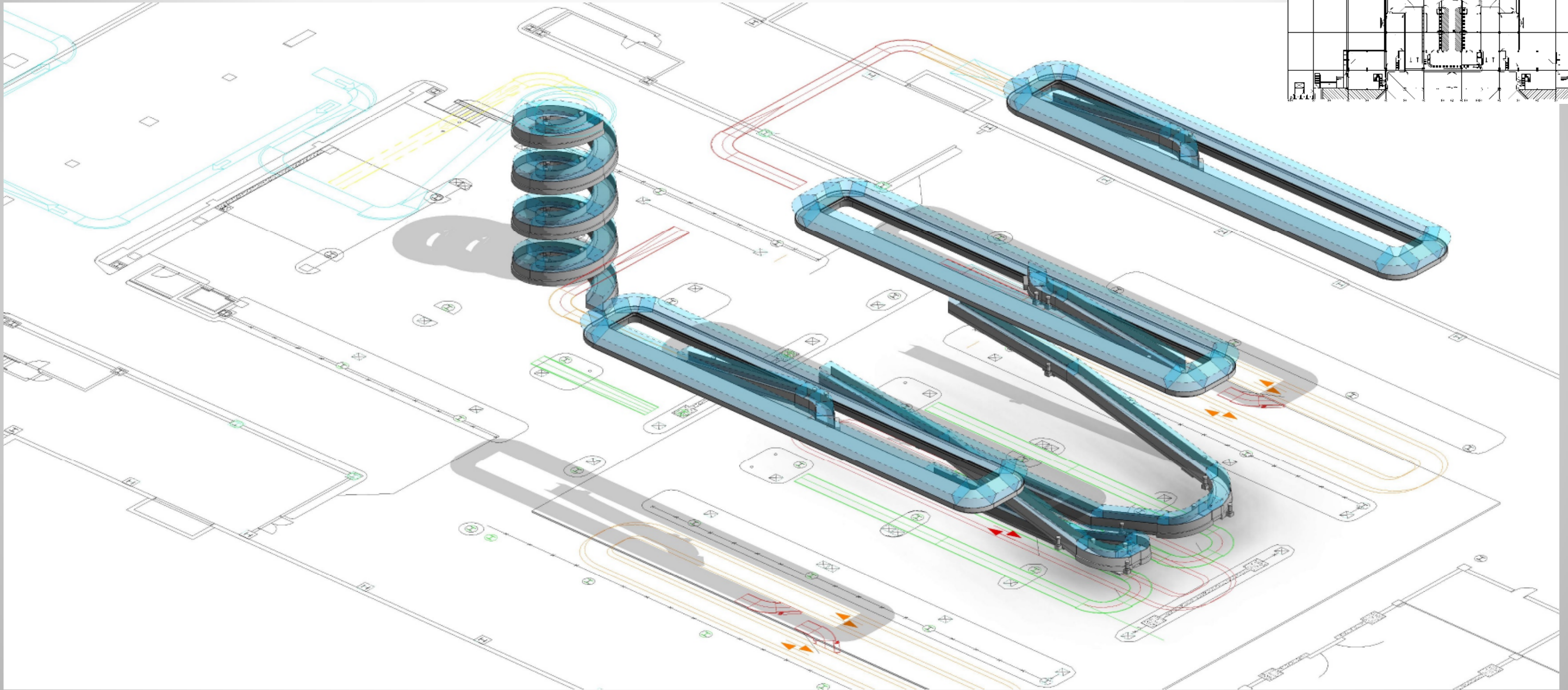
The median lifespan of a typical office building is 73 years.* However, at a 24/7, critical functioning facility such as an airport, the high usage factor is more likely to push the lifecycle cost past 80%.

* Source: 2008 Buildings Energy Data Book, Buildings Technologies Program, Energy Efficiency and Renewable Energy, U.S. Department of Energy, page 3-12.

The Difference in Vision = Predictable Cost



Critical Assets



Critical Assets

BHS-Conveyor-Curve-Spiral
BHS-Conveyor-Curve-Spiral 90 Deg/30"

Generic Models (1)

Edit Type

Constraints

Level	Level 1
Host	Level : Level 1
Offset	5' 0"
Moves With Nearby Elements	<input type="checkbox"/>

Graphics

Rail Right	<input checked="" type="checkbox"/>
Rail Left	<input checked="" type="checkbox"/>
Motor View	<input checked="" type="checkbox"/>
Motor Up Outside	<input type="checkbox"/>
Motor Up Inside	<input checked="" type="checkbox"/>
Motor Up	<input checked="" type="checkbox"/>
Motor Low Outside	<input type="checkbox"/>
Motor Low Inside	<input type="checkbox"/>
Motor Inside	<input checked="" type="checkbox"/>
End Gap	<input type="checkbox"/>
Built in Tag	<input checked="" type="checkbox"/>

Dimensions

Maint ROW Minimum	3' 0"
Maint ROW Maximum	1' 0"
Gap at end of Spiral	0' 0"
Volume	38.33 CF

Identity Data

VFD	<input checked="" type="checkbox"/>
Tracking Area	<input checked="" type="checkbox"/>
Speed - Modified	0.000000
Speed	150.000000
PLC Zone	
PE	<input checked="" type="checkbox"/>
MCP Zone	
Line Description	
E Stop	<input checked="" type="checkbox"/>
Conveyor ID - Modified	
Conveyor ID	Sample
Comment 3	
Comment 2	
Comment 1	
Comments	
Mark	
Workset	Workset1
Edited by	Chet Arasim

Phasing

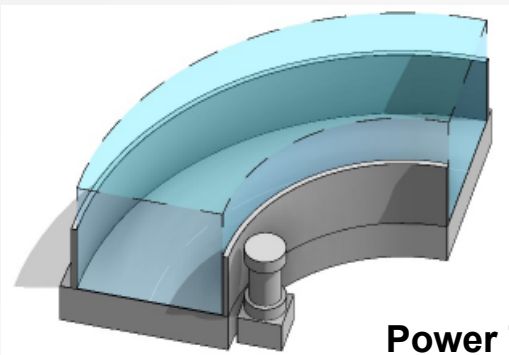
Phase Created	New Construction
Phase Demolished	None

Other

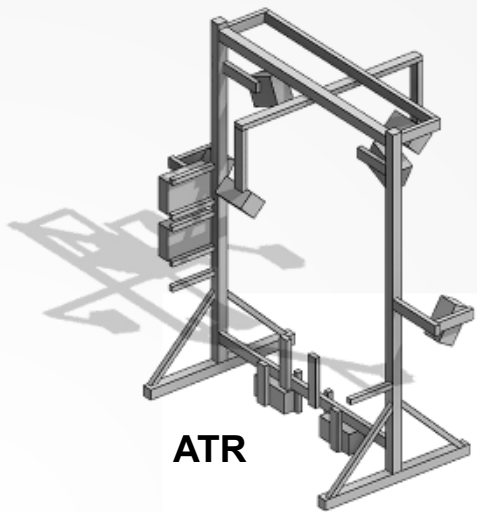
Transit Time	3.673039
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Properties help

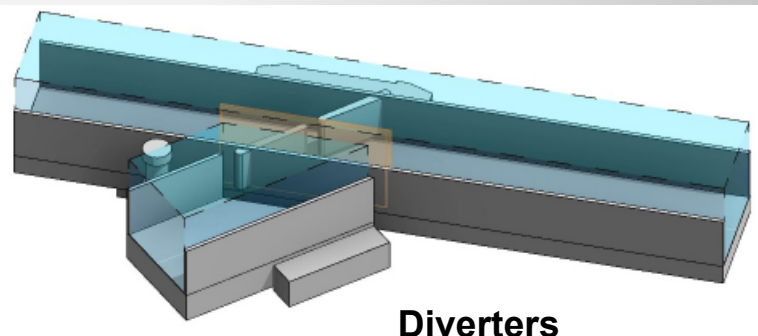
Apply



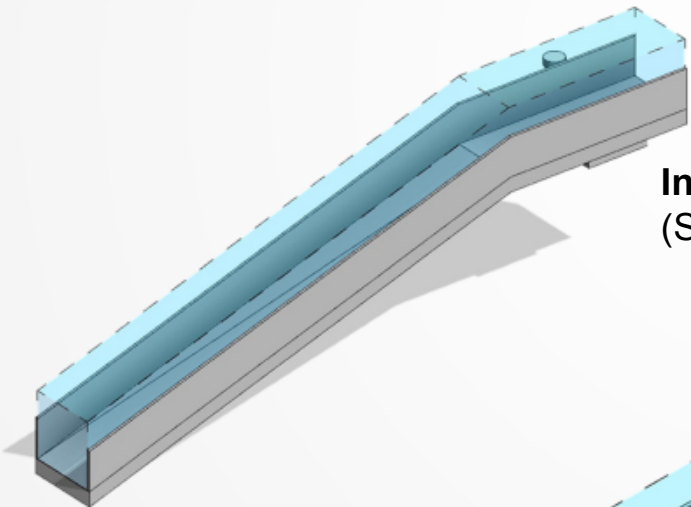
Power Turns
30, 45, 60, 90
degrees
(Standard &
Oddsize)



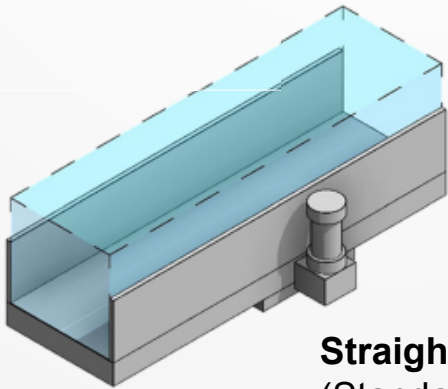
ATR



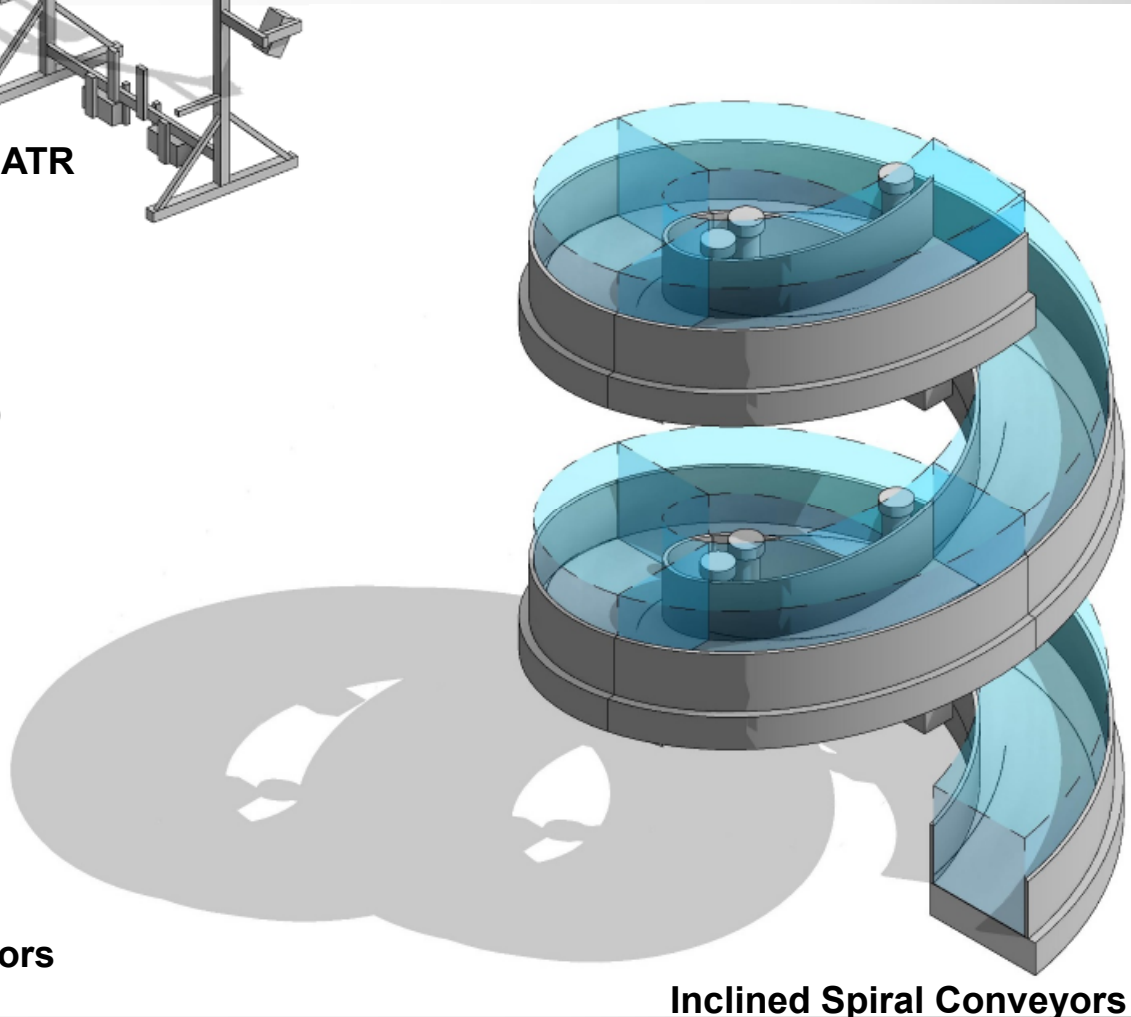
Diversers
(Standard & Oddsize)



Inclined Breakovers
(Standard & Oddsize)

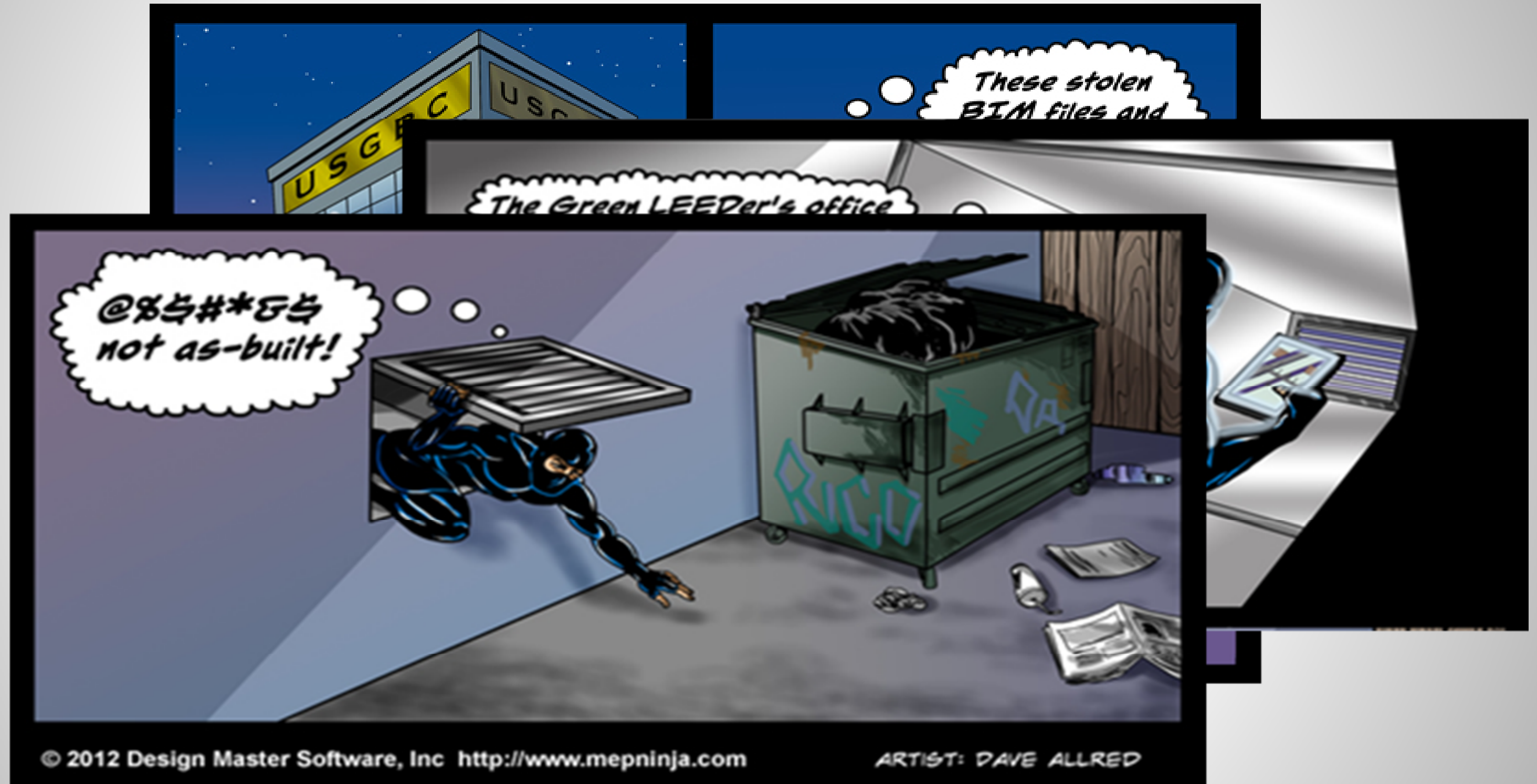


Straight Conveyors
(Standard &
Oddsize)

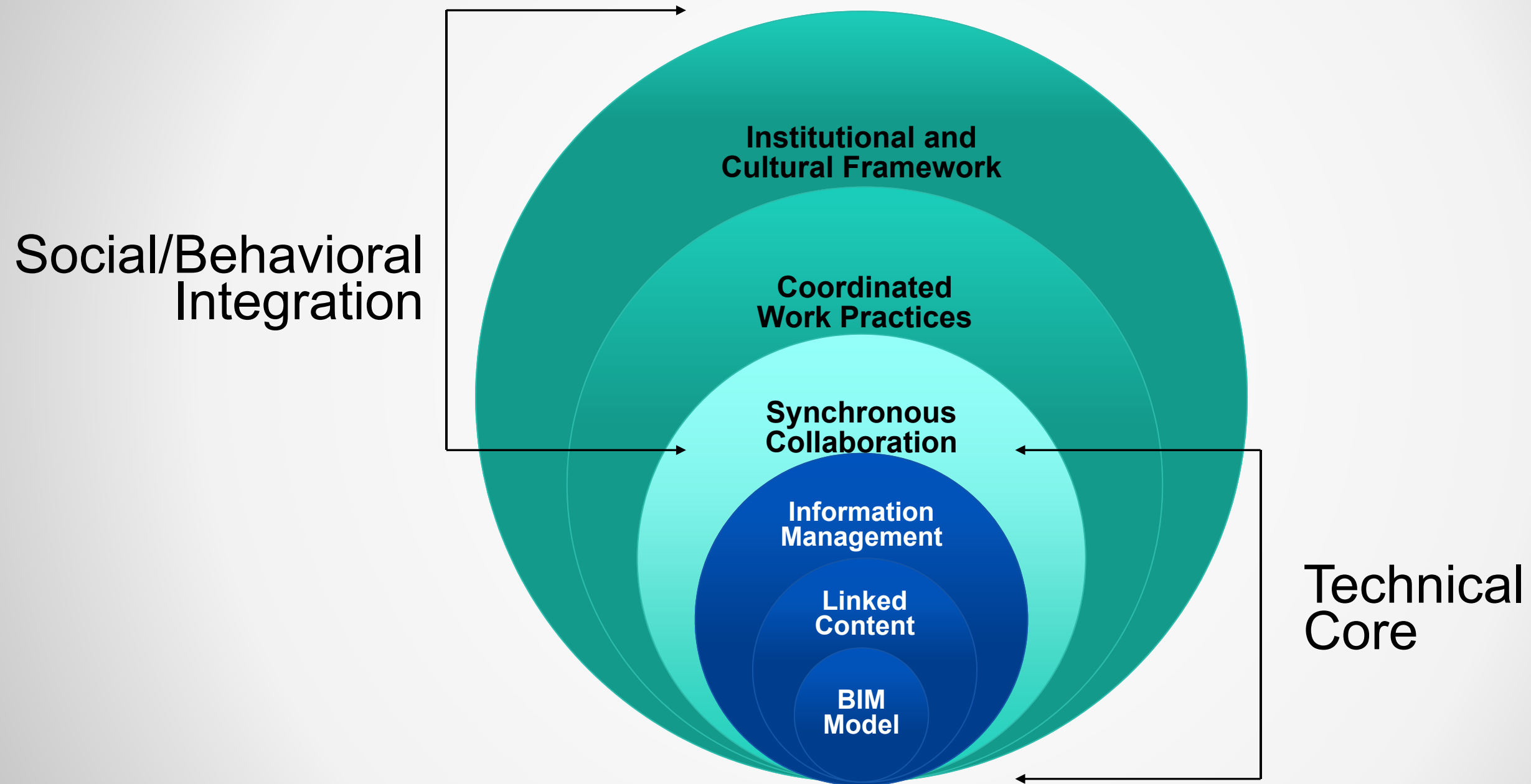


Inclined Spiral Conveyors
30, 45, 60, 90 degrees
(Standard & Oddsize)

The Effort to Change

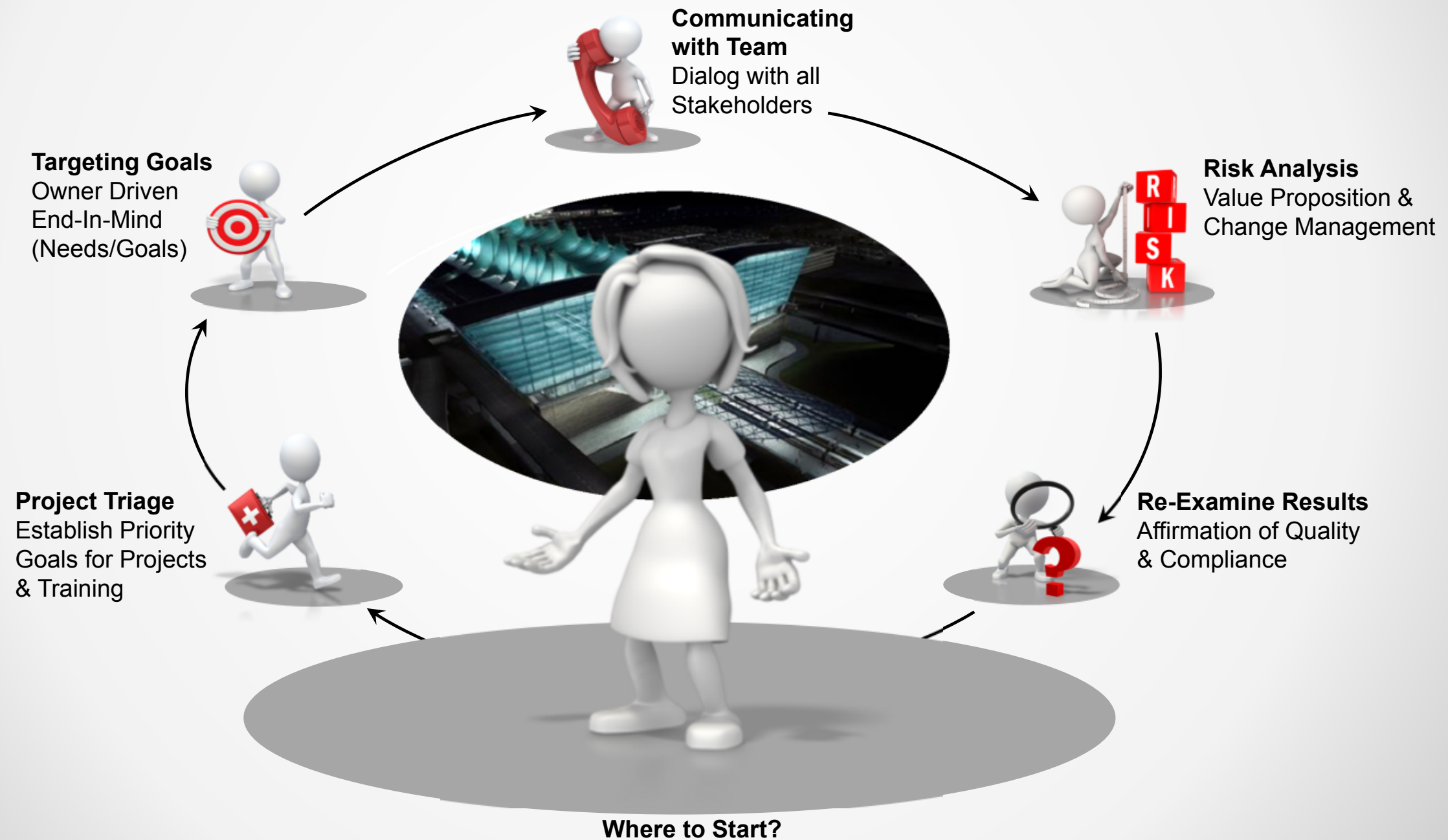


Technology vs. Psychology



BIM Implementation as a Sociotechnical System

Implementation: It's a Process



Answer and Questions



ANSWER: 8

