

# Drive successful BIM to FM practice – from a large facility owner's perspective

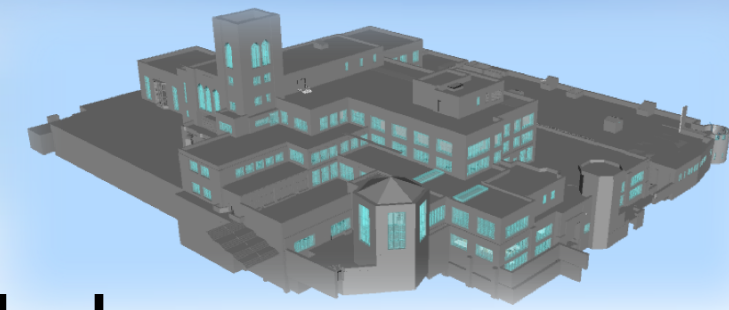
**William Bausmith, Jr.**

Associate Director, Design and Construction  
@bausmith  
**Princeton University**

**Sheryl Yang**

Solution Architect  
**Autodesk**

# Class Summary

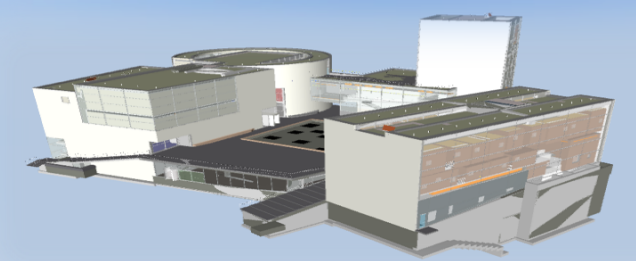


Many facility owners require intelligent models as deliverables for capital projects. However, simply asking for models or COBie, or mandating industry-standard Building Information Modeling (BIM) execution plans, may not fit the specific requirements and workflows within an owner's organization. In this session, you will learn best practices from Princeton University with more than a decade's experiences of driving successful BIM projects.





# Class Summary



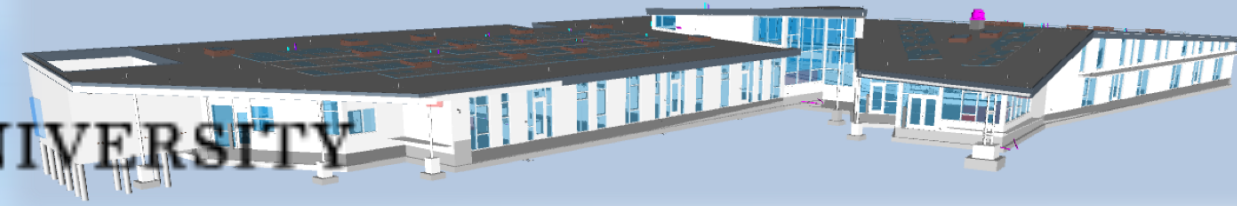
We will share with you how Princeton has standardized the workflows to obtain an integrated deliverable that combines BIM models with as-built documents and data. Princeton will explain how defining the facilities management (FM) deliverable as a prime objective very early in the construction phase empowers architects, engineers, and contractors to increase the quality of their services, while providing excellent FM deliverables.



# Class Summary



PRINCETON UNIVERSITY



You will also discover innovative technologies of integrating Princeton's existing FM applications with Autodesk, Inc., technology to extend BIM to FM teams.  
This session features BIM 360 Glue and BIM 360 Field.





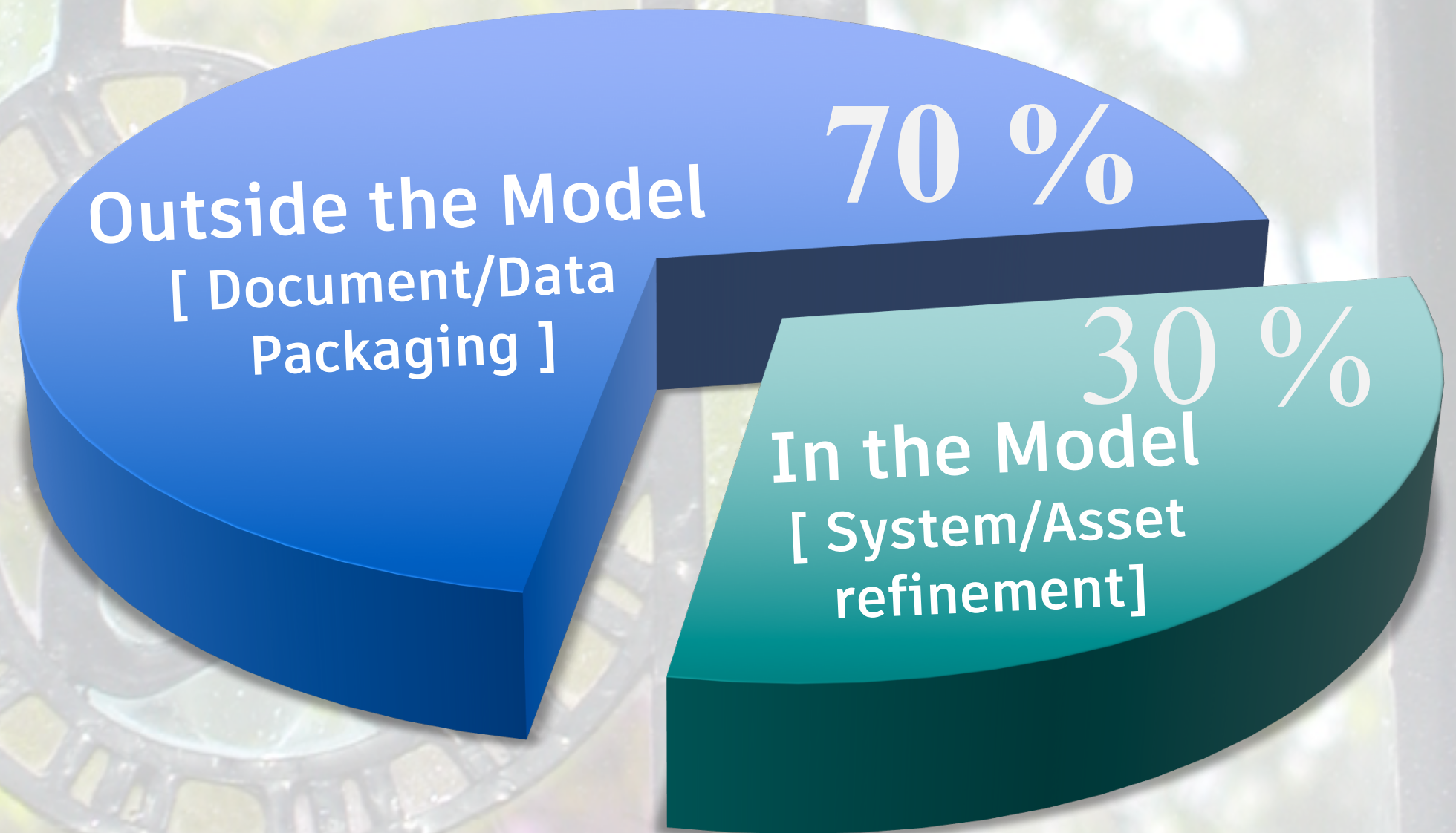
# Key learning objectives

At the end of this class, you will be able to:

- Understand important steps towards developing your 'custom' BIM standards.
- Set the stage for your BIM teams, and drive your team through an efficient, productive process.
- Integrate FM document collection workflows that seamlessly integrate with project execution workflows.
- Deploy a software solution that fully integrates BIM360Field, Glue and your FM library, creating a high value FM deliverable.

# **BIM to FM** **at Princeton**

## **- Focus over Time**

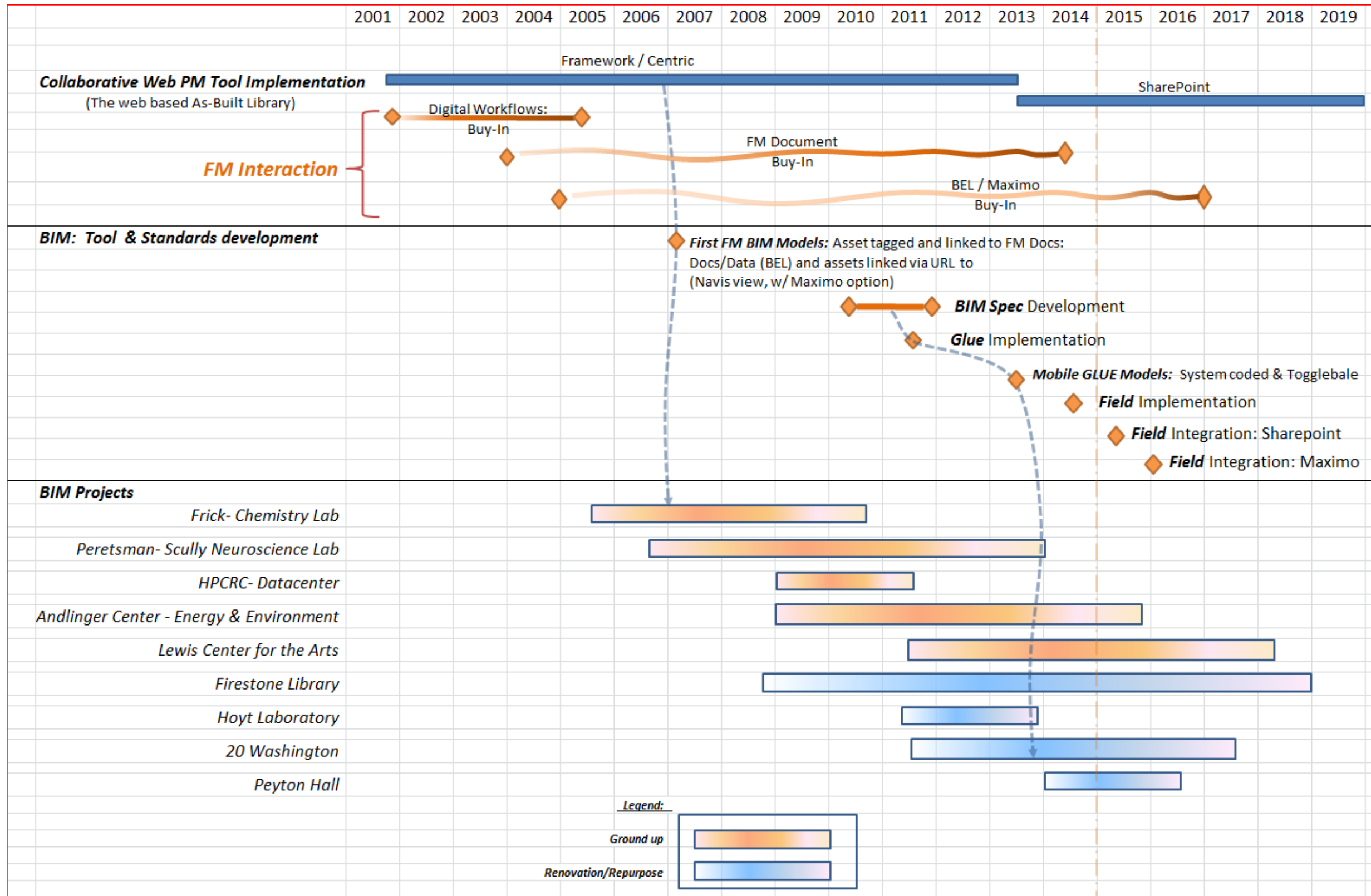




# **BIM to FM** **at Princeton**

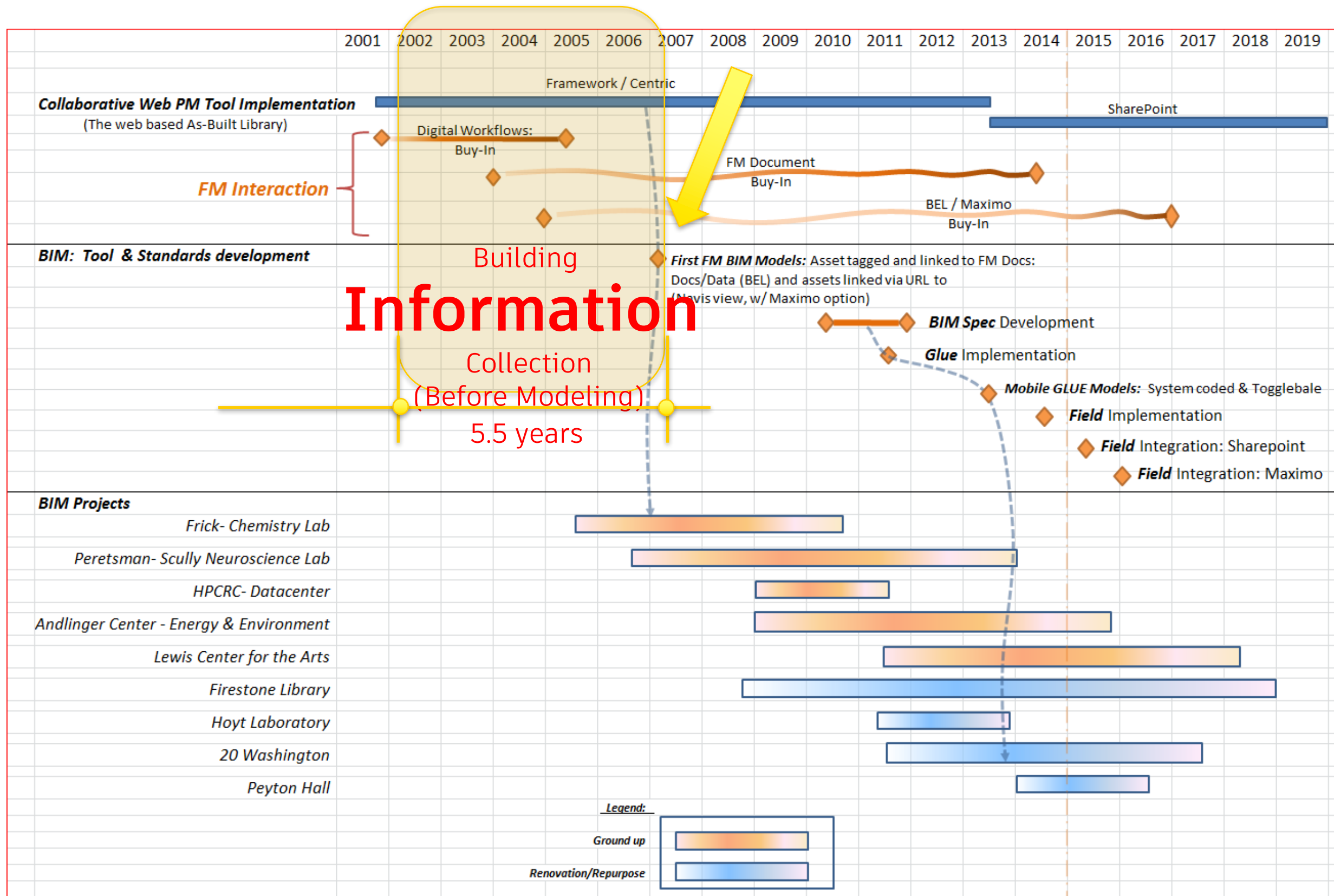
## **- Approach**

- 1. Keep model  
‘intelligence-light’**
- 2. No Revit Mandate**

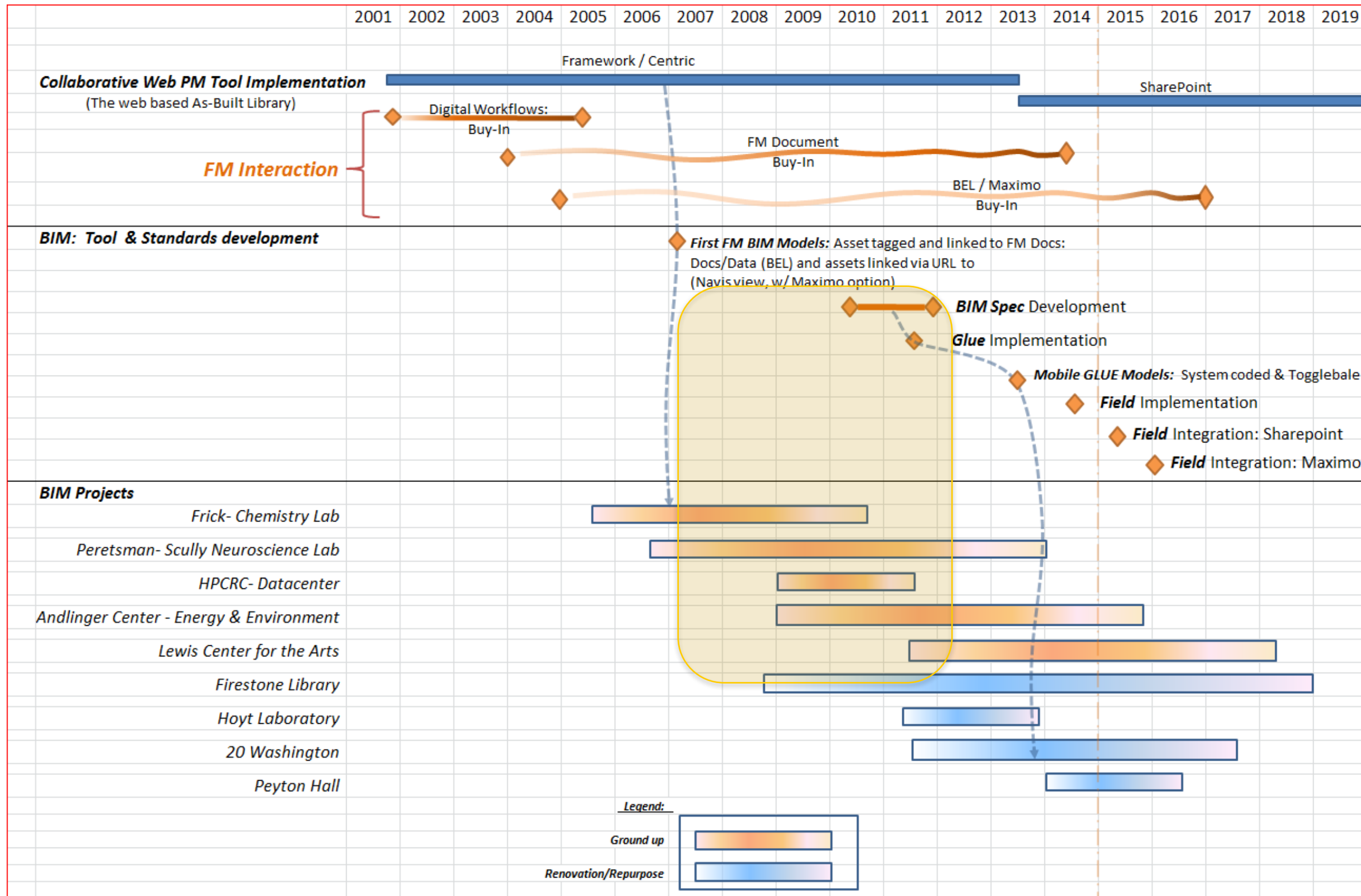


BIM to FM Development TimeLine



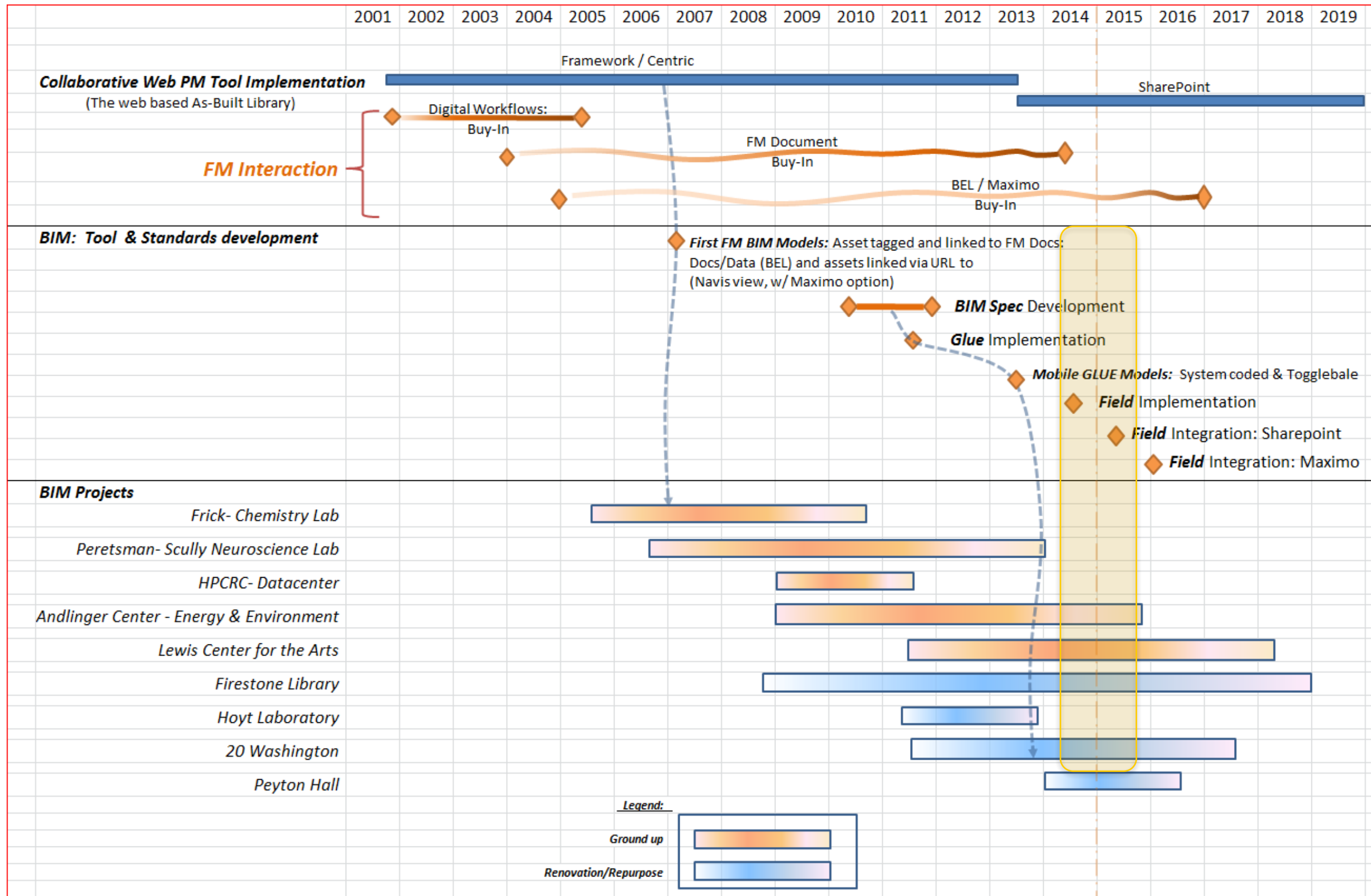


Digital FM Library existed pre-BIM

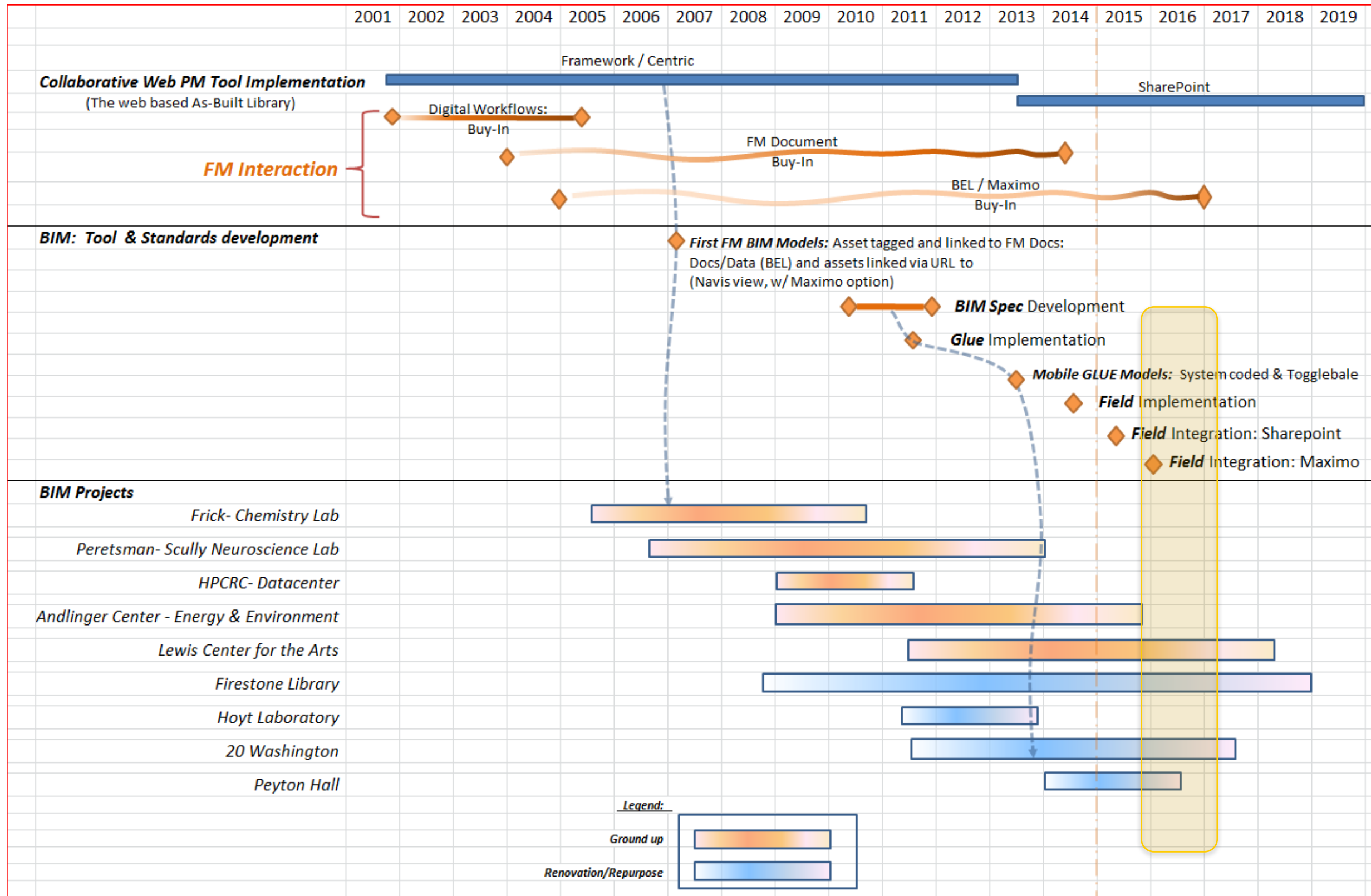


## BIM Spec evolution- Experience based





## Field Integration w/ FM Docs/Data



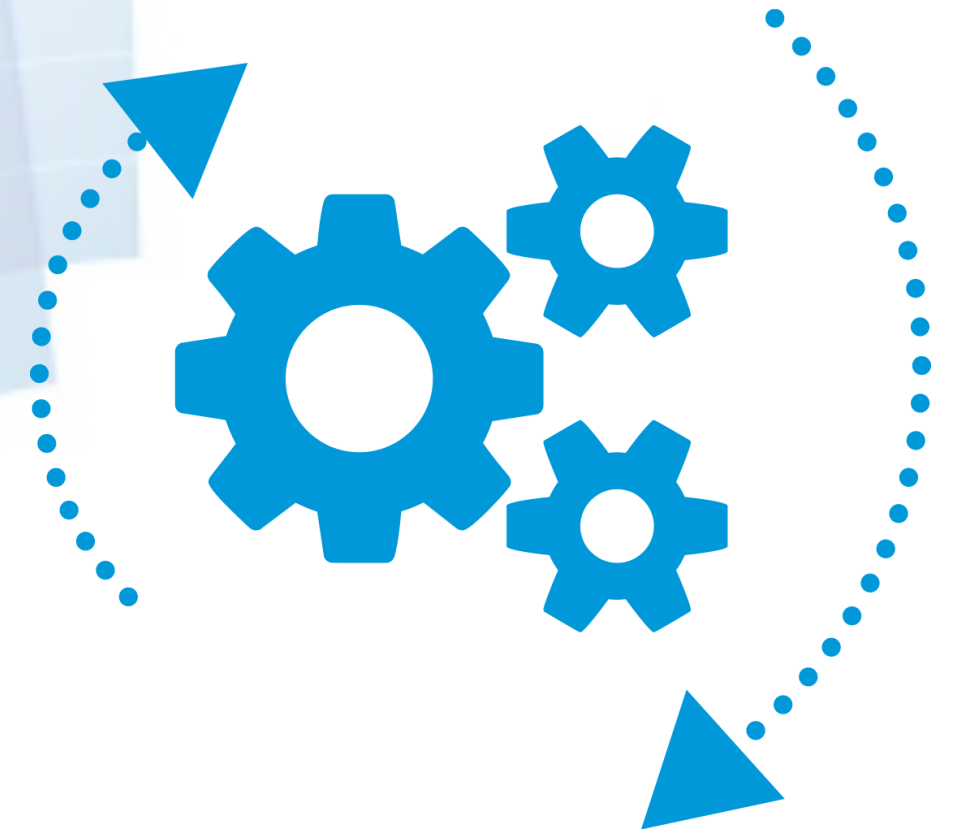
## BIM to CMMS Integration - Patience

# 1. Owner Driven Processes

- Developing BIM / BIM to FM requirements.
- BIM Deployment: Creating a strong team environment.

# 2. Technology

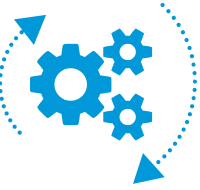
- An integrated BIM to FM solution.





# Developing you BIM Requirements

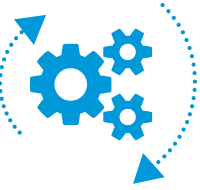
## Key Steps



1. Needs Assessment (FM focused)
2. Supply Stream evaluation
3. Impact Analysis
4. Value Judgment
5. BIM Spec development
6. Deploy, Maintain(h)

# Developing you BIM Requirements

## Needs Assessment



### ■ Documents

- Format
- Quick Reference
- Cx Documentation

### ■ Assets

- Attributes

### ■ UI / Device

- Desktop/Handhelds (type, OS?)

### ■ System isolation

- (2D & 3D)
- Level of Detail

### ■ Location based query

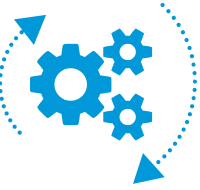
- Asset Location
- Asset Area Served

### ■ CMMS Integration?



# Developing you BIM Requirements

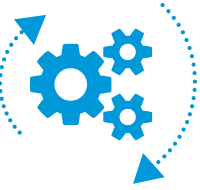
## Needs Assessment



- Documents
  - Format
  - Quick Reference
  - Cx Documentation
- Assets
  - Attributes
- UI / Device
  - Desktop/Handhelds (type, OS?)
- System isolation
  - (2D, 3D)
  - Level of Detail
- Location based query
  - Asset Location
  - Asset Area Served
- CMMS Integration?
  - Very Wary.....

# Developing you BIM Requirements

## Key Steps

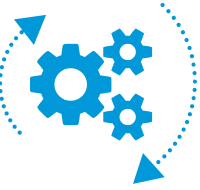


1. Needs Assessment (FM focused)
2. Supply Stream evaluation
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# Developing you BIM Requirements

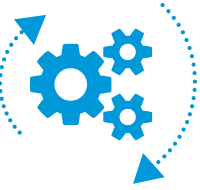
## Supply Stream analysis



1. Needs Assessment (FM focused)
2. Supply Stream evaluation(AE & Contractor)
  - What are current processes and business needs.
  - Software, technical expertise and workflows.
3. Impact Analysis
4. Value Judgment
5. BIM Spec development
6. Deploy, Maintain(h)

# Developing your BIM Requirements

## Key Steps



1. Conduct needs assessment (FM focused)
2. Evaluate supply stream
3. Impact analysis
4. Value judgment
5. Develop custom standards
6. Deploy, monitor, update (**h**)



# Developing your BIM Requirements



## Impact Analysis- AE Team

- Culture Change
  - Model Sharing
  - Design validation
- Authoring Software Choices
- Staff Workflow
  - Design Coordination – Lead Designers to BIM Drafters
  - Change Management (BIM updating)
  - Record Design BIM deliverables
- (LOD) Conventions
  - Modeling for FM



# Developing your BIM Requirements

## Impact Analysis- Contractor

- Culture Change
- Technical Proficiency/Staff
- Authoring Software Choices
- Fabrication Dependencies
- Native Model Intelligence
- Level of Detail (LOD) Conventions
- Work Required to Tag Modeled Assets
- Work to Upload Asset Attributes





# Owner Driven BIM Implementation – Key Steps

## Developing BIM / BIM to FM requirements

1. Conduct needs assessment (FM focused)
2. Evaluate supply stream
3. Impact analysis
4. Value judgment
5. Develop custom standards
6. Deploy, monitor, update (**h**)

# Owner Driven BIM Implementation – Key Steps

## Developing BIM / BIM to FM requirements

1. Conduct needs assessment (FM focused)
2. Evaluate supply stream
3. Impact analysis
4. Value judgment (Where to invest the effort)
5. Develop custom standards
6. Deploy, monitor, update (**h**)

# Owner Driven BIM Implementation – Key Steps

## Developing BIM / B



Projects Homepage

Centric Archives

EDIT LINKS

## Archive Library

### ■ Documents

- Format
- As-Builts
- Quick Reference
- Cx Documentation

### ■ Assets

- Attributes

### ■ UI / Device

- Desktop/Handheld

Dodge Hall Renovation  
Project Team  
Libraries

Archive Library

new document or drag files here

All Documents ... Find a file

✓	📁	Name	Folder Child Count
		1. Quick Reference Documents	5
		...	6
		...	0
		...	3
		...	0
		...	0

Dodge Hall Renovation  
Project Team  
Libraries

Archive Library

new document or drag files here

All Documents ... Find a file

✓	📁	Name	Folder Child Count
		Attic Stock	0
		Location Map_Schedule	2
		Riser Diagrams	2
		Schedules	20
		Zone Maps	7

ion?





# Owner Driven BIM Implementation – Key Steps

Developing BIM / BIM to FM requirements – Value

- Documents
  - Format
  - As-Builts
  - Quick Reference
  - Cx Documentation
- Assets
  - Attributes
- UI / Device
  - Desktop/Handhelds (type, OS?)
- System isolation
  - (2D & 3D)
  - Level of Detail
- Location based query
  - Asset Location
  - Asset Area Served
- CMMS Integration?

# Owner Driven BIM Implementation – Key Steps

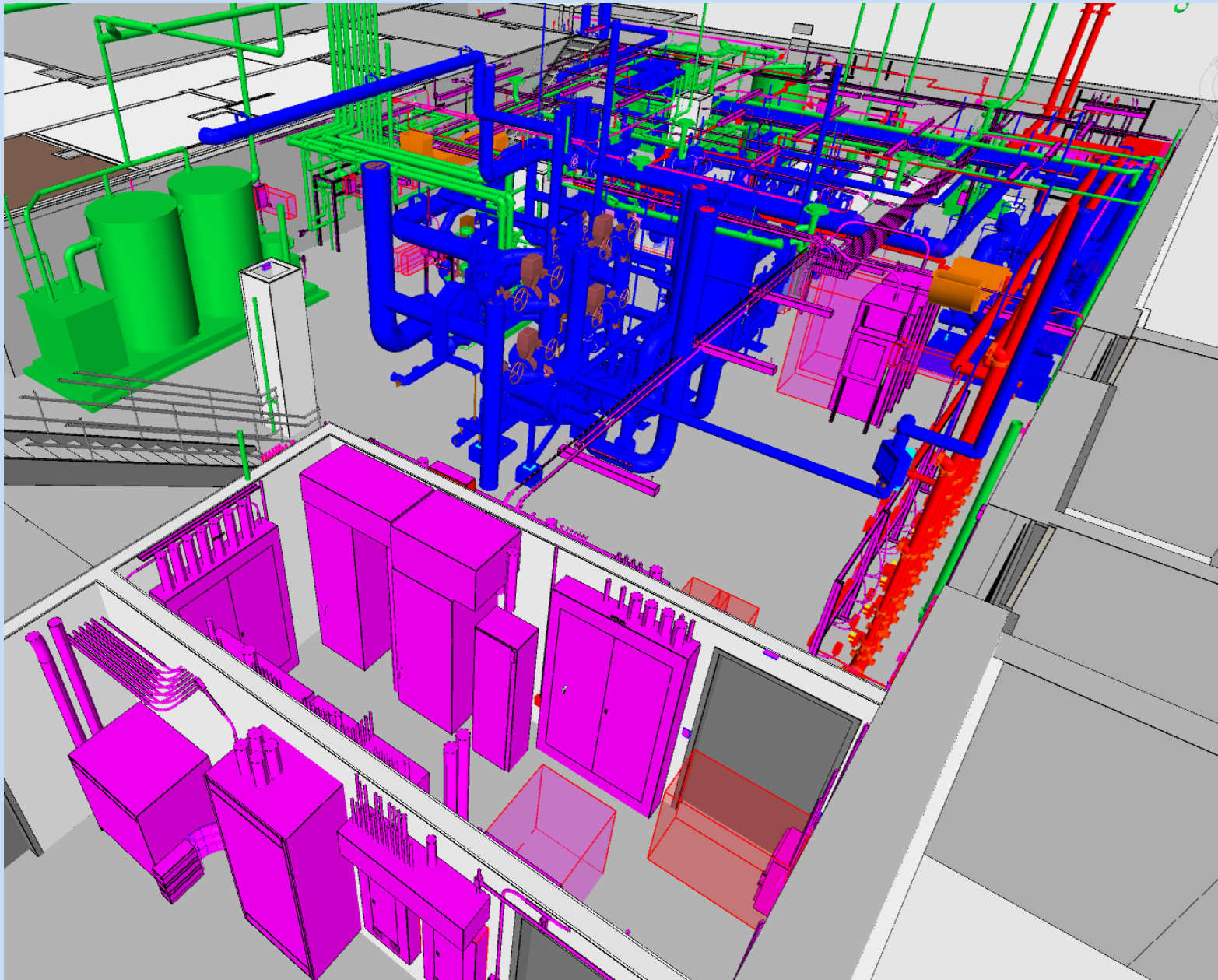
Developing BIM / BIM to FM requirements – Value

- Documents
  - Format
  - As-Builts
  - Quick Reference
  - Cx Documentation
- Assets
  - Attributes
- UI / Device
  - Desktop/Handhelds (type, OS?)
- System isolation
  - (2D & 3D)
  - Level of Detail
- Location based query
  - Asset Location
  - Asset Area Served
- CMMS Integration?

# Owner Driven BIM Implementation – Key Steps

Developing BIM / BIM to FM requirements – Value

First mention of “Model stuff”



## System isolation

- (2D & 3D)

- Level of Detail

## Location based query

- Asset Location

- Asset Area Served

## CMMS Integration?



# Owner Driven BIM Implementation – Key Steps

1. Conduct needs assessment (FM focused)
2. Evaluate supply stream
3. Impact analysis
4. Value judgment
5. Develop custom standards
6. Deploy, monitor, update (**h**)

# Owner Driven BIM Implementation – Key Steps

Now you know what you want,  
You've established the BIM to FM  
requirements,  
You've assembled your project team.  
**DEPLOYMENT!**

Where is the Owner's influence most helpful?

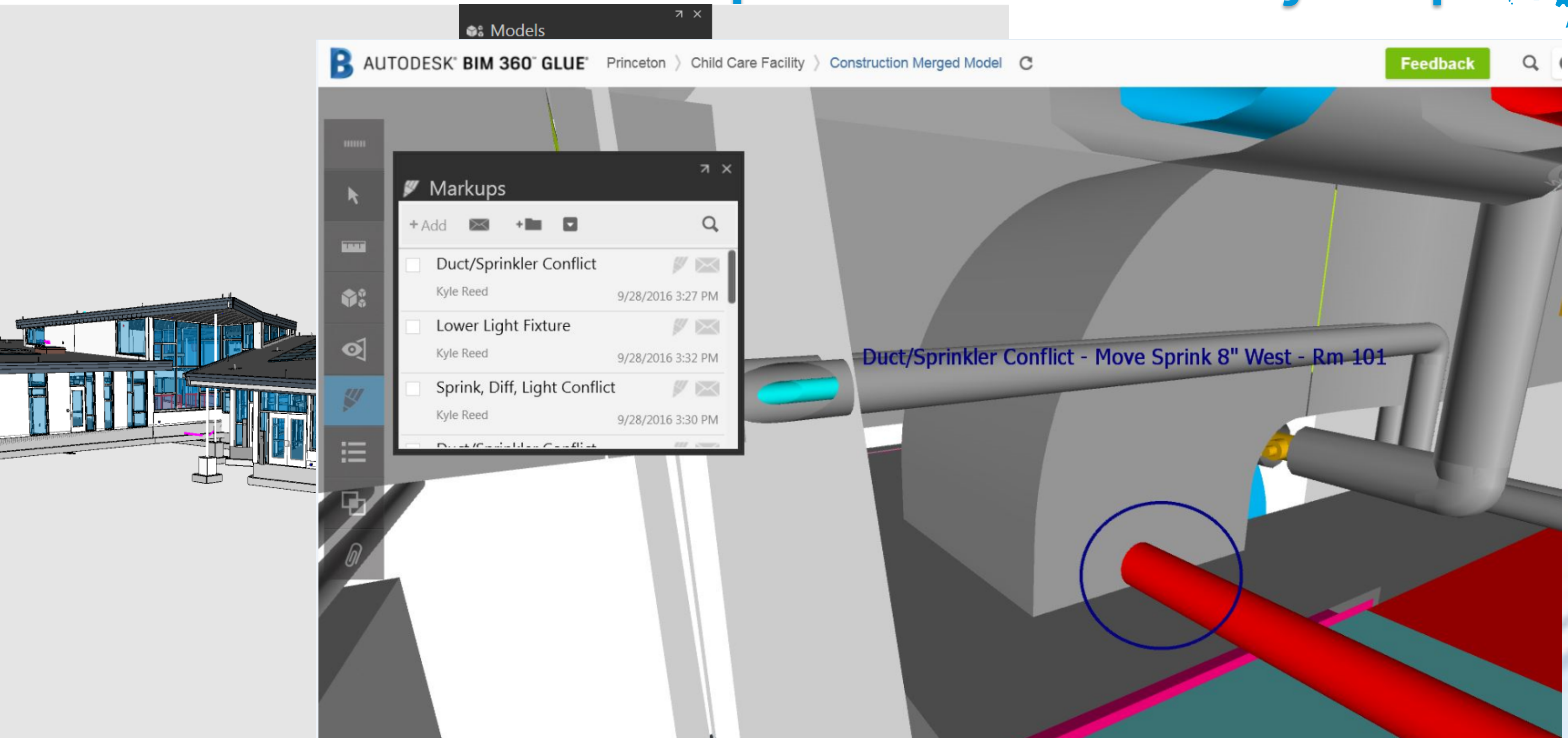
# Owner Driven BIM Implementation – Key Steps

## DEPLOYMENT!

1. Strong Owner presence/lead through design validation:  
AE, Contractor & FM participation.
2. Require the Contractor to utilize models in procurement phase: Bidding ‘Open House – BIM demo’
3. Engage FM to participate throughout construction coordination phase.
4. Monitor the completeness of the BIM to FM deliverable.
5. Highlight the importance of the BIM to FM deliverable on turnover to FM.



# Owner Driven BIM Implementation – Key Steps



# Owner Driven BIM Implementation – Key Steps

## DEPLOYMENT!

1. Strong Owner presence/lead through design validation: AE, Contractor & FM participation.
2. Require the Contractor ‘markets’ the models at “Bidding Open House – BIM demo”, and Owner co-presents.
3. Engage FM to participate throughout construction coordination phase.
4. Monitor the completeness of the BIM to FM deliverable.
5. Highlight the importance of the BIM to FM deliverable on turnover to FM.



# Owner Driven BIM Implementation – Key Steps

*To do these, its all about ....*

- Packaging*
- Presentation*
- (enter Technology...)*

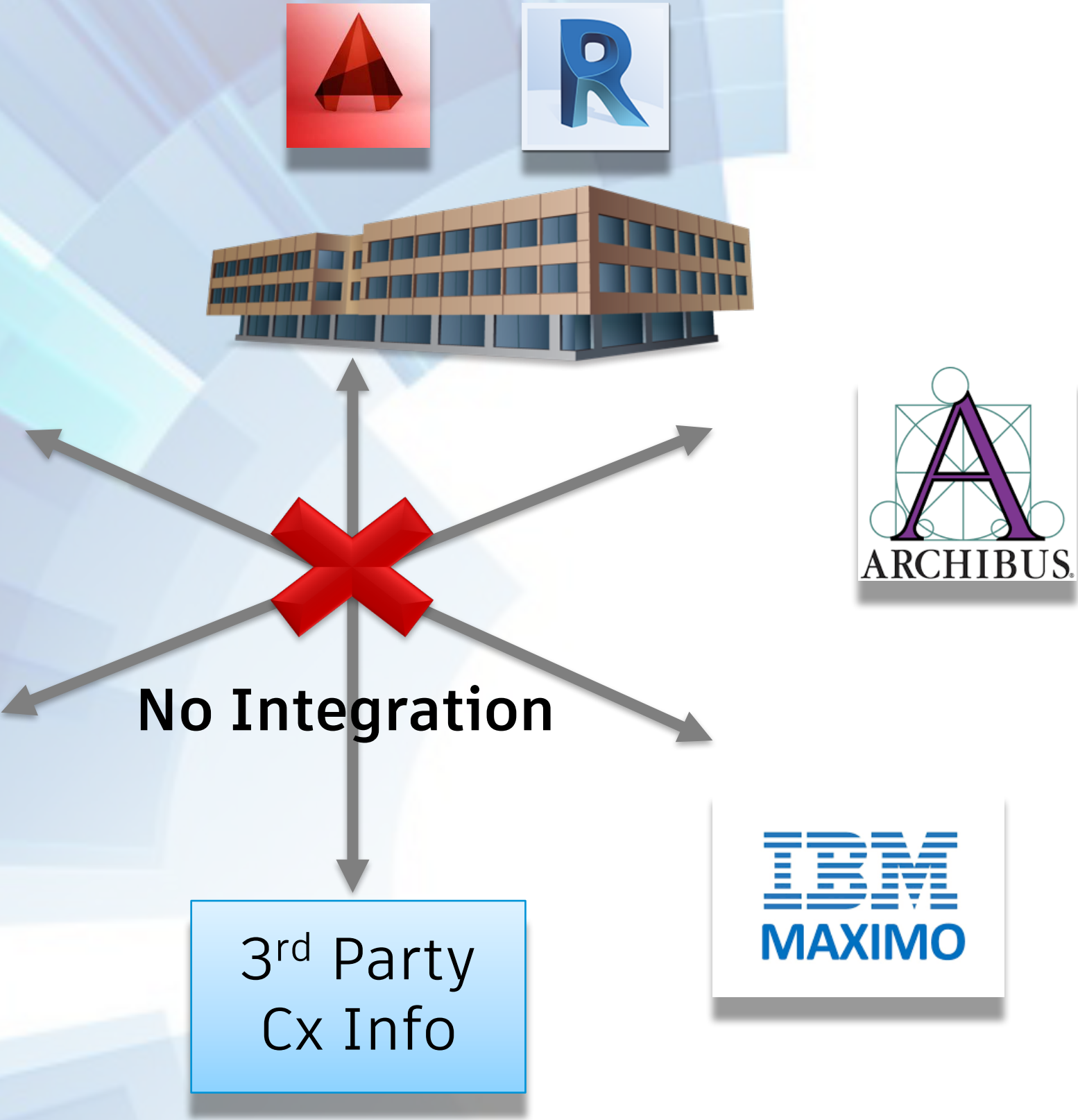
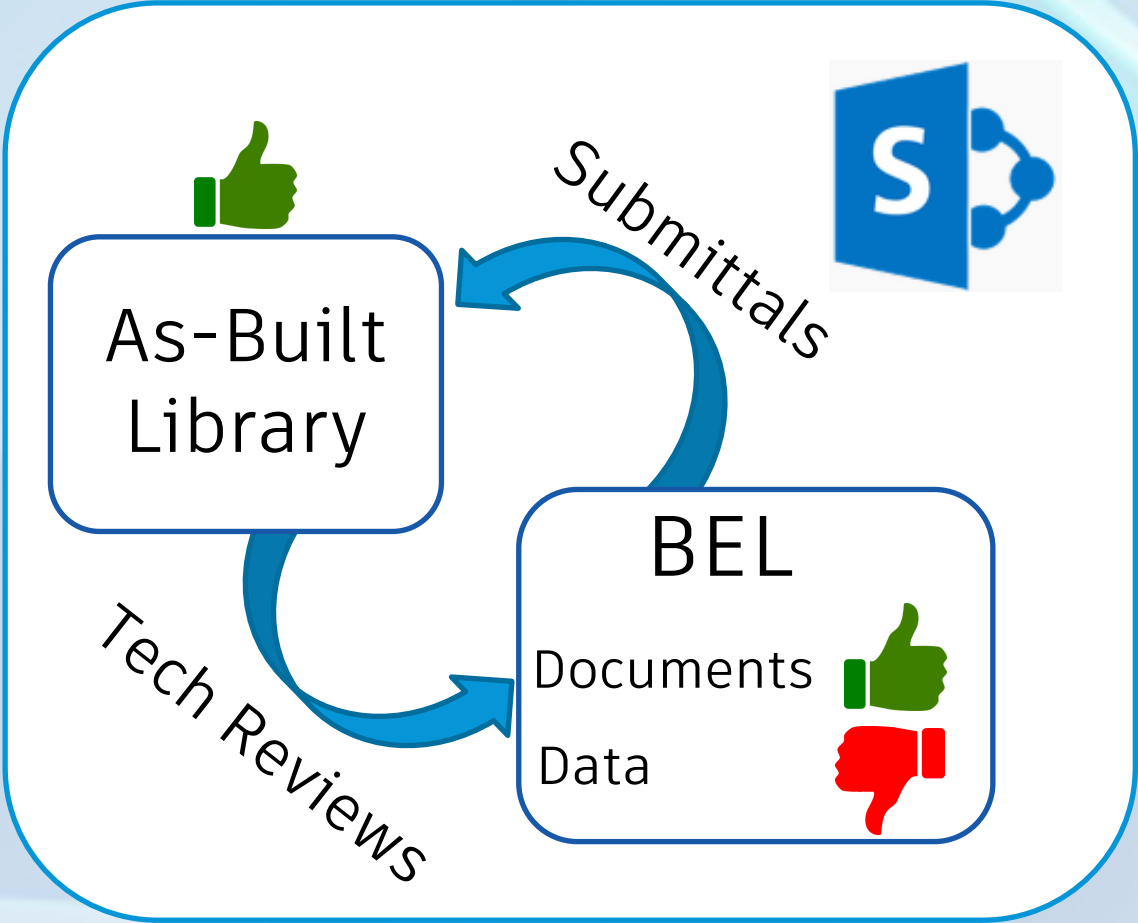
3. Engage FM to participate throughout construction coordination phase.
4. Monitor the completeness of the BIM to FM deliverable.
5. Highlight the importance of the BIM to FM deliverable on turnover to FM.

# Technology

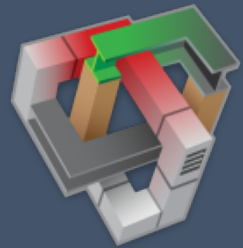




# The Challenge



# AUTODESK® BIM 360™



VDC / BIM  
Management



Production  
Planning



Layout &  
Verification



Field  
Management



Building  
Operations



Project Control - Doc Management, RFIs, Submittals

Construction Enterprise Integration & Insight



AUTODESK  
FORGE



SkySync



TOPCON

Microsoft  
HoloLens

Ecosystem Integration

SharePoint

coins

CMiC

COSENTIAL

salesforce

IBM  
maximo

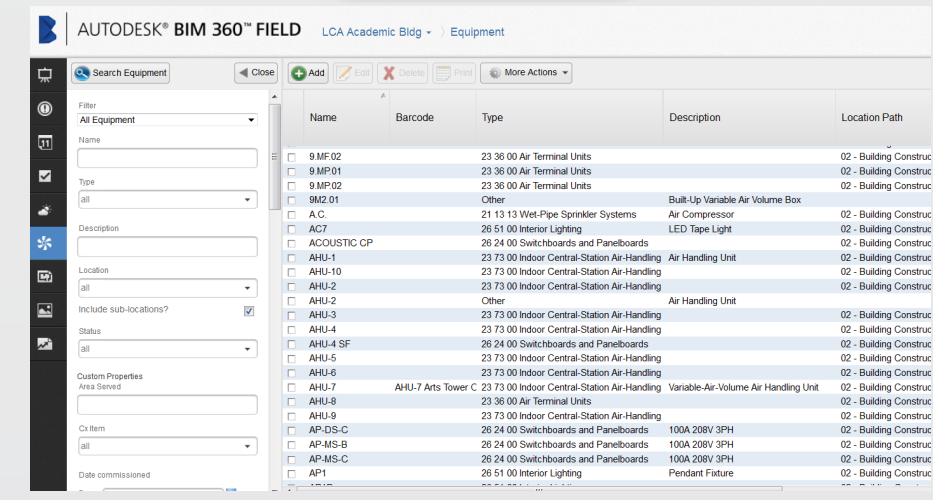
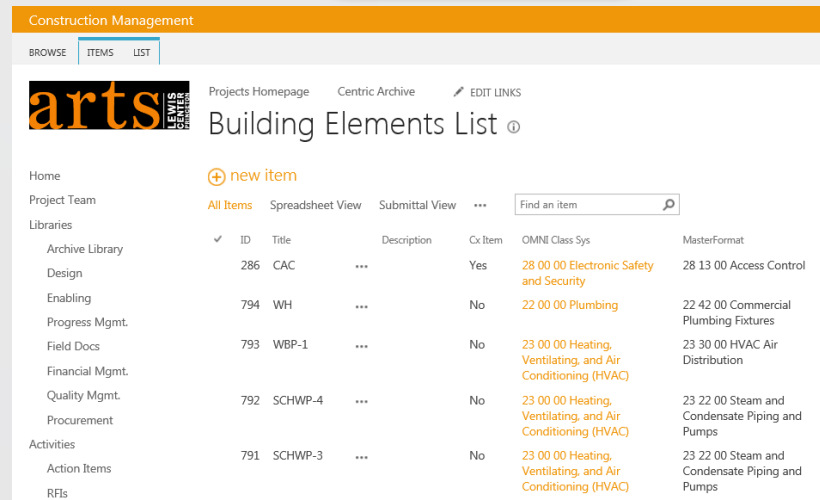
FM:Systems



AUTODESK UNIVERSITY 2016

AUTODESK  
AUTODESK





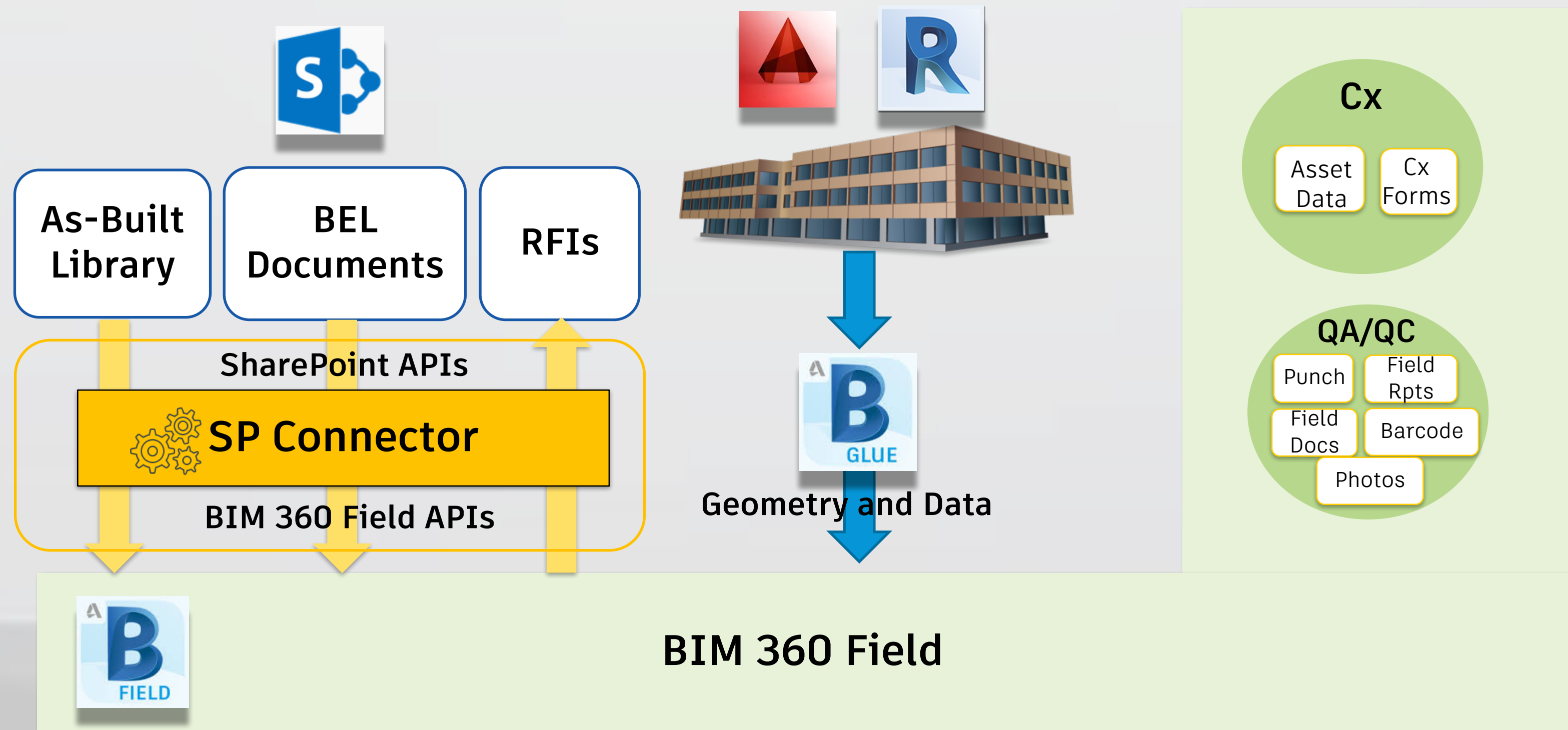
- Document Library
- PM Workflows
  - Submittals
  - Tech Reviews
  - RFIs
  - Sub Award
  - Change Mgmt
  - Rx

## Model Viewer

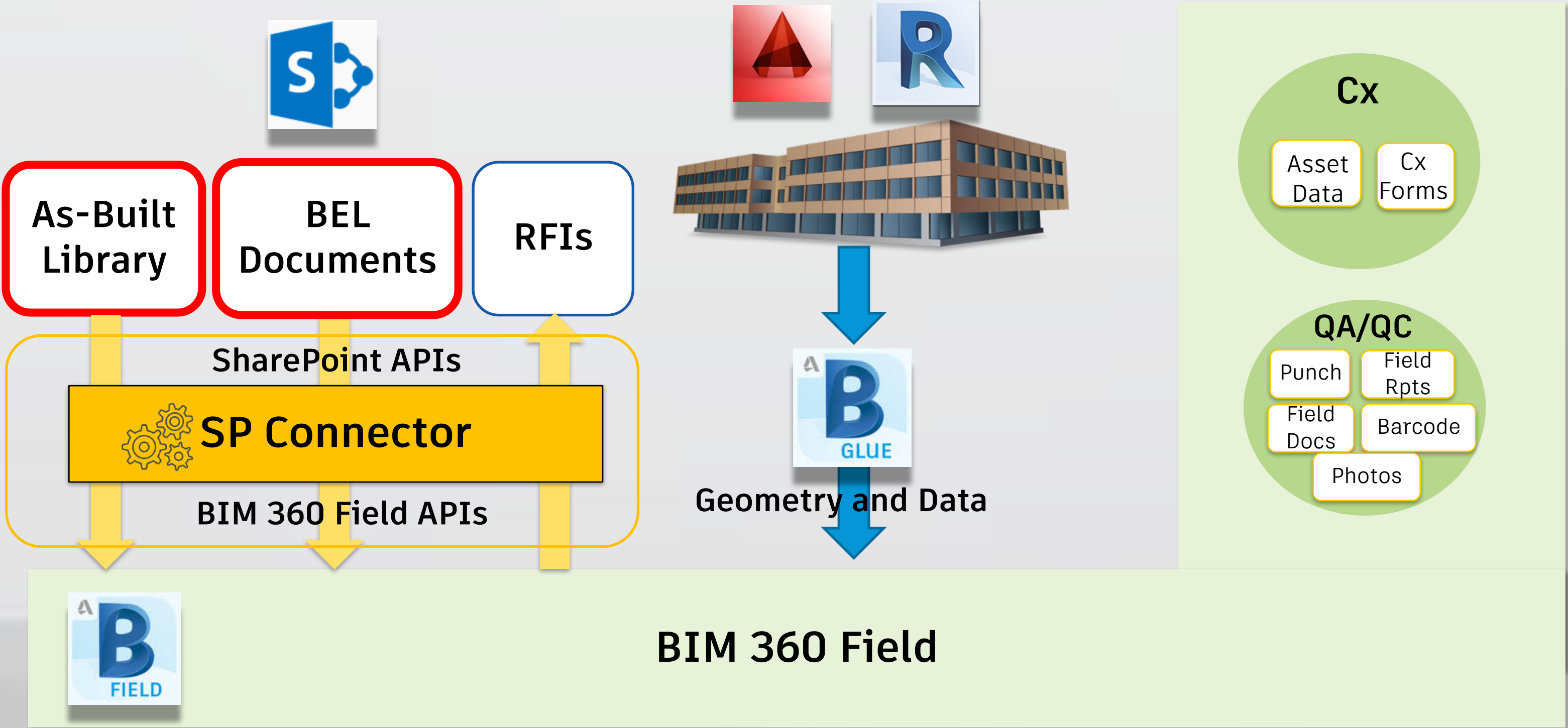
- Design validation
- Coordination validation
- FM Accessibility verification
- Asset isolation
- System isolation
- Field markups

- Asset data collection
- Cx platform
  - Issue tracking
  - Punchlist
  - QA/QC
  - Field Observations
  - Barcode integration
  - Photo markup

# The Integration



# The Integration





# SharePoint

## Document archive library (As-Built Library)



### Archive Library

new document or drag files here

All Documents

Find a file

- ✓ Name
- 1. Quick Reference Documents
- 2. As Built Drawings
- 3. Photos
- 4. Videos
- 5. Commissioning
- 6. Surveys
- 7. Final Design Documents

### Archive Library ▸ 1. Quick Reference Documents

new document or drag files here

All Documents

Find a file

✓		Name		Folder Child Count	Item Child Count	Modified	Modified By
		Attic Stock	...	0	0	September 14, 2015	<input type="checkbox"/> John T. Kraeck
		Location Map_Schedule	...	4	0	September 14, 2015	<input type="checkbox"/> John T. Kraeck
		Riser Diagrams	...	2	0	September 14, 2015	<input type="checkbox"/> John T. Kraeck
		Schedules	...	20	0	September 14, 2015	<input type="checkbox"/> John T. Kraeck
		Zone Maps	...	7	0	September 14, 2015	<input type="checkbox"/> John T. Kraeck



# SharePoint

## Building Elements List (BEL)



Construction Management

BROWSE ITEMS LIST

arts LEWIS CENTER PRINCETON

Projects Homepage Centric Archive EDIT LINKS

Building Elements List ⓘ

Home

Project Team

Libraries

- Archive Library
- Design
- Enabling
- Progress Mgmt.
- Field Docs
- Financial Mgmt.
- Quality Mgmt.
- Procurement

Activities

- Action Items
- RFIs
- BIM360 Issues
- Bid Approval
- Approvals
- Building Elements
- Submittals

+ new item

All Items Spreadsheet View Submittal View ... Find an item 🔍

✓	ID	Title	Description	Cx Item	OMNI Class Sys	MasterFormat
	286	CAC	...	Yes	28 00 00 Electronic Safety and Security	28 13 00 Access Control
	794	WH	...	No	22 00 00 Plumbing	22 42 00 Commercial Plumbing Fixtures
	793	WBP-1	...	No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 30 00 HVAC Air Distribution
	792	SCHWP-4	...	No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 22 00 Steam and Condensate Piping and Pumps
	791	SCHWP-3	...	No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 22 00 Steam and Condensate Piping and Pumps
	790	SCHWP-2	...	No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 22 00 Steam and Condensate Piping and Pumps
	789	SCHWP-1	...	No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 22 00 Steam and Condensate Piping and Pumps
	788	CWP-2	...	No	23 00 00 Heating,	22 30 00 Plumbing

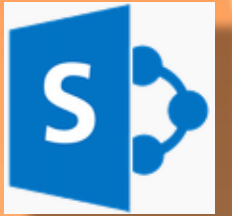
BEL: A collection of maintainable elements (assets or systems)

- Each record contains bundled as-built documents.

- The linking is part of natural submittal workflow.



# *New Submittal: 22 67 00 00 PCWP-11 O&M Manuals*



Contractor  
creates  
submittal

Tag	Descr	MasterFormat Tier 1	
PCWP-11	PCWP-11 O&M Manuals	22-XX-XX-XX	





# New Submittal: 22 67 00 00 PCWP-11 O&M Manuals



Tag	Descr	MasterFormat Tier 1	
PCWP-11	PCWP-11 O&M Manuals	22-XX-XX-XX	

## Building Elements List (BEL)

Based on  
submittal's  
MasterFormat  
value...  
BEL List is  
queried for  
system  
matches

Tag	Descr	MasterFormat Tier 1	MasterFormat Tier 2	Linked Documents
AHU-1	Lab wing AHU	23 00 00 00	23 74 00 00	Submittal-255 O&M Manual Warranty
HX-5	Heat Exchanger	23 00 00 00	23 57 00 00	Submittal-254 O&M Manual Warranty
LT-7	Light Type 7	26 00 00 00	26 51 00 00	Submittal-257 O&M Manual ( )
PCWP-11	PCHW secondary pump	22 00 00 00	22 67 00 00	Submittal-355 ( ) ( )
CT-4	Current Transformer Type 4	26 00 00 00	26 26 00 00	Submittal-210 O&M Manual Warranty
SP-3	Sump Pump Type 3	22 00 00 00	22 35 00 00	Submittal-385 O&M Manual Warranty



# New Submittal: 22 67 00 00 PCWP-11 O&M Manuals



Tag	Descr	MasterFormat Tier 1	
PCWP-11	PCWP-11 O&M Manuals	22-XX-XX-XX	

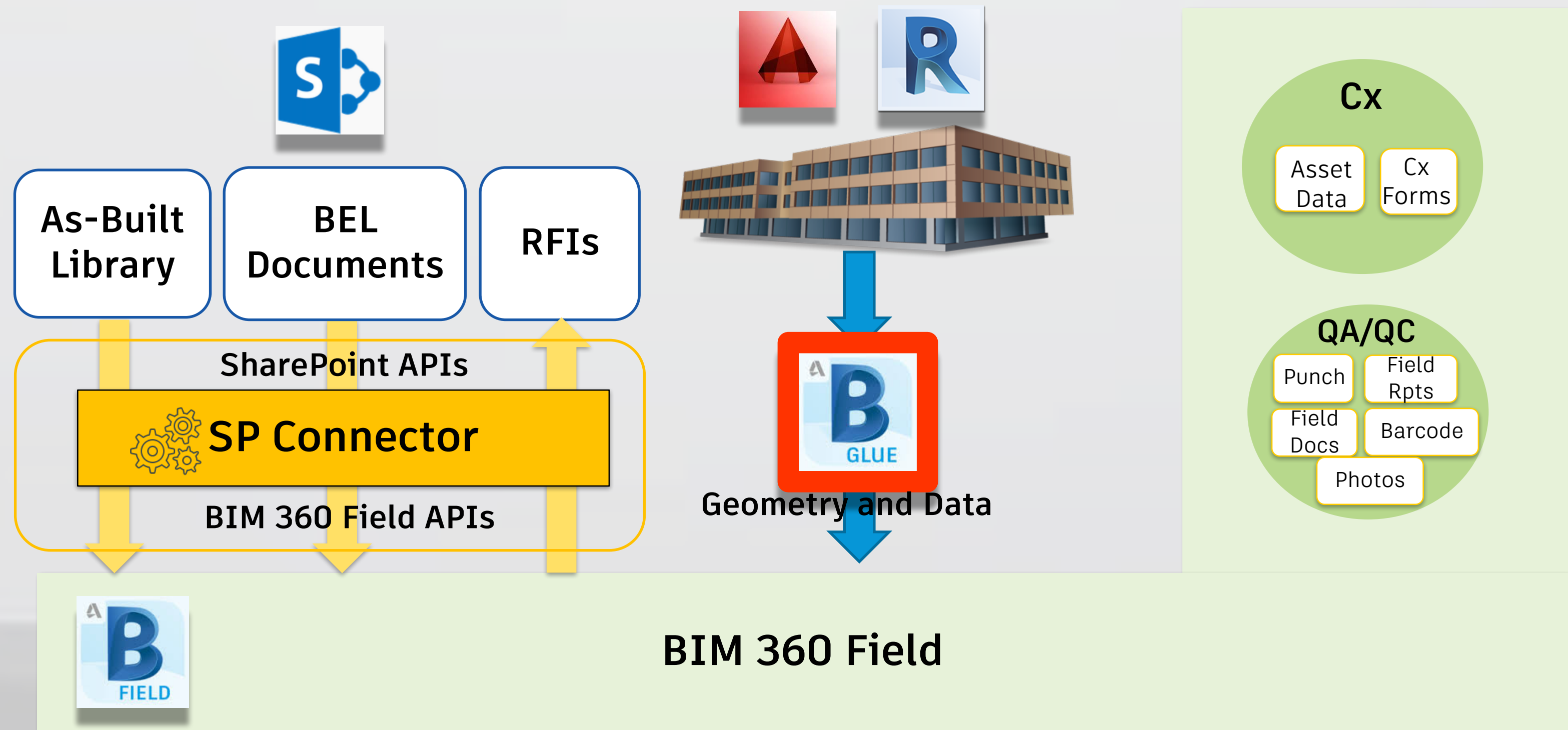
## Building Elements List (BEL)

Tag	Descr	MasterFormat Tier 1	MasterFormat Tier 2	Linked Documents
AHU-1	Lab wing AHU	23 00 00 00	23 74 00 00	Submittal-255 O&M Manual Warranty
HX-5	Heat Exchanger	23 00 00 00	23 57 00 00	Submittal-254 O&M Manual Warranty
LT-7	Light Type 7	26 00 00 00	26 51 00 00	Submittal-257 O&M Manual ( )
PCWP-11	PCHW secondary pump	22 00 00 00	22 67 00 00	Submittal-355 ( ) ( )
CT-4	Current Transformer Type 4	26 00 00 00	26 26 00 00	Submittal-210 O&M Manual Warranty
SP-3	Sump Pump Type 3	22 00 00 00	22 35 00 00	Submittal-385 O&M Manual Warranty

User bundles appropriate submittal link(s).



# The Integration





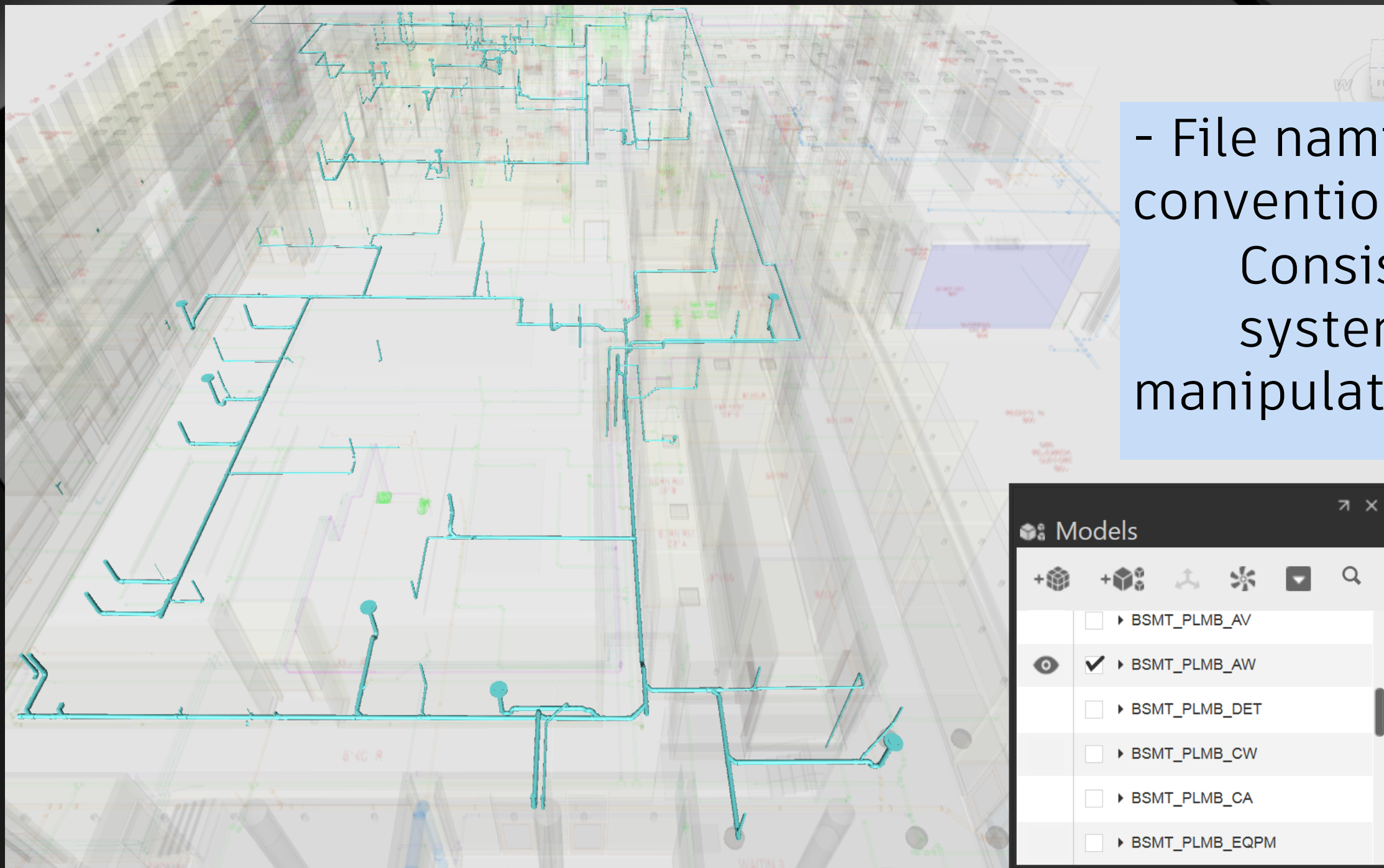
# BIM 360 Glue

## *Model Viewer*



# BIM 360 Glue

## *System Isolation and Model Access in the Field*

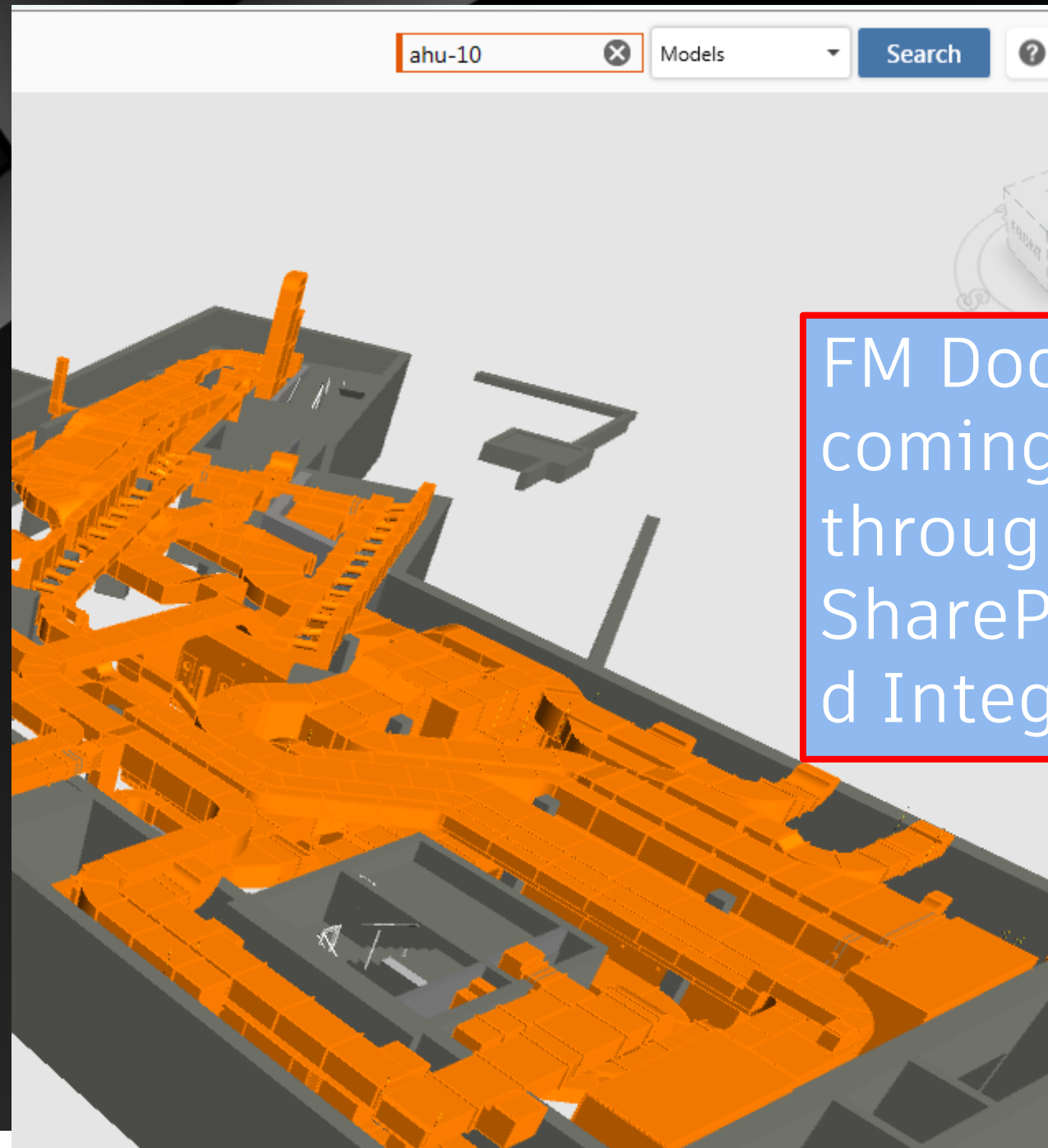


- File naming convention:  
Consistent, easy system manipulation.

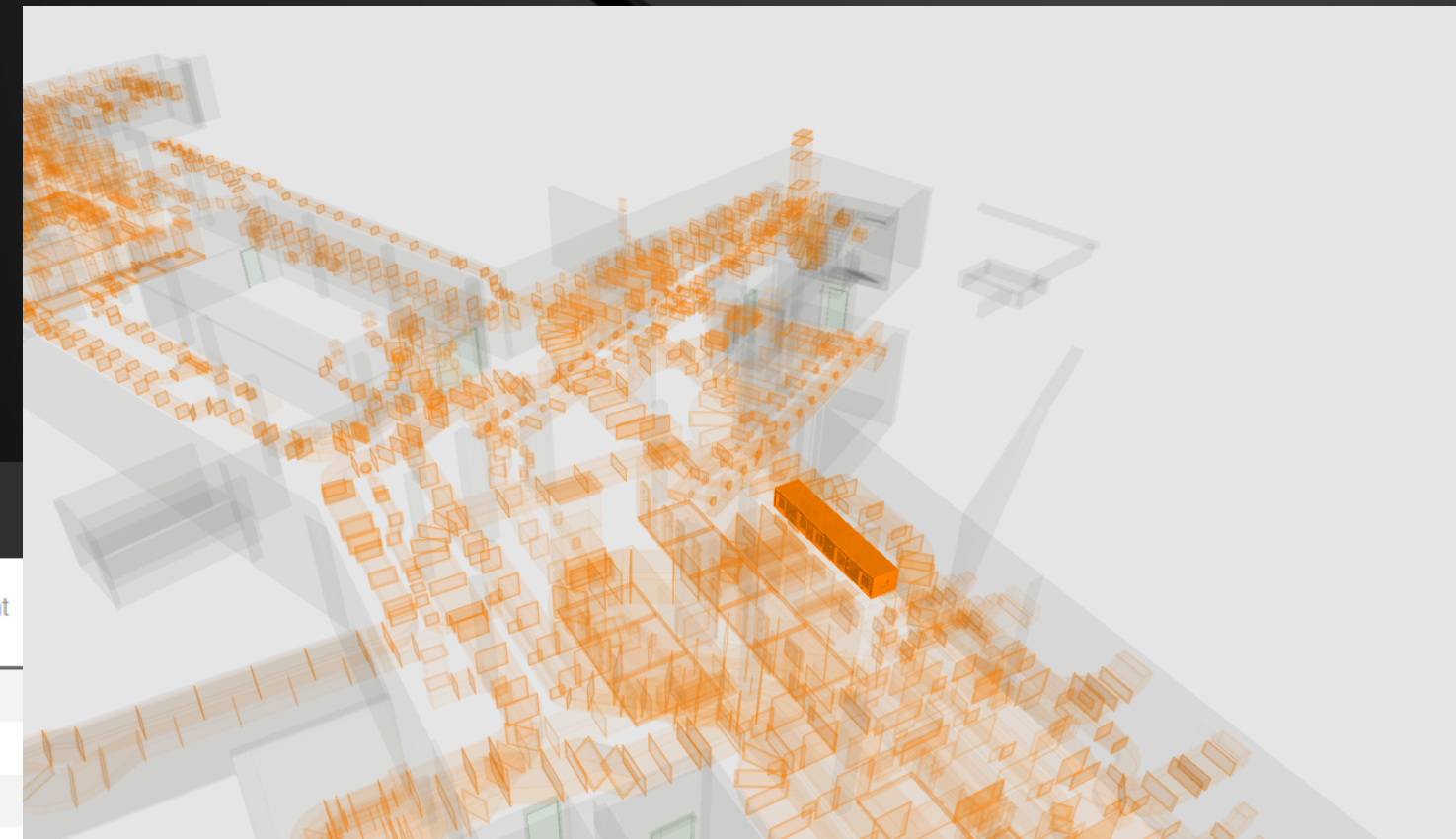


# BIM 360 Glue

## Search Asset and Information



FM Documents  
coming  
through via  
SharePoint/Field  
Integration



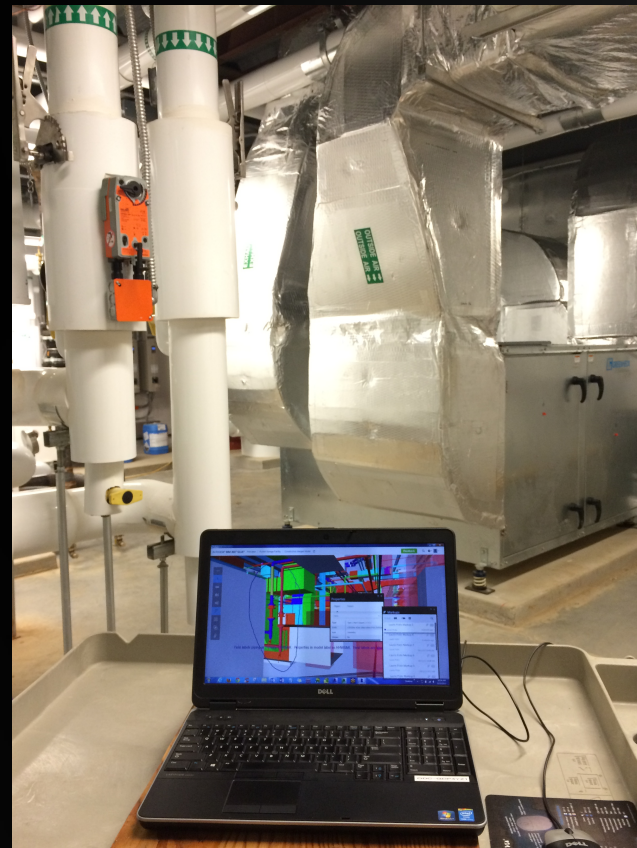
Name	AHU-10
Location	02 - Building Construction>Sub Basement
Serial number	
Description	
237313-0003-0_Haakon_Air_Handling_Units_-_Steam_Coils_RESPONSE.pdf	<a href="https://bim360field.autodesk.com/public_link/a2b2fde0cdf815e5bbe04c1e106c0dca0">https://bim360field.autodesk.com/public_link/a2b2fde0cdf815e5bbe04c1e106c0dca0</a>
237313-0003-0_Haakon_Air_Handling_Units_-_Steam_Coils.pdf	<a href="https://bim360field.autodesk.com/public_link/afab9d12ba65aa6a98cd40d1ec8447ce9">https://bim360field.autodesk.com/public_link/afab9d12ba65aa6a98cd40d1ec8447ce9</a>
HTS-Haakon_Coil_Substitution_request.pdf	<a href="https://bim360field.autodesk.com/public_link/aad08c7251e162c5abed444c1e3b9ab32">https://bim360field.autodesk.com/public_link/aad08c7251e162c5abed444c1e3b9ab32</a>
237313-0001-0_Haakon_Air_Handling_Units-RESPONSE.pdf	<a href="https://bim360field.autodesk.com/public_link/a84aa173d946af6cb37140ee0e729a9fe">https://bim360field.autodesk.com/public_link/a84aa173d946af6cb37140ee0e729a9fe</a>





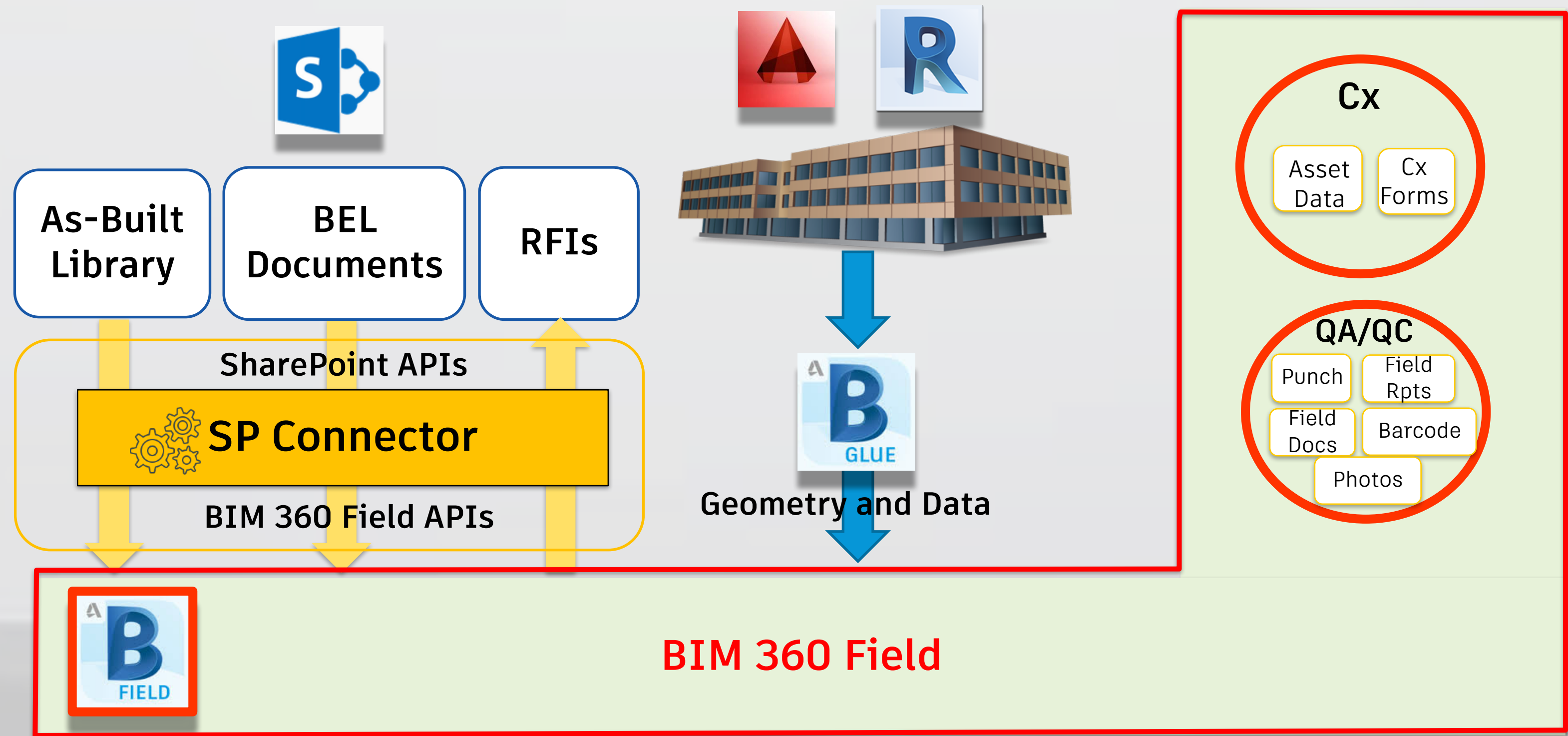
# BIM 360 Glue

## *Model Verification and Access in the Field*

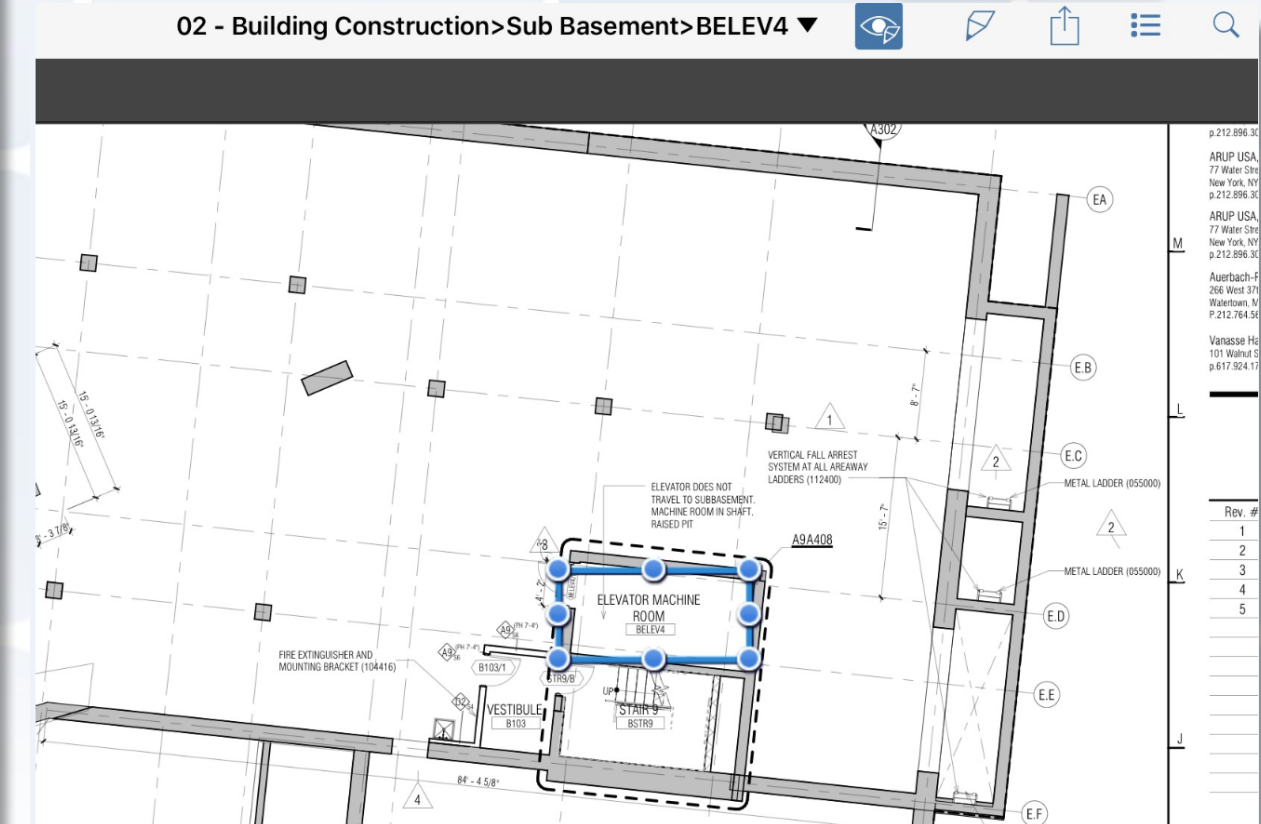




# The Integration



# BIM 360 Field QA/QC



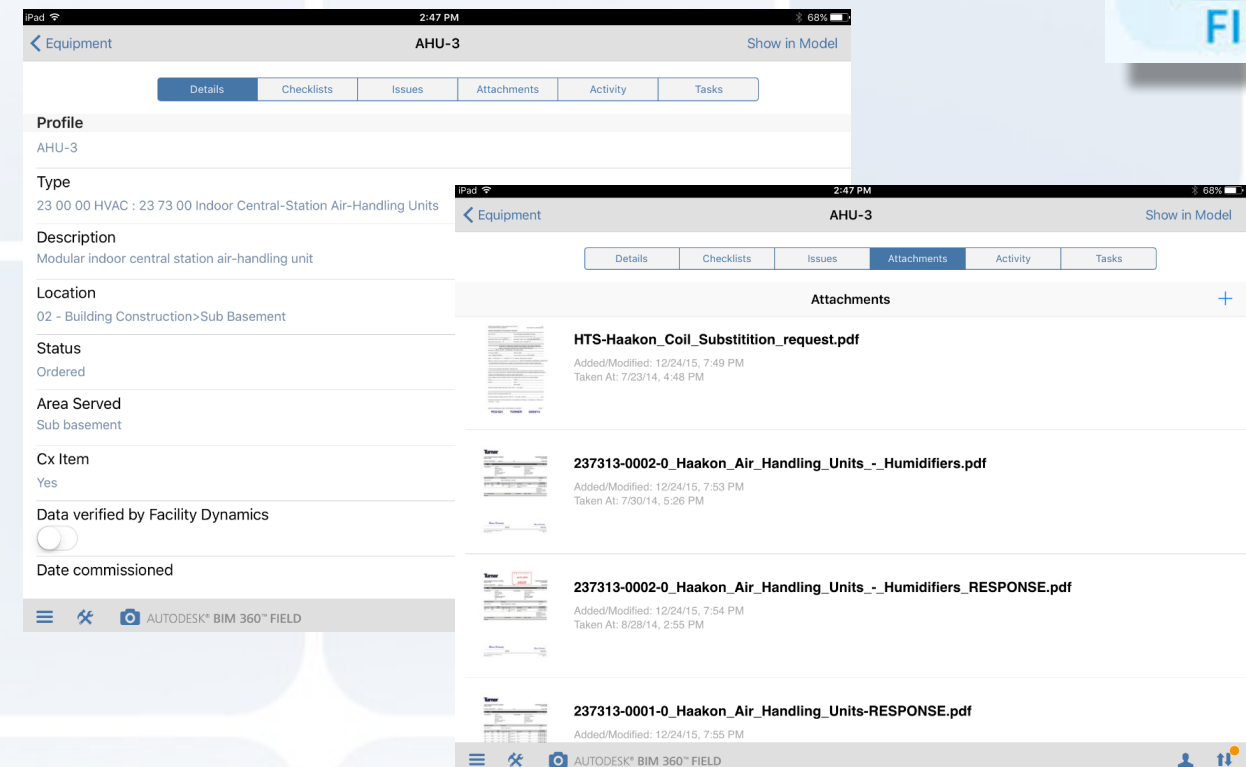
- **Bar Code enabled location data**
  - **Punch list**
  - **Field Observation**
  - **QA/QC**
  - **BELs tied to this**





# BIM 360 Field

## QA/QC



- **Bar code enabled asset/BEL data**
  - **QA/QC**
  - **Commissioning**
  - **As Built documents**
  - **CMMS Attributes**



# BIM 360 Field

## QA/QC

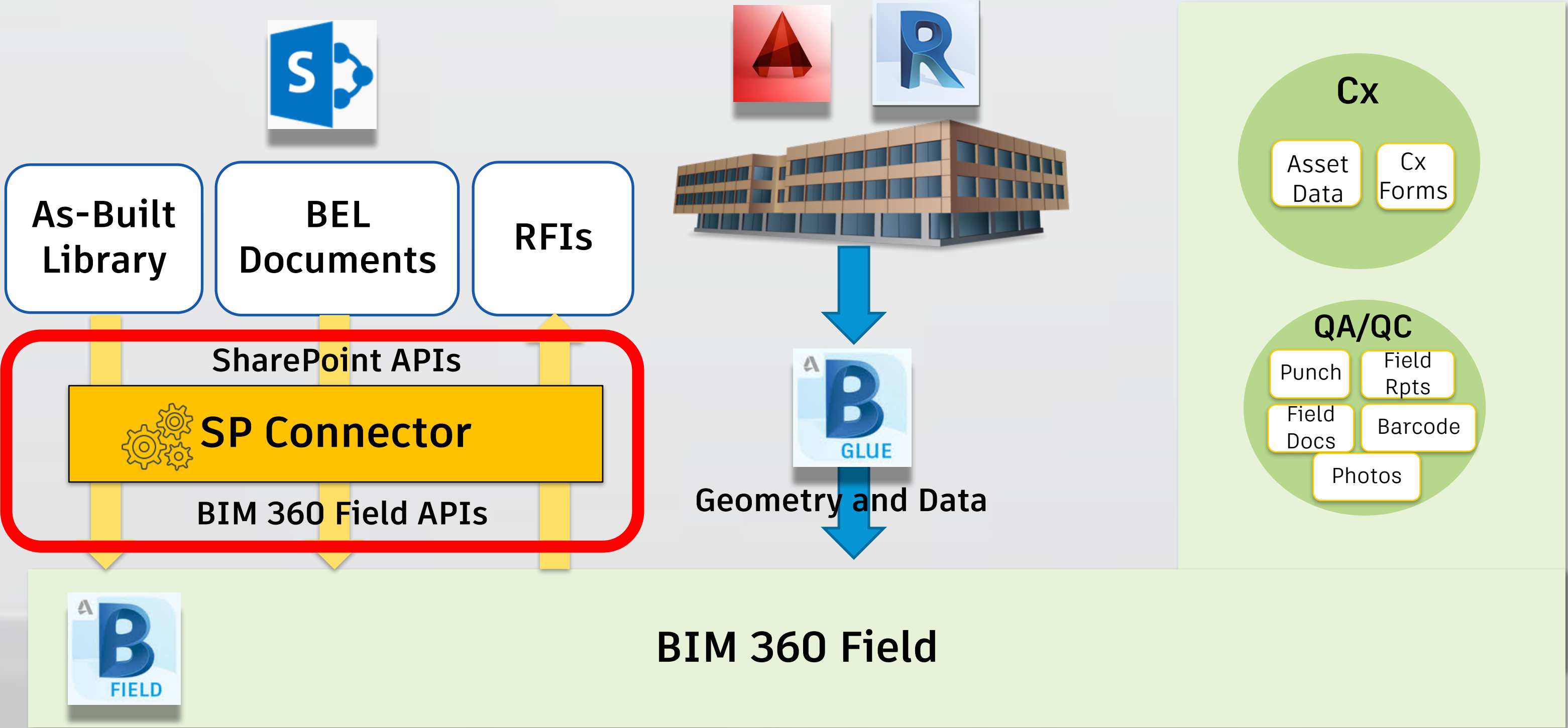


- **Most recent dwg changes always available – note red markup on plan**



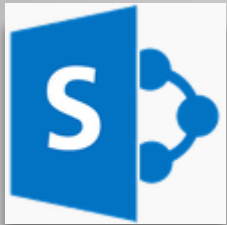


# The Integration

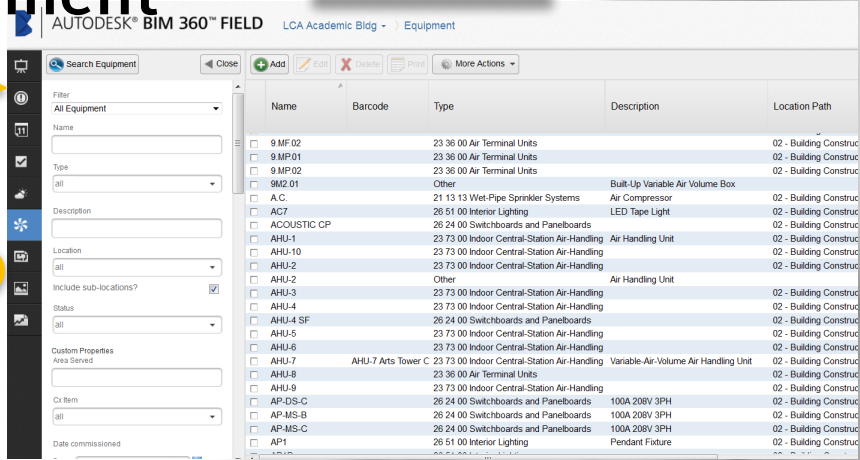
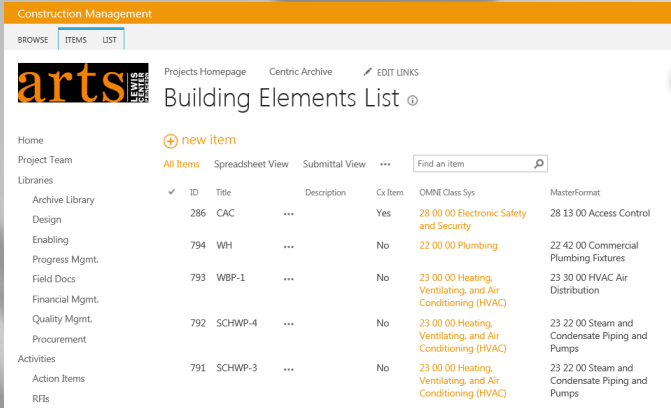




# SP Connector Solution Overview



- Submittals
- BEL documents
- Library
- Attach to Equipment



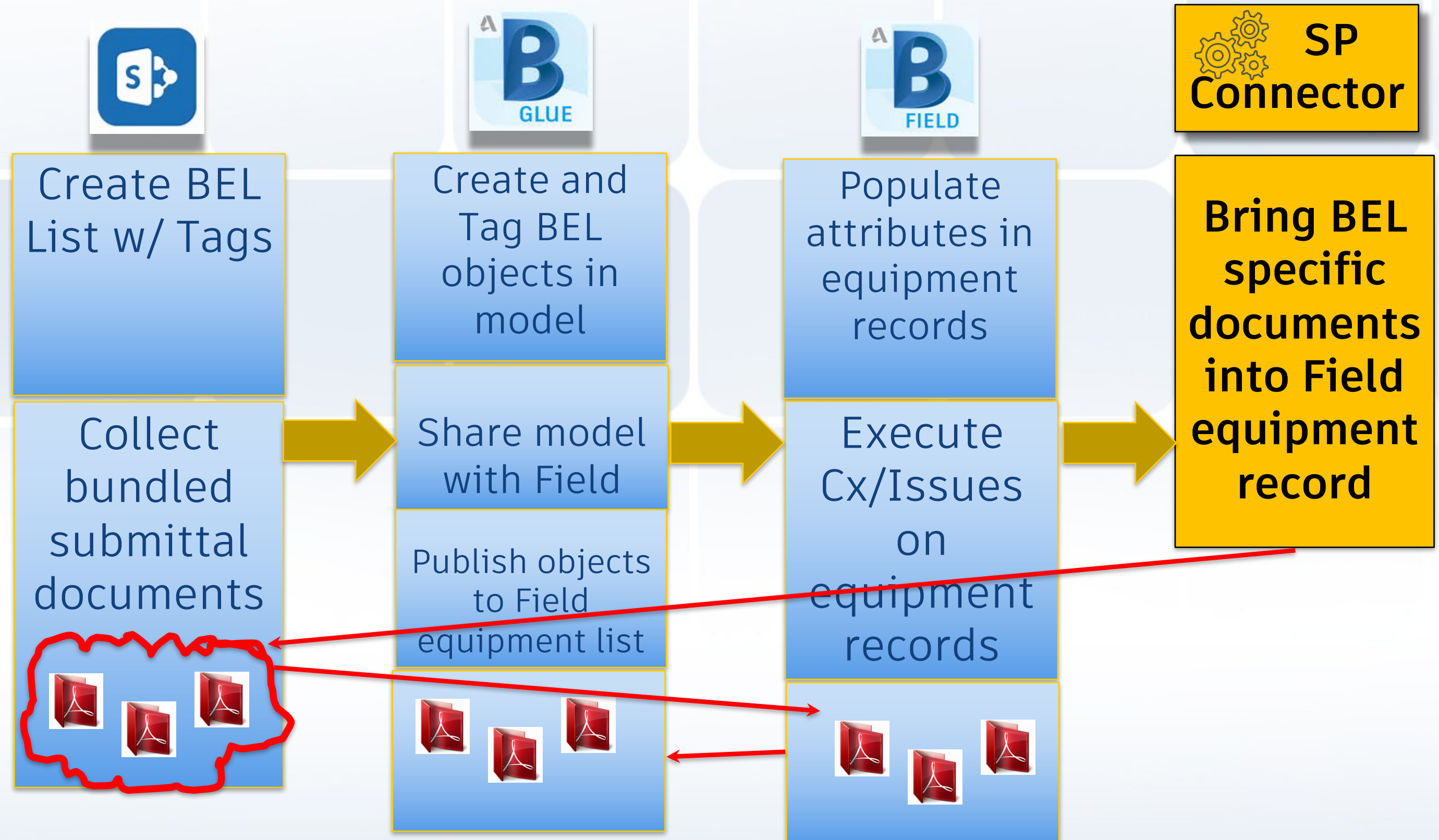
SharePoint Site URL

BIM 360 Field Project Name

PRINCETON UNIVERSITY					
Home Mappings Synchronize					
Mappings					
Connections Document Sync RFI Sync Submittals Sync					
SharePoint Site Url	SharePoint Building Element List Name	SharePoint Submittals List Name	BIM360 Field Project Name	Legacy Project	
<input type="text" value="https://cm.princeton.edu/projects/Dodge"/>	<input type="text"/>	<input type="text" value="Submittals"/>	<input type="text" value="Dodge Hall Renovation"/>	<input type="checkbox"/>	<input type="button" value="X"/>
<input type="text" value="https://cm.princeton.edu/projects/ChildCe"/>	<input type="text"/>	<input type="text" value="Submittals"/>	<input type="text" value="Child Care Facility"/>	<input type="checkbox"/>	<input type="button" value="X"/>
<input type="text" value="https://cm.princeton.edu/projects/hlthctr"/>	<input type="text"/>	<input type="text" value="Submittals"/>	<input type="text" value="McCosh Health Center"/>	<input type="checkbox"/>	<input type="button" value="X"/>
<input type="text" value="https://cm.princeton.edu/projects/III016"/>	<input type="text"/>	<input type="text" value="Submittals"/>	<input type="text" value="Thomas Lab Room 016"/>	<input type="checkbox"/>	<input type="button" value="X"/>
<input type="text" value="https://cm.princeton.edu/projects/DillonG"/>	<input type="text"/>	<input type="text" value="Submittals"/>	<input type="text" value="Dillon Locker Room Re"/>	<input type="checkbox"/>	<input type="button" value="X"/>
<input type="text" value="https://cm.princeton.edu/projects/ACEE"/>	<input type="text" value="Building Elements List"/>	<input type="text"/>	<input type="text" value="ACEE"/>	<input checked="" type="checkbox"/>	<input type="button" value="X"/>



# BIM to FM: Integration workflow





# SP Connector

## Submittals Sync – Submittals in SharePoint

Construction Management William Bausmith

BROWSE ITEMS LIST SHARE

Dodge Hall Renovation Princeton University Projects Homepage Centric Archives EDIT LINKS

Search this site

### Submittal Records

+ new item or edit this list

All Items Tech Reviews Find an item SAVE THIS VIEW

ID	Title	OMNI Class Sys	Description	Building Elements	Submittal Step	Created	Tech Reps Assigned	Submittal Stamp
358	HVAC Valve Chart	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	CP-1; HX-1; HX-2; AHU-1; AHU-2; FCU-3		AE Final Review	September 1		
355	Balancing Report	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	AHU-1; AHU-2; EF-1; FCU-1; FCU-10; FCU-12; FCU-13; FCU-14; FCU-15; FCU-16; FCU-17; FCU-18; FCU-19; FCU-2; FCU-20; FCU-21; FCU-22; FCU-23; FCU-24; FCU-25; FCU-26; FCU-27; FCU-28; FCU-29; FCU-3; FCU-30; FCU-31; FCU-32; FCU-33; FCU-34; FCU-35; FCU-36; FCU-37; FCU-38; FCU-7; FCU-8; FCU-9; EF-2; EF-3; EF-4; EF-5; EF-6; EF-7		AE Final Review	August 16	Louis E. Kagel III Alex A. Dezubay	
342	0059-15000-0 Freeze Pump for AHU-1	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	AHU-1; Freeze Pump 1; Freeze Pump 2; AHU-2		Reviewed: See Submittal Stamp	June 13	Louis E. Kagel III Gary Brancato	Furnish As Corrected
278	0056-15000-0 Cooney HW Coil for Ahu-2	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	AHU-2		Reviewed: See Submittal Stamp	February 18	Louis E. Kagel III Robert P. Macfarlan Jr.	Approved
254	AHU-2	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	AHU-2		Reviewed: See Submittal Stamp	February 4	Louis E. Kagel III Gary Brancato Robert P. Macfarlan Jr.	Furnish As Corrected



# SP Connector

## Submittals Sync – BEL records, bundling Submittals (as-builts)

Construction Management William Bausmith

BROWSE ITEMS LIST

BEL Records

+ new item

All Items Spreadsheet ahu-2

ID	Title	Description	Maintainable Element	Manufacturer	Model	OMNI Class Sys	MasterFormat	Serial Number	Building Id Installed	Recent Submittal Status	Submittals	Submittal Count	Rooms Installed	Rooms Serviced
39	AHU-2	Air Handling Unit 2	Yes	GREENHECK	MSCF-20L-FC-15	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)			Under Review	Close	2		

Related Submittal Docs

ID	Title	OMNI Class Sys	Description	Submittal Step	Created	Tech Reps Assigned	Submittal Stamp
358	HVAC Valve Chart	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)		AE Final Review	9/1/2016 4:35 PM		
355	Balancing Report	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)		AE Final Review	8/16/2016 3:23 PM	<input type="checkbox"/> Louis E. Kagel III <input type="checkbox"/> Alex A. Dezubay	
342	0059-15000-0 Freeze Pump for AHU-1	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)		Reviewed: See Submittal Stamp	6/13/2016 1:40 PM	<input type="checkbox"/> Louis E. Kagel III <input type="checkbox"/> Gary Brancato	Furnish As Corrected
278	0056-15000-0 Cooney HW Coil for Ahu-2	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)		Reviewed: See Submittal Stamp	2/18/2016 3:33 PM	<input type="checkbox"/> Louis E. Kagel III <input type="checkbox"/> Robert P. Macfarlan Jr.	Approved
254	AHU-2	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)		Reviewed: See Submittal Stamp	2/4/2016 11:09 AM	<input type="checkbox"/> Louis E. Kagel III <input type="checkbox"/> Gary Brancato <input type="checkbox"/> Robert P. Macfarlan Jr.	Furnish As Corrected

Some items might be hidden. Include these in your search

# SP Connector

## Documents Sync

BEL list in Field



<div> <b>AUTODESK® BIM 360™ FIELD</b> <span>Dodge Hall Renovation ▾</span> <span>Equipment</span> </div>													
<div> <span>+ Add</span> <span>Edit</span> <span>X Delete</span> <span>Print</span> <span>More Actions ▾</span> </div>													
	Name	Barcode	Type	Description	Status	# Issues	# Open Issues	# Checklists	# Open Checklists	Area Served	Cx Item	Date Ver by Cx Age	Date Cre
<input type="checkbox"/>	1" Butterfly Valve	1" Butterfly Valve	21 13 13 Wet-Pipe Sprinkler Systems	1" Butterfly Valve	Installed	0	0	0	0	Elevator Pit	No	<input type="checkbox"/>	May 17,
<input type="checkbox"/>	1" Butterfly Valve	1" Butterfly Valve	21 13 13 Wet-Pipe Sprinkler Systems	1" Butterfly Valve	Installed	0	0	0	0	Top of Elevator	No	<input type="checkbox"/>	May 17,
<input type="checkbox"/>	4" Alarm CK	4" Alarm CK	21 13 13 Wet-Pipe Sprinkler Systems	4" Easy Riser Check Valve	Installed	0	0	0	0	Entire Building	No	<input type="checkbox"/>	May 17,
<input type="checkbox"/>	4" Check ValveZs c	4" Check Valve	21 13 13 Wet-Pipe Sprinkler Systems	4" Swing Check Valve	Installed	0	0	0	0	Entire Building	No	<input type="checkbox"/>	May 17,
<input type="checkbox"/>	4" Main Control Val	4" Main Control Val	21 13 13 Wet-Pipe Sprinkler Systems	4" Butterfly valve	Installed	0	0	0	0	Entire Building	No	<input type="checkbox"/>	May 17,
<input type="checkbox"/>	4" Water Flow Switc	4" Water Flow Switc	21 13 13 Wet-Pipe Sprinkler Systems	4" Water Flow Alarm Switch	Installed	0	0	0	0	Entire Building	No	<input type="checkbox"/>	May 17,
<input type="checkbox"/>	AD-1	AD-1	22 13 19.13 Sanitary Drains	Area Drain 1	Ordered	0	0	0	0		No	<input type="checkbox"/>	Feb 28,
<input type="checkbox"/>	AD-2	AD-2	22 13 19.13 Sanitary Drains	Area Drain 2	Ordered	0	0	0	0		No	<input type="checkbox"/>	Feb 28,
<input type="checkbox"/>	AHU-1	AHU-1	23 73 00 Indoor Central-Station Air-Handling	AHU-1	Functional Perform	10	7	2	2	Entire building	Yes	<input checked="" type="checkbox"/>	Feb 24,
<input type="checkbox"/>	AHU-2	AHU-2	23 73 00 Indoor Central-Station Air-Handling	AHU-2	Functional Perform	4	4	2	2	Kitchen hood	Yes	<input type="checkbox"/>	Feb 24,
<input type="checkbox"/>	Ansul System		21 60 00 Kitchen Hood system	Ansul System	Functional Perform	0	0	0	0	basement kitch	No	<input type="checkbox"/>	Jul 14, 2
<input type="checkbox"/>	ATC	ATC	25 13 00 Integrated Automation Control and	Automatic Temperature Control System	Installed	2	2	3	3	Building	Yes	<input checked="" type="checkbox"/>	Mar 10,
<input type="checkbox"/>	ATS	ATS	26 36 00 Trasfer Switches	Automatic Transfer Switch	Functional Perform	3	2	2	2	Entire building	Yes	<input checked="" type="checkbox"/>	May 2, 2
<input type="checkbox"/>	BACKFLOW PREV		33 12 13.13 Water Supply Backflow Prevent	BACKFLOW PREVENTER BP-2 Chilled	Functional Perform	0	0	2	2	Chilled water r	Yes	<input checked="" type="checkbox"/>	Aug 2, 2
<input type="checkbox"/>	BACKFLOW PREV		33 12 13.13 Water Supply Backflow Prevent	BACKFLOW PREVENTER BP-3 heating	Functional Perform	0	0	2	2		Yes	<input checked="" type="checkbox"/>	Aug 2, 2
<input type="checkbox"/>	BALANCING VALV		Other	Balancing Valves	Installed	0	0	0	0		No	<input type="checkbox"/>	Jul 14, 2
<input type="checkbox"/>	BALL VALVES		Other	Ball Valves	Installed	0	0	0	0	Dodge Hall	No	<input type="checkbox"/>	Jul 14, 2
<input type="checkbox"/>	BF-1 BACKFLOW F	Backflow Preventor	33 12 13.13 Water Supply Backflow Prevent	Backflow preventor water main	Installed	0	0	2	2	Entire building	Yes	<input checked="" type="checkbox"/>	May 2, 2
<input type="checkbox"/>	BRONZE BALL VAI		Other	Bronze Ball Valves	Installed	0	0	0	0	Dodge Hall	No	<input type="checkbox"/>	Jul 14, 2
<input type="checkbox"/>	BRONZE STRAINE		Other	BRONZE STRAINERS	Installed	0	0	0	0			<input type="checkbox"/>	Jul 15, 2
<input type="checkbox"/>	BUTTERFLY VALV		Other	BUTTERFLY VALVES	Installed	0	0	0	0			<input type="checkbox"/>	Jul 15, 2
<input type="checkbox"/>	CAST IRON STRAI		Other	CAST IRON STRAINERS FLANGED	Installed	0	0	0	0			<input type="checkbox"/>	Jul 15, 2
<input type="checkbox"/>	CP	CP	21 13 13 Wet-Pipe Sprinkler Systems	Concealed Pendant	Installed	0	0	0	0	Through Out Bi	No	<input type="checkbox"/>	Feb 28,
<input type="checkbox"/>	CP-1	CP-1	23 22 23 Steam Condensate Pumps	Steam Condensate Pump	Installed	2	2	2	2	HX-1	Yes	<input type="checkbox"/>	Feb 24,
<input type="checkbox"/>	CP-2	CP-2	23 22 23 Steam Condensate Pumps	Condensate Pump for FC-1 and HX-2	Functional Perform	1	1	2	2	FCU-1, HX-2 M	Yes	<input type="checkbox"/>	Feb 24,
<input type="checkbox"/>	CP-3	CP-3	23 22 23 Steam Condensate Pumps	Air Conditioning Condensate Pump for A	Functional Perform	0	0	2	2	AHU-1	Yes	<input checked="" type="checkbox"/>	Feb 24,
<input type="checkbox"/>	CP-4	CP-4	23 22 00 Steam and Condensate Piping anc	Condensate Pump for FC-3	Ordered	0	0	0	0	Kitcher	Yes	<input type="checkbox"/>	Sep 21,
<input type="checkbox"/>	CP-5	CP-5	23 22 00 Steam and Condensate Piping anc	Condensate Pump for FC-7	Ordered	0	0	0	0	Electric Room	Yes	<input type="checkbox"/>	Sep 21,
<input type="checkbox"/>	CS	CS	21 13 13 Wet-Pipe Sprinkler Systems	Concealed Horizontal Sidewall	Installed	0	0	0	0	Through Out	No	<input type="checkbox"/>	Feb 28,
<input type="checkbox"/>	DF-1	DF-1	22 47 00 Drinking Fountains and Water Coo	Drinking Fountain	Ordered	0	0	0	0		No	<input type="checkbox"/>	Feb 28,
<input type="checkbox"/>	DOM Water Fixture	DOM Water Fixture	22 11 19 Domestic Water Piping Specialties	Domestic water fixtures	Ordered	0	0	0	0	Entire building	No	<input type="checkbox"/>	May 2, 2





# SP Connector

## Documents Sync

## BEL Documents in Field



**B**

AUTODESK® BIM 360™ FIELD

Dodge Hall Renovation ▾ Equipment ▾ AHU-2

Back to Equipment

Checklists Issues Tasks Attachments Comments History

Attachments

File Library Link Camera Download All

**IFC\_Siemens\_Parts.pdf**  
Added/Modified Aug 2, 2016 2:32 PM  
Public link:

Markup Download Delete

**change\_order\_#2\_FP\_Full\_Submittal.pdf**  
Added/Modified Aug 1, 2016 10:40 AM  
Public link:

Markup Download Delete

**AHU-2\_IOM.pdf**  
Added/Modified Aug 2, 2016 3:23 PM  
Public link:

Markup Download Delete

**AHU-2.JPG**  
Added/Modified Aug 16, 2016 2:06 PM  
Taken on Aug 15, 2016 2:26 PM  
Public link:

Markup Download Delete

ⓘ

★ = required  
● = COBie-standard property

11

Profile

★ Name  
AHU-2

● Type  
23 73 00 Indoor Central-Station Air-Handling Unit

● Description  
AHU-2

Location  
Dodge Hall

Status  
Functional Performance Tests

Area Served  
Kitchen hood

Cx Item  
Yes

Data Verified by Cx Agent  
☐

Date commissioned

Locations Installed (Families only)

Manufacturer  
Greenheck

Model  
MSCF-20L-FC-15



# Asset Information is integrated



**AUTODESK® BIM 360™ FIELD** LCA Academic Bldg. > Equipment > AHU-7

Back to Equipment

Checklists Issues Tasks Attachments Comments History

3.3-7-34 AIR HANDLING UNITS + Checklist Edit Link Check

Created	Modified	Name		# Issues	# Open
Nov 10, 2015 8:35	Nov 10, 2015 9:54	3.3-7-34 AIR HANDLING UNITS	lpotts@princeton.edu	13	13
Nov 10, 2015 8:36	Nov 10, 2015 8:45	3.3-8-34 AIR HANDLING UNITS	lpotts@princeton.edu		

**Profile**

\* = required  
• = COBie-standard property

**Name**  
AHU-7

**Type**  
23 73 00 Indoor Central-Station Air-Handling Unit

**Description**  
Variable-Air-Volume Air Handling Unit

**Location**  
Level 07 - Attic

**Status**  
Ordered

**Area Served**  
Levels 2-6

**Cx Item**  
Yes

**Date commissioned**

**Locations Installed (Families only)**  
Lewis Tower Attic

**Manufacturer**  
Haakon

**Model**  
Custom

## Attachments

- Submittal documents synced from SharePoint
- Attached automatically to Equipment records

## Cx Checklists

- Templates drawn from PU library
- Issues created and tracked via Cx Issues workflow.

## BEL Attributes (PU COBIE)

- Data provided by subcontractors,
- Validated by Cx agent

# SP Connector

## RFIs Sync

**ADD NEW ISSUE** [Save] [Close]

Details [Attachment Icon]

Issue type: **RFI**

\* Issue ID: <New>

\* Description: [Text Area]

Root cause: [Dropdown]

Company: [Dropdown]

Status: Open

Due date: Nov 14, 2016 [Calendar Icon]

Location: [Dropdown]

Location detail: [Text Field]

New Properties: [Dropdown]

Test Property: [Text Field]

Background: Filter: All Issues, 50 Items, Show: 50, Previous 1



# SP Connector

## RFIs Sync

Construction Management

BROWSE

ITEMS

LIST

artsLEWIS CENTERPRINCETON

Projects Homepage

Centric Archive

EDIT LINKS

Building Elements List

Home

Project Team

Libraries

+ new item

All Items

Spreadsheet View

Submittal View

...

Find an item

Archive Library

Activities

Action Items

RFIs

BIM360 Issues

Bid Approval

Approvals

Building Elements

Submittals

✓	ID	Title	Description	Cx Item	OMNI Class Sys	MasterFormat
...				Yes	28 00 00 Electronic Safety and Security	28 13 00 Access Control
...				No	22 00 00 Plumbing	22 42 00 Commercial Plumbing Fixtures
...				No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 30 00 HVAC Air Distribution
...				No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 22 00 Steam and Condensate Piping and Pumps
...				No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 22 00 Steam and Condensate Piping and Pumps
...				No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 22 00 Steam and Condensate Piping and Pumps
...				No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	23 22 00 Steam and Condensate Piping and Pumps
...				No	23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)	22 30 00 Plumbing



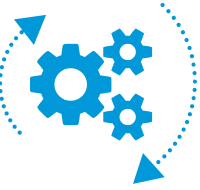
# Next Step

*BIM 360 – Maximo Integration Vision*





# Owner Driven BIM- CMMS Integration

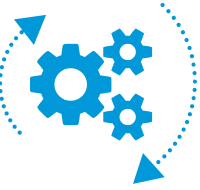


The screenshot displays the Maximo BIM360 interface, which integrates Building Information Modeling (BIM) with Computerized Maintenance Management System (CMMS) data. The central 3D model shows a complex mechanical system, including an Air Handling Unit (AHU) and associated piping. The interface is divided into several sections:

- Assets:** A top navigation bar with a home icon, a menu icon, and the text "Assets".
- Find Asset:** A search bar with a magnifying glass icon and a dropdown menu.
- Model Viewer:** A tabbed interface with options for "List View", "Asset", "Model Viewer", "Spare Parts", "Safety", "Meters", "Specifications", and "Relationships".
- Asset Details:** A section on the left showing the selected asset's details, including "Asset: 3966", "Location: MSB-6-MECHANICALPENT06", and "Description: Microdesk Demo, HVA".
- Equipment Properties:** A section on the right showing the selected asset's properties, including "Type: Heating / Cooling", "Description: Air Handling Unit for East Wing", and "Status: Installed".
- Documents:** A section at the bottom left showing a list of documents related to the asset, including "337238 - MBB Equipment JPP Reviewed.pdf", "337238 - MBB Equipment - SUB-10875.pdf", and "Conformance Stamp.pdf".



# Owner Driven BIM- CMMS Integration



Maximo Demo Site

Asset: 3966 **Microdesk Demo HVAC Air Handling Unit, 6/1/2016, Air Enter** Site: DEMO Attachments

Status: ACTIVE

View Attachments

Filter > 1 - 5 of 5

Document	Description	Document Folder	Document Version	Print?	Application		
<a href="#">MAINTMAN</a>	Maintenance Manual	Attachments		<input checked="" type="checkbox"/>	ASSET		
<a href="#">MANSPECS</a>	Manufacturer Specs	Attachments		<input checked="" type="checkbox"/>	ASSET		
<a href="#">BIM360FIELD</a>	<a href="#">337238 - MBB Equipment JPP Reviewed.pdf</a>	Submittals		<input checked="" type="checkbox"/>	ASSET		
<a href="#">BIM360FIELD</a>	<a href="#">337238 - MBB Equipment - SUB-10785.pdf</a>	Submittals		<input checked="" type="checkbox"/>	ASSET		
<a href="#">BIM360FIELD</a>	<a href="#">Conformance Stamp.pdf</a>	Submittals		<input checked="" type="checkbox"/>	ASSET		

OK

Details

Parent: >>

Maintain Hierarchy? ☐

Location: MSB-6-MECHANICALPENT06 >> Building MSB - Floor 6 - Room MECHANICAL PENT 06-205

Bin:

Rotating Item: >>

Condition Code:

Meter Group: >>

Usage:

Serial #:

Failure Class: >>

Item Type:

Tool Rate:

Address Information

Service Address: >>

Formatted Address:

Street Address:

City:

State/Province:

Address:





# Questions?





