

# Existing to Expansion – BIM 360 Ops for the Fayetteville Public Library

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# About The Speakers



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# Learning Objectives

## OBJECTIVE 1

Discover ways that standard industry project practices (Submittals and Commissioning) can enhance populating BIM 360 Ops data

## OBJECTIVE 2

Learn about the workflow of information required to successfully execute a BIM 360 Ops implementation

## OBJECTIVE 3

Discover lessons learned from implementing the BIM 360 Ops CMMS system on the Fayetteville Public Library project

## OBJECTIVE 4

Discover the importance of collaboration of the entire project team on BIM 360 Ops projects





# Fayetteville Public Library Expansion

## 70,000 SQUARE FEET

Innovation center with audio/video recording studio • virtual reality room • photography studio • simulation lab • expanded youth services area • 700-seat multipurpose center • additional meeting spaces • outdoor courtyard with green spaces around the property • other amenities



The goal is to provide one  
**seamless platform**





# Goals/Challenges

- Seamless platform to incorporate existing assets and new assets
- Manual data entry is time consuming
- Facility Personnel have many other tasks during a building transition
- O&M manuals provided during construction are often inaccurate & incomplete
- O&M manuals are often not available in time to have CMMS in place at building opening

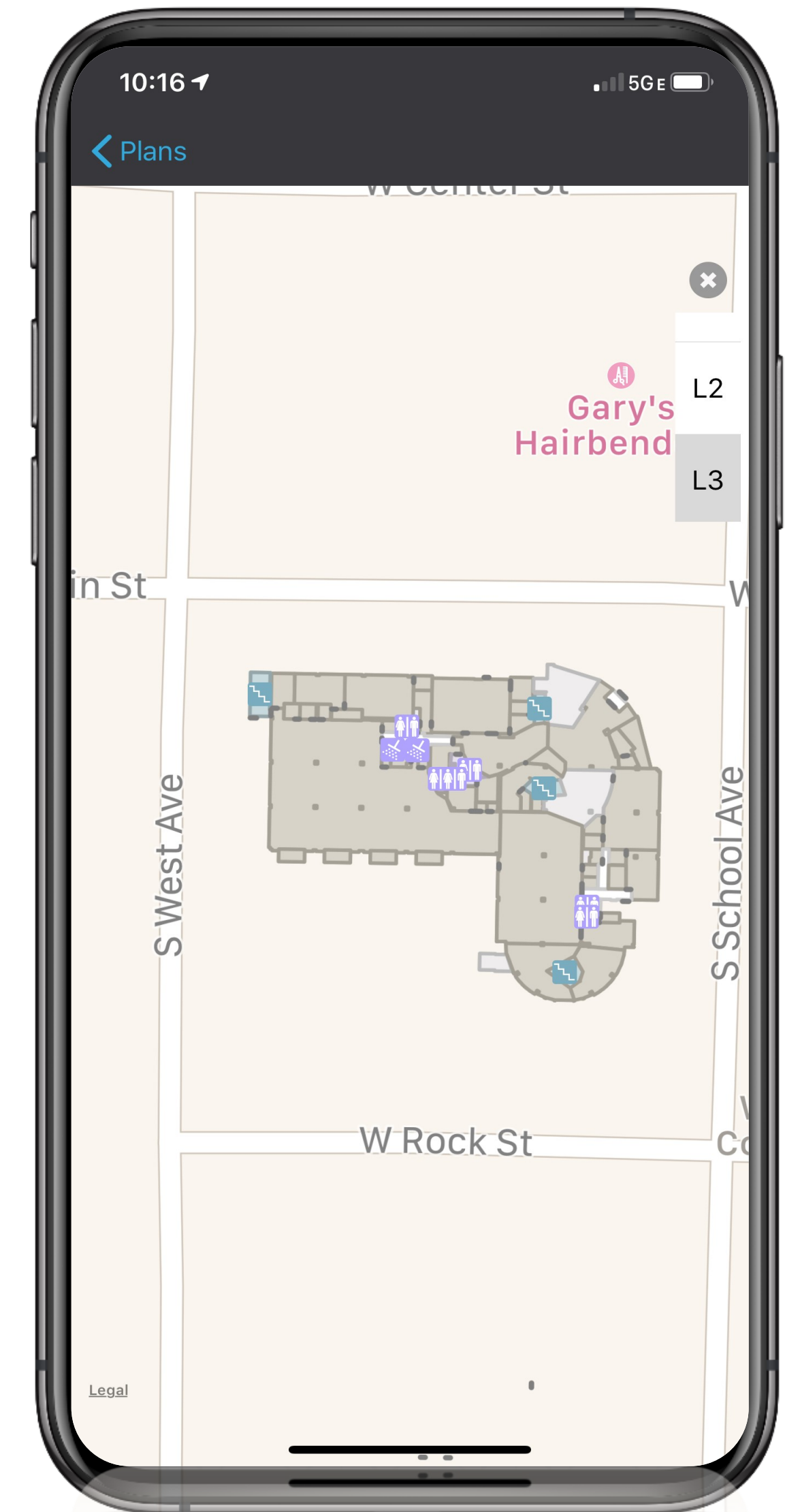




# What is BIM 360 Ops?

## MOBILE FACILITIES ASSET MANAGEMENT SOFTWARE

- Mobile-first asset and maintenance management solution
- Allows the BIM model to live on through the life of the building – extends the life of the model past construction documents
- **BIM-enabled asset data**
  - Extend the BIM lifecycle to the building operations phase
- **Data where you need it**
  - Gives your mobile teams the ability to directly access and update asset info
- **Modern design**
  - Improves a building's performance and operations with better insight





# A Holistic Solution

Existing CMMS	BIM 360 Ops
<ul style="list-style-type: none"><li>• Excel Spreadsheets</li><li>• Microsoft SharePoint</li><li>• Data collected in various ways</li><li>• Time consuming</li><li>• Often inaccurate or incomplete</li></ul>	<ul style="list-style-type: none"><li>• Extend the BIM lifecycle to operations phase</li><li>• Enable FPL to begin operations on day 1</li><li>• Easily accessible &amp; mobile</li><li>• Speed data entry</li><li>• Schedule and track asset-based preventative maintenance</li></ul>





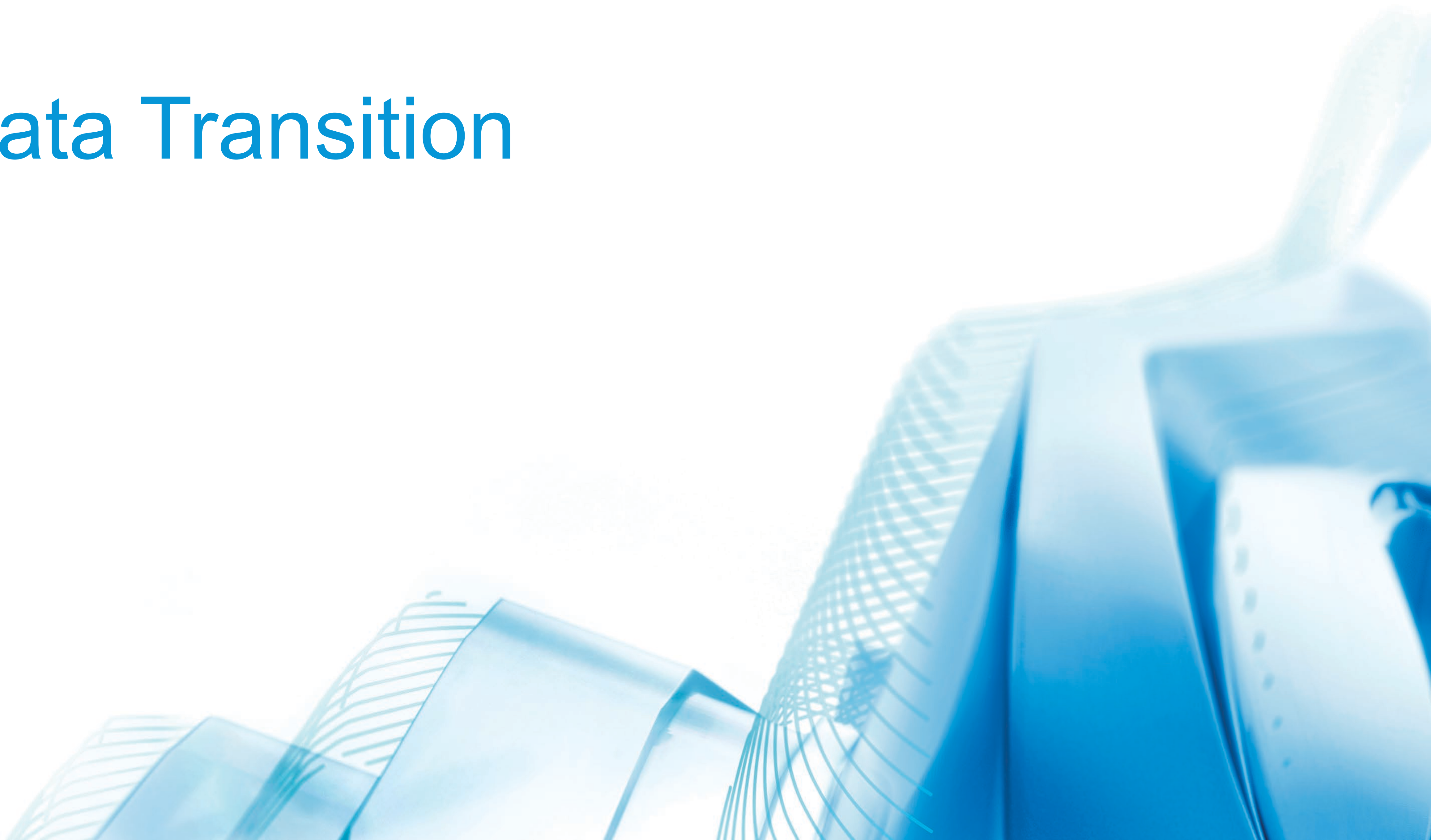
# Project Timeline

- Brought onto project by the Cx Agent after FPL expressed an interest in asset management
- Worked with design team to implement CMMS into the design model
- Worked with the FPL to identify assets to be tracked
- Built an FM spec around their needs
  - Assets to be tracked aren't only MEP items, but also include AV, Kitchen Equipment, Furniture, etc.
- Data Collection Process
- Training and Delivery



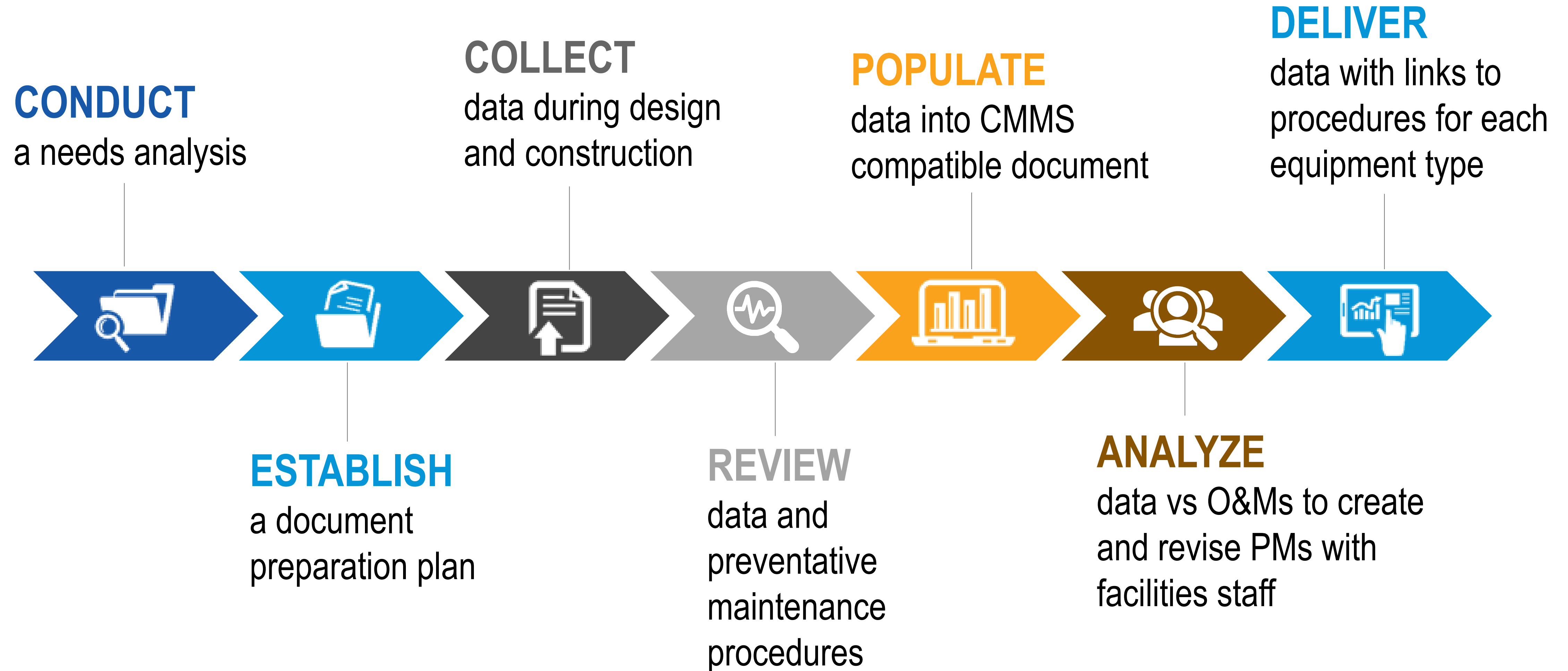


# Data Transition





# Data Collection Process



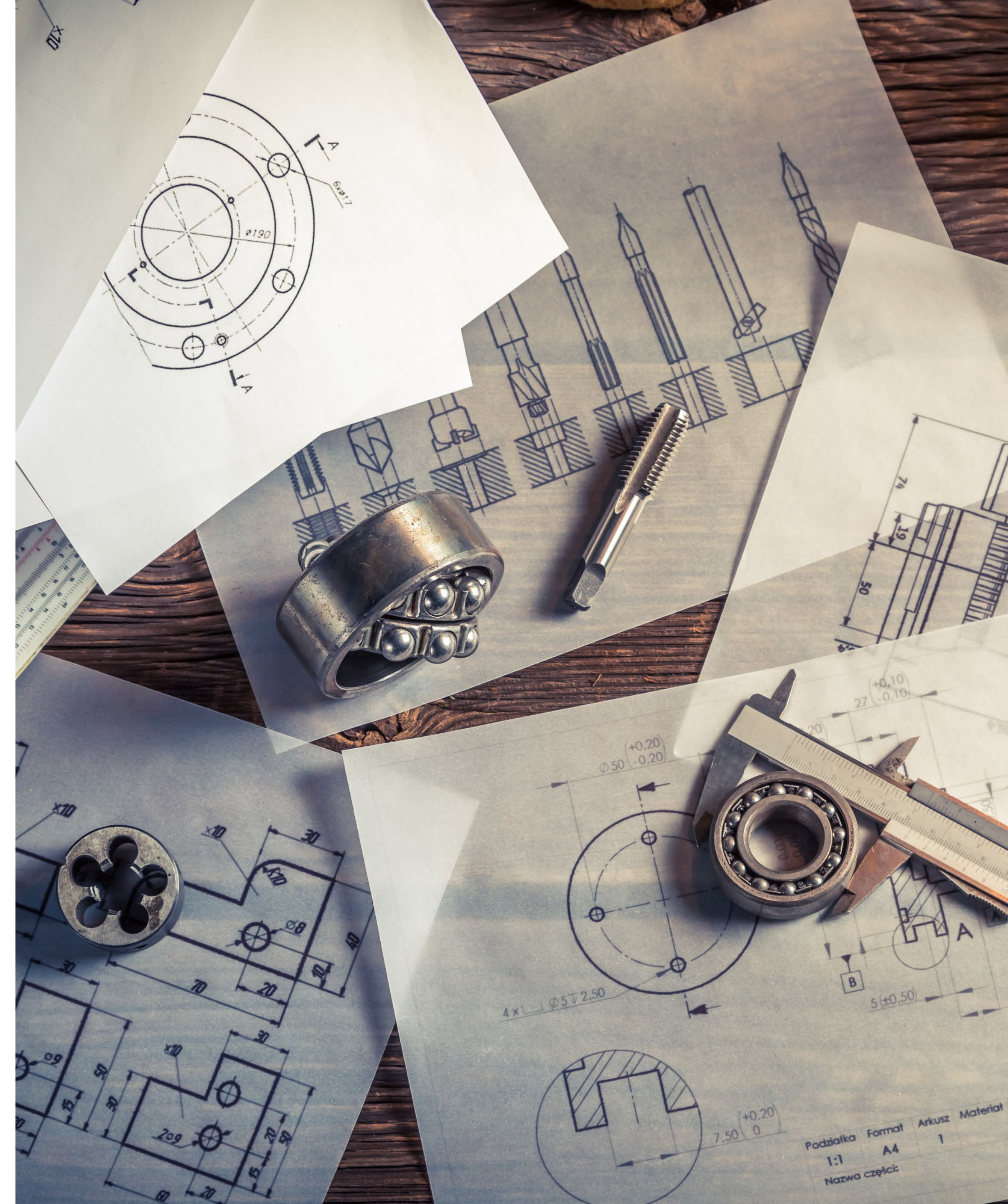


# Collect

## DATA COLLECTION PROCESS

Retrieve data during Design & Construction from: BIM Equipment data, commissioning data, preventative maintenance procedures, and O&M's from various sources

- Collected existing asset data from FPL SharePoint database
- For new FPL expansion, data was collected by contractors & Cx agents as part of the traditional Cx process
- By being integrated into the team early enough in the process, we are able to make sure BIM 360 Ops data integrated well with the Cx data that is being collected





# Populate/Analyze

## DATA COLLECTION PROCESS

- As assets are delivered to site & installed, the contractors collect the relevant make/model data that will populate BIM 360 Ops
- The BIM 360 Ops template for the FPL has been developed and shared with project team
- Preventative Maintenance data is delivered in Excel format as well as PDF.
  - Excel formatting allows for easy integration into the BIM 360 Ops software
- Means FM team doesn't need to hunt for the PM procedures; procedures are easily & accurately uploaded into BIM 360 Ops





# Deliver BIM 360 Ops

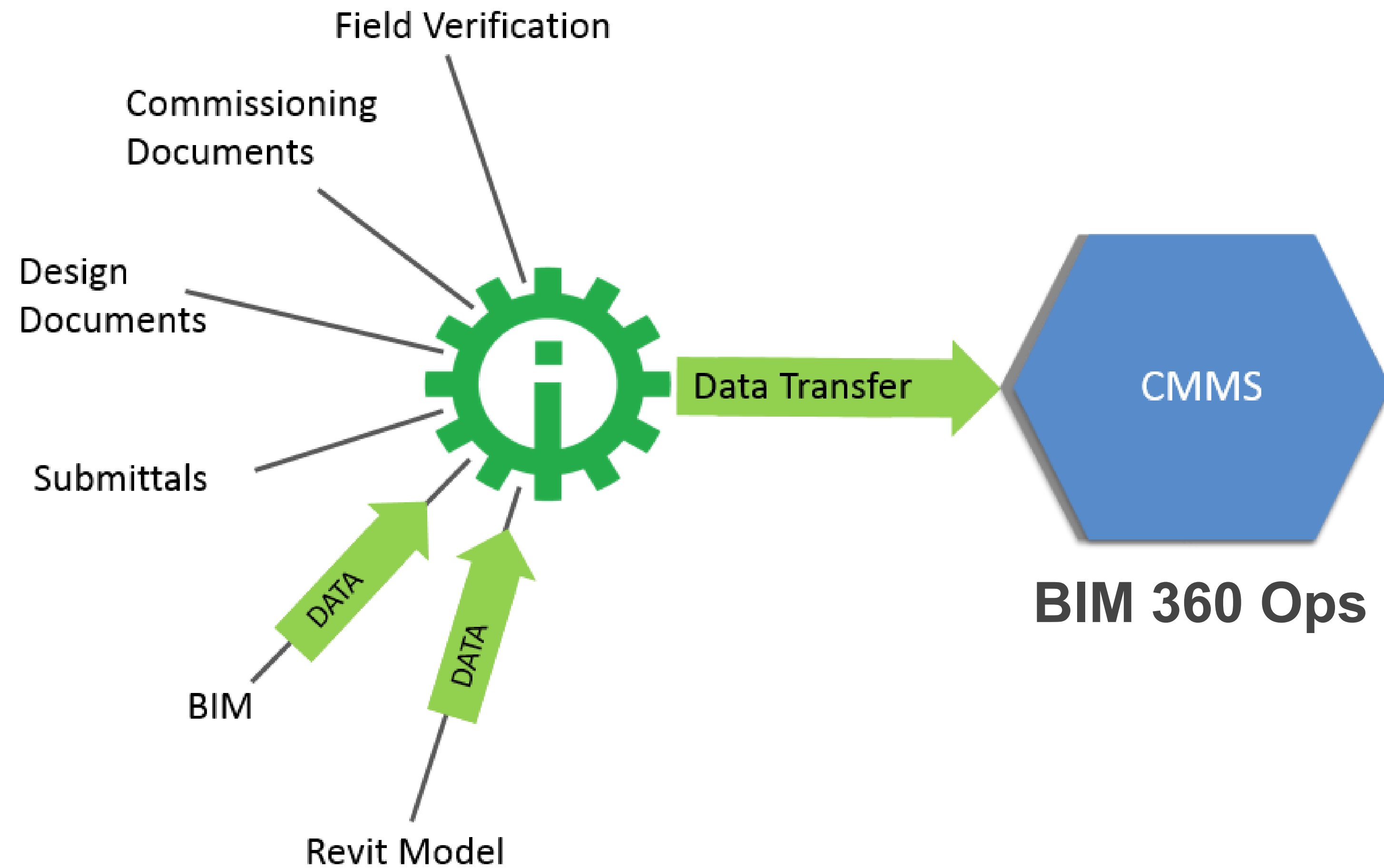
## DATA COLLECTION PROCESS

- Deliver all BIM Equipment Data
- Commissioning Data
- PM Procedures
- O&M's Manuals
- Matterport Scan
- 3-D Perspective
- Indoor mapping





# Transitioning Data to Operations





# Training

- Kick-off meeting with the team
- App installation and tutorial
- Uploaded test assets into BIM 360 Ops
- Created a test environment
- Transition to live portfolio





# Information Workflow





# Data Spec

MSR Design  
Issue for Bid  
02-08-2019

FAYETTEVILLE PUBLIC LIBRARY  
SECTION 017500  
OPERATION AND MAINTENANCE DATA INTEGRATION

- 1. Required Information
  - a. Vendor Name
  - b. Complete Address
  - c. Phone
  - d. Email
  - e. Project Contact
  - f. Responsible Party: Contractor
- B. Installing Contractor Contact Information
  - 1. Required Information
    - a. Vendor Name
    - b. Complete Address
    - c. Phone
    - d. Email
    - e. Project Contact
    - f. Responsible Party: Contractor
  - C. Sub-Contractor Contact Information
    - 1. Required for any sub-contractors associated with the installation of each Asset
    - 2. Required Information
      - a. Vendor Name
      - b. Complete Address
      - c. Phone
      - d. Email
      - e. Project Contact
      - f. Responsible Party: Contractor

**PART 4 - SPECIFIC ASSET DATA REQUIREMENTS**

- 4.1 The Responsible Party for Population of Data in Section 4 is the Installing Contractor unless otherwise specified.
- 4.2 MECHANICAL - 1100
  - A. 1101 - VARIABLE REFRIGERANT VOLUME FAN COIL UNIT
    - 1. Asset Number
      - a. Responsible Party: FMS
    - 2. Asset ID
      - a. Responsible Party: CxA

MSR Design  
Issue for Bid  
02-08-2019

FAYETTEVILLE PUBLIC LIBRARY  
SECTION 017500  
OPERATION AND MAINTENANCE DATA INTEGRATION

- 3. Asset Category
    - a. Responsible Party: CxA
  - 4. Asset Type
    - a. Responsible Party: CxA
  - 5. Room Name / Number
    - a. Responsible Party: CxA
  - 6. Manufacturer
    - a. Responsible Party: CxA
  - 7. Model Number
    - a. Responsible Party: CxA
  - 8. Serial Number
  - 9. Original Cost
  - 10. Estimated Life
  - 11. Warranty Start
  - 12. Warranty End
  - 13. Installation Date
  - 14. Source Power Panel Name
  - 15. Source Power Panel Location
  - 16. Source Power Breaker Number(s)
  - 17. Horsepower (nameplate data)
  - 18. Space Served
    - a. Responsible Party: CxA
  - 19. CW Flow Rate (submitted value)
    - a. Responsible Party: CxA
  - 20. HW Flow Rate (submitted value)
    - a. Responsible Party: CxA
  - 21. Max Primary Airflow (CFM)
    - a. Responsible Party: CxA
  - 22. Belt size
  - 23. Filter Type
  - 24. Filter Size / Quantity
  - 25. Voltage (nameplate data)
  - 26. Amperage (nameplate data)
  - 27. Thermostat Location
- B. 1102 – AIR COOLED VRF HEAT RECOVERY CONDENSING UNIT
    - 1. Asset Number
      - a. Responsible Party: FMS
    - 2. Asset ID
      - a. Responsible Party: CxA
    - 3. Asset Type
      - a. Responsible Party: CxA
    - 4. Room Name / Number
      - a. Responsible Party: CxA
    - 5. Manufacturer
      - a. Responsible Party: CxA



# Equipment Asset Information Sample

## MECHANICAL - 1100

- 1101 – VARIABLE REFRIGERANT VOLUME FAN COIL UNIT
- 1102 – AIR COOLED VRF HEAT RECOVERY CONDENSING UNIT
- 1103 – BRANCH SELECTOR
- 1104 – MAKEUP AIR UNIT
- 1105 – AIR HANDLING UNIT
- 1106 - ENERGY RECOVERY VENTILATOR
- 1107 - ELECTRIC BASEBOARD HEATER
- 1108 – EXHAUST FAN
- 1109 - DUCTLESS MINI-SPLIT SYSTEM
- 1110 - DUAL DUCT VAV BOX
- 1111 – LOUVERS
- 1112 – AIR COMPRESSOR
- 1113 – BOILER
- 1114 – HEATING WATER PUMP
- 1115 – HVAC WATER VALVE

## ELECTRICAL - 1200

- 1201 – GENERATOR
- 1202 – TRANSFORMERS
- 1203 – LIGHTING CONTROL PANELS

## PLUMBING - 1300

- 1301 – GREASE INTERCEPTOR
- 1302 – PUMPS
- 1303 – WATER HEATERS
- 1304 – BACKFLOW PREVENTOR
- 1305 – DOMESTIC MAIN WATER VALVE

## LIFE SAFETY - 1400

- 1401 – FIRE ALARM CONTROL PANEL
- 1402 – FIRE EXTINGUISHER
- 1403 – FIRE DAMPER
- 1404 – FIRE DOORS
- 1405 – FIRE PROTECTION BACKFLOW
- 1406 – FIRE SPRINKLER CONTROL VALVES
- 1407 – EXIT SIGNS
- 1408 – EMERGENCY LIGHTING

## SECURITY - 1500

- 1501 – ENTRANCE KIOSKS
- 1502 – CARD READERS
- 1503 – SECURITY CAMERA

## ELEVATORS - 1600

- 1601 – ELEVATOR

## FOOD SERVICE EQUIPMENT - 1700

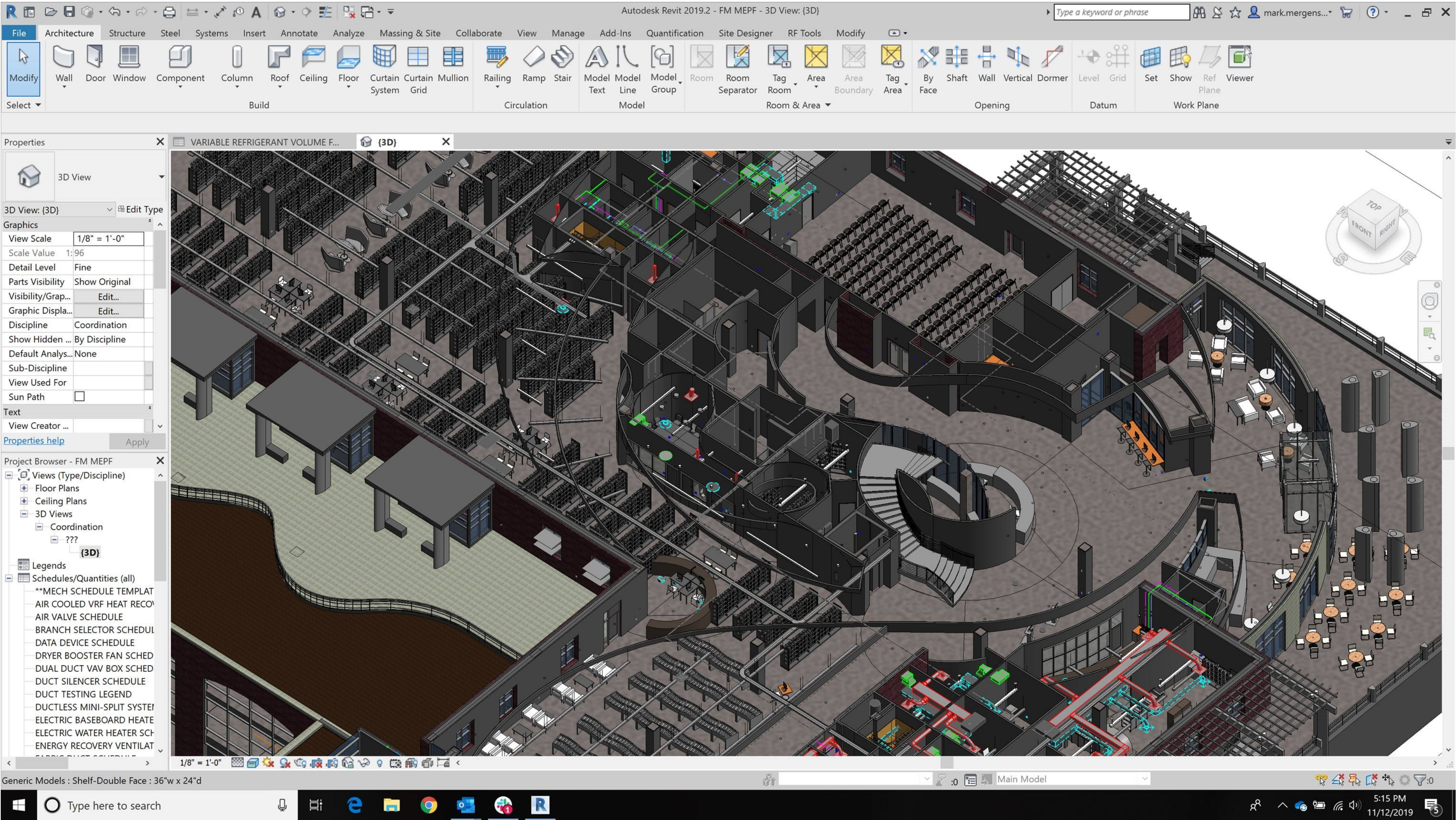
- 1701 – REFRIGERATED EQUIPMENT
- 1702 – HEATED EQUIPMENT
- 1703 – FIRE SUPPRESSION
- 1704 – KITCHEN HOODS
- 1705 – MISCELLANEOUS KITCHEN EQUIPMENT

## AUDIO VISUAL EQUIPMENT - 1800

- 1801 – PROJECTORS
- 1802 – AV CARTS
- 1803 – DIGITAL DISPLAYS

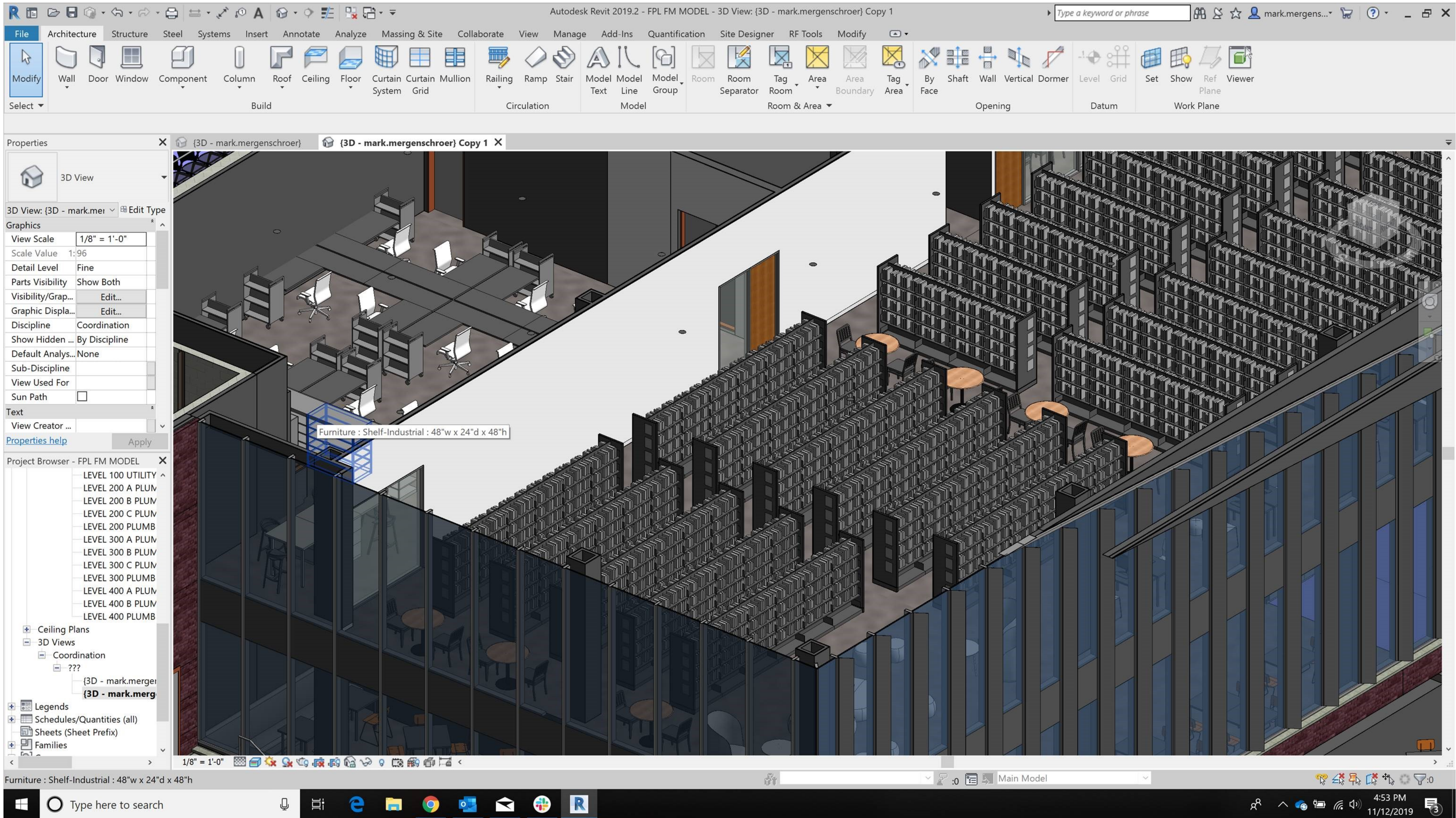


# Revit Modifications





# Revit Modifications





# Data Basics

	A	B	C	D	E	F	G	H	I	J
1	Asset ID	Asset Description	Asset Category	Asset Status	Barcode	Floor	Room Number	Manufacturer	Model	Serial N
2	FCU-3-06	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101001	LEVEL 000	012 TOOL LIBRARY	DAIKIN	FXMQ15PBVJU	
3	FCU-3-07	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101002	LEVEL 000	015 SHOP ZONE	DAIKIN	FXMQ30PBVJU	
4	FCU-3-08	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101003	LEVEL 000	016 CLEANZONE	DAIKIN	FXSQ09TAVJU	
5	FCU-3-09	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101004	LEVEL 000	017 DIR	DAIKIN	FXSQ05TAVJU	
6	FCU-3-10	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101005	LEVEL 000	021 MEETING ROOM	DAIKIN	FXSQ05TAVJU	
7	FCU-1-01	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101006	LEVEL 100	V.P1 PARKING VESTIBULE	DAIKIN	FXLQ09MVJU9	
8	FCU-1-03	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101007	LEVEL 100	128 FAB LAB	DAIKIN	FXMQ15PBVJU	
9	FCU-1-04	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101008	LEVEL 100	120 SIM LAB	DAIKIN	FXSQ05TAVJU	
10	FCU-1-05	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101009	LEVEL 100	119 CENTER FOR INNOVATION	DAIKIN	FXSQ09TAVJU	
11	FCU-1-06	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101010	LEVEL 100	120 SIM LAB	DAIKIN	FXSQ12TAVJU	
12	FCU-1-07	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101011	LEVEL 100	128 FAB LAB	DAIKIN	FXMQ15PBVJU	
13	FCU-1-08	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101012	LEVEL 100	127 VR STUDIO	DAIKIN	FXMQ30PBVJU	
14	FCU-1-09	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101013	LEVEL 100	128 FAB LAB	DAIKIN	FXMQ72MVJU	
15	FCU-1-10	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101014	LEVEL 100	143 STORAGE	DAIKIN	FXMQ96MVJU	
16	FCU-1-11	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101015	LEVEL 100	141 STORAGE	DAIKIN	FXMQ30PBVJU	
17	FCU-1-12	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101016	LEVEL 100	140 CRAFT ROOM	DAIKIN	FXMQ72MVJU	
18	FCU-1-13	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101017	LEVEL 100	140 CRAFT ROOM	DAIKIN	FXMQ30PBVJU	
19	FCU-1-14	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101018	LEVEL 100	119 CENTER FOR INNOVATION	DAIKIN	FXSQ12TAVJU	
20	FCU-3-01	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101019	LEVEL 100	177 STAGE	DAIKIN	FXSQ12TAVJU	
21	FCU-3-02	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101020	LEVEL 100	128 FAB LAB	DAIKIN	FXMQ72MVJU	
22	FCU-3-03	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101021	LEVEL 100	164 DRESSING ROOM	DAIKIN	FXMQ96MVJU	
23	FCU-3-04	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101022	LEVEL 100	167 AV STORAGE	DAIKIN	FXMQ96MVJU	
24	FCU-3-05	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101023	LEVEL 100	169 STORAGE	DAIKIN	FXMQ24PBVJU	
25	FCU-4-01	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101024	LEVEL 100	148 SORTING ROOM	DAIKIN	FXMQ15PBVJU	
26	FCU-4-02	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101025	LEVEL 100	150 CORRIDOR	DAIKIN	FXSQ12TAVJU	
27	FCU-4-03	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101026	LEVEL 100	162 JANITOR	DAIKIN	FXSQ07TAVJU	
28	FCU-4-04	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101027	LEVEL 100	160 B.O.H. CORRIDOR	DAIKIN	FXMQ54PBVJU	
29	FCU-4-05	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101028	LEVEL 100	181 STORAGE	DAIKIN	FXMQ96MVJU	
30	FCU-4-06	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101029	LEVEL 100	181 STORAGE	DAIKIN	FXMQ96MVJU	
31	FCU-4-07	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101030	LEVEL 100	160 B.O.H. CORRIDOR	DAIKIN	FXMQ54PBVJU	
32	FCU-4-08	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101031	LEVEL 100	163 GREEN ROOM	DAIKIN	FXSQ05TAVJU	
33	FCU-4-09	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101032	LEVEL 100	160 B.O.H. CORRIDOR	DAIKIN	FXSQ05TAVJU	
34	FCU-4-10	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101033	LEVEL 100	160 B.O.H. CORRIDOR	DAIKIN	FXSQ05TAVJU	
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36	FCU-4-12	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101035	LEVEL 100	16.1 STAIR 16	DAIKIN	FXHQ12MVJU	
37	FCU-1-01	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101036	LEVEL 200	V.P2 PL2 VESTIBULE	DAIKIN	FXLQ09MVJU9	
◀ ▶ ... assets.csv 1101 VRV 1102 VRF 1103 BR. SEL. 1104 MAU 1105 AHU 1106 ERV 1107 EBH 1108 EF 1109 MINI SPLIT 1110 VAV 1111 LOUVER 1112 AIR COMP. 1113 BOILER 1114 HEAT W. PMP. 1115 HVAC WAT. VLV.										

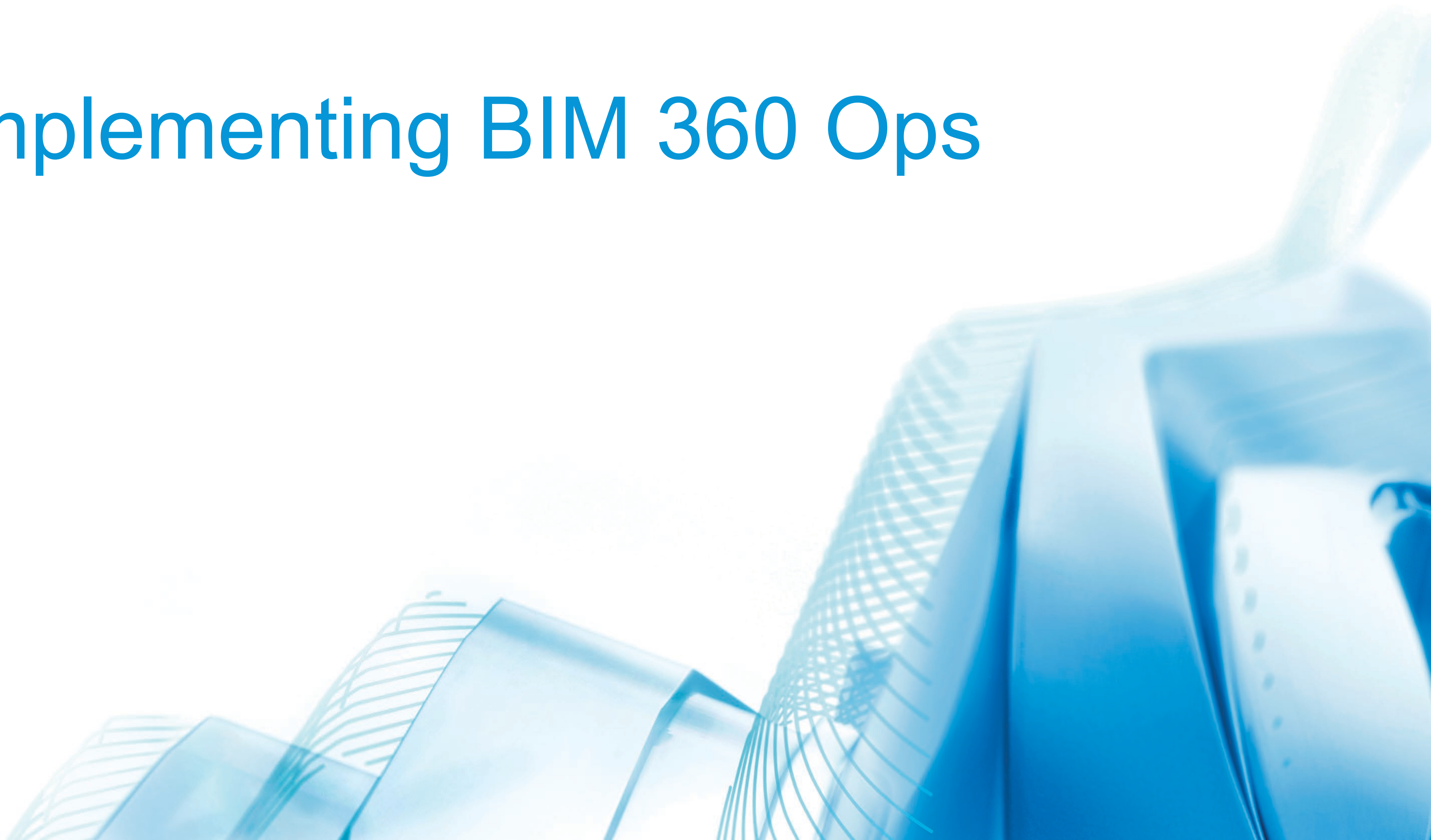


# Building Commissioning Data Population

Asset ID	Asset Description	Asset Category	Asset Status	Barcode	Floor	Room Number	Manufacturer	Model	Serial Number	Installed By	Installation Date	Warranty Expiration
FCU-3-06	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101001	LEVEL 000	012 TOOL LIBRARY	DAIKIN	FXMQ15PBVJU				
FCU-3-07	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101002	LEVEL 000	015 SHOP ZONE	DAIKIN	FXMQ30PBVJU				
FCU-3-08	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101003	LEVEL 000	016 CLEANZONE	DAIKIN	FXSQ09TAVJU				
FCU-3-09	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101004	LEVEL 000	017 DIR	DAIKIN	FXSQ05TAVJU				
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FCU-1-07	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101011	LEVEL 100	128 FAB LAB	DAIKIN	FXMQ15PBVJU				
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FCU-1-11	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101015	LEVEL 100	141 STORAGE	DAIKIN	FXMQ30PBVJU				
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FCU-3-01	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101019	LEVEL 100	177 STAGE	DAIKIN	FXSQ12TAVJU				
FCU-3-02	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101020	LEVEL 100	128 FAB LAB	DAIKIN	FXMQ72MVJU				
FCU-3-03	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101021	LEVEL 100	164 DRESSING ROOM	DAIKIN	FXMQ96MVJU				
FCU-3-04	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101022	LEVEL 100	167 AV STORAGE	DAIKIN	FXMQ96MVJU				
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FCU-4-09	Variable Refrigerant Volume Fan Coil Unit	HVAC		0011101032	LEVEL 100	160 B.O.H. CORRIDOR	DAIKIN	FXSQ05TAVJU				



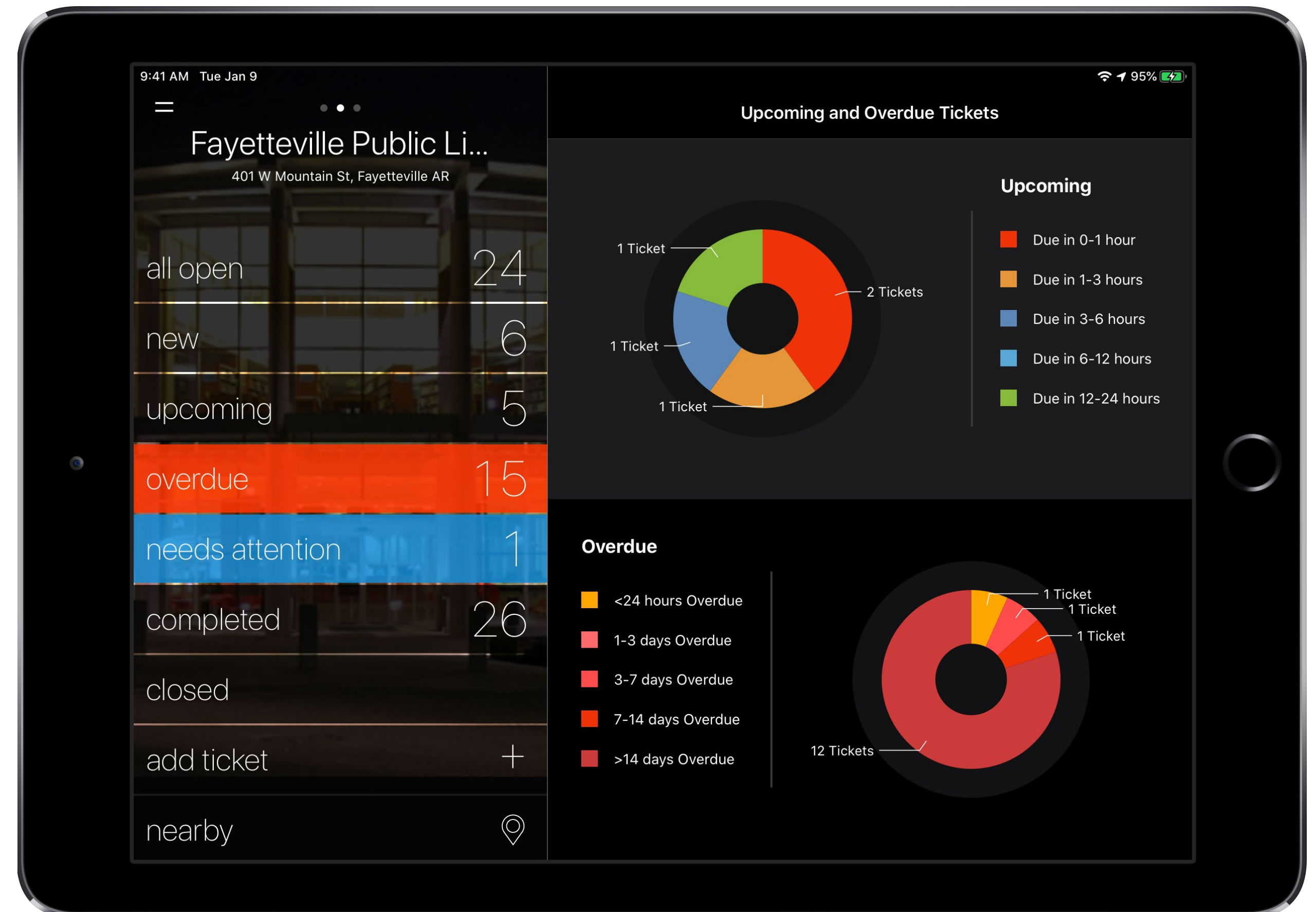
# Implementing BIM 360 Ops





# Ticket System

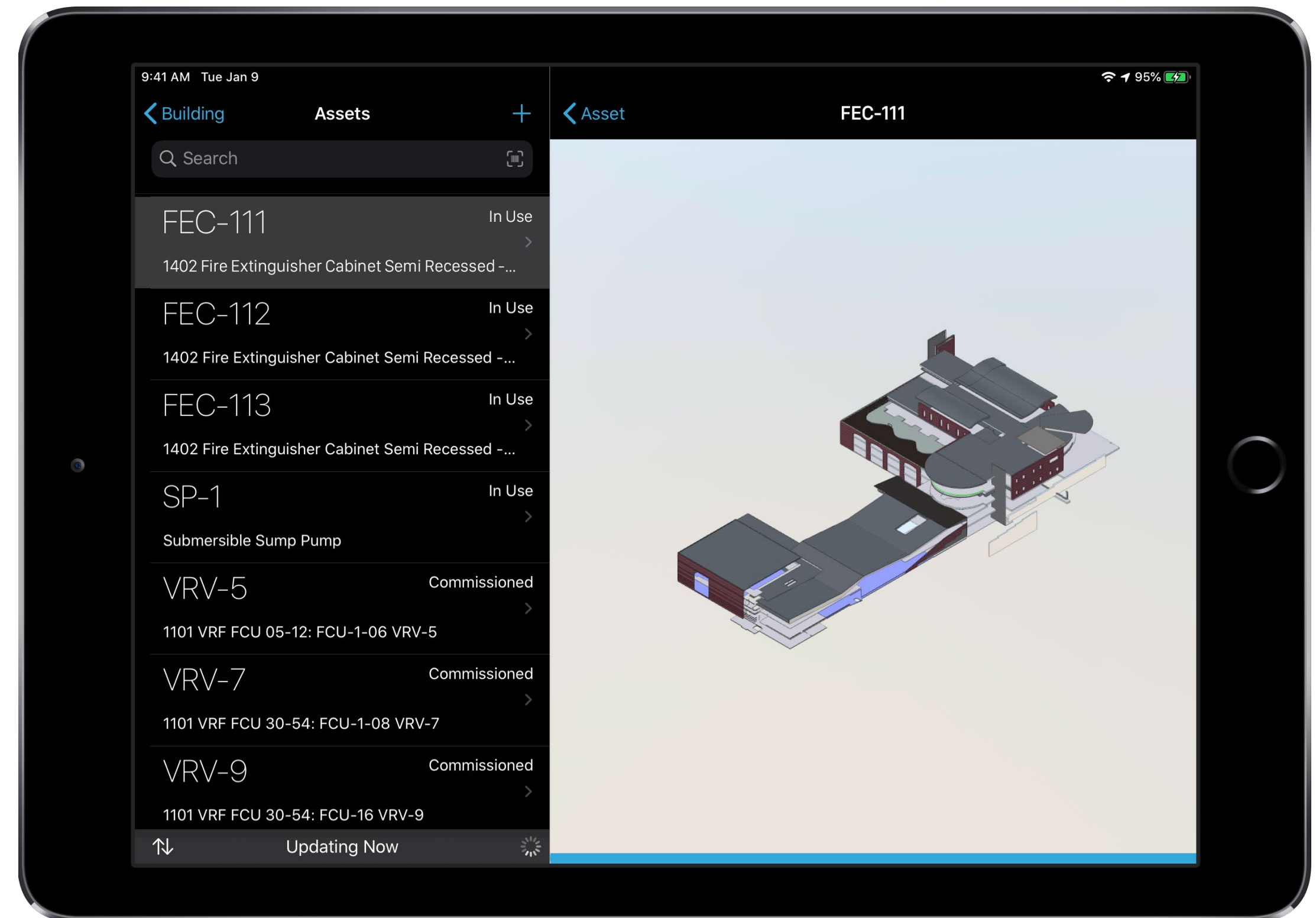
- Tickets are assigned to specific technicians or vendors
- Tickets contain:
  - Manuals and Links (unlimited)
  - Photos (unlimited)
  - Checklists
  - Assets and Location
  - Technician time tracking
- Communication with ticket creator
- Ticket Statuses
  - Changed throughout by tech and/or manager
  - Includes "Need Attention Reasons"
  - History shows entire ticket process
- Dashboard sorts new, upcoming, overdue, and "needs attention" tickets for quick viewing





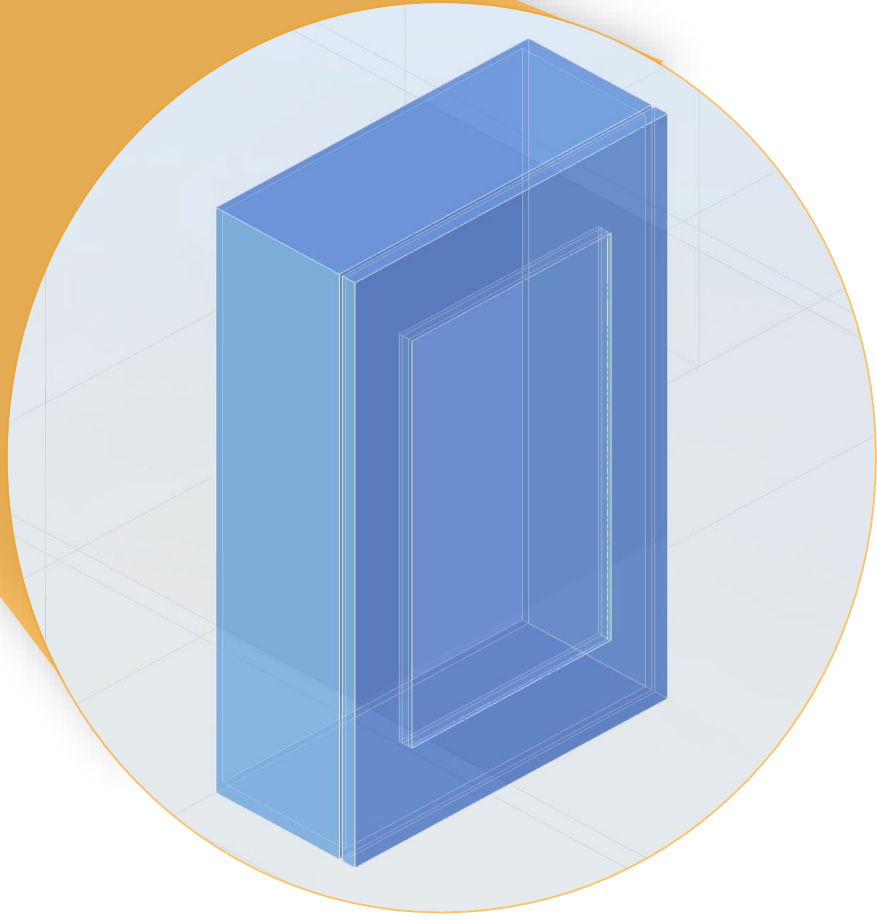
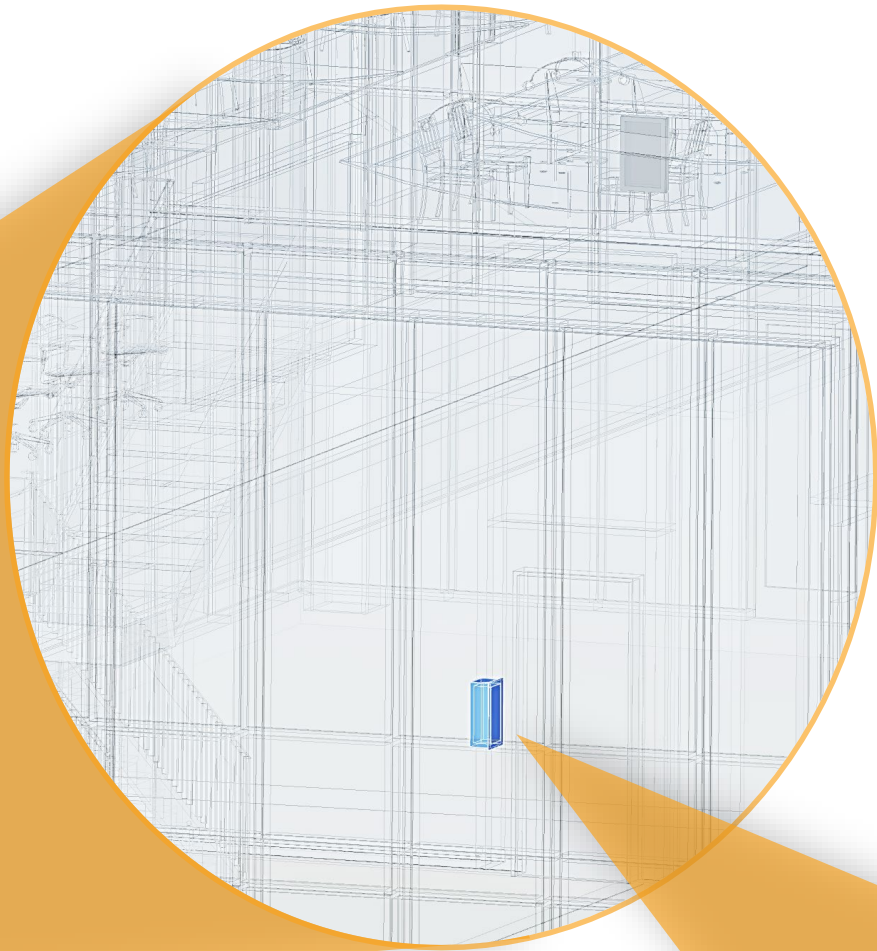
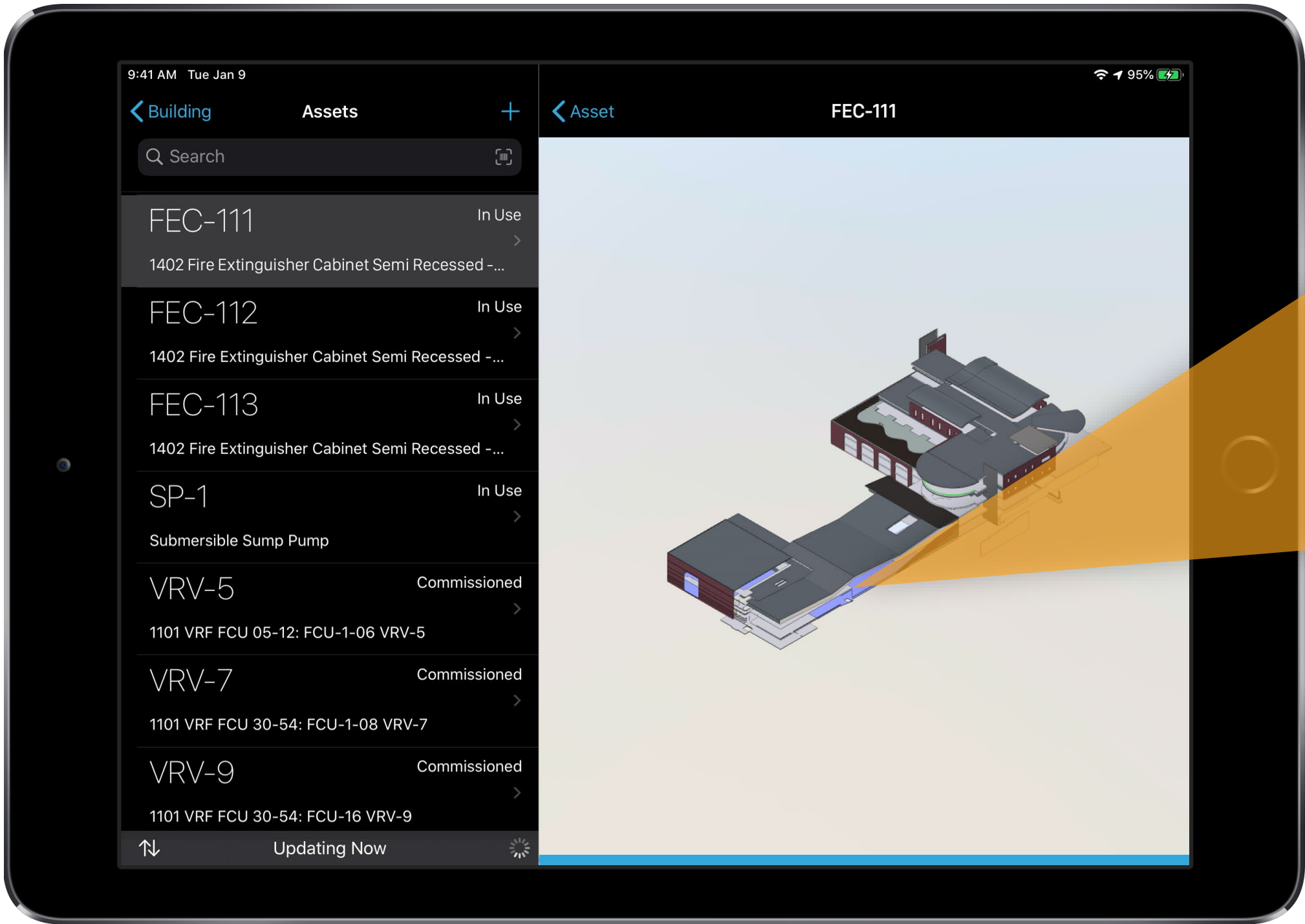
# Assets

- All installed finishes, fixtures, and equipment (selections and MEP)
- When uploaded to Ops through 3D Model, data automatically included:
  - Asset location
  - Manufacturer
  - Model
  - Documentation links
  - Mechanical/Electrical data
- **Benefits**
  - Enhance case management
  - Ensure accuracy





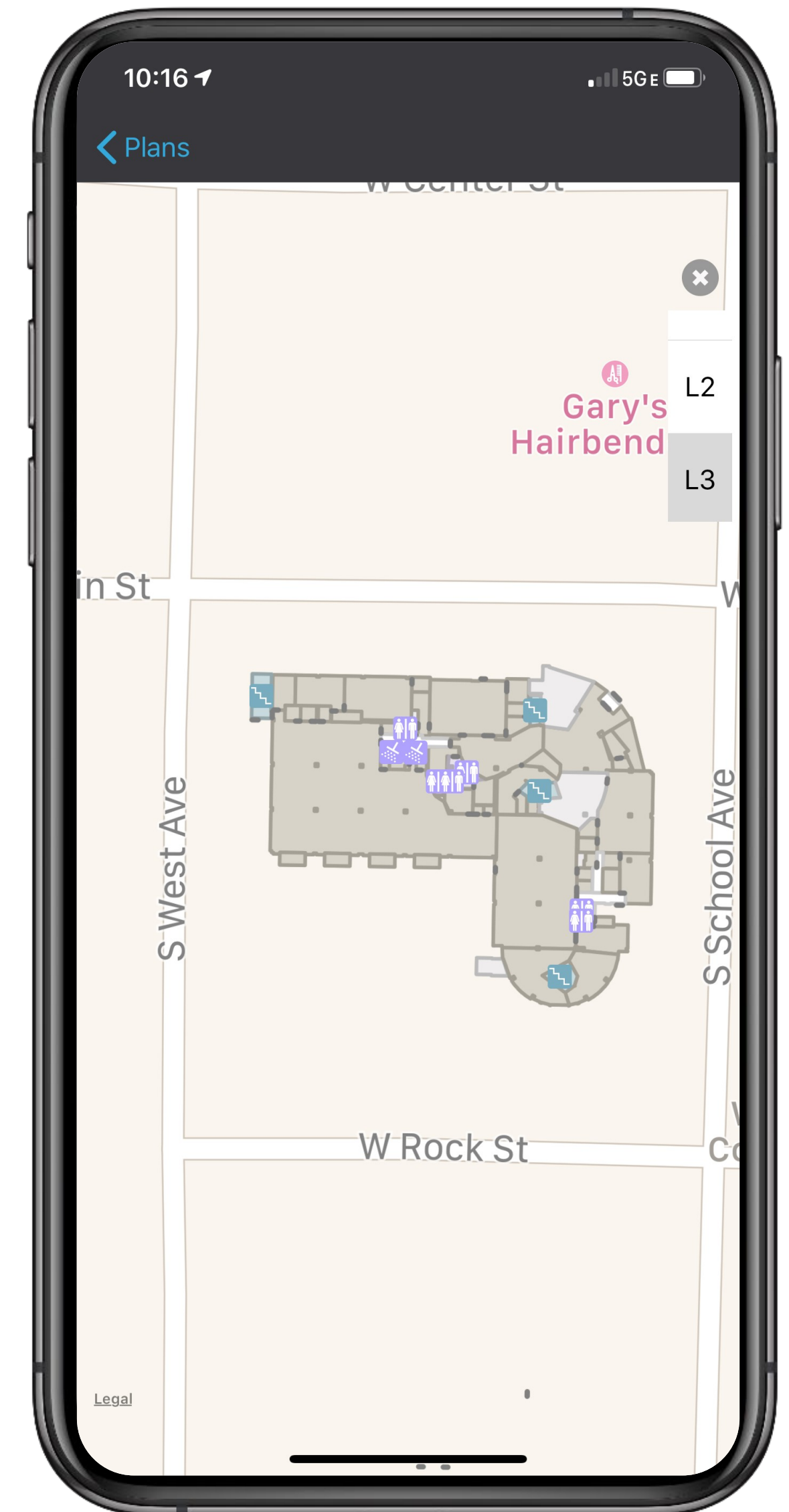
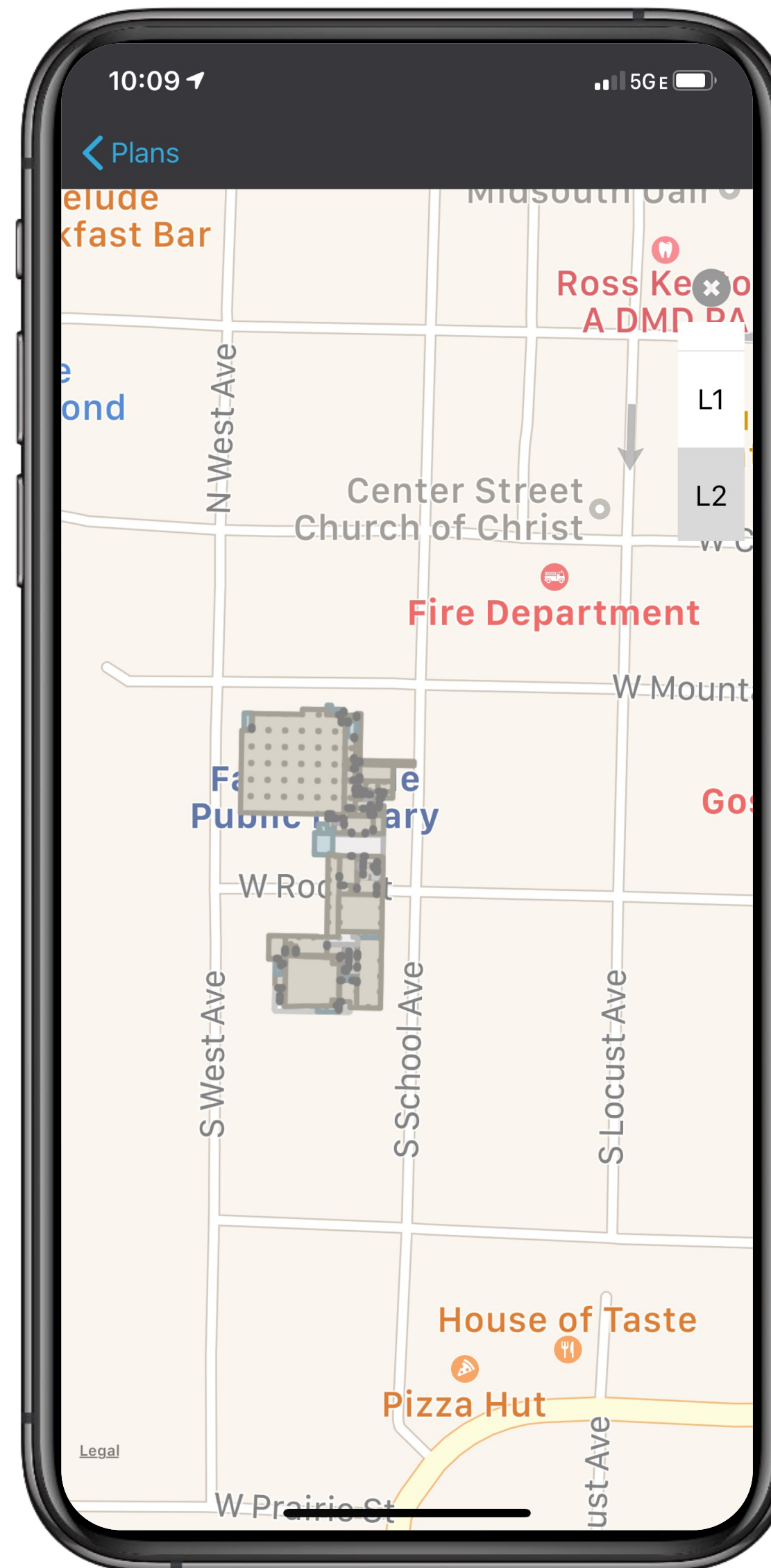
# Assets





# 3D View + Wayfinding

- Assets uploaded via Revit model or BIM360 Field are shown within a 3D space in Ops
  - 3D view available on desktop, mobile, or iOS app.
  - 3D view helps technician, vendor, or manager understand the context of the asset
- Assets can be geolocated to allow for wayfinding via map view





# Checklists

- Standardizes procedures
- Ensures accuracy during investigation
- Attached to ticket
- Technicians and managers can track percentage of Checklist completion
- Easy to update or add new checklists as needed
- Completely customizable

6 Items	Bathroom Checklist	
	add category	
	associated tickets	associated tasks
	None	1 >
	Check Mirrors	
	Check Sinks	
	Check Floors	
	Check Toilets	
	Check Stainless Steel	
	Check Doors	



# Scheduled Tasks

- Pre-created tickets meant for maintenance items
  - Preventative Maintenance
  - Maintenance Inspections
  - Site Inspections
- Automatically create ticket at pre-scheduled intervals

Name

TASK-00002

10:00 AM Bathroom Check

add category

created by

Grant Logan >

priority

Medium >

repeat every

None >

checklist

Bathroom Checklist >

create ticket

1 Day(s) > before

history

View >

associated assets

None

associated locations

24 >

schedules

Add start dates and assignees >

Photos and Videos

Add Photo or Video



# Overview





# Benefits for FPL

- FPL has new and existing assets in a new CMMS platform
- Able to generate work orders for assets for trouble calls as well as Preventative Maintenance tasks on a scheduled basis
- FPL building is geo-located in BIM 360 Ops for accurate indoor mapping
- Assets can be located in BIM 360 Ops accurately where they are in the building based on the modeled (and field verified) data





# Fayetteville Public Library Project Progress



November 2019



Fall 2020



# Questions?

## Thank you for your time!







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