BLD124210

Implementing BIM 360 Ops for Arkansas Children's Northwest Hospital—An Open Book

Mark Mergenschroer
Bernhard TME

Learning Objectives

- Discuss processes for gathering and validating data throughout the project lifecycle
- Discover insights for dealing with the complexity of multiple disciplines and firms at various stages of the project lifecycle
- Learn how to properly write a data collection spec and properly check the accuracy of the data
- Understand how mistakes were made and what was done to correct them

Description

In August 2015, Arkansas Children's, Inc., announced plans to build a freestanding children's hospital in Springdale, Arkansas, to advance pediatric health care in the region and provide care close to home for the more than 200,000 children. The new building—Arkansas Children's Northwest—will include 235,000 square feet of inpatient beds, emergency care, diagnostic services, and clinical space. The hospital's construction and facilities team put together a detailed set of data specifications to streamline the handover of the building and jumpstart maintenance and operations. The goal was to have all equipment data populated in the computerized maintenance management system (CMMS) by substantial completion in the fall of 2017. This will let critical maintenance processes be in place prior to completion. To realize that vision, a number of issues had to be addressed to successfully hand over data before the end of the project. This presentation will walk through planning, design, construction, and the beginning of operations.

Speaker(s)

Mark Mergenschroer is the Building Information Modeling (BIM) application specialist for TME, a multidiscipline engineering firm based in Little Rock, Arkansas. Mergenschroer has 21 years of construction and engineering design experience. He has played a key role in the implementation of Revit MEP software at TME. Mergenschroer has shared his BIM knowledge at events such as Autodesk University, BIM Forum, American Society for Healthcare Engineering, American Hospital Association, ASHRAE, Fiatech, and numerous Revit User Groups. Mergenschroer has also been leading the BIM Innovative Services Group at TME. This group focuses on training, technology, and project delivery for the building lifecycle. He is also an adjunct professor at Arizona State University (ASU), and has been involved with the development of the VLC Collaboration Space at ASU, and lectures on the subject of building start-up and commissioning using BIM tools.

About the Project:

In August 2015, Arkansas Children's, Inc. announced plans to build a freestanding children's hospital in Springdale, Ark. to advance pediatric healthcare in the region and provide care close to home for the more than 200,000 children. The new building, Arkansas Children's Northwest, will include 235,000 square feet of inpatient beds, emergency care, diagnostic services and clinical space. The hospital's construction and facilities team put together a detailed set of data specifications to streamline the handover of the building and jumpstart maintenance and operations. The current goal is to have all equipment data populated in the CMMS by substantial completion in the Fall of 2017. This will allow for critical maintenance processes to be in place prior to the admission of patients. To realize that vision, a number of issues had to be addressed to successfully hand over data at the end of the project. This presentation will: - Review the owner's original data specifications and lessons learned (What was missed, What had to be done to fix it) - Discuss processes for gathering and validating data throughout the project lifecycle. - Offer insights for dealing with the complexity of multiple disciplines and firms at various stages of the project lifecycle. - Show how the final deliverable, verified data will go into the CMMS and discuss the value of streamlined BIM to FM workflows for owners.

Increased Accuracy and Data Management

Using Building Commissioning to validate the BIM Turnover, will give your operations staff detailed facility operations and maintenance data very early in the handover process, which allows them to focus on operations rather than data collection.
The Owner Driven BIM Turnover goal should be to provide a facility owner with complete and verified data before the first day of operation. The "I" in BIM is critical for this turnover. Some time and effort should be taken when preparing for this turnover. There are many different thought processes for what needs to be addressed when implementing an Owner Driven BIM process. Incorrect BIM data can prove to be costly for a facilities department. Building Commissioning data is a key for data validation. In the Owner Driven process, building commissioning is used to verify equipment data to avoid wasting precious time, effort and capital. Using a three step method of data collection and validation will allow bring a business value to BIM and will allow the owner to reduce cost, ensure equipment continuity and future proof their investments.

- Manual data entry by Facility Personnel is time consuming
- Facility Personnel have many other tasks during a building transition
- O&M manuals provided during construction are often inaccurate and incomplete.
- O&M manuals are often not available in time to have CMMS in place at building opening
- Technicians can't find the paper deliverables.
- Large PDF's are challenging to handle.
- Asset data is inaccurate or incomplete.
- As-Builts are inaccurate or incomplete.

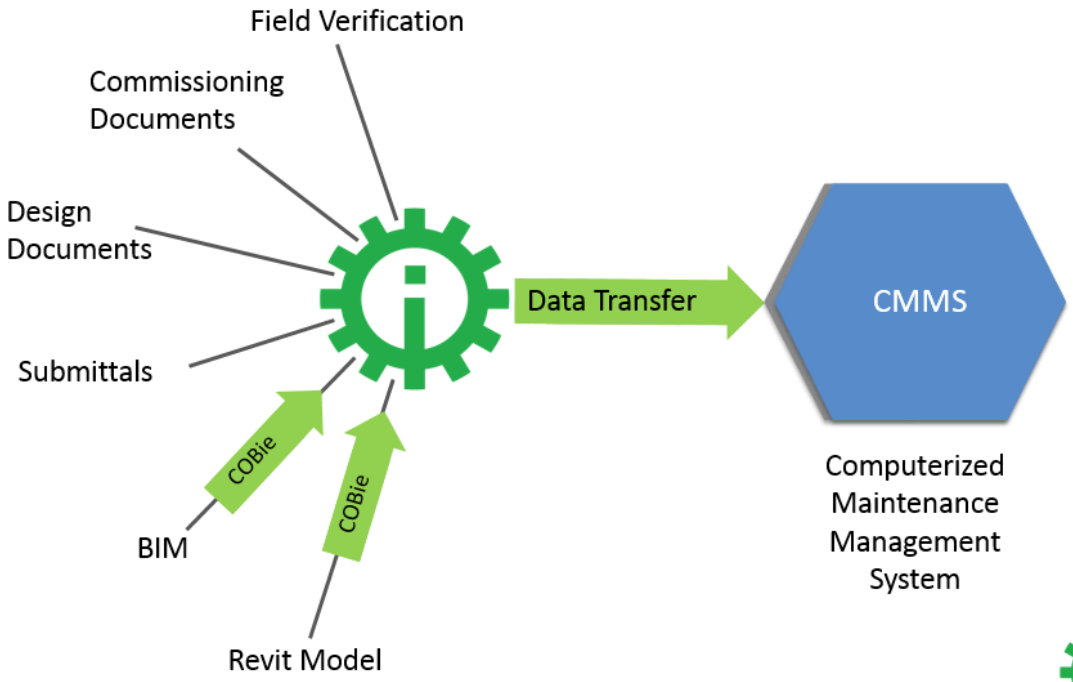
- Time consuming efforts by sub-contractors at data handoff.
- Managing the maintenance documentation prior to occupancy

Tracking and Turnover

Studies indicate that a typical operations and maintenance staff day includes as much as 1.5 hours per day of travel time from the work zones to the shop area to obtain information. Using mobile devices to access a complete archive of information directly from the work site significantly reduces the amount of unproductive travel time and increases staff productivity. The scope of work includes the items below:

- Obtain existing digital and paper original construction drawings for mechanical, electrical, plumbing and architectural floor plans.
- Obtain existing digital and paper as-builts drawings for mechanical electrical, plumbing and architectural floor plans.
- Obtain existing equipment submittal data for major equipment (chillers, boilers, pumps, generators, medical gas equipment, AHU's, major exhaust fans).
- Obtain existing TAB reports for major equipment (chillers, boilers, pumps, AHU's, major exhaust fans).
- Develop a digital database of existing drawings in PDF format indexed by year constructed, project number, project name, sheet number and sheet name. Database will be capable of being edited in the future to include additional equipment in the future.
- Assign a unique identifier for all major equipment (chillers, boilers, pumps, generators, medical gas equipment, AHU's, major exhaust fans).
- Affix labels to all major equipment (chillers, boilers, pumps, generators, medical gas equipment, AHU's, major exhaust fans).
- Develop a link to a construction document archive of all related construction documents including as-built drawings, submittals, and TAB reports.
- Develop a link to the BAS graphic display.
- Develop a link to the computerized maintenance management system (CMMS).
- Provide gap analysis of assets recommending best approach for maintenance task Manufacturer's Recommended Maintenance (MRM) vs Alternative Equipment Maintenance (AEM) to address CMMS needs.
- Retrieve and locate data to fill gaps and transfer to CMMS.
- Provide the facility team with complete verified data before the first day of operation.
- Develop interfaces between the BAS and the CMMS and ADT systems.
- Provide operators with mobile devices capable of reading QR codes and viewing all related documentation.
- Train operators on use of database and mobile devices.

Validation Method Images



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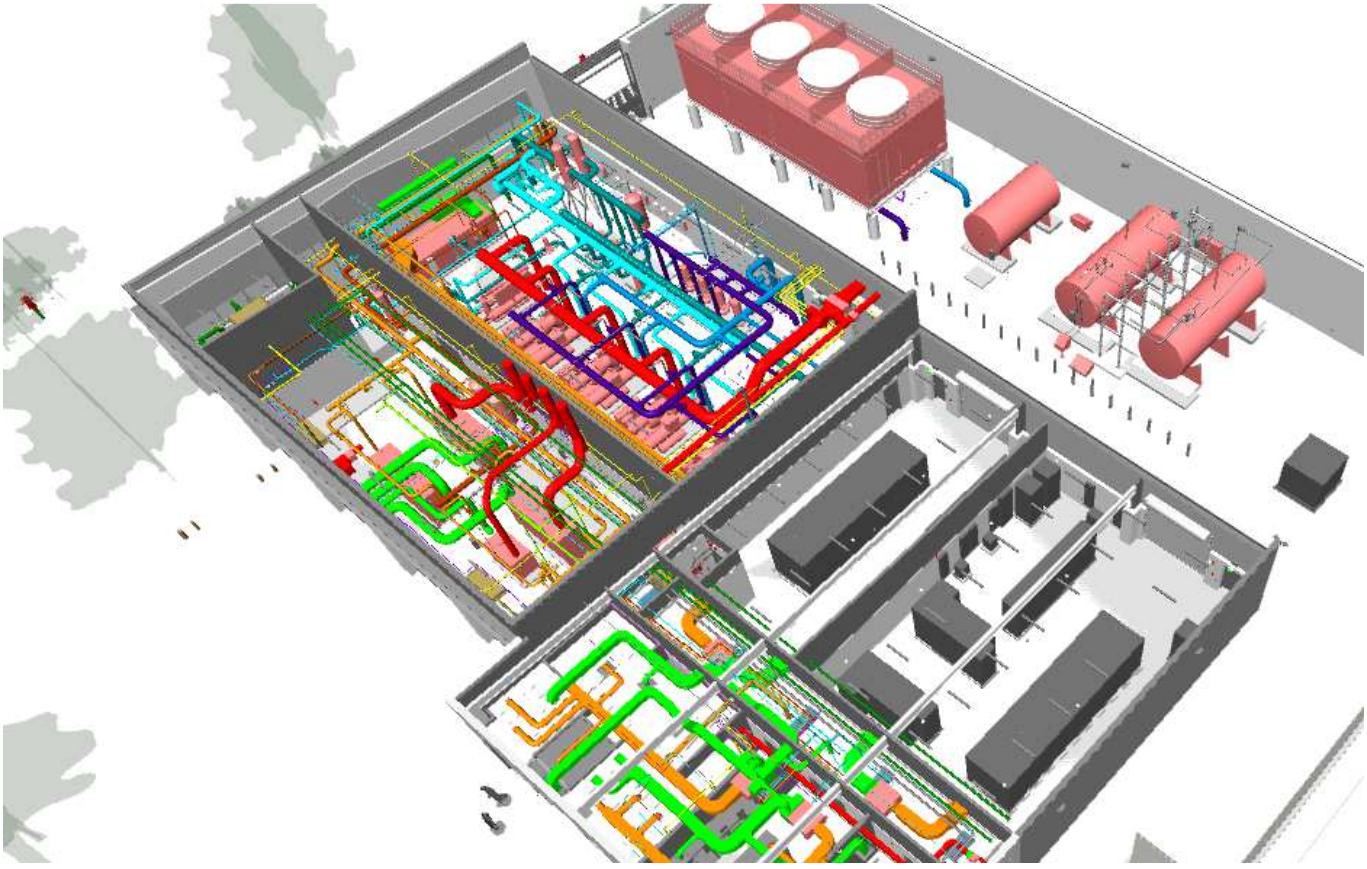
Grease Trap	Medical Air Compressor	Electrical Distribution Panel CH-PRL2A
Medical Air Dryer	Lab Air Dryer	Electrical Distribution Panel CH-PRL1A
Medical Air Dryer	Single Duct Terminal Unit T-DESV	Fire Door 45 Minute
Control Air Compressor	Single Duct Terminal Unit S-LGE	Fire Door 90 Minute
Heating Hot Water Pump	Single Duct Terminal Unit S-LGS	Fire Door 20 Minute
Air Handling Unit H-Airpak	City Water Booster Pump	Pneumatic Tube System Diverter
Chilled Water Pump	Backflow Preventer Watts LF	Pneumatic Tube System Station
120-208 Volt Electrical Breaker Panel CH-PRL1A	Backflow Preventer Wilkin 350A	Medical Gas Zone Valve Box
480/Pri.120/208 Sec. Electrical Transformer, CH-V48	Circulating Pump	Fan Coil Unit E-H20
Variable Frequency Drive D-FC102	Medical Gas Area Alarm	Fan Coil Unit E-HPE
Air Compressor	120-208 Volt Electrical Breaker Panel E-CH-PRL1A	Fan Coil Unit E-H30
277-480 Volt Electrical Breaker Panel CH-PRL2A	120-208 Volt Electrical Breaker Panel E-PG-IDP	Fan Coil Unit L-MM
Campus Elevator	277-480 Volt Electrical Breaker Panel E-CH-PRL2A	Air Handling Unit H-Acousti
Fire Damper R20G	Eye Wash Station	Hazardous Exhaust Fan G-085
Fire Damper R60	Automatic Transfer Switch	Hazardous Exhaust Fan G-15
Fire and Smoke Damper FSD60	Domestic Water Filter ETS-SX	Hazardous Exhaust Fan G-8
Fire and Smoke Damper FSDR25	Domestic Water Filter ETS- ECP	Hazardous Exhaust Fan G-16
Domestic Water Heater	Fire Standpipe Compressor	Exhaust Fan G-18
Medical Vacuum Pump	Main Electrical Switch Gear Panel	Exhaust Fan G-099
Water Softener	Electrical Capacitor Bank	Exhaust Fan G-CUBE
Fire Pump	Electrical Distribution Panel CH-PRL4	Exhaust Fan G-MSX

Training and Documentation Images



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HPCH-1 Heat Pump Chiller

status In Use >

hvac × add category

barcode / QR code	scheduled maintenance	location
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Add >		

associated tickets	assigned	history
1 >	None	View >

Photos and Videos

Add Photo or Video

Documents and Manuals

Add PDF

Add web link

30xw-3t.pdf
Updated: Oct 3, 2016

30XW Water-Co...
Updated: Oct 3, 2016

30XW-V High-Eff...
Updated: Oct 3, 2016

Details

manufacturer	model	serial number
Carrier	30XWB25063M-ZJWB	2414Q21986
installed by	**installation date**	**warranty expiration**
Mark Mergenschroer ›	Select a date	Select a date
condenser cool mode desi…	**condenser design pressur…**	**condenser fouling factor**
550	9.0	0.00025
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condenser min. pressure d…	**condenser min. water flow …**	**condenser no. of passes**
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electrical cool mode total …	**electrical heat mode total …**	**electrical maximum motor …**
171.7	275	311.5

Sample Information Required

- List of Assets tracked in CMMS
- Equipment type Designations
- Asset ID Nomenclature
- Asset ID Numbering System
- Attributes for Individual Assets
- Room Naming Nomenclature
- Level Designations
- Building Designations
- O&M linking and Storage location
- PM examples

Sample Recommendations

- Conduct Needs Analysis
- Execution Plan
- Integrate existing processes.
- Develop facility-specific standards for O&M Documentation
- Standardize naming nomenclatures.

- Develop PM schedules.
- Set comprehensive modeling standards

Sample Approach

- Conduct a needs analysis to recommend best approach to address transition to operation needs.
- Review inventory of CMMS asset data for accuracy.
- Retrieve and locate data to fill gaps and transfer data into CMMS.
- Return to client a fully populated compliant CMMS.
- Use of BIM Data

Developing a Plan:

There are many different thought processes for what needs to be in the model. The key is to look and see what fits the facility best to avoid wasting precious time, effort and capital. Answering some simple questions early in process will help to develop a model with useful data:

- How will your facility implement the BIM+FM deliverable into the Facility Management process?
- What is the cost for implementing BIM+FM and Facility Management for your facility?
- What is the purpose of the BIM+FM deliverable?
- What is the level of detail within the BIM+FM deliverable?
- What information should your facility track from the BIM+FM deliverable?
- What asset data does your facility want to manage in the BIM+FM deliverable?
- Does your facility want to extract life cycle cost analysis from the Model and BIM+FM process?
- Does your facility want to track trending history?
- Does your facility want the process to help with The Joint Commission tracking and logging?
- Does your facility want to own and control their BIM content for release to the Design Team?
- Does your facility want access to model numbers, warranty information and O&M manuals from the BIM Deliverable or a FM tool?

When planning a BIM+FM deliverable, all of these questions and more need to be discussed. Being able to create specific parameters inside of the BIM+FM deliverable will give your facility the power over the model data. Your facility specific parameters will allow for use of the BIM deliverable as a specific tool to add value to the lifecycle management system. A data rich BIM

deliverable can be a powerful tool, useful in collaboration from concept through facility management.

Define and Develop a BIM Execution Plan:

Several keys issues will need to be addressed in the transition to the BIM World. Traditional thoughts and methods will need to be revisited and revised for implementation of a BIM Deliverable for daily facility management. The BIM process

can be complex and needs to be defined during the early stages of a project. A few steps for a positive execution of BIM:

- Determine a budget for first year implementation. This should include software, allocation for BIM+FM Manager Position, training and computer hardware.
- Set target dates.
- Determine what you want to accomplish with the BIM+FM.
- Hire or train existing personnel to run the BIM+FM department.
- Select the right project for implementation.
- Start small - do not try to implement system-wide.
- Set BIM+FM deliverable standards and guidelines, and stick to them.
- Define custom BIM+FM Parameters for the facility. This is another key step for quality BIM deliverables.
- Use all available tools and resources, such as consultants and the software vendor, for guidance.
- Incorporate key management personnel into the BIM Facility Management tool. Their buy-in is key to success.
- Educate maintenance personnel on the BIM+FM deliverable. They are key to performance.
- Inform consultants that a switch is being made to BIM+FM, and that certain expectations will be met in the future. They will need to know what the expectations are, so they can virtually design the model accordingly.
- Stress the “I” in BIM. If you do not have that, you will not have a quality BIM+FM deliverable.
- Be involved during the design and construction process. Don’t sit back and wait for an as-built model to show up and expect to start using it.
- Meet with a local manufacture vendor representative, and let them know that BIM content will be used for Facility Management purposes.

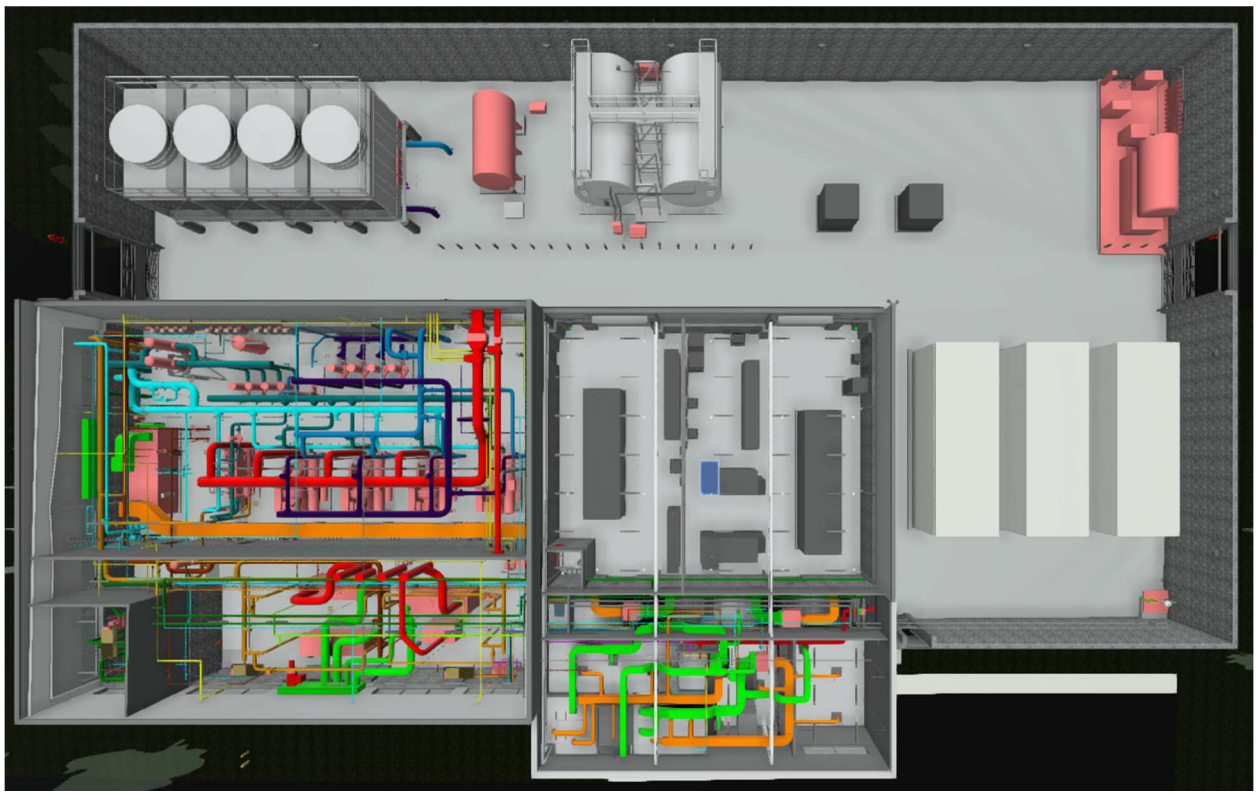
A quality execution plan can go a long way in the success of the BIM Deliverable Facility Management tool. It is very important to be prepared. It takes time and planning to achieve this goal, but the return on investment will be tremendous.

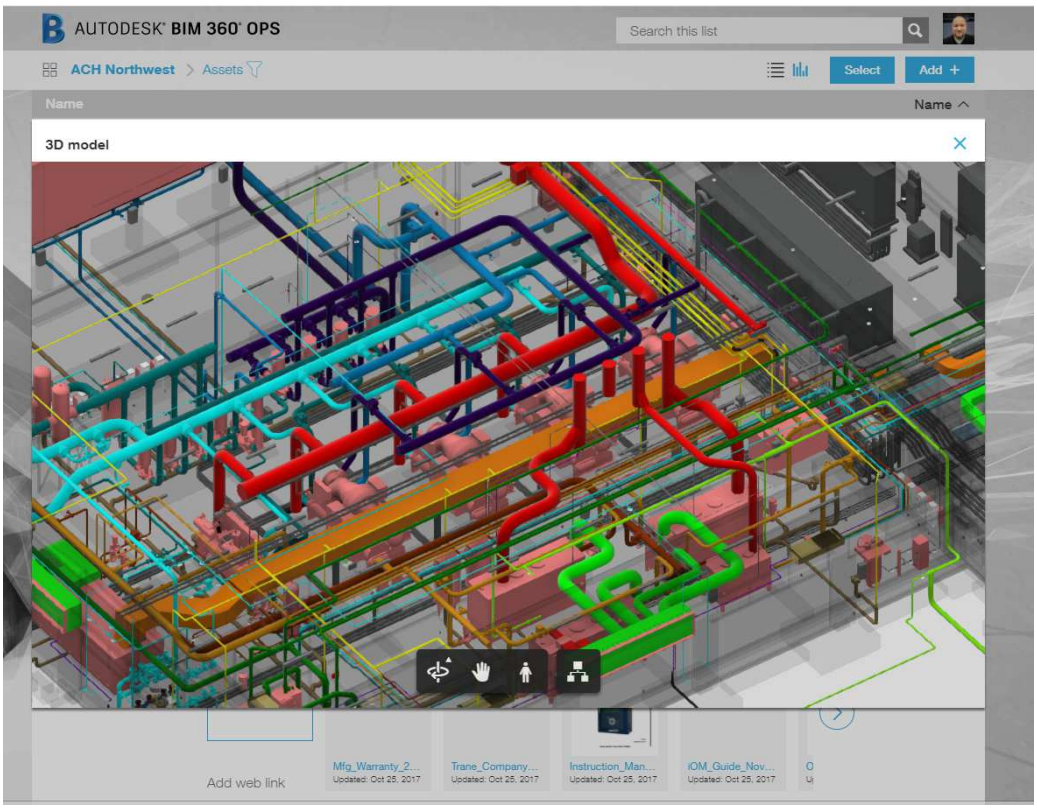
Define the Scope of the deliverable contractually:

The defined scope of project sets the expectations for a BIM deliverable. The contract scope seems to be one of the overlooked areas with BIM projects. When writing a contract for a BIM project the following items will need to be thought about and included:

- Define the BIM+FM objectives in the contract.
- Set BIM+FM Standards for the deliverable in the contract.
- Define the Architects, Engineers, Consultants and Contractors obligations for the BIM+FM deliverable in the contract.
- Determine who will be responsible for ownership of the BIM+FM deliverable.
- Clarify who will manage the BIM+FM deliverable from concept through construction.
- Define the BIM+FM Deliverable clearly in the contract.
- Determine the software package in which the BIM+FM deliverable will be delivered.
- Define model sharing for collaboration among the design team. (With BIM, work must be done as a team.)
- Define Fee Structure. BIM+FM deliverables require more design time during the schematic design and design development stage. Consultants will be revising the fee structure for BIM+FM deliverables.

Sample Images:

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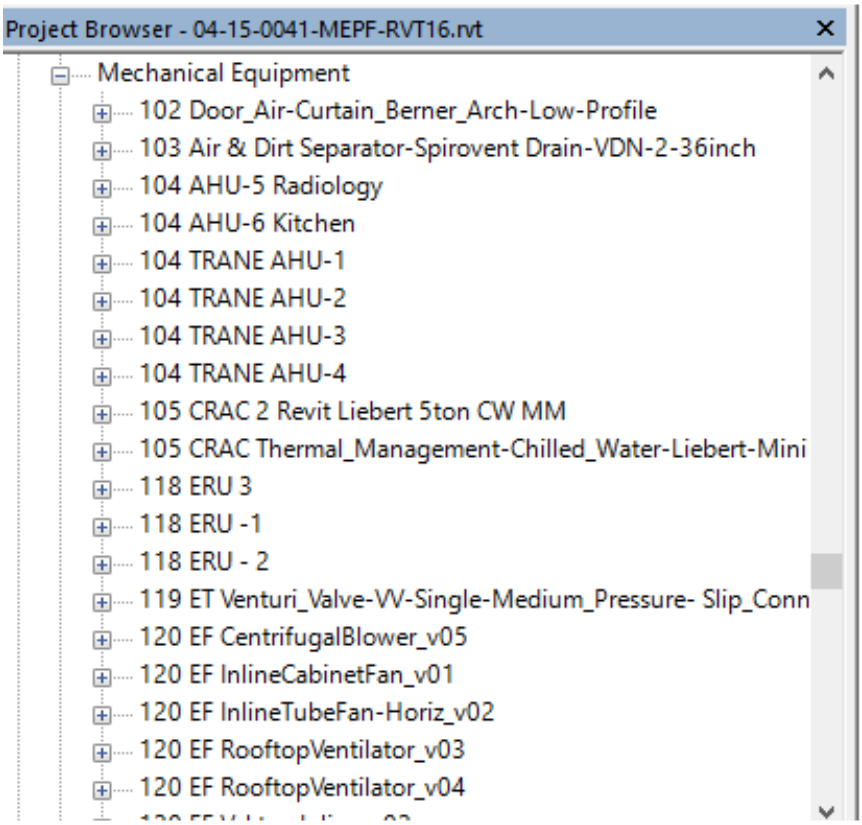
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ACH Northwest
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add ticket
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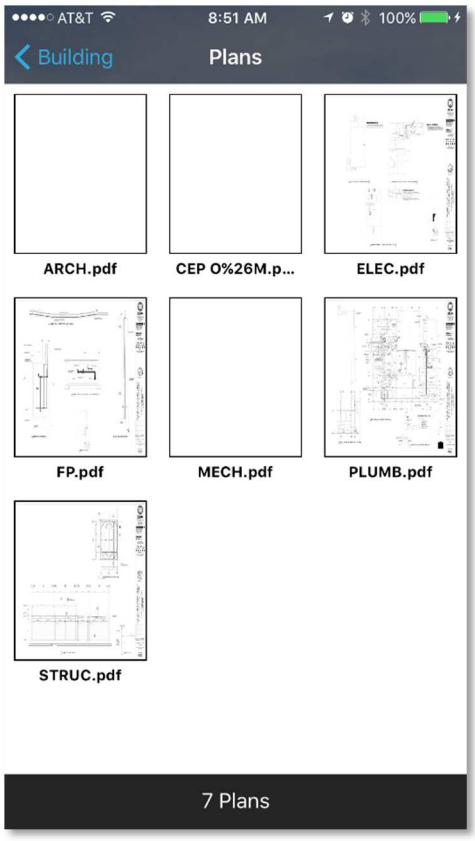
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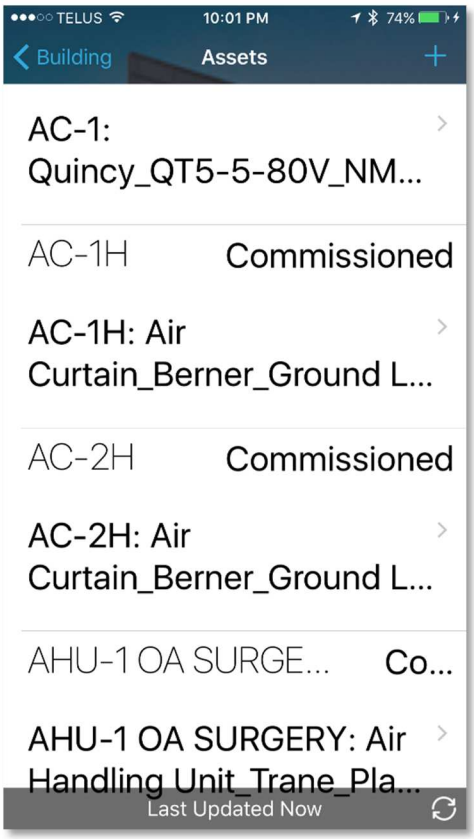
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Co...
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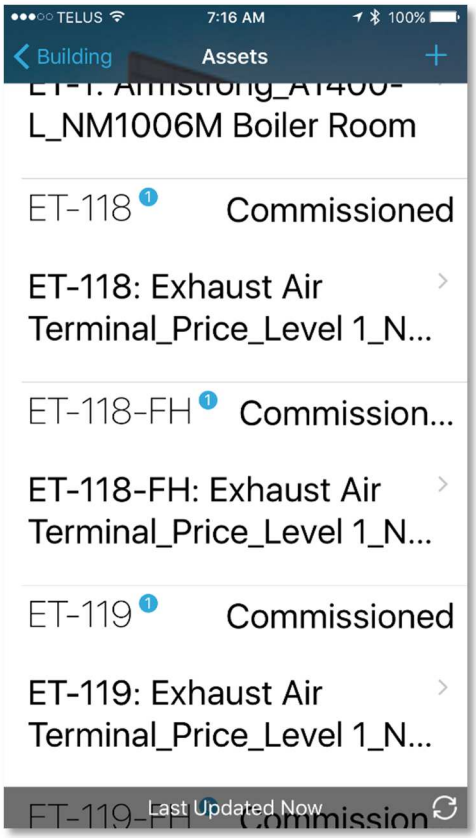
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