

# Firestop BIM Services at the “Hospital of the Future”

Trevor Owen

BIM Product Manager



# Social Media

- **Trevor Owen**
  - Twitter: @t\_owen
  - Instagram: @townen
- **Hilti**
  - Twitter: @HiltiNAmerica #Hilti
  - Instagram: @hiltinorthamerica #Hilti
  - Facebook: HiltiNorthAmerica
- **Autodesk University**
  - Twitter: @autodesku #AU2019
  - Instagram: @autodeskuniversity #AU2019







# About the speaker

## Trevor Owen

Trevor has been using Revit and BIM practices since 2008 and seen firsthand the adoption in the industry. Trevor Owen is a Product Manager for BIM who creates innovative solutions that AEC specifiers and contractors value and trust. Before starting at Hilti, Trevor spent six years as a BIM Manager for an electrical contractor in New Orleans. After a successful career helping the construction industry in New Orleans, Trevor now assists in the development of software and services that impact the AEC industry. Trevor enjoys spending time with his family and traveling domestically and internationally.

# Trevor's BIM Software and Workflows History

8

YEARS

Started using Revit and Navisworks in 2011 and evolved into other workflows as technology evolved.

11

\$2.2 IN PROJECTS

Totaling \$2.2B

15

SOFTWARES

2D/3D/4D Modeling, Coordination, Drones, Reality Capture, Visualization, etc.

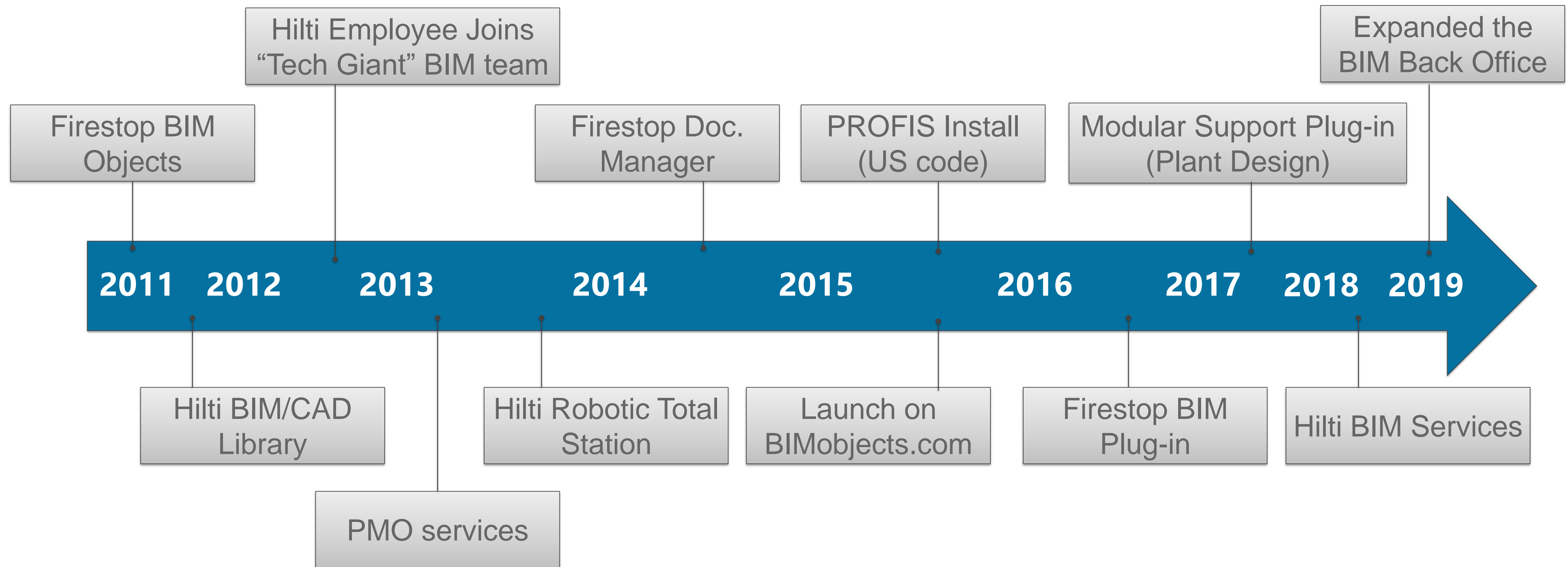
1,000+

COORDINATION HOURS

Includes attending, and sometimes leading, weekly coordination meetings.



# Hilti Has Been on the BIM Journey Since 2011



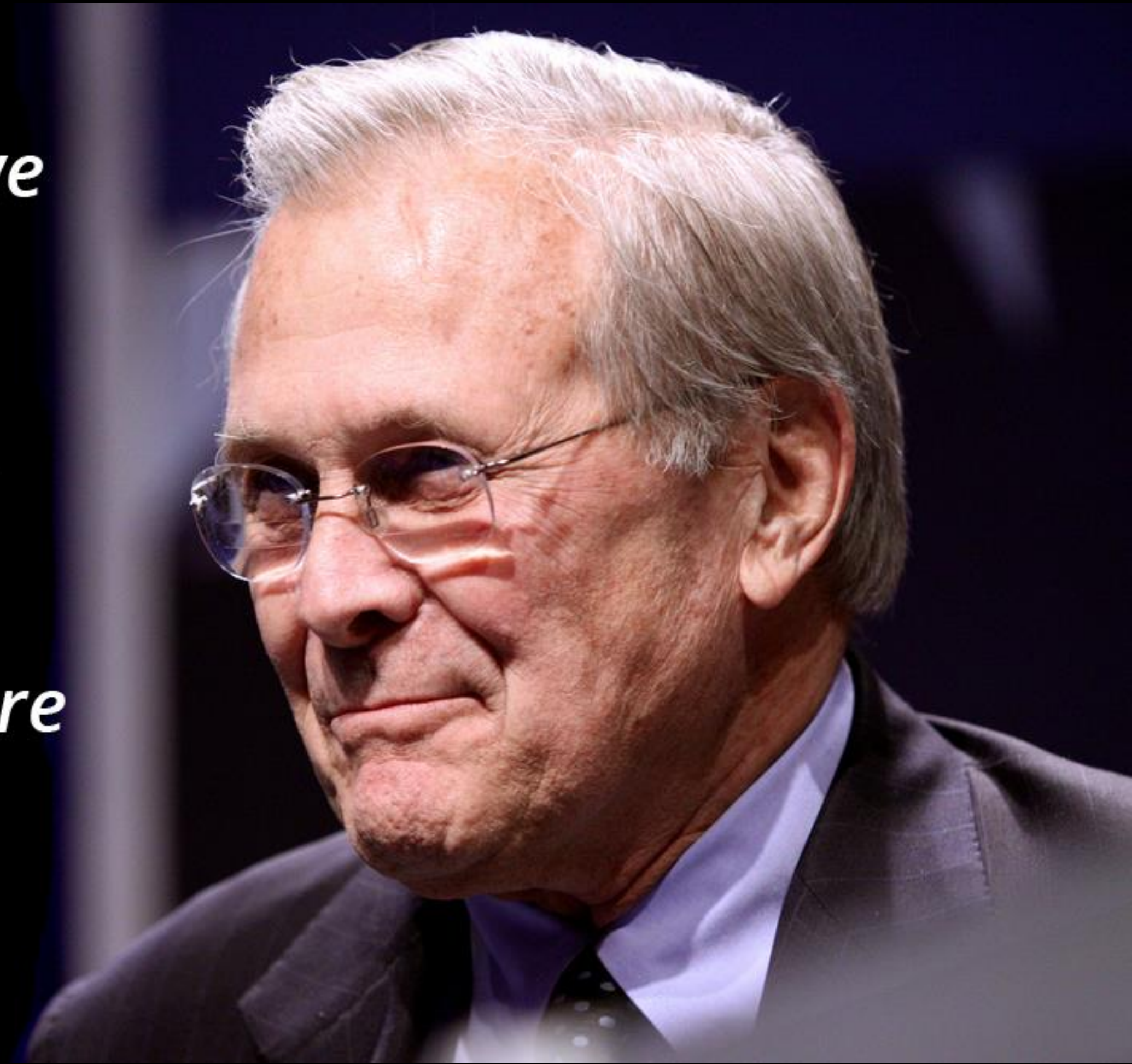


*There are known knowns; there are things we know that we know.*

*There are known unknowns; that is to say, there are things that we now know we don't know.*

*But there are also unknown unknowns – there are things we do not know we don't know.*

-Donald Rumsfeld



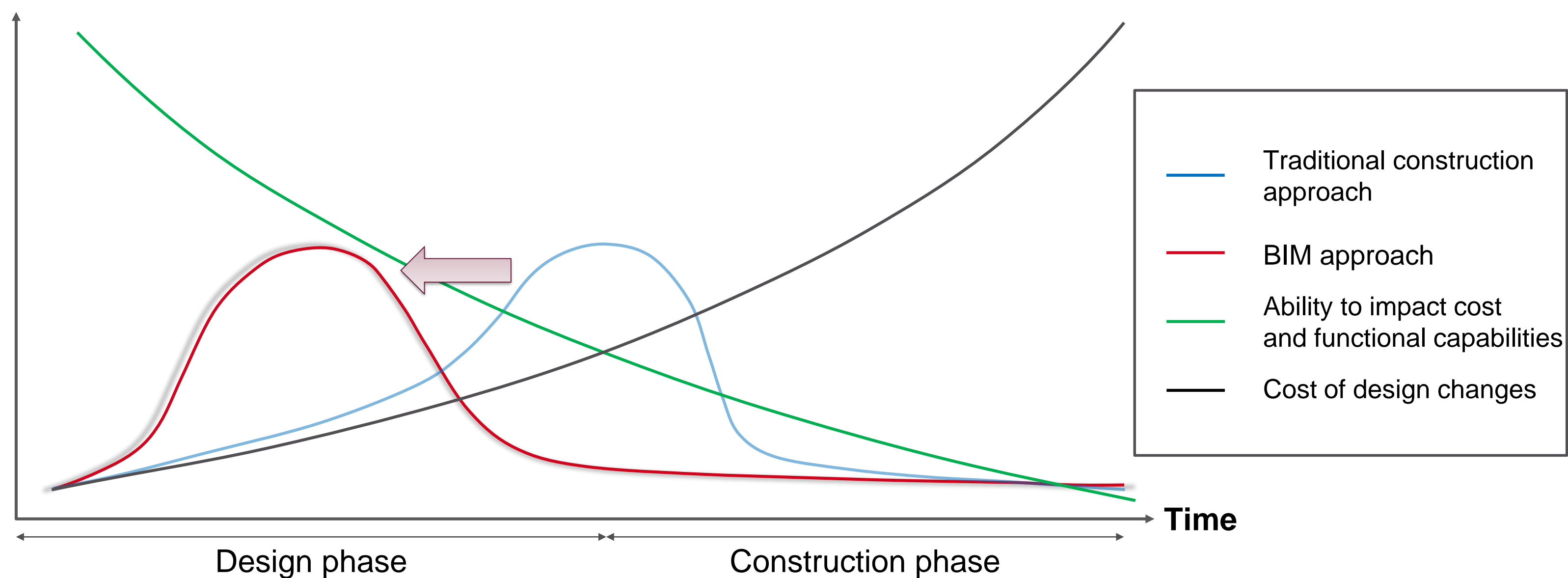


# The Problem with Innovation...





# BIM is Increasing the Emphasis on Upfront Design, Engineering, and Detailing



Source: American Institute of Architects / HOK



**3D Scanning and Photogrammetry**



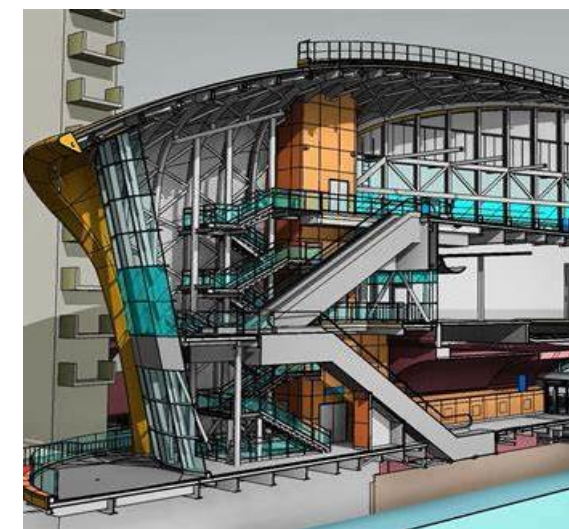
**Augmented Reality and Visualisation**



**Prefabrication and Modular Construction**



**3D Printing and Additive Manufacturing**



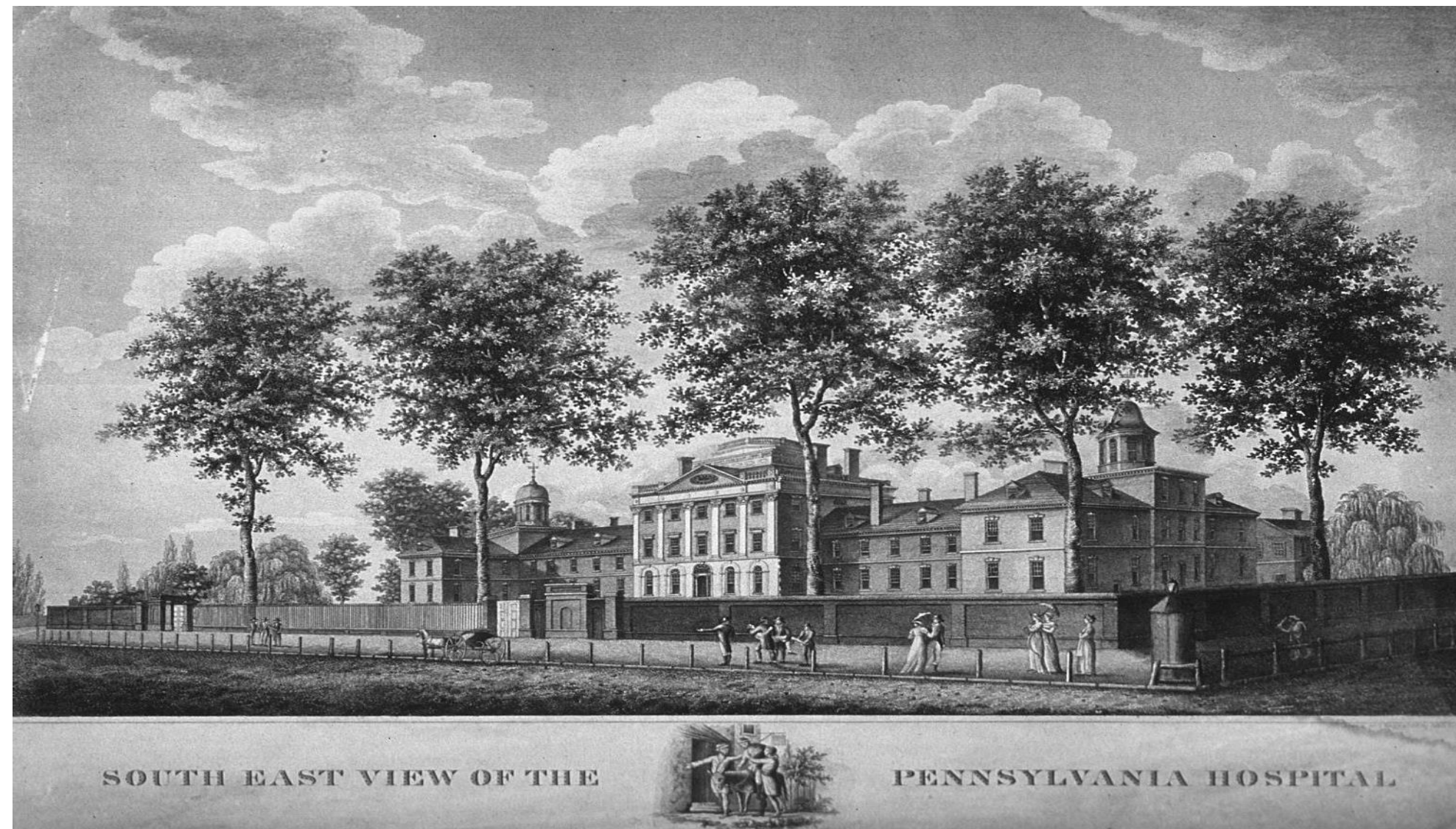
**Building Information Modelling**



**Big Data and Predictive Maintenance**



# Delivering Medicine in the 21<sup>st</sup> Century

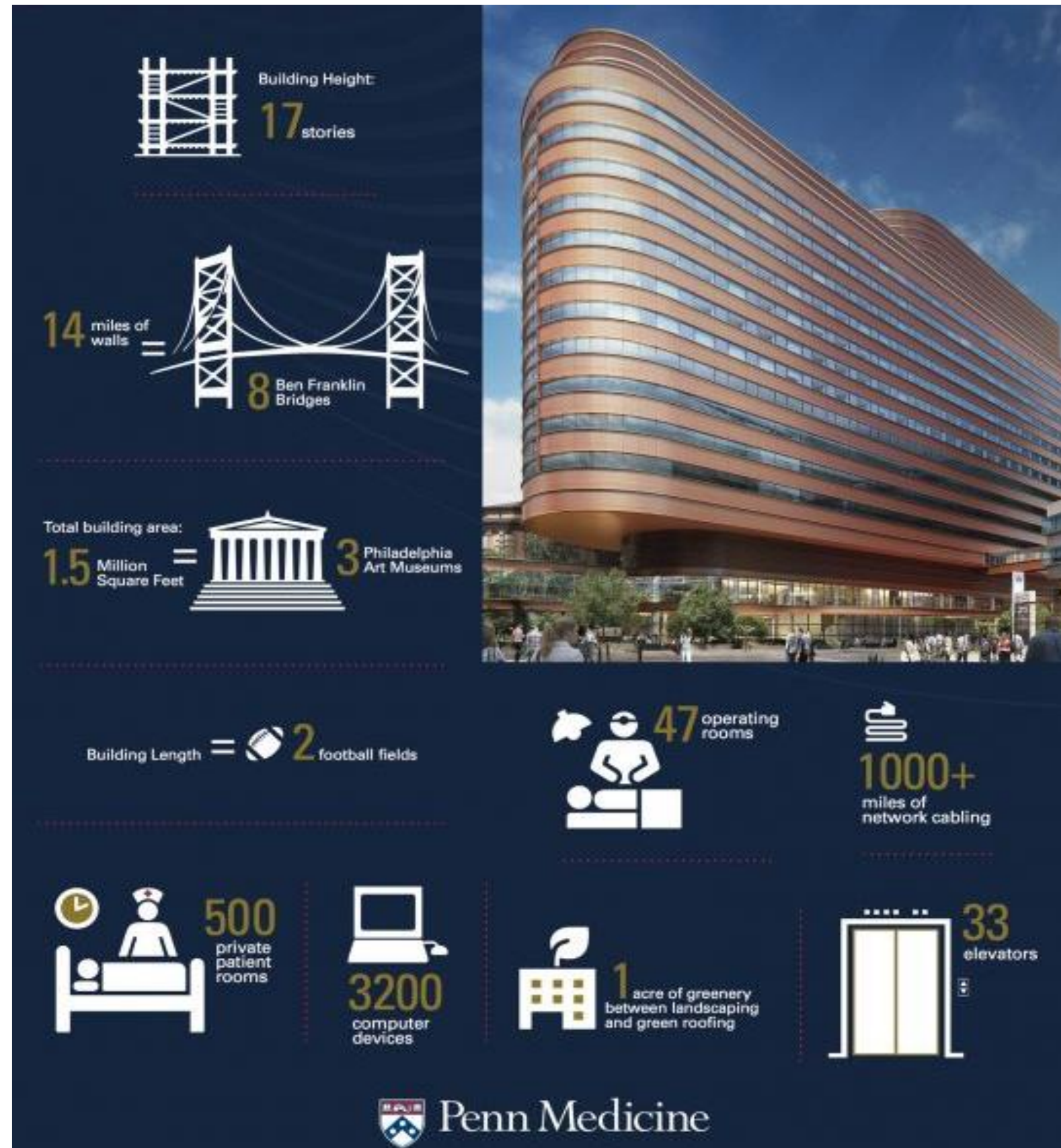


**Balfour Beatty**



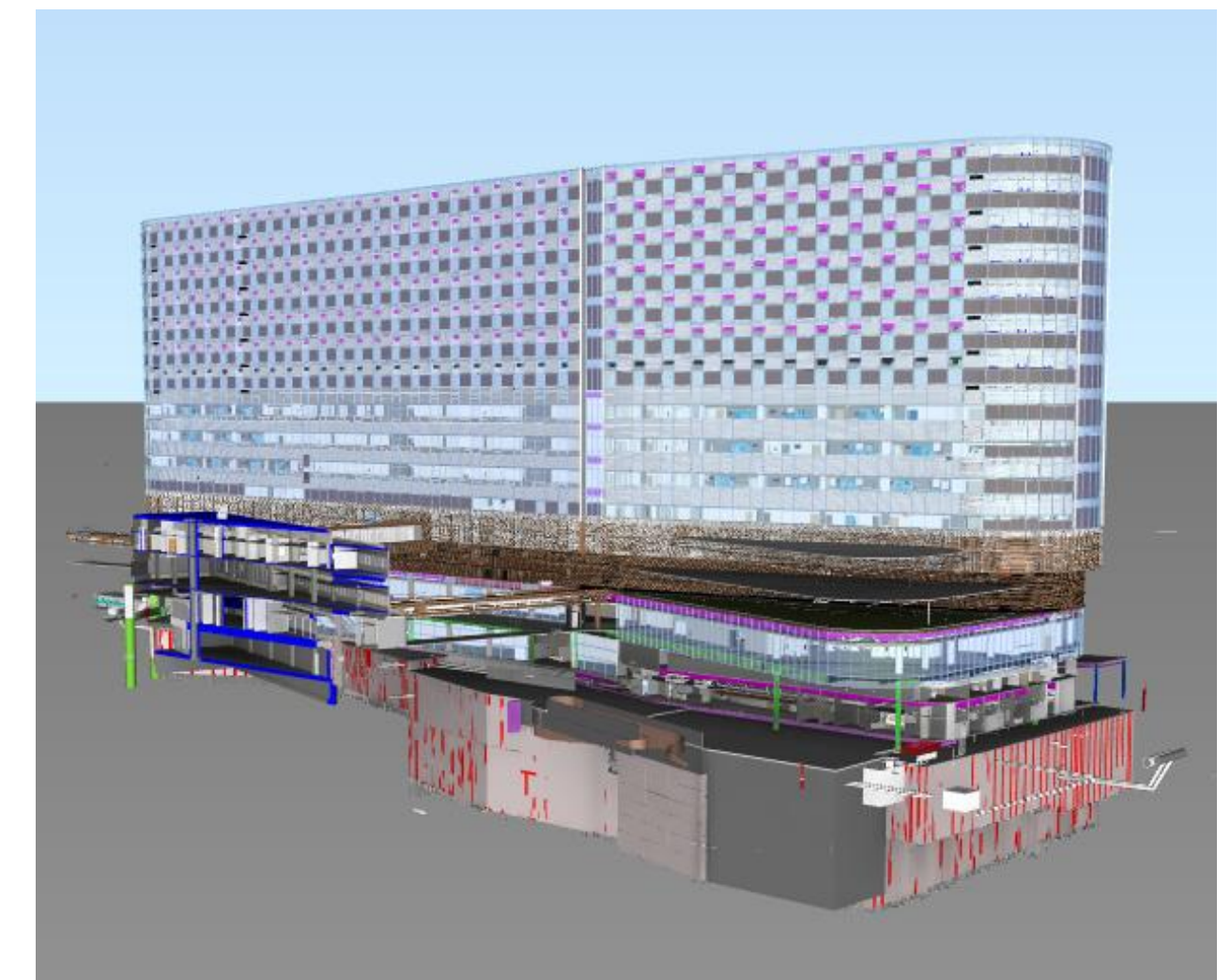
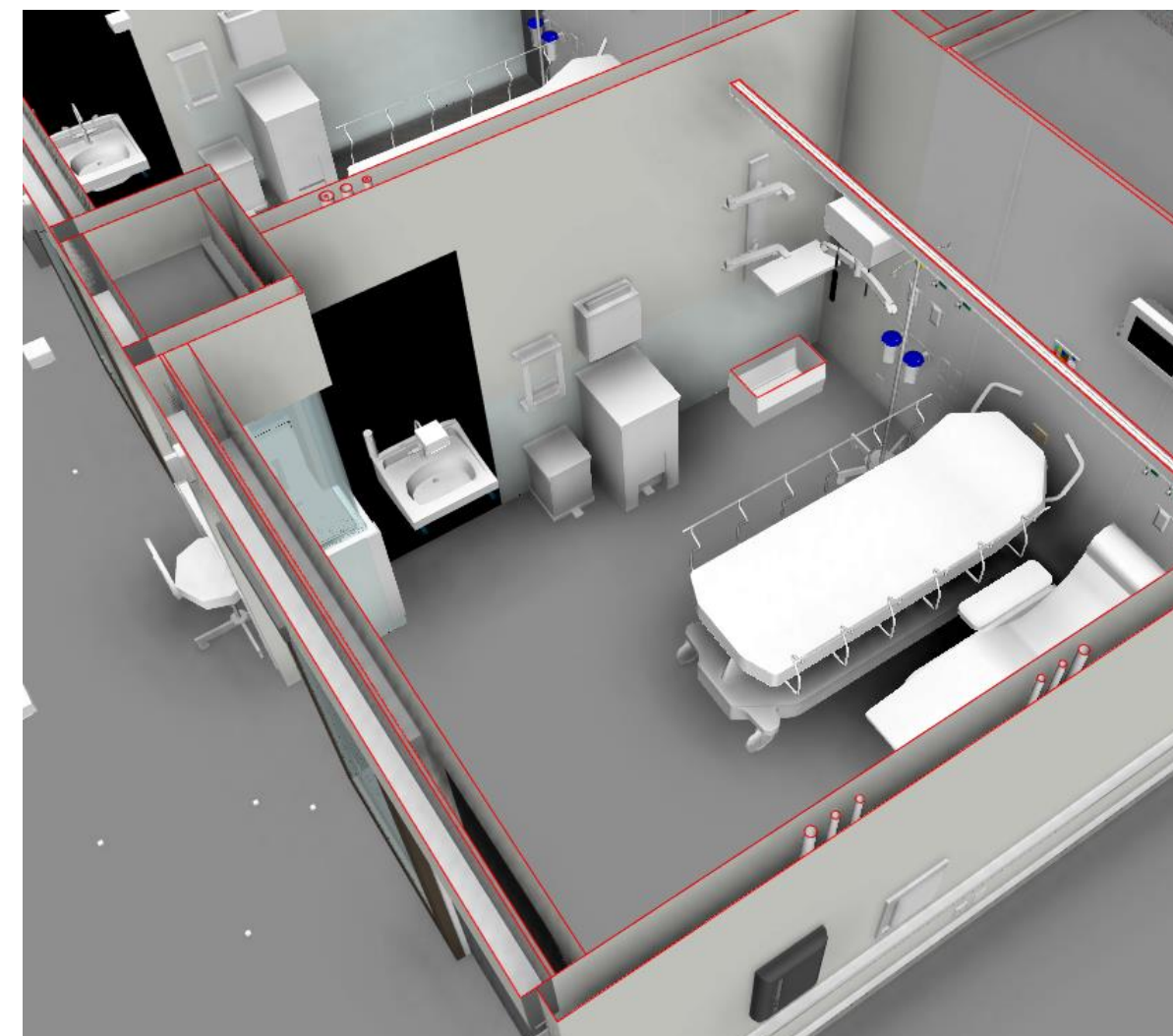


# PennFIRST “Hospital of the Future”



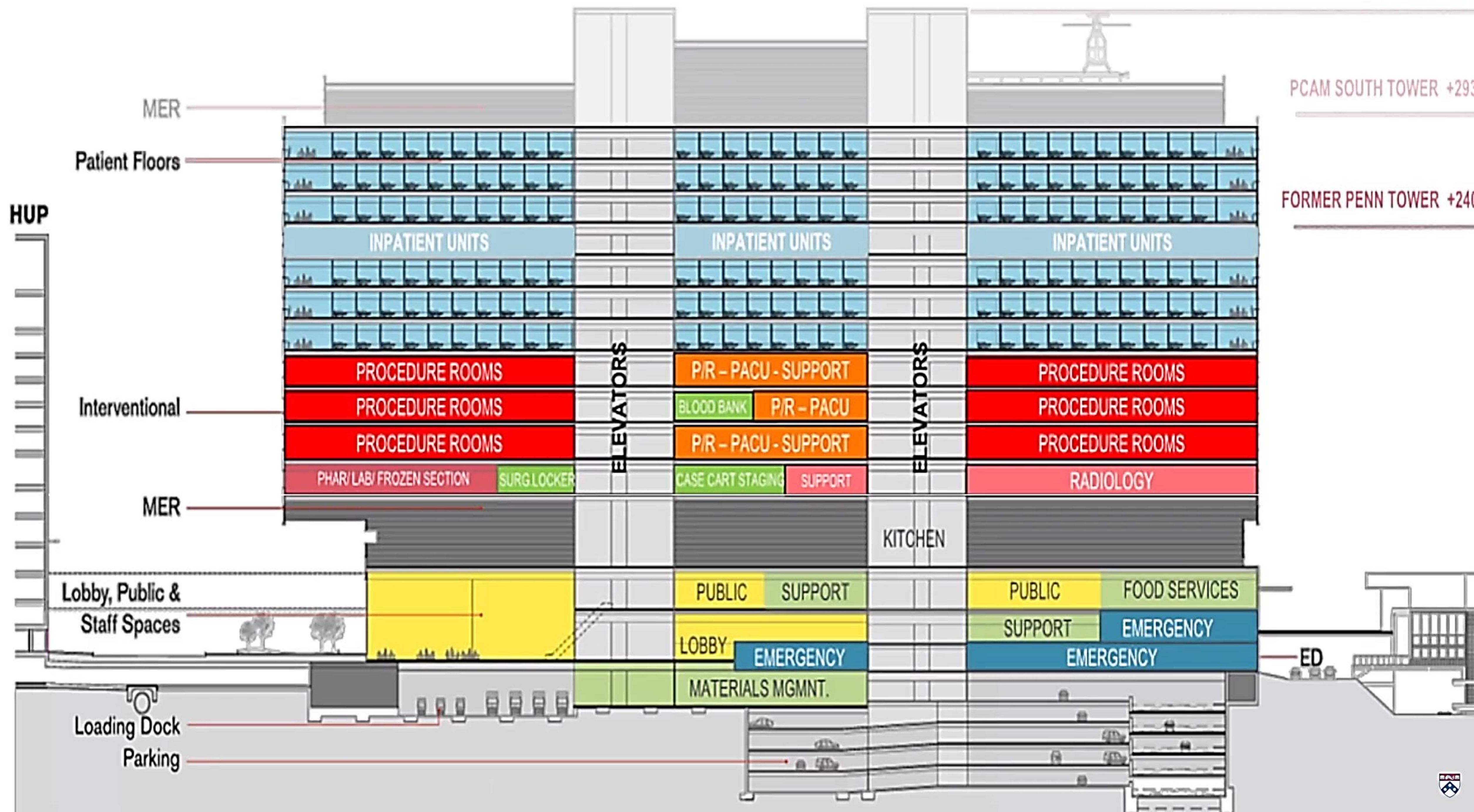
Pavilion infographic courtesy of Penn Hospital.

- Project Value = \$1.5B (IPD)
- Projected occupancy= Spring 2021
- Number of floors= 18
- GC= (JV) LF Driscoll and Balfour Beatty Construction
- Jobsite address: 387 South 33<sup>rd</sup> St, Philadelphia, PA 19104



The IPD team focusing on driving innovation, productivity and lean processes





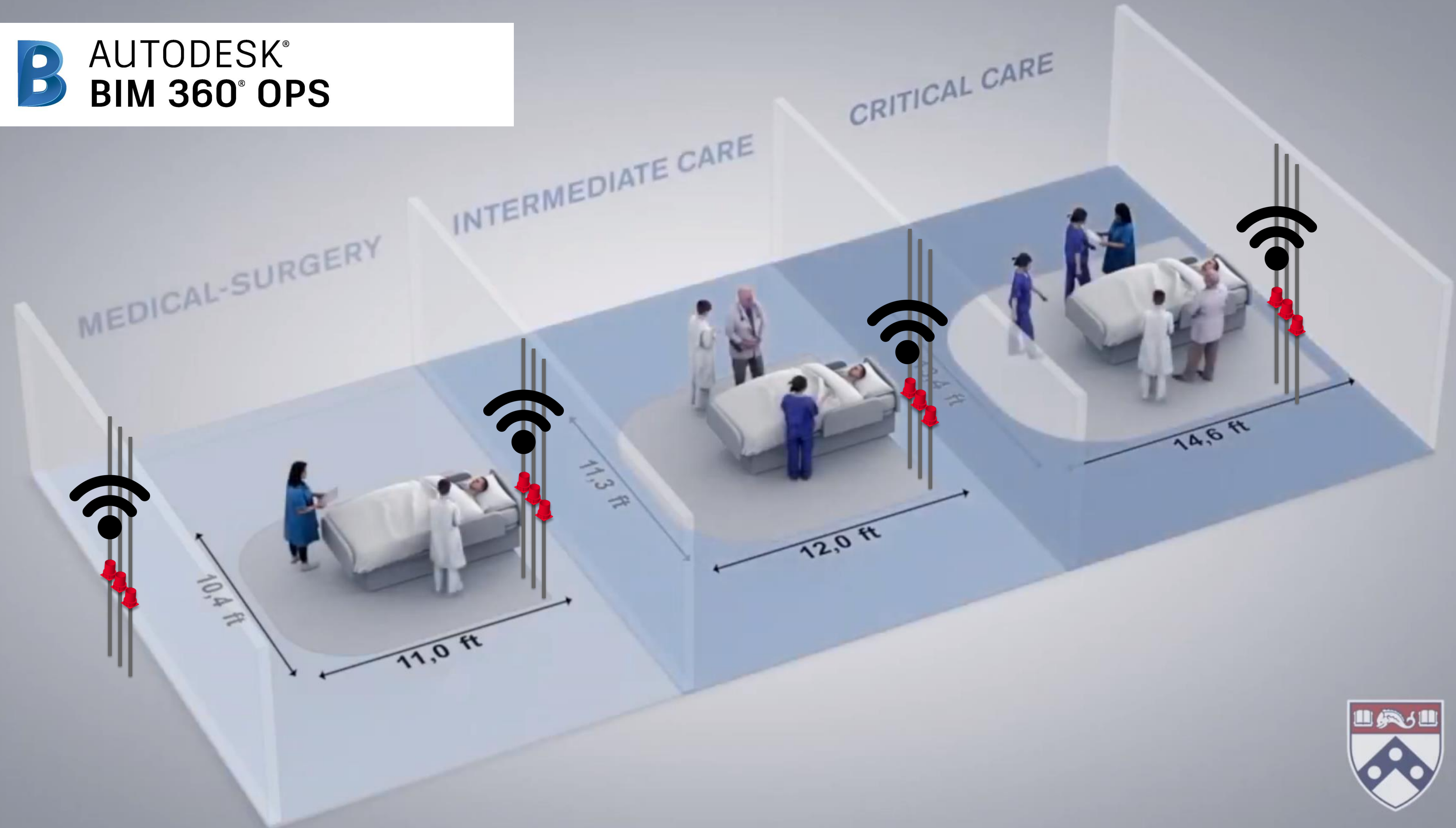


# The Problem

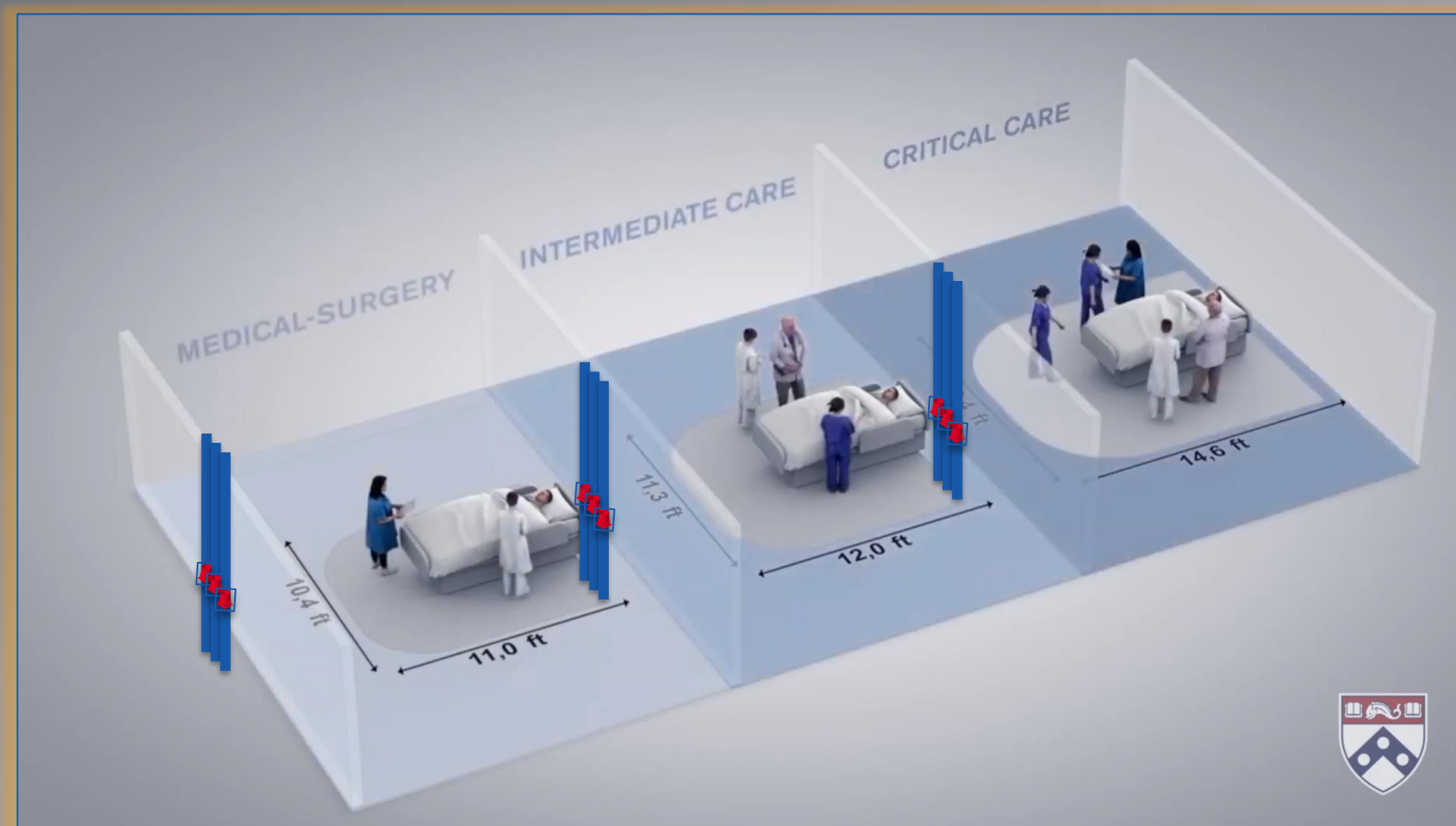
The Owner has Facilities Management Software that talks to Revit and requires that all components that are left in the building, get modeled.

- Philadelphia D&M had no capabilities of modeling in Revit, uploading to BIM360 Glue and Detailing Shop Drawings.
- Philadelphia D&M was already using Hilti for all Firestop Hardware on the project.
- Hilti proposed to provide the modeling and Shop Drawing creation as a Service and Philadelphia D&M agreed.

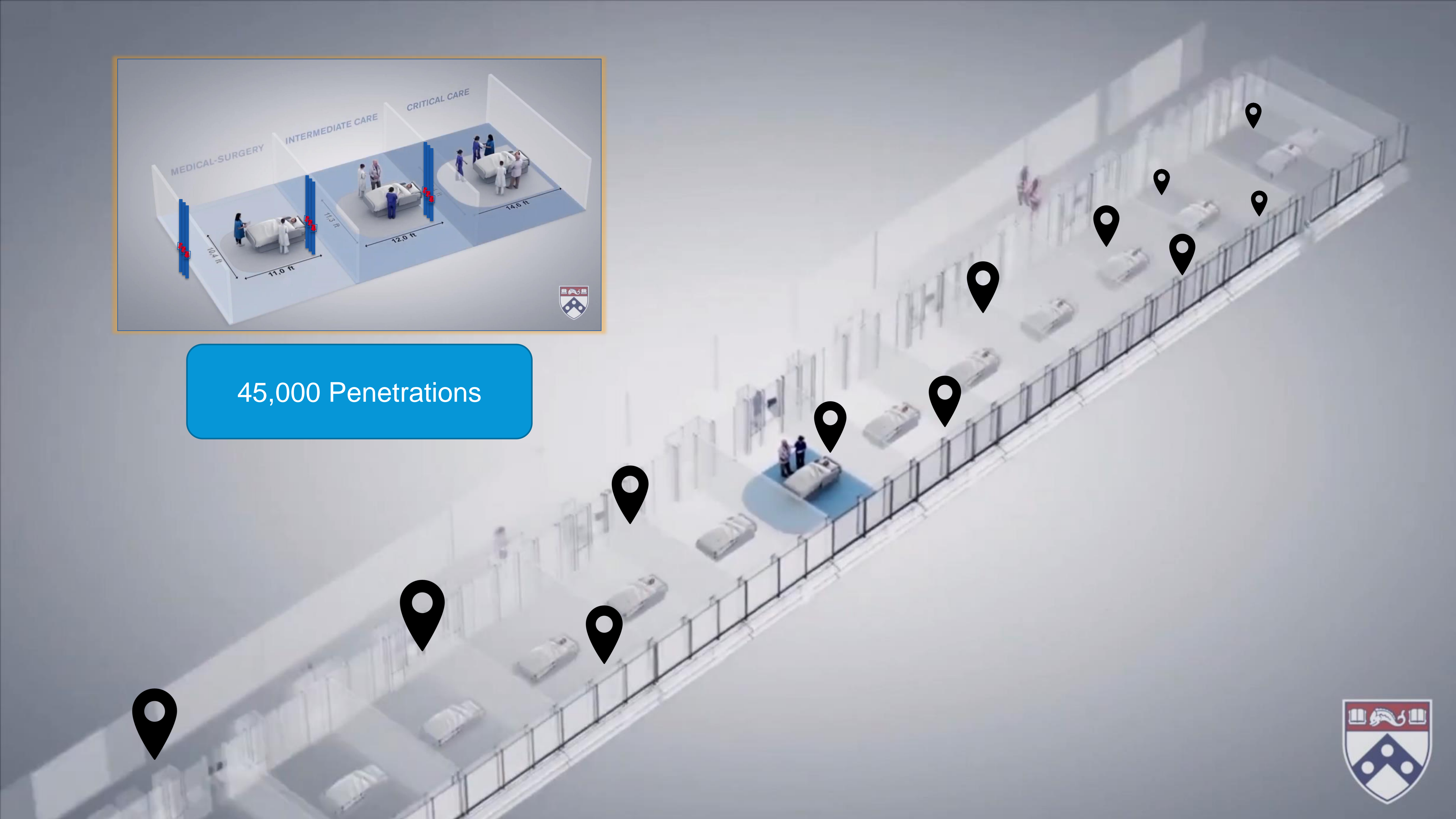








45,000 Penetrations





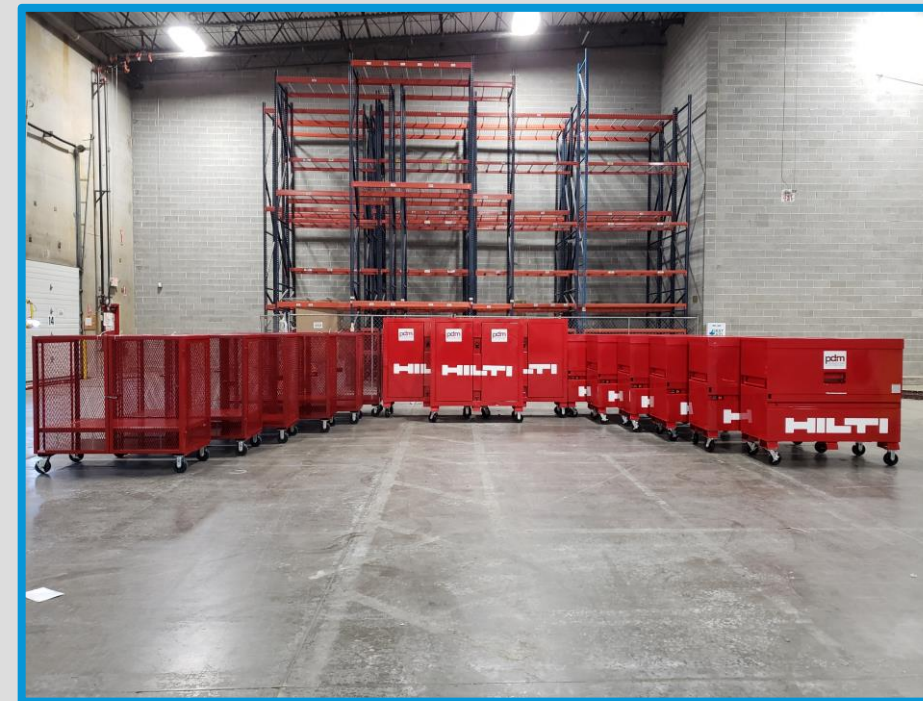
Why should I model  
Firestop?



# Bringing Innovation to Traditional Firestop Practices



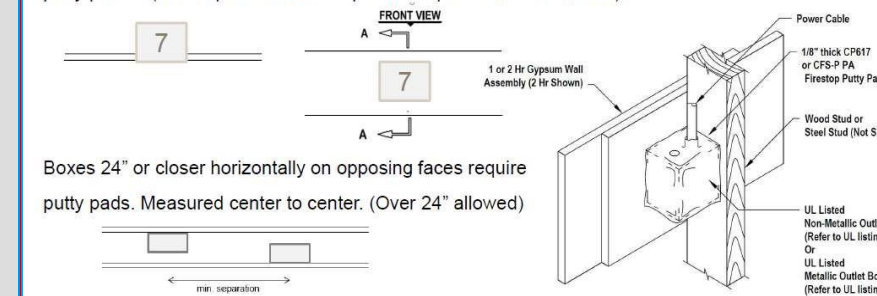
STANDARD PRACTICES



## ELECTRICAL BOXES – PUTTY PADS - CLIV

Completely seal all voids over box and seams with stud and gypsum.

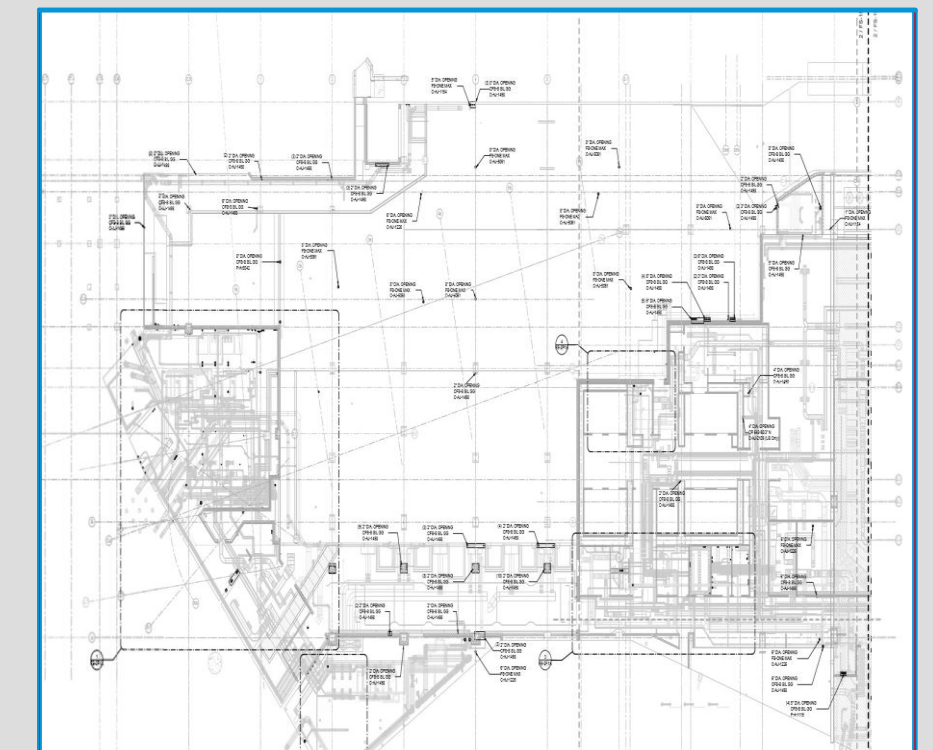
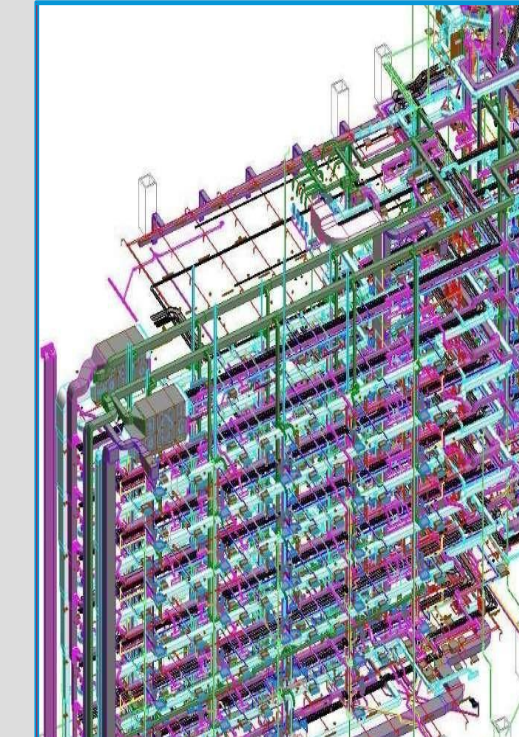
Seven 4"x4" electrical boxes or more in one 100 sq. ft. face – all boxes require putty pads – (100" sq. in. of box face per 100 sq. ft. wall face allowed)



Boxes 24" or closer horizontally on opposing faces require putty pads. Measured center to center. (Over 24" allowed)

Questions: Mike D'Alterio, PDM Foreman [mdalterio@philadm.com](mailto:mdalterio@philadm.com) 610-635-6015  
Joe Swaim, PDM Foreman [jswaim@philadm.com](mailto:jswaim@philadm.com) 610-633-3186

HILTI FIRESTOP SYSTEMS	
<b>WARNING! — FIRE RATED ASSEMBLY — DO NOT DISTURB</b> <b>THROUGH PENETRATION FIRESTOP SYSTEM</b> <b>NOTIFY BUILDING MANAGEMENT OF ANY DAMAGE</b>	
UL System: <b>W-L-1054</b>	Contractor: <b>Philadelphia D&amp;M</b>
Product: <b>FS-ONE MAX</b>	Address: <b>500 Davis Dr. Suite 100</b> <b>Plymouth Meeting, PA 19462</b>
Date Installed:	Phone #: <b>610-941-9070</b>
Location:	Installer's Name:
<b>PennFIRST</b> <small>Hilti, Inc. (U.S.)   1-800-679-8000   <a href="http://www.hilti.com/firestop">www.hilti.com/firestop</a></small>	
<b>pdm</b> <small>CONSTRUCTORS</small>	



PENNFIRST PRACTICES



# We followed the BIM Basics Called-out in the Project BIM Execution Plan

Penn**FIRST**

Section 4.0      Project Milestones Schedule

Phases for this project are defined below.

Phase	Milestone Description	Anticipated Dates	
		Start	Completion
Initial Design Phase (IDP)	Conceptualization Phase		
	Physical Co-Location Space Available		
	Initial Criteria Design (Project Target Cost)		
BIM & Construction Documents Phase	Remainder of Criteria Design		
	Detailed Design		
	Construction Documents (including Revised Project Target Cost)		
Construction Phase	Agency Review/Final Buyout		
	Construction/Substantial Completion		
Commissioning & Activation	FFE Final Move-in/Installation		
	Final Testing		

The schedule/dates are rough approximations only.

Revit Shared Coordinates + Origin Points

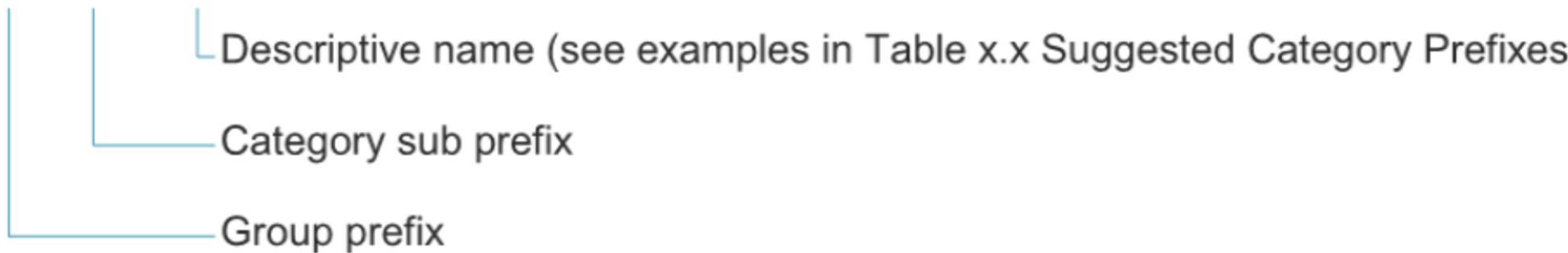
A datum model shall be established for communicating and coordinating the project's Levels, Grids, Matchlines and the Shared Coordinates in a lightweight and easily transferrable format. The coordinates are contained within the following file: UPHS-Master Site Coordinate.rvt

Datum	Definition
Project Origin	Prior to beginning any modeling efforts Link the datum model <b>Origin to Origin</b> and confirm coordinate accuracy with the Overall Model Manager.
Project North/True North	"Project North" is 41.0781 Degrees East of True North.
Levels + Grids	NPP LOBBY Level or Entry Level is at 37'-0"

Shared Revit Family Standard (Component Families/aka "Loadable Content")

This naming standard should be used for the creation of NEW families to be shared or otherwise created specifically for this project. Existing family libraries or content need not be re-named to this format.

xxx-xxx-family name.rfa



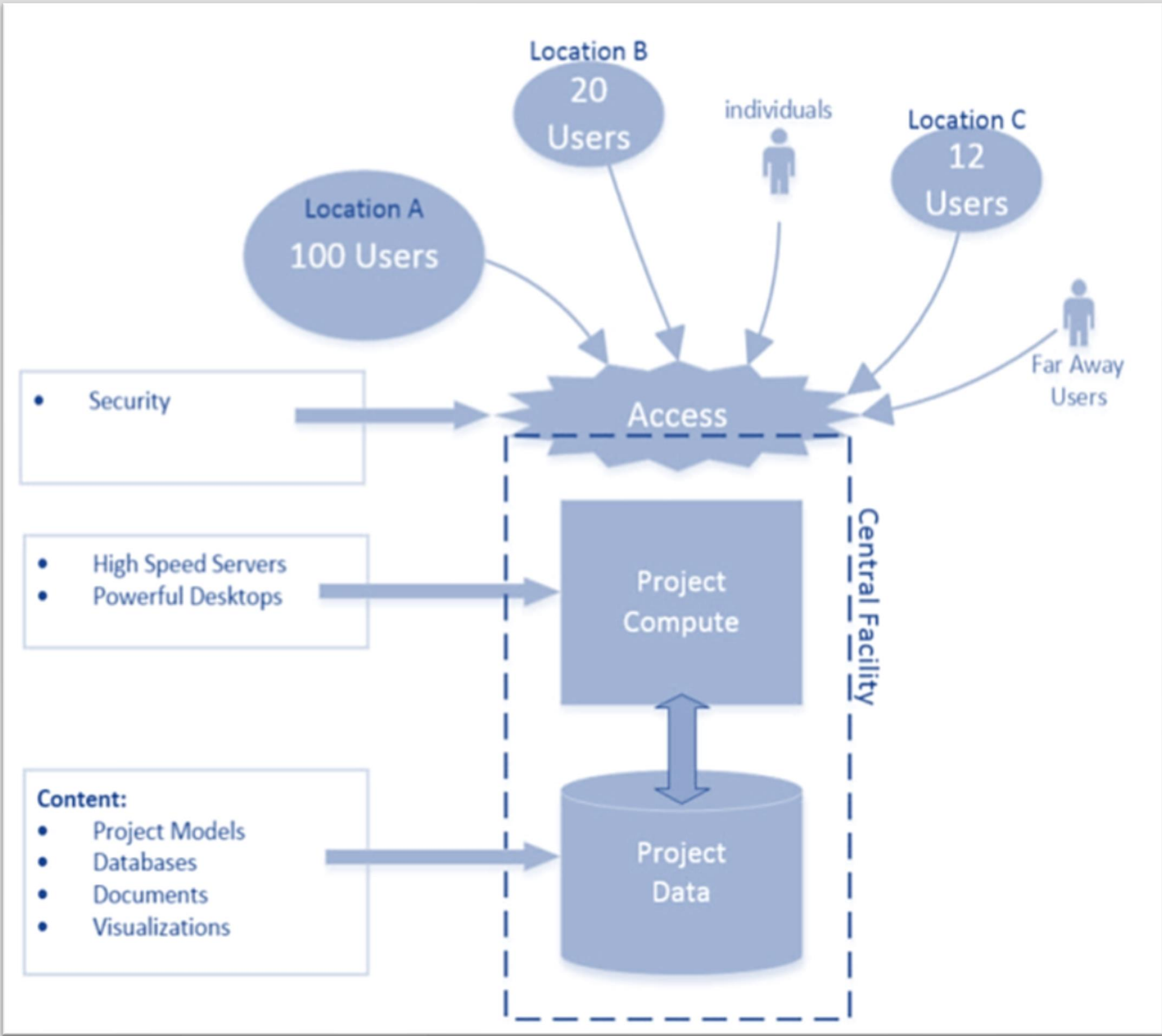
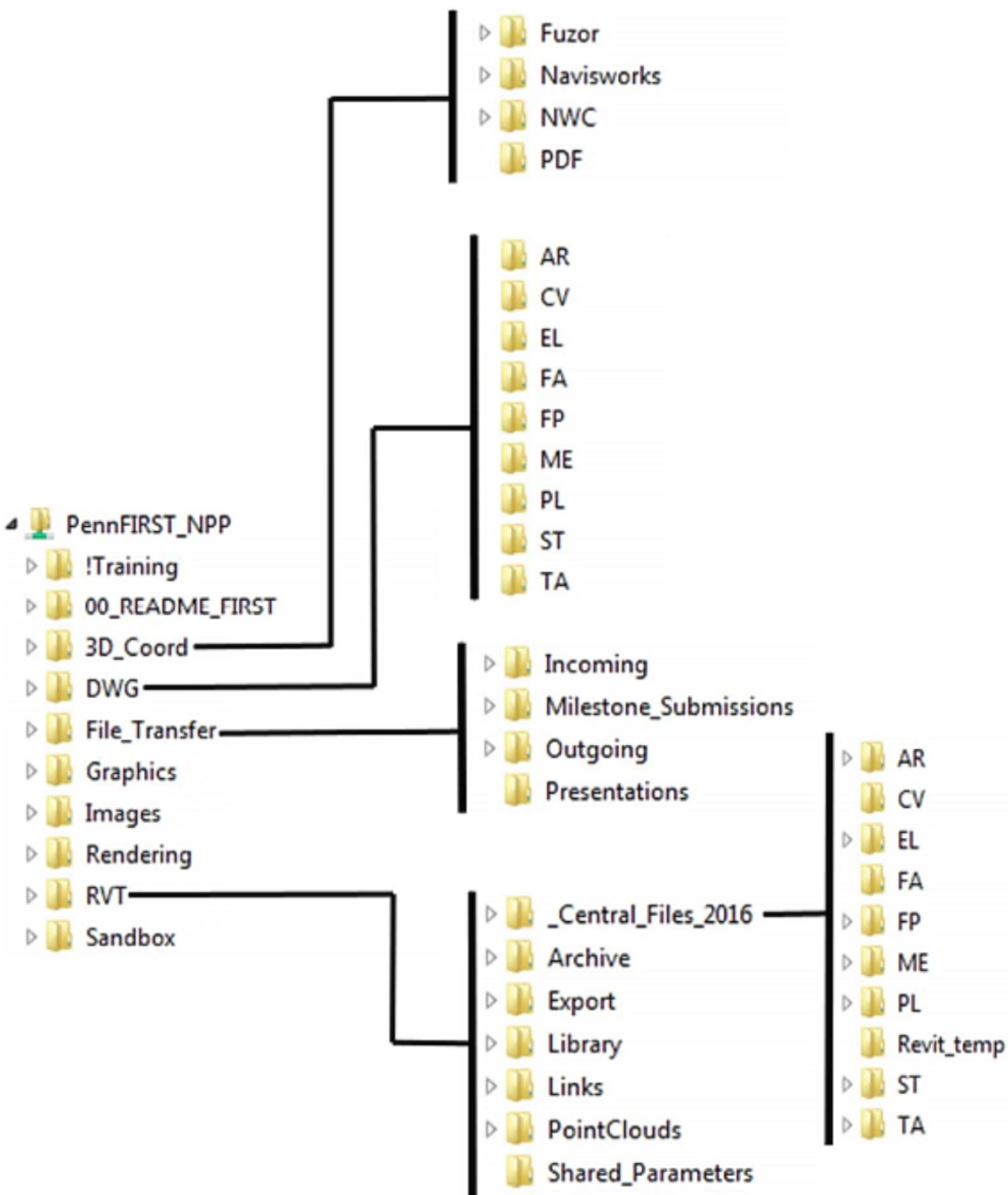
Group Prefix

The use of prefixes will help to sort and track Revit families. This can be used at a Practice Group level or a system of families (*i.e. toilet accessories*). It allows the content to appear in the same place in a project browser or when searching directories. Below is a list of suggested Group Prefixes



# Hilti Navigated the File Hierarchy and Flow of Information

13.3 Advance 2000 VDI Directory Structure





PENETRATION FIRESTOPPING SCHEDULE

TYPE OF PENETRATION		UL-CLASSIFIED PENETRATION SYSTEM			
PENETRANT	PENETRATED ASSEMBLY	1-HR	2-HR	3-HR	B.O.D. PRODUCT(S) - HILTI
UNINSULATED METALLIC PIPE	WALL- GWB ON METAL FRAMING	W-L-1054 W-L-1205	W-L-1054 W-L-1205	-	FS-ONE MAX
	WALL- CONCRETE OR CMU (MIN 4-1/2")	C-AJ-1149 C-AJ-1226	C-AJ-1149 C-AJ-1226	C-AJ-1226	FS-ONE MAX CP 606
	FLOOR- CIP CONCRETE (MIN 4-1/2")	C-AJ-1149 C-AJ-1226	C-AJ-1149 C-AJ-1226	C-AJ-1226	FS-ONE MAX CP 606
INSULATED (FIBERGLASS) METALLIC PIPE	WALL- GWB ON METAL FRAMING	W-L-5029	W-L-5029	W-L-5029	FS-ONE MAX
	WALL- GYPSUM SHAFTWALL	W-L-5240	W-L-5240	-	FS-ONE MAX
	WALL- CONCRETE OR CMU (MIN 2-1/2")	C-AJ-5096	C-AJ-5096	-	FS-ONE MAX
	FLOOR- CIP CONCRETE (MIN 2-1/2")	C-AJ-5096	C-AJ-5096	-	FS-ONE MAX
UNINSULATED HVAC DUCT (RECTANGULAR) 24 INCHES OR LARGER	WALL- GWB ON METAL FRAMING	W-L-7040	W-L-7040	-	FS-ONE MAX
	WALL- GYPSUM SHAFTWALL	EJ	EJ	-	FS-ONE MAX
	WALL- CONCRETE OR CMU (MIN 5-1/2")	C-AJ-7046 C-AJ-7154u	C-AJ-7046 C-AJ-7154u	C-AJ-7046	CFS-S SIL GG CFS-S SIL SL
	FLOOR- CIP CONCRETE (MIN 4-1/2")	C-AJ-7046 C-AJ-7154u	C-AJ-7046 C-AJ-7154u	C-AJ-7046	CFS-S SIL GG CFS-S SIL SL
INSULATED HVAC DUCT (RECTANGULAR) 24 INCHES OR LARGER	WALL- GWB ON METAL FRAMING	W-L-7151	W-L-7151	-	FS-ONE MAX
	WALL- GYPSUM SHAFTWALL	EJ	EJ	-	-
	WALL- CONCRETE OR CMU (MIN 5-1/2")	C-AJ-7145	C-AJ-7145	-	FS-ONE MAX
	FLOOR- CIP CONCRETE (MIN 4-1/2")	C-AJ-7145	C-AJ-7145	-	FS-ONE MAX
UNINSULATED HVAC DUCT (RECTANGULAR) UNDER 24 INCHES	WALL- GWB ON METAL FRAMING	W-L-7143	W-L-7143	-	CP 606
	WALL- GYPSUM SHAFTWALL	W-L-7069	W-L-7069	-	FS-ONE MAX
	WALL- CONCRETE OR CMU (MIN 5-1/2")	C-AJ-7192	C-AJ-7192	C-AJ-7192	CFS-S SIL GG CFS-S SIL SL
INSULATED HVAC DUCT (RECTANGULAR) UNDER 24 INCHES	WALL- GWB ON METAL FRAMING	W-L-7059	W-L-7059	-	FS-ONE MAX
	WALL- GYPSUM SHAFTWALL	EJ	EJ	-	-
	WALL- CONCRETE OR CMU (MIN 5-1/2")	C-AJ-7122	C-AJ-7122	-	FS-ONE MAX
	FLOOR- CIP CONCRETE (MIN 4-1/2")	C-AJ-7122	C-AJ-7122	-	FS-ONE MAX
EMT	WALL- GWB ON METAL FRAMING	W-L-1095	W-L-1095	-	FS-ONE MAX
STRUT	WALL- GWB ON METAL FRAMING	W-L-7130	W-L-7130	-	FS-ONE MAX
LARGE OPENINGS	WALL- GWB ON METAL FRAMING	W-L-8004 W-L-8013	W-L-8004 W-L-8013	-	CFS-BL FS-ONE MAX
	WALL- CONCRETE OR CMU (MIN 4-1/2")	C-AJ-8143	C-AJ-8143	-	FS-ONE MAX
	FLOOR- CIP CONCRETE (MIN 4-1/2")	C-AJ-8143	C-AJ-8143	-	FS-ONE MAX

Mech / Plumbing UL Systems

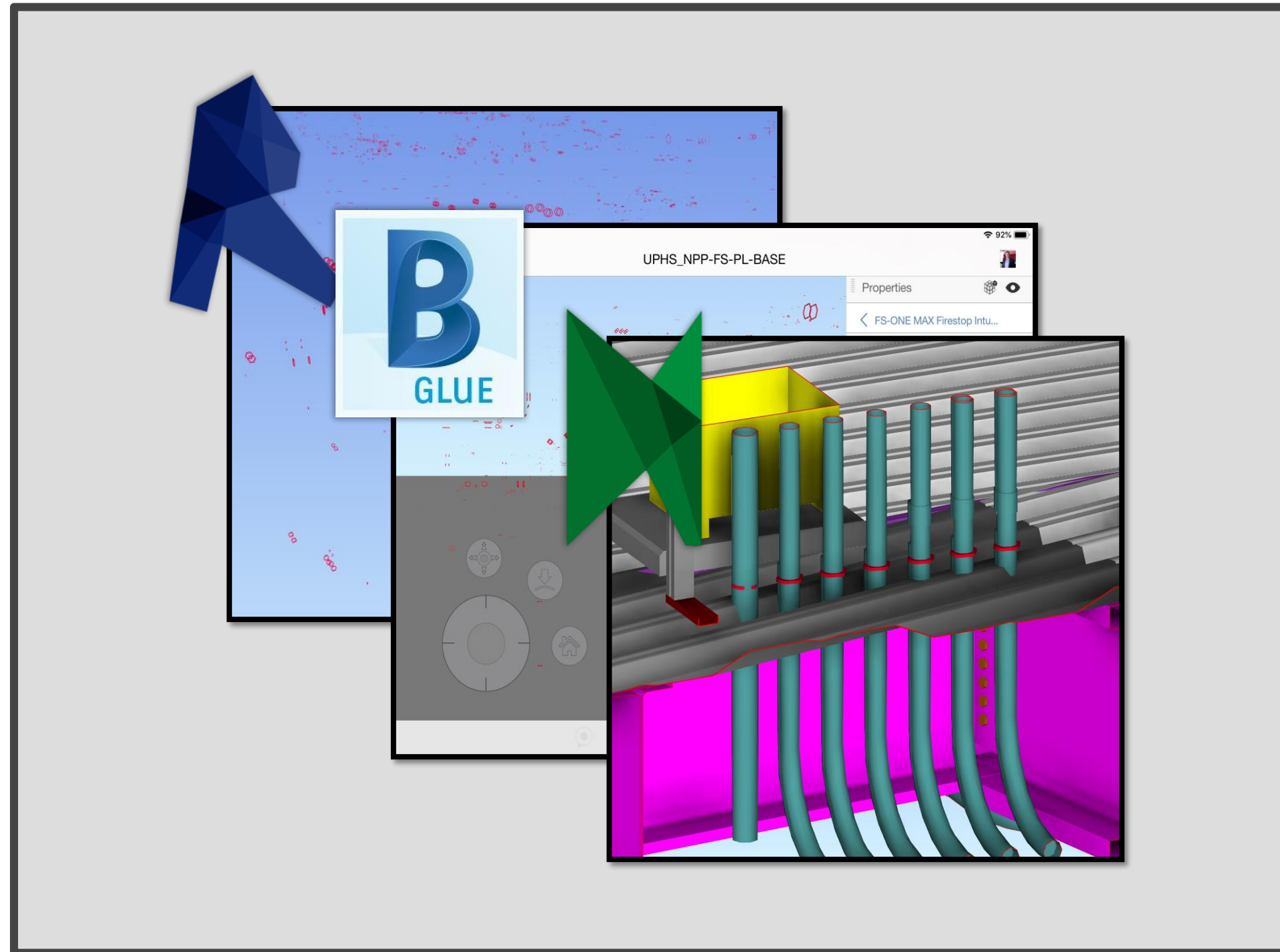
- Uninsulated Metallic Pipe
- Insulated (Fiberglass) Metallic Pipe
- Uninsulated HVAC Duct (Rectangular) 24 inches or Larger
- Insulated HVAC Duct (Rectangular) 24 inches or Larger
- Uninsulated HVAC Duct (Rectangular) Under 24 Inches
- Insulated HVAC Duct (Rectangular) Under 24 inches

Electrical UL Systems

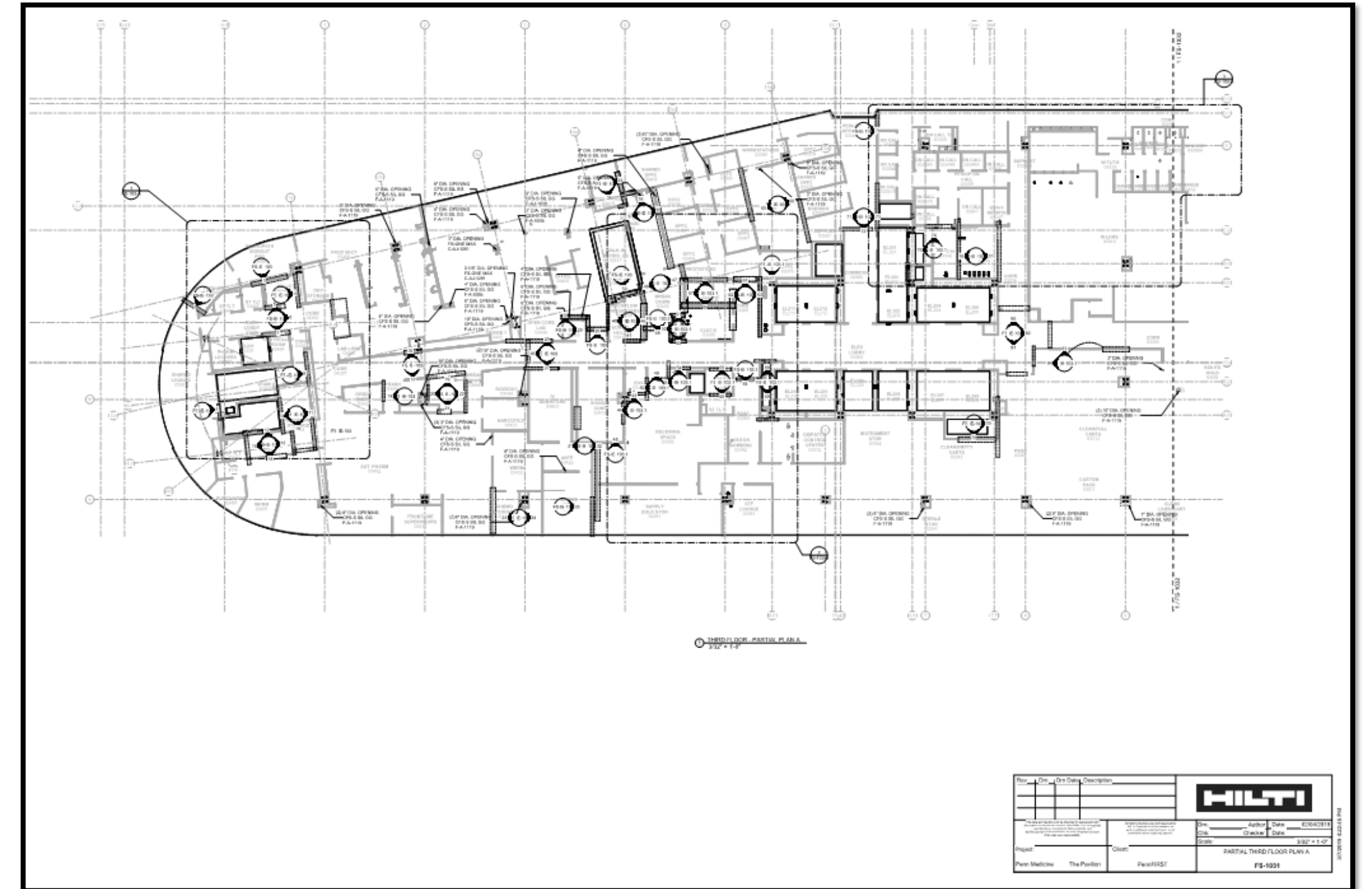
- Cable Tray
- EMT
- PVC



# From Coordination to the Field

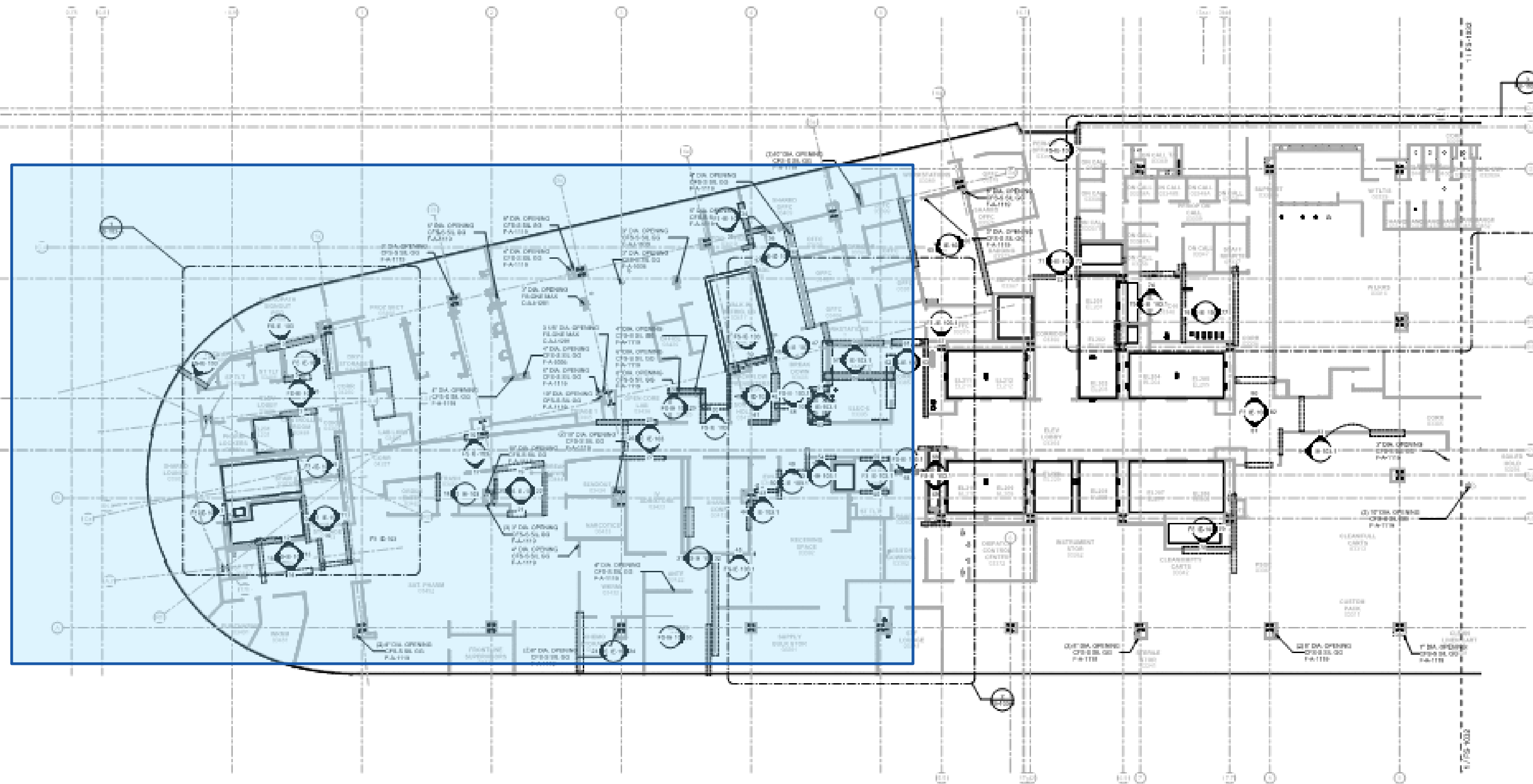


Modeling and Coordinating  
all Firestop Penetrations



Annotated Shop Drawings  
Issued for Installation





① THIRD FLOOR - PARTIAL PLAN A  
3/32" = 1'-0"

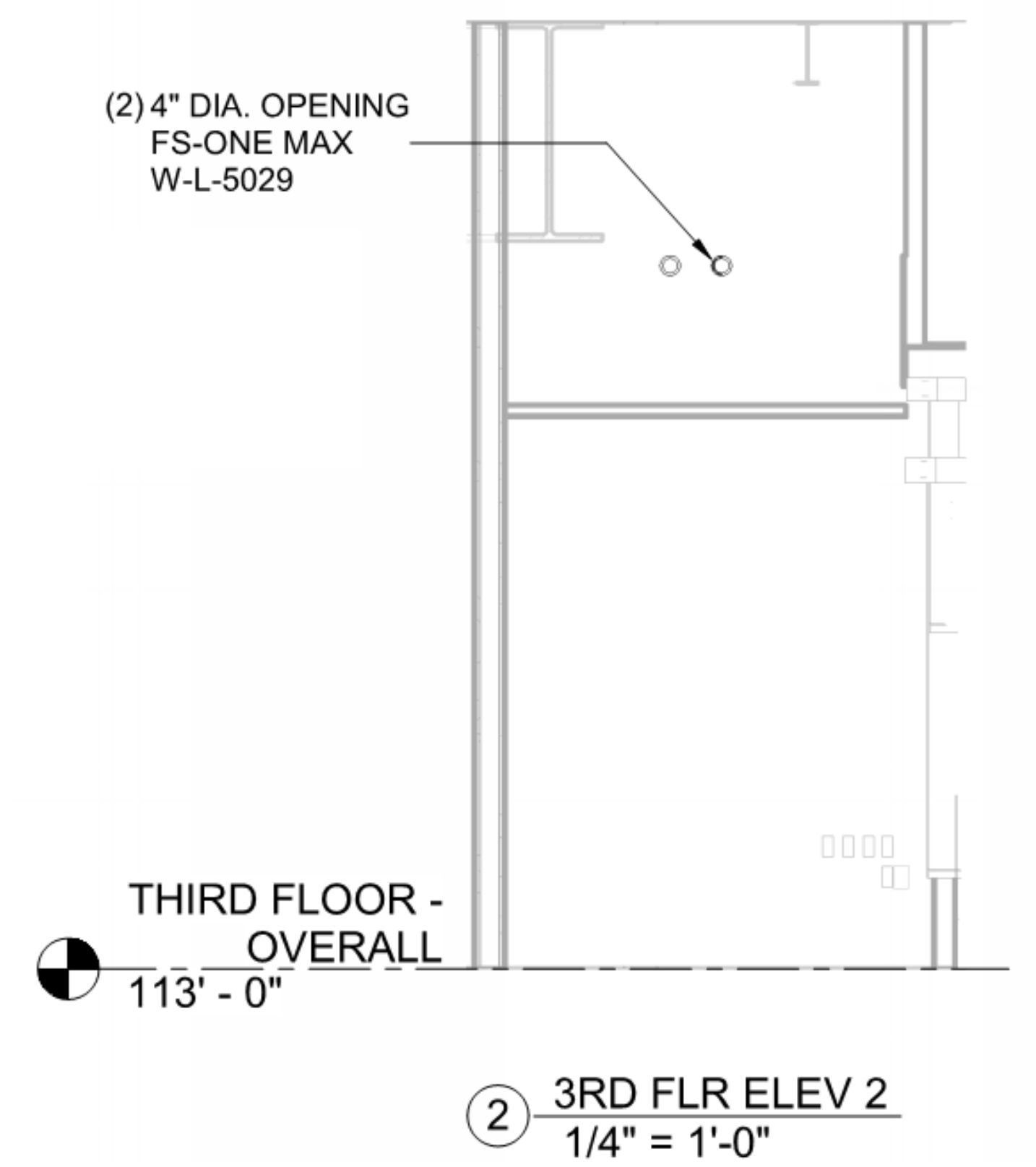
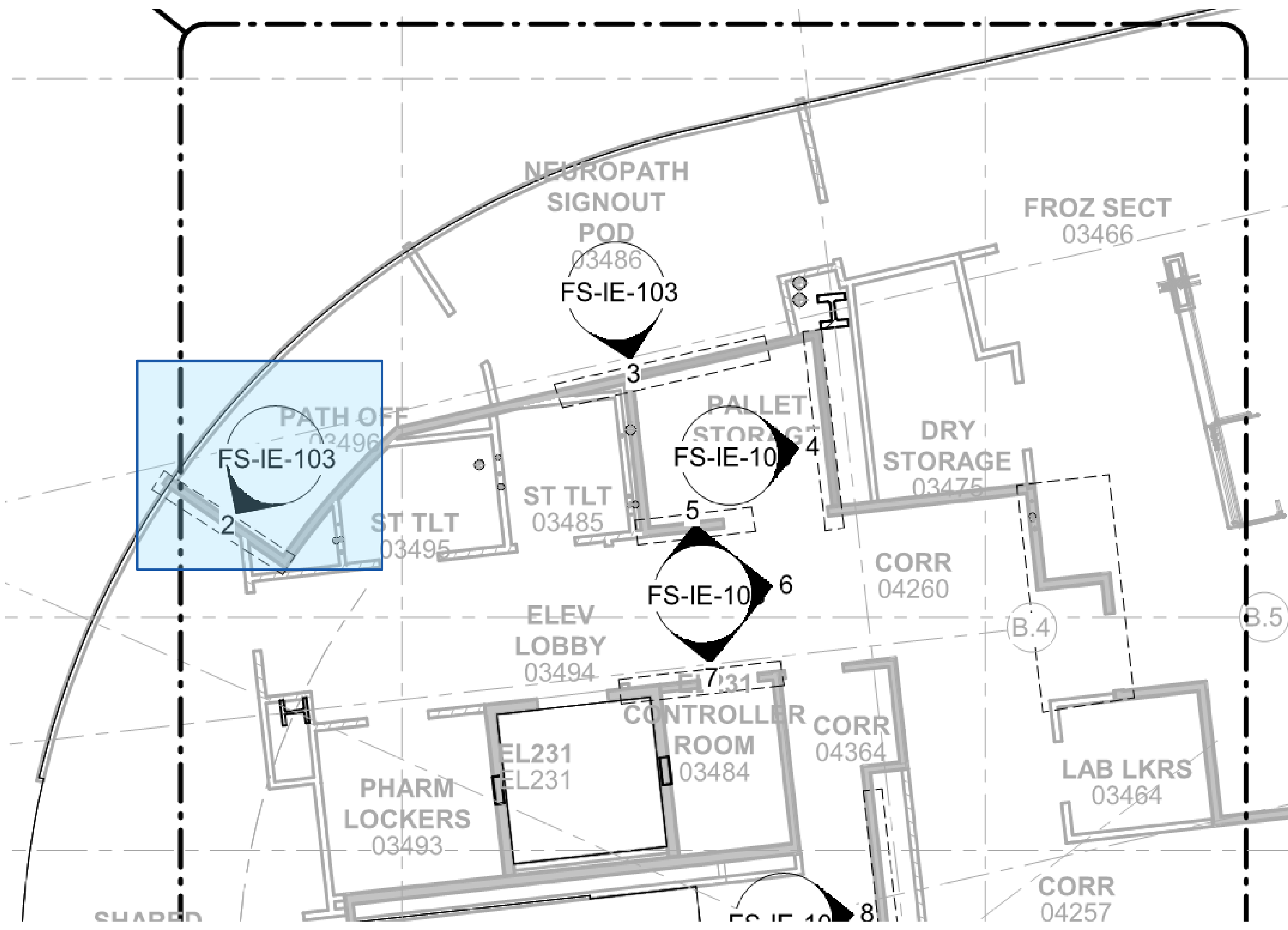
Rev		On	On Date	Description
<div style="display: flex; justify-content: space-between;"> <div> <p>THIS DRAWING IS A PARTIAL REVISION OF A PREVIOUS DRAWING. IT IS NOT TO BE USED FOR CONSTRUCTION PURPOSES. FOR MORE INFORMATION, CONTACT THE DESIGNER OR ARCHITECT.</p> </div> <div> <p>THIS DRAWING IS A PARTIAL REVISION OF A PREVIOUS DRAWING. IT IS NOT TO BE USED FOR CONSTRUCTION PURPOSES. FOR MORE INFORMATION, CONTACT THE DESIGNER OR ARCHITECT.</p> </div> </div>				
Project		Client		<div style="display: flex; justify-content: space-between;"> <div> <p>On: <u>          </u></p> <p>By: <u>          </u></p> </div> <div> <p>On: <u>          </u></p> <p>By: <u>          </u></p> </div> </div>
Penn Medicine		The Pavilion		<div style="display: flex; justify-content: space-between;"> <div> <p>Partial FIRST</p> </div> <div> <p>PARTIAL THIRD FLOOR PLAN A</p> </div> </div>
				<div style="display: flex; justify-content: space-between;"> <div> <p>Scale: <u>3/32" = 1'-0"</u></p> </div> <div> <p>Partial THIRD FLOOR PLAN A</p> </div> </div>
				<div style="display: flex; justify-content: space-between;"> <div> <p>Partial FIRST</p> </div> <div> <p>Partial THIRD FLOOR PLAN A</p> </div> </div>

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# PennFIRST Software and Services Landscape

EASY TO VIEW ON BIM360  
GLUE

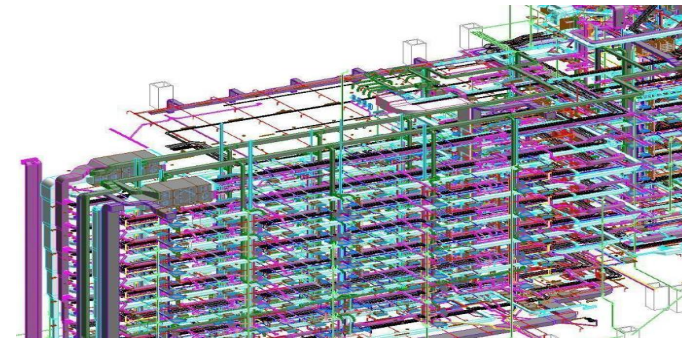


SHOP DRAWINGS



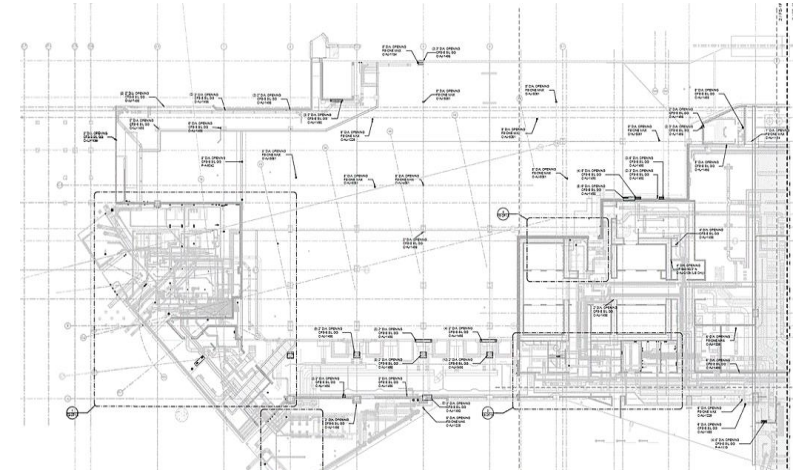


# PennFIRST Software and Services Landscape



3D

- Modeling Style Orientation
- Wall Qualification/Labeling
- Run Plug-In/Clash
- **Model 45k MEP pens**
- System tag/insert object
- **Pre-Con EJ Identification**
- Estimating/BOMs
- Scheduling
- Weekly Uploads



2D

- **Development of Shops**
- Firestop Legend /Tables
- **Load Shops in FS DM**
- 2D as built back into model



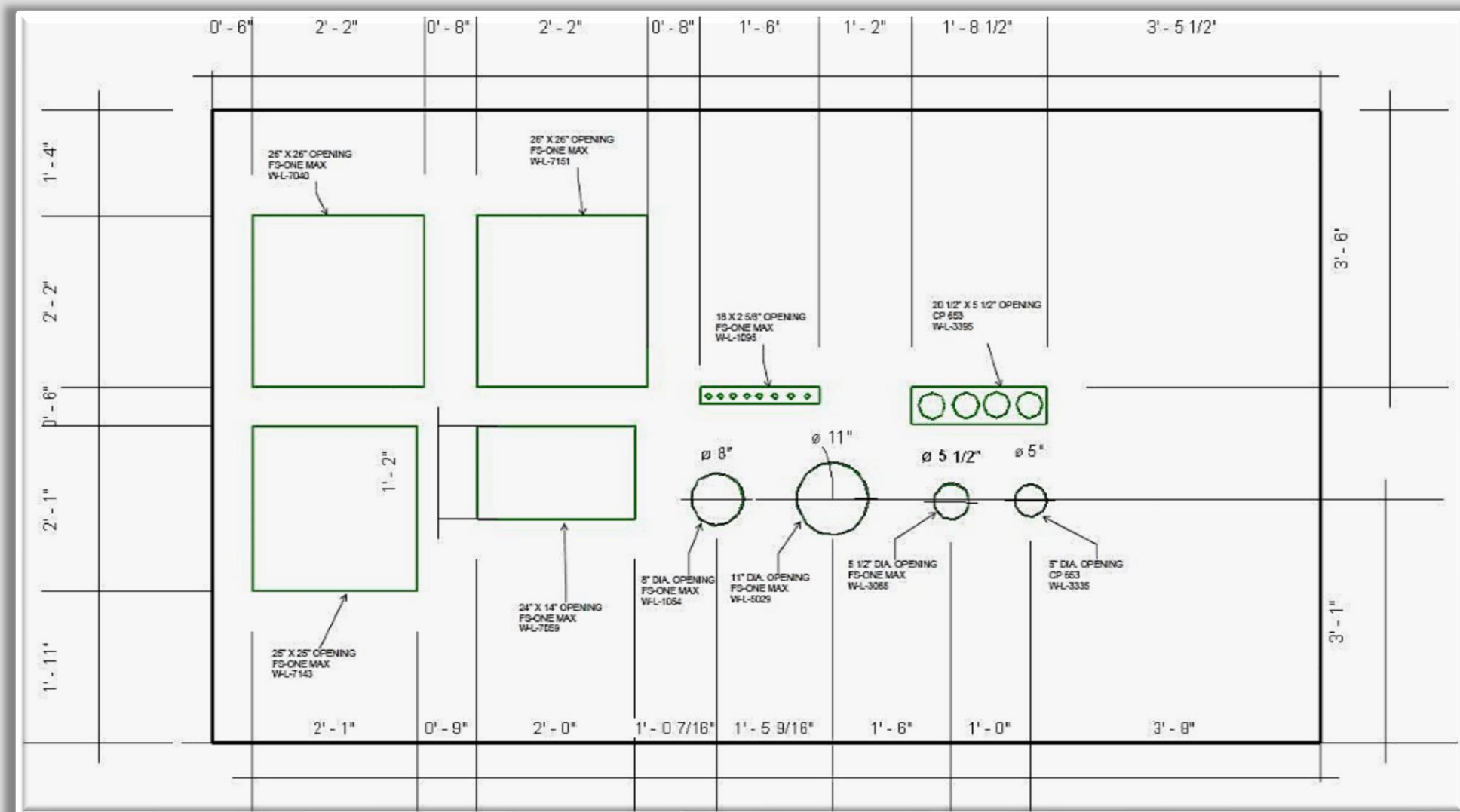
Onsite Consulting

- **RFI Process Owner**
- Onsite Training
- Mock Up Applications
- Submittals by Zone
- System Matrix
- **QA/QC Consulting**
- Installer IFU Cards
- Model Based Labeling Program
- **Weekly Coordination Meetings**
- Monthly Inspection Walks
- FS DM Consulting



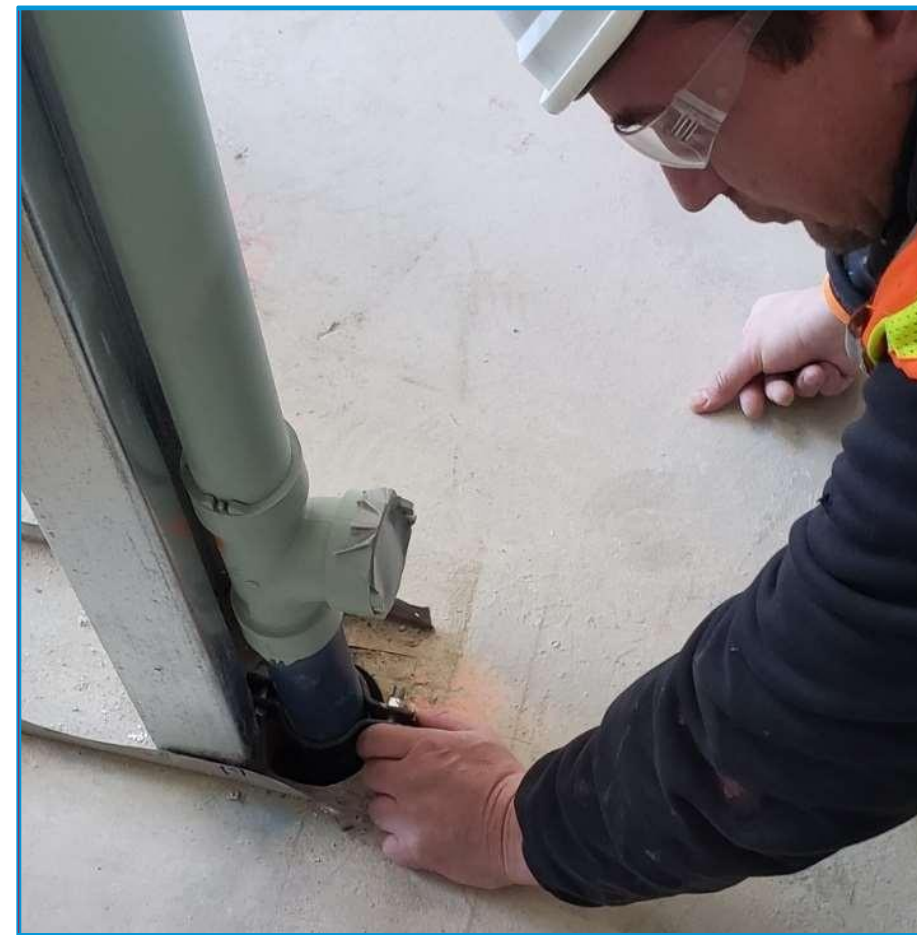
# BEST PRACTICES – TYPICAL SYSTEMS MOCK-UP

Coordinated with Trades to produce a Virtual Mock-up





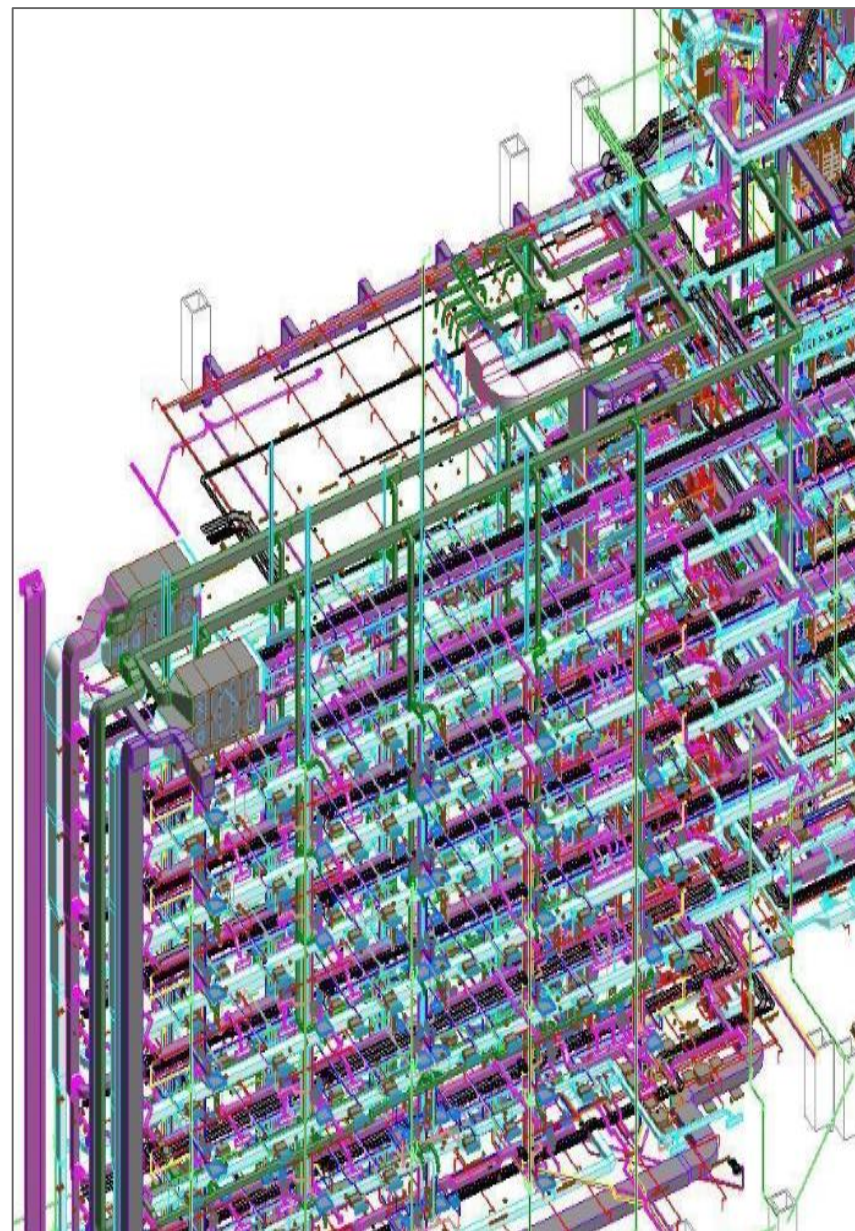
# QUALITY INSTALLATION – RATED PENETRATIONS



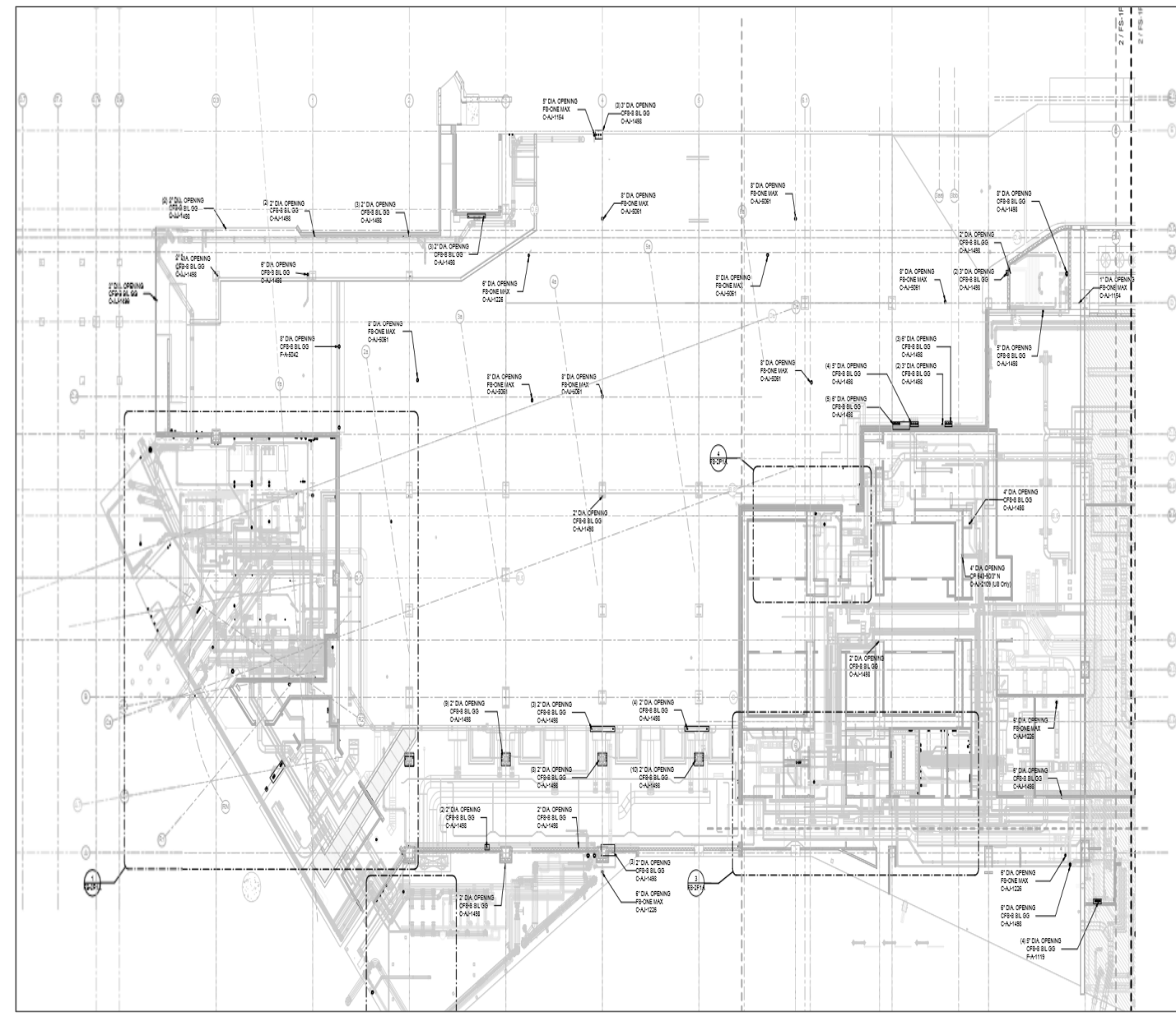


# Hilti Firestop BIM Services Help Provide an End-to-End Solution for the Project

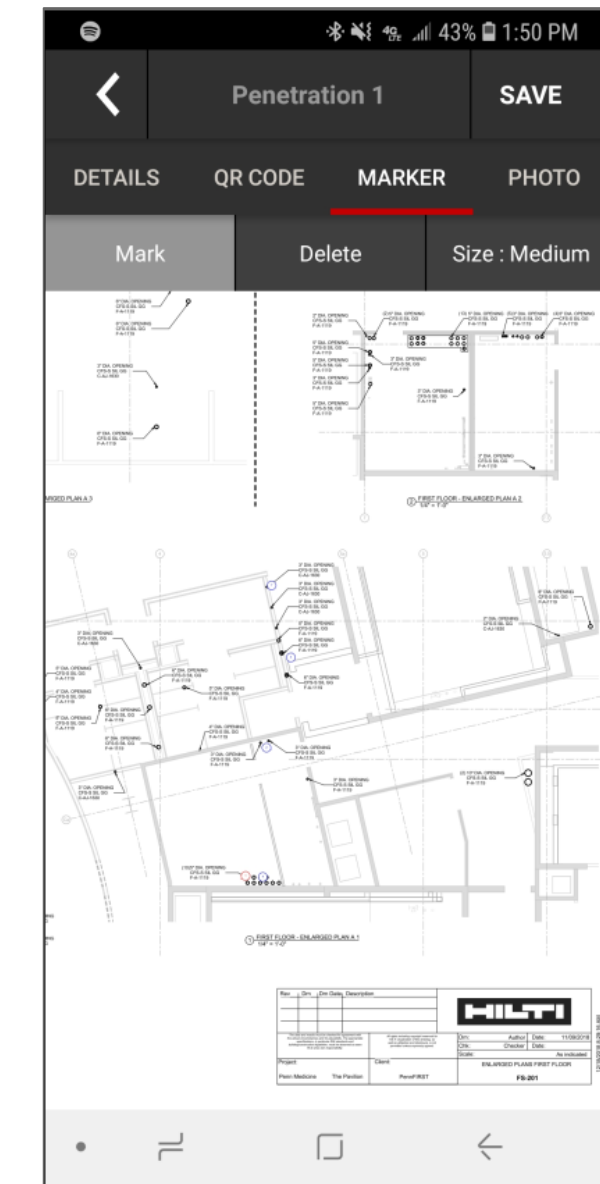
BIM to Project Completion through coordination of 3D to 2D to DM



**3D Model**



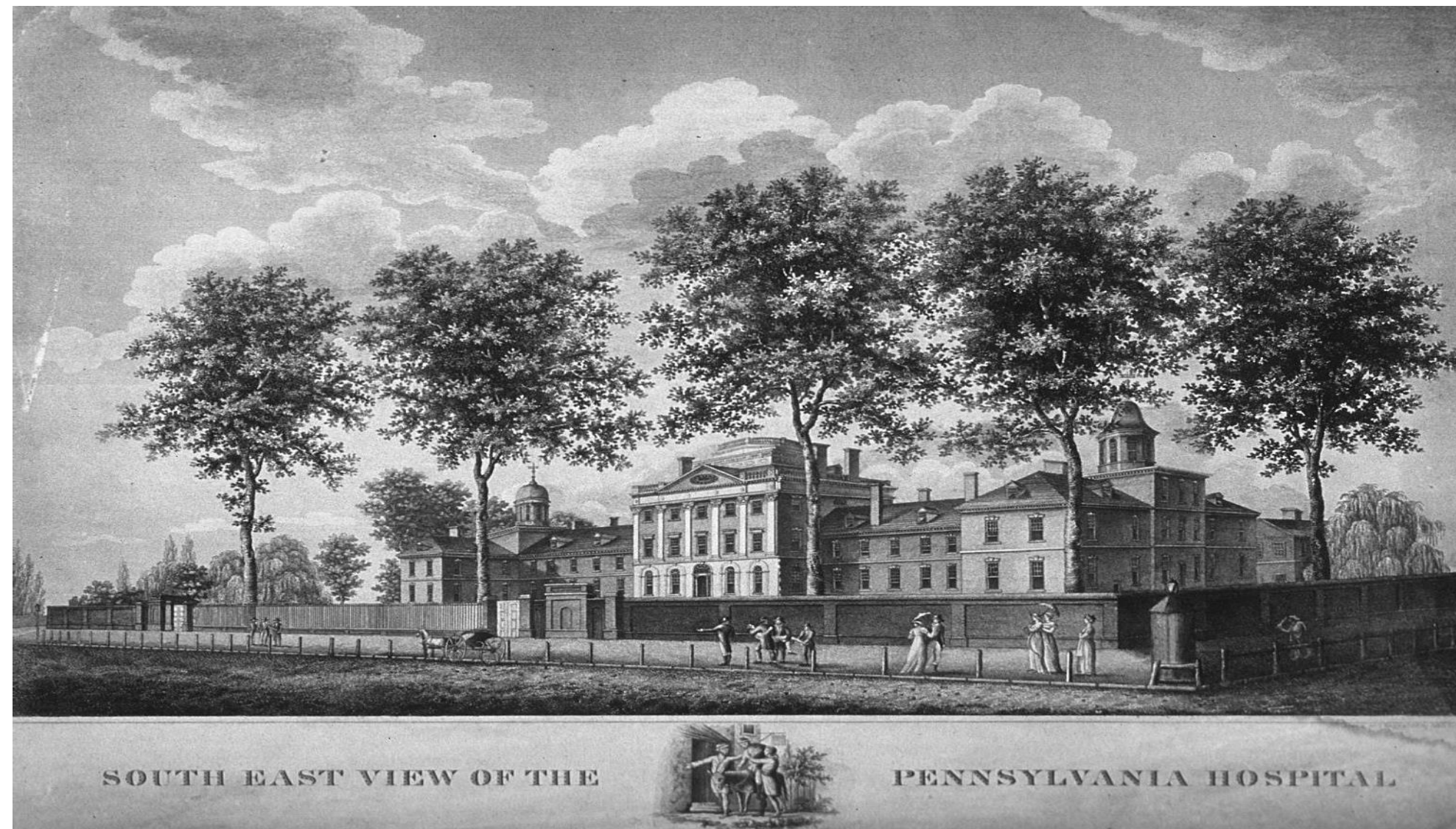
**2D Shop Drawings**



**Project Exported to  
Documentation Manager**



# Delivering Medicine in the 21<sup>st</sup> Century







# Please complete the Class Survey



# Social Media

- **Trevor Owen**
  - Twitter: @t\_owen
  - Instagram: @towen
- **Hilti**
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  - Instagram: @hiltinorthamerica #Hilti
  - Facebook: HiltiNorthAmerica
- **Autodesk University**
  - Twitter: @autodesku #AU2019
  - Instagram: @autodeskuniversity #AU2019







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