25TH ANNUAL

25TH LCI CONGRESS
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Leveraging Lean and VDC to Eliminate Deferred Submittals

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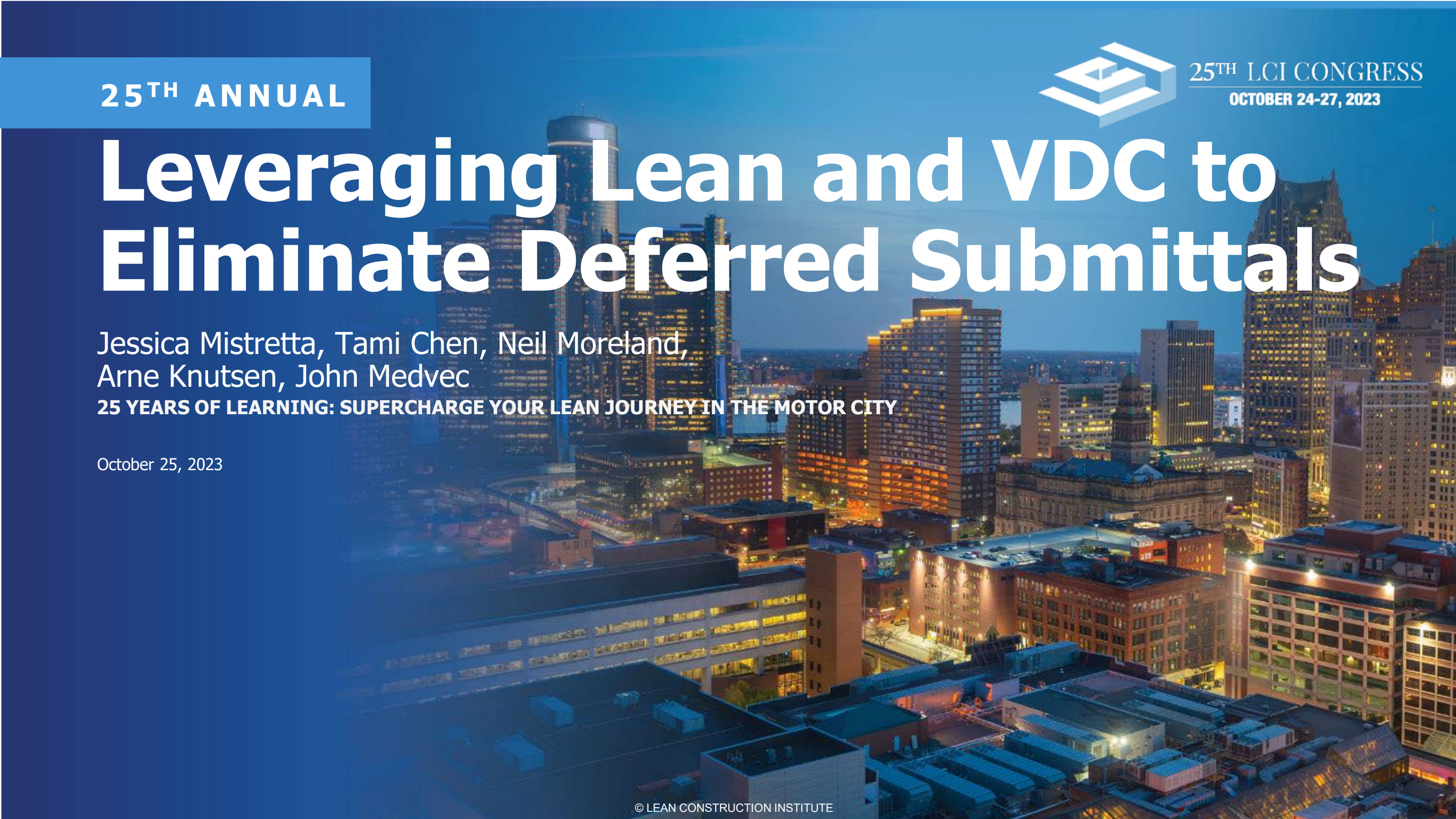
Arne Knutsen, John Medvec

25 YEARS OF LEARNING: SUPERCHARGE YOUR LEAN JOURNEY IN THE MOTOR CITY

October 25, 2023



Presenters

Jessica Mistretta
Oregon Health & Science University

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NBBJ

Arne Knutsen
Southland Industries

Neil Moreland
Cherry City Electric

John Medvec
Skanska

Problem Statement

The project team established a goal of being fully coordinated prior to submitting a permit application to the Authority Having Jurisdiction (AHJ).

How do we accomplish the goal and know we are fully coordinated?

- Utilize VDC to model to a higher Level of Detail (LOD > 300)
- Trade partners will develop BIM for the Engineer of Record (EoR)
- Eliminate traditional Deferred Submittals (DFS) by having Delegated Design elements completed and submitted with the Building Permit Application.

Project Goals & Desired Benefits

Fully coordinated construction model prior to submitting a permit application. No deferred submittals to keep on time with the construction schedule.

Owner

- Better overall coordination
- Improved Timeline

Design Team

- Fully coordinated model with the architectural design & limit changes during construction

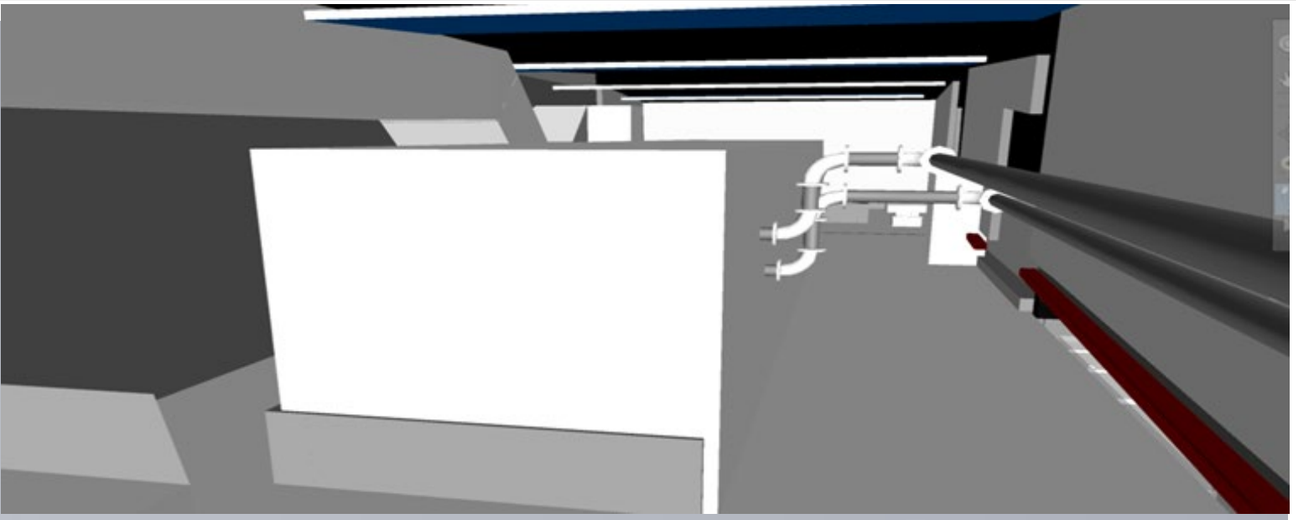
Contractor

- Reduce RFI's
- 350 Requests for Information (RFIs), at $150 million complete
- Capture all scope up front

Sub-Contractors/ Trade Partners

- More efficient workflow
- Submittals complete prior to construction
- Accurate workforce planning

Example of Fully Coordinated Model vs. Traditional Model



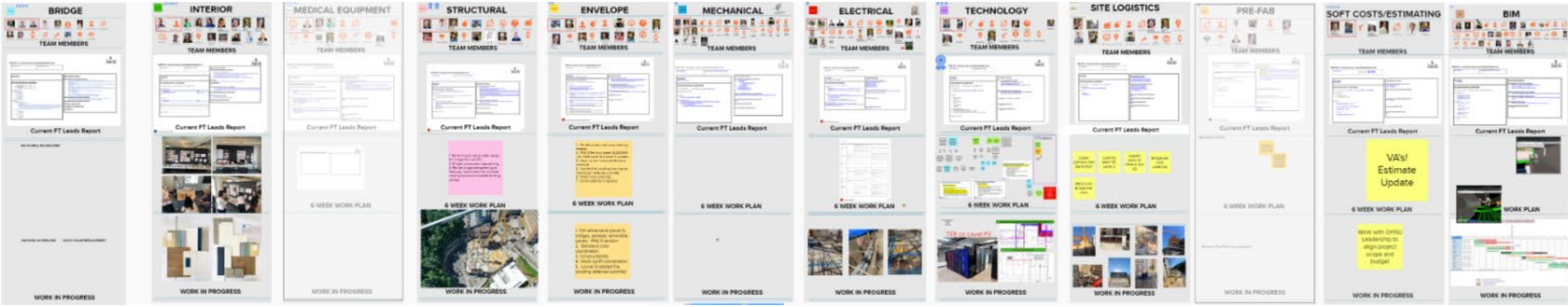
Typical Model

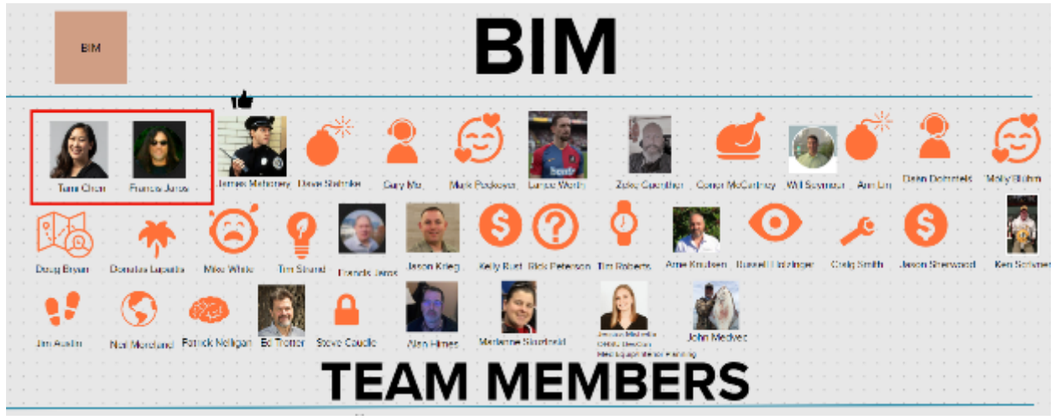
- Permit submission is generally coordinated but not ready-to-build.

Fully Coordinated Model

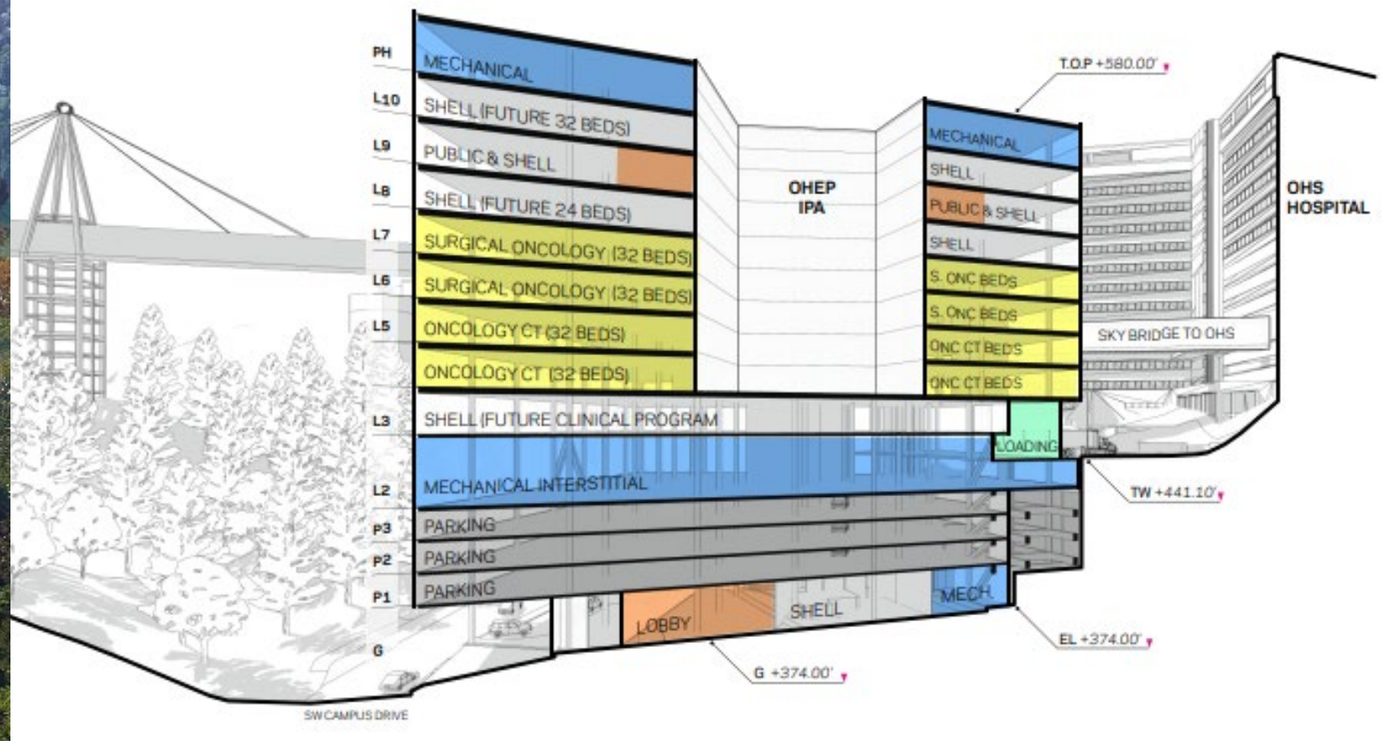
- Requires submittal approval in order to model to LOD >300 and be constructable.
- Submittals are approved prior to completion of Construction Documents (CDs).
- Trade Partners remain flexible to design changes as CDs are completed.
- AHJ reviewed traditionally deferred submittals with the permit plan review

Team Structure





Project Introduction



General Strategies

- Functional Teams
- Big Room & Pull Plans
- Colocation (In-Person & Virtual)
- Establish Conditions of Satisfaction
- Agree upon definition of Fully Coordinated
- Roles & Responsibilities between design & trades
- Trades engaged in modeling early

Team Culture

- Flexibility
- Accountability
- Representation
- Equal Voices
- Humility
- “Ask the dumb questions”
- StrengthsFinder
- Functional Team "Award of the Week"

Challenges

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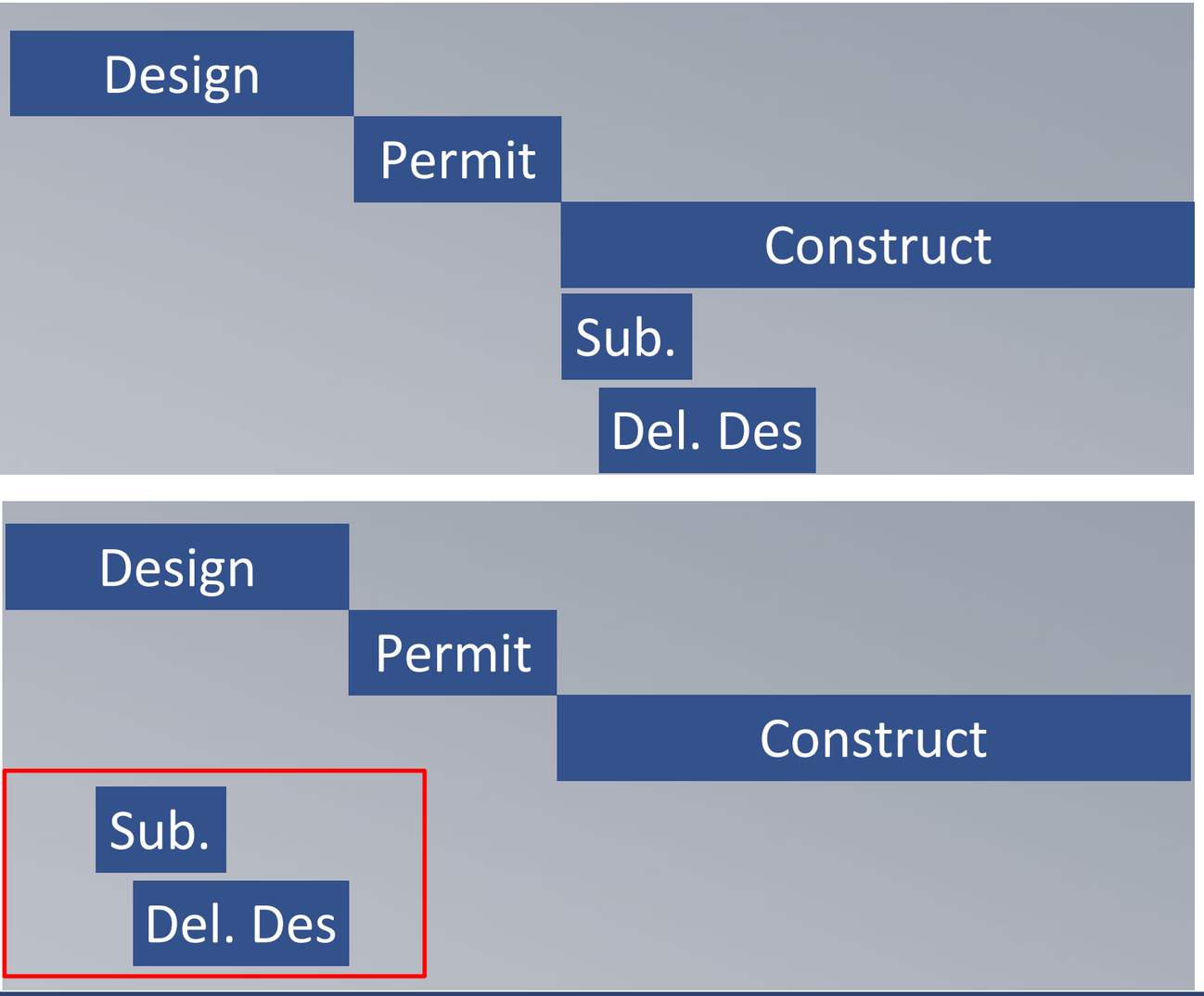
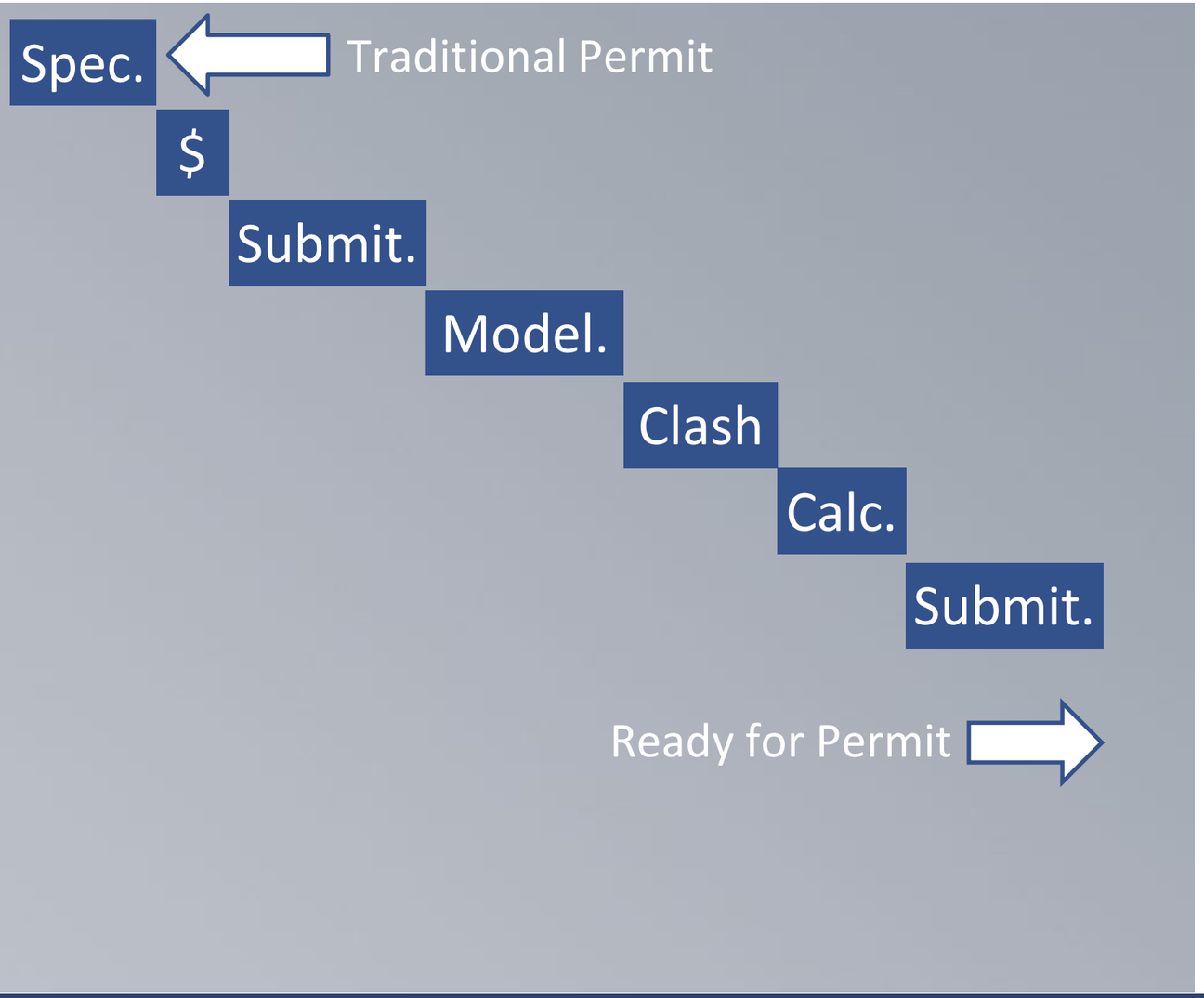
Delegated Design Process



- Early funding for long lead and PO required submittals ex. Generators, Chillers etc.
- Staffing and process of vendors and NSS designers to keep up with the fluid model and design-ex. BB sessions for submittals
- General submittals vs shop drawing factory submittals-Ex. Square D, Caterpillar
- Owner and project approval of submittals before permit/City submission.
- Design far enough ahead for detailed submittals
- Spec differences and as-building specs to submittals.
- Approved submittals and process during design

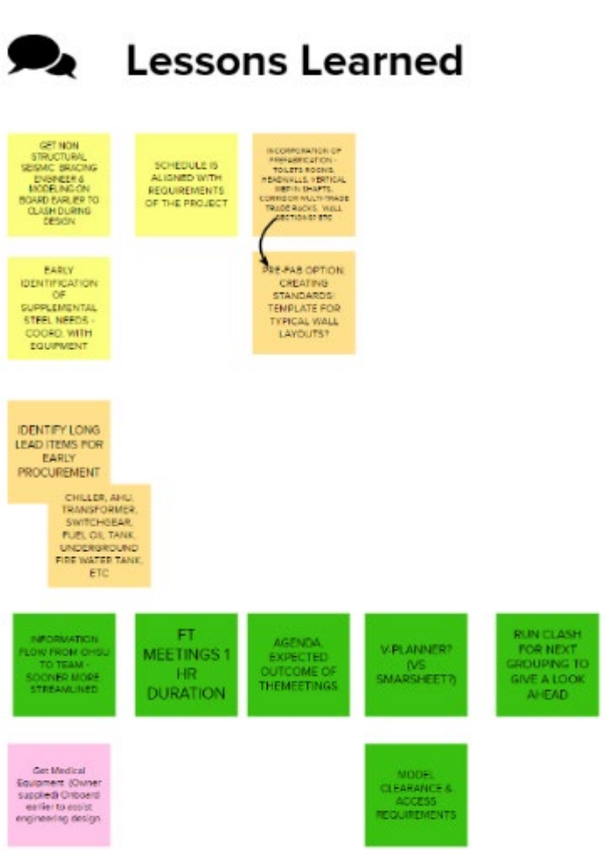
Delegated Design Process

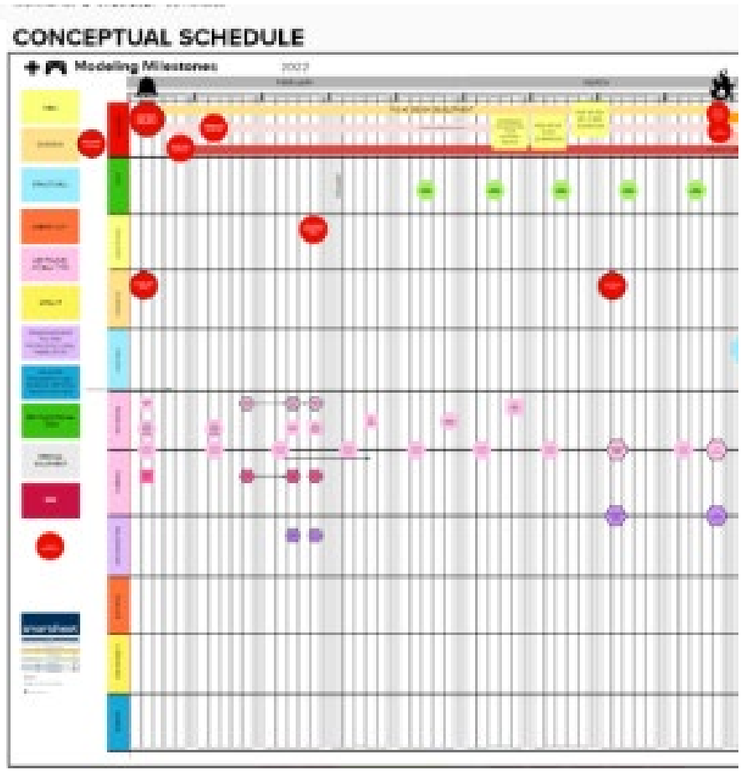


Outcome

- Ability to adjust design with submittal information rather than a cost and schedule impact with submittal design deviations
- Ability to incorporate more of trade partner influence in design for best practices and install methods.
- Ability have further detail for installation rather than design as it is being built.

Project Start/Stop/Restart





Challenges

- Project shutdown 2020 & 2021, transition from in-person to virtual
- Program Change
- Permits for Package 1 and 2 and design review complete for structure and envelope
- Allowed us to bring on additional trade partners
- Pull planning to validate project schedule before restarting

Project Start/Stop/Restart

Lessons Learned

- Shift in access/conversations from Owners to Trades/Design
- Shift to being over scheduled
- Delay in decision making
  - Narrowed voices from users
- Lost culture

Pull Planning

Challenges

- Disorganized start
- Some key design team members did not have pull planning experience
- Trade partners had experience in pull planning but not leading a design pull
- Too many internal activities on the board
- Unclear links between predecessors and successors
- Confusion

Response

Created separate functional team pull plans to feed into the overall.

- Keep tasks with predecessors and successors that were internal to the FT's off of the main pull plan
- Link tasks that were relative to overall pull plan

Lessons Learned

- Last Planner Facilitator from the start
- Track variances and PPC in a log and review weekly

Successes

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How did we do?

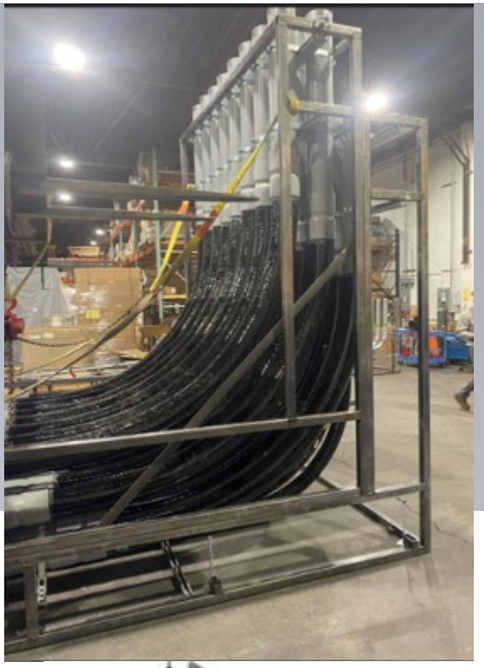
Package 1 (Site Clearing, Demolition, Shoring, Excavation)	**Deferred**	**Submitted**
Permanent Shoring		**X**
Temporary Shoring		**X**
Occupant Safety Plan		**X**
Package 2 (Deep Foundations, Footings, Backfill, U.G. Utilities)		
Fire Water Storage Tank, UG Fire Suppression Piping		**X**
Occupant Safety Plan		**X**
Package 3 (Superstructure, Exterior Enclosure)		
Curtainwall System		**X**
Steel Stairs		**X**
Spray Fire Resistant Material (SFRM)	**X**	
Occupant Safety Plan		**X**

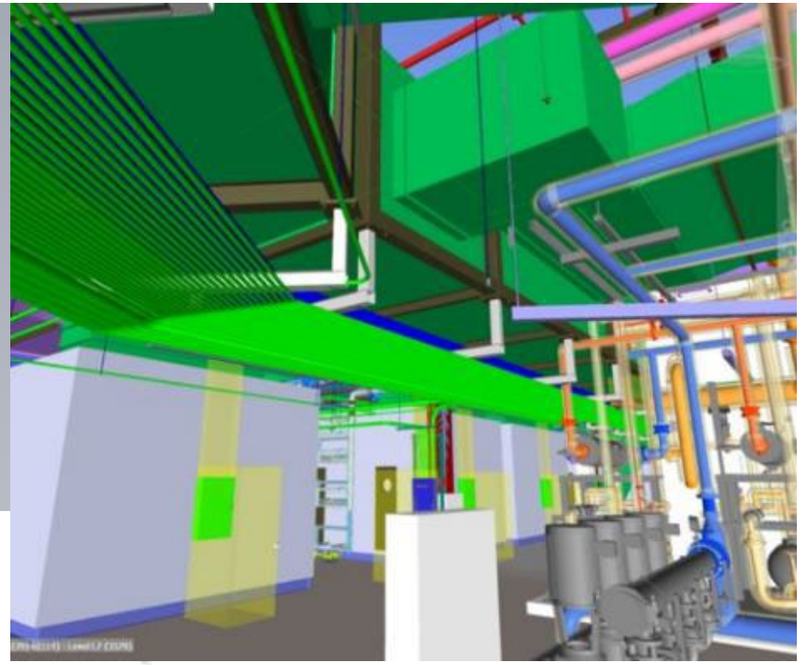
How did we do?

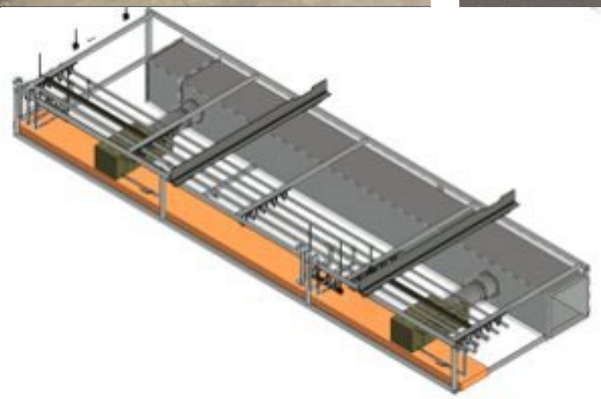
Package 4 (Interior Buildout)	Deferred	Submitted
Non-Structural Seismic Anchorage & Bracing of MEP Systems		X
Fire Suppression		X
Interior Framing		X
Guardrails		X
Occupant Safety Plan		X
Thermal Calculations		X
Fire Alarm and 2 way communication plans	X	X

93.75% Success Rate

Positive Outcomes







- Early purchase orders to procure equipment in design phase
- Cost certainty in-lieu-of allowances
- Detailing is done by the time of permit submission vs. during installation
- Prefabrication modeled and coordinated in design – multi-trade rack and headwalls
- Coordination of Mechanical, Electrical, Plumbing, Pneumatic Tube, Fire Suppression anchorage and seismic bracing prior to permit submission
- Interior framing, bracing and blocking prior to permit submission

Key Tools / Processes

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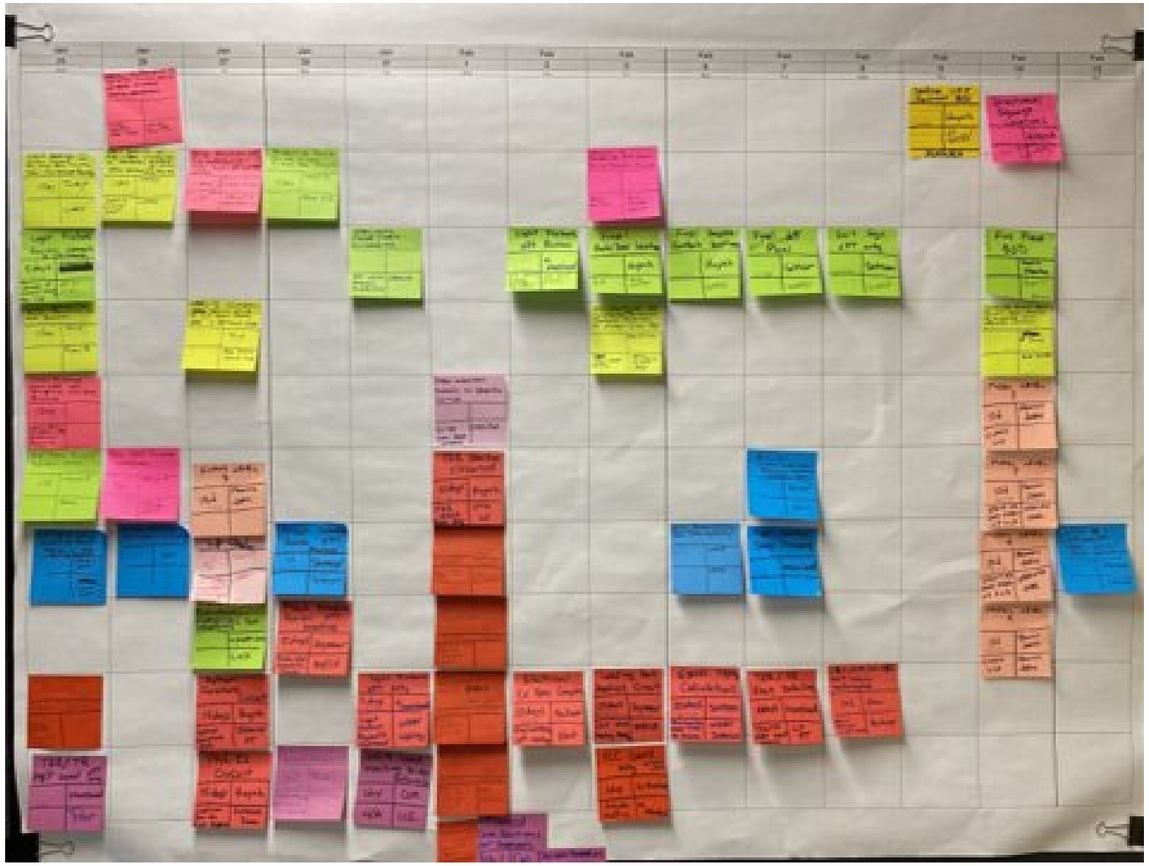
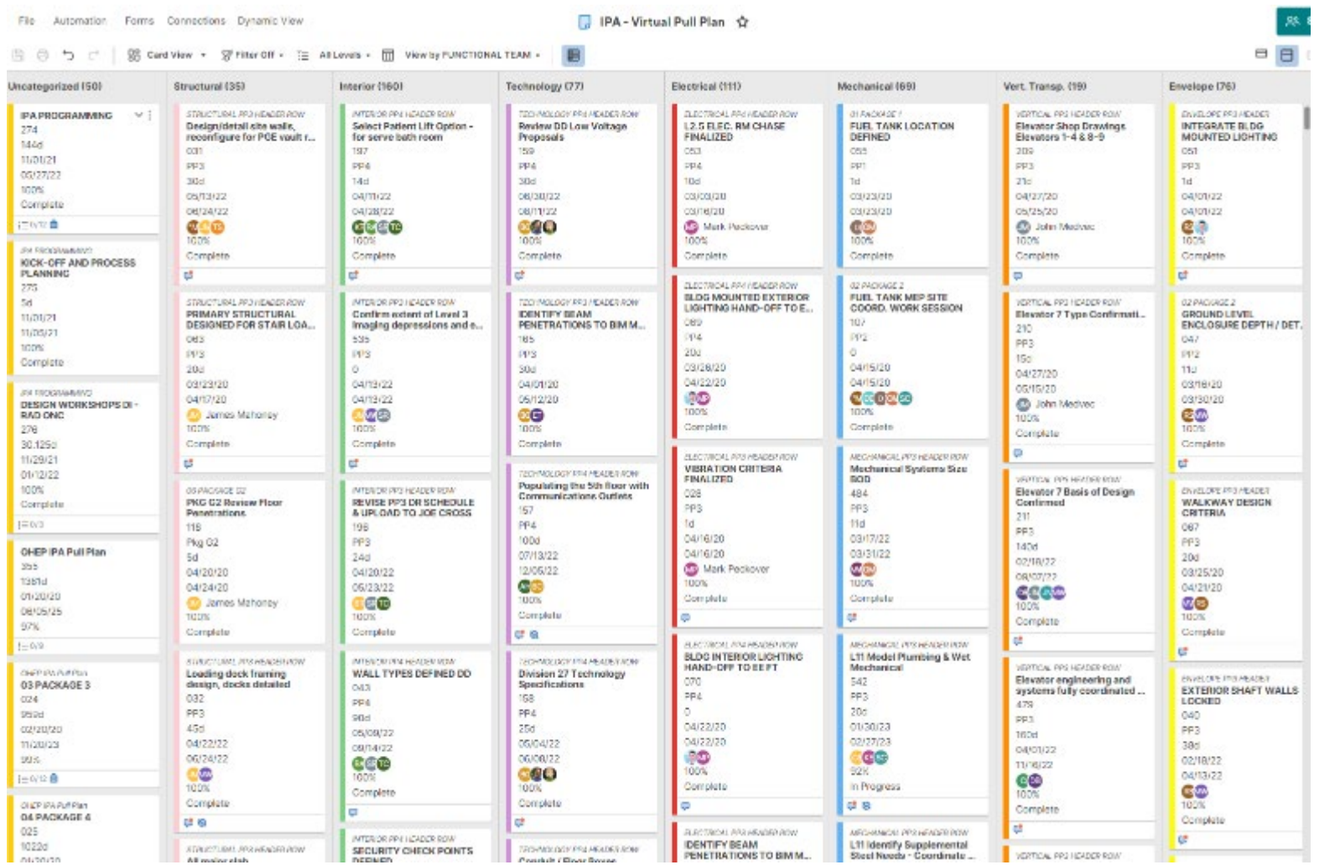
Tools

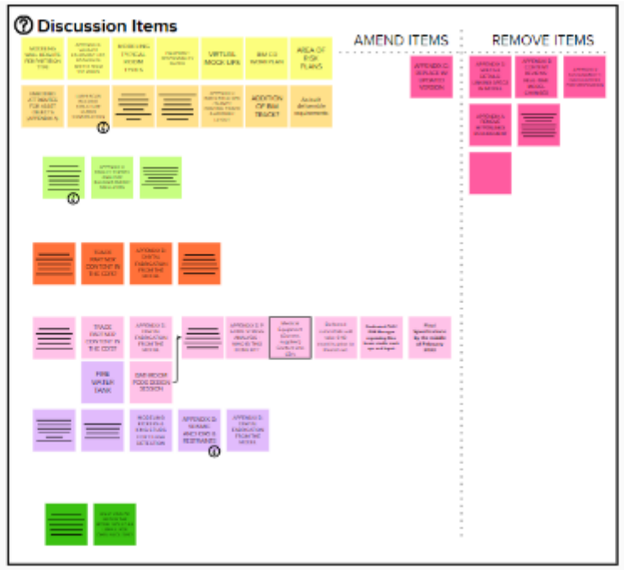



File
Automation
Forms
Connections
Dynamic View
IPA - Virtual Pull Plan
Card View
Filter Off
All Levels
View by FUNCTIONAL TEAM
Uncategorized (50)
Structural (35)
Interior (160)
Technology (77)
Electrical (111)
Mechanical (69)
Vert. Transp. (19)
Envelope (76)
IPA PROGRAMMING
KICK-OFF AND PROCESS PLANNING
DESIGN WORKSHOPS DI - RAD ONC
OHEP IPA Pull Plan
03 PACKAGE 3
04 PACKAGE 4
Design/detail site walls, reconfigure for POE vault r...
PRIMARY STRUCTURAL DESIGNED FOR STAIR LOA...
PKG G2 Review Floor Penetrations
Loading dock framing design, docks detailed
Select Patient Lift Option - for serve bath room
Confirm extent of Level 3 imaging depressions and e...
REVISE PP3 DR SCHEDULE & UPLOAD TO JOE CROSS
WALL TYPES DEFINED DD
SECURITY CHECK POINTS
Review DD Low Voltage Proposals
IDENTIFY BEAM PENETRATIONS TO BIM M...
Populating the 5th floor with Communications Outlets
Division 27 Technology Specifications
L2.5 ELEC. RM CHASE FINALIZED
BLDG MOUNTED EXTERIOR LIGHTING HAND-OFF TO E...
VIBRATION CRITERIA FINALIZED
BLDG INTERIOR LIGHTING HAND-OFF TO DEPT
IDENTIFY BEAM PENETRATIONS TO BIM M...
FUEL TANK LOCATION DEFINED
FUEL TANK MEP SITE COORD. WORK SESSION
Mechanical Systems Size SOD
L11 Model Plumbing & Wet Mechanical
L11 Identify Supplemental Steel Needs - Coordinate ...
Elevator Shop Drawings Elevators 1-4 & 8-9
Elevator 7 Type Confirmati...
Elevator 7 Basis of Design Confirmed
Elevator engineering and systems fully coordinated ...
INTEGRATE BLDG MOUNTED LIGHTING
GROUND LEVEL ENCLOSURE DEPTH / DET...
WALKWAY DESIGN CRITERIA
EXTERIOR SHAFT WALLS LOCKED

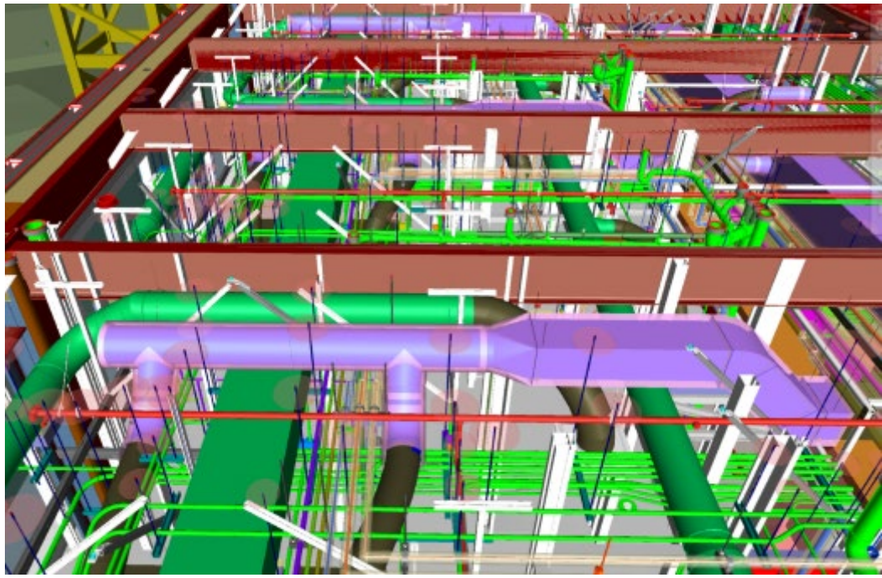
Tools


BIM Execution Plan Documents
OTHER RELATED DOCUMENTS

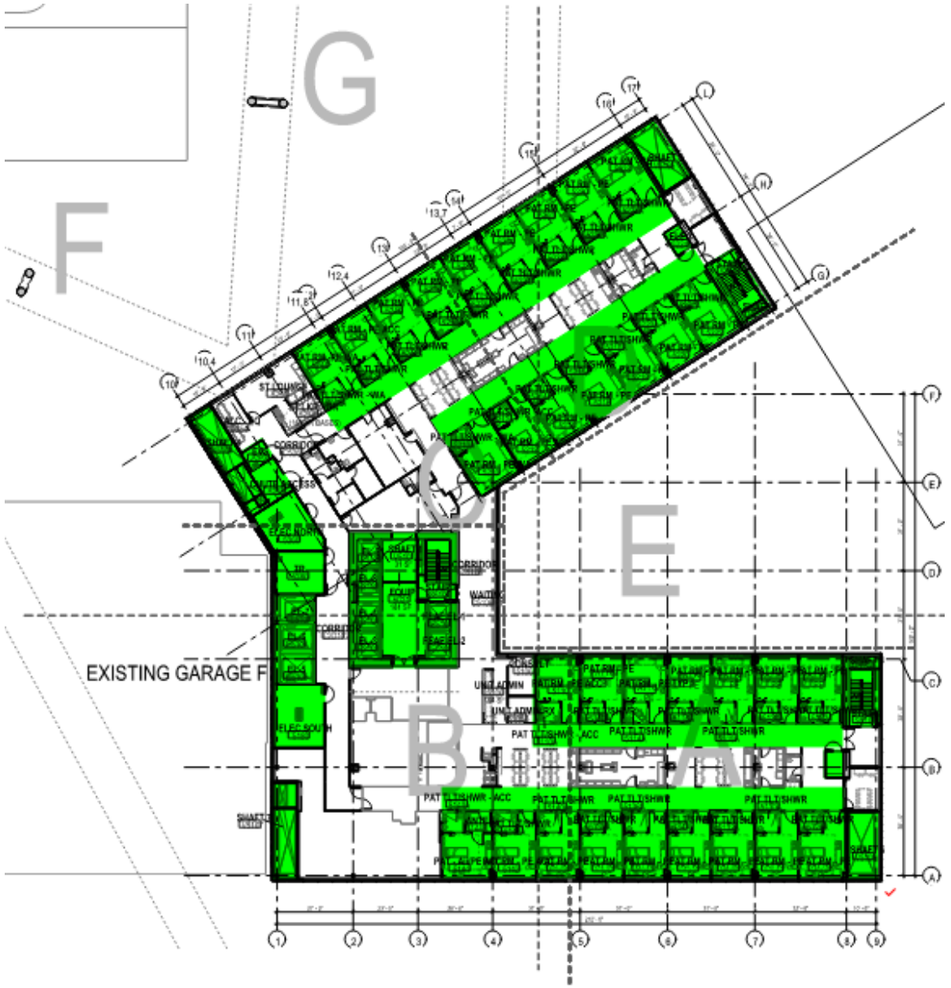

BIM Execution Plan Responsibilities


Discussion Items
AMEND ITEMS
REMOVE ITEMS


Lessons Learned



Tools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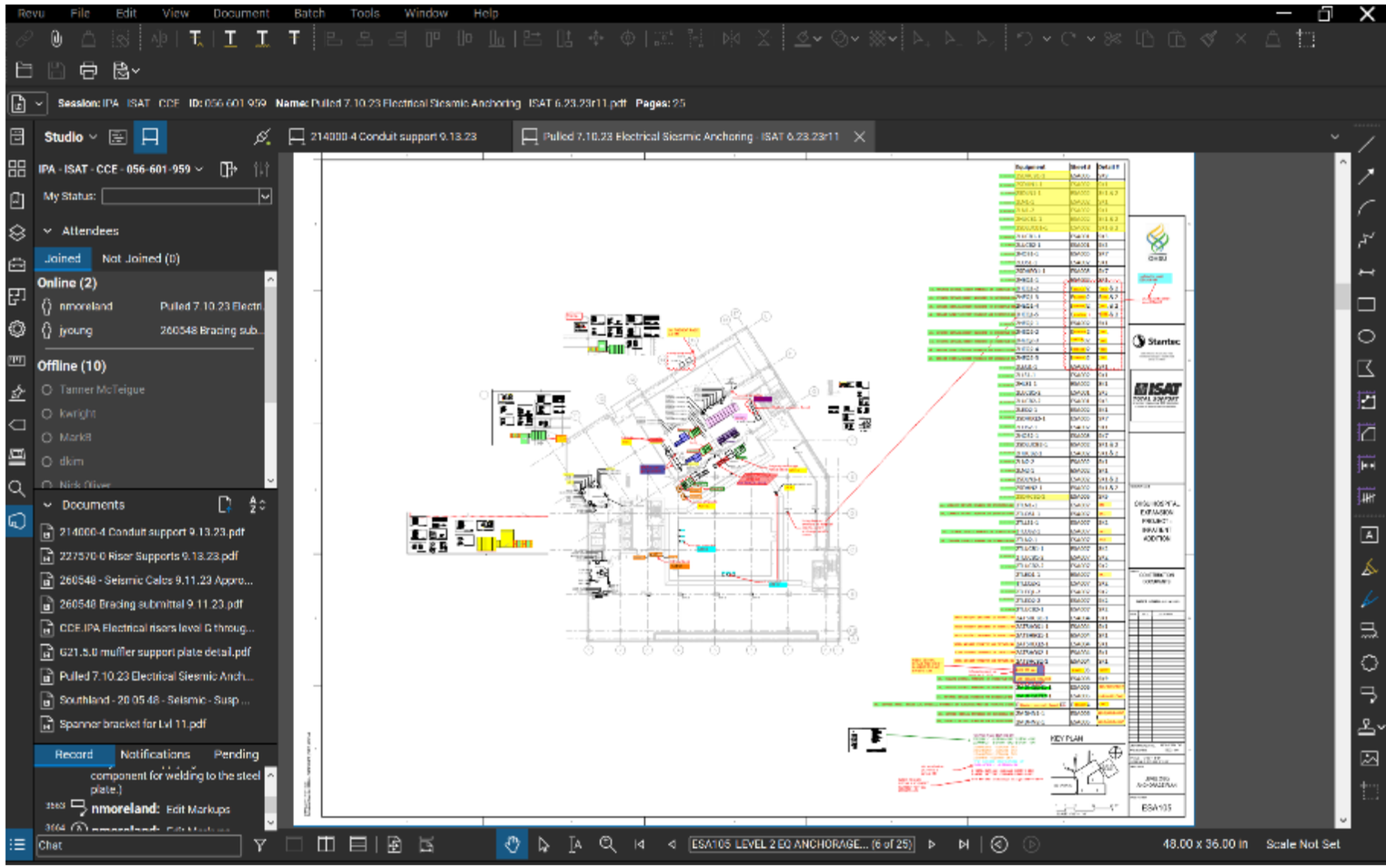
Revu File Edit View Document Batch Tools Window Help
Studio
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My Status:
Attendees
Joined
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jyoung
Offline (10)
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Documents
214000-4 Conduit support 9.13.23.pdf
227570-0 Riser Supports 9.13.23.pdf
260548 - Seismic Calcs 9.11.23 Appro...
260548 Bracing submittal 9.11.23.pdf
CCE IPA Electrical risers level G throug...
G21.5.0 muffler support plate detail.pdf
Pulled 7.10.23 Electrical Seismic Anch...
Southland - 26 05 48 - Seismic - Susp ...
Spanner bracket for Lvl 11.pdf
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214000-4 Conduit support 9.13.23
Pulled 7.10.23 Electrical Seismic Anchoring - ISAT 6.23.23r11
ESA105 LEVEL 2 EQ ANCHORAGE... (6 of 25)
48.00 x 36.00 in
Scale Not Set

Lessons Learned

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How can you apply this tomorrow?

On-board vendors early	Identify your delegated design submittals
Define ‘DONE” Yes, I’m done?	On-board Authorities Having Jurisdiction
Actionable conversations	
Plan submittal review into design schedule	
Clear goals memorialized	
The whole team needs to be onboard with clear expectations of the goals	
Hire Last Planner Facilitator at the start	

Would we do this again?

"Fully coordinated? – YES!..." - Jessica

"….everyone is an expert & removes bottlenecks of information" - Tami

"More efficient field execution" - Arne

"The extra work up front opens more opportunities." - Neil

"It's a challenge" - John M

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In the spirit of continuous improvement, we would like to remind you to complete this session's survey! We look forward to receiving your feedback.

Contact Us

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