

24TH ANNUAL



24TH LCI CONGRESS
OCTOBER 18-21



Chris Dezsi

Ryan O'Grady

John Jurewicz

Digital From the Beginning

Pull Planning the Walbridge Way

LEAN GUMBO: THE RIGHT INGREDIENTS FOR PROJECT SUCCESS

October 19, 2022 1:30 PM CST

Your Presenters



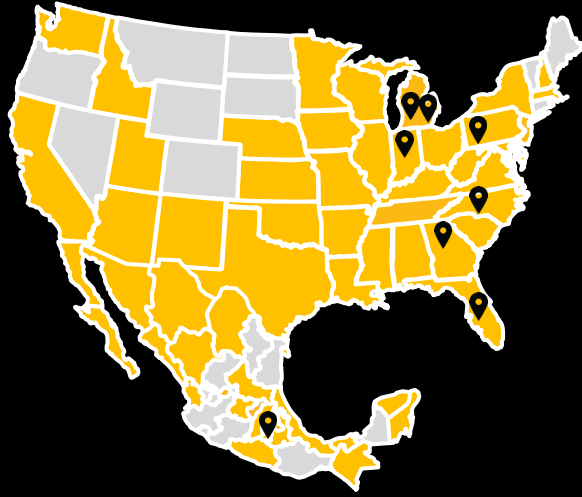
John Jurewicz
Director of Innovation





Chris Dezzi
Director, Scheduling



Ryan O'Grady
Superintendent



 Where We've Worked
  Office Locations

About Us

- 0.45 EMR - 2022
- Top 50 construction company in the U.S.
- 106-years experience, founded in 1916
- \$3.4 billion annual sales
- More than 25M+ annual craft hours
- Experts in delivering complex & technical Projects
- 8 domestic U.S. / 3 international office locations
- 1,500 global team members
- 95% repeat clients

Single Source

- Consulting
- Planning
- Procurement
- Construction
- Process Equipment Install
- Facility Management
- Concrete
- Technology
- Architecture / Engineering



Locations

- Atlanta, Georgia
- Charlotte, North Carolina
- **Detroit, Michigan (HQ)**
- Kalamazoo, Michigan
- Kokomo, Indiana
- Mexico City, Mexico
- Pittsburgh, Pennsylvania
- Sao Paulo, Brazil
- Tampa, Florida
- Windsor, Canada



Delivery Systems

- FEL Studies
- Preconstruction
- Construction Management
- Design-Build
- General Contracting
- Program Management
- Integrated Project Delivery
- EPC / EPCM
- Facility Management



2021-22 ENR Rankings

- #1 – Automotive *(19 of the last 20 years)*
- #1 – Manufacturing
- #3 – Co-generation
- #7 – Aerospace
- #8 – Steel & Non-ferrous Plants
- #12 – Data Centers
- #14 – Telecom
- #39 – ENR Top 400
- #46 – Industrial Process
- #48 – Power



Self-Perform

- Design
- Structural Concrete / Placement
- Structural Steel Erection
- Selective Demolition
- Heavy Rigging
- Emergency Shutdowns
- Plant Relocation / Shutdowns
- Tooling / Equip. Shutdown
- Technology (Field / Radar / Laser / etc.)

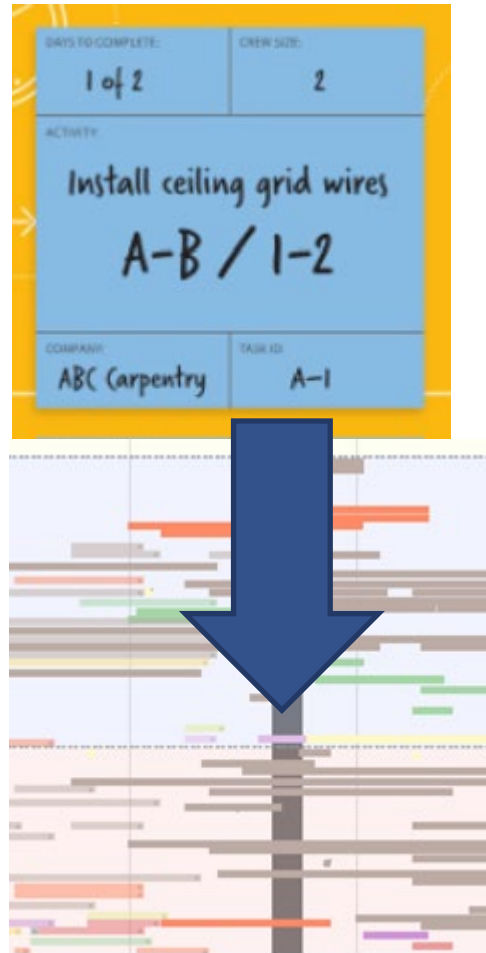
Problem Statement

Often adopting something new is challenging, especially when team are stressed with limited resources. To encourage pull planning adoption, Walbridge uses a large collaborative wall, onsite, so that trade foreman have an easy way to perform adjustments.

- Inconsistencies in implementation and usage



Agenda




1. History/Journey
2. Reboot of Last Planner
3. Implementation/Daily Use
4. Tutorial
5. Technology & Start up Tips

1 History/Journey



How We Started



Last Planner System® Guidelines

Date: May 27, 2020
Revision: <DRAFT>

LAST PLANNER GUIDELINES

Fill out your Task Note as shown:

- A detailed description of the work to be performed.
- The number of days needed to complete the work, and the day number of the work.
- The crew size that will be doing the work that day.

Days to Complete: 1 of 2

Crew Size: 2

Activity: Install ceiling grid wires

A-B / 1-2

Company: ABC Carpentry

Task ID: A-1

Days to Complete: 2 of 2

Crew Size: 2

Activity: A-1

Company: ABC Carpentry

Task ID: A-1

Confidential Project

Overall Project PPC

83%

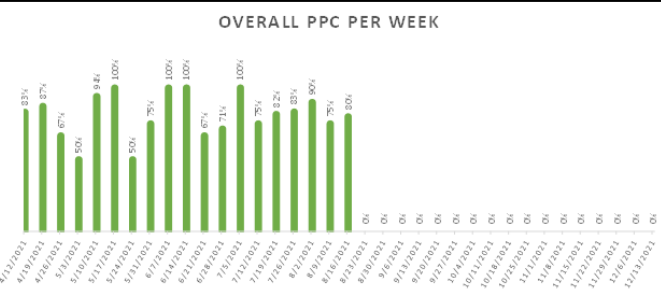
Contractor	Overall PPC
Demolition	72%
Sitework	85%
Landscaping	73%
Concrete	94%
Masonry	85%
Steel	78%
Casework	29%
Roofing	90%
Metal Panels	87%
Glazing	93%
Doors & Hardware	88%
Flooring	83%
Drywall and Framing	100%
Grid Ceiling	61%
Painting	73%
Specialties	0%
Signage	67%
Conveying Systems	0%
Fire Protection	75%
Mechanical and Plumbing	75%
Electrician	0%

Top 5 Performer

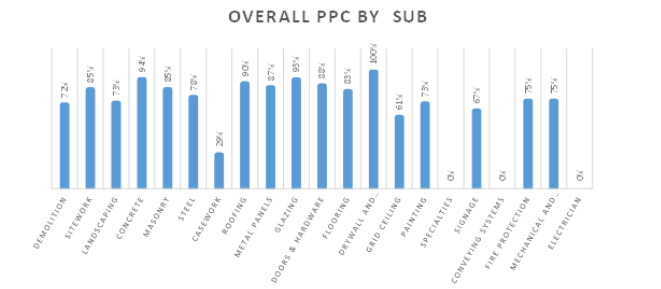
PPC Below 70%

Not Participating


OVERALL PPC PER WEEK



OVERALL PPC BY SUB



Reasons For Missed Commitments Project Trends



Constraints:

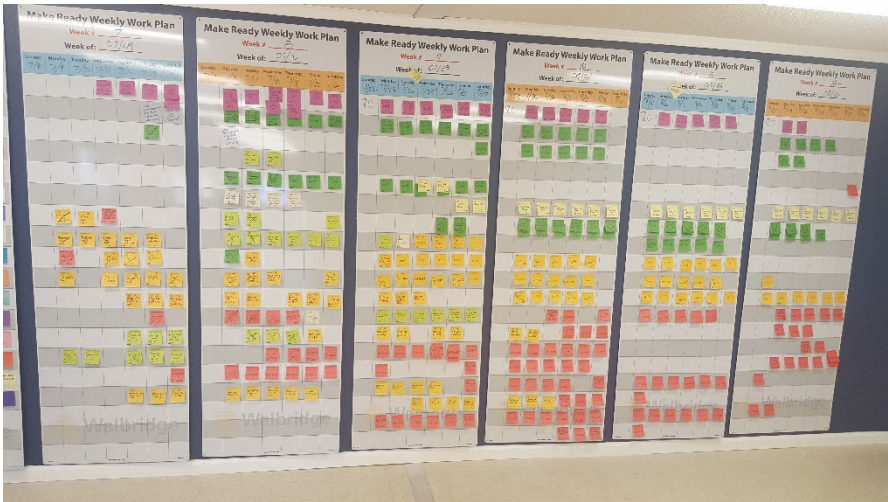
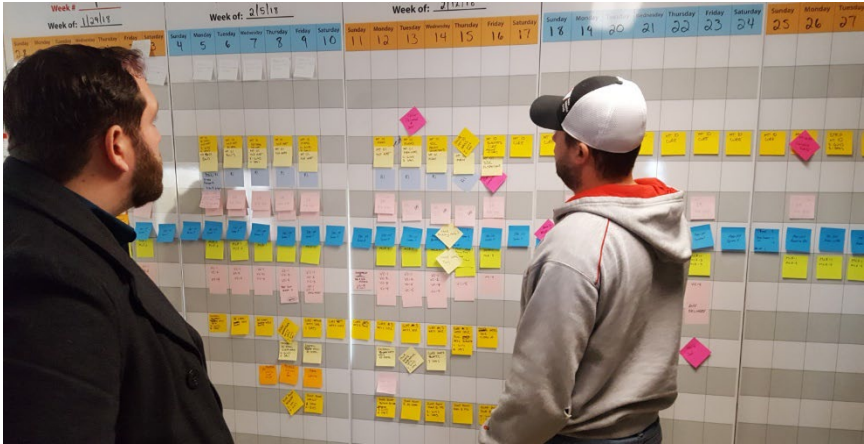
RFI 035 Duct interference @ col line E
RFI 041 Confirmation of finish elevation at gas meter.

Final equipment set to confirm Dimension for duct field fab

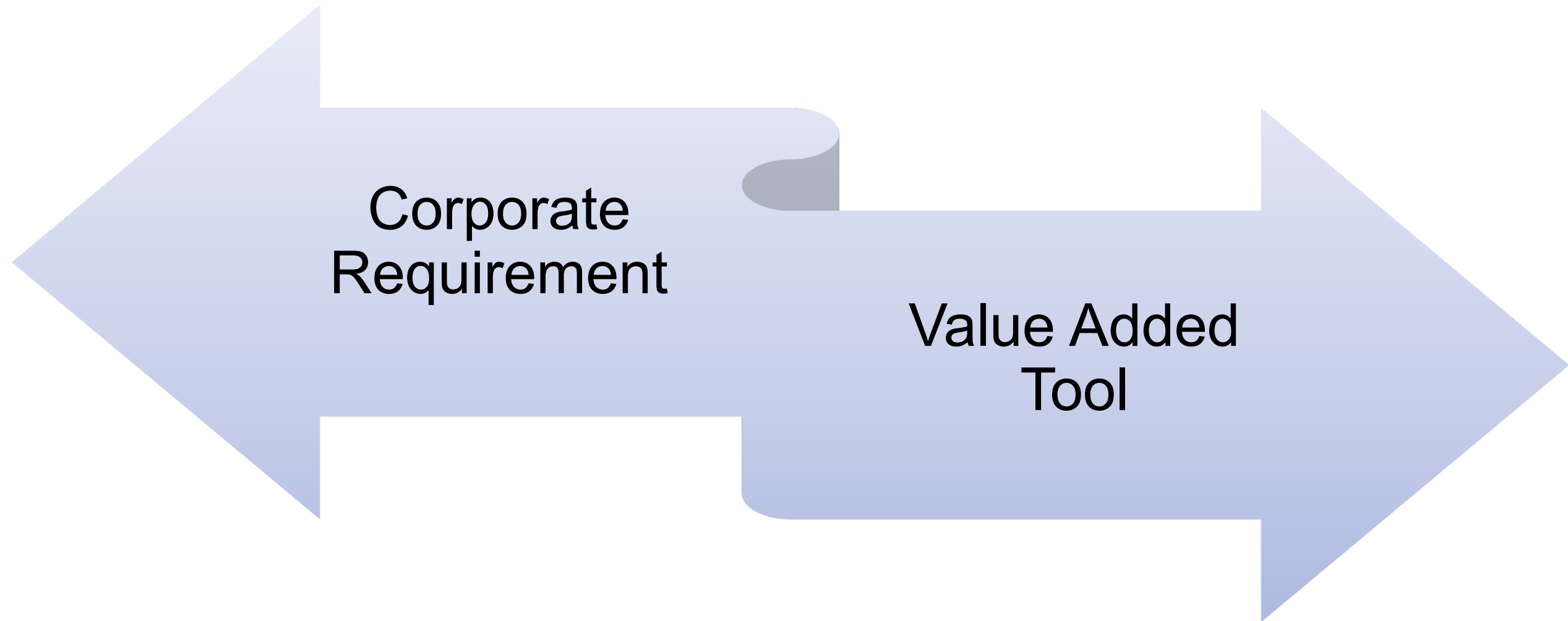
How We Started



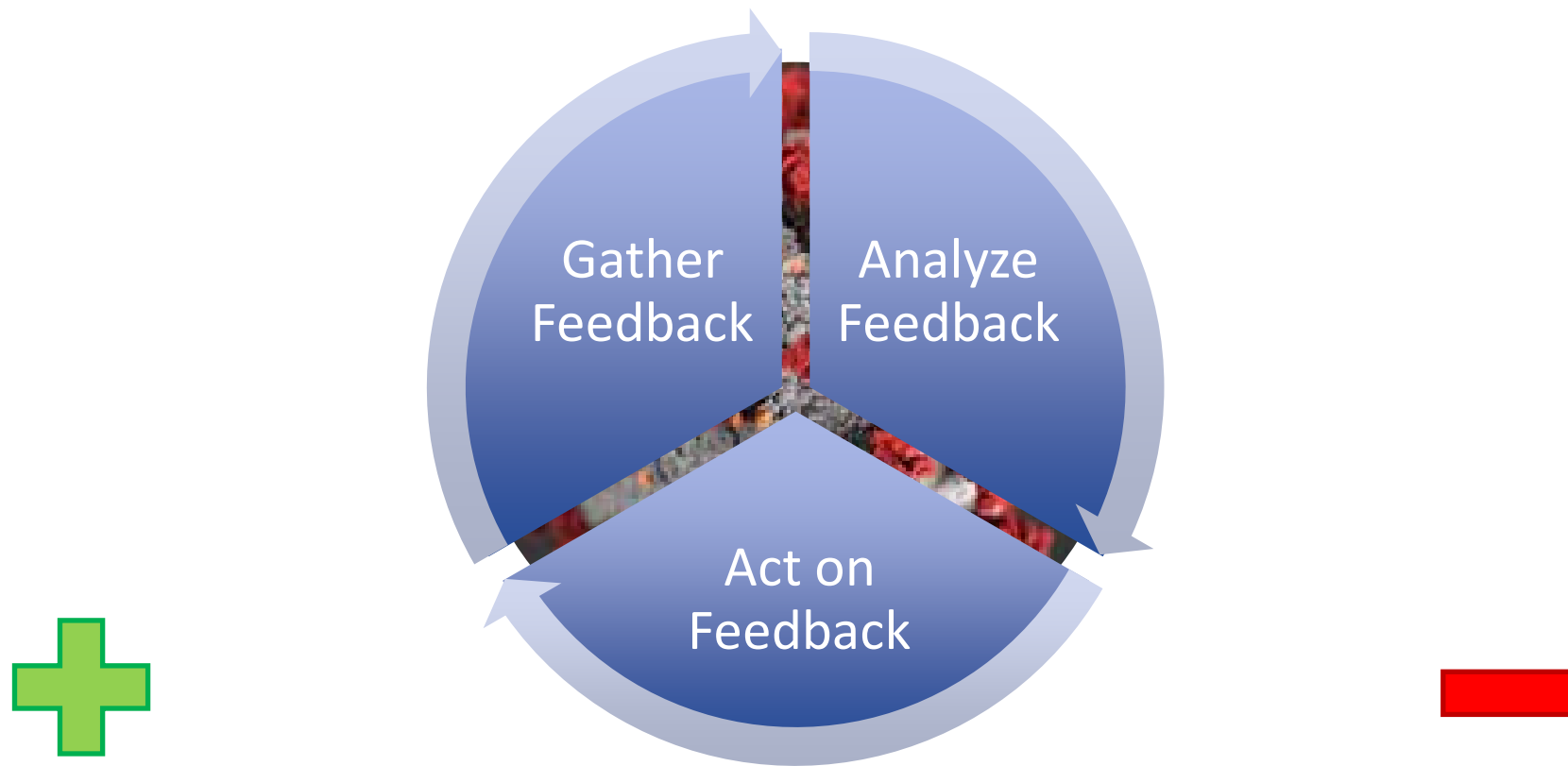
DAYS TO COMPLETE: 5	CREW SIZE:
ACTIVITY: <i>Place slab on grade</i>	
COMPANY: DIG	TASK ID:



Mixed Success



Reevaluation



Known Struggles

- Logistics
- Board Size
- Planning Limitations
- Post-its Falling



Journey Measurements & Accomplishments (Audits)

3. Weekly Work Plan meetings are being held on a weekly basis.

Yes ☒ No ☐ - Yes, but slowed due to slowed work flow and covid

5. Weekly Work Plan shows tasks extending out the appropriate number of weeks (5 Weeks).

Yes ☒ No ☐ - Due to space and the number of projects this team is only using 4 sets of board, 8 in total.

6. Each subcontractor has been assigned a color for their task notes.

Yes ☒ No ☐ - Yes, using Walbridge standard post its. Had some issues with enough colors at peak construction

10. Planned Percent Complete is being tracked and posted.

Yes ☒ No ☐ - Tracked on White Board. 100% mean subs could be challenged more

What is the current PPC of the project? 100%

13. Reasons for missed commitments are being tracked.

Yes ☒ No ☐ - Not using WA procedure, tracking through meeting minutes.

14. All necessary subcontractors are actively participating.

Yes ☒ No ☐ - Roughly 80% subcontractor participation.



Audit Findings

- Inconsistencies of Application
- Inconsistencies in Documentation
- Social Distancing Requirements
- Subcontractor Engagement



2 Reboot of Last Planner



Removing Barriers

Barrier



- ☐ Logistics
- ☐ Board Size
- ☐ Planning Limitations
- ☐ Post-its falling
- ☐ Inconsistencies of application
- ☐ Inconsistencies in documentation
- ☐ Subcontractor Engagement

Solution



- ☐ Electronic Version of LPS
- ☐ Electronic Version of LPS
- ☐ Electronic Version of LPS
- ☐ Electronic Version of LPS
- ☐ Electronic Version of LPS
- ☐ Electronic Version of LPS
- ☐ Contracts/Costs



Removing Barriers

- Last Planner software testing
- Supporting technology
- Enterprise License with Hoylu
 - Removed Cost Barriers on Project
- Introduce Contract Language
 - Remove Contractual Barriers
- Team Training



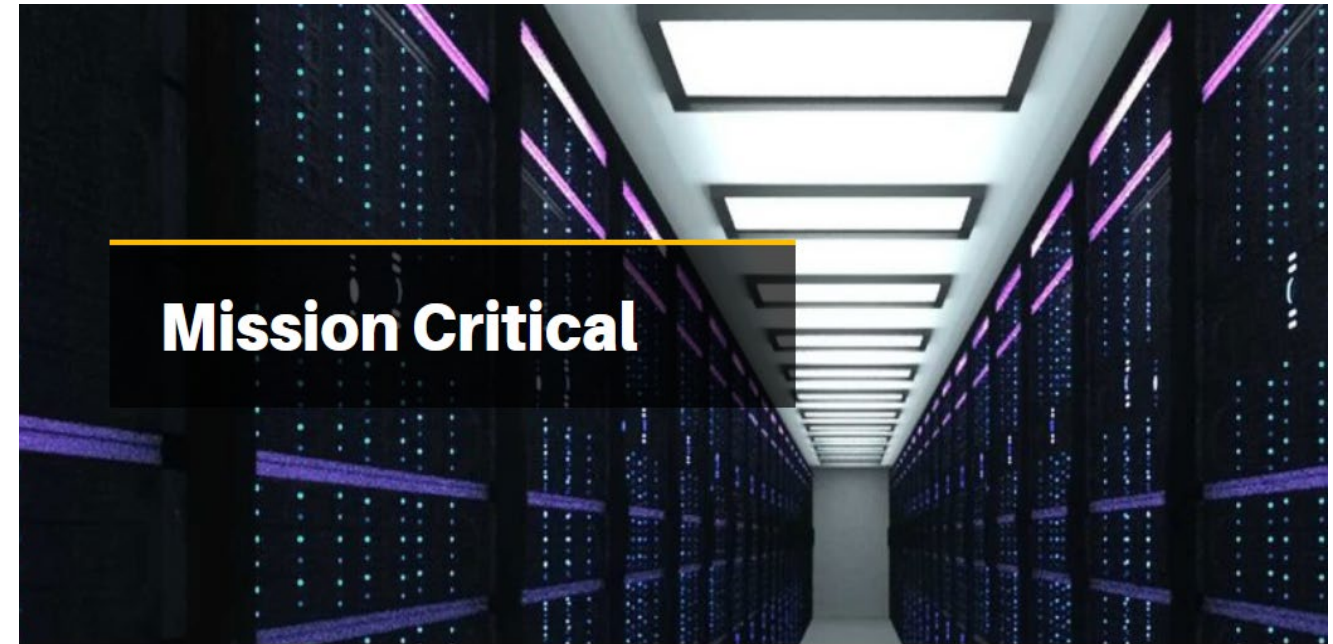
3 Implementation/Daily Use *in Action*

The Weekly Sub Coordination Meeting Then is Turned Into Daily Task Use



Overview | Success

- Recent success
 - Data Center – Virginia
 - Up to \$50,000 / day liquidated damages
- Success Metrics
 - \$0 in actual liquidated damages
 - 3 weeks ahead during slab placement
 - All major construction milestones met
- Project challenges
 - COVID
 - Location / Trade availability
 - 2 months faster than previous phase



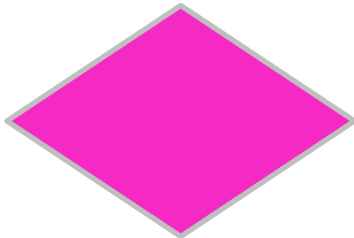
Overview | Last Planner



Meeting Flow

Weekly

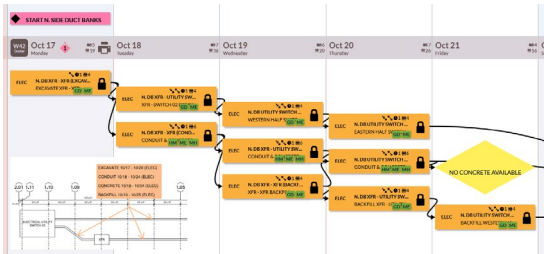
Schedule Milestones
(12 Week)



Visual Planning &
Discussion

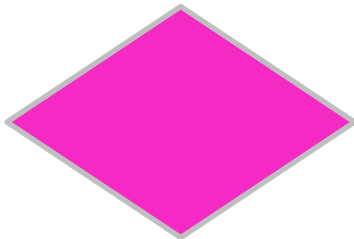


Detail Tasks
in Hoylu

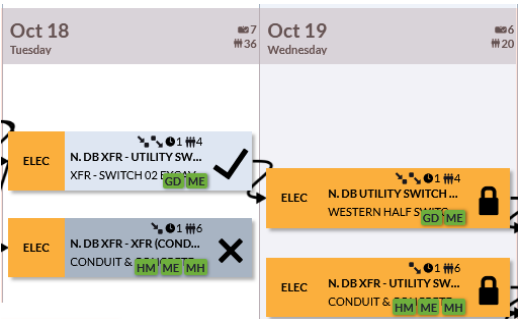


Daily

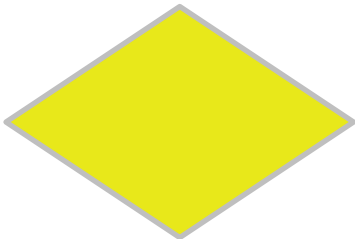
Schedule Milestones
(4 Week)



Task Review:
Current and Previous Day

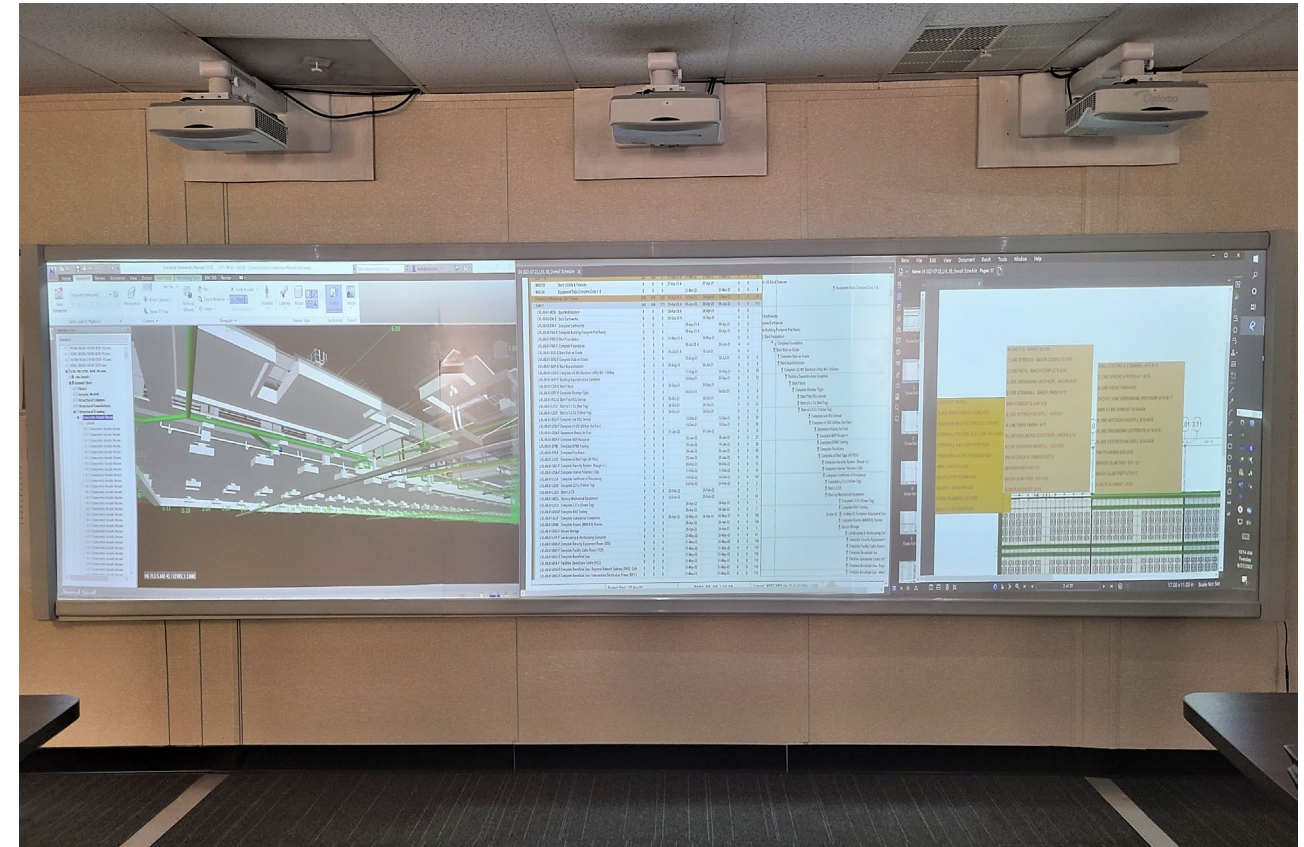


Current and
Upcoming Constraints



Weekly Meeting

- Major milestones (12 weeks)
- 4-week lookahead
- Drawings, BIM, Visual Planning
- Contractor involvement
 - Contract language
 - Visual aids
 - Lessons learned
- Benefits and disadvantages
 - Understanding potential impacts to / from other trades
 - Identify trends in Reasons for Missed Commitment (RMC)
 - Reluctancy to commit when missing commitments

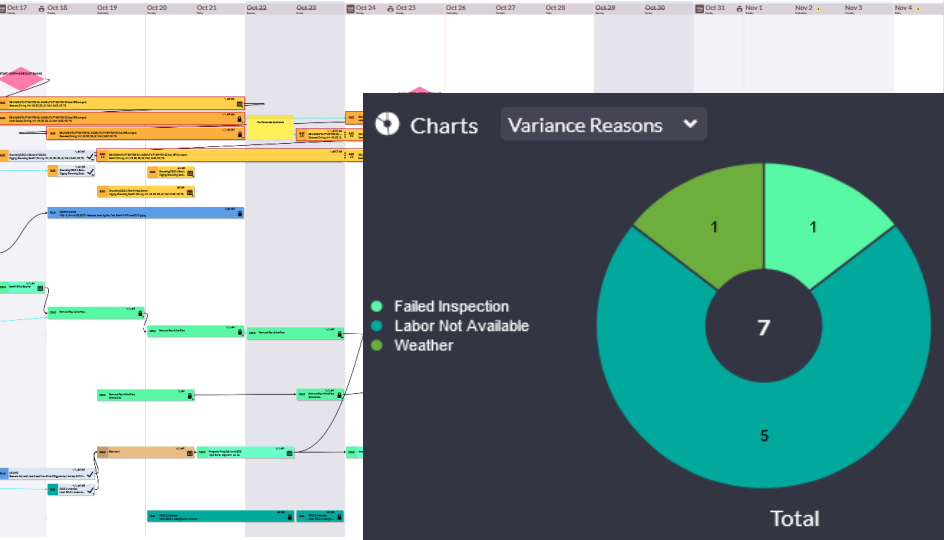


Daily Meeting

- Safety
- Critical milestones in the next 4 weeks
- Were planned tasks completed yesterday?
 - If not, why? (47% of incomplete tasks were from labor issues)
 - What are the impacts?
 - How do we recover?

- Today's tasks
- Current constraints
- Daily walks

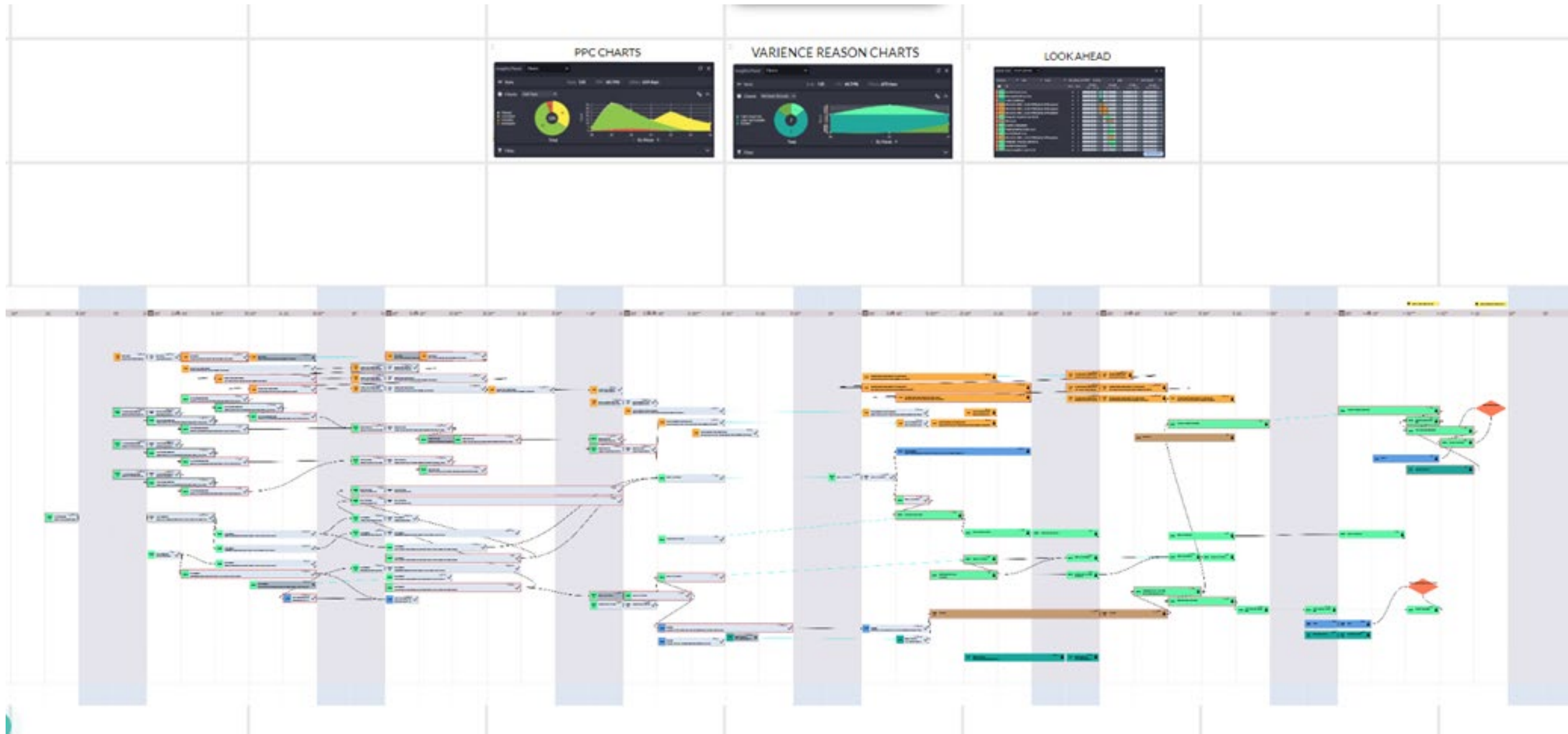
Activity ID	Activity Name	Org	Est	Rev	Start	Finish	Last M. Start	Last M. Finish	Start	Finish	Total
CMFT280	Install Priority Walls Tape and Finish Priority Rooms	5	5	5	12-Oct-21	19-Oct-21	12-Oct-21	19-Oct-21	0	0	26
CMFT280	Pull BAS Wire / Term & Device Priority Rooms	15	15	15	18-Nov-21	18-Nov-21	18-Nov-21	18-Nov-21	0	0	29
CMFT270	Pipes and Pans Priority Rooms	8	8	8	19-Oct-21	28-Oct-21	19-Oct-21	29-Oct-21	0	0	29
CMFT280	Install Gutter / Tray - FCR & SER	3	3	3	28-Oct-21	28-Oct-21	28-Oct-21	28-Oct-21	0	0	31
CMFT270	Install Telecom Equipment & Cable Tray ER 1 (Primary)	5	5	5	29-Oct-21	29-Oct-21	29-Oct-21	29-Oct-21	0	0	29
CMFT220	Set Equipment Rack - FCR & SER	2	2	2	18-Nov-21	18-Nov-21	18-Nov-21	18-Nov-21	0	0	31
CMFT220	Install Telecom Equipment & Cable Tray ER 2 (Secondary)	5	5	5	05-Nov-21	12-Nov-21	05-Nov-21	12-Nov-21	0	0	29
CMFT240	Install Light Fixture For Priority Rooms	2	2	2	05-Nov-21	05-Nov-21	05-Nov-21	05-Nov-21	0	0	31
CMFT270	Install Electrical Equipment ELEC	4	4	4	18-Nov-21	18-Nov-21	18-Nov-21	18-Nov-21	0	0	31
CMFT480	Install Non-production Tray Priority Rooms	5	5	5	15-Nov-21	15-Nov-21	15-Nov-21	15-Nov-21	0	0	60
CMFT480	Pull EPMS Wire & Term Priority Rooms	5	5	5	22-Nov-21	22-Nov-21	22-Nov-21	22-Nov-21	0	0	60
Admin/General Building											
CMFT109	Rough in OH Fire Protection Admin	11	11	11	27-Sep-21	12-Oct-21	27-Sep-21	12-Oct-21	0	0	43
CMFT110	Layout & Frame Walls Line D-G	7	7	7	27-Sep-21	08-Oct-21	27-Sep-21	08-Oct-21	0	0	16
CMFT108	Install Lighting Protection Admin	12	12	12	28-Oct-21	28-Oct-21	28-Oct-21	28-Oct-21	0	0	86
CMFT140	In-Wall Electrical Rough-In Admin	14	14	14	06-Oct-21	26-Oct-21	06-Oct-21	26-Oct-21	0	0	60
CMFT160	Layout & Frame Walls Line B-D	8	8	8	06-Oct-21	18-Oct-21	06-Oct-21	18-Oct-21	0	0	17
A27100	In-Wall Mechanical Rough-In Admin	14	14	14	06-Oct-21	26-Oct-21	06-Oct-21	26-Oct-21	0	0	10
A27101	In-Wall Plumbing Rough-In Admin	14	14	14	06-Oct-21	26-Oct-21	06-Oct-21	26-Oct-21	0	0	10
CMFT110	Install Door Frames Admin	12	12	12	25-Oct-21	25-Oct-21	25-Oct-21	25-Oct-21	0	0	10
CMFT190	Doors - Hang Admin	8	8	8	04-Nov-21	26-Oct-21	04-Nov-21	26-Oct-21	0	0	10
CMFT210	Perform In-Wall MEP Inspections Admin	1	1	1	27-Oct-21	27-Oct-21	27-Oct-21	27-Oct-21	0	0	10
CMFT220	Finishing Walls - Drywall, Tape, Finish Admin South from the above	5	5	5	27-Oct-21	04-Nov-21	28-Oct-21	04-Nov-21	0	0	10
CMFT240	Install Dock Levelers, Curbouts, Vehicle Restraints, Seals Admin	10	10	10	27-Oct-21	19-Nov-21	28-Oct-21	19-Nov-21	0	0	26
CMFT241	Finishing Walls - Drywall, Tape, Finish Admin North from the above	5	5	5	04-Nov-21	04-Nov-21	04-Nov-21	04-Nov-21	0	0	16
CMFT280	Install Plywood Wall Protection Admin	5	5	5	04-Nov-21	05-Nov-21	05-Nov-21	05-Nov-21	0	0	10
CMFT280	Rough in Fire Alarm Admin	10	10	10	05-Nov-21	05-Nov-21	05-Nov-21	05-Nov-21	0	0	40
CMFT242	Walls Painting Admin North from above 10 Ft	4	4	4	05-Nov-21	15-Nov-21	10-Nov-21	15-Nov-21	0	0	16
CMFT242	Finishing Walls - Drywall, Tape, Finish Admin South from Below 1	5	5	5	18-Nov-21	17-Nov-21	18-Nov-21	17-Nov-21	0	0	38
CMFT280	Install OH Doors Admin	5	5	5	18-Nov-21	17-Nov-21	17-Nov-21	17-Nov-21	0	0	28
CMFT280	Walls Painting Admin South from above 10 Ft	5	5	5	15-Nov-21	15-Nov-21	15-Nov-21	15-Nov-21	0	0	10
CMFT220	Perform Electrical Gear Connections Admin	14	14	14	18-Nov-21	07-Dec-21	15-Nov-21	07-Dec-21	0	0	31
CMFT220	Rough in OH Ductwork Admin North	12	12	12	15-Nov-21	02-Dec-21	16-Nov-21	02-Dec-21	0	0	16
CMFT244	Walls Painting Admin South from below 10 Ft	4	4	4	17-Nov-21	23-Nov-21	16-Nov-21	23-Nov-21	0	0	42
CMFT240	Finishing Walls - Drywall, Tape, Finish Admin North from Below 1	4	4	4	18-Nov-21	23-Nov-21	16-Nov-21	23-Nov-21	0	0	38
CMFT280	Pull Fire Alarm Cabling Admin	12	12	12	07-Dec-21	07-Dec-21	19-Nov-21	07-Dec-21	0	0	40
CMFT410	Place Plywood Wall Protection - Paint Admin	10	10	10	22-Nov-21	23-Nov-21	23-Nov-21	06-Dec-21	0	0	26
CMFT420	Install EPMS Equipment Admin	4	4	4	22-Nov-21	23-Nov-21	23-Nov-21	23-Nov-21	0	0	41
CMFT420	Install Security Equipment Admin	4	4	4	22-Nov-21	23-Nov-21	23-Nov-21	23-Nov-21	0	0	40
CMFT440	Install Door Hardware Admin	4	4	4	22-Nov-21	22-Nov-21	22-Nov-21	26-Nov-21	0	0	29
CMFT441	Rough in OH Ductwork Admin South	14	14	14	22-Nov-21	22-Nov-21	22-Nov-21	19-Dec-21	0	0	10
A27100	Install BAS Equipment Admin	4	4	4	22-Nov-21	22-Nov-21	22-Nov-21	20-Nov-21	0	0	41
CMFT442	Walls Painting Admin North from the below 10 Ft	4	4	4	23-Nov-21	30-Nov-21	24-Nov-21	30-Nov-21	0	0	38
CMFT470	Install Signage Admin	10	10	10	25-Nov-21	19-Dec-21	25-Nov-21	19-Dec-21	0	0	51
CMFT480	Install ERP in Restrooms / Jan. Closet Admin	5	5	5	18-Nov-21	06-Dec-21	25-Nov-21	06-Dec-21	0	0	29
CMFT480	Install EPMS Tray, Wiring, Devices Admin	20	20	20	25-Nov-21	27-Dec-21	29-Nov-21	27-Dec-21	0	0	41
A27110	Install BAS Tray, Wiring, Devices Admin	20	20	20	25-Nov-21	27-Dec-21	29-Nov-21	27-Dec-21	0	0	41
CMFT170	Install Cabling Admin	12	12	12	22-Dec-21	20-Dec-21	03-Dec-21	20-Dec-21	0	0	18
CMFT443	Install Security & Telecom Tray North	8	8	8	02-Dec-21	14-Dec-21	03-Dec-21	14-Dec-21	0	0	18



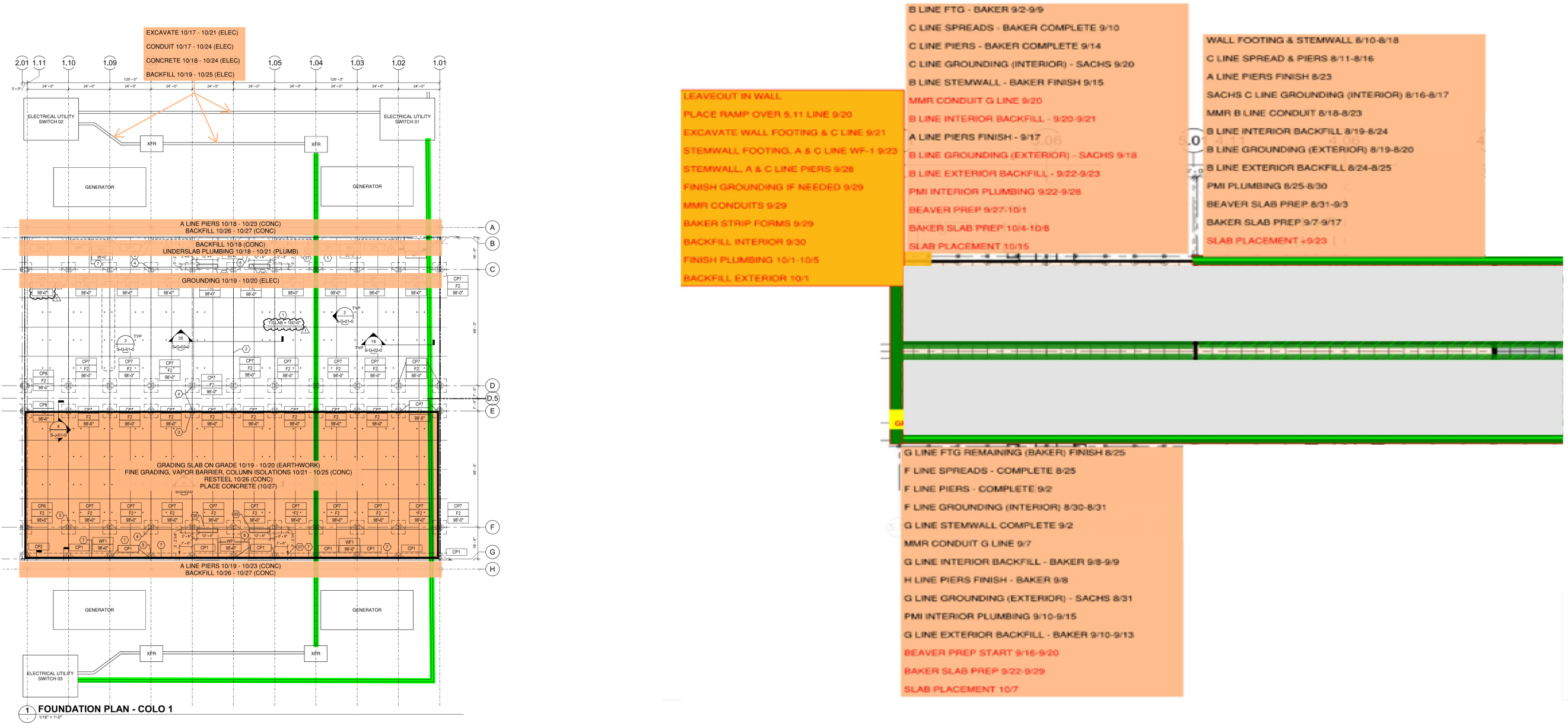
4 Tutorial

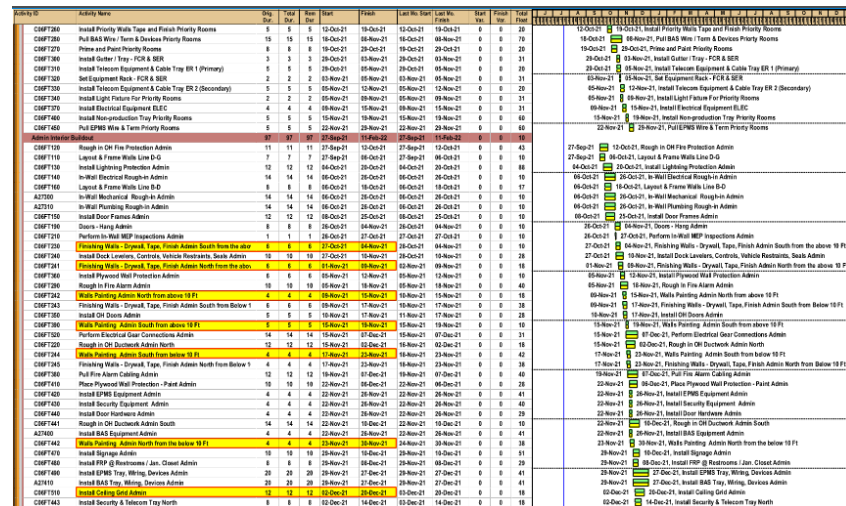


Hoylu Workspace



Visual Planning



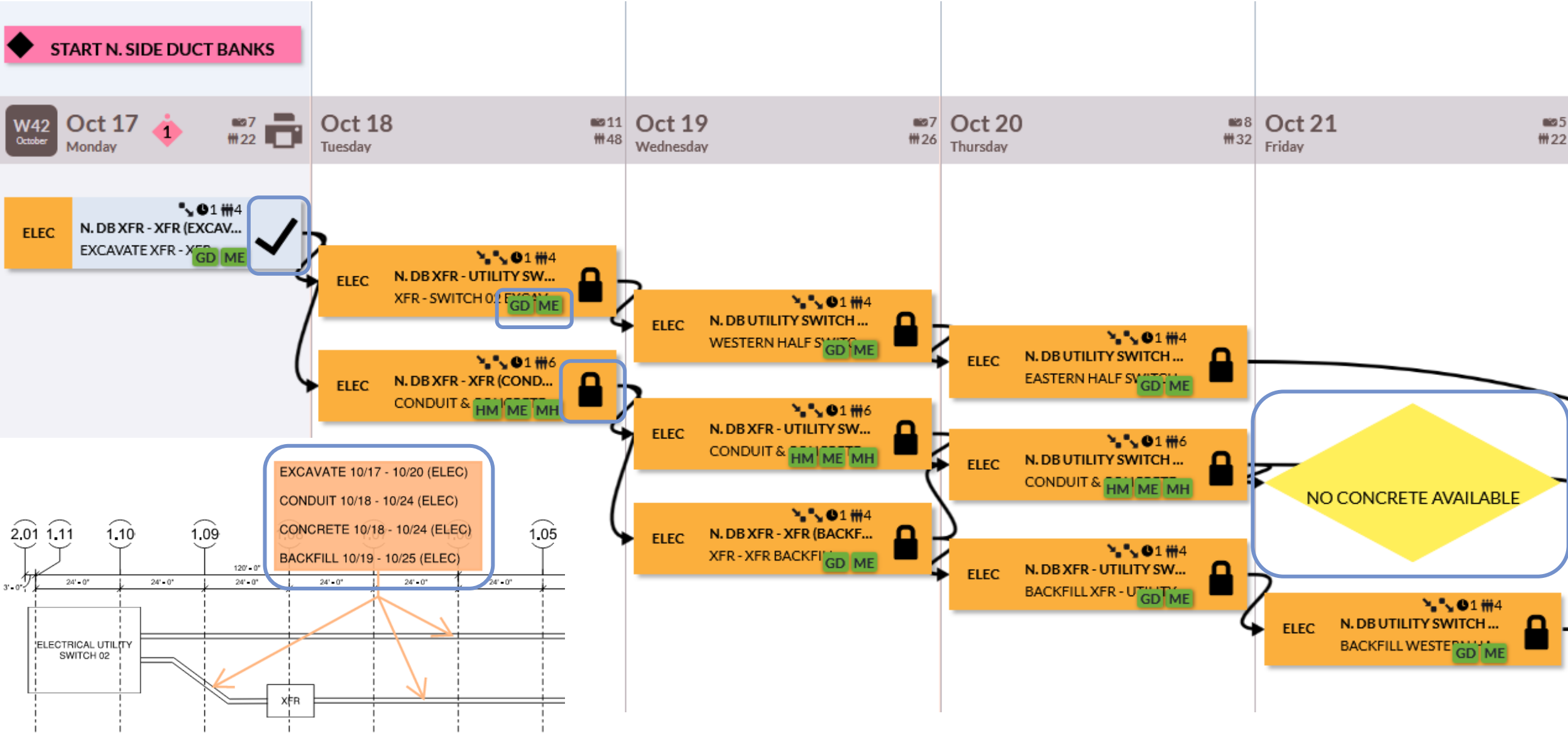


Committing to Work

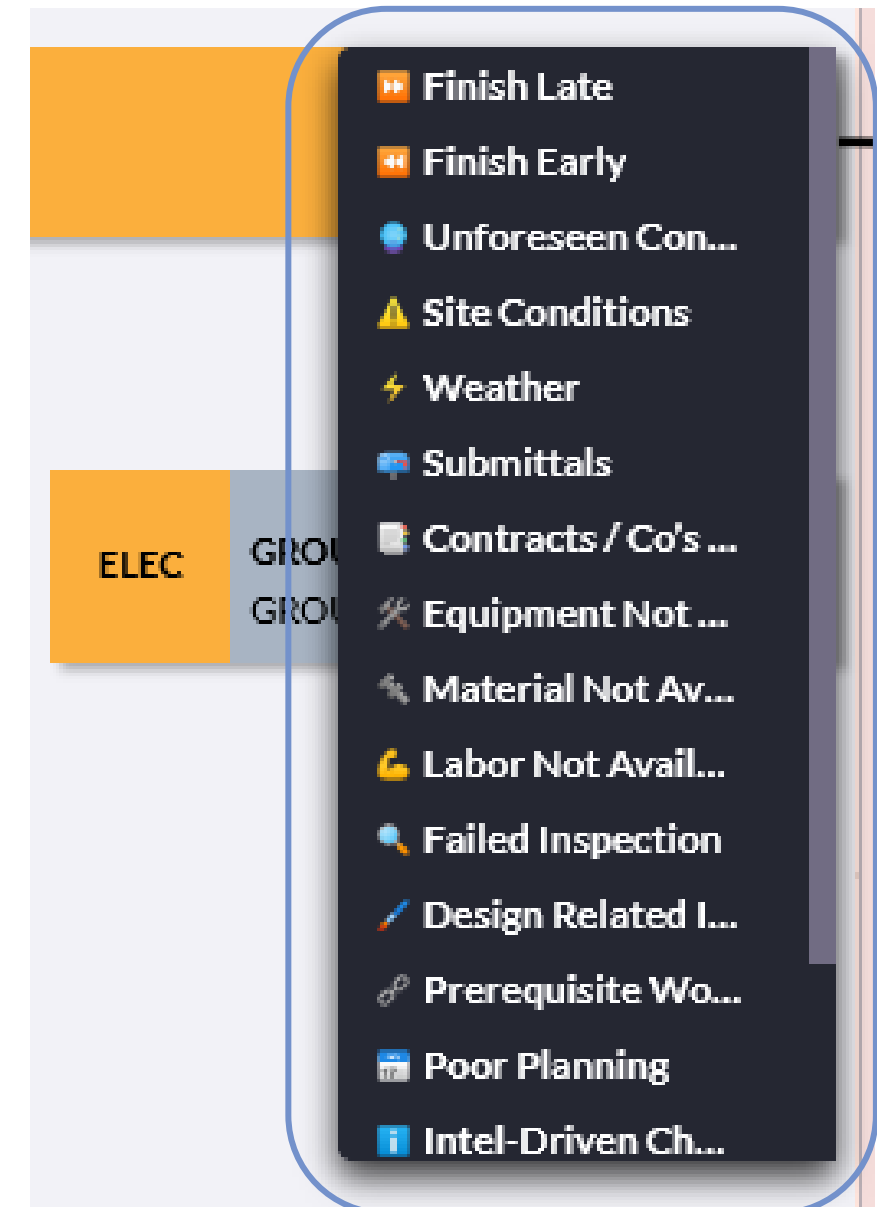
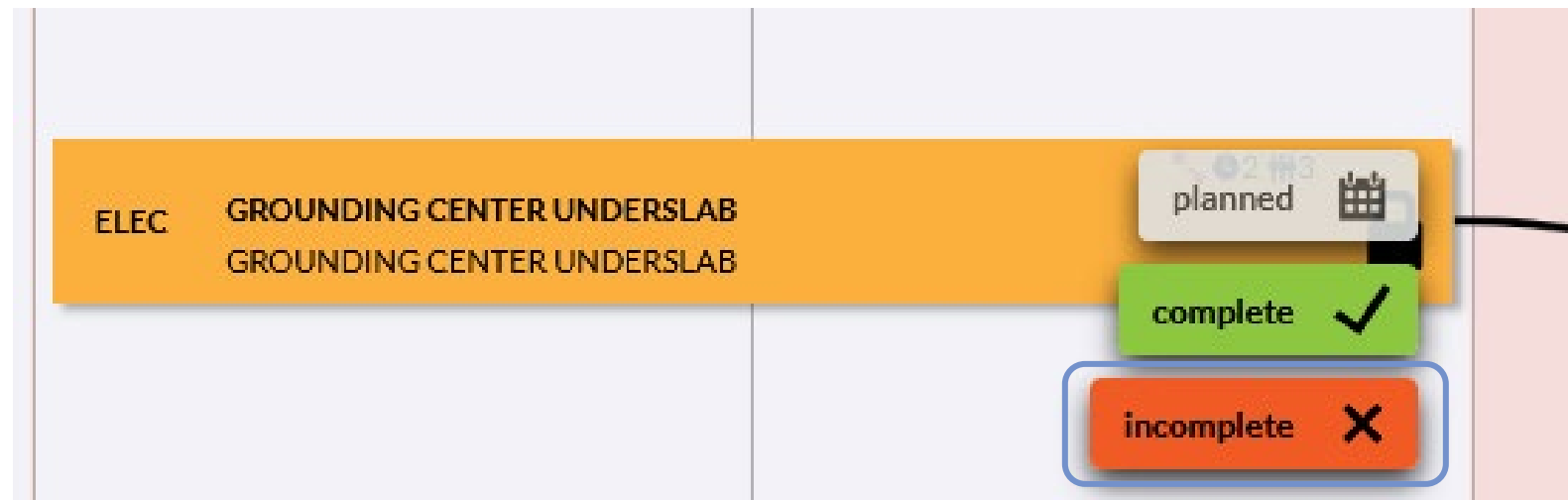
Contractor enters activities which are then reviewed and locked in.



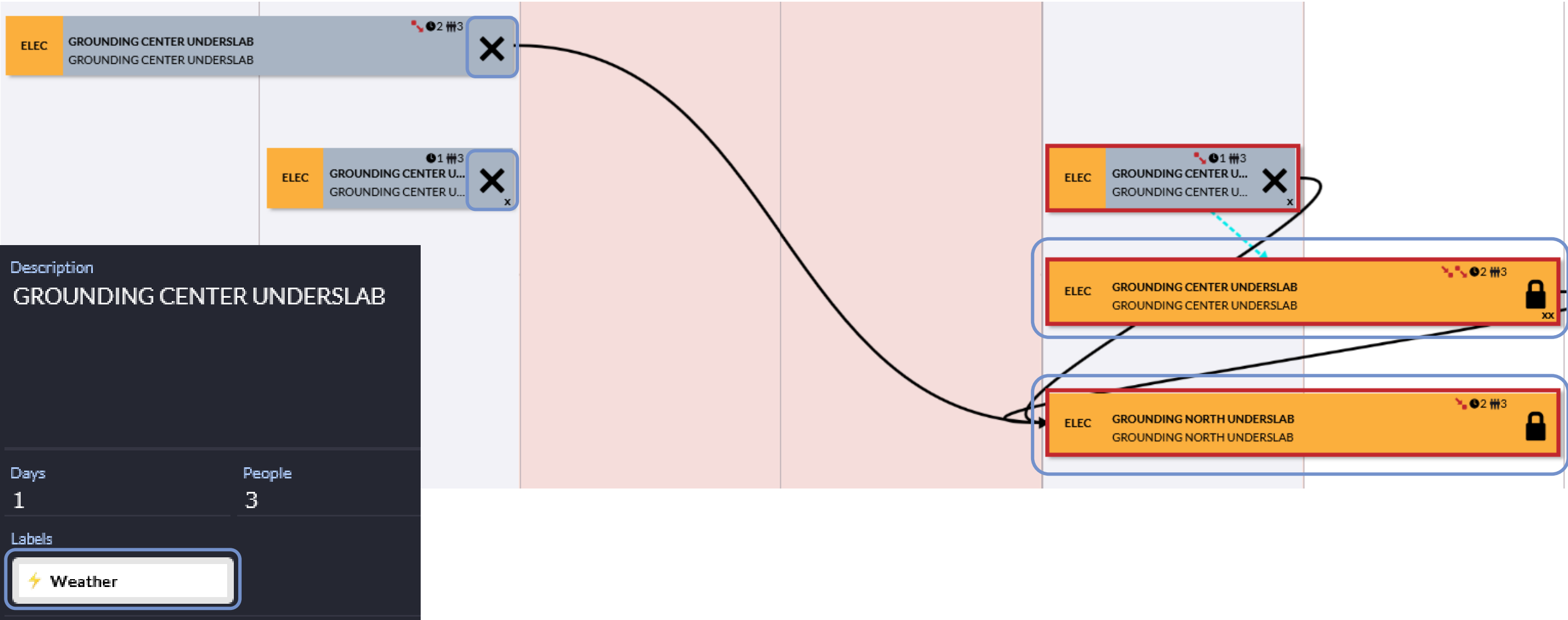
Commitments, and Constraints



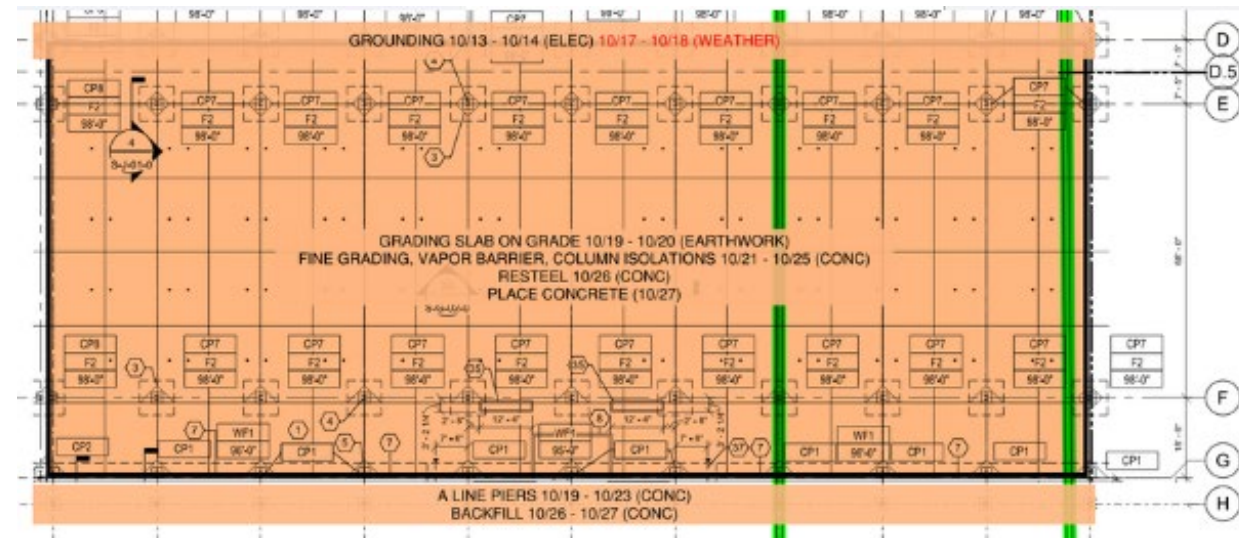
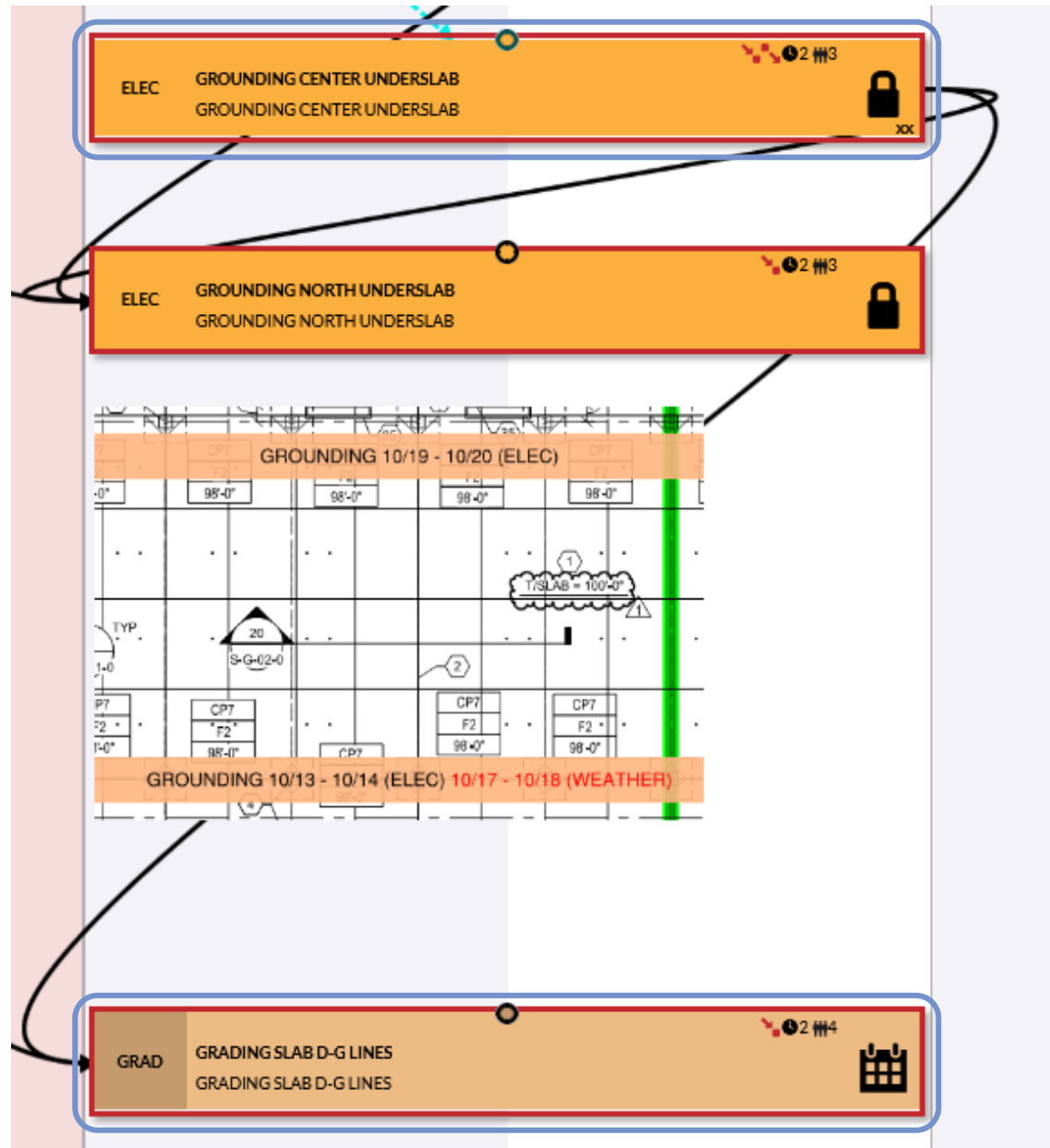
Variance: Reasons for Missed Commitment (RMC)



Delayed Work = Overlapping Activities



Overlapping Activities = Shifting & Recovery



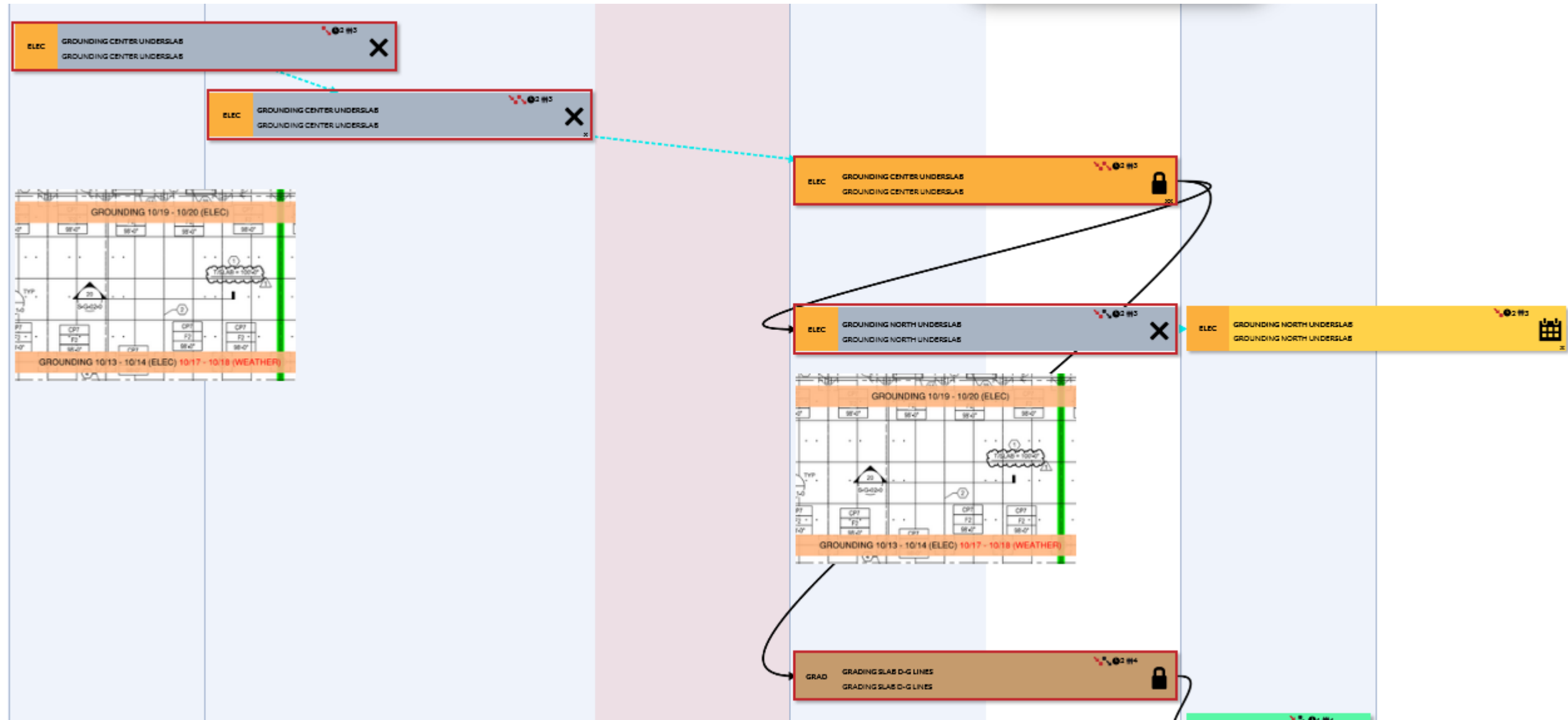
Problem: Grounding before grading for slab.

Questions:

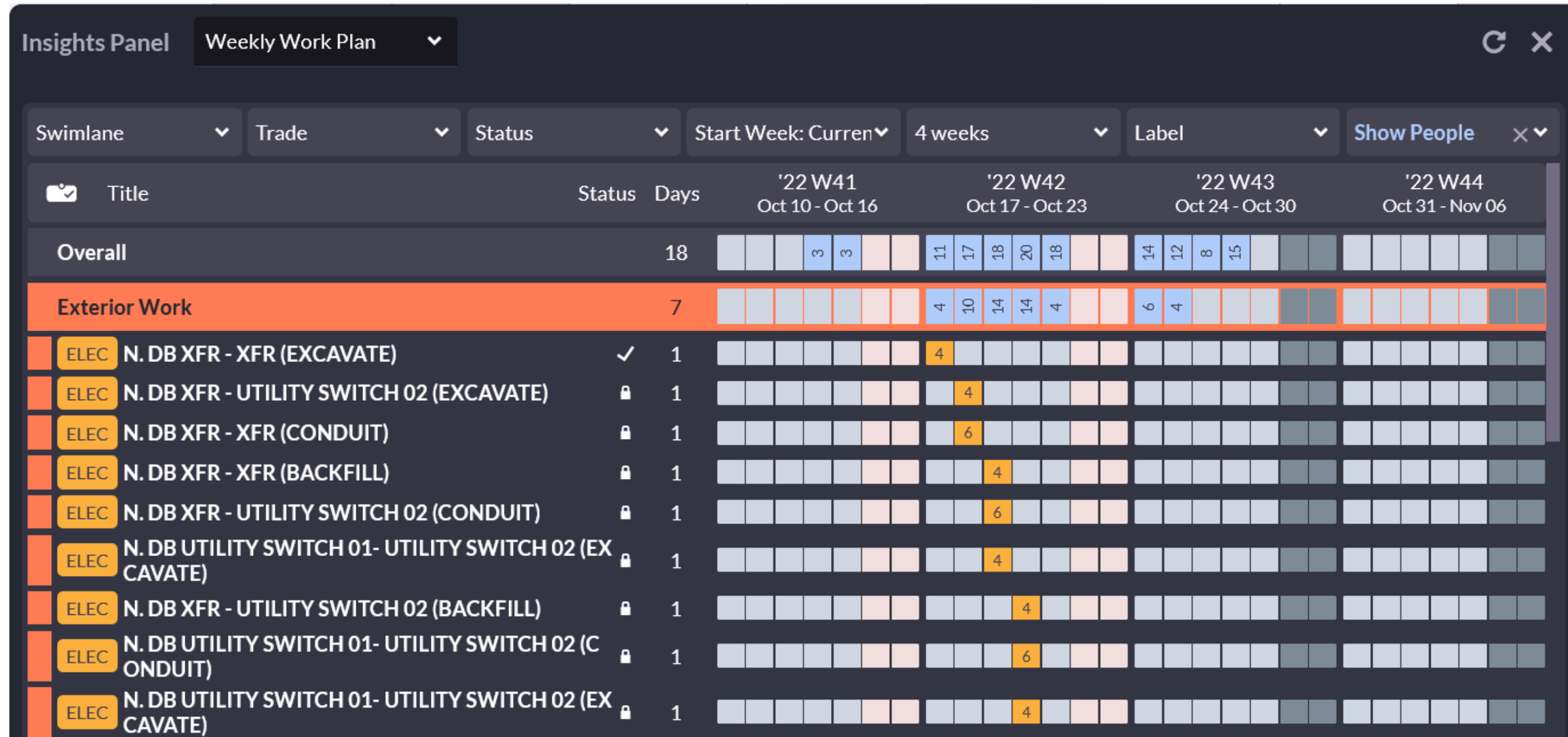
- 1.) Can grading and grounding happen at same time?
- 2.) What can be done to speed up grading or following activities?
- 3.) Is grounding of the north side in the critical path?

Note: Questions will vary depending on RMC

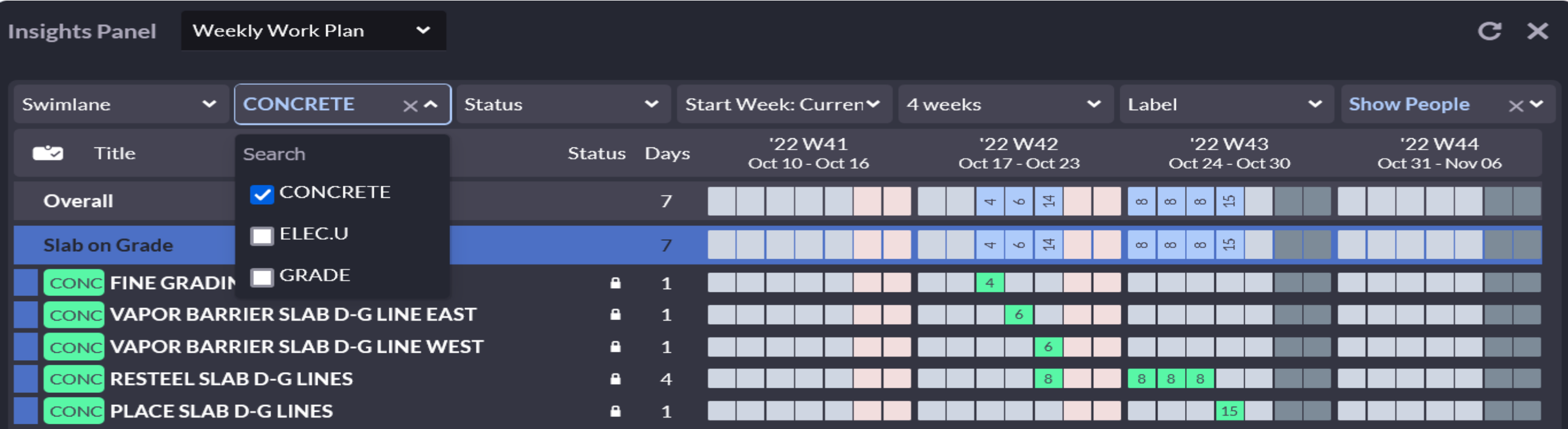
End Result = Shifting & Stacking



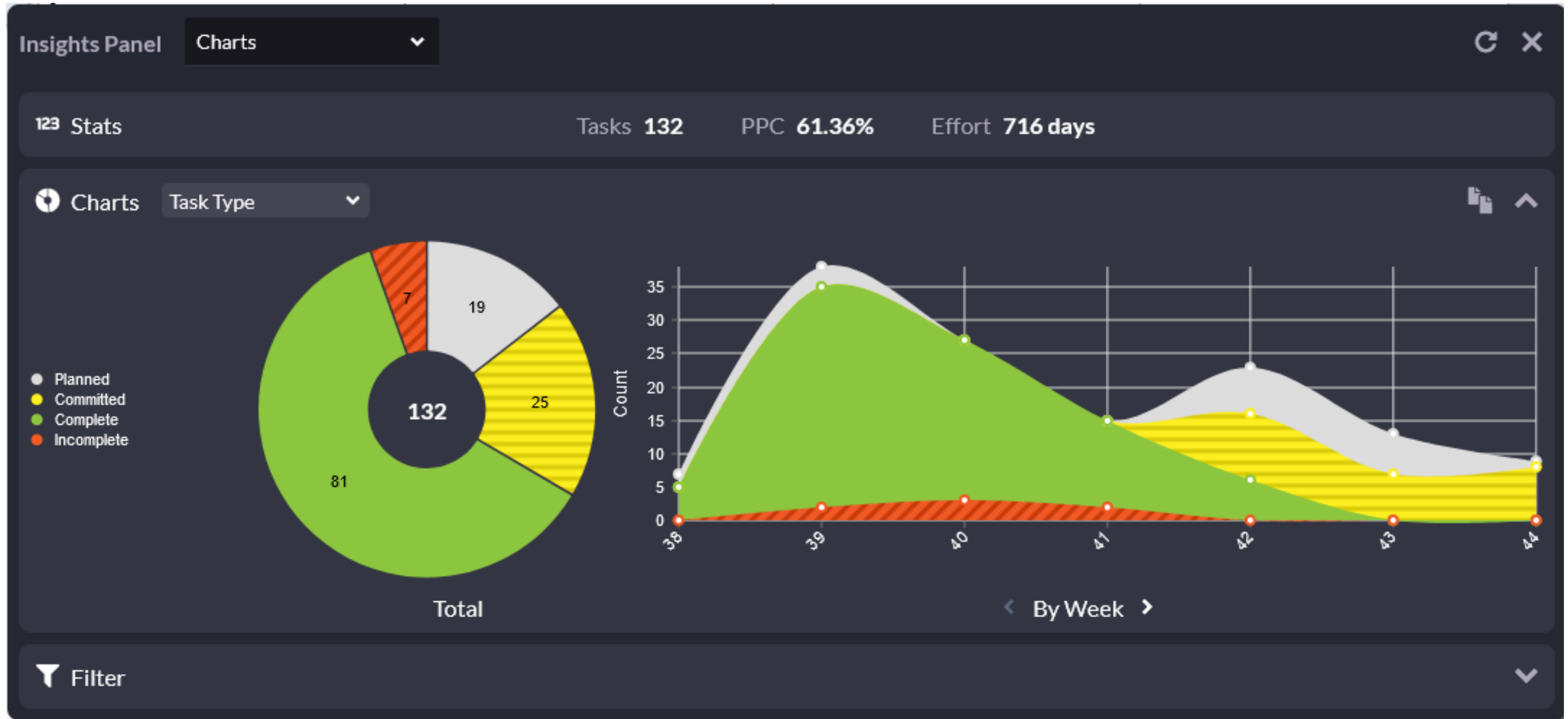
Weekly Work Plan / Trade Stacking



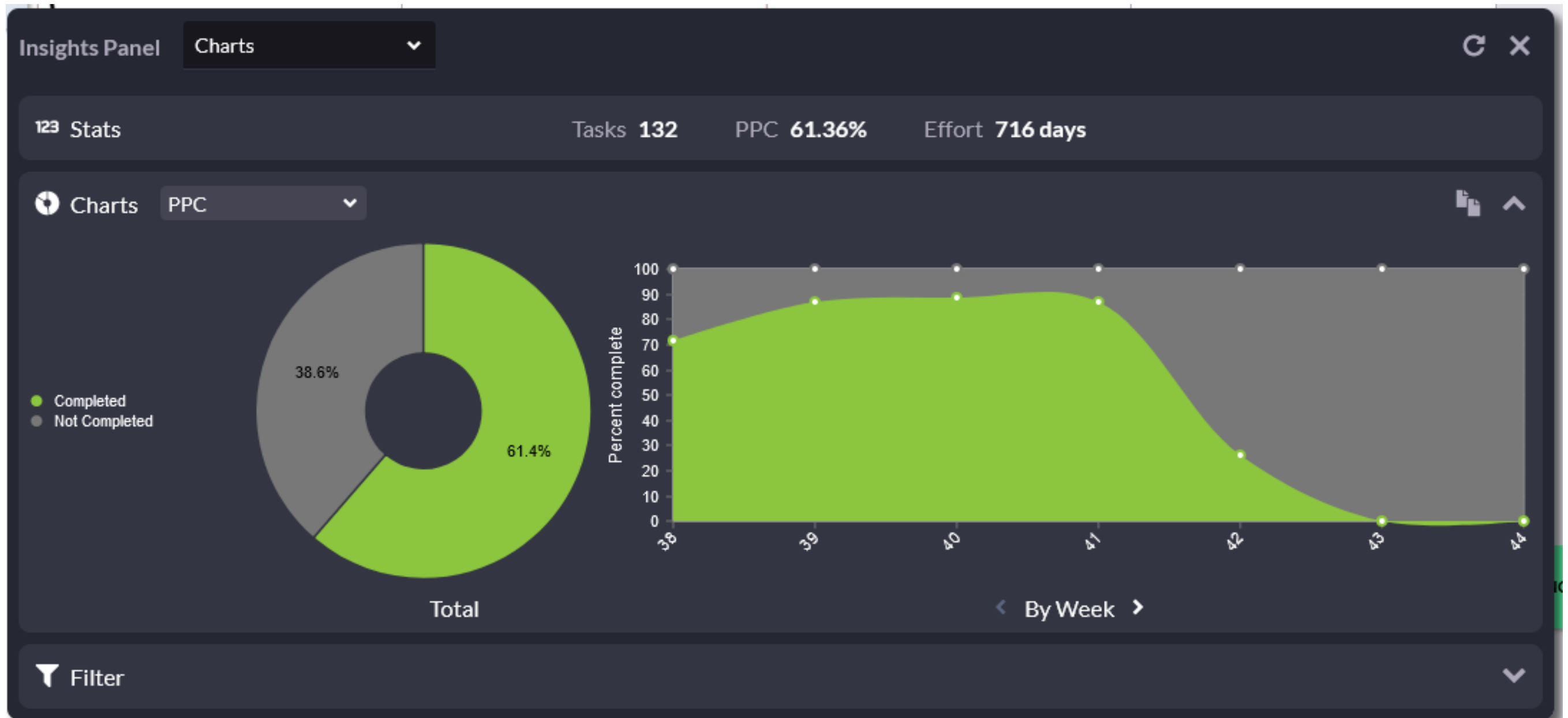
Filters



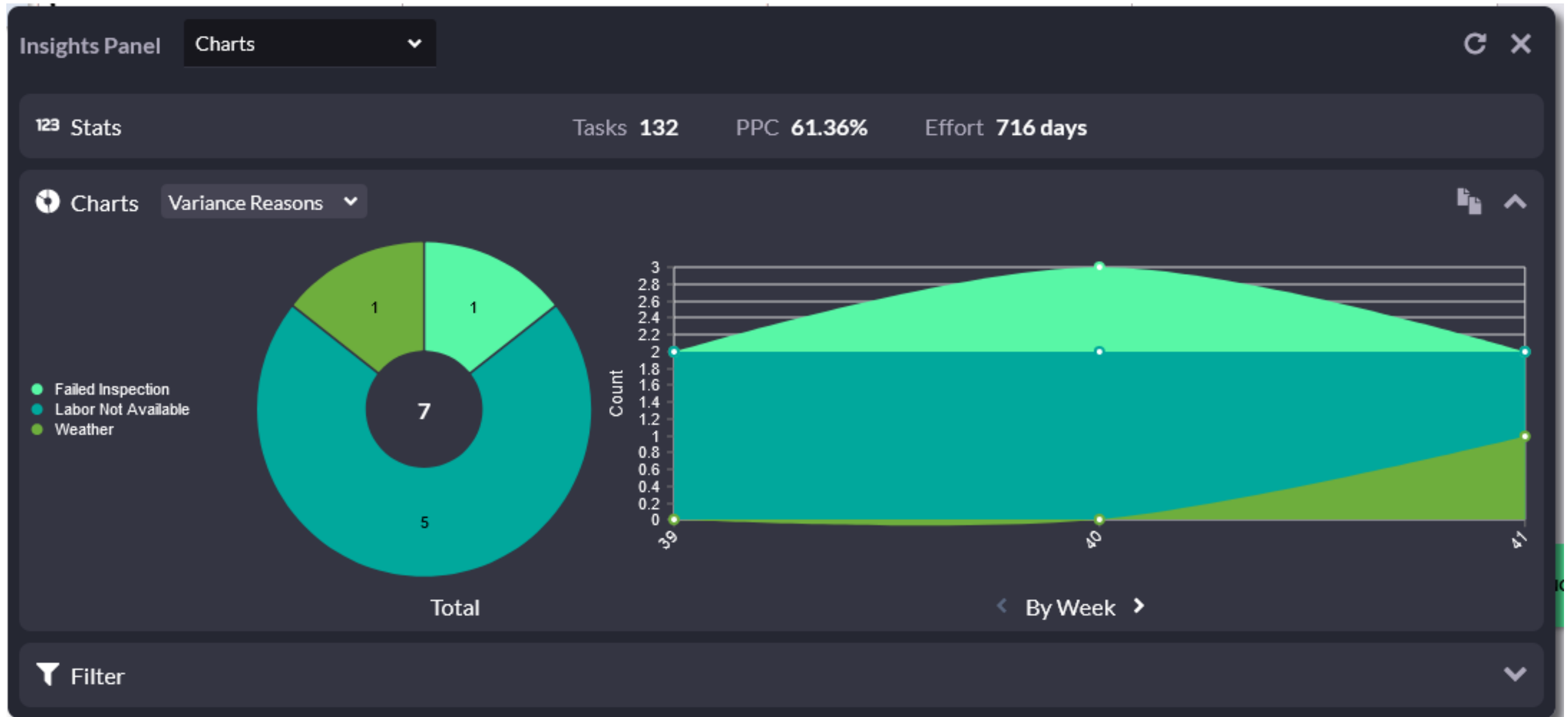
Charts and Trends - Tasks



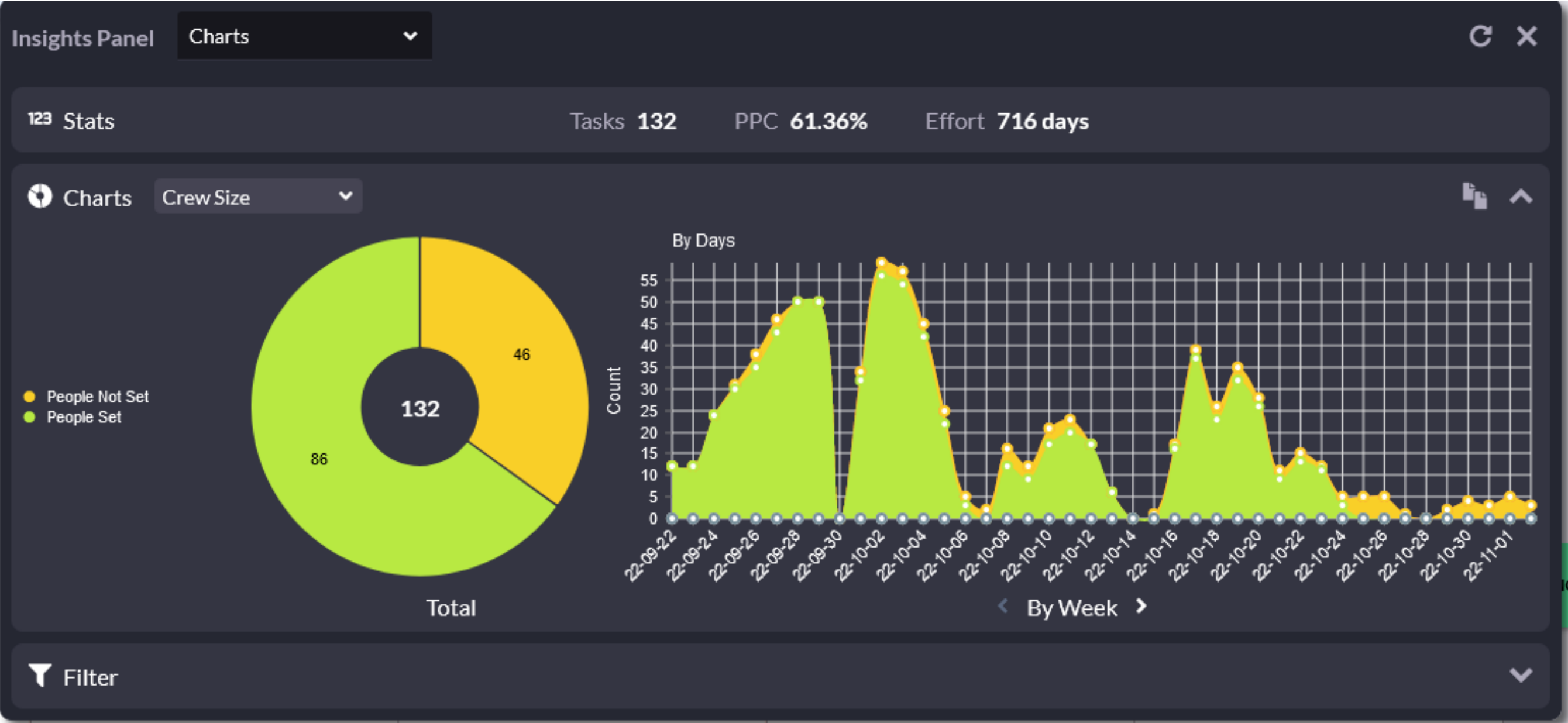
Charts and Trends – Planned Percent Complete



Charts and Trends – Reason for Missed Commitment



Charts and Trends – Crew Sizes

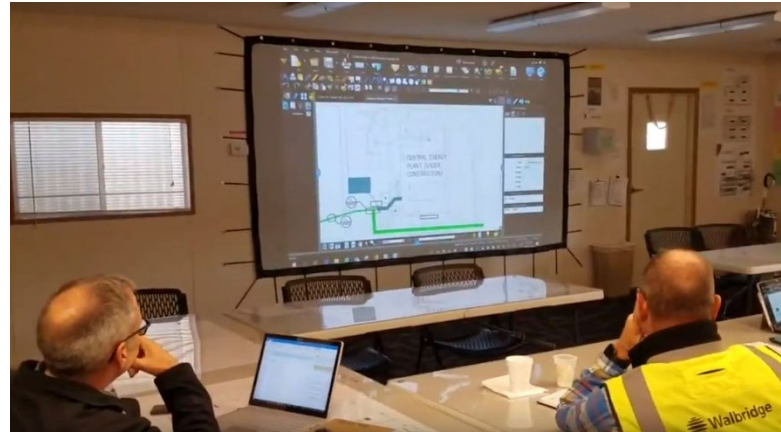


5 Technology & Start up Tips

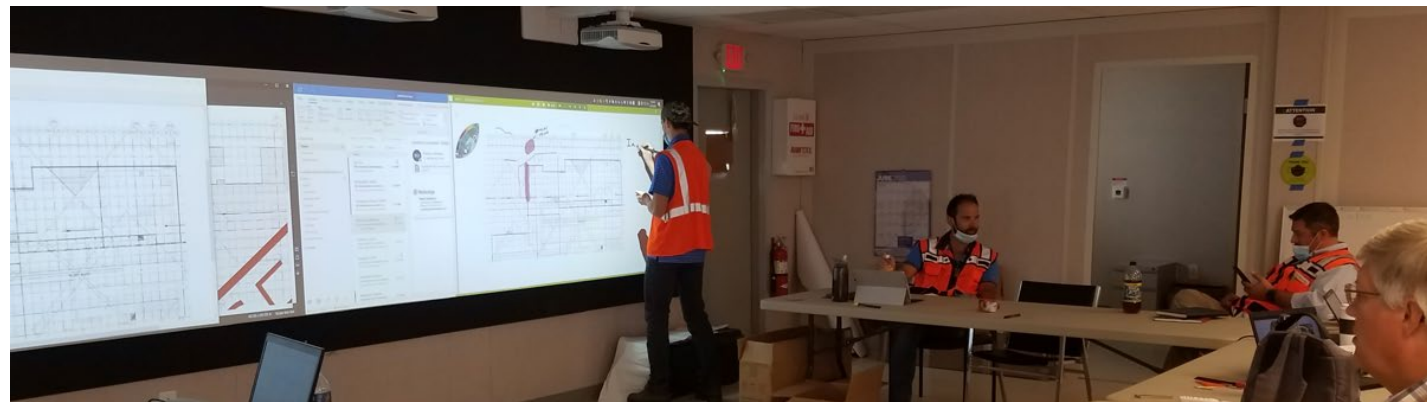
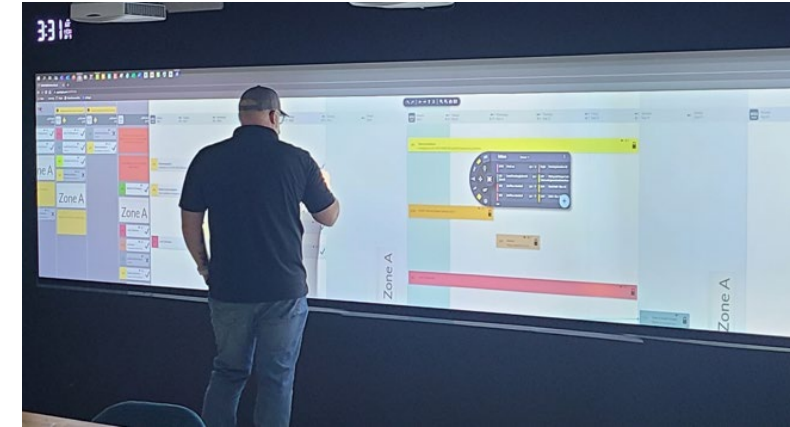


Technology Tips

Good: Large screen, so people can see

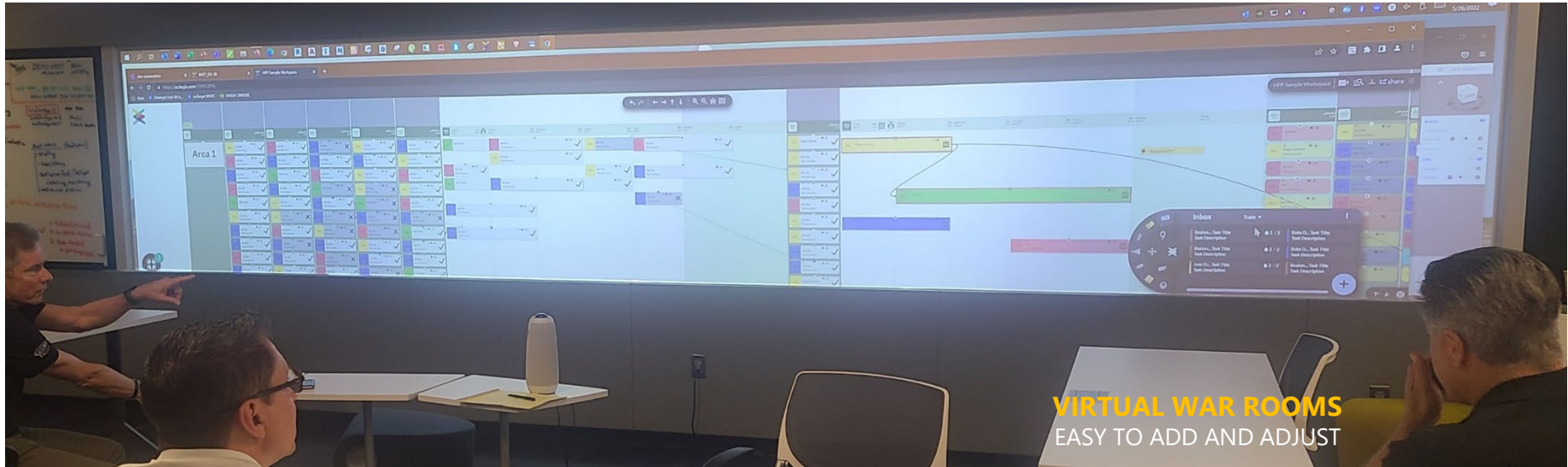


Better: Collaborative wall, easy to adjust



Best: Trade involvement; Well run, efficient

Technology Tips



3
PROGRAMS

5M+
Square Feet

Lessons Learned
& Shared Savings

HOYLU
multi-site
collaboration tool



Walbridge | Start-Up Tips

2-3 Weeks Prior to Last Planner Meeting

Secure a Space

WIFI Availability

Technology Works

Appetizers/Coffee

Calendar Invites to the Right People

Update Schedules and Visual Plans

1 Week Prior to Last Planner Meeting

Team Member Logins

Team Member Training

Add Basic Organization Within the
Software

Add Milestones Within the Software

Add Visual Plans Within the Software



Walbridge | Start-Up Tips

Day of Last Planner Meeting

Test Technology

Have a Subject Matter Expert on Hand

Appetizers/Coffee

Last Planner Meeting Sample Agenda

0800-0820 Logins

0820-0830 Introductions, Express Project Commitment for LPS

0830-0930 Train Subcontractor on the Software

0930-1015 Sub Break Out Sessions

1015-1030 Break

1030-1130 1st Coordination Meeting – Make Commitments

1130-1200 Communicate Expectations Moving Forward – Schedule Future Meetings



Conclusions From a Scheduler Perspective

Communication is the hardest part of scheduling

- Difficult content
- Diversity understanding
- Schedule simplification is key

Last Planner forces schedule communication

- Active participation increases schedule buy-in
- Collaborative resolution of problems
- Virtual Big rooms
- Constraints identified and documented

Key to success

- Remove all barriers. i.e., IT, contracts, costs
- Stay diligent and do not lose momentum
- Bad news early



Questions?

Thank you!

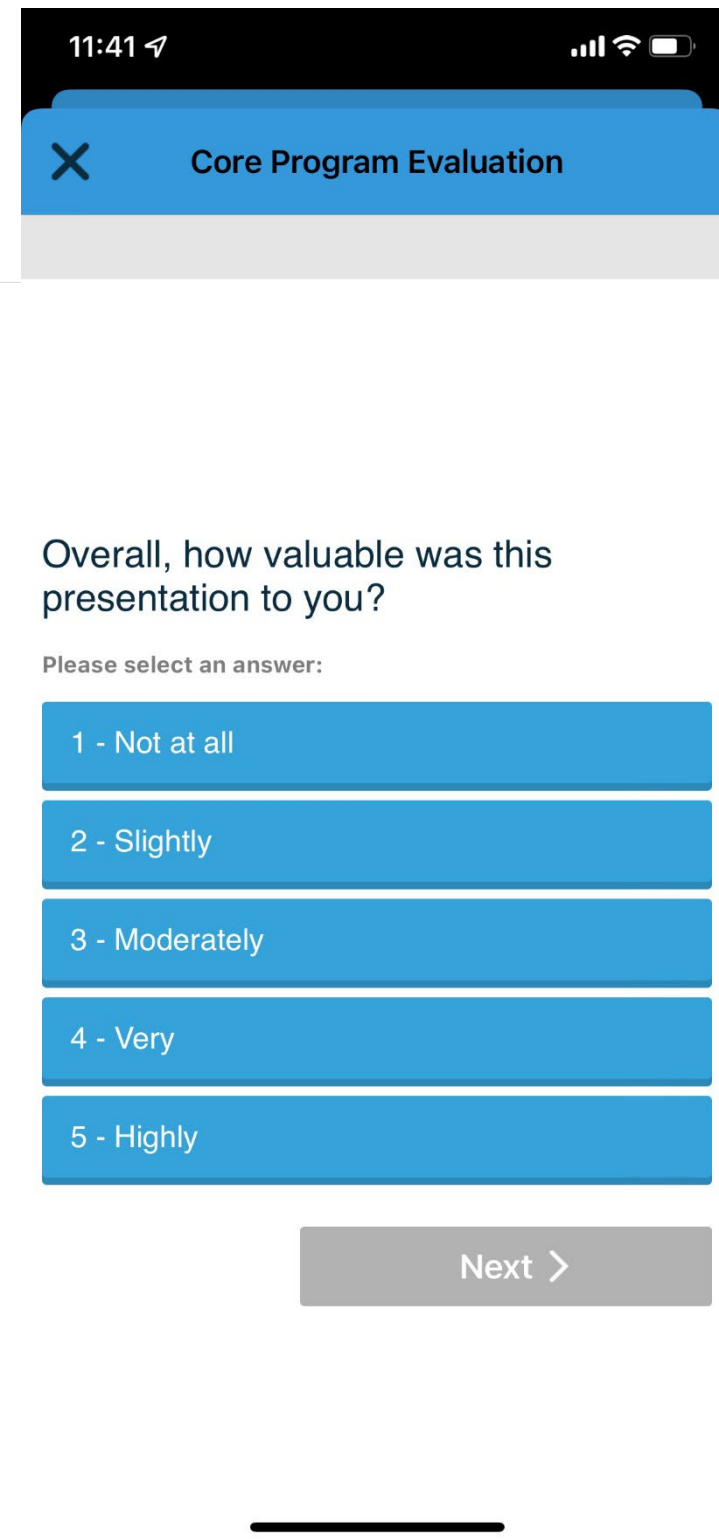
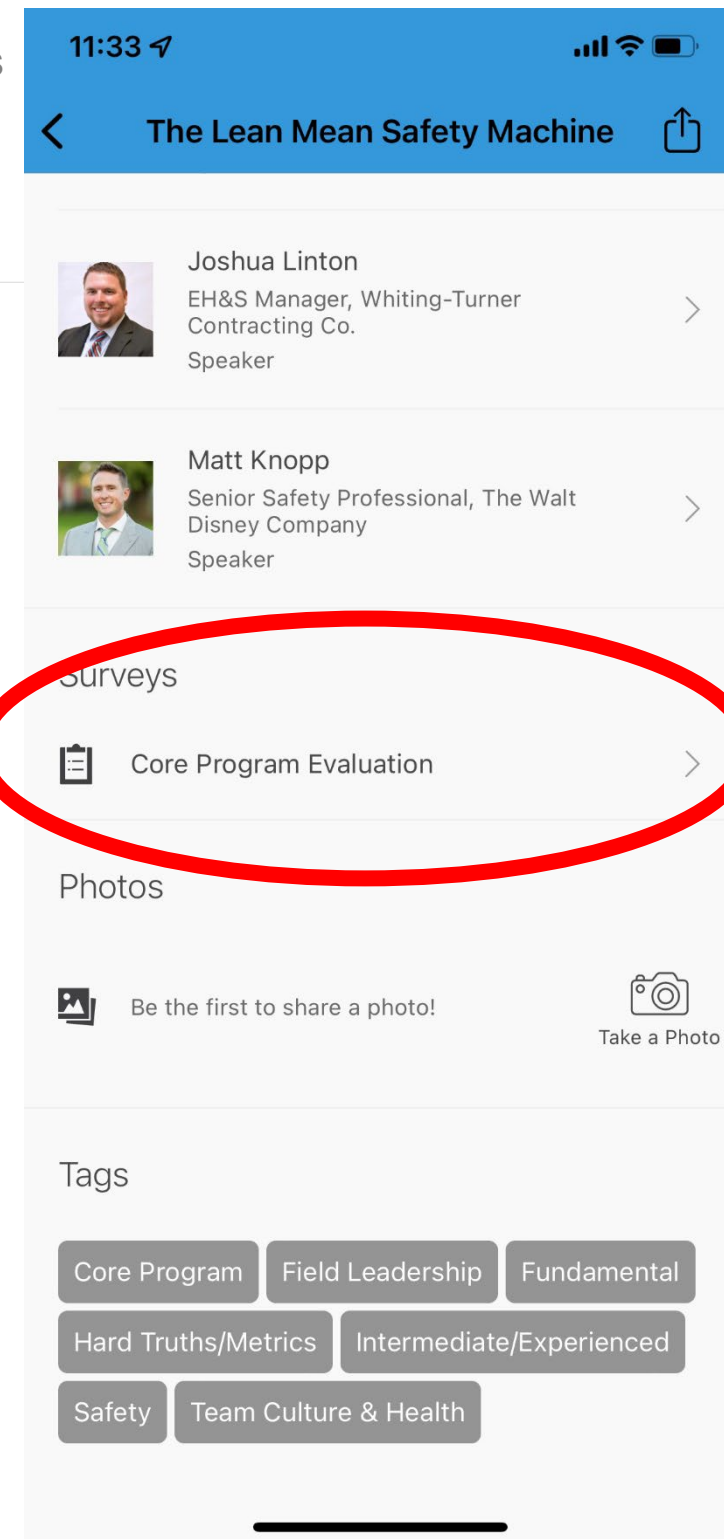


Rate Presentations in the App

Continuous improvement: give presenters your feedback by taking the session evaluation!

1. Find the session under “schedule”
2. Click on it then scroll down
3. Click “core program evaluation”
4. Complete the 5-question evaluation

This information will determine the top 5 presentation teams and the top Live Lab





24TH LCI CONGRESS
OCTOBER 18-21



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.



Glossary

- **HPP (Hoylu Pull Planning):** a method of collaborative software for pull planning
- **LPS (Last Planner System):** is an approach on how to efficiently run a construction project ensuring that each manages their workload, while being held accountable for the work their promises for completion. *(developed by **Glenn Ballard and Greg Howell** who also founded LCI (letsbuild.com/blog)*
- **PPC (Percent Plan Complete):** analysis determines what percentage of the weekly tasks were accomplished. This helps to visualize what went wrong during the week so that adjustments can be made for the following week.
- **TMR (Tasks Made Ready):** Measuring checks if the phase scheduling process worked and is being followed. root-cause-analysis determines what went wrong.
TA (Tasks Anticipated): measures how many tasks were identified for the upcoming week. Allows you to see how much work is expected week by week.



Contact Us –

John Jurewicz

Walbridge

jjurewicz@walbridge.com

Ryan O’Grady

Walbridge

rogrady@walbridge.com

Chris Dezsi

Walbridge

cdezsi@walbridge.com

Ryan Kelly

Hoylu

rkelly@hoylu.com