Lean Construction Institute
Immersive Education Program

Introduction to the Last Planner System®

Virtual Course

Rich Seiler

INSERT PRESENTATION DATE

Lean Construction Institute

Provider Number H561

Introduction to the Last Planner System®

LCIV.ILPS

Presenter

date

2 LU Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Course Description

Unpredictable workflows correlate with an increase in construction costs and schedules. The Last Planner System® (LPS®) was developed to improve predictability while maximizing efficiency and safety. In the Introduction To The Last Planner System® course, you will discover the five connected planning conversations of LPS and how they improve communication, trust, transparency and reliability. This course, which includes real-life examples of LPS implementation will be a first step in mastering the System.

Learning Objectives




01.

At the end of this presentation, participants will recognize the need for predictability on projects and how LPS creates more predictable outcomes.

02.

At the end of this presentation, participants gain an overview understanding of each of the five connected planning conversations of LPS and how they interrelate.

03.

At the end of this presentation, participants will discover the basic mechanics of LPS including the foundational base of reliable commitments.

04.

At the end of this presentation, participants will understand the need for continuous learning and for measuring reliability to improve predictability.

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Rules of Engagement

- This is a safe zone
- Everyone has equal status
- Speak up and share your ideas
- Actively listen to others
- One conversation at a time
- Use E.L.M.O.
- Silence phones
- Be focused and engaged
- Stay on time
- Have fun!

Lean Journey to Mastery

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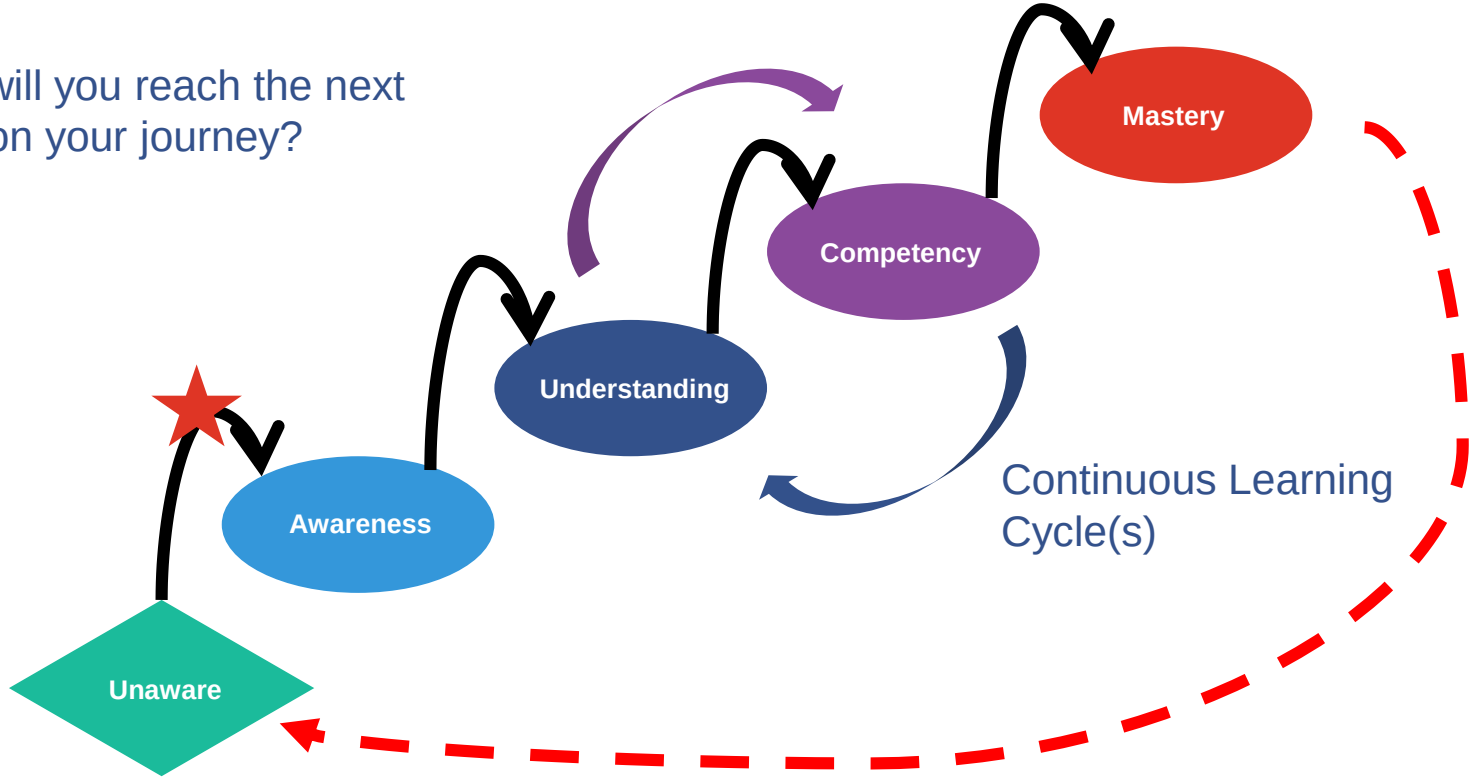
How will you reach the next level on your journey?



Last Planner System Trademark

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The Last Planner System® is a registered trademark of the Lean Construction Institute in the following formats:

- Last Planner System®
- LPS®
- Last Planner® in reference to the person not the system

Learning Overview

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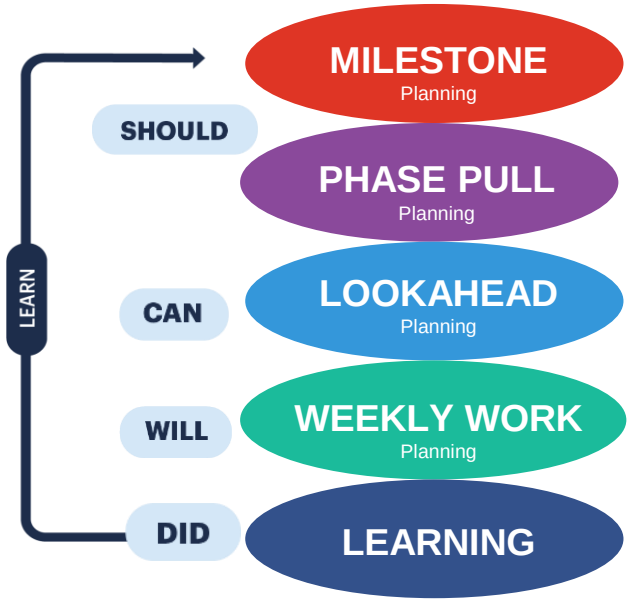
1. Why Last Planner System
2. LPS Overview
3. Milestone Planning
4. Phase Pull Planning
5. Lookahead Planning
6. Weekly Work Planning
7. Learning

5 Connected Conversations



Group Discussion Question – Chat Box

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What are challenges with traditional project planning?

Chat Box
3 minutes

Six Tenets of Lean

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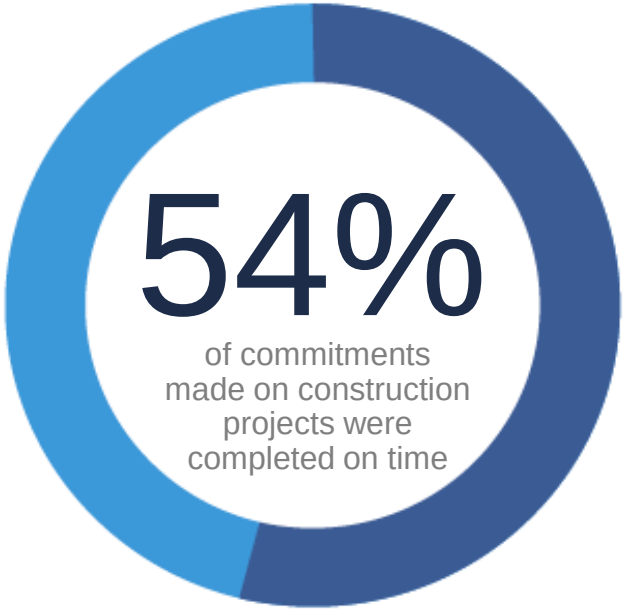
1. Respect for people
2. Optimize the Whole
3. Generate Value
4. Eliminate Waste
5. Focus on Flow
6. Continuous Improvement

Brief History LPS



The Opportunity…

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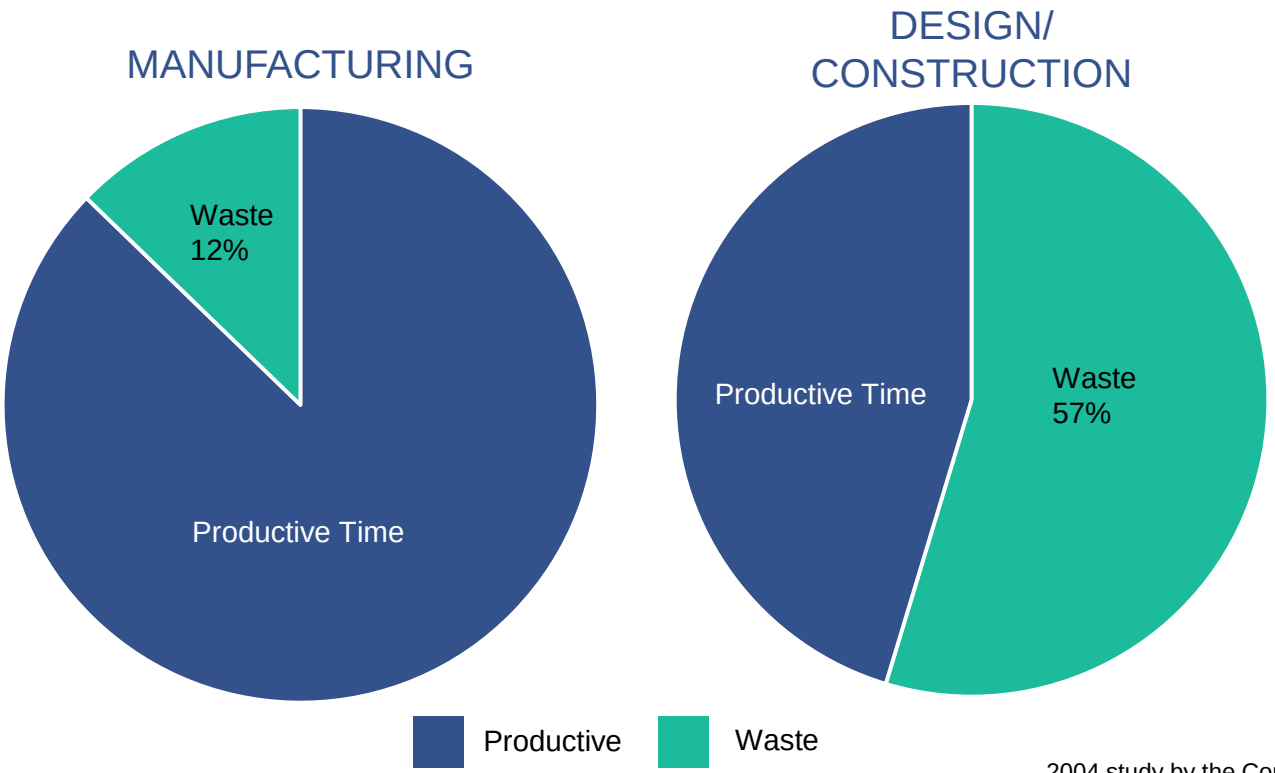

2004 study by the Construction Industry Institute

Why Use Last Planner System?

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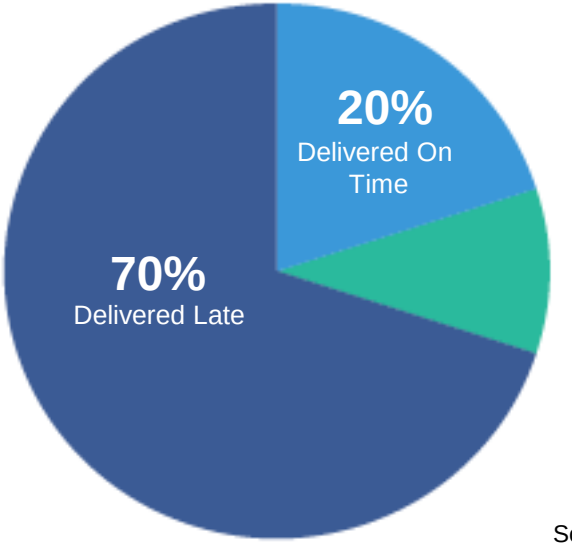
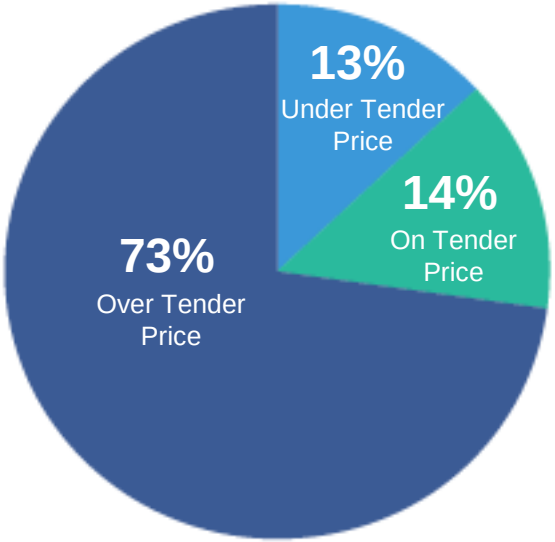
Time —
70% were delivered late



10%
Delivered Early

Cost —
73% were over budget



Source: Benchmarking the Government Client Stage Two Study December 1999

Correlation of Lean

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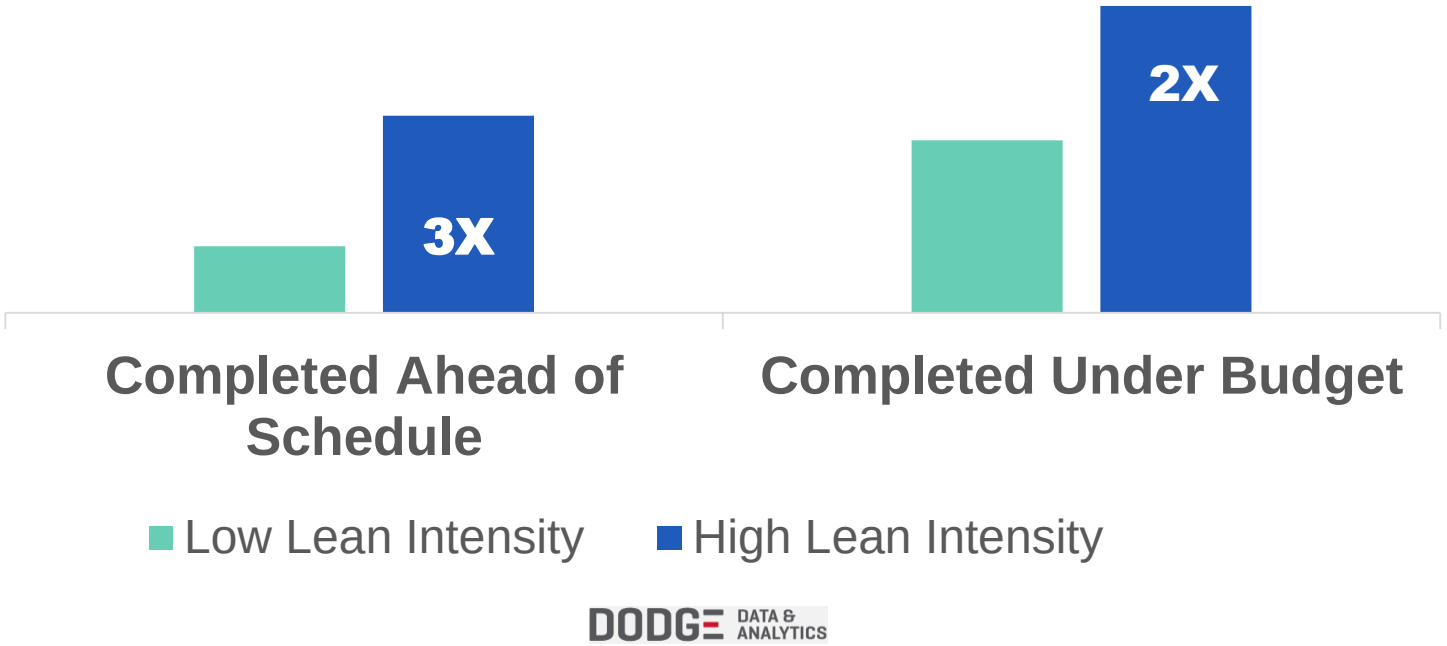
Correlation of Lean intensity to outcomes (% likelihood on best projects)



Last Planner System Defined

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The Last Planner System is a production planning system designed to produce predictable work flow and rapid learning in programming, design, construction and commissioning of projects.

Key Concepts

1. Traditional planning systems are unable to produce predictable workflow
2. Workflow reliability directly affects system speed and cost
3. All plans are forecasts, all forecasts are wrong
    - The further in advance, the more wrong
    - The more detail, the more wrong

Benefits

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1. Improves communication & reliability.
2. Fosters an enjoyable environment, trust, and collaboration.
3. Promotes early stakeholder engagement.
4. Improves visibility of the project plan (transparency).
5. Creates team alignment.
6. Rapid learning through metrics, revealing areas for improvement.
7. Improves planning in both design & construction phases.

Project As A Promise

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- All organizations or groups of greater than one can be viewed as operating as a *network of promises* or commitments, whether done well or poorly.
- The goal is to understand how to *improve the quality* of commitments and to *actively take responsibility* for managing them.
- The Last Planner System is a planning system based on developing a *network of promises*, then delivering on the commitments.

Elements Of A Promise

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Elements of a promise include:

- *The Customer:* The person making the request.
- *The Performer:* The person fulfilling the request.
- *Negotiated Conditions of Satisfaction (CoS):*
  - Are part of language act of making a promise.
  - Are developed by the people involved in the request and promise.
  - Are measureable statements that inform the performer of the promise which tests a task must pass to be accepted as a success.
  - Inform the decision-making process of the promisor.
  - Include a time frame.

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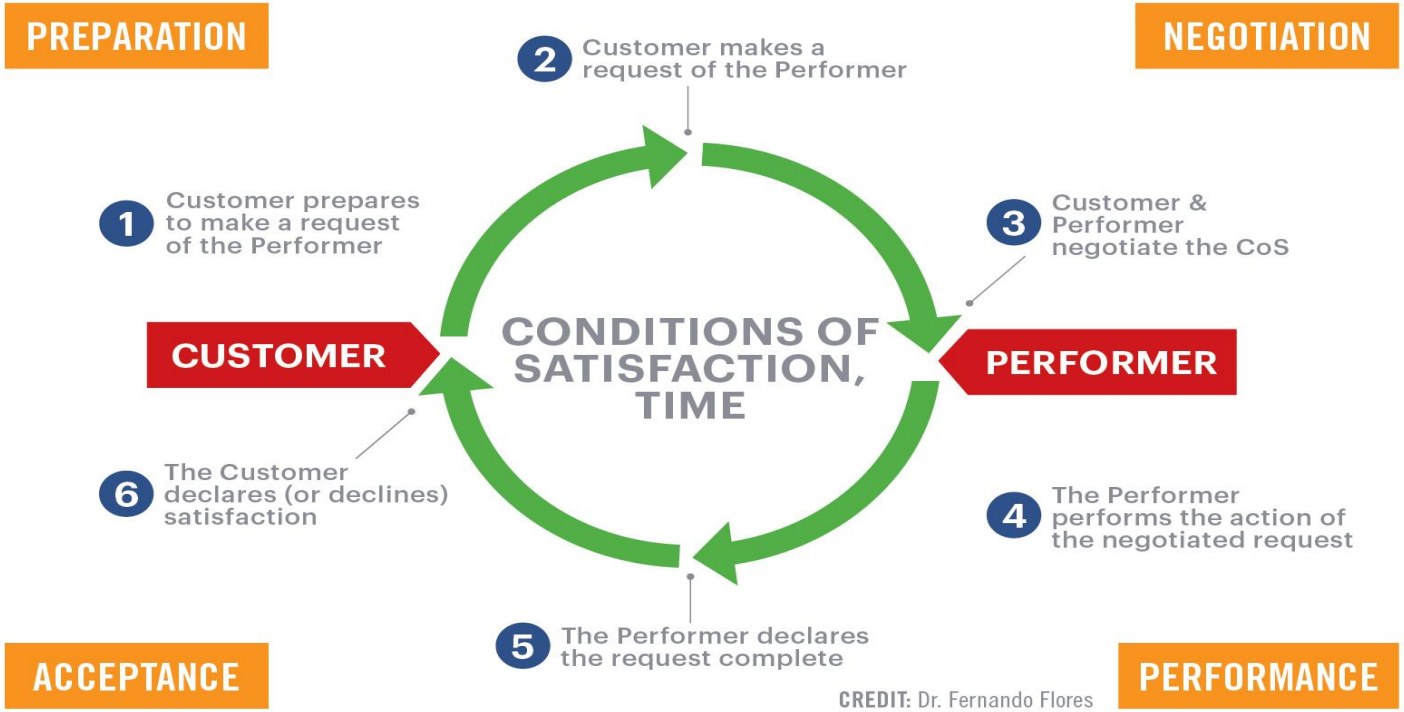
Basic Action Workflow Of A Promise



5 Connected Conversations Of LPS

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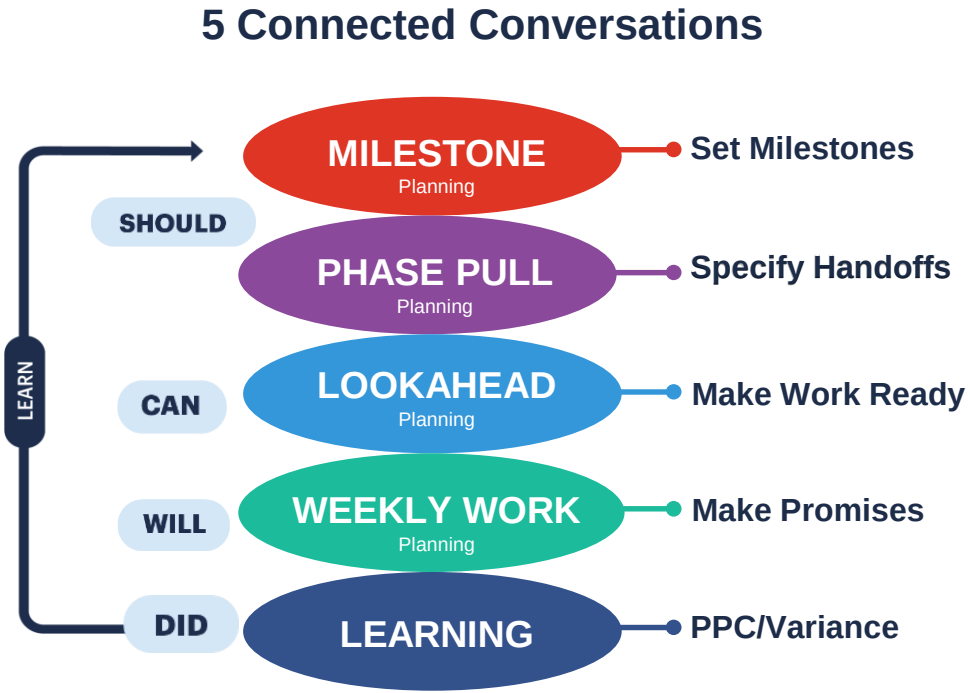
The LPS is a commitment-based system integrating 5 connected planning conversations:

1. Milestone Planning (Should)
2. Phase Pull Planning (Should)
3. Lookahead Planning (Can)
4. Weekly Work Planning (Will)
5. Learning (Did/Learn)



System for Planning

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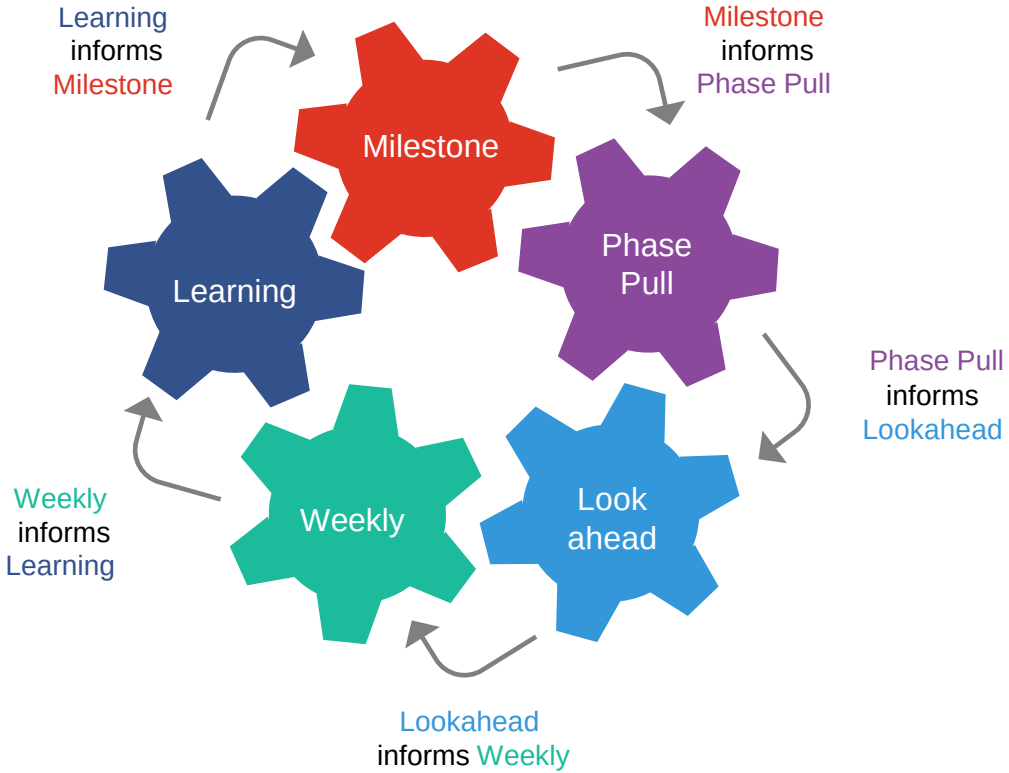

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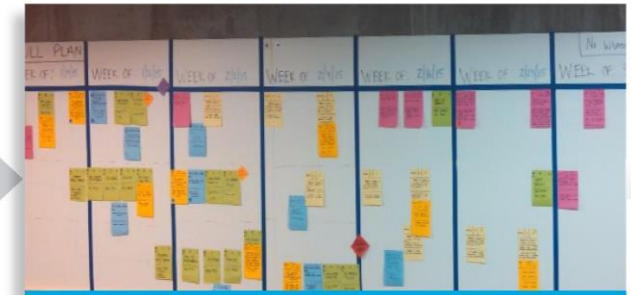
Last Planner System Flow

MILESTONE PLAN

PHASE PULL PLANNING



LOOKAHEAD PLANNING

WEEKLY WORK PLANNING

DAILY HUDDLE

Last Planner System Overview

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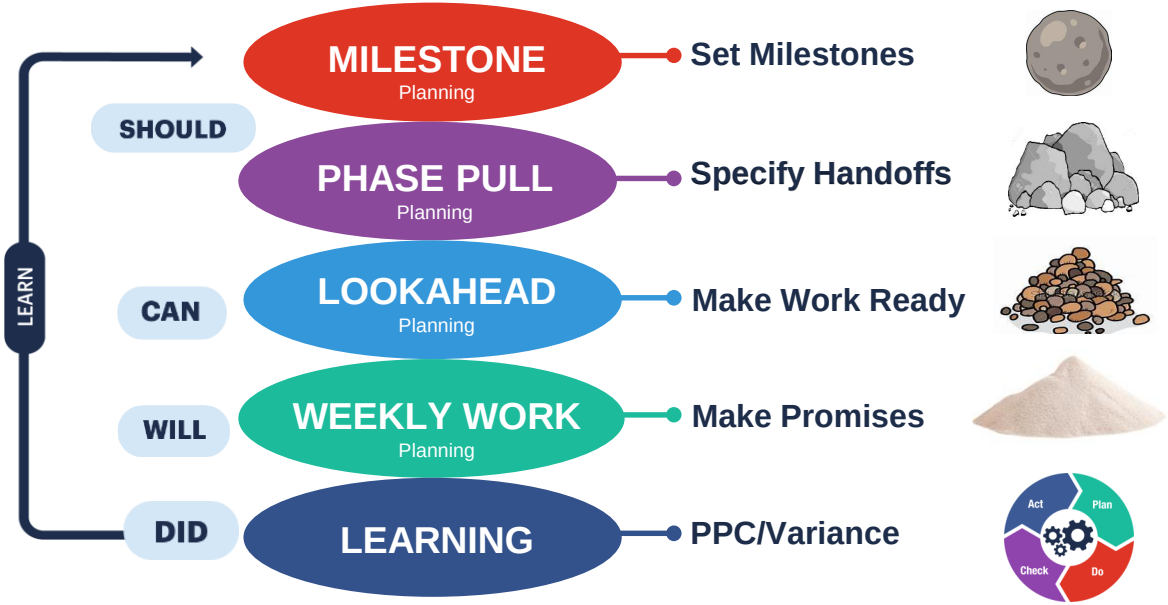
5 Connected Conversations



Last Planner System Overview

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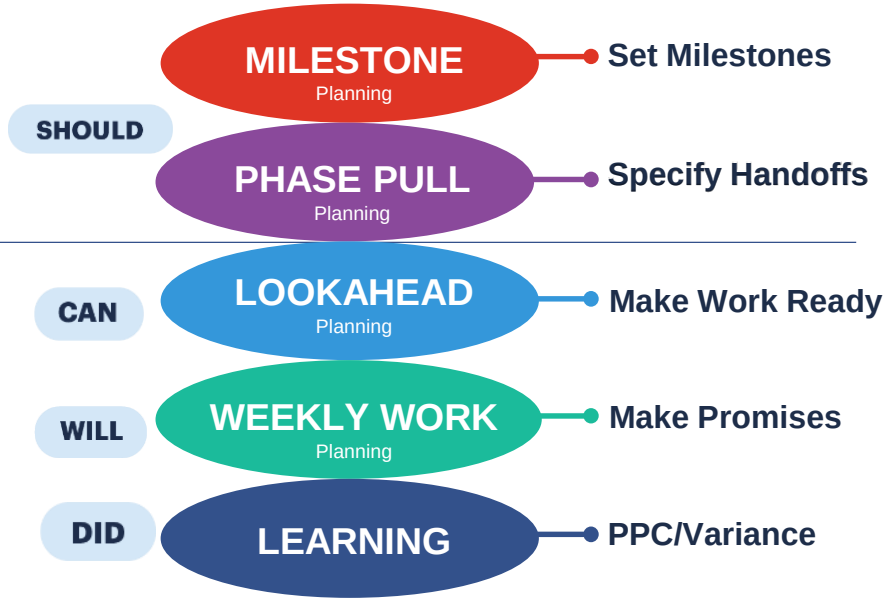
Collaborative Planning

As - Needed

Work Management
Continuous Improvement

Weekly

5 Connected Conversations



Who Is The Last Planner

The *Last Planner* is the person closest to work with authority to make decisions regarding the schedule and to make reliable commitments to complete the work of their discipline.

This may include the lead architect or project manager, the lead engineer, owner's project representative and the constructors as appropriate.

Last Planners

1. Discussion Question – Breakout Room

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What would be some specific advantages of improved work flow reliability on your projects?

Breakout Room Discussion
10 minutes

Milestone Planning

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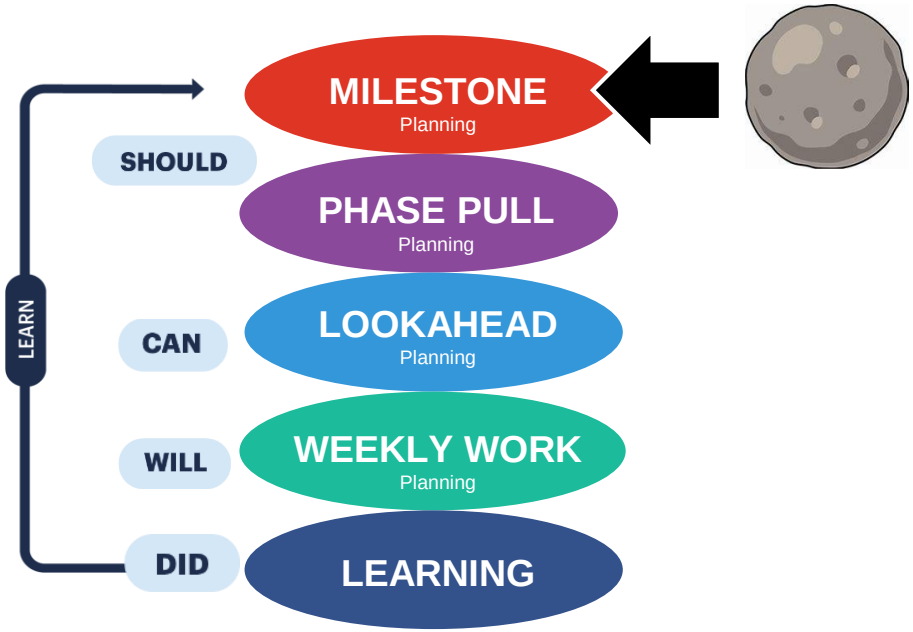
The first conversation of LPS is *Milestone Planning*.

The goal of Milestone Planning is for the team to align on and *set the milestones* for the project.

This starts the we *"should"* be able to do conversation.

5 Connected Conversations



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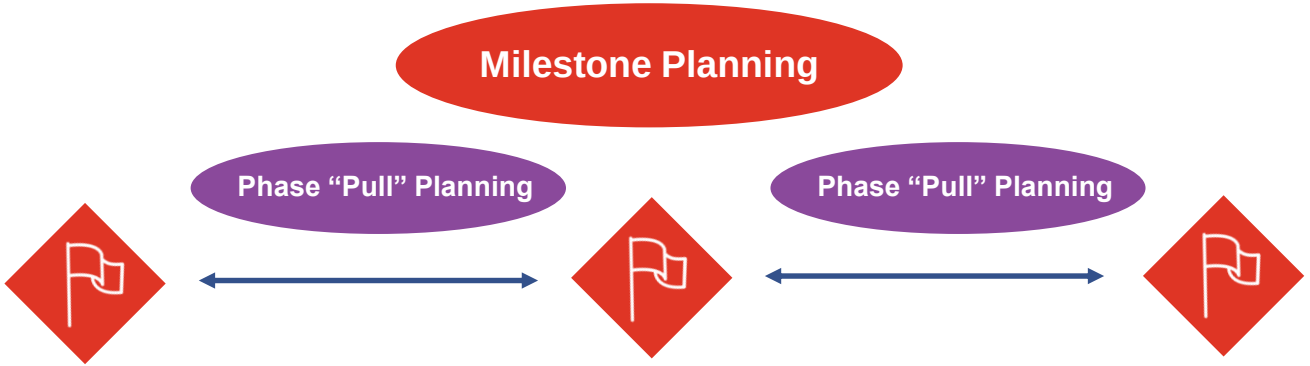

Define the overall road map and gain alignment

Identify milestones important to client and stakeholders – especially immovable dates

Informs the Phase Pull Planning

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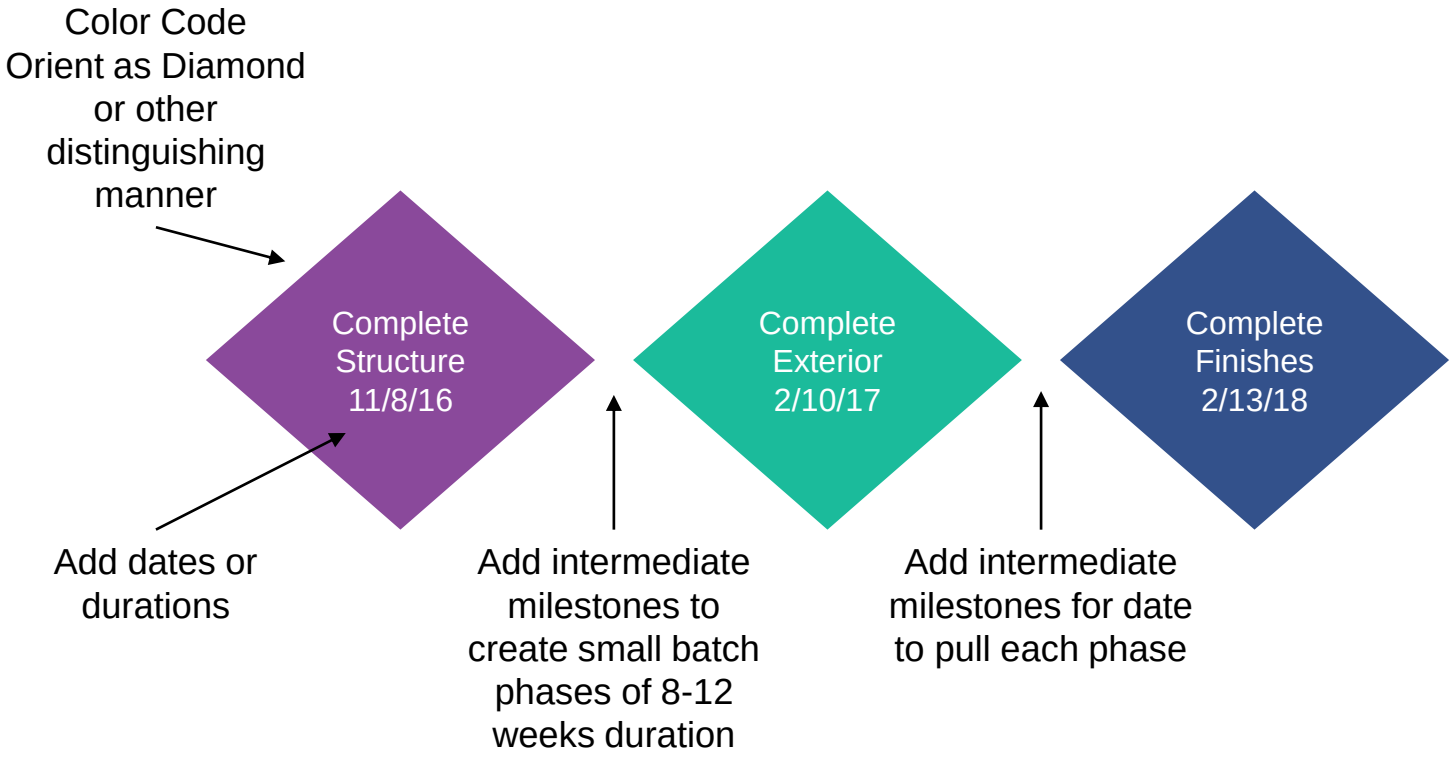
Milestone Planning Example Tag



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Milestone Planning Example Tag

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Milestone Planning Example Tag

Creating The Milestone Plan

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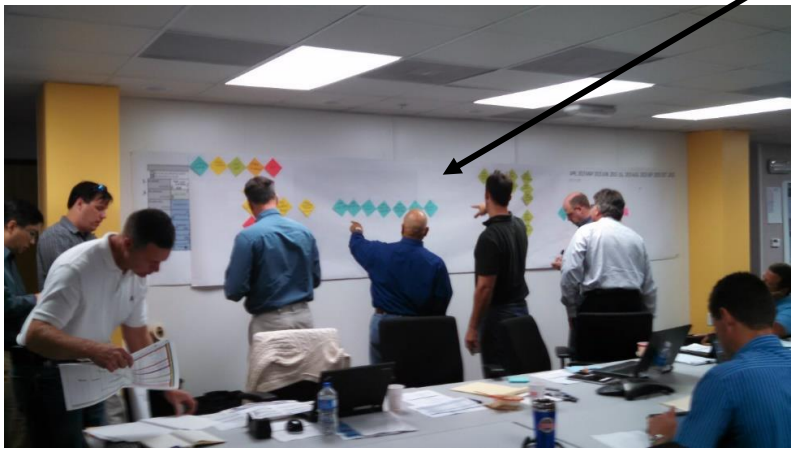
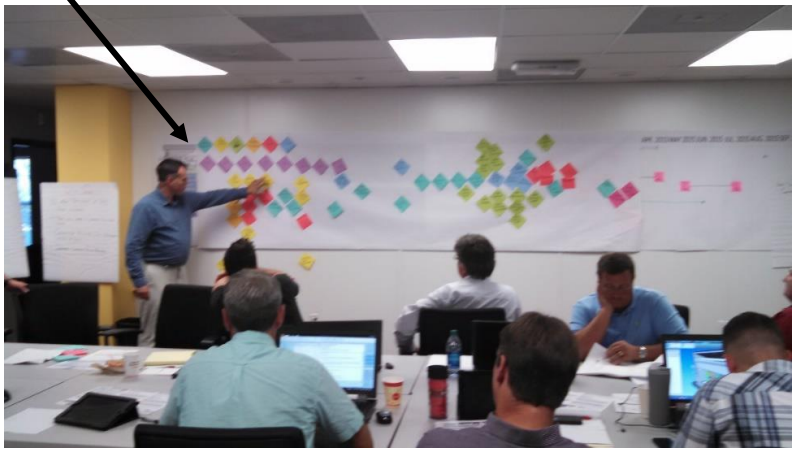
Developing the milestones to structure the flow. The next step will to add estimated durations.



Collaboratively creating the plan

Color coding for different aspects of the plan, i.e. design, approval processes, key decisions, construction, turnover, activation.



Reviewing the plan

Courtesy of: InsideOut Consulting

Phase Pull Planning

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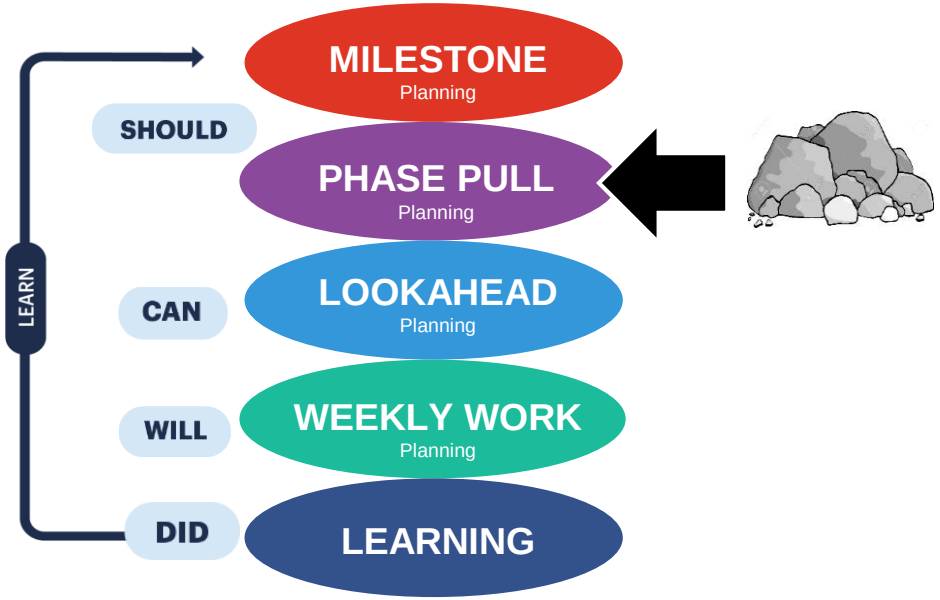
The second conversation of LPS is *Phase Pull Planning.*

The goal of Phase Pull Planning is for the team to determine the key *handoffs* of work or information needed to deliver a milestone.

This continues the we *"should"* be able to do conversation.

5 Connected Conversations



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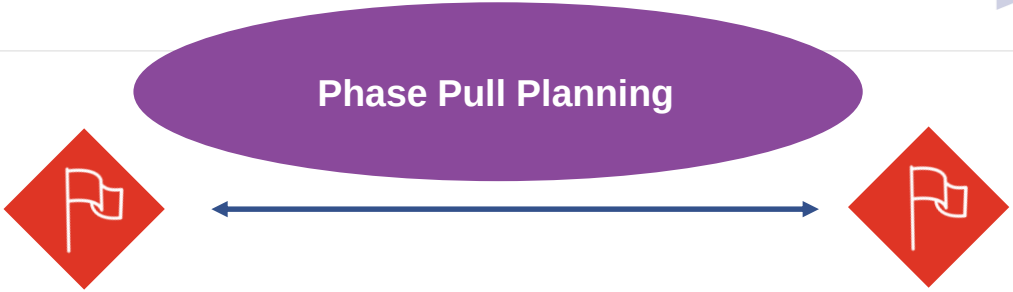

Courtesy of : PCL

- Phase of the work (~8-12 weeks)
- Informed by the Milestone Plan
- Work out the structure and durations
- After – add dates and transfer to the Look Ahead Plan

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Push vs. Pull

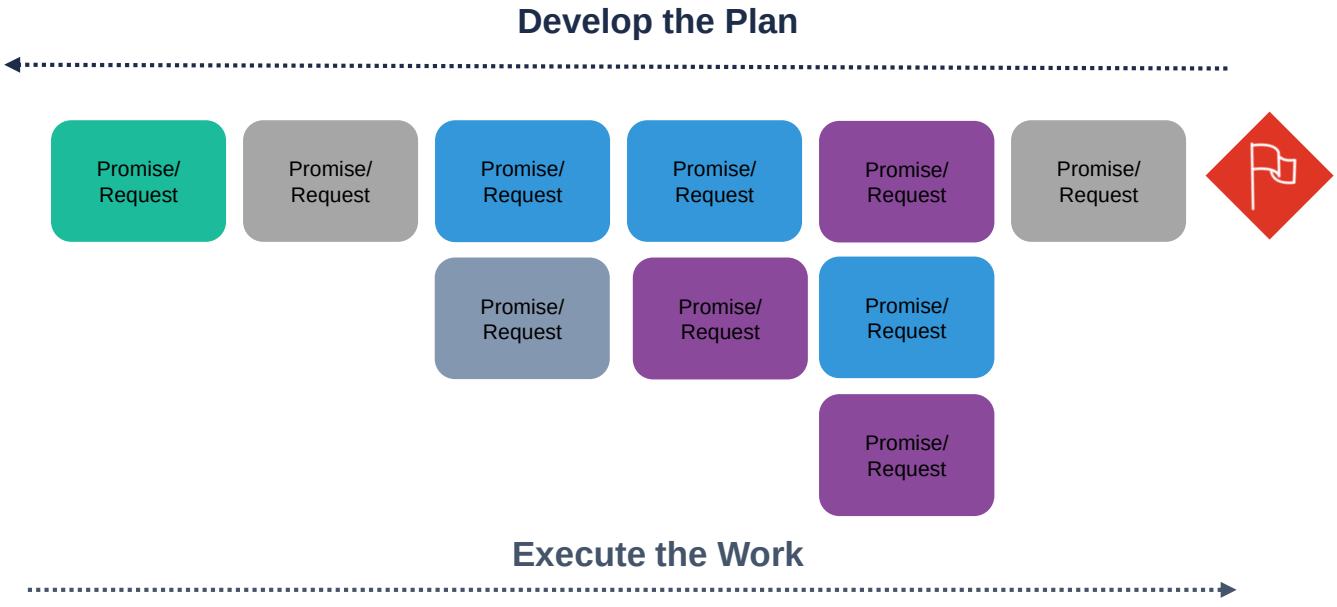
Push:

- Advancing work based on central schedule.
- Releasing materials, information, or directives possibly according to a plan, but irrespective of whether or not the downstream process is ready to process them.

Pull:

- Advancing work when the next in line customer is ready.
- A “Request” from the customer signals that the work is needed and is “pulled” from the performer.

Pull: Creating Flow



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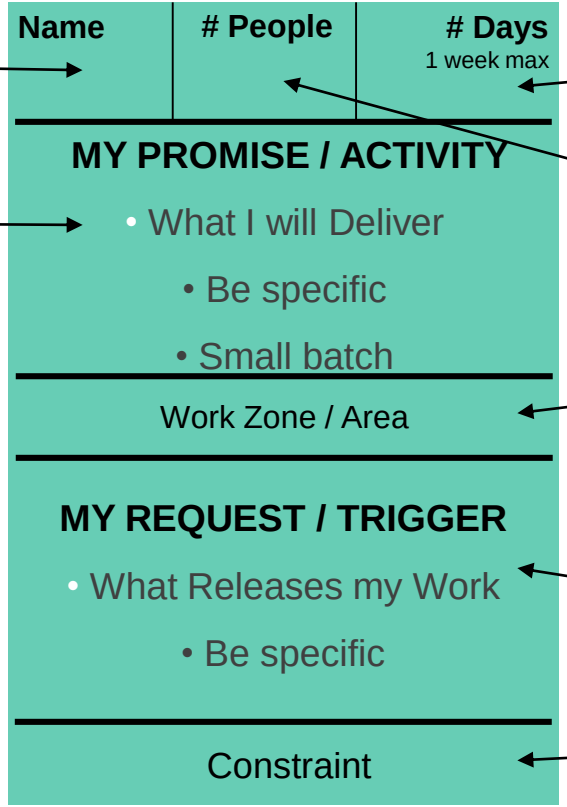
Phase Pull Planning Example Tag

Name of person making the commitment

Description of the activity

- Format tag to best fit your team needs
- Add more information as valued
- Color code by trade or discipline



Duration of the work in days
Small batch work into days

# of People for the work

Work zone or area

Description of the predecessor activity or work that releases the start of your activity

Known constraint such as RFI

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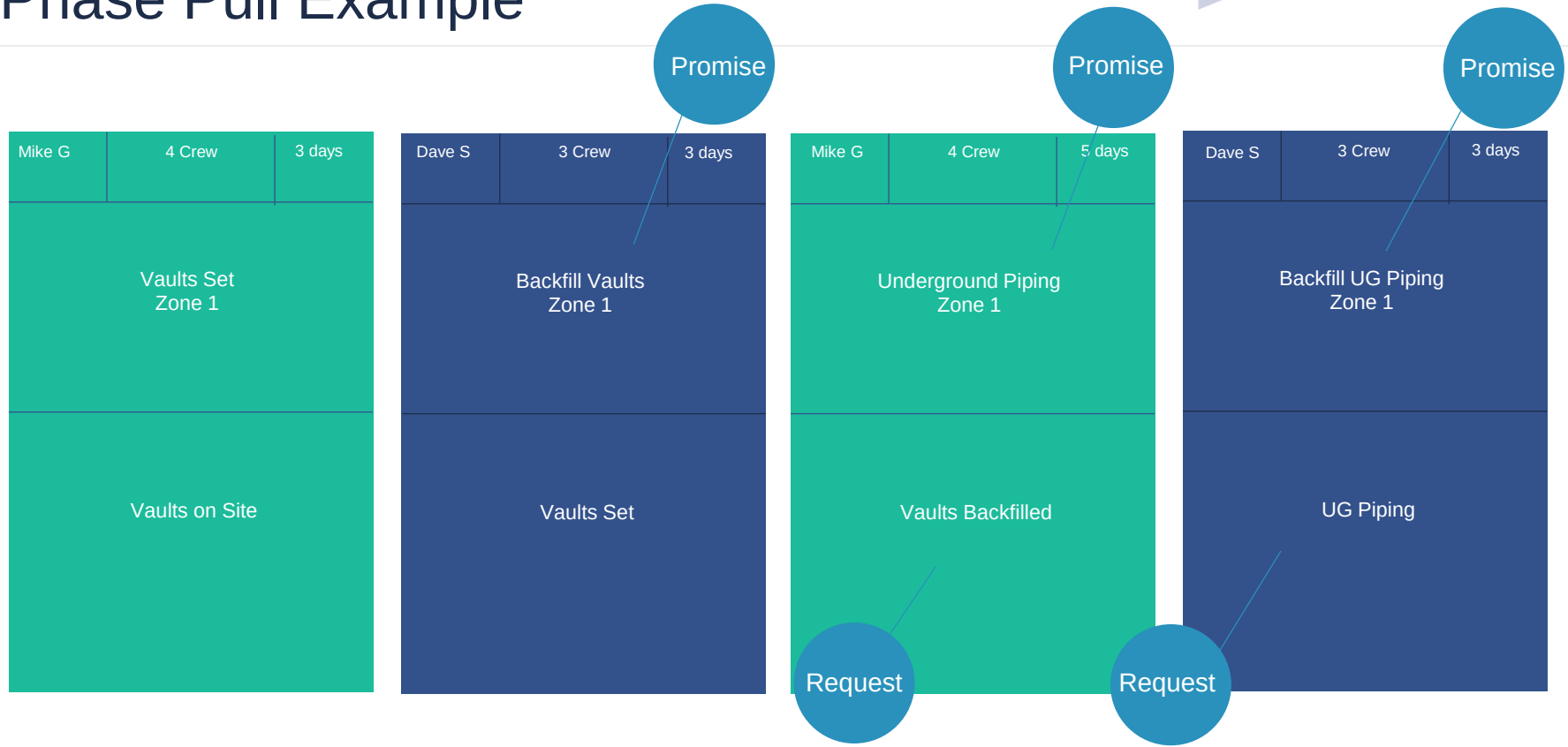
Phase Pull Example



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Phase Pull Plan: Start at End

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Phase Pull Plan: Pull The Work

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Phase Pull Plan: Review From The Start

2. Discussion Question – Breakout Room

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What might be some improved outcomes from implementing a pull planning methodology?

Breakout Room Discussion
10 minutes

Lookahead Planning

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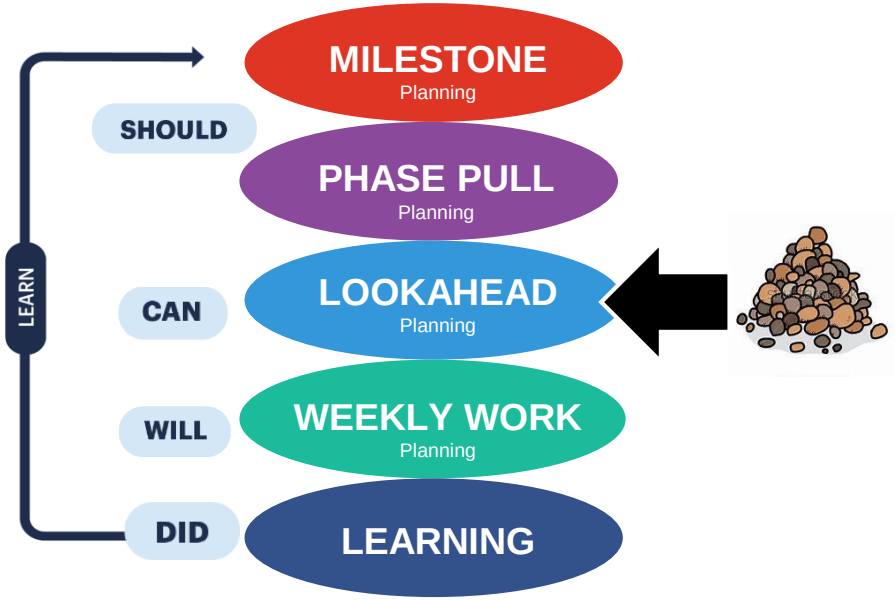
The third conversation of LPS is *Lookahead Planning.*

This level focuses on making work ready or assuring that the work that *should* be done, *can* be done by identifying and *removing constraints* in advance of need.

The conversation is we *"can"* do this.

5 Connected Conversations



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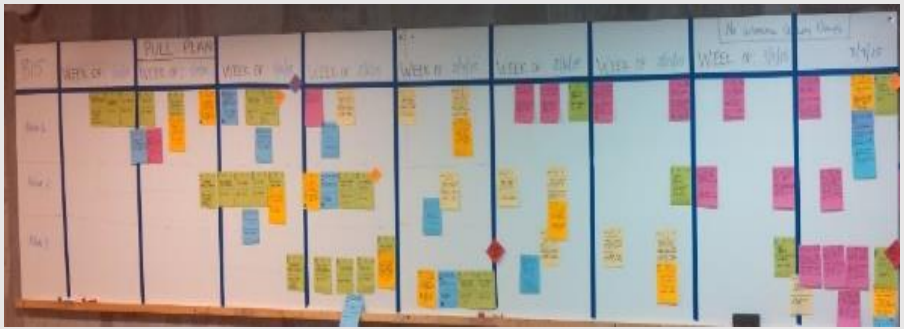

Project:
Project No.:
Responsible Person:

Constraint Number	Activity Number	Constraint Description	RFI No.	Responsible Person	Responsible Company	Date Identified	Date Need Resolution	Date Resolution Promised	Actual Date Resolved

Constraint Log

48

Lookahead Planning

- Transferred from the Phase Pull Plan to a plan with dates/weeks
- Boards, P6 or other software documentation
- Rolling (6-10 weeks) Look ahead to "make work ready"
- Supports Team Meeting Discussion/Action for:
- Identify Risk – Risk Log
- Identify Constraints – Constraint Log
- Informs the Weekly Work Plan

Lookahead Planning Example

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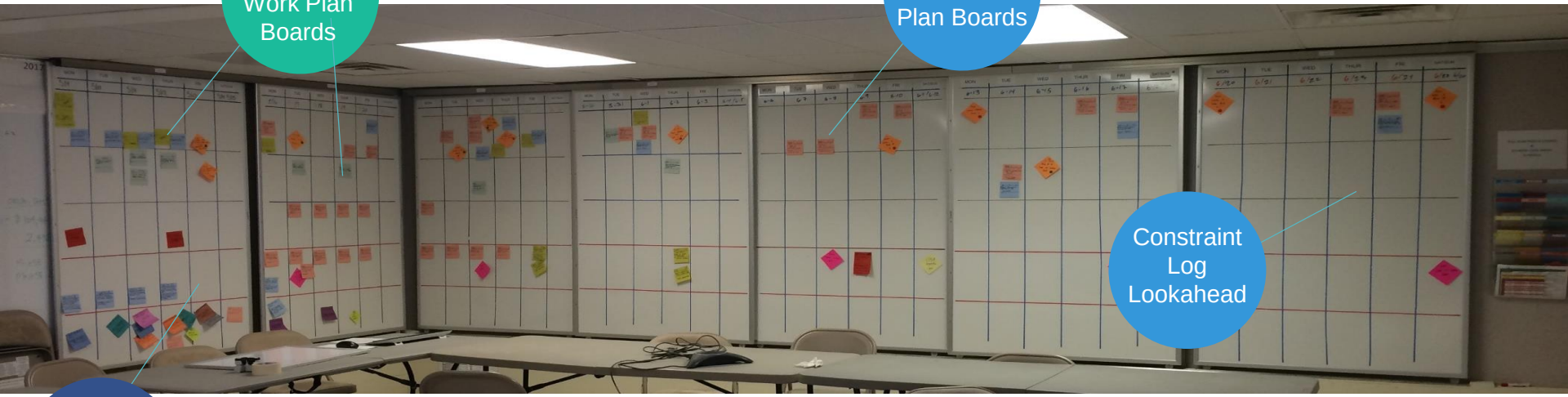

Courtesy of: Turner Construction

Lookahead Planning Options

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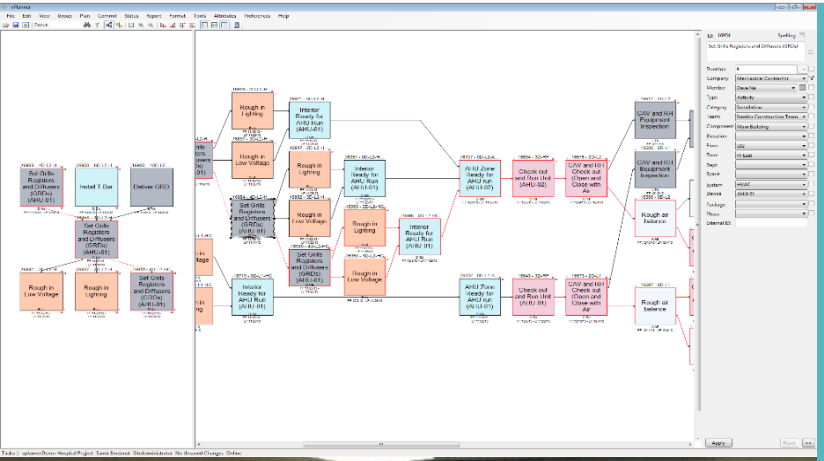

Electronic

- P6
- Microsoft Project
- TouchPlan
- PlanGrid
- vPlanner
- Others

Constraint Log Example

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Project:
Project No.:
Responsible Person:

Constraint Number	Activity Number	Constraint Description	RFI No.	Responsible Person	Responsible Company	Date Identified	Date Need Resolution	Date Resolution Promised	Actual Date Resolved

DATE PROMISED

CONSTRAINT DESCRIPTION

RESPONSIBLE PERSON & CO

DATE IDENTIFIED

DATE NEEDED

DATE RESOLVED

Weekly Work Planning

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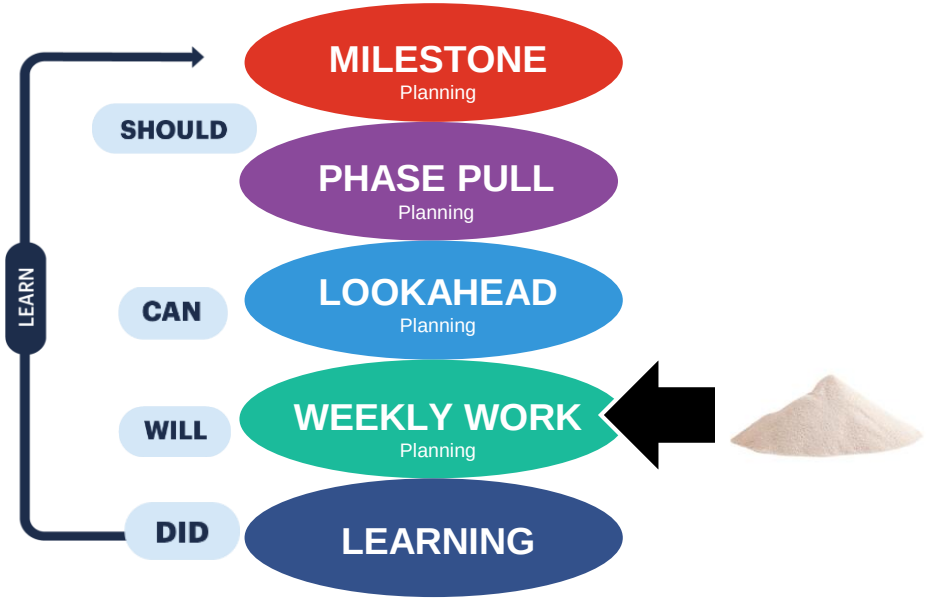
The fourth conversation of LPS is *Weekly Work Planning.*

The goal of this level is for the Last Planners to *establish the plan* for the upcoming week at the daily level.

The conversation is I *"will"* do this.

5 Connected Conversations



Weekly Work Planning

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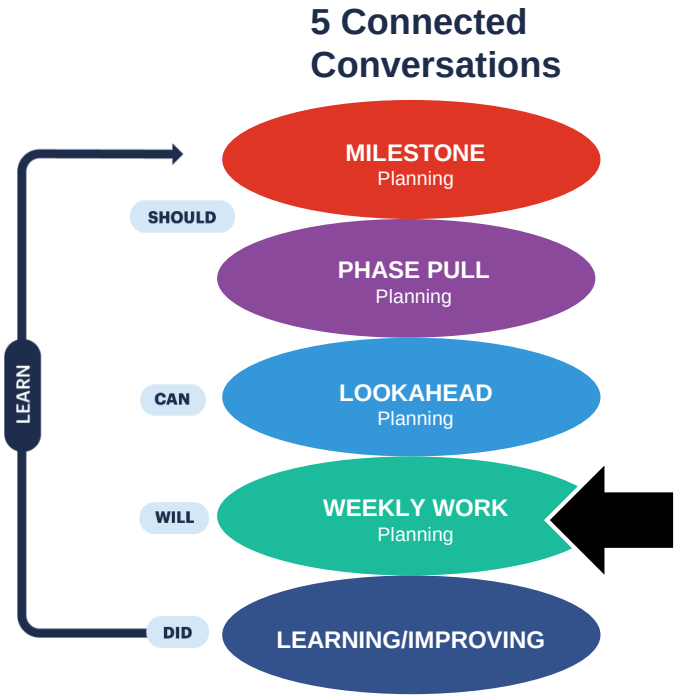
This is the level that the team identifies the *promised task completions* agreed upon by the *Performers* for the upcoming week.

The WWP is used to determine the *success* of the planning effort and to determine what *factors limit performance*. and is the basis of measuring PPC (Percent Plan Complete).

This is done during a *Check-in Session or Huddle.*



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Weekly Work Planning

- Informed by the Look Ahead Plan
- Detail work by trade at the Daily Level
- Detailing of the next week
- Informs the Daily Huddle
- Take to the field

WEEKLY WORK PLAN

Area:		CATEGORY* OF PLAN FAILURE										TOTAL ACTIVITIES	10	
Contractor:		1 Coordination	5 Prerequisite Work	9 Submittals		13 Space						ACTIVITIES COMPLETED	5	
Shift:		2 Design	6 Labor	10 Approvals		14 Site Conditions						PERCENT PLAN COMPLETE (PPC)	50%	
Last Planner:		3 Owner Decision	7 Materials	11 Equipment		15								
		4 Weather	8 Contracts/COs	12 RFIs		16								

Activity ID	ASSIGNMENT DESCRIPTION Safe · Defined · Sound · Proper Sequence · Right Size · Able to Learn	Responsible Person	Start Date		05-Oct-09				DONE?		LEARNING REASONS FOR PLAN FAILURE	Category*
			Mon	Tue	Wed	Thu	Fri	Sat	Sun	YES	NO	
	Column Grid A1 - G8											
	Joes Framing	*Bill*										
7055	*Top Track Install*		*4*	*4*						*1*		
7060	*Framing Walls*			*4*	*4*					*1*		
7065	*Backing Install*				*4*	*4*					*0*	*IOR not available*	10
	Sparky's Electrical	*Jim*										
1605	*Rough in Walls*			*2*	*2*	*2*	*2*			*1*		
1610	*Rough in Ceilings*					*2*	*2*	*2*			*0*	Need grid elevation layout	5
	Acme Mechanical											
1505	*Plumbing - in wall rough in - Install*				*2*						*0*	Walls not inspected	10
1510	*Plumbing - ceiling rough in - Install*					*2*					*0*		
	Column Grid G9 - J 12 Kitchen servery											
	Joes Framing	*Bill*										
7055	*Top Track Install*						*4*			*1*		
7060	*Framing Walls*							*4*		*1*		
7065	*Backing Install*							*2*			*0*	room not available	1
	Workable Backlog (My "Plan B": What work can I do without affecting other trades if above plan breaks down?)									*5*			

Weekly Work Planning

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Weekly Work Plan Informs the Daily Huddle

Courtesy of : PCL

Courtesy of : Turner/DPR JV

Weekly Work Planning Example

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"What, Where, Who & When"

WEEKLY WORK PLAN

Work Beginning:

Area:		CATEGORIES OF PLAN FAILURE				TOTAL ACTIVITIES	31
Contractor:		1 Coordination	5 Prerequisite Work	9 Submittals	13 Space	ACTIVITIES COMPLETED	
Shift:		2 Eng/Design	6 Labor	10 Approvals	14 Site Conditions	PERCENT PLANNED COMPLETE	0%
Last Planner:		3 Owner Decision	7 Materials	11 Equipment	15		
		4 Weather	8 Contracts/COs	12 RFIs	16		

Activity ID	Commitment Description Safe - Defined - Sound - Proper Sequence - Right Size - Able to Learn	Responsible Person	Start Date		1\28					DONE?		LEARNING	Category
			Mon	Tue	Wed	Thu	Fri	Sat	Sun	YES	NO	REASONS FOR PLAN FAILURE	
1	Pour new moat floor on the south side of the building	B.A.M	4	4									
2	Adjust (4) down spouts on the south side of the building	B.A.M	2	2	2								
3	Patch masonry around 6 conducter boxes on the roof	B.A.M	1	1	1	1	1						
4	Install base on 2nd floor in the south side class rooms	B.A.M		3	3	3	3						
5	Install wainscoting on the first floor north side	B.A.M		4	3	4							
6													
7													
8	Pull wire for Chiller	Ryan	5										
9	Security rough-in on all floors	Ryan	3	3	3	3	3						
10	Basement rough-in complete	Ryan	4	4	4	4	4						
11													
12	Hang and finish all rated chases	Fred			3	3							
13	Reframe and hang dry wall in hallway 121	Fred	4	4	4	3	5						
14	Sand dry wall in hallway 139	Fred	2	2									
15	Finish dry wall in west class room 107,144	Fred	3	3	3	3							
16													
17													
18	Rough-in media center ceiling	Troy	5										
19	Get fresh air duct inspected in attic	Troy				6							
20	Get north west chase duct inspected	Troy				6							
21	Insulate north west chase duct	Troy			4								
22	Tie in vav boxes in the attic	Troy	3	3	3								
23	Start tying in vav boxes in the east wing 1st and 2nd floors	Troy	4	4	4	4							

What & Where?

Crew Size?

Who?

When will it be done?

Learning/Improving

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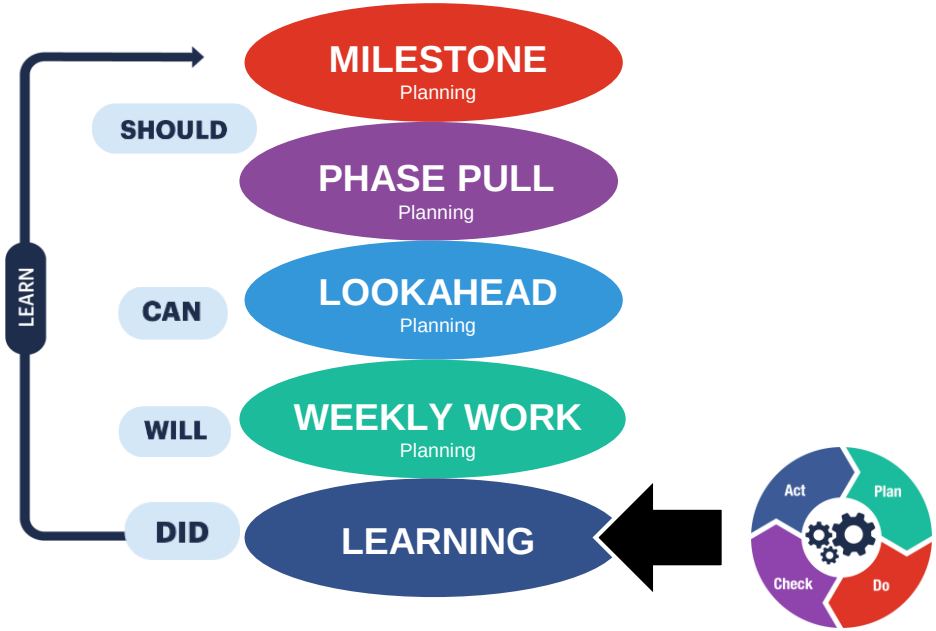
The fifth conversation is *Learning/Improving*.

The goal is for the team to *learn* from the cycle and take *actions for improving* going forward fulfilling PDCA.

The conversation is what we *"Did"* and *"Learned"*.

5 Connected Conversations



Daily Huddle

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1. What did I complete?
2. What will I complete?
3. What needs to be re-planned?
4. How can we prevent this from happening again?

Learning From Daily Huddles

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The *Percent Plan Complete* (PPC) is calculated for the period or week.

PPC is the basic measure of how well the *planning system is working*

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Calculating PPC

$$\text{WEEKLY PPC} = \frac{\text{\# Completed Activities}}{\text{\# Planned Activities}} = \frac{16}{20} = 80\%$$

3. Discussion Question – Breakout Room

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Discuss the advantages of the Daily Huddle as presented here.

Breakout Room Discussion
10 minutes

Reasons For Variance

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Reason for Variance:

- Factors that prevented a task from being completed as promised.
- Used by the team to promote learning concerning the failure of the planning system to produce predictable workflow.
- Assigned a category of variance.
- Enable a team to identify those areas of recurring failure that require additional reflection and analysis.

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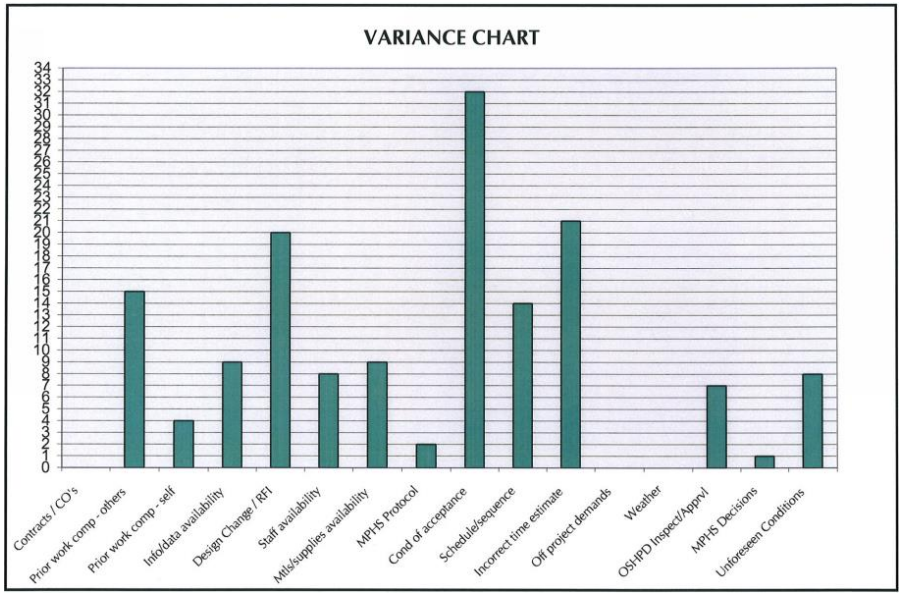
Taking Action For Variance

When a variance or failure occurs, the team must discuss the likelihood of it occurring again and determine actions to mitigate such.



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Standard Work Available @ LeanConstruction.org

https://www.leanconstruction.org/membership/corporate-members-center/last-planner-system/




Last Planner System®
Standard Work
3_Planning Session Preparation

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Outcome:
The Last Planner System® organizer will be able to prepare for a planning session by arranging to have the spatial and material requirements for a successful session.

Process:
Prior to the pull planning session, arrange for appropriate space, room set-up and materials to be in place. The session outcome is dependent on this.

LPS Modified For Design

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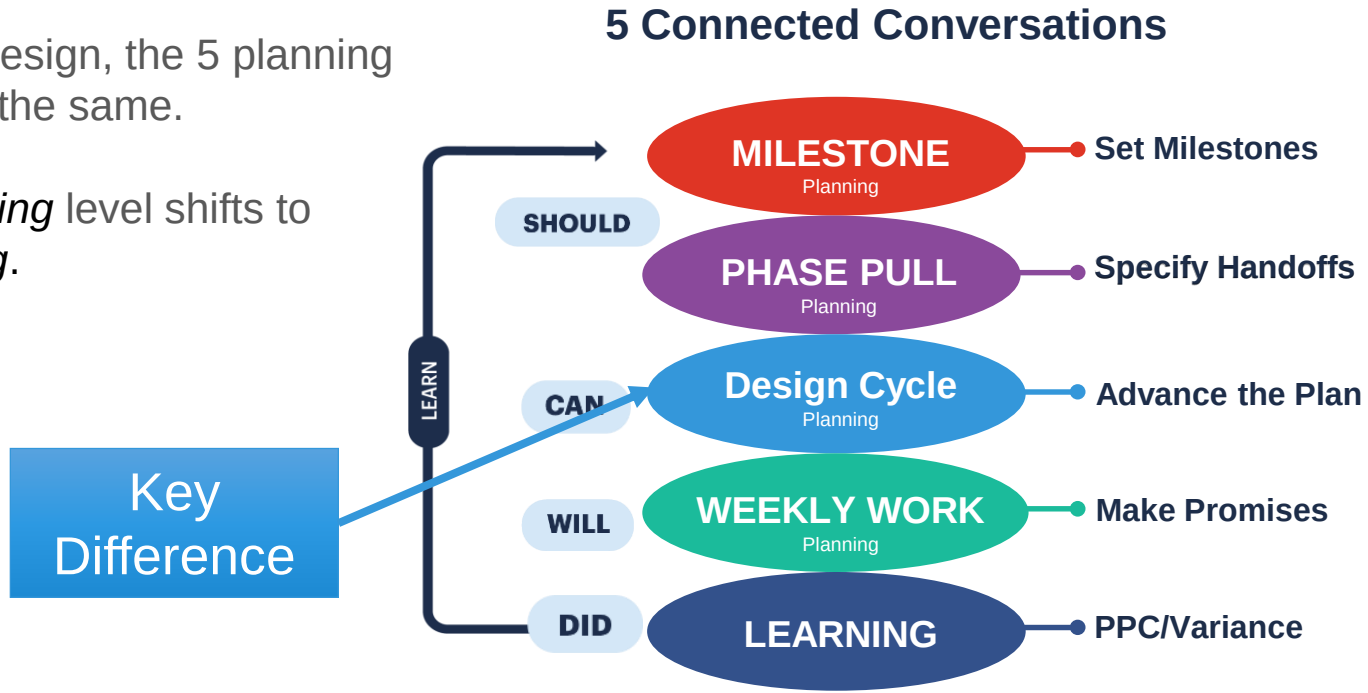
In modifying LPS for design, the 5 planning conversations remain the same.

The *Lookahead Planning* level shifts to *Design Cycle Planning*.



Creating The Phase Pull Plan

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Color-coded milestones on the Phase Pull Plan

Pull to date of handoff needed

Involve key discipline leads

Future milestone remain on the Milestone Plan

UHS Temecula Valley Hospital Team

Group Discussion Question – Chat Box

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New Actions?

What new actions or ideas that you learned today can you take back to your project?

Chat Box
3 minutes

Lean Journey to Mastery

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How will you reach the next level on your journey?

Target Value Delivery: Classroom & eLearning (release 2019)
Lean in the Design Phase: Classroom & eLearning
Mindset of an Effective Big Room: Classroom & eLearning (release May 2019)
Last Planner® System in Design: Classroom & eLearning (release 2019)
Conducting Gemba Walks: Classroom

Introduction to Lean Project Delivery: Classroom, eLearning & Webinar
Introduction to Last Planner® System: Classroom & eLearning
Lean in the Design Phase: Classroom & eLearning
Introduction to Lean in Design-Build: Classroom
The Business Case for Learn: Classroom

More on Learning

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Books:

Events:

- Local Community of Practice
- Congress (October)
- Design Forum (May)

eLearning:

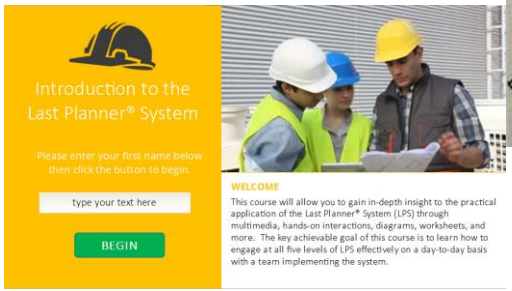
Learn on your own time without taking time off project work.

Start learning now:

www.LeanConstruction.org

eLearning Courses

- Introduction to the Last Planner System®
- Introduction to Lean Project Delivery
- Lean in the Design Phase
- Effective Big Room
- Target Value Delivery
- Last Planner System® in Design



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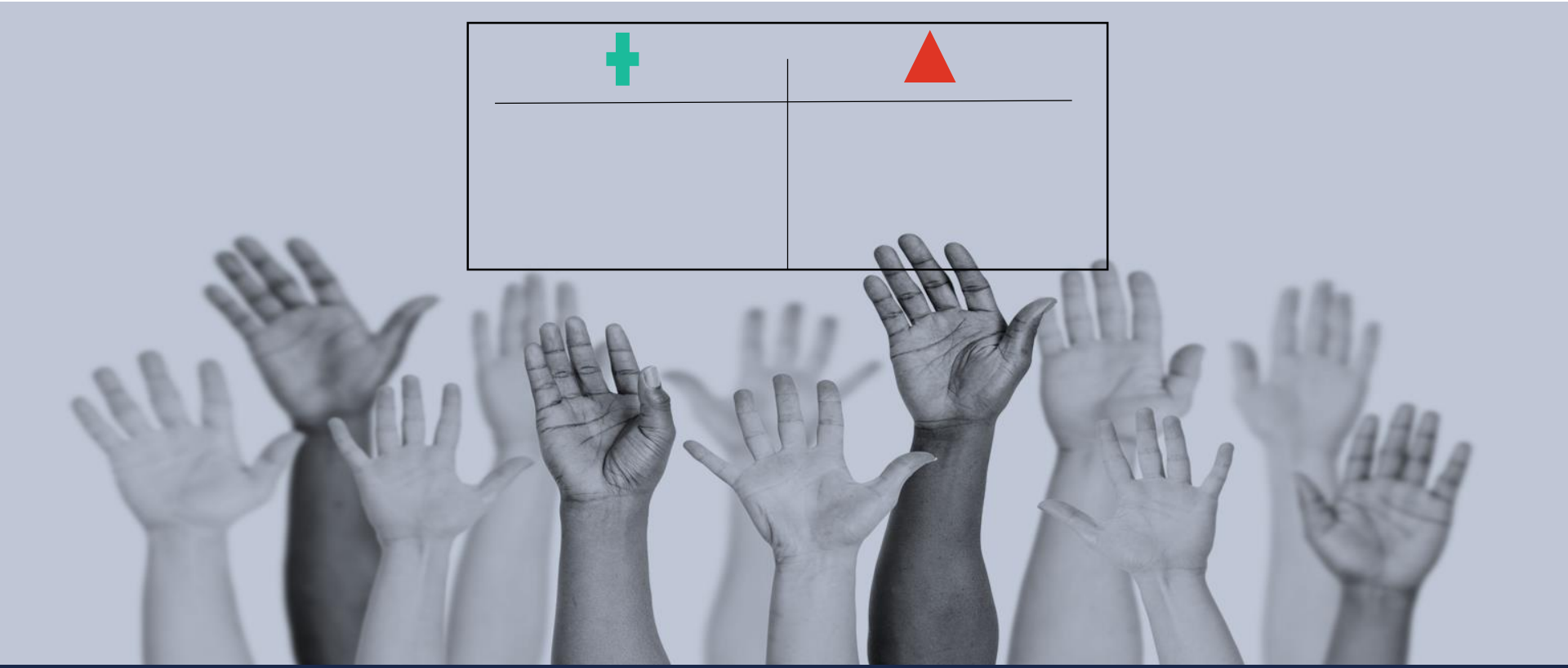
Questions & Plus/Delta



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This concludes The American Institute of Architects
Continuing Education Systems Course

Lean Construction Institute info@leanconstruction.org