

23RD ANNUAL



23RD LCI CONGRESS
OCTOBER 19-22

Introduction to Last Planner System in Design

Felipe Hernandez, Beck Architecture
Dave Hagan, Devenney Group

LEARN BY DOING FROM THOSE WHO DO

ANNMARIE THURNQUIST, COURSE CHAMPION, JACOBS GROUP

October 19, 2021

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- Wear masks at all times in indoor events.
- Complete your daily health screening on your phone and bring it with you when you enter the center each day.
- Practice social distancing to the extent possible. Seating at plenary sessions is structured to help with this.
- If you feel ill at any time, please leave the conference and return to your room/consult a physician as necessary.



Lean Construction Institute

Provider Number H561



Last Planner System® in Design

053117DF.LPD

Presenters: Felipe Hernandez and
Dave Hagan; Annemarie Thurnquist, Course
Champion

10/19/2021



4 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

This training will include an overview to Last Planner System® (LPS®) for design phase implementation. LPS® integrates Lean principles and is based on conversation leading to reliable commitments by team members. Participants will learn the fundamentals of LPS® for design phase. The training will include mock simulations of milestone and pull planning phases.

Learning Objectives



01.

At the end of this presentation, participants will understand the Last Planner System® for design phase implementation

02.

At the end of this presentation, participants will understand why collaborative planning matters

03.

At the end of this presentation, participants will understand how LPS raises reliability of planning on projects for the benefit of the team

04.

At the end of this presentation, participants will have a hands-on understanding of milestone planning and pull planning through a mock planning simulation

Last Planner System® in Design

8:00 AM – Introductions

8:05 AM – Last Planner System® Design

9:30 AM – Break 15 Minutes

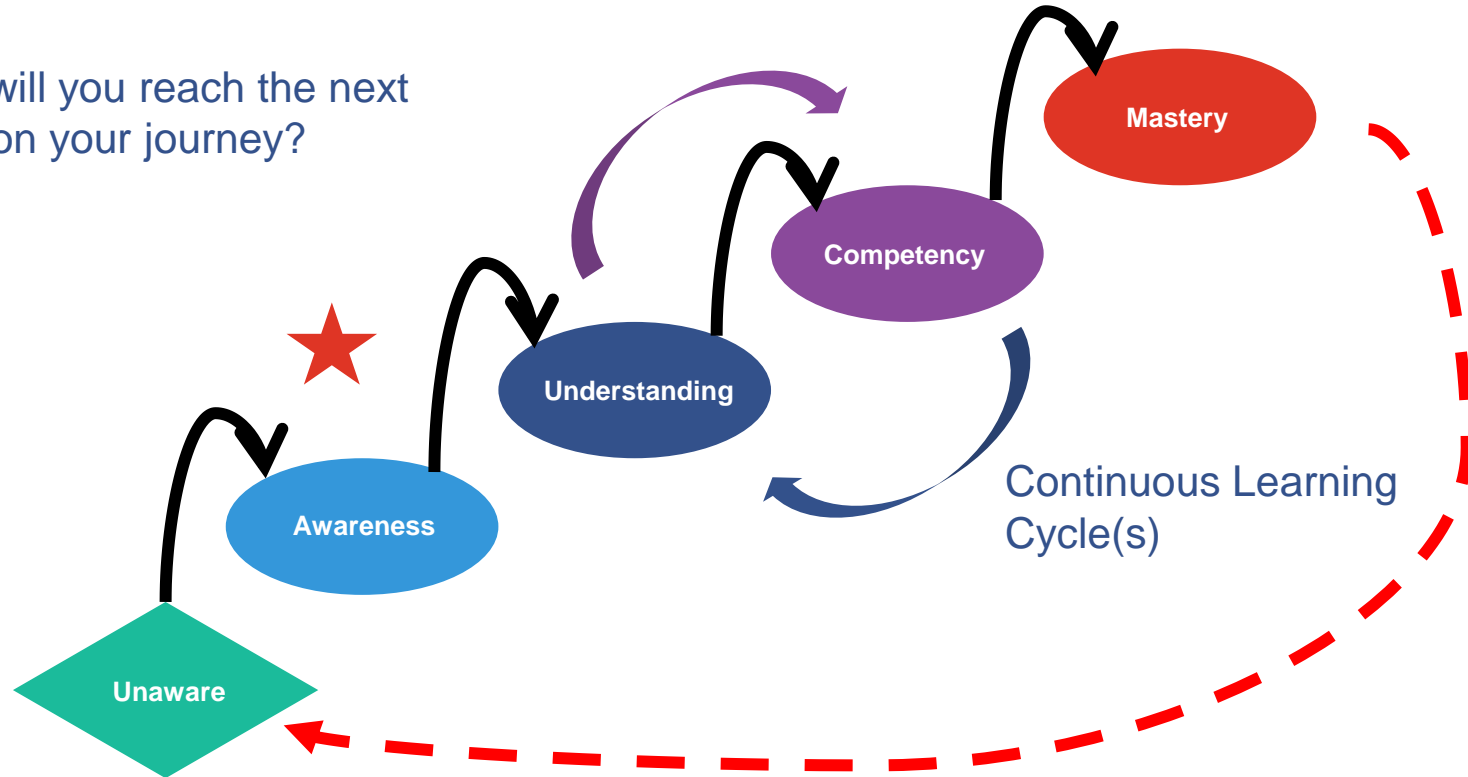
11:50 AM – Wrap Up & Plus/Delta

12:00 PM – Adjourn



Lean Journey To Mastery

How will you reach the next level on your journey?

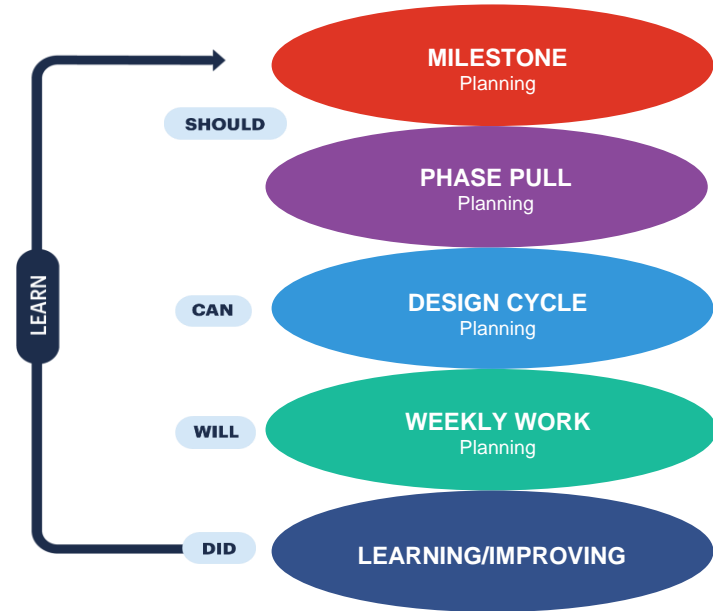


Learning Overview

The Last Planner System® (LPS®) is a registered trademark of the Lean Construction Institute.

1. Why Last Planner System®
2. LPS® Overview
3. Milestone Planning
4. Phase Pull Planning
5. Design Cycle Planning
6. Weekly Work Planning
7. Learning/Improving

5 Connected Conversations



Discussion Question

What are your dissatisfactions with the way projects are conventionally planned?

Large Group Discussion 5 min

Why LPS® In Design?

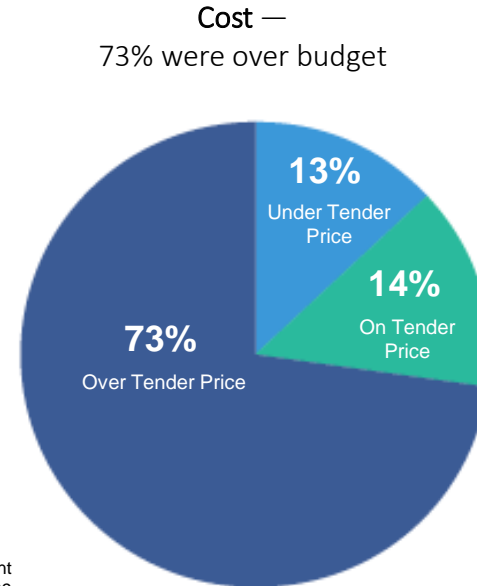
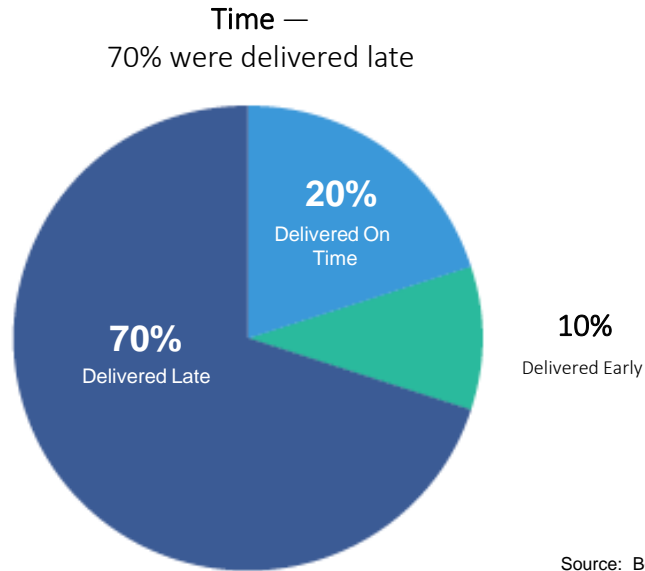
Experienced Lean practitioners implementing LPS in design state that it aids in:

- Controlling how information gets shared across the different parties of the project.
- Identifying key decision points.
- Keeping the owner on track with making decisions that enable the next series of work to start.
- Aligning the team and the owner regarding information needed and when.
- Aligning the team with the plan for delivering the project.



Why Implement LPS®?

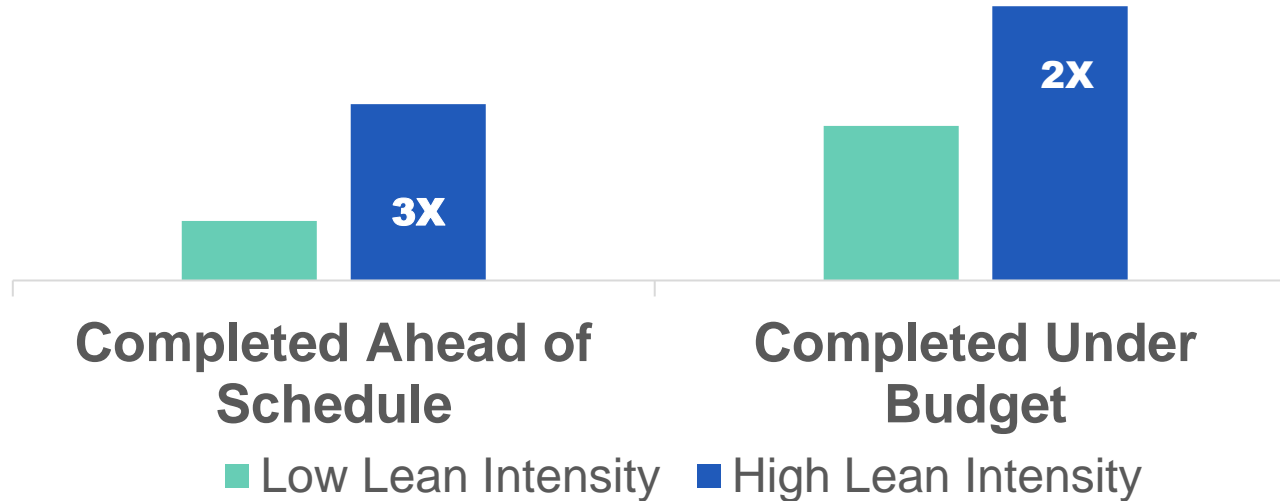
As the results of this benchmarking study indicate, there is great opportunity to improve the delivery of projects.



Source: Benchmarking the Government
Client Stage Two Study December 1999

Why Implement LPS®?

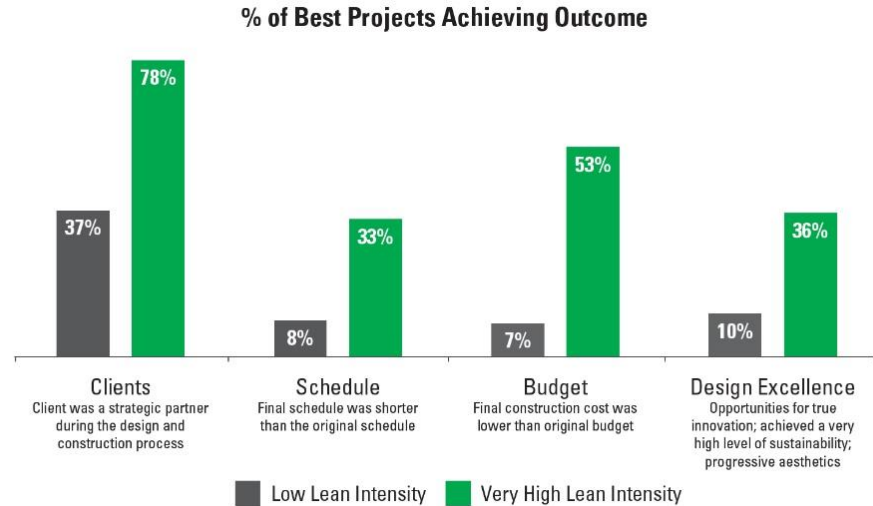
This study indicates the correlation of Lean intensity to project outcomes (% likelihood on best projects).



Why Implement LPS®?

In an industry study, Dodge benchmarked “best” and “typical” projects from 310 designers. Each project was completed in 2012 or later with construction costs of at least \$10M.

Of the best projects Dodge found a statistically significant correlation between very high Lean intensity projects and likelihood for better client outcomes and design excellence.



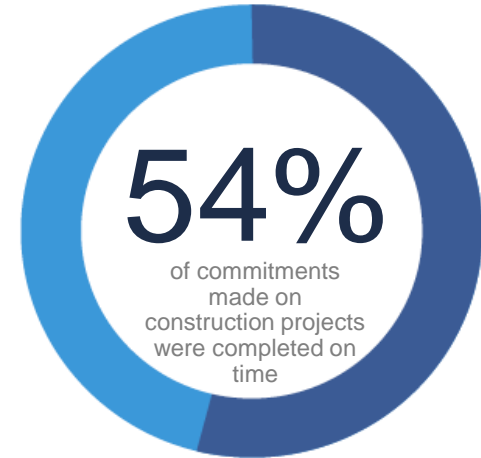
DODGE DATA & ANALYTICS

The Reliability Gap

In the early 90's, Greg Howell and Glenn Ballard conducted a study of construction projects and determined that on average 54% of commitments made on projects were completed on time.

This led to the development of the Last Planner System.

This gap in reliability extends to the design phase of projects where there is also room to improve.



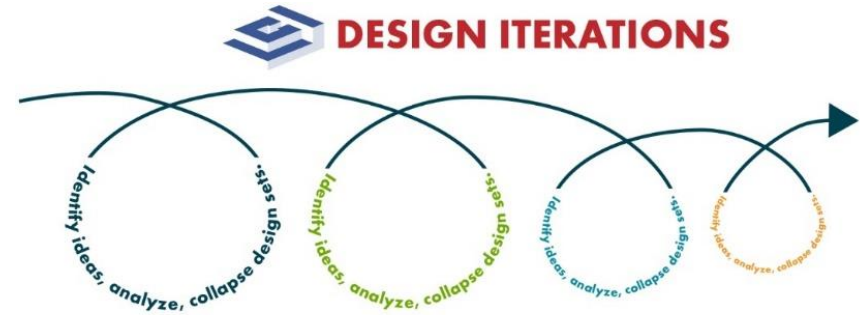


LPS® In Design

While design work doesn't have the hard logic of construction work, it is still accomplished in a network of commitments made among specialists.

That network can be designed and managed so that the work that should be done, can be done, and will be done.

Some adaptations have been made.



Design Considerations

While the Last Planner System® is used in construction, it is highly applicable and useful in design. Some key differences to keep in mind include:

Design:

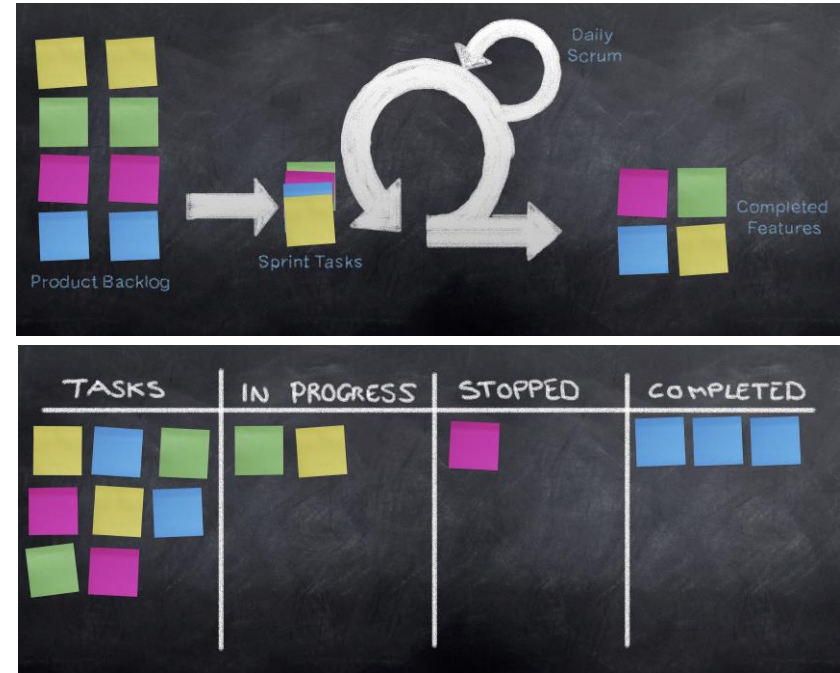
- Is emerging based on new information and the flow is “information”.
- Milestones are clearly defined by expected outcome which should describe what needs to be known.
- Milestones are often “decision points”.

Construction:

- Is linear in nature and the flow is “tangible materials”.
- Milestones are clearly defined by expected outcome which will be observable in the field.

Scrum & Agile Approaches

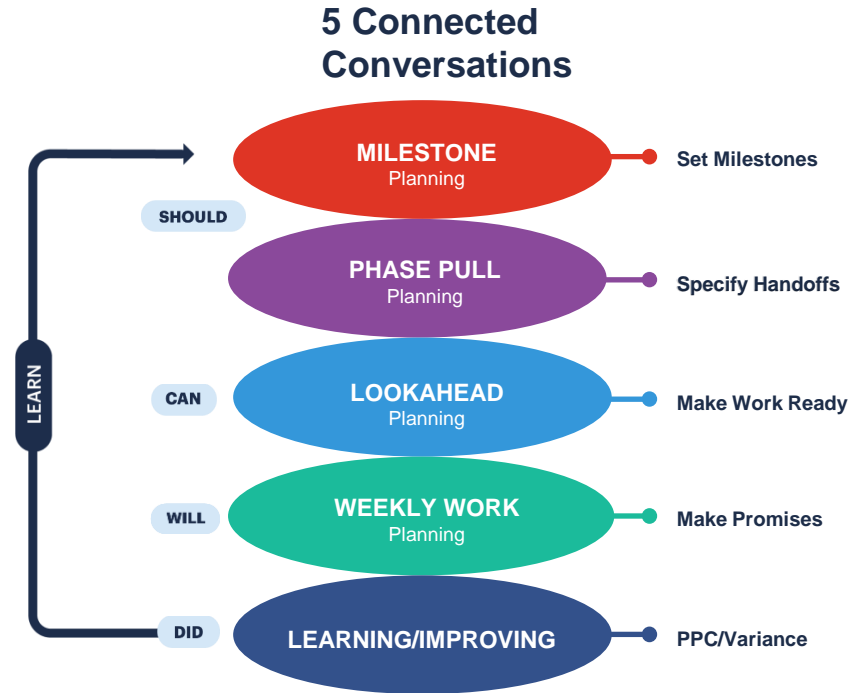
LPS as used herein was influenced by Scrum and Agile software development approaches integrated with Last Planner System principles and approaches.



5 Connected Conversations Of LPS®

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

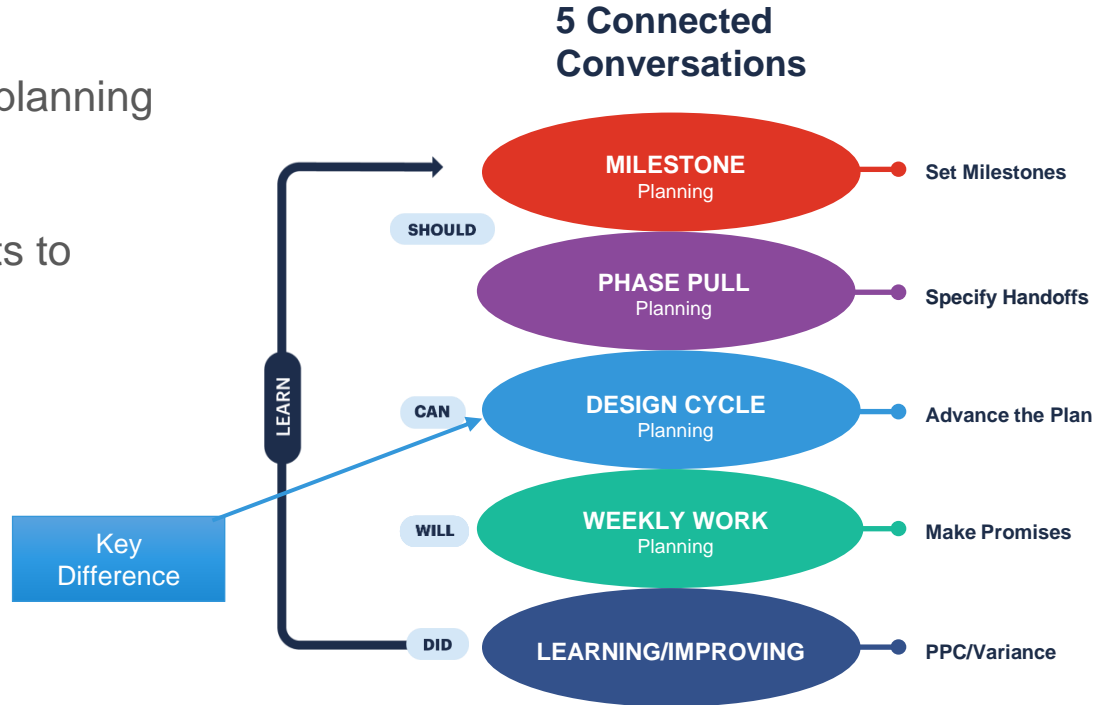
1. Milestone Planning (Should)
2. Phase Pull Planning (Should)
3. Lookahead Planning (Can)
4. Weekly Work Planning (Will)
5. Learning & Improving (Did/Learn)



LPS® Modified For Design

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

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



Who Is The Last Planner®

The *Last Planner*® (LP™) 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®



Courtesy of: InsideOut Consulting, Inc.

Understanding 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:

- A method of advancing work when the next in line customer is ready to use it. A “Request” from the customer signals that the work is needed and is “pulled” from the performer.
- Pull releases work when the system is ready to use it.



Creating Pull

- 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 commitments*, then delivering on the commitments.



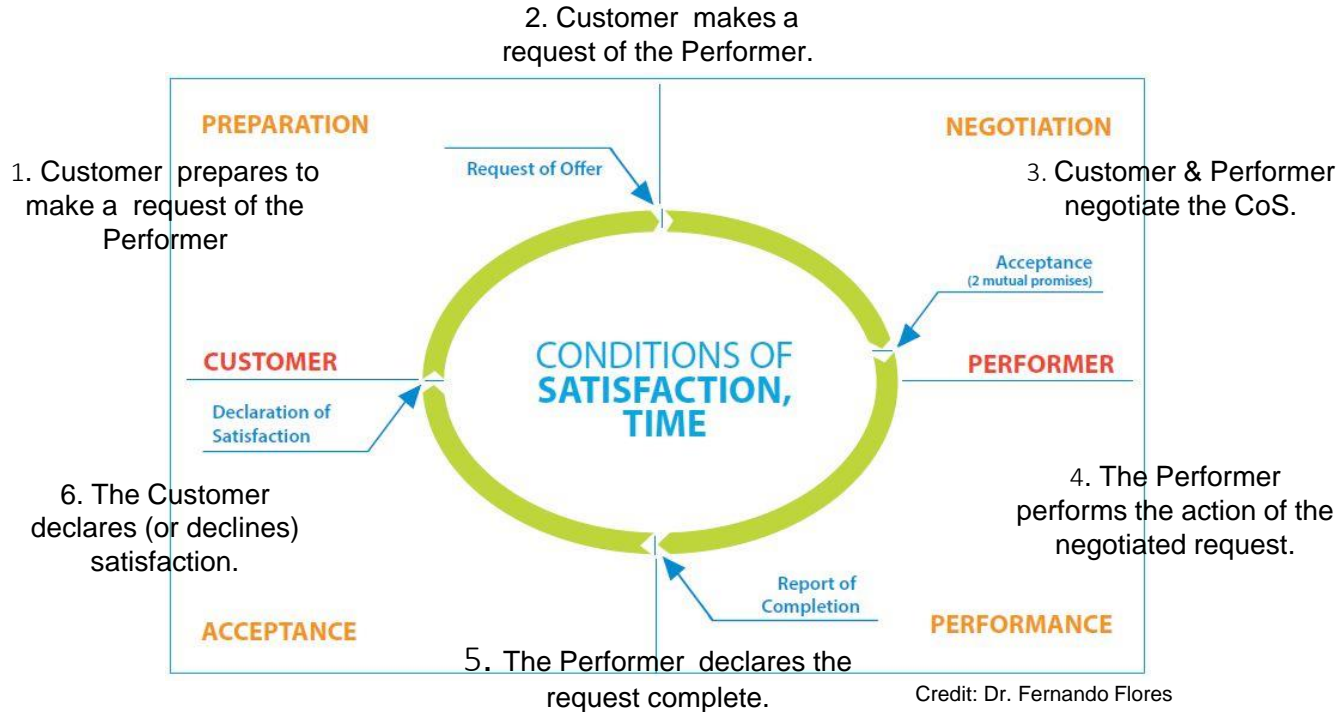
Elements Of A Promise

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.



Basic Action Workflow Of A Promise



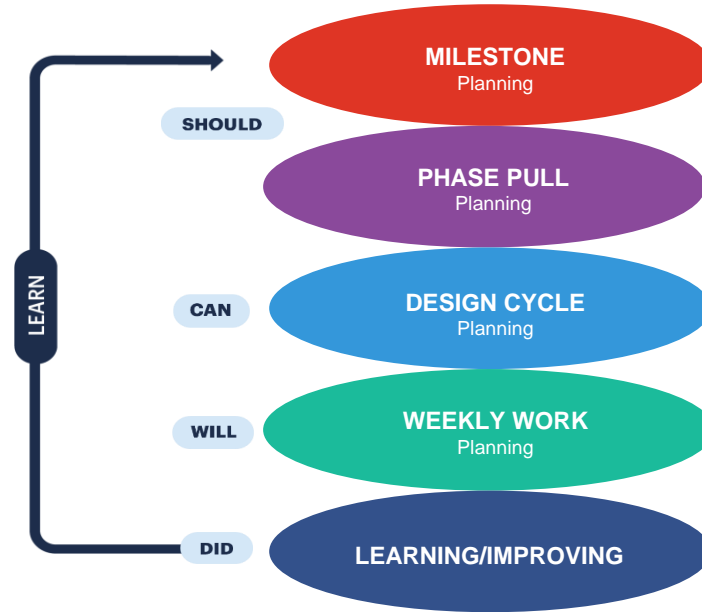
Milestone Planning

The first level of LPS is *Milestone Planning*.

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

The conversation at this level starts the “*should*” be able to do conversation.

5 Connected Conversations



Re-Defining Design Milestones

Traditional

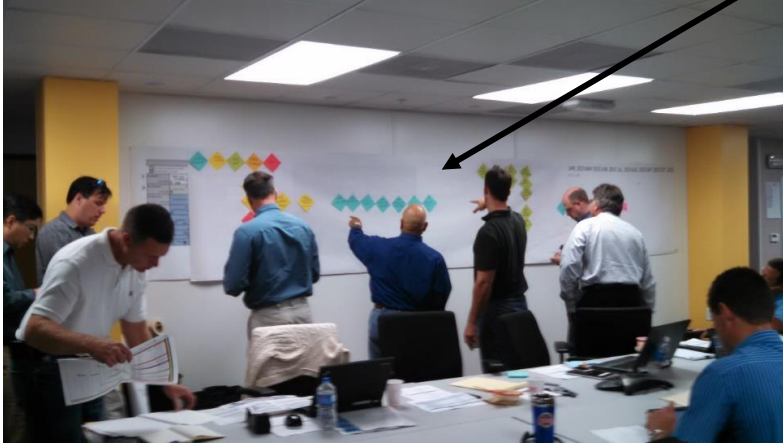
- Deliverable Drawing Sets
- Submit, Review, Price Iteration
- Percent Complete Sets
 - 30/60/90

Re-Defined

- Information Hand Offs
- Decision Points as Milestones
- Design first then draw
- Submission (permit) sets as backlog

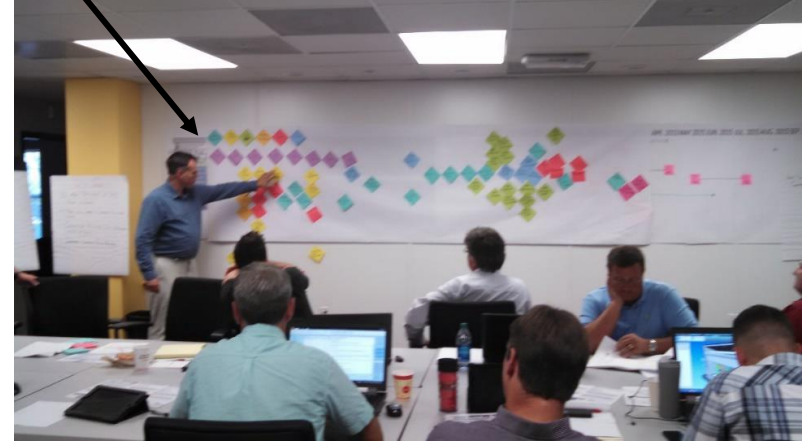
Creating The Milestone Plan

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

Creating The Milestone Plan

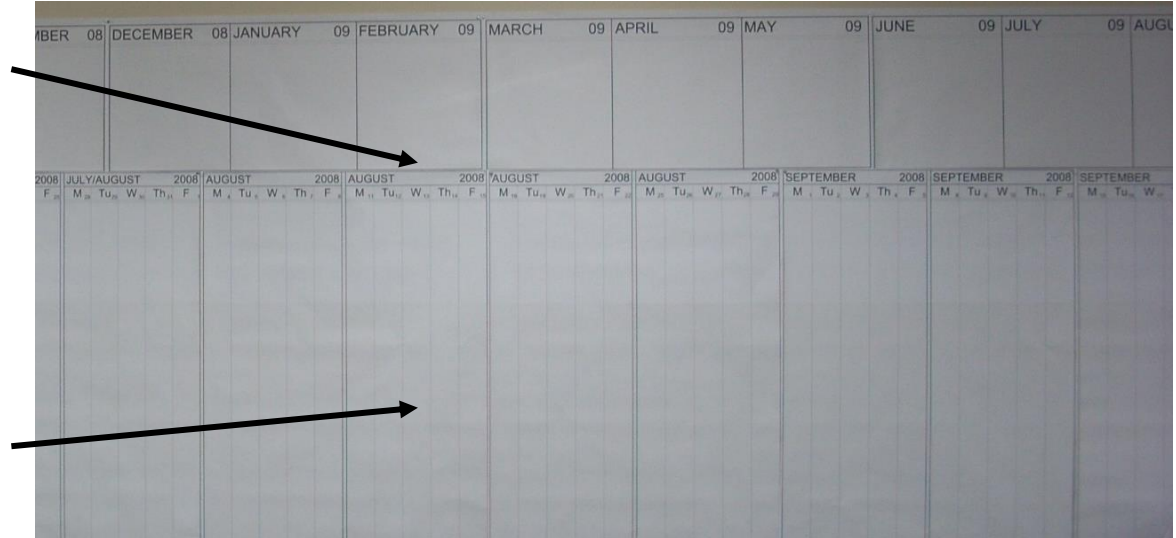
Developing the milestones to structure the flow.
The next step is to add estimated durations.



Courtesy of : The ReAlignment Group of California

This set up includes a time scale (months) to transfer the Milestone Plan to once dates are determined.

This set up includes a time scale (weeks & days) for the next level Phase Pull Planning.



Simulation Project



Business Plan:

Business Plan
HUD Tiny House

The Project

The following slides outline “The Project”
Business Case & relevant information



15 minutes

Owner Business Case

Owner:

Anytown Arizona Community Social Services Group

Mission Statement:

“Strengthen our community by creating living condition stability, economic opportunity and supporting services to those in need.”

Owner Business Case

- \$4,500,000 Allowable Cost
 - HUD grant and private donations
- 'Tiny Home' low income housing community of 45 units
- Approximately 40'x100' lot sizes
- Unit diversity 250 – 750SF
 - (Single, Single Parent, Couple + 1 Child)
- 10 year rent to own model
- Minimize Utility Costs (100 energy units / month)



Allowable Cost Breakdown

\$1,141,000	Land Purchase
\$550,000	Entitlements, Clearing/Grading & Utilities
<u>\$225,000</u>	<u>Project Administration</u>
\$2,574,000	Construction Funding <ul style="list-style-type: none">• Building, Landscape/Hardscape & Furnish
Rent to own: \$1/SF for 10 years, simple payback	
• Max allowable cost = 10 year rent – 5% Admin/HOA	

E.g. $550\text{SF} \times \$1 \times 10 = \$55\text{K} - 5\% = \$52,250$ (\$95/SF)



Project Site

- 4.6 Acre Parcel
- 40'x100' Lot subdivisions
- Main site, utility and roadworks by owner



Team-Developed CoS:

Quantitative

- Energy efficient design
 - Low monthly utility cost
 - High % of daylighting
 - Innovative water management system
- Meet the ***Allowable Cost***
- 25% workforce inclusion (Underemployed / Community Residents – min. 10% each)
- Community engagement:
- Regularly (weekly) updated progress signage at visible location
- Social Media Updates (min. 3 per week)
- Regularly (weekly) updated progress signage at visible location
- Social Media Updates (min. 3 per week)
- Robust, proactive protection of the safety of our workers and community:
 - Weekly team safety walk-throughs
 - Short-falls remediated immediately (no more than 24 hours)
 - System for immediate reporting of safety problems identified by workers and community members
- All team members earn a fair profit

05 minutes

Team-Developed CoS:

Qualitative:

- TVD team actively builds and sustains a culture of respect for all team members
- TVD team creates design that supports a culture self-respect for customer
- TVD team actively seeks innovation to reduce waste and wasteful activities, streamline processes, and improve the flow of work

Method of Measuring Success:

Monthly measurement of progress against CoS:

- Quantitative – Current results calculated and reported by CM
- Qualitative– Survey completed by all TVD team members
- Continuous Improvement session held to review results, and determine steps to correct short-falls against targets

Milestone Exercise

Develop Project Milestone Plan

- Color Code by phase/type of activity
- Pull back from final milestone
- Stay high level
- Refrain from:
 - 30/60/90
 - SD/DD/Final CD
 - Incorporate cost feedback
- Have fun!



First Home
Ready for
Occupancy

20 min Groups at Wall
15 minute de-brief

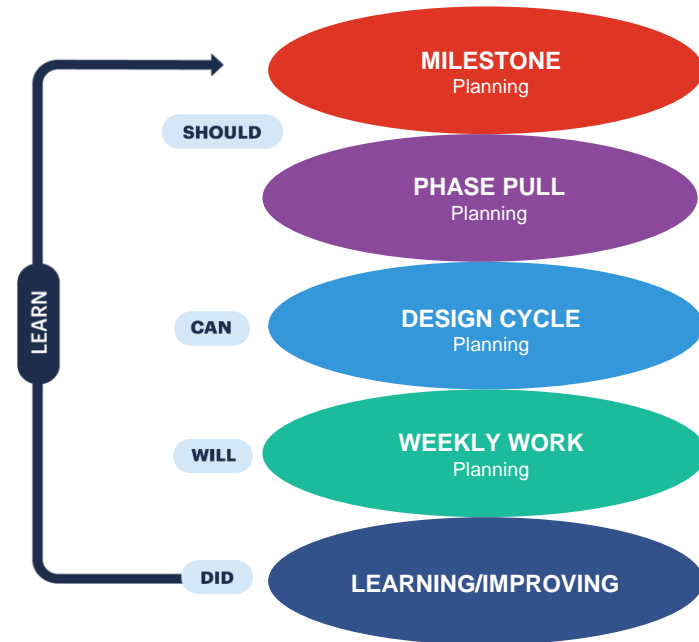
Phase Pull Planning

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

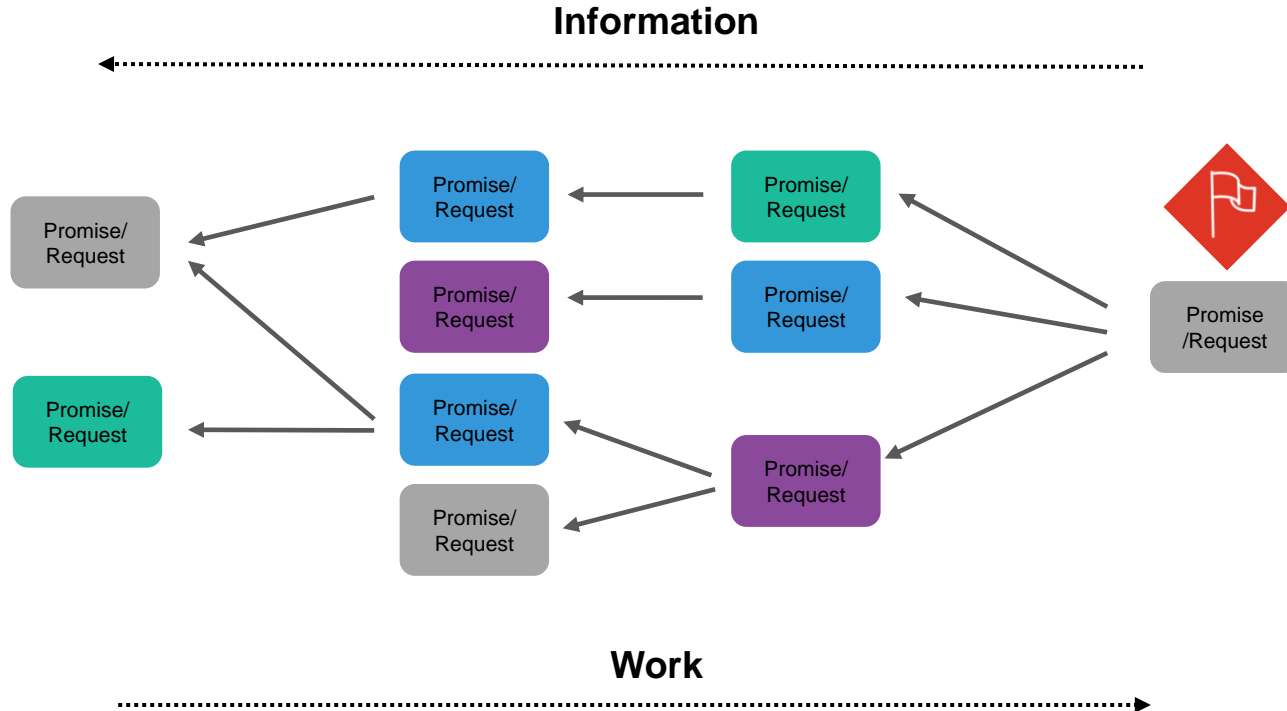
The goal of Phase Pull Planning is for the team to determine the key *handoffs* of work or information needed to deliver a milestone.

The conversation at this level continues the “*should*” be able to do conversation.

5 Connected Conversations



Pull-Creating Flow



Focus On Hand-offs





Creating Tags For Promises

The *Performer* completes a tag (Post-it note 4x6 preferred) to capture their *Promise* for work or information to be delivered to meet the *Request* of the downstream *Customer*.

The *Performer* then makes a *Request(s)* for work or information needed from a upstream *Performer* in order to complete their *Promise*.

A diagram of a tag structure, represented as a blue rectangle divided into two main sections. The top section is titled 'MY PROMISE' and the bottom section is titled 'MY REQUEST (S)'. Each section contains a bulleted list of items. Two black arrows point from the left towards the sections: one points to the 'MY PROMISE' section and the other points to the 'MY REQUEST (S)' section.

Name	Deliver Date
MY PROMISE <ul style="list-style-type: none">•What I will Deliver<ul style="list-style-type: none">•Be specific•Small batch	
MY REQUEST (S) <ul style="list-style-type: none">•What I need from others<ul style="list-style-type: none">•Be specific•Person /date	

Creating Tags For Promises

The *Performer's Promise* for work or information they will deliver.



Ralph M

June 4

Final set of documents
to Contractor for Permit
3 sets hard copy and electronic
format

The *Performer's Request(s)* for work or information needed to complete their *Promise*.



Documents from:
MEP & FP, Structural, Furniture
Vendor, Internal Arch, Interior
Design & Check from Owner
By _____

Creating Tags For Promises

The **Performer's** name
(not company) is
placed on the tag.



Ralph M

June 4

Upon negotiation of the
Conditions of Satisfaction
including a **delivery date**,
the date is noted.



Final set of documents
to Contractor for Permit
3 sets hard copy and
electronic format

Note additional
information that adds
clarity to the plan
includes who a request
is made of and the date
the request is needed.



Documents from:
MEP & FP, Structural,
Furniture Vendor, Internal
Arch, Interior Design &
Check from Owner
By _____
—

Creating The Phase Pull Plan

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



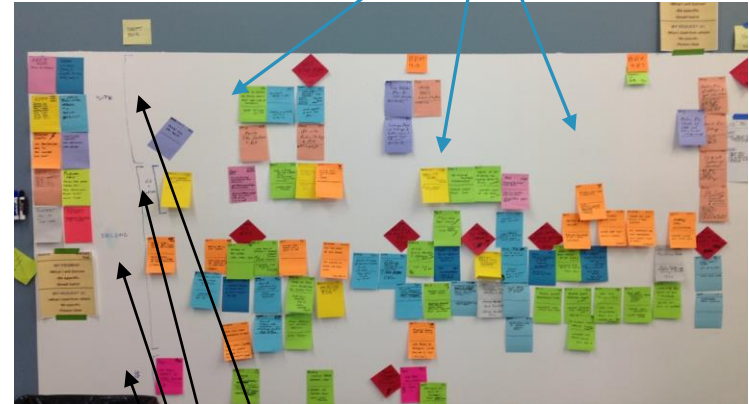
UHS Temecula Valley Hospital Team

Phase Pull Planning

Milestones



Swim Lanes



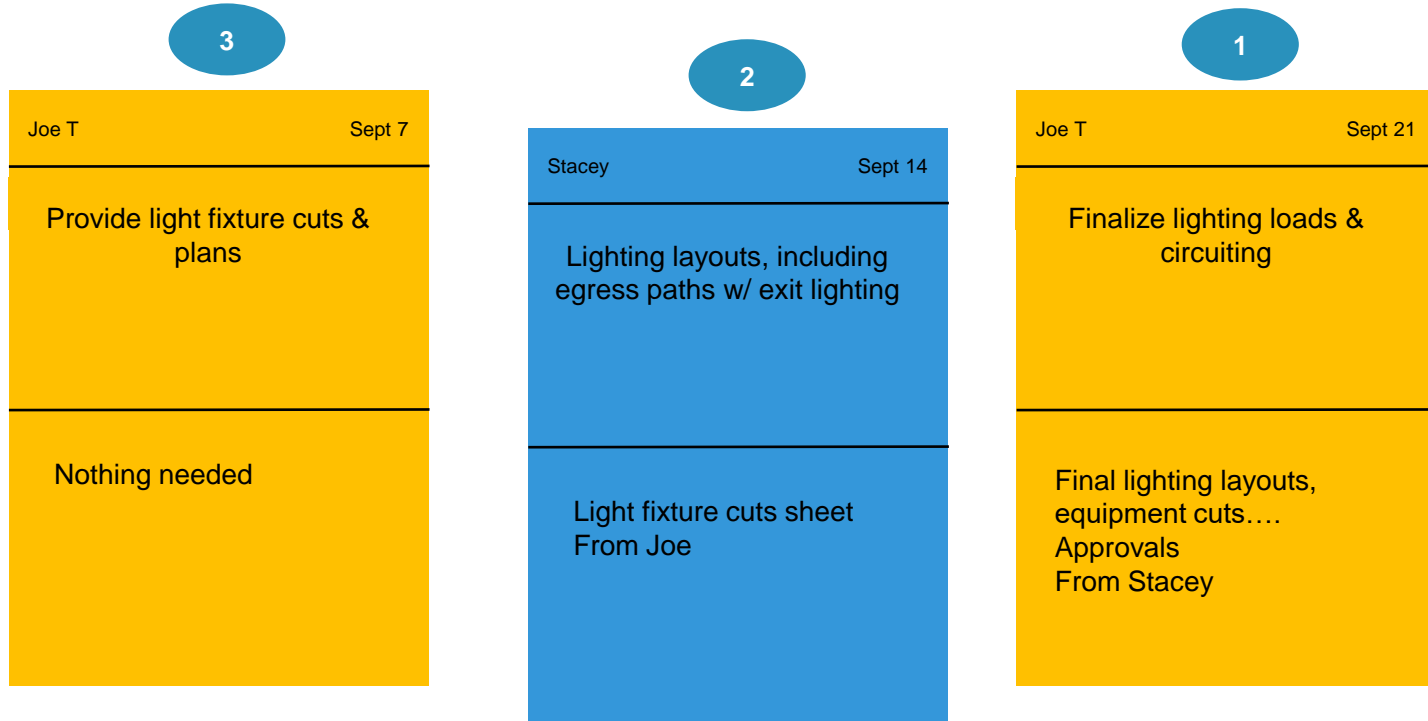
Site Package
Foundation Package
Shell & Core Package
Current Working Estimate

Pull Planning In Action

Note the 3 tag pull example from this planning session.



Pull Planning In Action





BENNETT WAGNER & GRODY ARCHITECTS

LEAN SCHEDULING

CONSULTANT TEAM

GSA FEDERAL OFFICE BUILDING

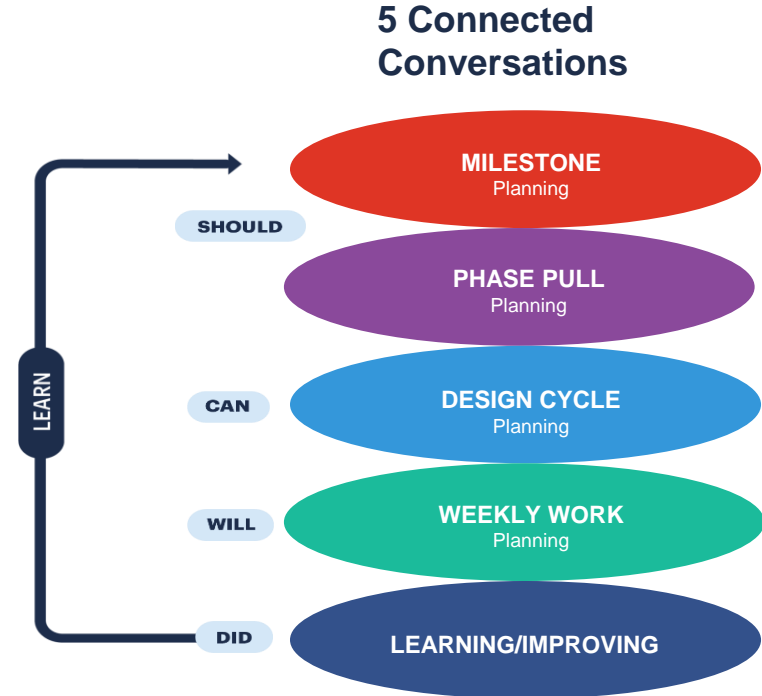
7/7/11 (3 HRS)

Design Cycle Planning

The third level of LPS is
Design Cycle Planning.

The goal of this level is to continuously *advance the level of detail* of the Phase Pull Plan in 2-3 week cycles of time.

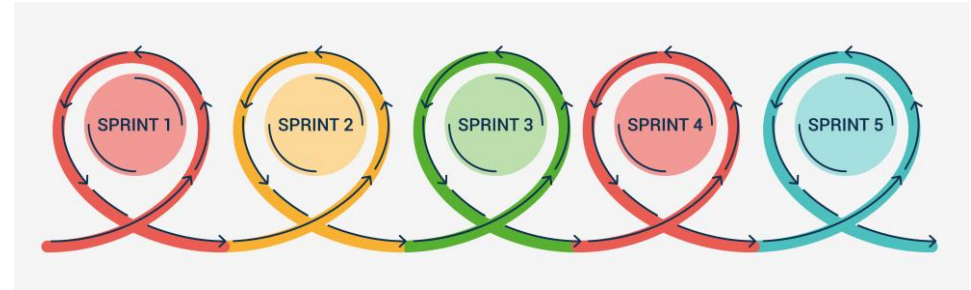
The conversation at this level is we “*can*” do this.



Scrum & Design Cycle Planning

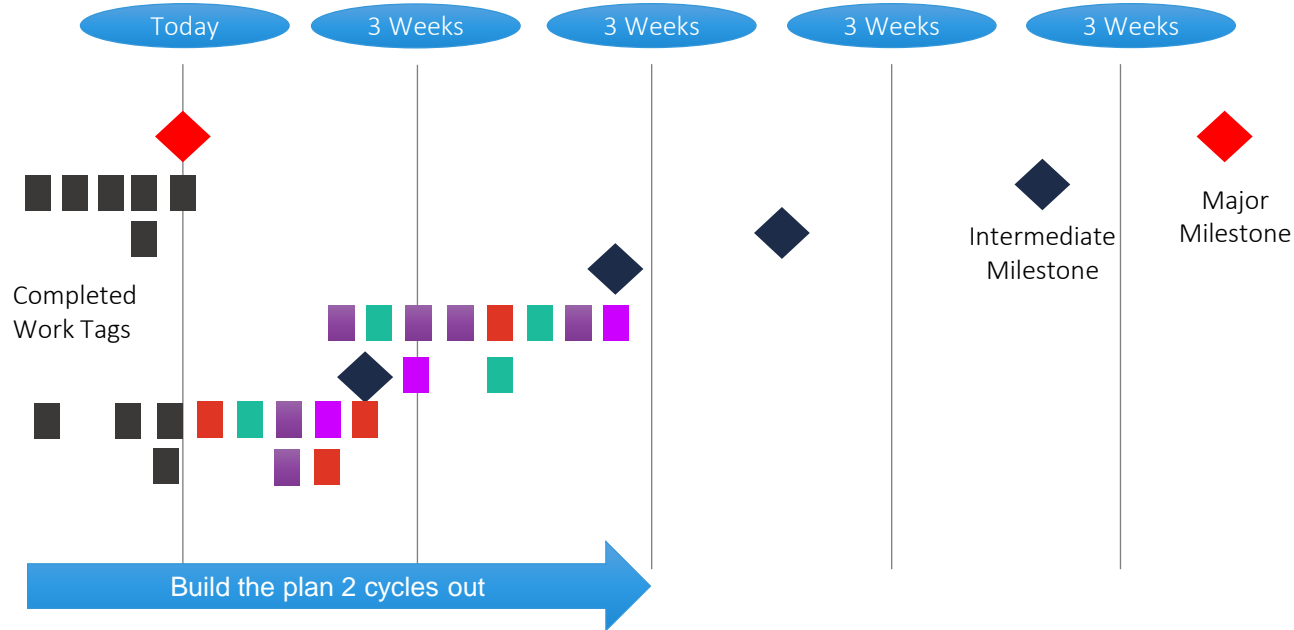
Design cycle planning draws from *Scrum* in software design.

In Scrum, teams focus on determining what work can be delivered in continuous 2-3 week cycles called sprints. This aligns well with design.



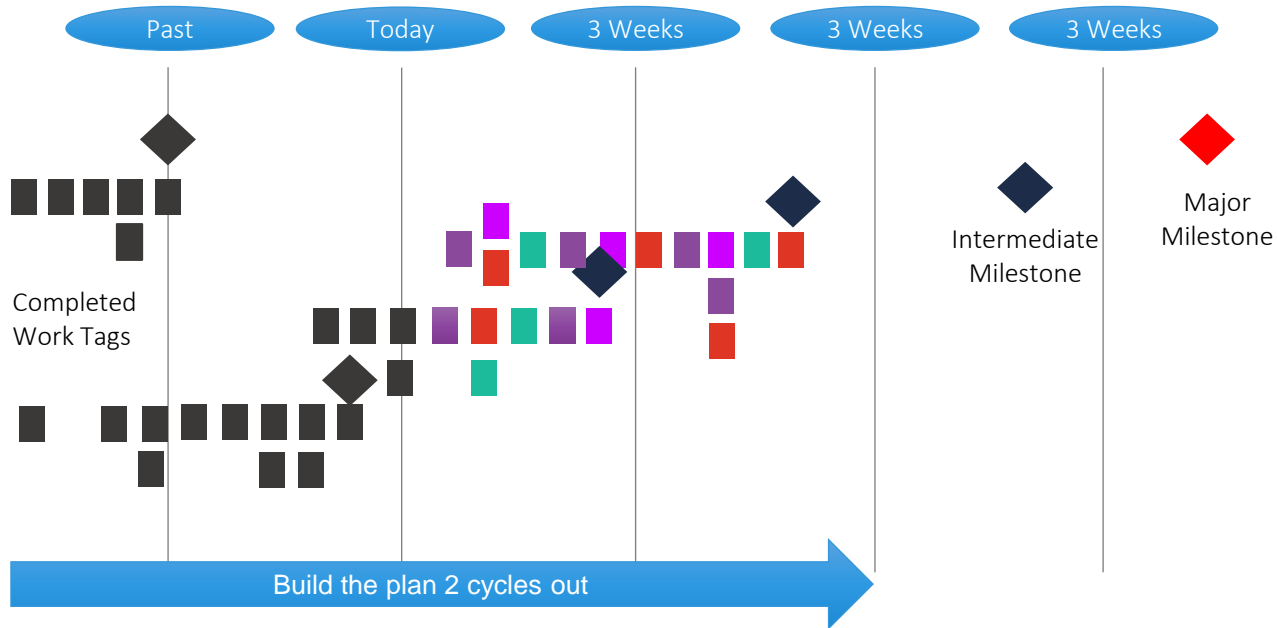
Advancing The Plan

Continuously advance the plan every 2-3 weeks, always staying 2-3 cycles ahead in time.

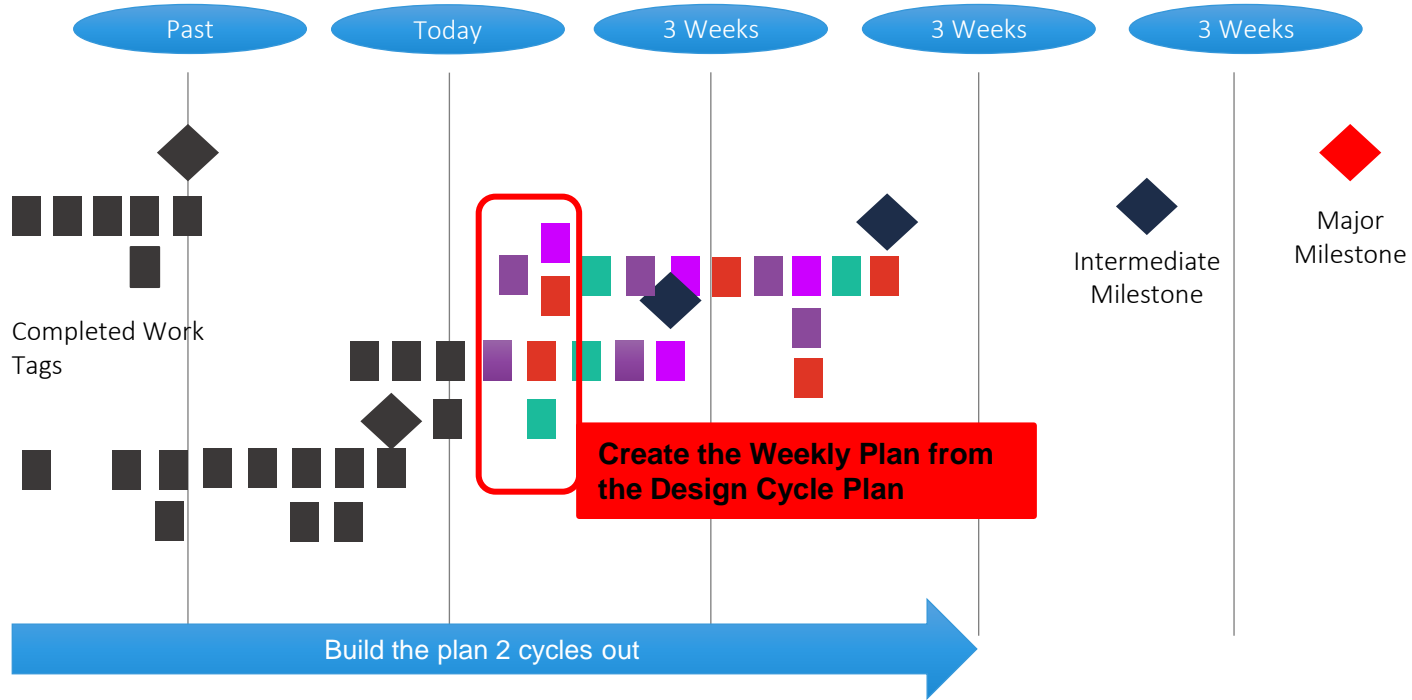


Advancing The Plan

Continuously advance the plan in 2-3 week cycles.



Advancing The Plan



Documenting The Plan

Whether using movable boards, or paper for the plan, the promises from the tags are documented in a *Work Register* for people to access at their place of work.



Project: [Dropdown]							
Date of Pull Plan: 09/30/19							
Milestones	Cycle Level Work	Requester	Performer	Discipline	Start Week	Estimated E1	Task Stat
Week of 9/20							
City B Site Plan	Discuss SCE with Rahm	self	Ward	Architectural	20-Sep	Done	
City B Site Plan	User name password Project Wise for Emily	Emily	Vanessa	DPR	20-Sep	Done	
City B Site Plan	Conservation w/Marge (see list)	self	Cynthia	Civil	20-Sep	Done	
City B Core and Shell	UHST Approval of Space Program					Done	
City B Core and Shell	Structural Steel Trade Partner		Turner/DPR		20-Sep	Done	
OSHPD "I" Submission 1.1	Appoint/confirm LV designer		Scott	Electrical	20-Sep	Done	
City B Site Plan	Obtain COT for building permit and email to team	Team	Ward	Architectural	20-Sep	Done	
City B Site Plan	Email first floor to trade partners and Site and CV and LA	Team	Ward	Architectural	20-Sep	Done	
OSHPD "I" Submission 1.1	Complete 3rd party code review		Shaw	Architectural	27-Sep	Done	

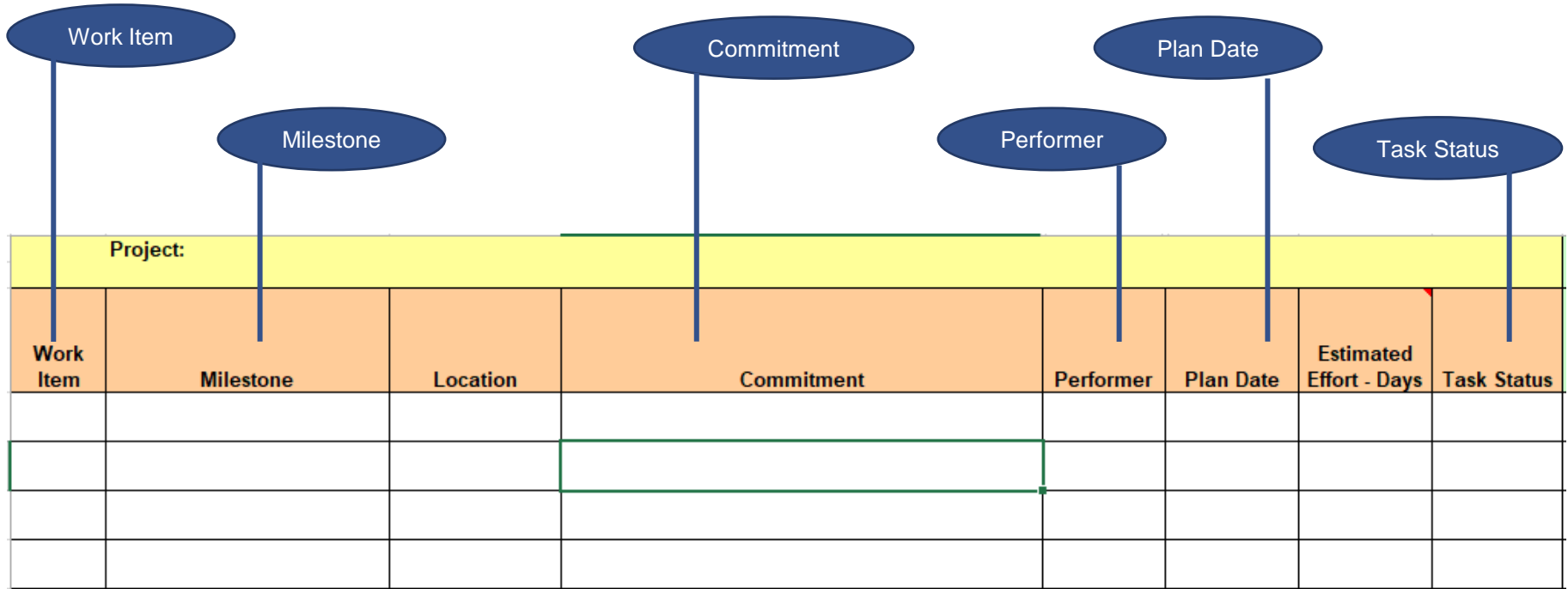
UHS Temecula Valley Hospital Team

The Work Register is a combination of :

- The Commitment Log to stay on track with the commitments made.
- The Constraint Log to track the roadblocks that arise for any commitment.

[illegible]

Elements Of The Commitment Log

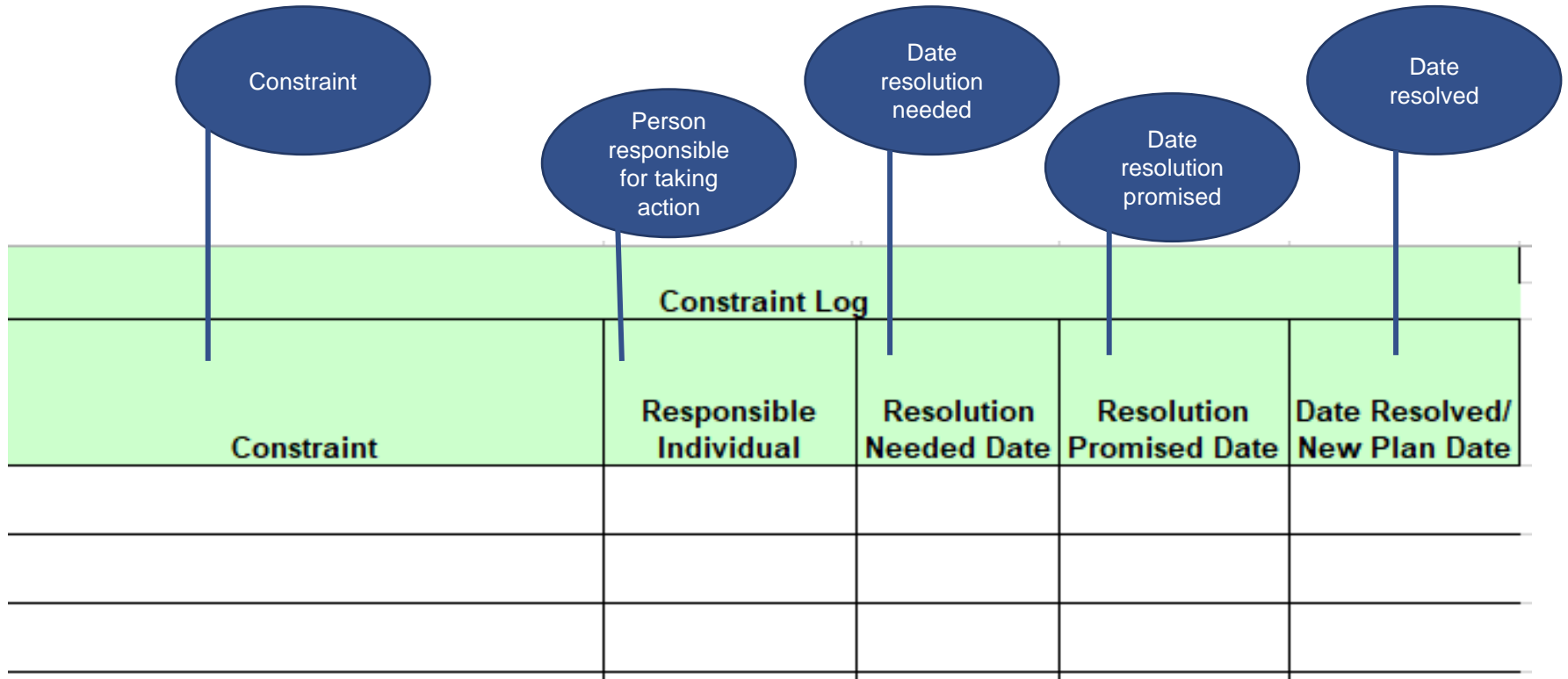


The diagram illustrates the components of a Commitment Log. Callouts in blue ovals point to specific columns in the table below:

- Work Item** points to the first column.
- Milestone** points to the second column.
- Commitment** points to the fourth column.
- Performer** points to the sixth column.
- Plan Date** points to the seventh column.
- Task Status** points to the eighth column.

Project:							
Work Item	Milestone	Location	Commitment	Performer	Plan Date	Estimated Effort - Days	Task Status

Elements Of The Constraint Log



Phase Pull Plan Exercise

Develop Design Phase Pull Plan

Name	Deliver Date
MY PROMISE <ul style="list-style-type: none">•What I will Deliver<ul style="list-style-type: none">•Be specific•Small batch	
MY REQUEST (S) <ul style="list-style-type: none">•What I need from others<ul style="list-style-type: none">•Be specific•Person /date	

- Put a date scale at top (Weeks)
- Pick a milestone that involves many participants
- Color Code by discipline
- Define the milestone outcome
- Pull back from the milestone

45 min Groups at Wall
15 min de-brief

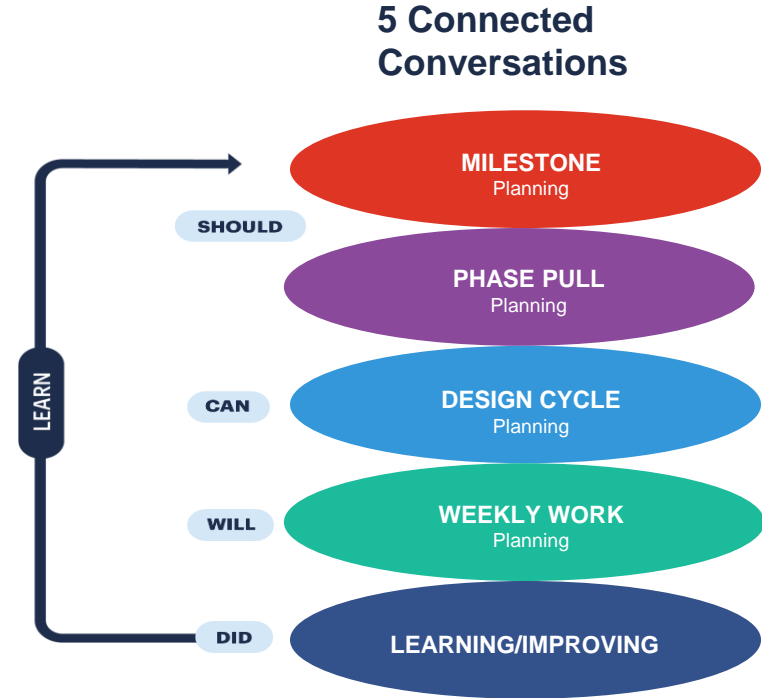
Weekly Work Planning

The fourth level 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.

At this level a Scrum or Kanban board can be integrated.

The conversation at this level is we “*will*” do this.



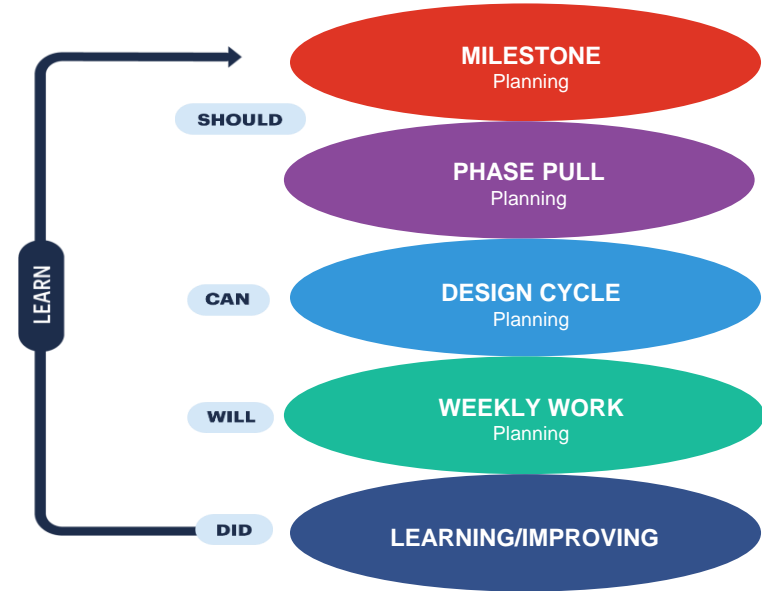
Weekly Work Planning

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*.

5 Connected Conversations



Conducting Check-in Sessions

Check-in Sessions are short, high energy touch points. They are best conducted standing.

Each person answers:

1. What promises I fulfilled. (Declaring Done)
2. What promises I will fulfilled. (Managing Commitment)
3. What are my constraints or concerns. (Constraint management)
4. What is the status of my commitments overall. (Am I on track).

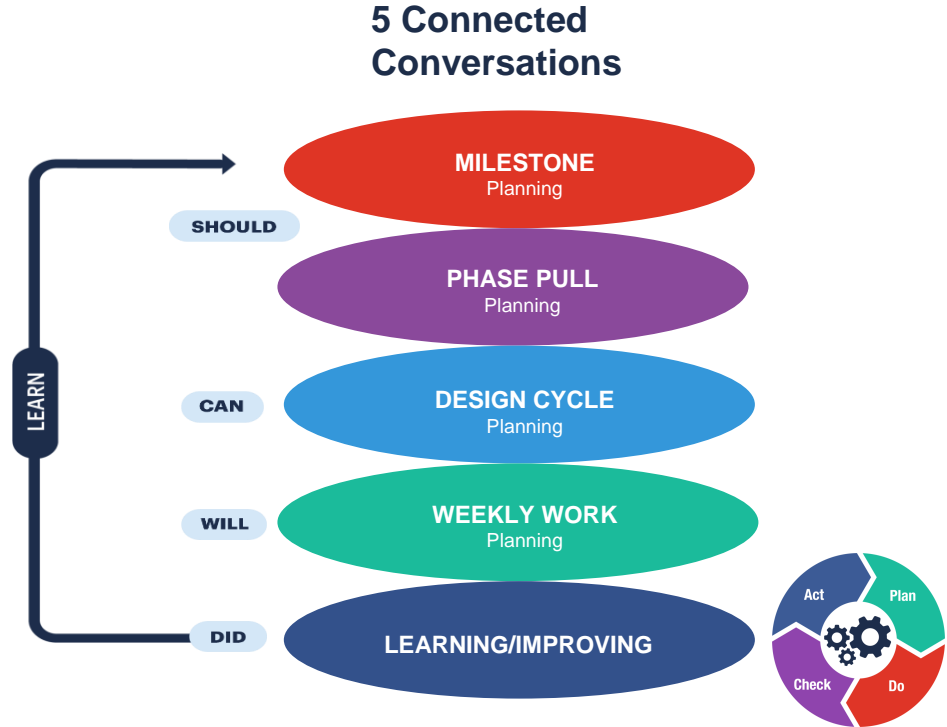


Learning/Improving

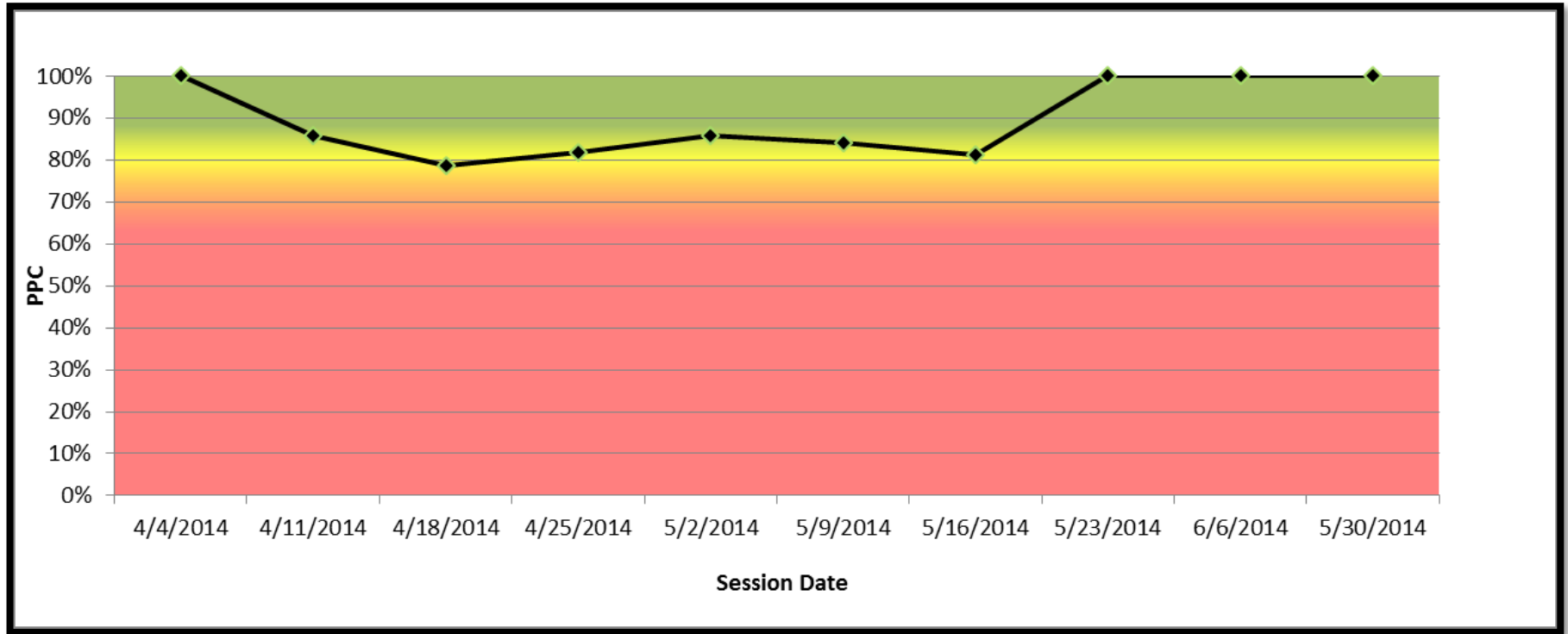
The fifth level is *Learning/Improving*.

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

The conversation at this level is we “*Did*” and “*Learned*”.



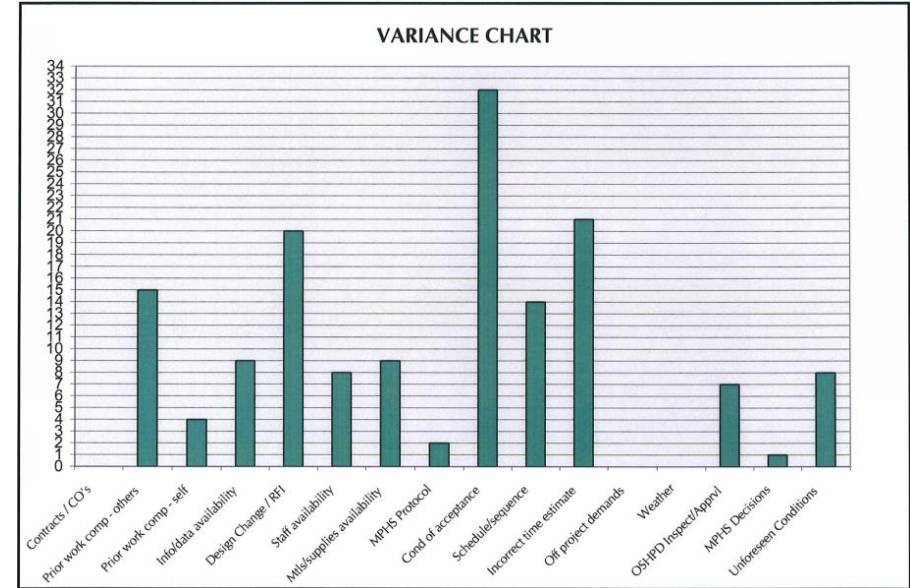
Track Percent Plan Complete



Reasons For Variance

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.



Reasons for Variance

Design Phase:

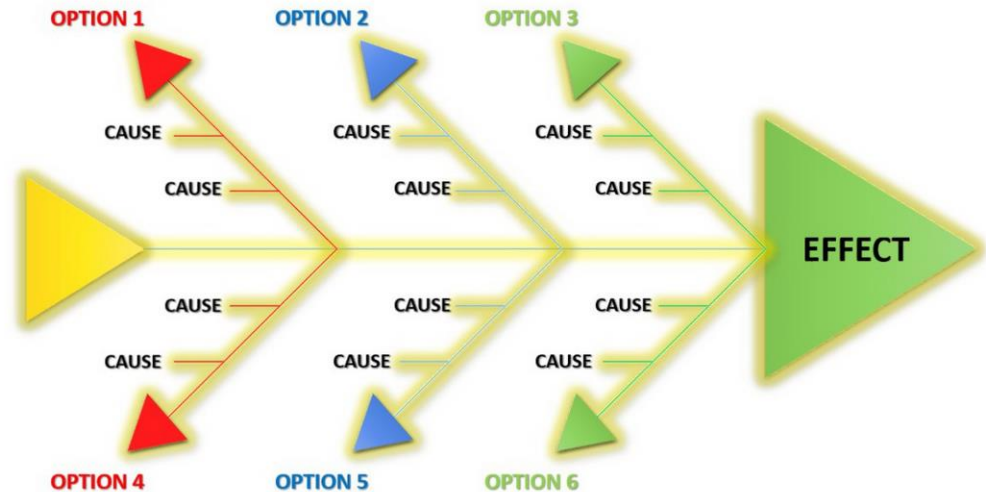
1. Overcommitted
2. Miscommunication
3. Previous work not complete
4. Change in work plan
5. Outside constraint
6. Resources not available
7. Other



Root Cause Analysis

Root Cause Analysis is a systematic method of analyzing possible causes to determine the root cause of a problem.

FISHBONE DIAGRAM



Discussion Question

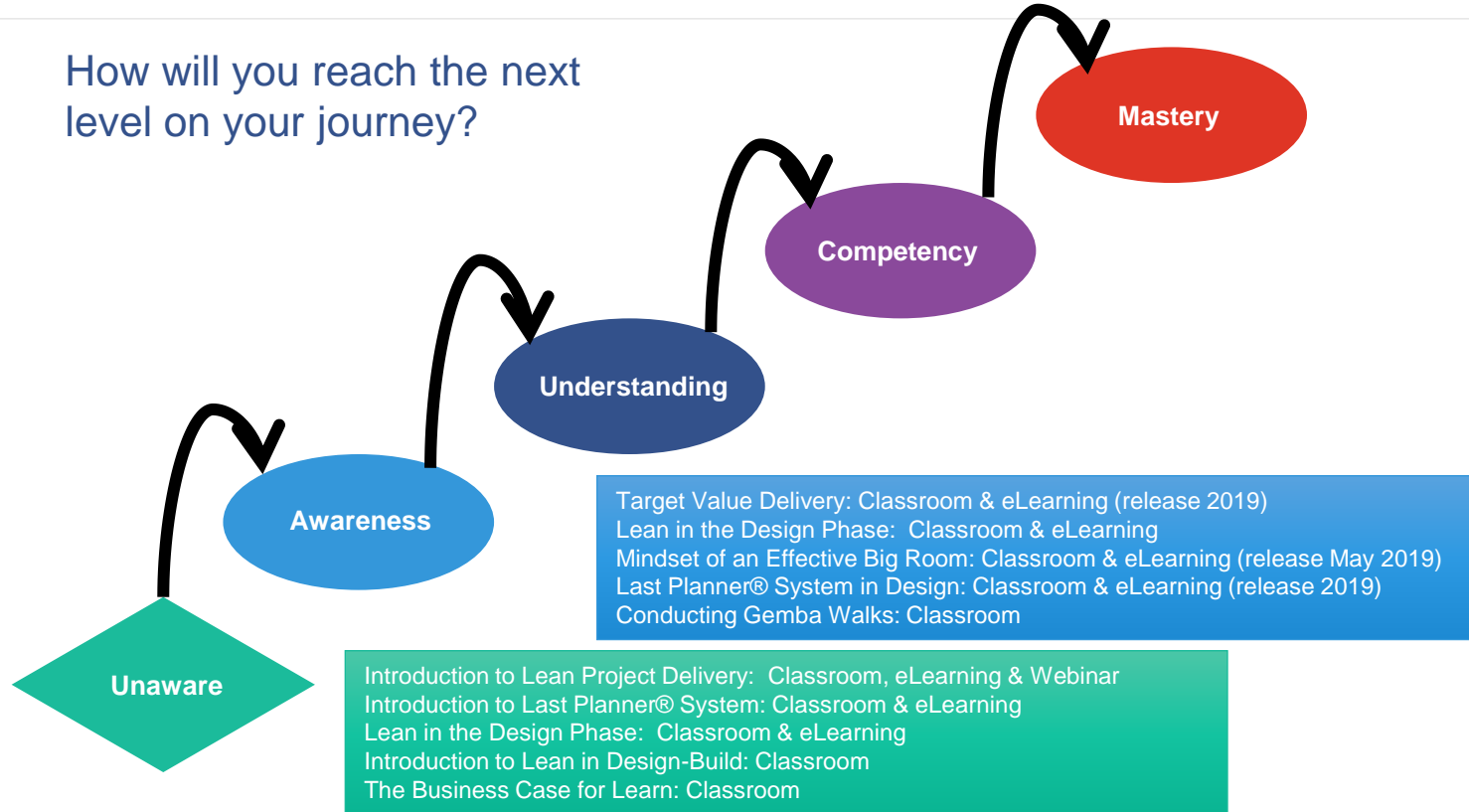
How to Implement?

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

10 min table conversation

Lean Journey to Mastery

How will you reach the next level on your journey?



More on Learning

Books:



Events:

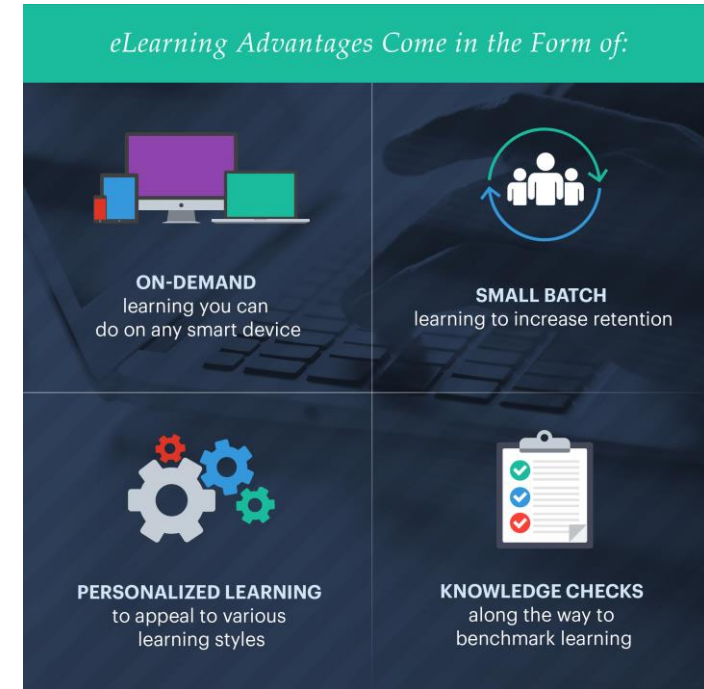
- Local Community of Practice
- Congress (October)
- Design Forum (May)

Start learning now:

www.LeanConstruction.org

eLearning

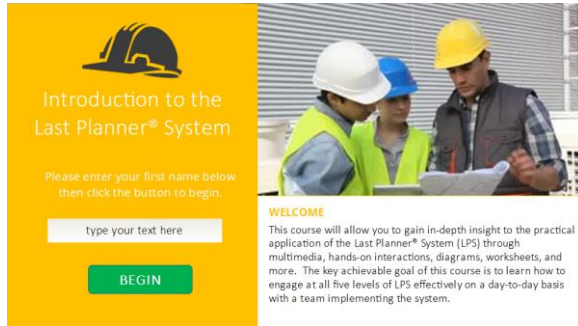
- **Learn on your own time** without taking time off project work
- **Increase knowledge retention by up to 60%** with interactive, small-batch learning
- **Access field resources** to use with teams
- **Earn 1.5 CEUs** (self report to AGC CM-Lean and/or AIA)
- **Incentivize with LCI badging credentials** for email signatures and a certificate of completion
- **Save money** by eliminating instructor and travel expenses
- **Enterprise-level model:** unlimited access to all our eLearning courses directly from your own internal Learning Center or Learning Management System.



eLearning Courses

Available now:

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



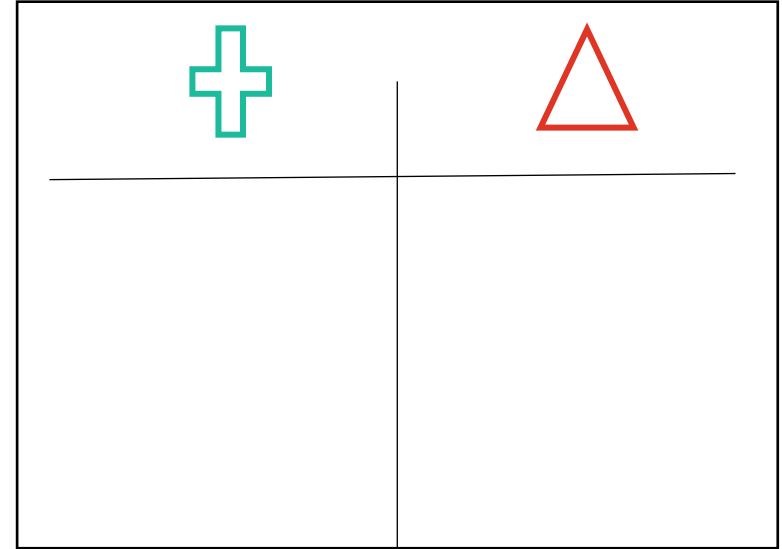
Conduct Plus/Delta

Conduct a Plus/Delta

Capture on a flip pad or white board:

Plus: What produced value during the session?

Delta: What could we change to improve the process or outcome?



This concludes The American Institute of Architects Continuing Education Systems Course

Lean Construction Institute



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