Lean Construction Institute
Immersive Education Program

Target Value Delivery Module 3: Organizing for Flow & Efficiency

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October 22, 2024

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LCI Course:
Target Value Delivery Module 3:
Organizing for Flow & Efficiency
4 CEU

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AIA Approved Continuing Education

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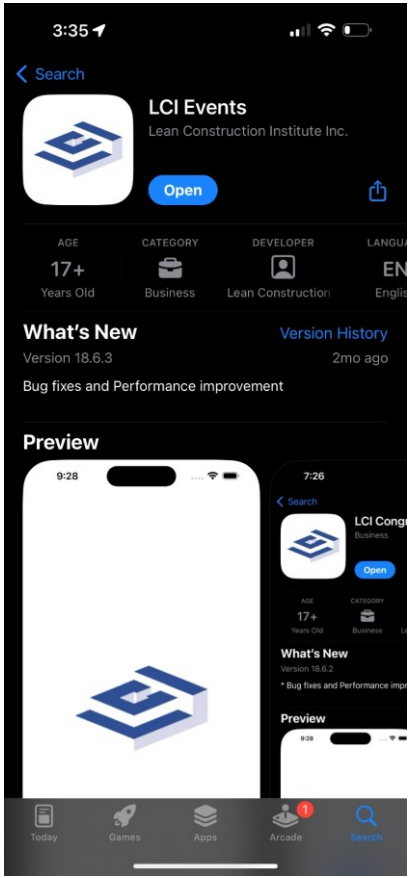

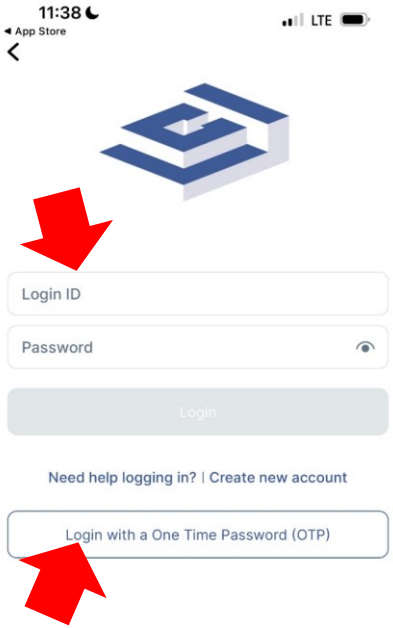

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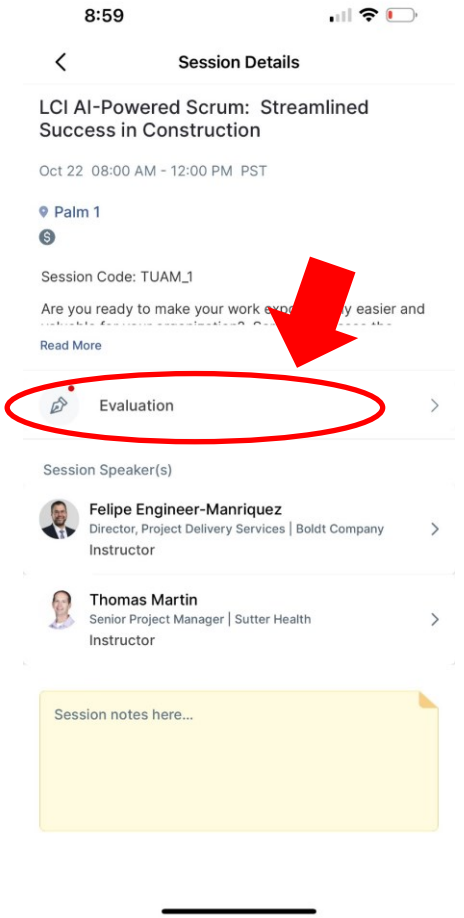

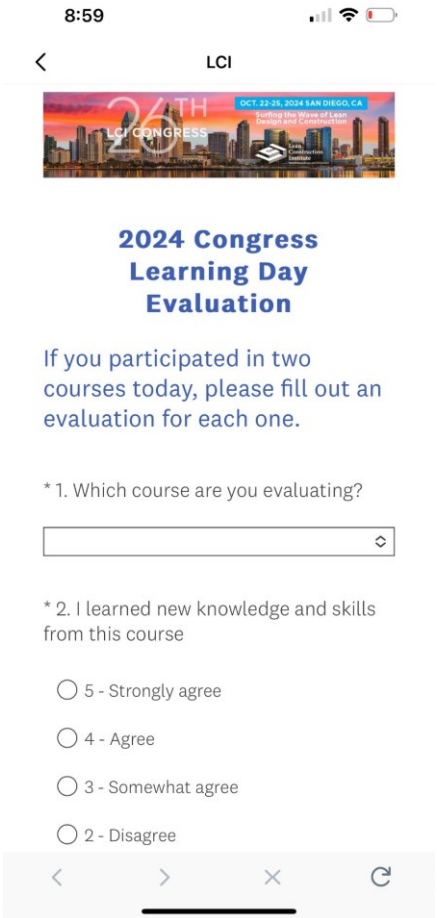

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TVD Modules

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Module 1: Learning the Fundamentals

- Gain insight into how implementing TVD approaches improves project outcomes through an overview of the phases and key components of TVD.

Module 2: Setting the Stage for Success

- Discover how creating early alignment and understanding of the owner's Business Case, Value Statements and Conditions of Satisfaction will lead to successful outcomes and how these foundations become the anchor for future decisions.

Module 3: Organizing for Flow and Efficiency

- Discover how teams can be challenged with maintaining effective processes and engagement through creating a cross-functional work cluster organization as a highly effective means of driving innovation and productivity through concurrent work.

Module 4: Modeling for Predictable Outcomes

- Experience a framework for predictive cost modeling, target setting and rapid innovation capture in collaborative TVD environments.

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Learning Objectives

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Discover how to effectively organize and manage teams in cross functional, interconnected work clusters and how cluster groups engage with cost model and Last Planner System in Design.

Discover the importance of key leadership roles and responsibilities that are foundational to the successful implementation of Target Value Delivery, information management, and decision making.

Identify what are the characteristics of effective facilitation and Lean practices at a project and work cluster level for Target Value Delivery to support information flow.

Understand information and decision-making workflow across clusters and from cluster groups to decision making authorities within team and how to manage owner prerogative in the context of consensus driven decision making.

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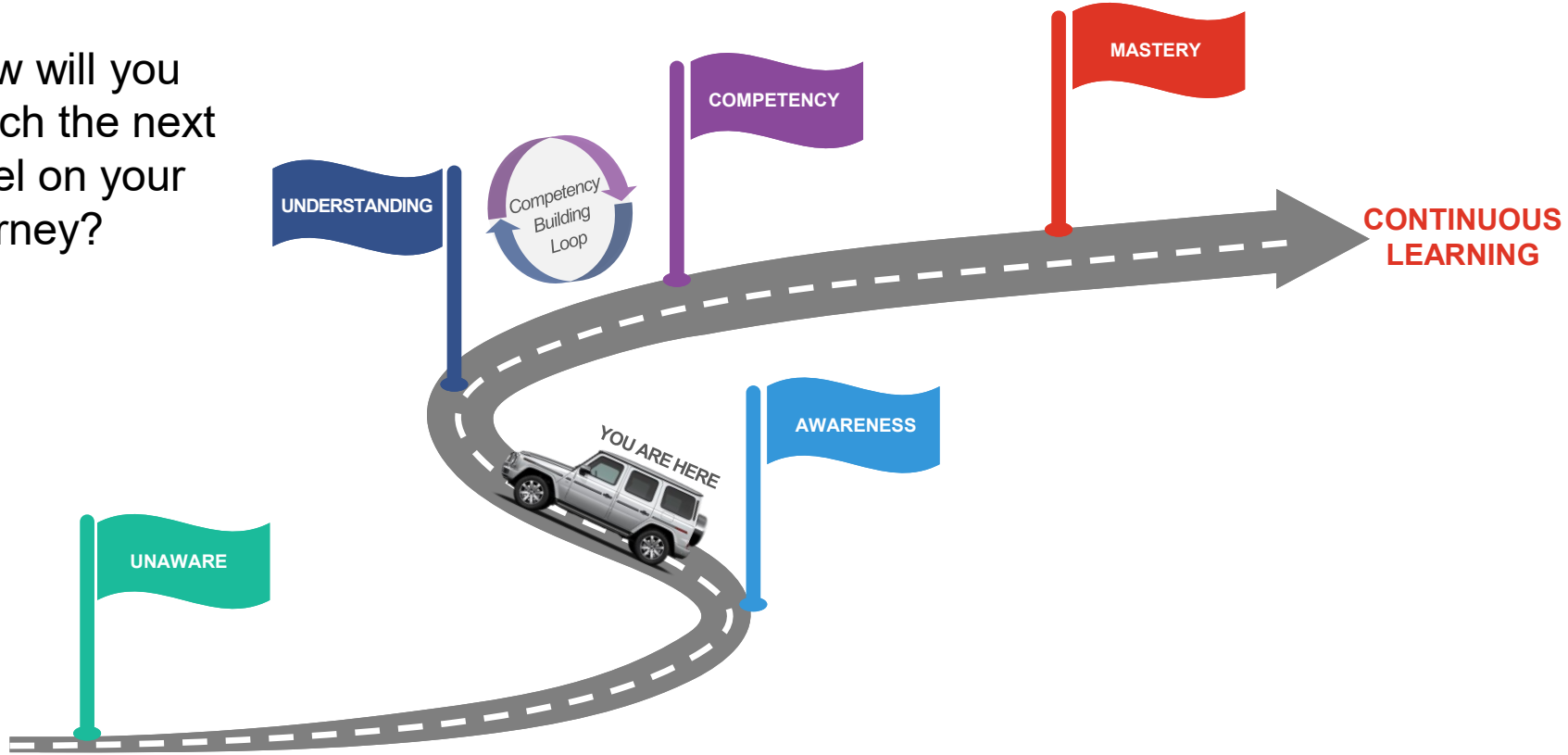
Lean Journey to Mastery

How will you reach the next level on your journey?



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Project Elements

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Lean teams organize in a structure that leads to improved coordination, outcomes and shared leadership.

Lean can be implemented regardless of commercial terms: Design-Bid-Build, Design-Build or Integrated Project Delivery. The degree of implementation varies with the terms.

A Lean Operating System is a organized implementation of Lean Principles and Tools combined to allow a team to operate in unison to create flow.

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Six Tenets of Lean Construction

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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

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Target Value Delivery

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8:00 AM – Class Begins

9:45 AM – Break 15 minutes

12:00 PM – Class Adjourns

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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!

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References

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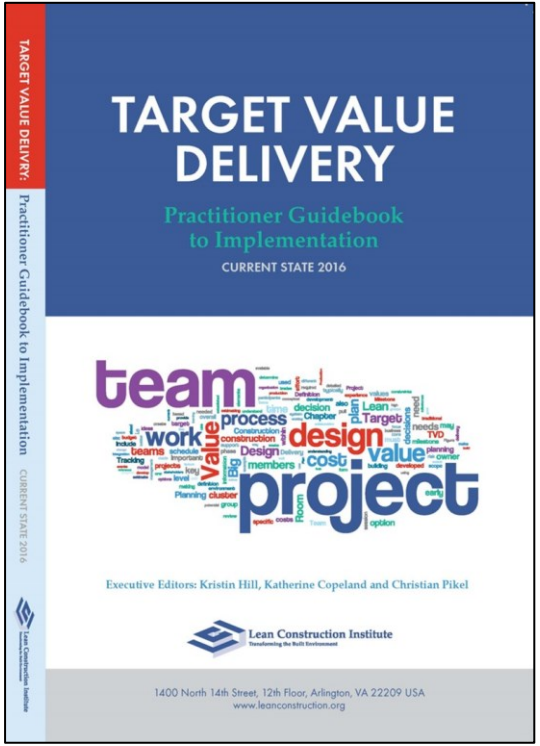

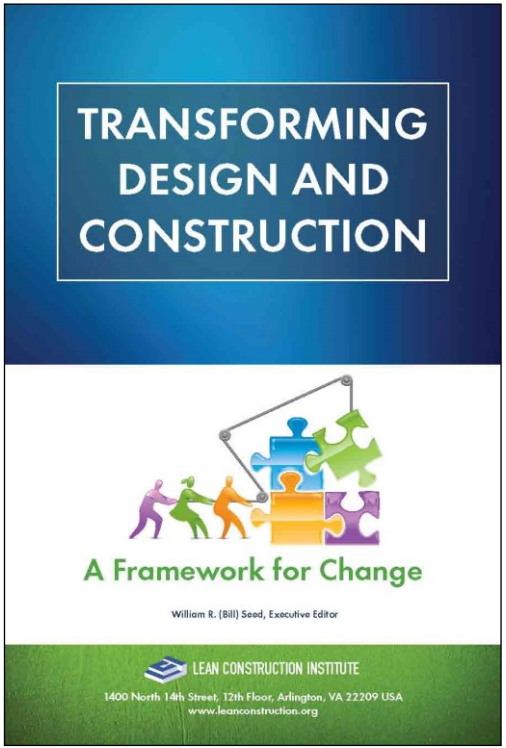

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Introduction / Discussion

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Introduction: Who you are, What you do & What you hope to get from the day.

Discuss challenges associated with team organization and information flow?

15 MINUTES

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Participants' CoS

What do you want to gain from this workshop?

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TVD Definition

A disciplined management practice to be used *throughout* the project to ensure:

- The facility meets the operational and performance *needs and values* of the users.
- The project is delivered within the *allowable budget*, *schedule*, and *intended scope.*
- That *innovation* is promoted throughout the process to *increase value* and eliminate waste.

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Target Value Delivery (TVD)

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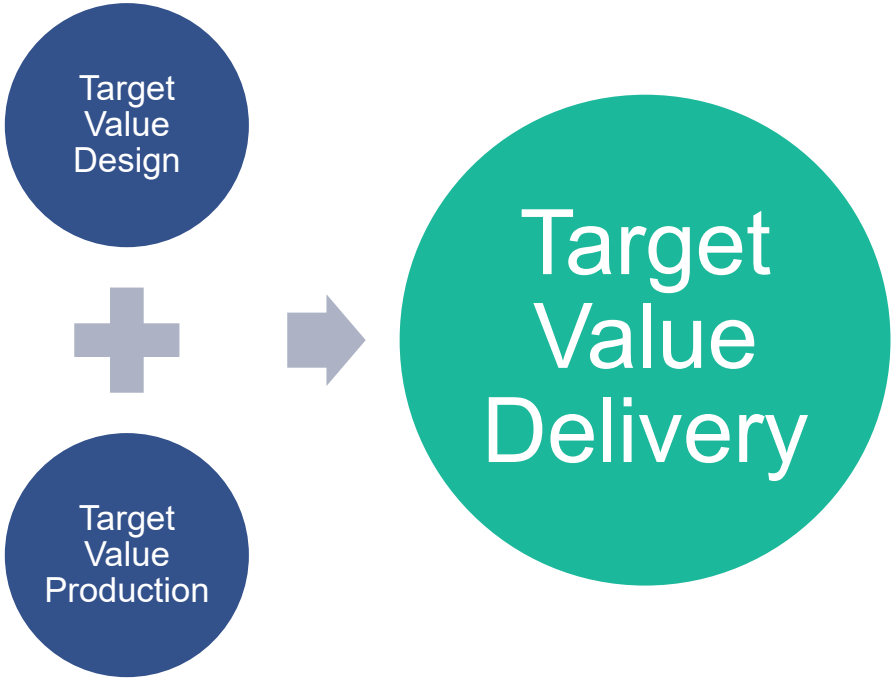
Target Value Delivery *encompasses* Target Value Design **AND** Target Value Production (Construction).



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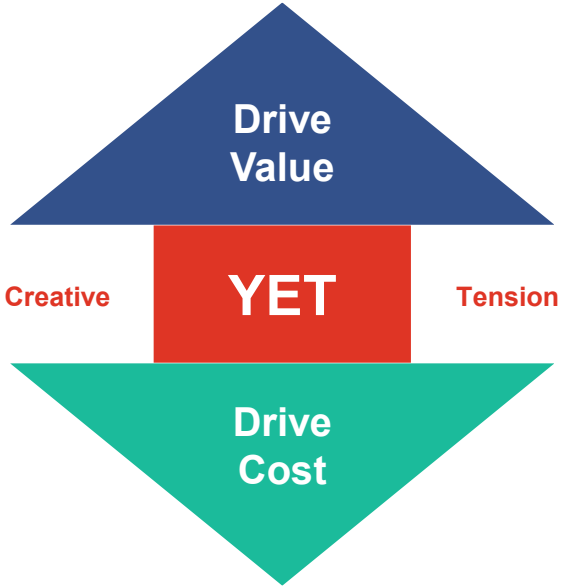
Application

Target Value Delivery is to be applied holistically to obtain maximum value.

Regardless of the project delivery framework, the owner, designers, builders, and key trades must be fully engaged from the onset.

It generates a creative tension between driving up quality YET driving cost down.



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Traditional vs. Target Value Delivery

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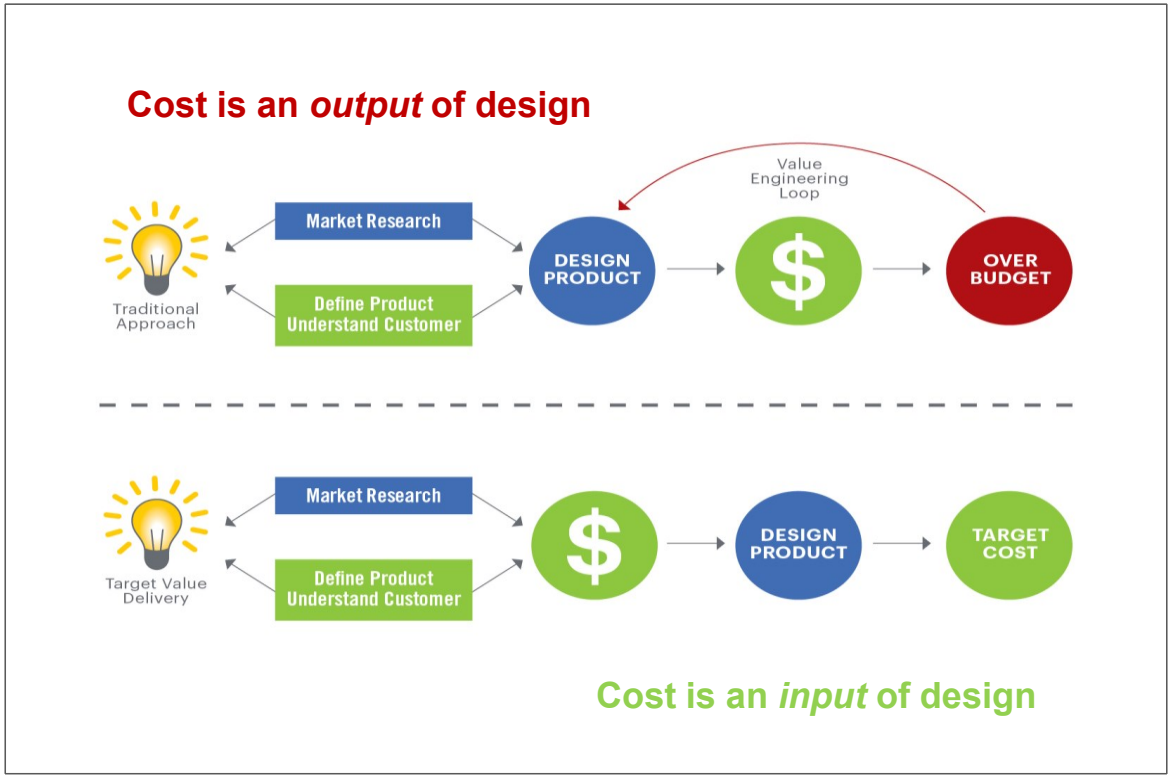
The goal of TVD is to minimize the waste produced by the design, estimate and redesign cycle(s) of the traditional value engineering approach.



Courtesy of HKS Architects

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TVD Phases Overview

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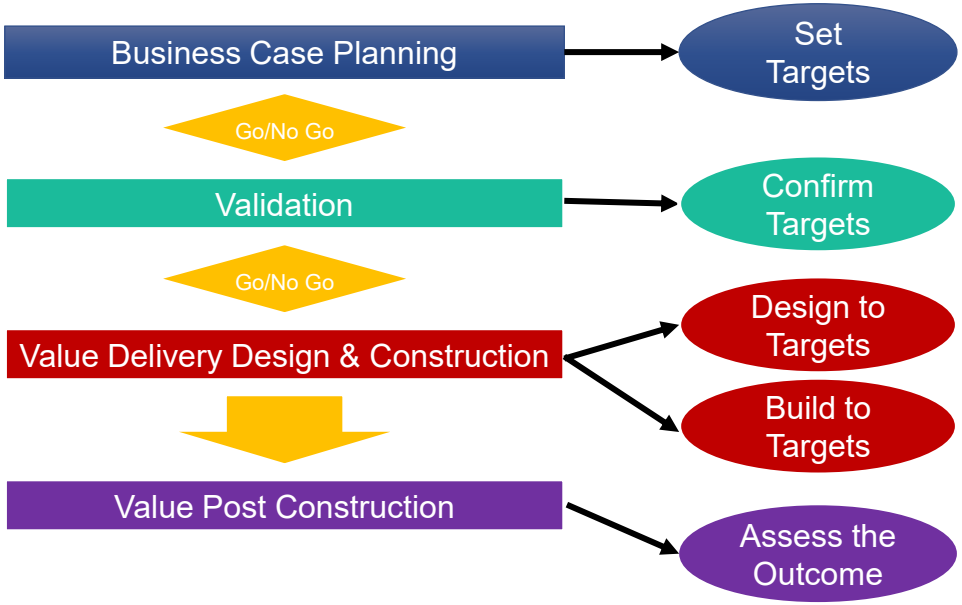
- This graphic depicts the relationship between the TVD Phases and the Targets.
- Targets may include cost, time and quality as defined by the Value Definition.



Resource

Target Value Delivery (TVD) Overview

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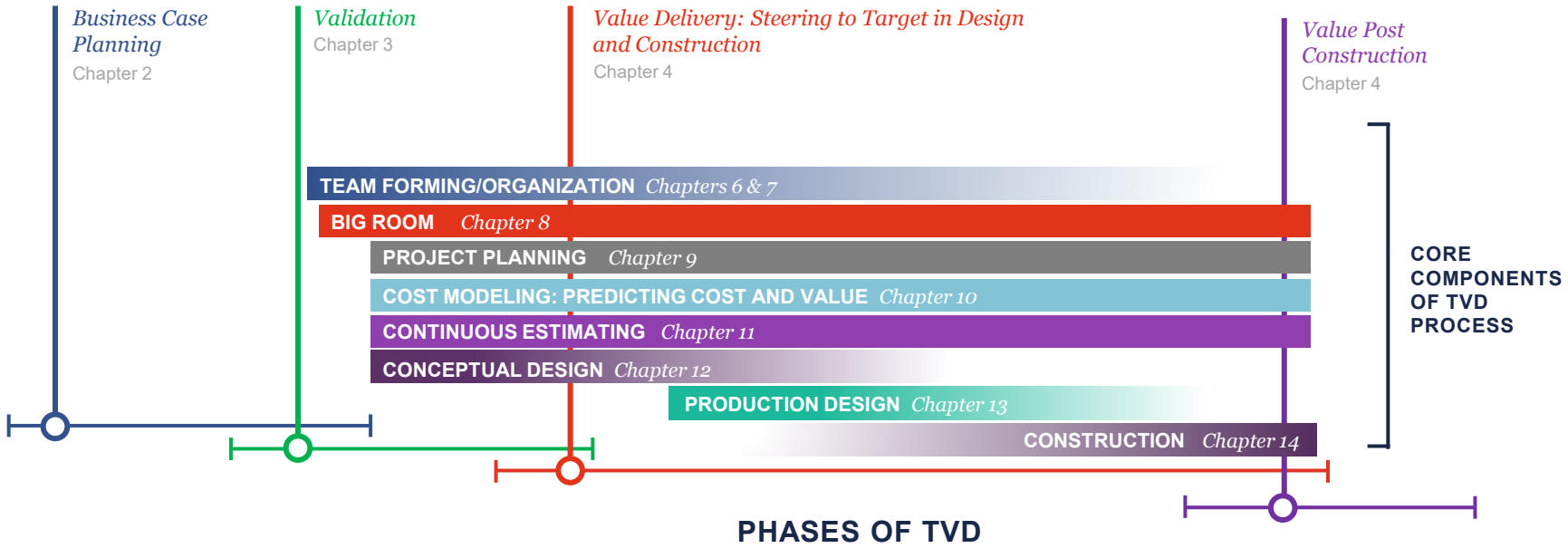

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Target Value Delivery (TVD) Overview

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Module 3: Organizing for Flow and Efficiency
Team Forming/Organization
Big Room

Business Case Planning
Chapter 2

Validation
Chapter 3

and Construction
Chapter 4

Construction
Chapter 4

TEAM FORMING/ORGANIZATION *Chapters 6 & 7*
BIG ROOM *Chapter 8*
PROJECT PLANNING *Chapter 9*
COST MODELING: PREDICTING COST AND VALUE *Chapter 10*
CONTINUOUS ESTIMATING *Chapter 11*
CONCEPTUAL DESIGN *Chapter 12*
PRODUCTION DESIGN *Chapter 13*
CONSTRUCTION *Chapter 14*

CORE COMPONENTS OF TVD PROCESS

PHASES OF TVD

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Team Structure Formation

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Team Kick-Off Workshop

- Why: Create necessary alignment among all team members
- Who:
  - Project leadership
  - Core team
  - End user stakeholders as necessary
  - Day to day team members / design implementation team
- What:
  - Team building and goal alignment
  - Define team structure, roles and responsibilities, decision workflow, etc.
  - Design planning
  - Learning

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Kick-Off Meeting Examples

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BRASFIELD & GORRIE GENERAL CONTRACTORS

Oldcastle Project Flagship – Kickoff Agenda

Date | Location

Day 1 – Team Dynamics

8:00am	**Breakfast**
8:30am	**Commencement** Open Meeting, Purpose Moment, Review Agenda & Project Overview
9:00am	**Introductions** Team Introductions & Ice Breaker
10:00am	**Break**
10:30am	**Measures of Success** Project Goals & Measures of Success
11:00am	**Team Organization** Team Organization, Roles & Responsibilities
11:30am	**Lunch**
12:30pm	**Team Activity**
1:00pm	**Collaboration Strategy** Team Communication, Meeting Cadence & BIM Execution Plan
2:00pm	**Design Assist** Trade Partner Strategy
2:30pm	**Break**
3:00pm	**Focus Session** Project Specific Focus Session – TBD
4:00pm	**Adjourn** Plus/Delta & Adjourn
6:00pm	**Team Social** Location TBD
7:00pm	**Dinner**

BRASFIELD & GORRIE GENERAL CONTRACTORS

Oldcastle Project Flagship – Kickoff Agenda

Date | Location

Day 2 – Team Workshops

8:00am	**Breakfast**
8:30am	**Commencement** Open Meeting, Review Agenda & Ice Breaker
9:00am	**Schedule Workshop** Major Milestones & Design Decision Planning
12:00pm	**Lunch**
1:00pm	**Budget Workshop** Cost Review & Design Alignment
4:00am	**Adjourn** Plus/Delta & Adjourn

UAB MedWest
Team Kick-Off Day 2

Date:	7/15/2020
Location:	Blackjack Farm
Time:	8:00:00 AM
Facilitator:	Katie Wells
Time Mgr:	Stephen Powell

Start	End	Duration (minutes)	Topic	Leader	Comments / Resources / Homework	Needed Attendees
8:00:00 AM	8:30:00 AM	30	Breakfast / Socialize			
8:30:00 AM	9:00:00 AM	30	Introduction / Agenda Overview / Ice Breaker	Facilitator		Core Team
9:00:00 AM	11:00:00 AM	120	Budget Discussion	Jud	Overall Budget Discussion	Core Team + Nick Harper
11:00:00 AM	11:15:00 AM	15	Break			
11:15:00 AM	12:45:00 PM	90	Component Team Discussion - MEP and Structural / Lunch	Jud / Stephen	Structural System and MEP System Review	Core Team
12:45:00 PM	1:45:00 PM	60	Design Assist Partner Onboarding Discussion	Jud / Stephen	How are we onboarding and what are design-assist partner expectations?	
1:45:00 PM	3:35:00 PM	110	Team Collaboration Strategy (see subtopics below)	See below		
3:35:00 PM	4:05:00 PM	30	Review Agenda for Day 3	Facilitator		Core Team
4:05:00 PM	4:20:00 PM	15	Plus / Delta	Facilitator		Core Team
4:20:00 PM	6:20:00 PM	120	Social Time / Dinner			
	Total	10.33	Hours			

Start	End	Duration	Team Collaboration Strategy	Leader	Comments / Resources/Homework	Needed Attendees
1:45:00 PM	2:05:00 PM	20	Big Room Frequency and Location / Check In Calls	Katie / Stephen		Core Team
2:05:00 PM	2:25:00 PM	20	Method for Cost Control - Tabled	Jud	Example for Review	Core Team
2:25:00 PM	2:45:00 PM	20	Decision Documentation [A37] - Tabled	Katie / Stephen	Example for Review	Core Team
2:45:00 PM					Document management, collaboration space,	
3:15:00 PM						

UAB MedWest
Team Kick-Off Day 3

Date:	7/16/2020
Location:	BJ Farm
Time:	8:00:00 AM
Facilitator:	Katie Wells
Time Mgr:	Stephen Powell

Start	End	Duration (minutes)	Topic	Leader	Needed Attendees
8:00:00 AM	8:30:00 AM	30	Breakfast / Socialize		
8:30:00 AM	8:50:00 AM	20	Agenda Overview / Ice Breaker	Facilitator	Core Team
8:50:00 AM	10:20:00 AM	90	Pull Planning Validation Package	Facilitator	Core Team
10:20:00 AM	10:35:00 AM	15	Break		
10:35:00 AM	12:05:00 PM	90	Pull Planning Validation Package	Facilitator	Core Team
12:05:00 PM	12:50:00 PM	45	Lunch		Core Team
12:50:00 PM	1:20:00 PM	30	Wrap Up / Next Steps	Facilitator	Core Team
1:20:00 PM	1:40:00 PM	20	Plus / Delta	Facilitator	Core Team
1:40:00 PM	2:40:00 PM	60	Prepare to Report out to ELT	Stephen	Core Team
2:40:00 PM	3:40:00 PM	60	Report Out to ELT	Stephen	Core Team
	Total	7.67	Hours		

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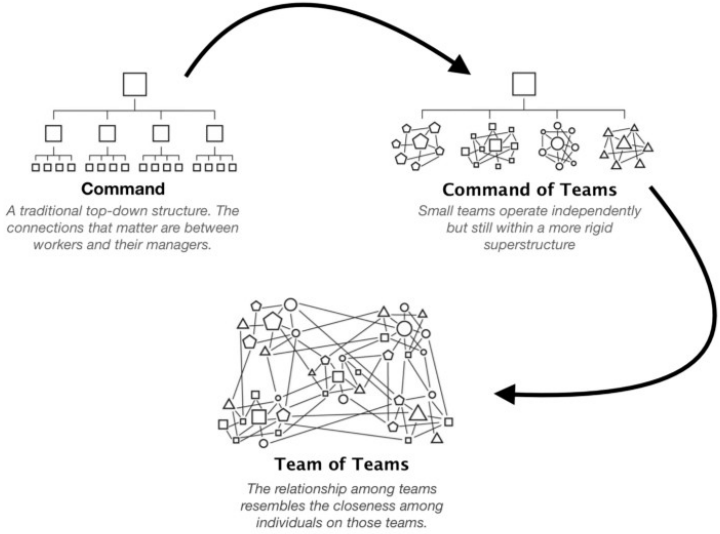
Work Cluster Organization – Why?

- Breaks down project complexity for rapid learning and decision making
- Cross-functional knowledge sharing
- Better informed and well-timed decisions (LESS ITERATION)
- Ensure design solutions aren't made in a vacuum



Source. Team of Teams: The New Rules of Engagement for a Complex World, General Stanley McChrystal, 2015

Work Cluster Organization

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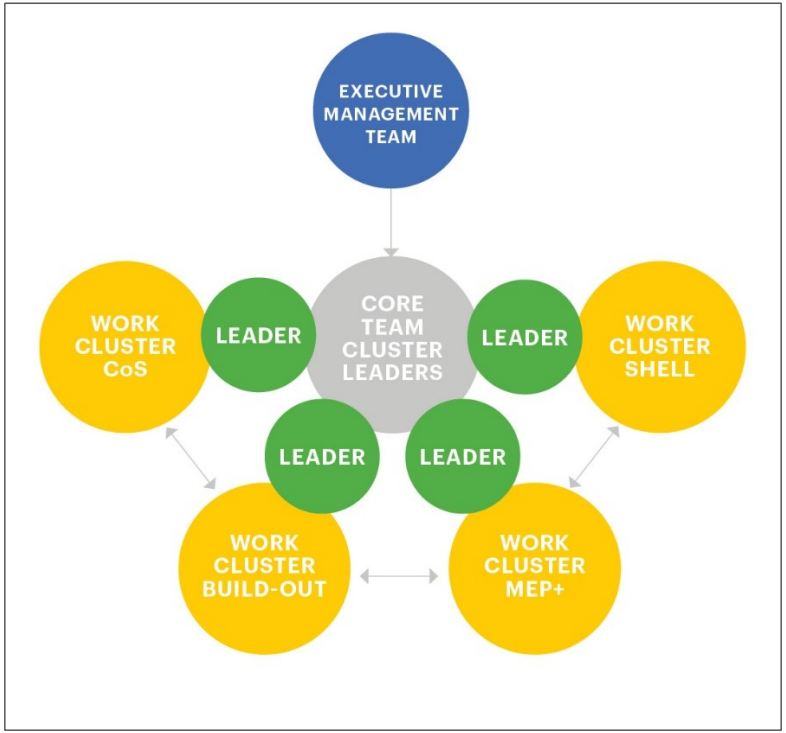
Executive/Senior Management:
- Not involved in day-to-day of team
- Resolve conflicts

Core Team:
- Day-to-day leaders of the team

Work Clusters:
- Leader
- System oriented
- Cross discipline
- Stakeholder representation
- Form as need

Work Cluster Leader:
- Coordination between work cluster & core team



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Work Cluster Organization

- Formed as necessary for project needs
  - Can be formed ad-hoc around a critical decision
  - Depends on size and complexity of the project
- Should be Multi-disciplinary /Cross Functional

- Examples include:
  - Building System (MEP, skin, structure, site)
  - Department type
  - Big Ideas and Innovation

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Leadership & Facilitation

- Leadership: visionary, big picture, leads the group to achieve vision
- Facilitator: brings people together to develop a vision then leads them toward achieving it

**A facilitator can be a leader, but a leader is not necessarily a facilitator

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Cluster Examples

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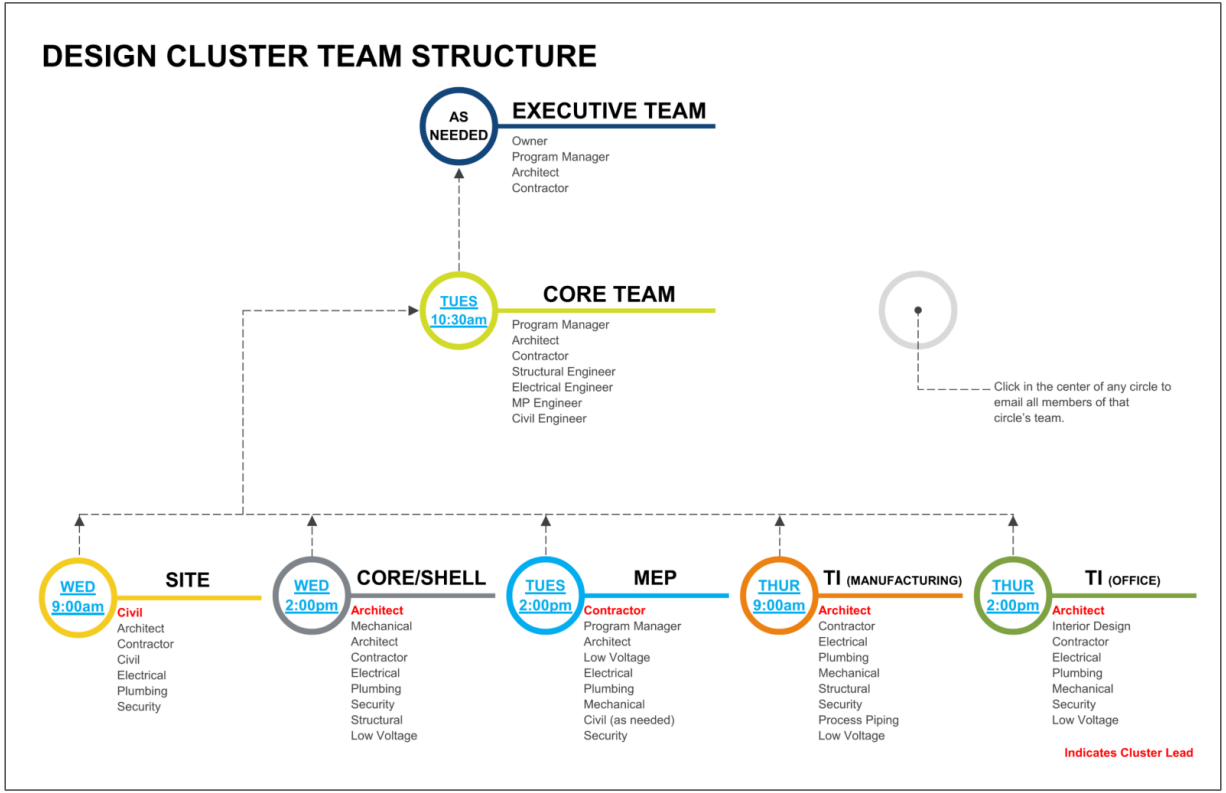
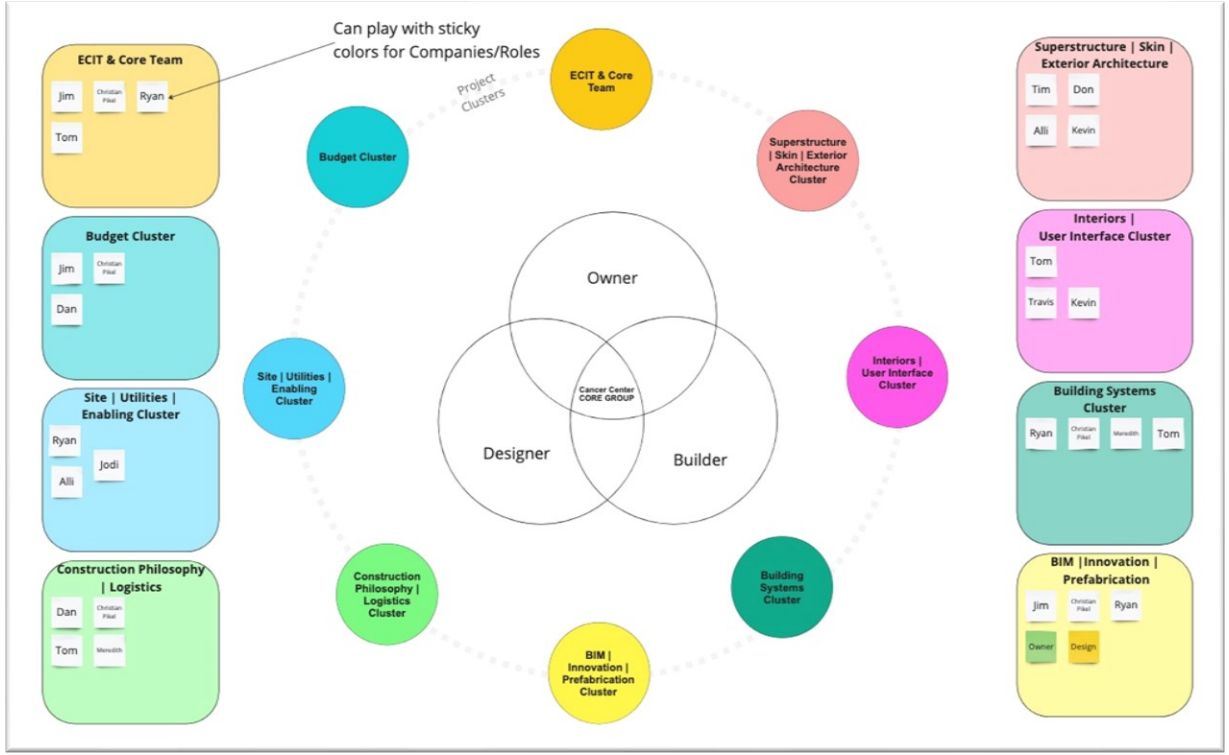


Cluster Examples



Cluster Examples

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Project E.A.S.T.

Updated 10/05/2021

* Limit to 3 Clusters/PITs per individual
* No more than 2 individuals from a company on any Cluster/PIT
* Name = ACTION!!

Owner
AE
Construction

TVD CLUSTERS & PIT's

TVD Clusters ... *teams designing to a target cost*

STRUCTURE	EXTERIOR ENVELOPE	CONVEYING	MECHANICAL, PLUMBING & ELECTRICAL		SITE / CIVIL	INTERIOR/ FF	TECHNOLOGY	MEDICAL EQUIPMENT	CEP	DEMO	OPERATIONS/ TRANSITION
Matt O'Callaghan	Kerry Bennett	*Arch*	Wes Richardson		Kelway Howard	Adam Chahulski	Josh Snyder	John Sion	Justin Swanson	Jason Golzbein	
Dan Isenogle	Eric Walters	Tommy Wilhoit	Bill Payne	Steve Holladay	Eric Walters	Lori Harris	Daniel James	Amanda Melton	Steve Holladay	Eric Walters	True Morse
Tim Dubyoski	*BECx Agent*	T.R Bowers	Josh Snyder	*MEP Cx Agent*	Joel Palmer	Kim Carrison	Ed McCrea	Chris Painter	Randall Marshall	Bill Payne	*Communication*
Kerry Bennett	Dan Isenogle	Joel Palmer	Test & Balance	Dan Isenogle	Lee Shore	*Infection Preventionist*	Kevin Leonard/ Security	Tri Dang	Bill Payne	Lee Shore	Kim Carrison
Kelway Howard	Greg Luongo	*St. Ongo*	Matt Franklin	Mark Miller	Wes Richardson	Joel Palmer	Randall Marshall	*Supply Chain*	Mark Miller	Tim Dubyoski	Lauren Cooper
Stephen Perry	Ryan Griffin		Adam Chahulski	Kerry Bennett	Kerry Bennett	Laura Hild	Lee Shore	Cary Simmons	Adam Chahulski	Matt O'Callaghan	
Steve Mann	David Wyatt		Kevin Davis	Matt O'Callaghan	Adam Chahulski	Kerry Bennett					
David Wyatt			Justin Swanson	*Mech Sub*	Steve Mann	Stephen Perry					
Justin Swanson				*Elect Sub*	Justin Swanson	Molly Livingstone					
						David Wyatt					
						Lauren Edwards					

Infection Prevention, Emergency Management, Safety, S

Scope, Systems, etc.

STRUCTURE	EXTERIOR ENVELOPE	CONVEYING	MECHANICAL, PLUMBING & ELECTRICAL		SITE / CIVIL	INTERIOR/ FF	TECH
Structural Systems	Exterior Skin	Elevators	hvac Equipment	Normal Power	Sitework	Interior Walls	Nurse
Foundations	Vestibules, Canopies	P-Tube	Chilled/ Hot Water/ Steam Piping	Essential Power	Site Utilities	Millwork	Structu
Bridges	Green Roofs	Chutes	CEP Chillers	Lighting - Exterior, Interior, Specialty	Site Permitting	Finishes	Voic S
Misc Steel	Roofing		Ductwork	Isolated Power	Traffic Planning	Non-Med Equipment	Te
Prefab	Waterproofing		Building Automation System	Lightning Protection	Parking Planning	Furniture/ Site Furnishings	End P
Screen Walls	Fall Protection		Smoke Control	Fire Alarm	Bridges	Signage	DA S
Helipad	Energy Performance		Med Gas, Natural Gas	Raceways & Rough-in	Temp Roadways/ Utilities	Artwork	Video/
	Exterior Signage		Dom Water Systems	Duke Power coordination	Retaining Walls	Prefab Strategy	Badg C
	Eat lights, antennas, cameras		Storm/ Sanitary - Building	Prefab Strategy	Fuel Systems	Window Treatments	RTLS
			Special Water Systems		Site Signage	Cubicle Curtains	Temp Monitoring
			Fire Suppression		Parking Equipment	Equipment Finishes	Med Equip Connectivity

IT/ Furniture Load-in	Final Cleaning/ Air Testing	Building Keying/ Badging		

Weekly Planner for Meetings & Various Sessions

Project EAST

	Monday	Tuesday	Wednesday	Thursday	Friday
7:00 AM					
8:00 AM		Team Check-in	Tech Wkly Check-in / Tech Wkly Check-in	FPC Team Check-in / FPC Team Check-in	
9:00 AM		Big Room (all day)	Enabling Work Planning / Enabling Work Planning	MEP Cluster / MEP Cluster	Core Team / Core Team
10:00 AM			Interiors Cluster	Structure Cluster / Structure Cluster	
11:00 AM				Demo Cluster	
12:00 PM	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1:00 PM					
2:00 PM		Big Room (all day)	CEP Cluster / CEP Cluster		
3:00 PM			Site/ Civil Cluster / Site/ Civil Cluster	Med Equip Cluster	
4:00 PM					
5:00 PM		Decision Council			
6:00 PM					

Roles & Responsibilities

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Wake Forest Baptist Health

Project EAST Steering Committee

Decision Council (13)
President: DNP - Cathleen Wheatley
Finance: Stephan Lillie
Operations: Mike Wade
Physician Lead: MD - Matt Edwards (Interim), Wayne Meredith
Nursing Lead: DNP - Libby Pearsall
Facilities: Karen Huey, Amanda Mewborn
PM: Josh Storey (Stantec)
Design: Tim Knapp, Leslie Hanson (HKS+CPL)
CM: Mike Powers, Michael Byrd (Blum+BG)
Leaders: Bill Payne, John Sion (Stantec)

Purpose & Responsibilities	
The Decision Council is to monitor overall progress and health of the project, advise project leaders and to act decisively when called upon for decisions or course correction. The Decision Council meets every two weeks. The frequent cadence of this meeting underscores the need for timely responsiveness from the Decision Council in order to ensure project progress.	
· Monitor Project Progress	
· Monitor Budget vs Cost Projections	
· Monitor Resources needed on the Project	
· Monitor Issues and Risk that Arises	
· Report out to the Steering Committee	

Core Team (7)
Owner: Bill Payne, True Morse, John Sion
Design: Matt Franklin, Mark Miller
CM: Justin Swanson, Steve Mann

Purpose & Reponsibilities	
· Atrium Alignment	· Team Health
· Owns Validation Process	· Master Schedule
· Operational Impacts Input	· Resource Management
· Owns TVD Process and Budget	· Cluster Team Makeup
· A3 Approval/ Escalate to Decision Council	· Report out to the Decision Council

Cluster Teams
Facilities PDC/ Engineering
Project Manager
Design Team
CM Team
Design Assist Partners

Purpose & Reponsibilities	
· Atrium Alignment	
· A3 Development/ Recommend to Core	
· Action Item Management	
· Maximize value within budget	

Roles / Responsibilities

Executive Team Responsibilities

Purpose & Responsibilities
The Executive Team is to monitor overall progress and health of the project, advise project leaders and to act decisively when called upon for decisions or course correction. The Executive Team meets every two weeks or on an as-needed basis. The frequent cadence of this meeting underscores the need for timely responsiveness from the Executive Team in order to ensure project progress.
· Discuss major decisions with Raytheon
· Monitor Project Design Progress
· Monitor Budget vs Cost
· Monitor Resources needed on the Project
· Monitor Issues and Risks that Arise

Core Team Responsibilities

Purpose & Responsibilities
Decision Approval / Request Executive Team for Presentation to Raytheon
Monitor Cluster Teams Health and Performance
Resource Management for Overall Team
Adjust Cluster Team Makeup if Needed
Provide Reports / Information to Executive Team
Maintain Master Schedule

Cluster Team Responsibilities

Purpose & Responsibilities
Align Design with Raytheon Expectations
A3 Development / Recommendations to Core Team
Report Progress (Major Decisions and Major Questions) to Core Team
Action Item Management
Maximize value within budget
Activity planning to advance design and meet schedule

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What do Cluster Teams Do?

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Cluster Groups:

- Develop work based on priorities created with core team
- Analysis and research for presenting decision information
- Set design priorities based on decisions
- Use collaboration tools to provide access to whole team
- Use cost model in each cluster group
- Make sure right balance of team members across groups

Cluster Group Report Outs:

1. Present design set analysis and make recommendations to Core Team
2. What have you been working on?
3. What work will occur over the next work cycle?
4. Risks & Opportunities
5. What upcoming decisions need to be made?
6. Are you on track with your pull plan commitments?

Cluster Member/Leader Responsibilities

CLUSTER LEADER

- Role Model / Motivate
- Use pull planning to organize work of cluster
- Ensure that cluster's commitments are being met
- Verify cluster member constraints are being removed
- Verify that cluster topics make their way on to agenda
- Represent the cluster in integrated team meetings
- Organize daily cluster check-in structure as appropriate
- Assist with On-Boarding process
- Foster A3 process in decision making
- Foster lean learning and principles

CLUSTER MEMBER

- Make reliable commitments
- Manage commitments to completion
- Make cluster leader aware of any and all constraints
- Actively participate in pull planning
- Actively participate in development of A3's
- Fill in for cluster leader as needed
- Actively pursue lean principles and learning

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Project Club House

- LCI has decided to partner with a national non-profit to build a clubhouse that will be donated to a local elementary school.
- We have committed to building (1) Play/Learn Clubhouse this year utilizing lean principles with our LCI members.
- They have identified an elementary school (Pre-k thru 2nd grade, kids aged 4-8 years old) in an underserved community as the recipient of the clubhouse.
- LCI has raised $55,000.00 to go towards the clubhouse
- The LCI would like to cover the material and labor cost of building the clubhouse and be able to completely furnish it. It would be nice to provide playsets such as a kitchen playset, etc. if savings allow

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Cluster Group Formation

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Cluster Assignment Per Table - Develop:

- Cluster Organization / Leadership / Facilitation
- Cluster Priorities / Purpose
  - What are the 1st 2-3 things we should focus on?
- Develop Cluster Meeting Agenda

20 MINUTES

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15 Minute Break

38

Managing Information Flow & Decision Making

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Set Based Design

- Method that keeps requirements and options flexible for as long as responsible during the development process.
- Highly collaborative and less rework during design
- Allows for:
  - Designers to be more creative
  - Owners to get more options and more information to inform decisions
  - Builders get involved earlier to inform cost, schedule, and constructability

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Set Based Design

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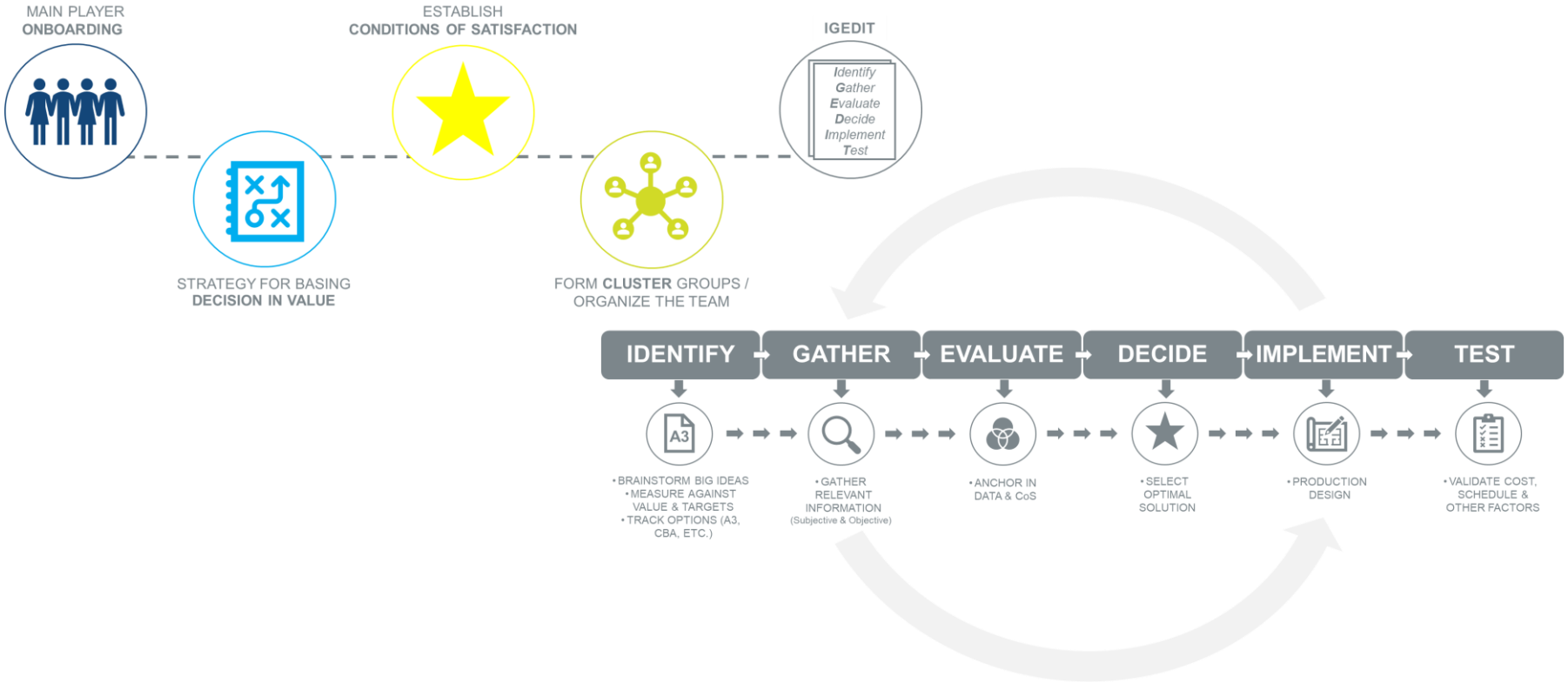

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Set Based Design

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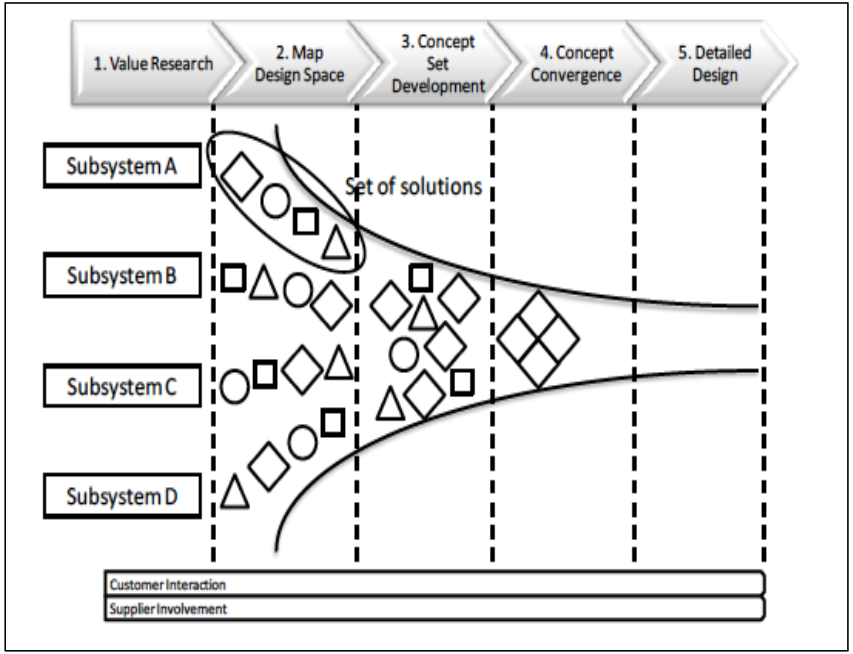
Also known as Set Based Concurrent Engineering



Improving complex systems today : proceedings of the 18th ISPE International Conference on Concurrent Engineering, Massachusetts, USA 4-8 July 2011, pp433-430 Eds. Daniel D Frey, Shuichi Fukuda, Georg Rock.

Tools Supporting Set Based Design

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Choosing by Advantages (CBA)

- Decisions must be based on **Differences**
- Decisions must be based on the **Importance of Advantages**
- Decisions are **Anchored** to the relevant facts
  - **Stakeholders** contribute relevant **subjective** data

Set Based Design Examples

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TEMECULA VALLEY HOSPITAL 1st FLOOR EXPANSION

A3 Number	Title	Revision	Champion	Date Started	Collaborators	Approved by	Approved date	Status
A3-00#	CONFIGURATION OF FUTURE BED TOWER	1	Creed Kampa	3/22/16	Stan Chiu, Vicki Hooper, Jennifer Ries	tbd	tbd	Development Collaborative Review Implementation

Section 1 - Background

Planning for the 1st Floor expansion is currently underway. As part of planning validation, we need to understand how the future bed tower may be affected by the current expansion and vice versa.

Section 2 – Problem Statement / Current State

If we proceed with the 1st floor expansion footprint as illustrated to the right, does it constrain the future bed tower in any way?

If we had more certainty about the future bed tower location and configuration, we would be able to better inform and tailor the current 1st floor expansion.

Section 3 – Future State

- Improve departmental capacity and functionality
- Provide flexibility for future expansions
- Improve patient and staff experience
- Plan for eventual separation of public and patient service flows.

Section 4 – Analysis

- Central plant location
- Helipad location
- Structural cost
- Factor weighting
- Schedule impact
- Approach aesthetic
- Neighbor visual impact
- Roof drainage
- Lateral Spread Analysis

Per MASTERPLAN

ELBOW

PARALLEL

	Per MASTERPLAN		ELBOW		PARALLEL	
PUBLIC CONNECTION & WAYFINDING	Public access occurs through existing rotunda.	2	Public access occurs through existing rotunda, but elbow plan not as clear for way finding	1	Public access occurs through new connector. Approx 200 ft farther.	0
SERVICE ACCESS TO PATIENT BEDS	520 ft from new Service Elevator to Central Supplies	0	400 ft from new Service Elevator to Central Supplies	1	192 ft from new Service Elevator to Central Supplies	2
ACCESS TO D+T FROM PATIENT BEDS	318 ft longer route to D+T services.	0	Closest connection to D+T services.	2	278 ft longer route to D+T services.	1
VIEWS FROM PATIENT BEDS	All beds have views of Temecula Valley	2	25% of all beds do not have views of Temecula Valley	1	50% of all beds do not have views of Temecula Valley	0
ADHERENCE TO MASTERPLAN / EIR	Directly adheres to Masterplan / EIR. No probable cost/schedule impacts	2	Partially adheres to Masterplan / EIR. Probable cost/schedule impacts.	1	Does not fully adhere to Masterplan / EIR. Probable cost/schedule impacts.	0
USABILITY OF 1st FLR of FUTURE BED TOWER	Far east side is isolated from rest of hospital.	0	Compact plan creates good adjacencies to rest of hospital.	2	Location of footprint is further east than other options, creating less ideal adjacencies.	1
PRESENCE ALONG TEMECULA PKWY	Creates 350 ft long elevation along Temecula Pkwy.	0	Elevation facing Temecula is 50% less long.	1	Elevation facing Temecula is 18% less long.	2
IMPACT TO NEIGHBORS	Northern neighbors view is impeded by new bed tower	0	Northern neighbors view is partially impeded by new bed tower	1	Northern neighbors view is less impeded by new bed tower	2
score		**6**		**10**		**8**

DRAFT

Section 5 – Proposal

- Current baseline schematic validation plan for the 1st Floor Expansion does not appear constrained by location or configuration of the future bed tower.
- tbd

Section 6 – Follow up

- tbd

Set Based Design Examples

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		Category 1: Massing influence	Category 2: Planning influence	Category 3: Means & Methods	Study Go No Go	Construction savings ($)	Design cost impact ($)	LRM for decision	Construction savings (weeks)	Design schedule impact	RECOMENDATION	Core team TEAM / notes
STRUCTURE												
SidePlate Steel Frame Connection (Structure)	STRUCTURE (Structure)							DD-1				*Schedule Advantage, vet cost& Detail*
~~Connect-X-Tech (Structure)~~	~~STRUCTURE (Structure)~~							~~N/A~~				
Concrete Strut Inserts	STRUCTURE (Structure)							DD-3 BCS				*Coord. Big itemsbigger than 4"dia*
Structural Bays (Connected on the Ground)	STRUCTURE (Structure)							M&M				
Anchors in Slab (Structure)	STRUCTURE (Structure)							M&M				
Rebar Cages for Foundation Walls (Structure)	STRUCTURE (Structure)							M&M				
INTERIORS												
bathroom pods (with structure) 6 sided box	PODS (Interiors)							SD-3 BCS				*Slab Thickness is a project constraint , need to be roll in showers(5 sided box)/ Panels / might have to provide FP*
bathroom panels (5 sided box) no floor	PANELS (Interior)							DD-2 INT				
Prefinished 15'X15'X60' volumes (mods)	MODS (Interiors)											
OR Room Ceilings (Cleansuite)	FRAMING (Interiors)							DD-1 Int				*Coordinate w/ Facilities / Future Flexibility*
Pharmacy Clean Room	FRAMING (Interiors)							DD-2 Int				*Pharmacy Team Is Interested in Clean Room*
OR Panelized Room	PANELS (Interior)											More Information/Installed Location quantities
Infrastructure Room (MODS)	MODS (Interior)							SD-3 Int				
PreManufactured Headwalls	PANELS (Interior)							SD-3 Int				*Need to understand Design / Finish Understanding/ accoustics*
Pre-Built Headwalls (Multi-Trade) WT/PJD Prefab	PANELS (Interior)							DD-2 Int				
Electrical Closet Pods	PODS (Interiors)							SD-3 Int				*Panels or Boxes*
IT Closet Pods	PODS (Interiors)							SD-3 Int				*Panels or Boxes*
Prefabricated Soffits	FRAMING (Interiors)							M&M				*Curve Building is a challenge*
Interior Panel System (DiRT) Ki								DD-1 Int				
Interior wall panels (Multi-Trade) (WT/PJD Prefab)	PANELS (Interior)							M&M				
Off the shelf Interior Finish Products	FINISHES (INTERIOR)											

Set Based Design Example

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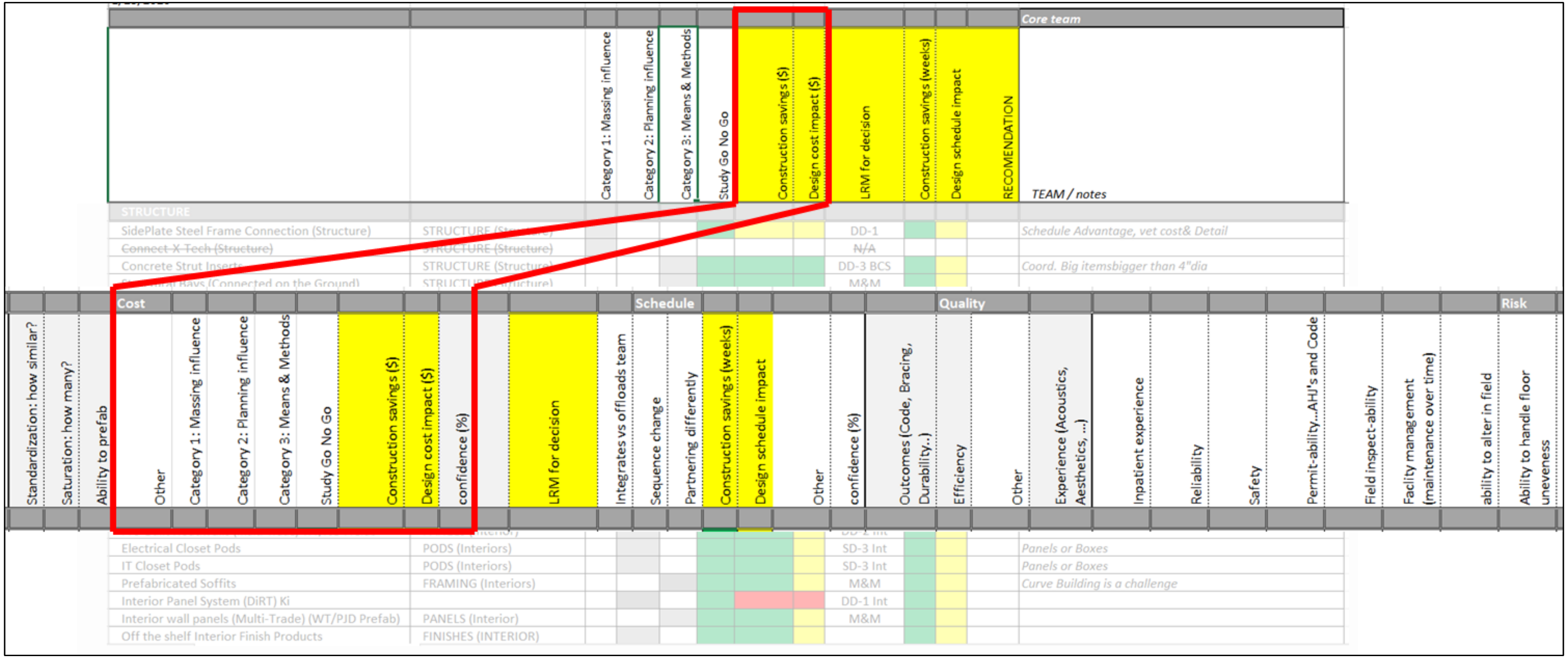

Decision Flow Model

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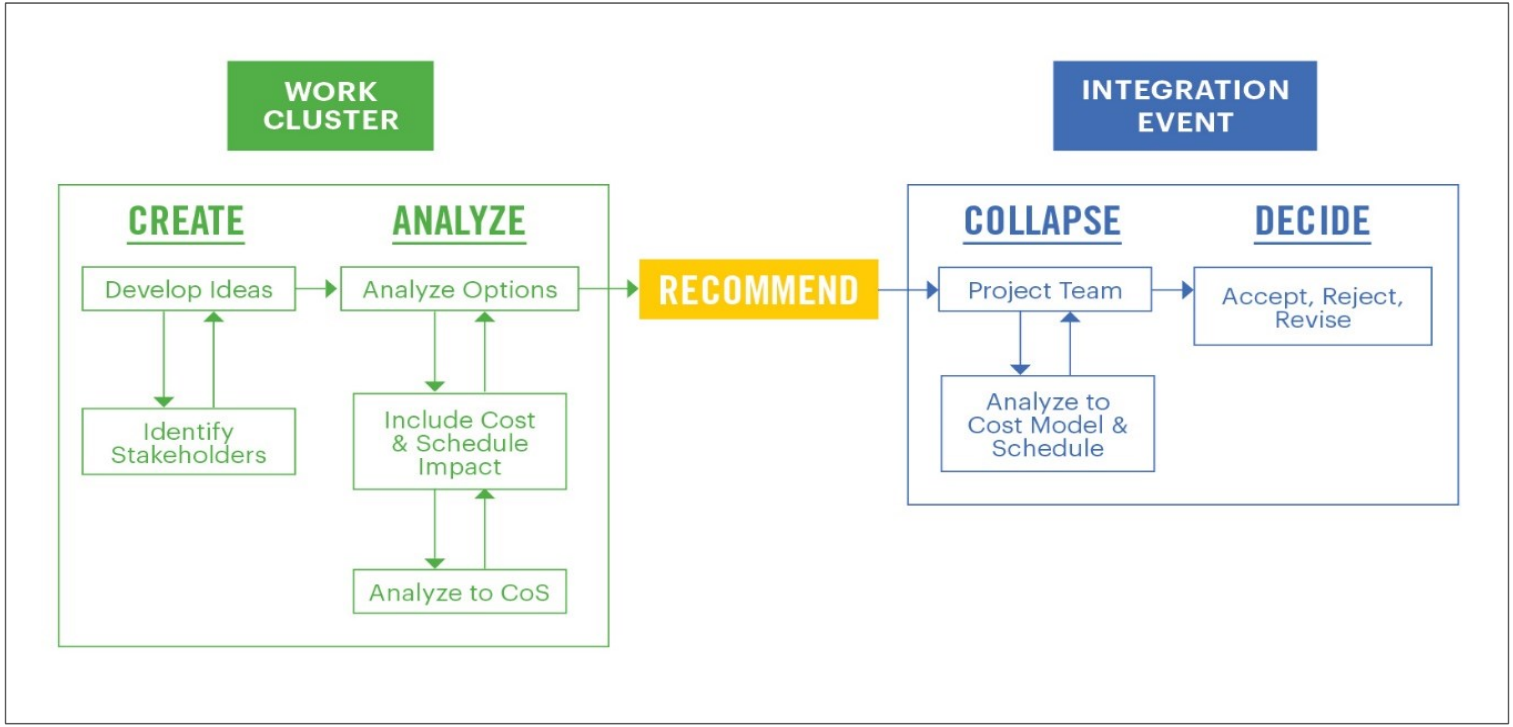
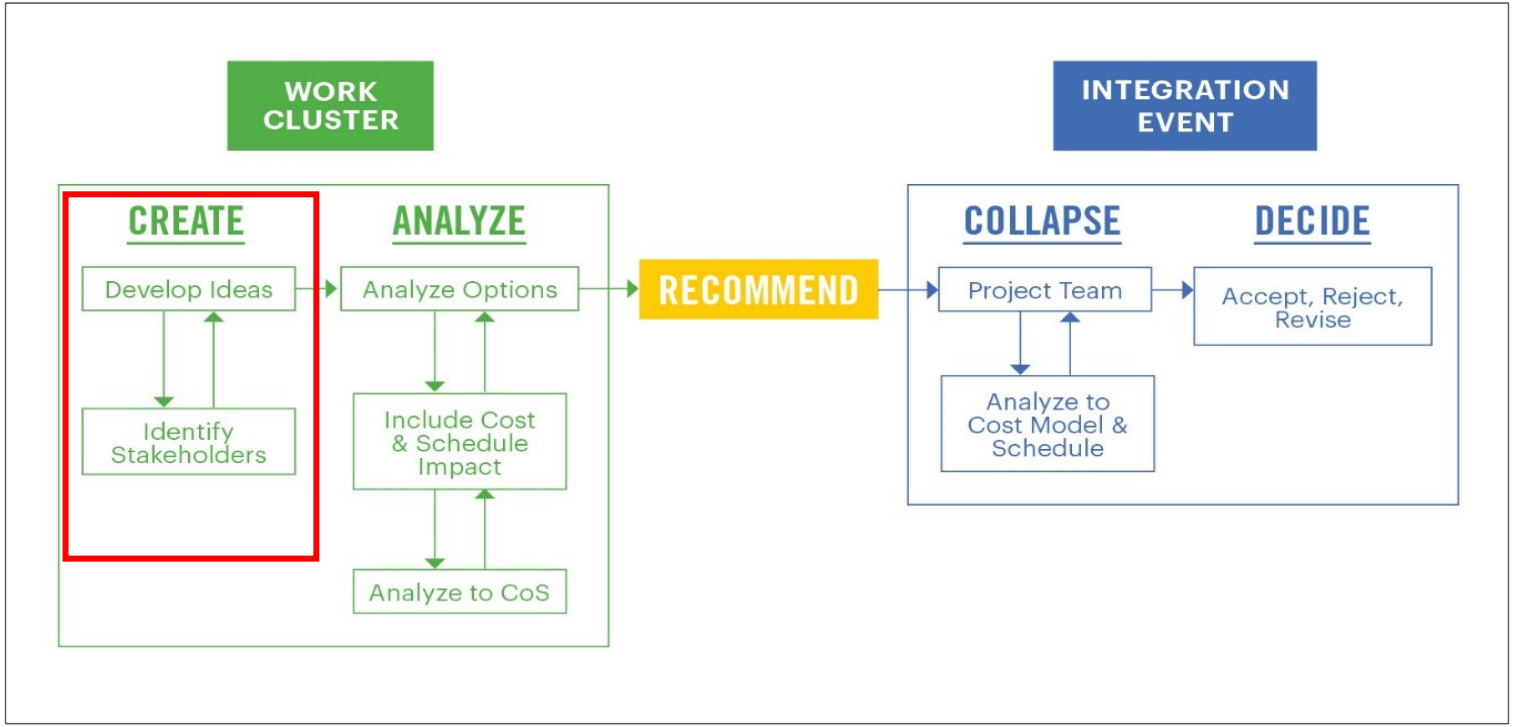


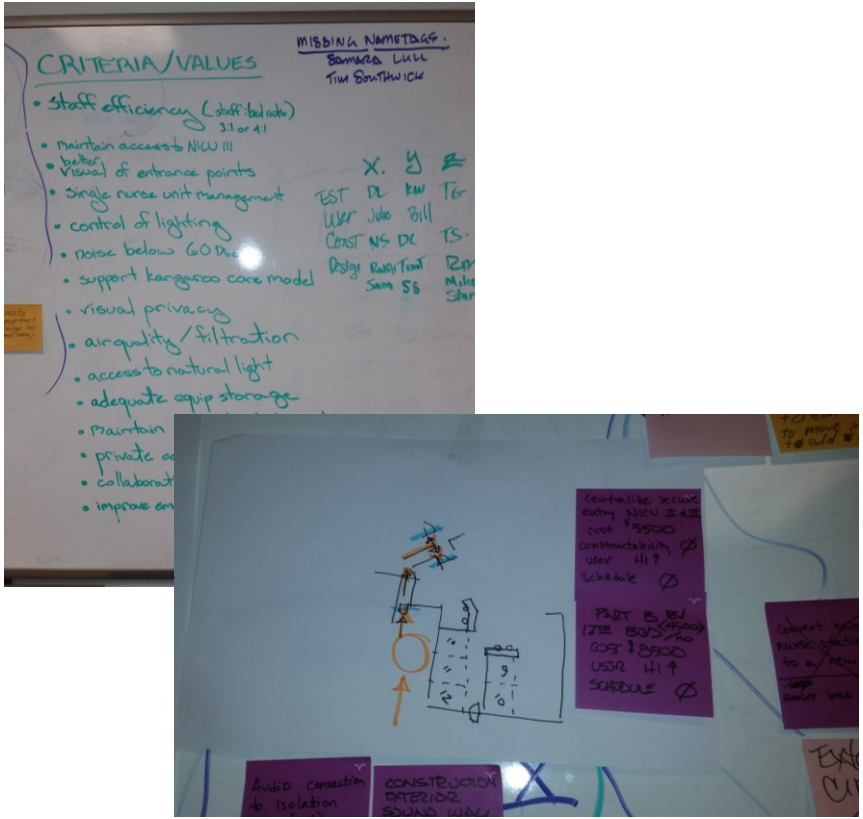
Decision Flow Model

Lean Construction Institute
Immersive Education Program



Decision Flow Model

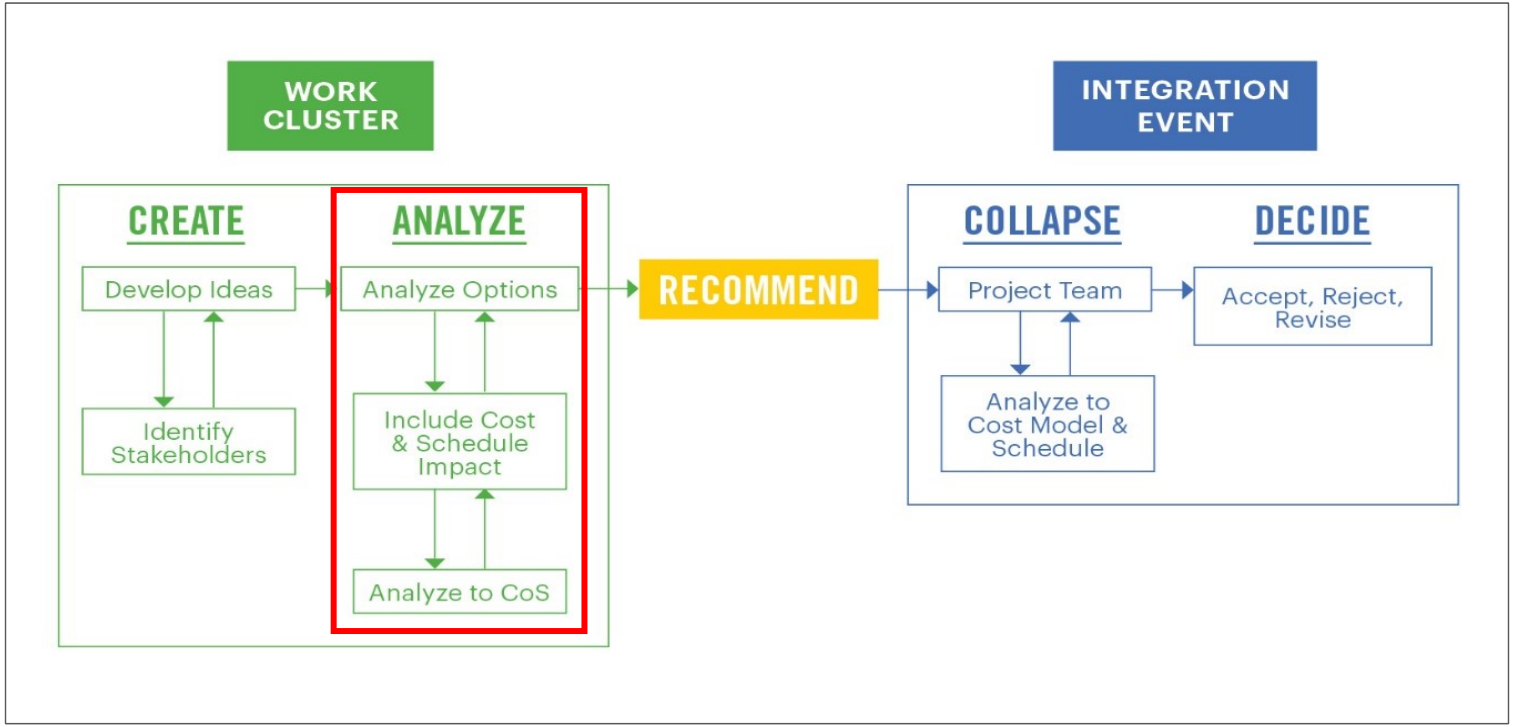
Lean Construction Institute
Immersive Education Program



	Champions	Easy to implement	Impactful	Safe	Reuse existing	Storage/ qty and location	Tech workflow	Constructability/ phasing	No corrugated in pharmacy	Right sized storage right location	Ergonomics of workstations	Interdependent but connected workstations	Sight lines: compounding, inspection areas, dept access	Travel distance: filing adjacent to use	Capital cost	Employee engagement	Maintainable/ durable	Cleanliness	Schedule (complete with tower)	Minimize gown cycles	Thermal control
Camera inspection (compounding)	Debbie						X						x							x	
~~eyewash (ante room)~~	~~Ralph~~																				
Robotic pickers (fill)	LK						X														
8 crash carts (crash cart fill)	Bill W						X														
~~Add clerestory windows at courtyard wall (fill)~~	~~Katie~~							~~X~~													
Switch from vct to no wax floor	Jenna							X													
Single compounding room	Bill W							X													
~~Same pharmacy with 4 HVAC zones~~	~~Natasha~~							~~X~~													
Right size storage	Bill W					X															
Deploy storage to point of use	Jenna					X															
Reuse existing offices	Bill W			y	X																
Reuse existing breakroom plumbing	Bill W				X																
Reuse existing envelope	Bill W				X																
Centralize tech workstation (fill)	Bill W						X														
Reuse pharmacist workstation	Bill W				X																
~~Deploy pharmacists to floors~~							~~X~~														
Modular workstations instead of casework	Jenna					X															

Decision Flow Model

Lean Construction Institute
Immersive Education Program



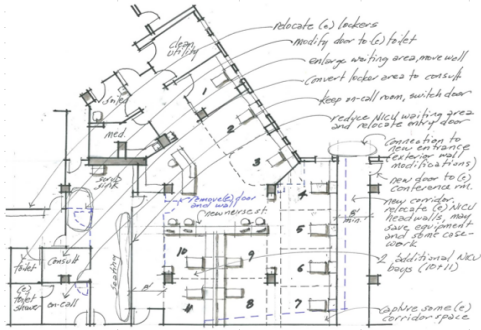
Decision Flow Model

Lean Construction Institute
Immersive Education Program

PROBLEM STATEMENT	ROOT CAUSE ANALYSIS / INTENDED GOAL	A3-018
The original business case for NICU II to expand by 2 bassinets to a total of 11. This A3 is to explore the value of Option 2 in comparison to currently baseline Option 1 for the purpose of increasing project value. The existing NICU waiting room is a code required space and provides the functional need to secure visitor access to all NICU spaces.	Reduce the current NICU remodel budget of Option 1 ($311,589) by (-$15,247) and increase value. The reduction in this remodel scope is part of a strategy to bring total project cost, tower addition and remodel scope, into budget alignment. The initial goal of providing 11 bassinets does not work with current 3:1 nursing ratios. Goals is to increase the number of bassinets to 12. Each bassinet is equal to roughly $45,000 per month. Reduce construction duration and disruption of babies.	NICU Layout Spring Valley Hospital Addition Date: 7/14/2015 Author: Bill Whipple

OPTION 1 (Baseline)

11 Bassinets

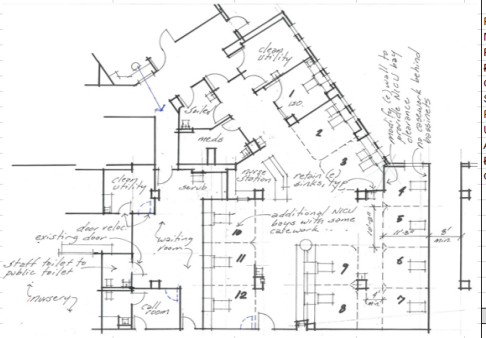


+ No disruption of central nurse station, Soiled Utility, and Clean Utility.
+ Maintain two exits from suite with 8' clear from door to door
Δ New bays 10 and 11 have partial wall blocking natural light access
Δ Does not provide 4' clear path to 2 curtain bays (7 and 9)
Δ Increase bassinettes to 12 for 3:1 baby to nurse ratio, currently 11
Δ Reuse existing casework and computer workstations
Δ Utilize existing doors including frames, hardware, and security
Δ Simplify visitor flow to both NICU II and III, common PPE, security, and communication
Δ Limit relocation of plumbing fixtures
+ Provided consult room (currently being used by wellcare)
+ All headwalls have consistent casework
Δ Construction duration 8-9 weeks
Δ Increase equipment storage
Δ Eliminate need to replace angled rated corridor wall
Δ Waiting room less than code required 1 seat per bassinet (need 29)

	Option	Baseline	Difference
Construction Cost	**$316,368**	$316,368	$0
FFE Cost	**$160,159**	$160,159	$0
Total	**$476,527**	$476,527	$0

OPTION 2

12 Bassinets



+ No disruption of central nurse station, Soiled Utility, and Clean Utility.
+ Maintain two exits from suite with 8' clear from door to door
+ Bays 10, 11, and 12 face windows, natural light access
+ Provides minimum 4' clear path to all curtain bays
+ Provides 12 bassinets, proper nurse ratio
+ Counter and workstations opposite new bays 11 and 12 left as is, also Bay 8
+ Reused existing suite exit and toilet room door
+ Visitor entry to NICU II and III through same route and processes
+ All existing handwash fixtures remain as is
Δ Does not provide consult room, not code required
Δ 4 new headwalls do not have consistent casework, does provide gases and clearances
Δ Construction duration 8-9 weeks
Δ Increase equipment storage
Δ Eliminate need to replace angled rated corridor wall
Δ Waiting room less than code required 1 seat per bassinet (need 30)

	Option	Baseline	Difference
Construction Cost	**$333,094**	$316,368	$16,726
FFE Cost	**$236,598**	$160,159	$76,439
Total	**$569,692**	$476,527	$93,165

ADDITIONAL VALUE

Item	Cost
Relocate medication dispensing to open	$4,416
Medication room to formula prep	No Cost
Panic button at nurse station	$5,375
~~Prefab stud walls to reduce duration~~	~~$0~~
Create equip. storage room nearby	$13,500
Sound blankets above ceiling	$2,700
Remove walls Isolation Bay 1	$4,789
Upgrade acoustics of ceiling tiles	$18,025
Aiphone at Nurse Station	$2,240
~~Eliminate new VAV for Med Room~~	~~$0~~
Create wellcare office nearby	$9,000

RECOMMENDATION

Decision Flow Model

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1 PROBLEM STATEMENT	2 ROOT CAUSE ANALYSIS / INTENDED GOAL
Explore solutions to relocate and expand the inpatient Pharmacy department and corresponding services. The Materials Management department is expanding into the existing Pharmacy. The existing inpatient Pharmacy department is 2,452 SF included sterile compounding, Pyxis refill, crash cart refill, unit dose, offices, breakdown, and bulk storage. No cytoxic compounding services are currently provided. The median average area for an inpatient pharmacy is 15 SF/bed. There are currently 237 beds SVH or 10.3 SF/bed. This project includes +54 beds to 291 total. The next tower build-out +90 beds to 381 total. Two pharmacists are deployed.	Sterile compounding area to become USP 797 compliant. Breakdown and bulk storage separate from fill area. Add 2 private offices and clinical pharmacist workstation Accomodate Pharmacy program of 3,731 DGSF or better Keep projects costs and remodel areas to a minimum Maintain security and patient services relationships

A3-001
Pharmacy Relocation
Spring Valley Hospital Addition
Date: 2/11/2015
Author: Bill Whipple

3 CRITERIA	OPTION A Existing Administration, HR, Computer Training	OPTION B Existing Physician Lounge, Medical Records, Misc offices	OPTION C Existing CVO office, Computer Training, and Risk
PROJECT AREAS Less required space in new tower, better Less remodel space, better Less shell space, better	BEST 4,869 SF to new tower 5,136 SF of existing building remodel 800 SF of shell space (10,805 SF total impact)	GOOD (1,499 SF total impact difference) 3,660 SF to new tower 8,644 SF of existing building remodel 0 SF of shell space (12,304 SF total impact)	BETTER (+237 SF total impact different) 4,280 SF to new tower 6,762 SF of existing building remodel 0 SF of shell space (11,042 SF total impact)
PHARMACY AREA More space, better	BETTER 4,300 DGSF	BEST 4,600 DGSF	GOOD 3,900 DGSF
WORK FLOW More rectangular department, better Less access from public corridors, better	GOOD Height:width ratio 1:3.7, three distinct appendages 1 public corridor egress door	BEST Height:width ratio 1:1, one distinct appendage 0 public corridor egress doors	BETTER Height:width ratio 1:1.26, no appendages 0 public corridor egress doors
OPERATIONAL IMPACT Less departments moved, better Right sized departments, better Less total department reduction, better	BEST 5 departments impacted 1 department reduced in size (9.5% reduction in Computer Training)	GOOD 6 departments impacted 2 deparments reduced in size (9.3% reduction in Doctor's Lounge) **(60.9% reduction in Medical Records)** **(No increase in Human Resources area)**	BETTER 7 departments impacted 2 departments reduced in size (9.5% reduction in Computer Training) (28.8% reduction in CVO Office)
CONSTRUCTION AND DESIGN IMPACT Less phases, better Less building systems changes better	GOOD 3 phases Pharmacy under floor drain leaks Venting to roof not very feasible	BEST 3 phases Pharmacy under single story portion of building Misc offices under floor drain leaks	BETTER 3 phases Most of pharmacy under single portion of building Human Resources under floor drain leaks
COST* Less construction cost, better $155 / SF for tenant improvement $170 / SF for major remodel $65 / SF for minor remodel Pharmacy location multiplier *These costs are for decision making magnitude only, not final costs	BETTER $1,601,790 rough construction cost 4,869 SF of tenant improvement 4,516 SF of major remodel 620 SF of moderate remodel 1.025	GOOD $1,701,000 rough construction cost 4,460 SF of tenant improvement 4,600 SF of major remodel 3,244 SF of minor remodel 1.01	BEST $1,584,430 rough construction cost 5,080 SF of tenant improvement 3,900 SF of major remodel 2,062 SF of minor remodel 1.00
OTHER CRITERIA			

4 RECOMMENDATION

Recommend Option C with understanding that the cost of the Pharmacy relocation must come down. The project budget was set at $1.5M in construction cost for Pharmacy, Materials Management, and Kitchen.
Option C provides a balanced solution to the expansion of a few department while meeting the programmed area for Pharmacy done with Milan Moncilovich and James Pickren.

5 IMPLEMENTATION PLAN

Action Item	Champion	Completion Date
Revise costs	Katie Wells	February 19, 2015
Generate Pharmacy sketch	Bill Whipple	February 24, 2015
Draft First Floor Tower floor plan	Bill Whipple	February 18, 2015
Finalize Adminstration department	Bill Whipple	February 20, 2015
HR, CVO, Risk sketches	Bill Whipple	February 24, 2015

UHS HGA BRASFIELD & GORRIE GENERAL CONTRACTORS

CORE GROUP APPROVAL SIGNATURES:

Leonard Freehof _____ Date: _____
Matthew Wheelus _____ Date: _____
Tara Laski _____ Date: _____
Douglas Lee _____ Date: _____
Stan Chiu _____ Date: _____

Decision Flow Model

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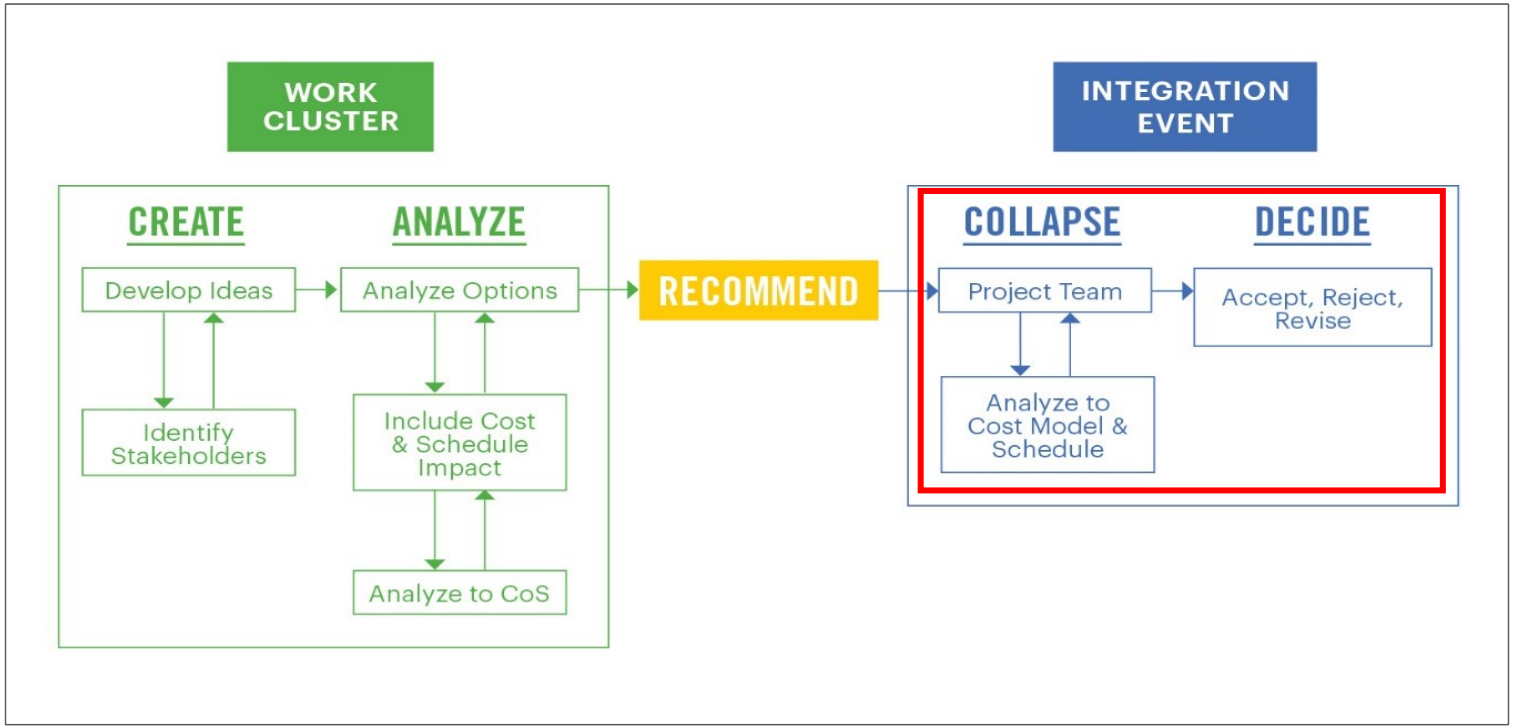
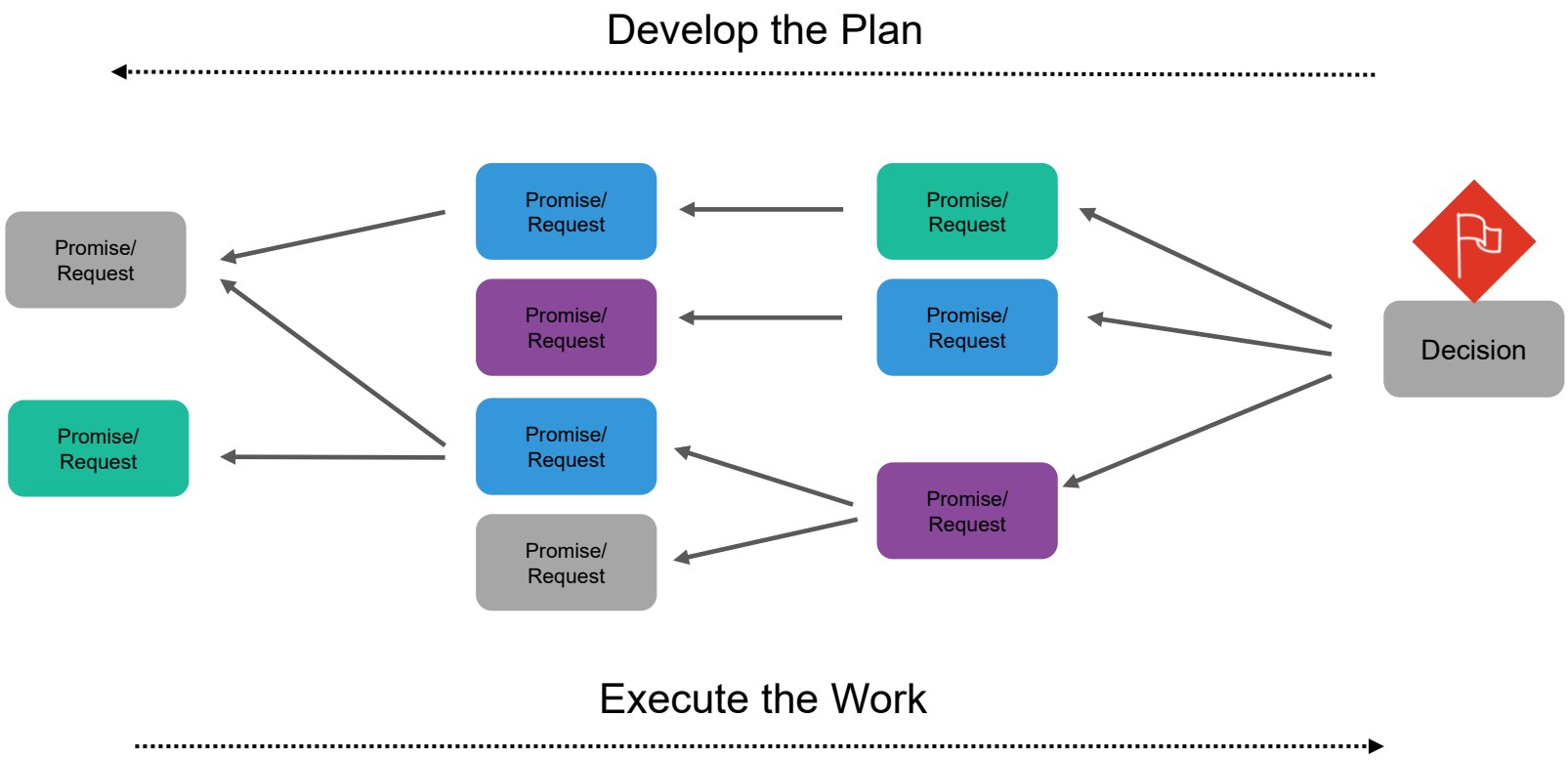


Utilizing LPS® in Work Clusters



Decision Mapping and Pull Planning

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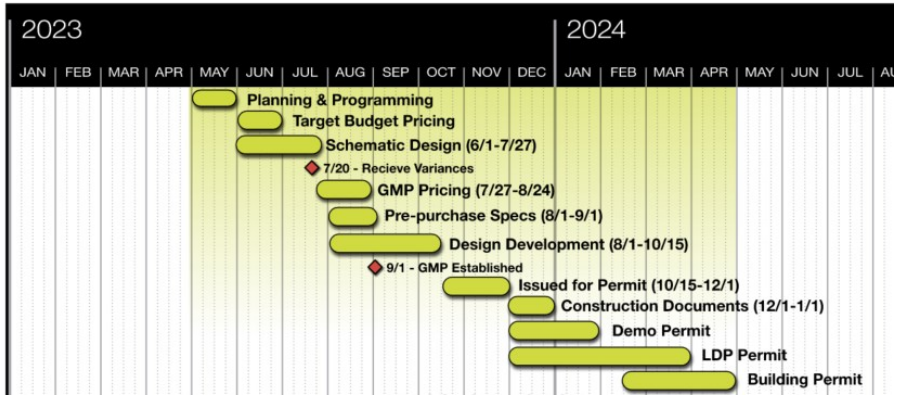
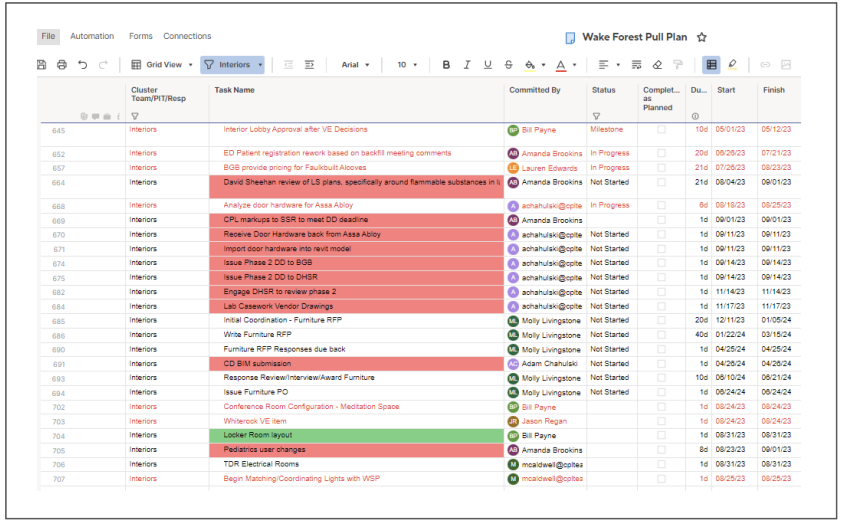
Traditional Design Planning vs. Target Value Delivery Approach



Managing by “Big Bars”

Detailed Plan



File Automation Forms Connections

Wake Forest Pull Plan

Grid View | Interiors | Arial | 10

	Cluster Team/PIT/Resp	Task Name	Committed By	Status	Complet... as Planned	Du...	Start	Finish
645	Interiors	Interior Lobby Approval after VE Decisions	Bill Payne	Milestone		10d	05/01/23	05/12/23
652	Interiors	ED Patient registration rework based on backfill meeting comments	Amanda Brookins	In Progress		20d	06/26/23	07/21/23
657	Interiors	BGB provide pricing for Faulkbuilt Alcoves	Lauren Edwards	In Progress		21d	07/26/23	08/23/23
664	Interiors	David Sheehan review of LS plans, specifically around flammable substances in li	Amanda Brookins	Not Started		21d	08/04/23	09/01/23
668	Interiors	Analyze door hardware for Assa Abloy	achahulski@opite	In Progress		6d	08/18/23	08/25/23
669	Interiors	CPL markups to SSR to meet DD deadline	Amanda Brookins			1d	09/01/23	09/01/23
670	Interiors	Receive Door Hardware back from Assa Abloy	achahulski@opite	Not Started		1d	09/11/23	09/11/23
671	Interiors	Import door hardware into revit model	achahulski@opite	Not Started		1d	09/11/23	09/11/23
674	Interiors	Issue Phase 2 DD to BGB	achahulski@opite	Not Started		1d	09/14/23	09/14/23
675	Interiors	Issue Phase 2 DD to DHSR	achahulski@opite	Not Started		1d	09/14/23	09/14/23
682	Interiors	Engage DHSR to review phase 2	achahulski@opite	Not Started		1d	11/14/23	11/14/23
684	Interiors	Lab Casework Vendor Drawings	achahulski@opite	Not Started		1d	11/17/23	11/17/23
685	Interiors	Initial Coordination - Furniture RFP	Molly Livingstone	Not Started		20d	12/11/23	01/05/24
686	Interiors	Write Furniture RFP	Molly Livingstone	Not Started		40d	01/22/24	03/15/24
690	Interiors	Furniture RFP Responses due back	Molly Livingstone	Not Started		1d	04/25/24	04/25/24
691	Interiors	CD BIM submission	Adam Chahulski	Not Started		1d	04/26/24	04/26/24
693	Interiors	Response Review/Interview/Award Furniture	Molly Livingstone	Not Started		10d	06/10/24	06/21/24
694	Interiors	Issue Furniture PO	Molly Livingstone	Not Started		1d	09/24/24	09/24/24
702	Interiors	Conference Room Configuration - Meditation Space	Bill Payne			1d	08/24/23	08/24/23
703	Interiors	Whiterock VE item	Jason Regan			1d	08/24/23	08/24/23
704	Interiors	Locker Room layout	Bill Payne			1d	08/31/23	08/31/23
705	Interiors	Pediatrics user changes	Amanda Brookins			8d	08/23/23	09/01/23
706	Interiors	TDR Electrical Rooms	mcaldwell@opitea			1d	08/31/23	08/31/23
707	Interiors	Begin Matching/Coordinating Lights with WSP	mcaldwell@opitea			1d	08/25/23	08/25/23

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Decision Mapping and Pull Planning

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Identify Major Decisions vs. Depending on Traditional Design Milestones

	Sequence	Decisions	Facilitator	Needs	Notes
Schematic Phase	9	Emergency Power	Electrical Eng	emergency business functions	
	10	Future Expansion Needs			Structural, utility & adjacencies considerations
	11	Access Control	Communications Designer	depending on complexity of need for facility	
	12	Low Voltage Systems	Communications Designer		
	13	Partition Types	Architect	acoustical designer helping with STC ratings & guidelines	
	14	Location on Property	Architect, Civil Eng	existing utilities, flood planes, future growth needs, preliminary geotech information	structure alignment on site
	15	Geotechnical Data & Analysis	Geotech Eng		
	16	Finish Floor Elevation	Civil Eng, Architect	contractor input on site leveling, means & methods, borrow/export needs	
	17	Parking	Civil Eng	specialty consultant (especially where pkg decks considered)	
	18	Outdoor Amenities	Landscape Arch, Arch		
	19	Structural Frame System	Structural Eng	contractor input on market economy & means/methods	
	20	Structural Layout & Spacing	Structural Eng, Arch		
	21	Foundation System	Structural Eng, Geotech		
	22	HVAC System	Mech Eng	contractor input on market economy & maintenance, facilities input, energy consumption consultant	
	23	Plumbing & Electrical Programmatic Fixture Needs	Mech & Elect Eng, Arch, Interior Arch		counts and level of finish
	24	Redundancy Needs	Mech & Elect Eng	input from facilities, contractor input on market & m/m	
	25	Major Eq Placement	MEP & Arch		
	26	Single Line Electrical Design	Electrical Eng		
	27	Interstitial Needs (abv clg & below flr)	MEP & Arch		
	28	Programmatic Finishes	Interior Design	owner influence	ie: allotment of hard flr vs soft vs resilient, etc
	29	Glazing & Veneers: % of Openings	Arch, Mech Eng	contractor input on cost allotments, energy consumption consultant	

Decision Mapping and Pull Planning

Lean Construction Institute
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Identify Major Decisions vs. Depending on Traditional Design Milestones

Preconstruction & Design Milestone Mapping

	PROGRAM	PROGRAM SIZING	ORIENTATION	LOCATION	FRAME	FOUNDATION	MECHANICAL	ENVELOPE	POWER	FIXTURES	FINISHES
Major Decision Milestones	• Department Needs Identified • Department Adjacency Requirements	• Space Allocation Program • Code & Licensure Requirements	• Building Shape • Number of Levels vs Footprint	• Building Location on property • Site Design Elements	• Structural Frame Type • Structural Layout & Spacing • Structural Interstitial	• Foundation Type • Geotechnical Information	• HVAC System Selection • Major Equipment Placement • Utility Routing	• Roof Type • Storm System • Insulation Level • Windows & Veneers	• Roof Type • Storm System • Insulation Level • Windows & Veneers	• Plumbing Fixtures • Light Fixtures • FFE	• Level of Finishes • Reflective Ceiling • Access Control • Millwork • Low Voltage Layout
Partner Experts	• Owner • Program Manager	• Owner • Program Manager • Designer • Builder	• Owner • Program Manager • Designer • Builder • Structural Expert	• Owner • Program Manager • Designer • Builder • Structural Expert • Civil Expert	• Owner • Program Manager • Designer • Builder • Structural Expert	• Owner • Program Manager • Designer • Builder • Structural Expert • Civil Expert	• Owner • Program Manager • Designer • Builder • Mechanical Expert	• Owner • Program Manager • Designer • Builder • Walls Expert	• Owner • Program Manager • Designer • Builder • Electrical Expert	• Owner • Program Manager • Designer • Builder • Electrical Expert • Mechanical Expert • Interiors Design	• Owner • Program Manager • Designer • Builder • Walls Expert • Flooring Expert • Millwork Expert • Door Expert • Interiors Design
Tools or Methods	• Financial Pro-Forma • Bench Marking against similar Projects for Investment Predictions • Establish Initial Target	• Want vs Need Analysis • Budgeting Validation & Feasibility	• Budgeting Validation & Feasibility • Design Set Selection (CBA) • Document & Share (Design Update & A3)	• Budgeting Validation & Feasibility • Design Set Selection (CBA) • Document & Share (Design Update & A3)	• Budgeting Validation & Feasibility • Design Set Selection (CBA) • Document & Share (Design Update & A3)	• Budgeting Validation & Feasibility • Design Set Selection (CBA) • Document & Share (Design Update & A3)	• Budgeting Validation & Feasibility • Design Set Selection (CBA) • Document & Share (Design Update & A3)	• Budgeting Validation & Feasibility • Design Set Selection (CBA) • Document & Share (Design Update & A3)	• Budgeting Validation & Feasibility • Design Set Selection (CBA) • Document & Share (Design Update & A3)	• Budgeting Validation & Feasibility • Design Set Selection (CBA) • Document & Share (Design Update & A3)	• Budgeting Validation & Feasibility • Design Set Selection (CBA) • Document & Share (Design Update & A3)

Floor Plate Locked 90%

Floor Plate Locked 100%

CONTINUOUS ESTIMATING AND INNOVATION

Integration Event

From CPR Program

Cluster Work Activity

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- Cluster Assignments
- Brainstorm Value Driving Ideas within your Cluster
- Write 1 idea per sticky note
- Ideas that could optimize owner value
  (Value Def & CoS)
- Analyze and Agree on Top 3 to present at Core Team / Integration Event

30 MINUTES

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Cluster Work Presentations

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- Present Top Value Ideas to Core Team
- Recommendation for Implementation

- Core Team Decision for Further Evaluation

15 MINUTES

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Cluster Maintenance

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- Be nimble based on project needs
- It’s ok to close out a cluster team when necessary
- Check in with cluster team on effectiveness occasionally

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Drive Learning & Improvement

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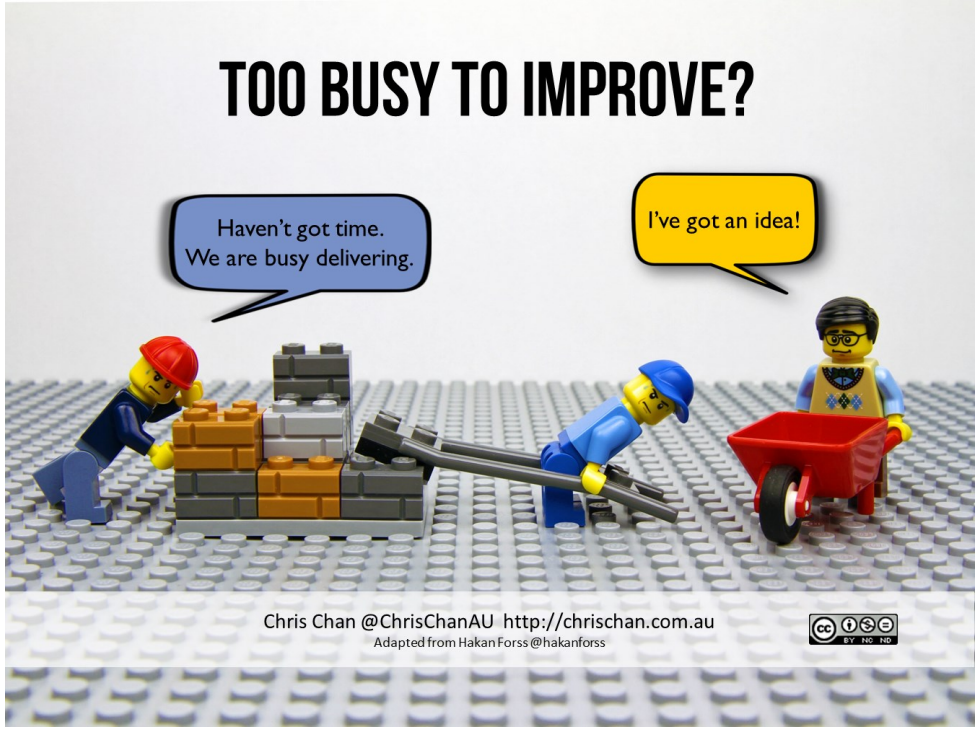

Discussion Question

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

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Learning Objectives

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Discover how to effectively organize and manage teams in cross functional, interconnected work clusters and how cluster groups engage with cost model and Last Planner System in Design.

Discover the importance of key leadership roles and responsibilities that are foundational to the successful implementation of Target Value Delivery, information management, and decision making.

Identify what are the characteristics of effective facilitation and Lean practices at a project and work cluster level for Target Value Delivery to support information flow.

Understand information and decision-making workflow across clusters and from cluster groups to decision making authorities within team and how to managing owner prerogative in the context of consensus driven decision making.

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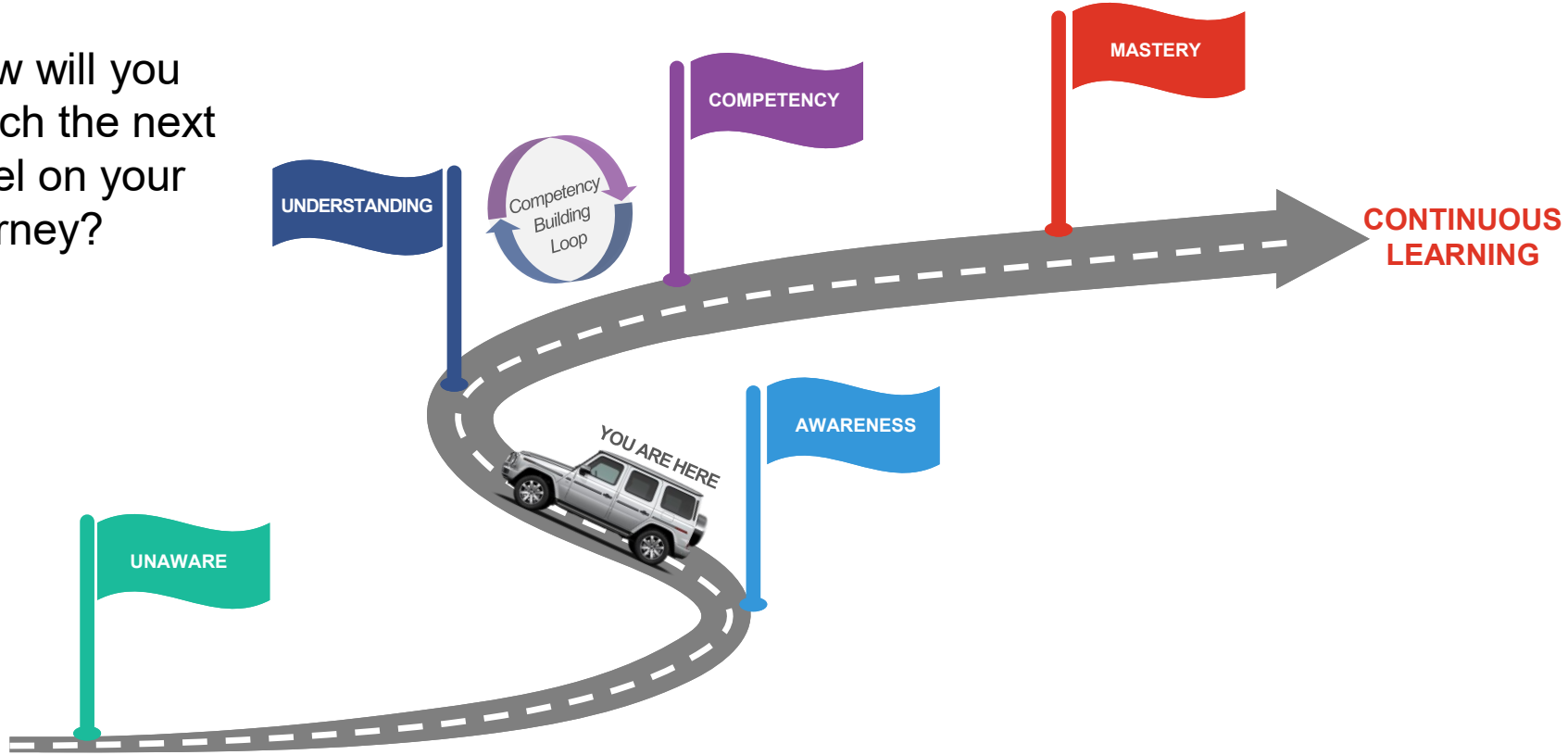
Lean Journey to Mastery

How will you reach the next level on your journey?



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Define Your Journey

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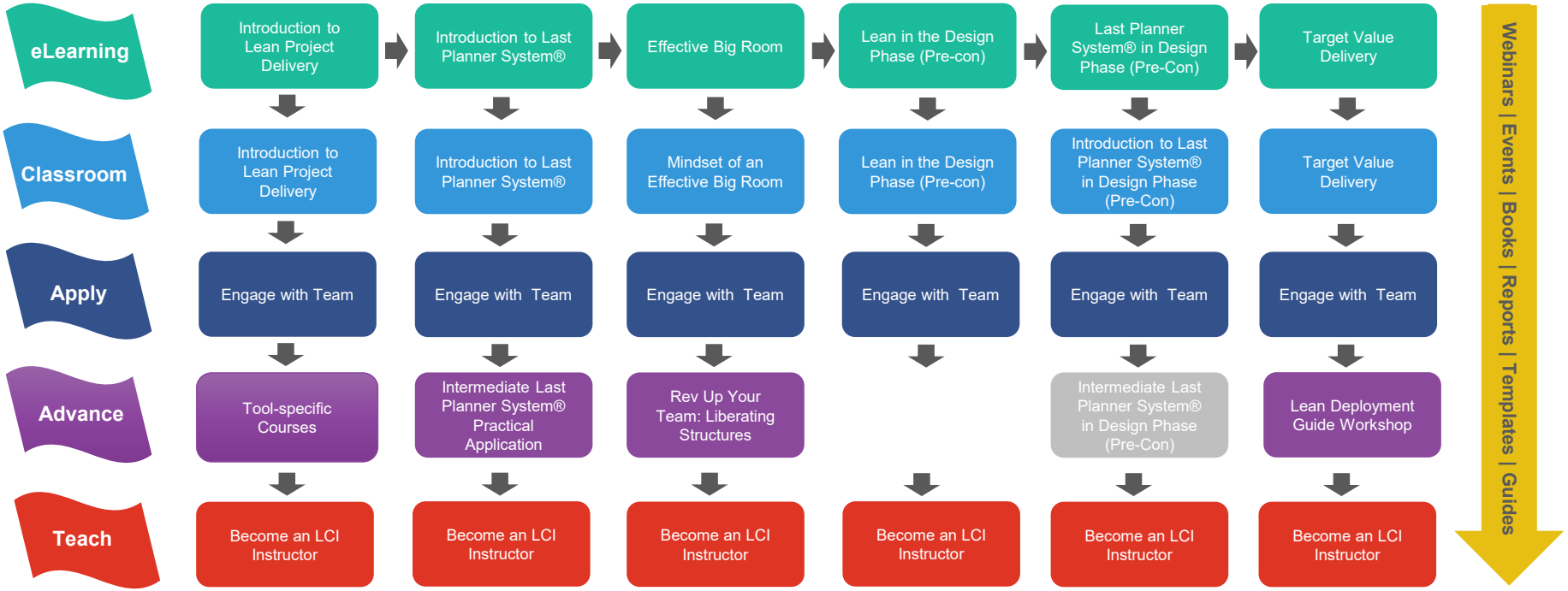

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eLearning Courses

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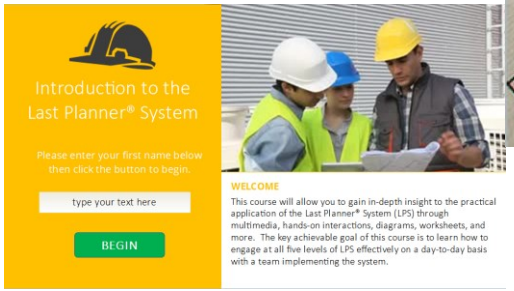
- Introduction to the Last Planner System®
- Introduction to Lean Project Delivery
- Lean in the Design Phase
- Effective Big Room
- Target Value Delivery
- Last Planner System® in Design



Questions?

Conduct Plus/Delta

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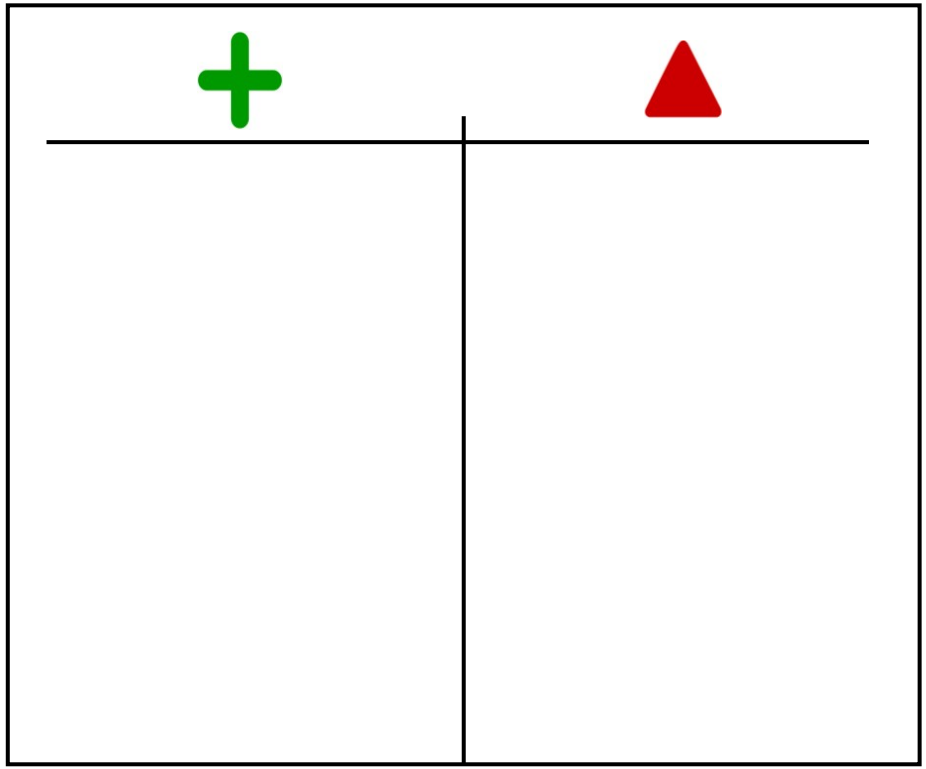
Plus: What produced *value* during the session?

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



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Brasfield & Gorrie

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LCI Website Information

www.LeanConstruction.org

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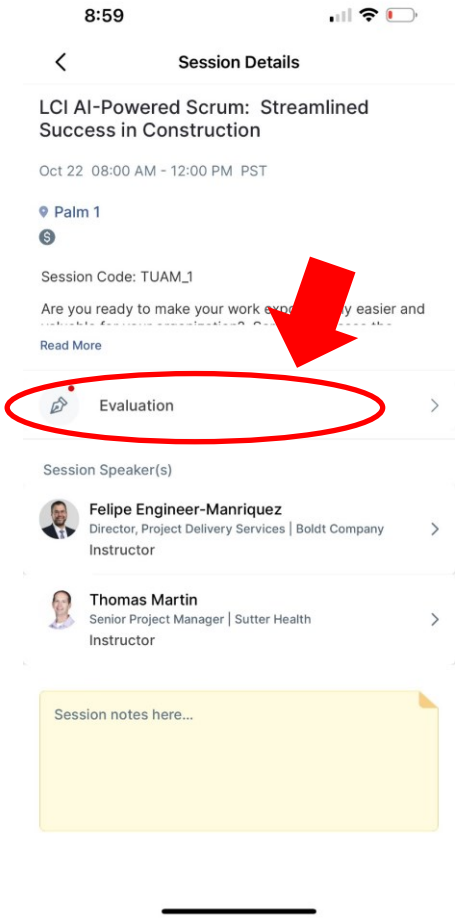

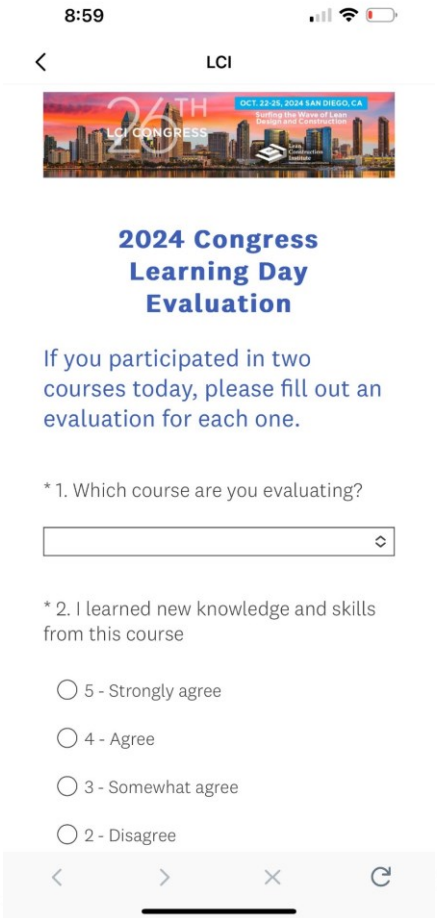

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