Lean Construction Institute
Immersive Education Program

Target Value Delivery Module 1: Learning the Fundamentals

Elizabeth Taylor – JE Dunn Construction
Emily Lowe – Butz

October 22, 2024

Lean Construction Institute
Immersive Education Program

Presenter Highlights

Elizabeth Taylor
National Lean Director
JE Dunn Construction
elizabeth.taylor@jedunn.com

EMILY LOWE
Enterprise Lean Champion
emily.lowe@butz.com

Lean Construction Institute CERTIFIED Practitioner Construction LCI-CPC

Lean Construction Institute CERTIFIED Practitioner Design LCI-CPD-SME

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA AGC CM-LEAN

CERTIFICATE LEAN CONSTRUCTION OF MANAGEMENT CM-LEAN LEAD INSTRUCTOR

Lean Construction Institute
Immersive Education Program

LCI Course:
Target Value Delivery Module 1:
Learning the Fundamentals
4 CEU

Sign the sign-in sheet for credit

AIA Approved Continuing Education

TVD Modules

Lean Construction Institute
Immersive Education Program

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.

Learning Objectives

Lean Construction Institute
Immersive Education Program

Define the meaning of Target Value Delivery and understand the intent of the approach.

Identify the four phases, including the actions and outputs of each phase.

Identify key Core Components of TVD.

Discover how implementing TVD approaches improves project outcomes.

Lean Construction Institute
Immersive Education Program

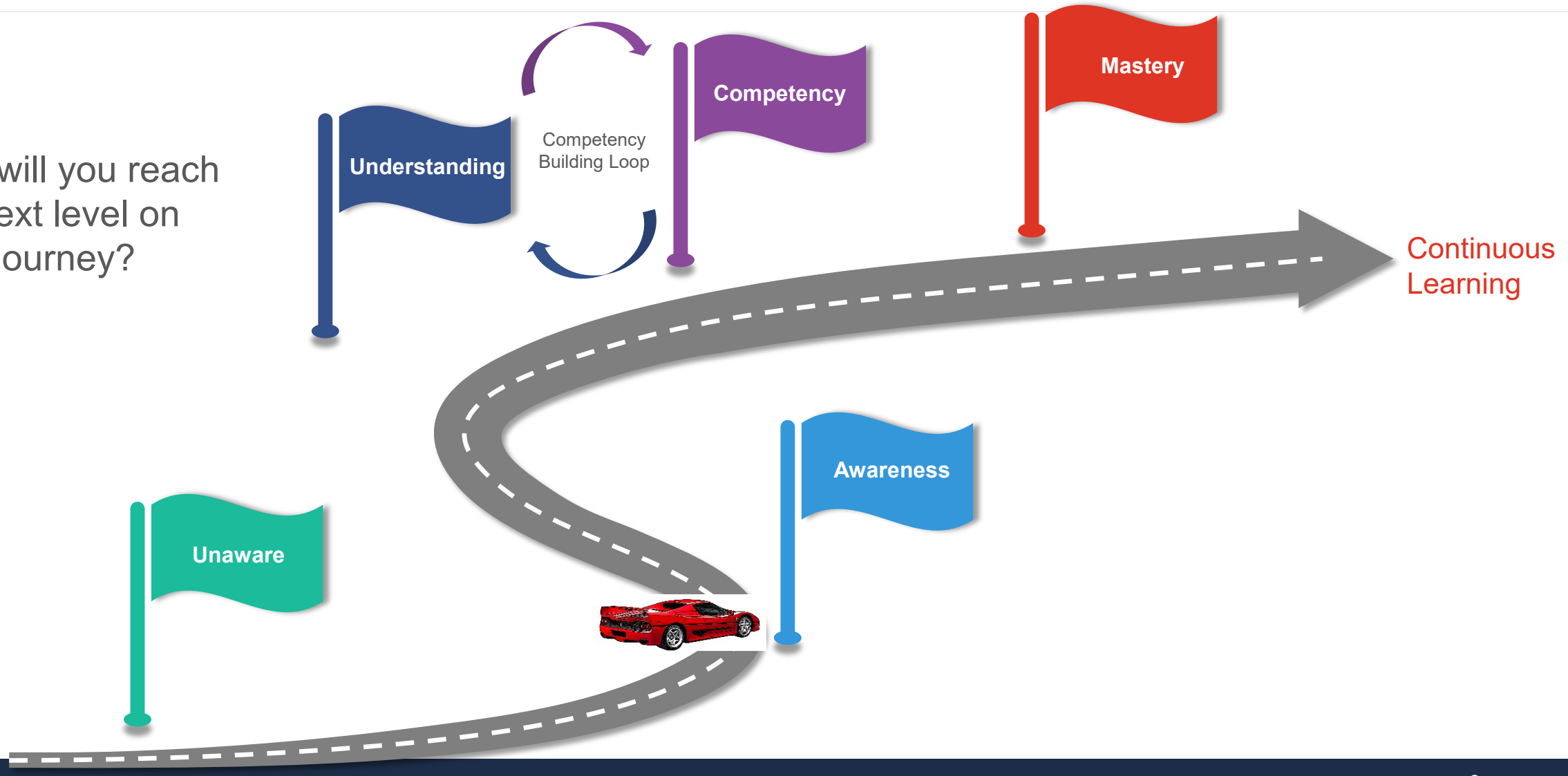
Participants' CoS

What do you want to gain from this workshop?

Lean Journey to Mastery

Lean Construction Institute
Immersive Education Program

How will you reach the next level on your journey?



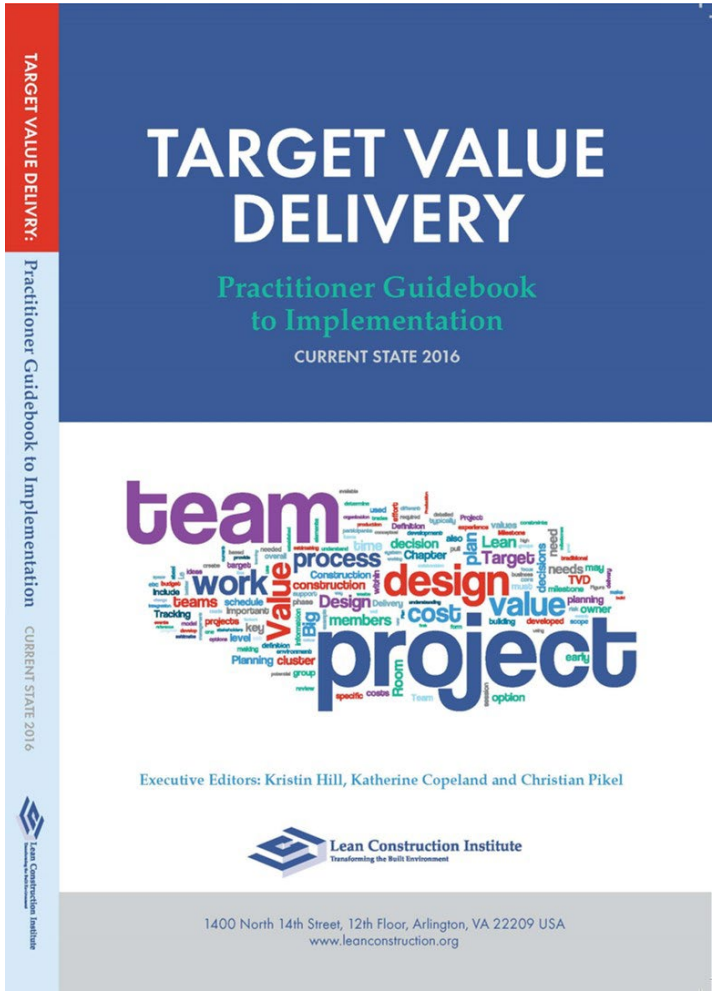
Lean Construction Institute
Immersive Education Program

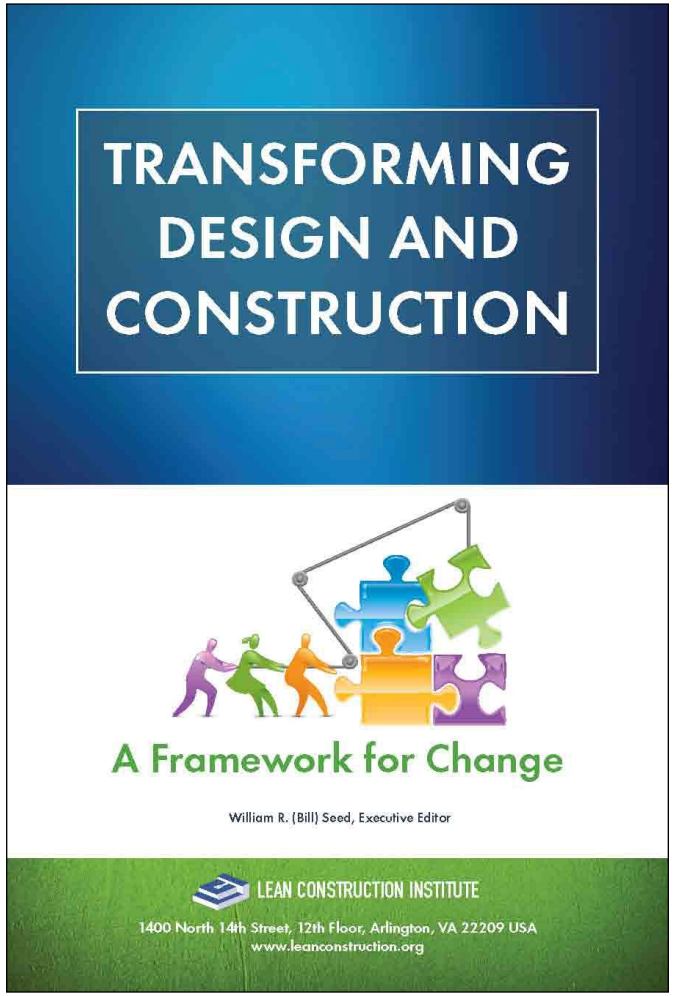
Rules of Engagement

- 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!

References

Lean Construction Institute
Immersive Education Program





Introduction / Ice Breaker

- Introduction: Who you are? What you do?
- Discuss challenges associated with delivering to budgets

10 MINUTES TABLE DISCUSSION
5 MINUTES REPORT OUT

Six Tenets of Lean Construction

Lean Construction Institute
Immersive Education Program

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

Project Elements

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 an organized implementation of Lean Principles and Tools combined to allow a team to operate in unison to create flow.

Lean Construction Institute
Immersive Education Program

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.

Target Value Delivery

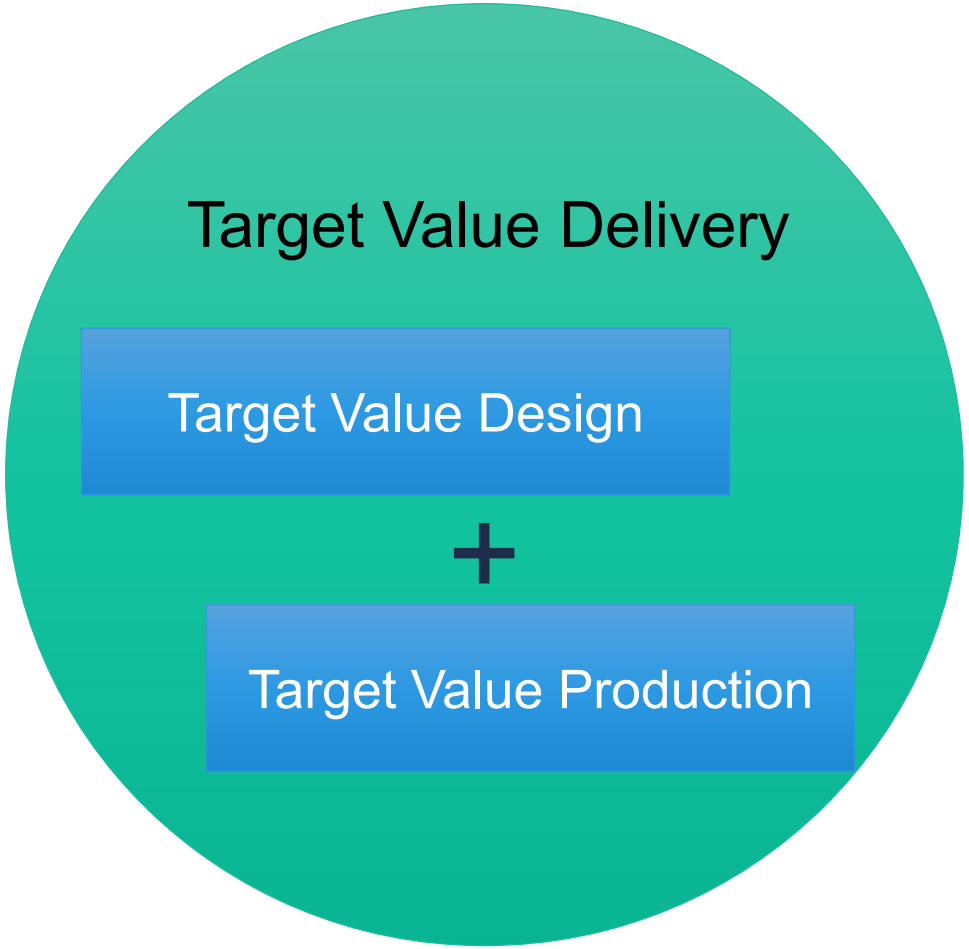
Lean Construction Institute
Immersive Education Program

Target Value Delivery encompasses

Target Value Design

AND

Target Value Production (Construction)



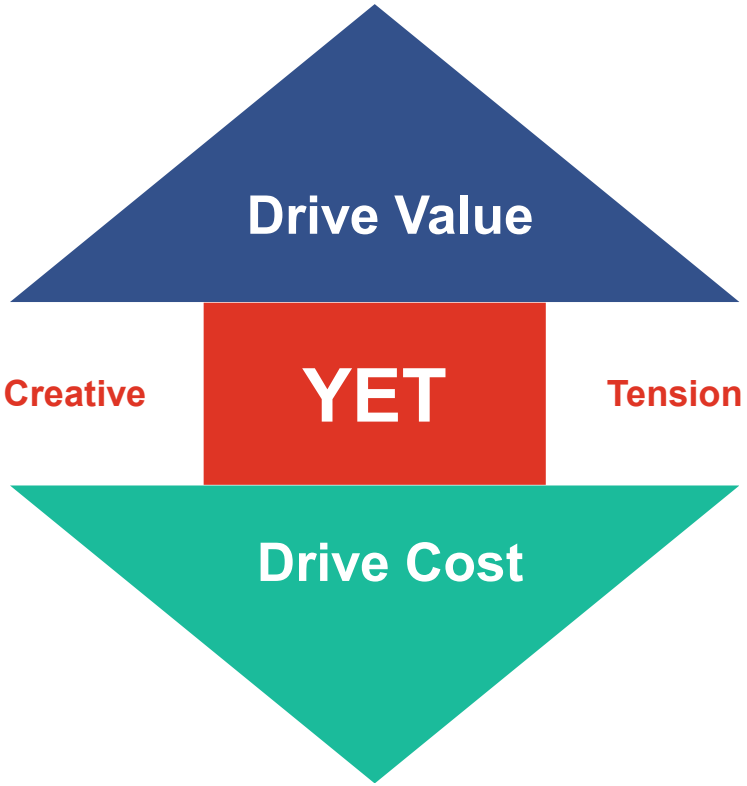
Lean Construction Institute
Immersive Education Program

Application

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

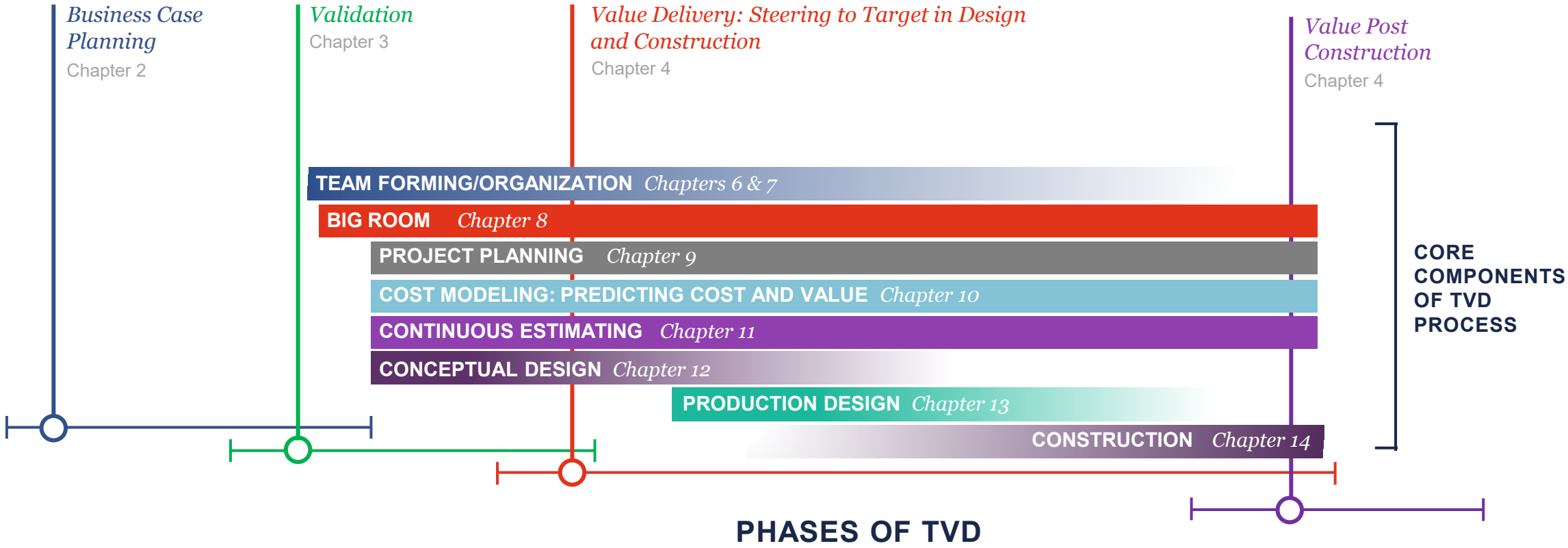
Regardless of the project delivery framework, the owner, designers, builders, and key trades must be fully engaged from the onset.

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



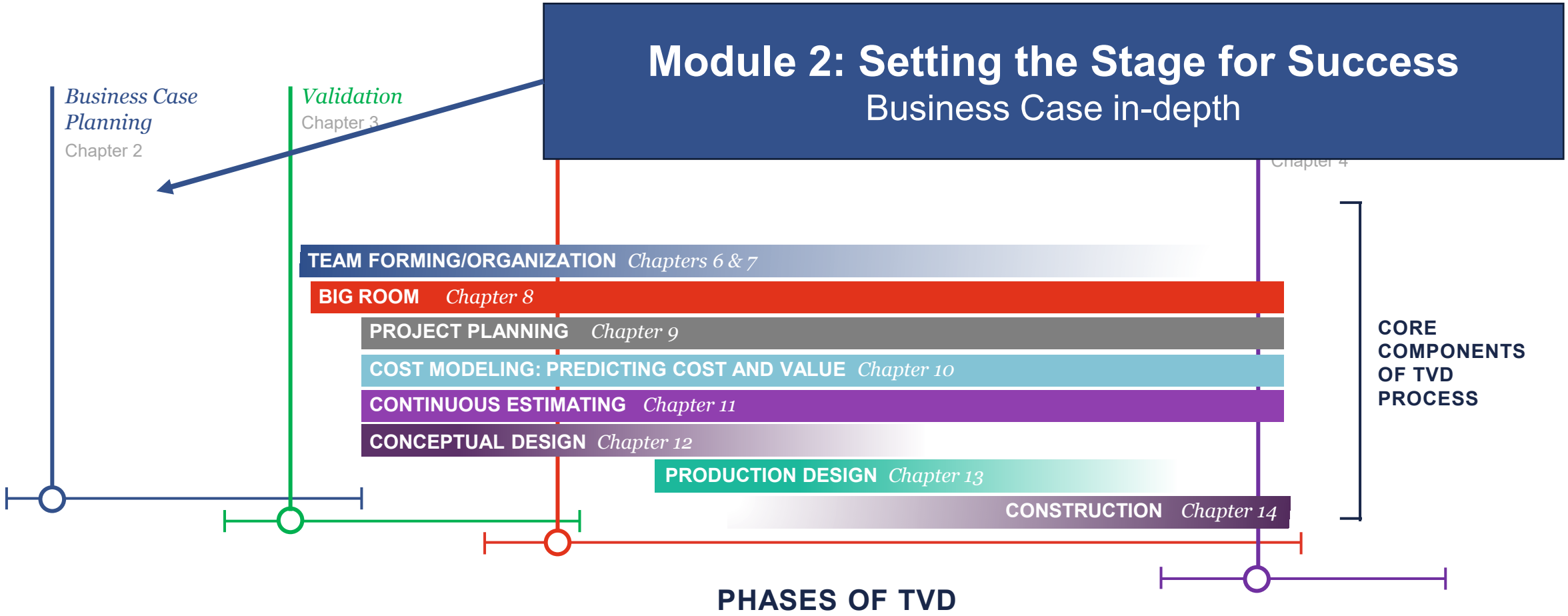
Target Value Delivery (TVD) Overview

Lean Construction Institute
Immersive Education Program



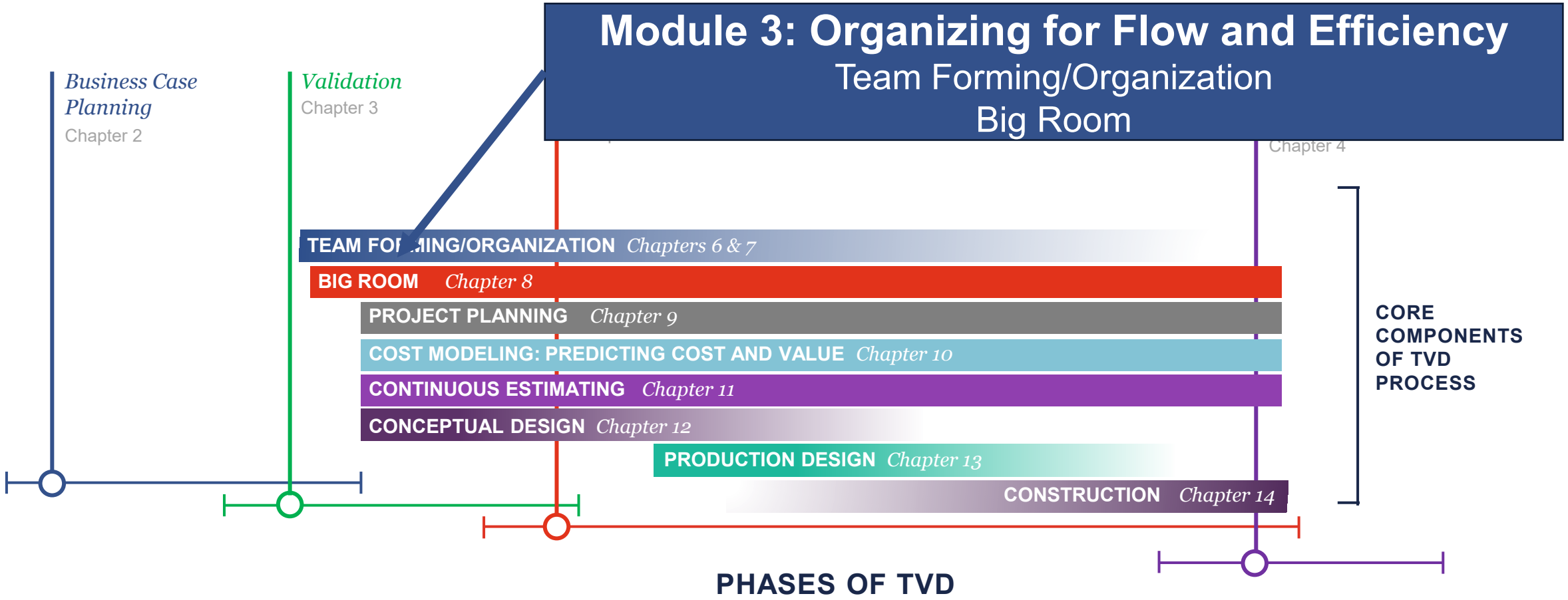
Target Value Delivery (TVD) Overview

Lean Construction Institute
Immersive Education Program



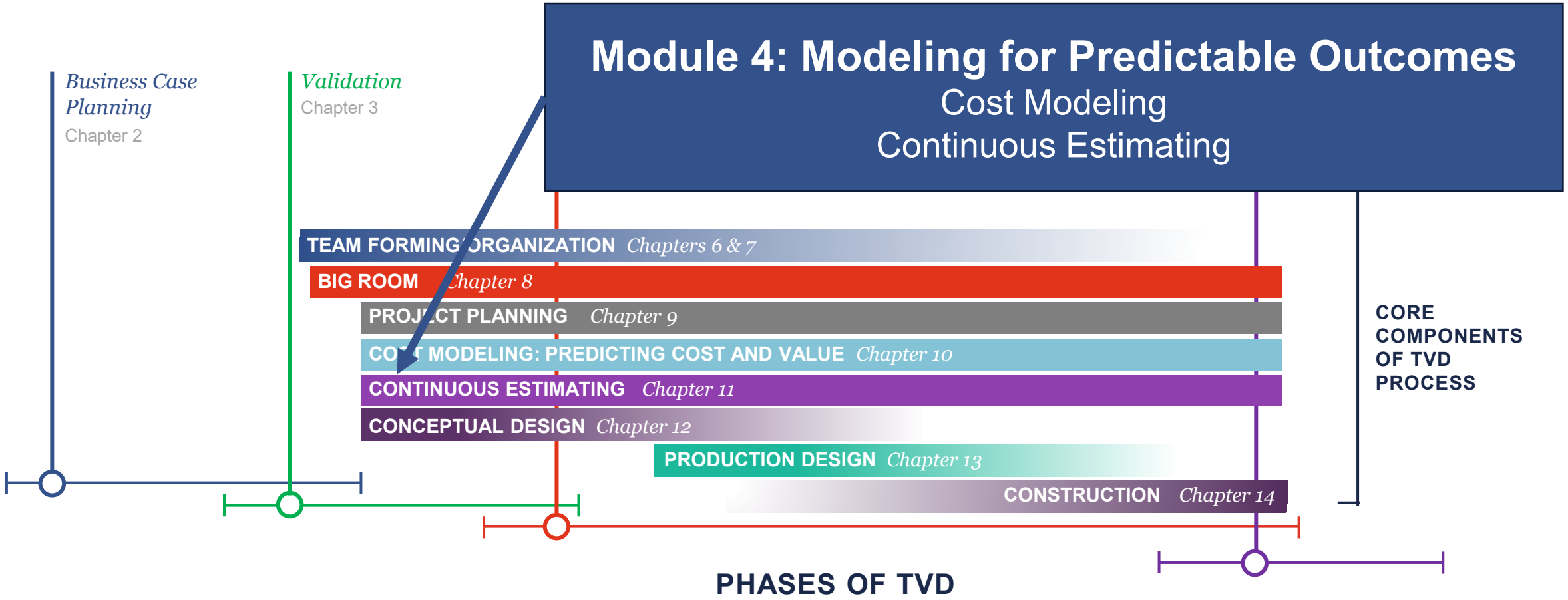
Target Value Delivery (TVD) Overview

Lean Construction Institute
Immersive Education Program



Target Value Delivery (TVD) Overview

Lean Construction Institute
Immersive Education Program



Business Case Planning Phase

Lean Construction Institute
Immersive Education Program

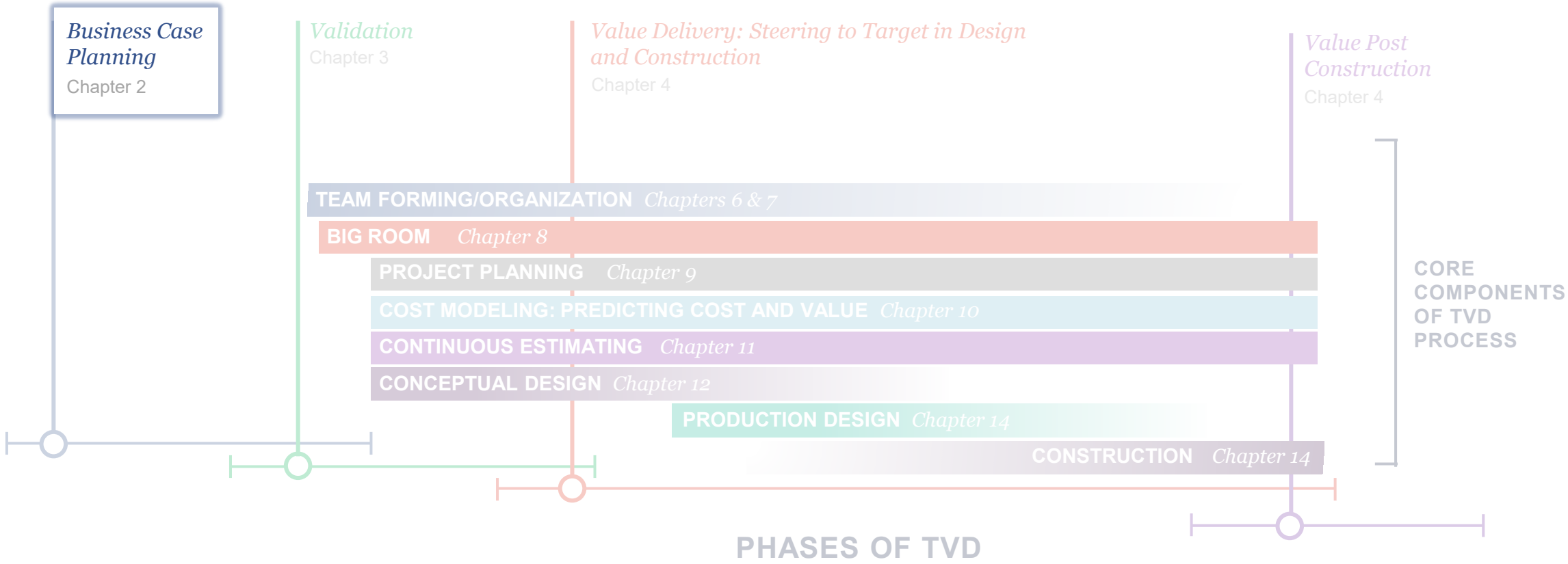


Image courtesy of InsideOut Consulting & Southland Industries

Business Case Phase

Lean Construction Institute
Immersive Education Program

The operational use/benefit proposition described by the owner that initiates the development of the project.

- The owner-provided purpose or “why” that becomes the anchor of the project.
- Sets the ***Allowable Cost***.
- Includes ***Value Definition Statements*** by the owner for the project.

Framing the Business Case

Lean Construction Institute
Immersive Education Program

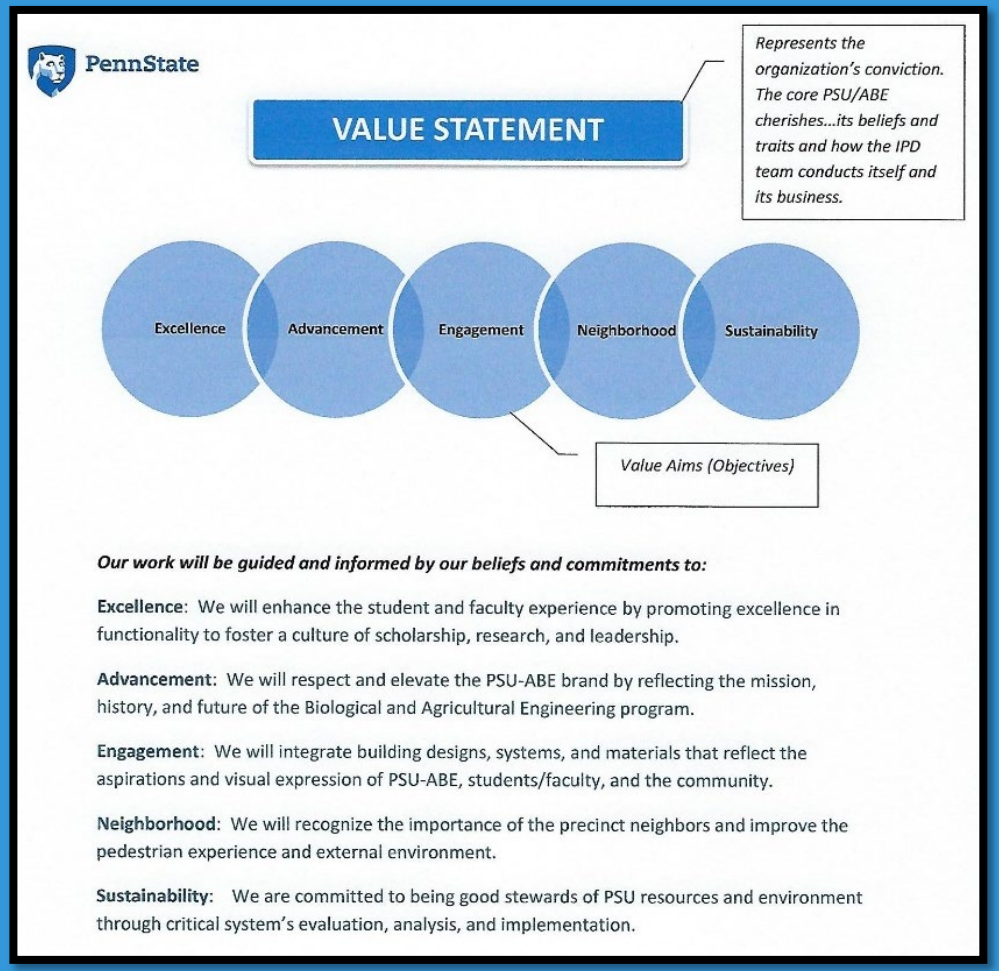
Could we build **X** thing for $**Y** and have it by **Z** date?

- Could we open a replacement hospital in Castro Valley, CA for $300 million by early 2027?
- Could we find a way to increase overall visitor count by X% for a capital expenditure of $1 billion by 2030?

Value Definition Statements

Lean Construction Institute
Immersive Education Program

- Define what the customer wants from the process.
- Are composed of high-level statements that describe expected outcomes, or “value” that the project will deliver.
- Should not be ranked or weighted.
- Should include all stakeholder input.



PennState

VALUE STATEMENT

Represents the organization’s conviction. The core PSU/ABE cherishes…its beliefs and traits and how the IPD team conducts itself and its business.

Excellence | Advancement | Engagement | Neighborhood | Sustainability

Value Aims (Objectives)

Our work will be guided and informed by our beliefs and commitments to:

Excellence: We will enhance the student and faculty experience by promoting excellence in functionality to foster a culture of scholarship, research, and leadership.

Advancement: We will respect and elevate the PSU-ABE brand by reflecting the mission, history, and future of the Biological and Agricultural Engineering program.

Engagement: We will integrate building designs, systems, and materials that reflect the aspirations and visual expression of PSU-ABE, students/faculty, and the community.

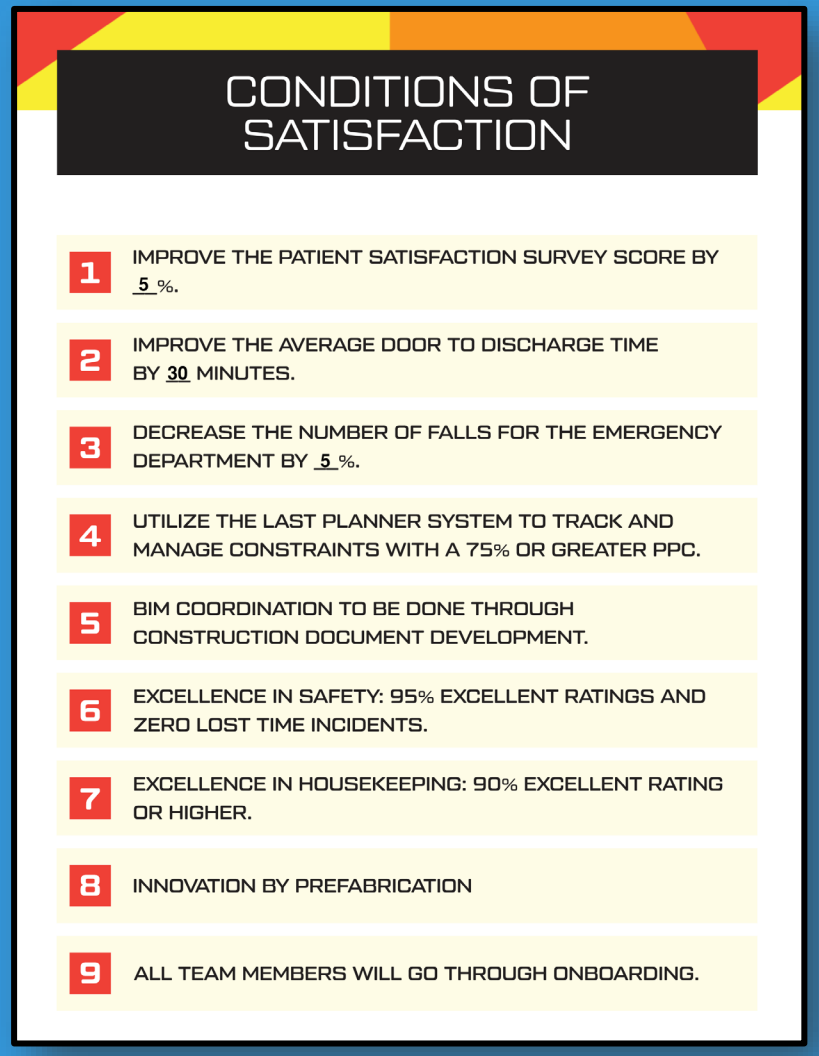
Neighborhood: We will recognize the importance of the precinct neighbors and improve the pedestrian experience and external environment.

Sustainability: We are committed to being good stewards of PSU resources and environment through critical system’s evaluation, analysis, and implementation.

Conditions of Satisfaction (CoS):

Lean Construction Institute
Immersive Education Program

- Are developed by the team informed by the ***Value Definition Statements***.
- Measurable statements that inform a project team about which tests a project must pass to be accepted as a success.
- Inform the decision-making process of the team.
- Are developed by the team including the owner.



TVD Cost Terminology

Allowable Cost

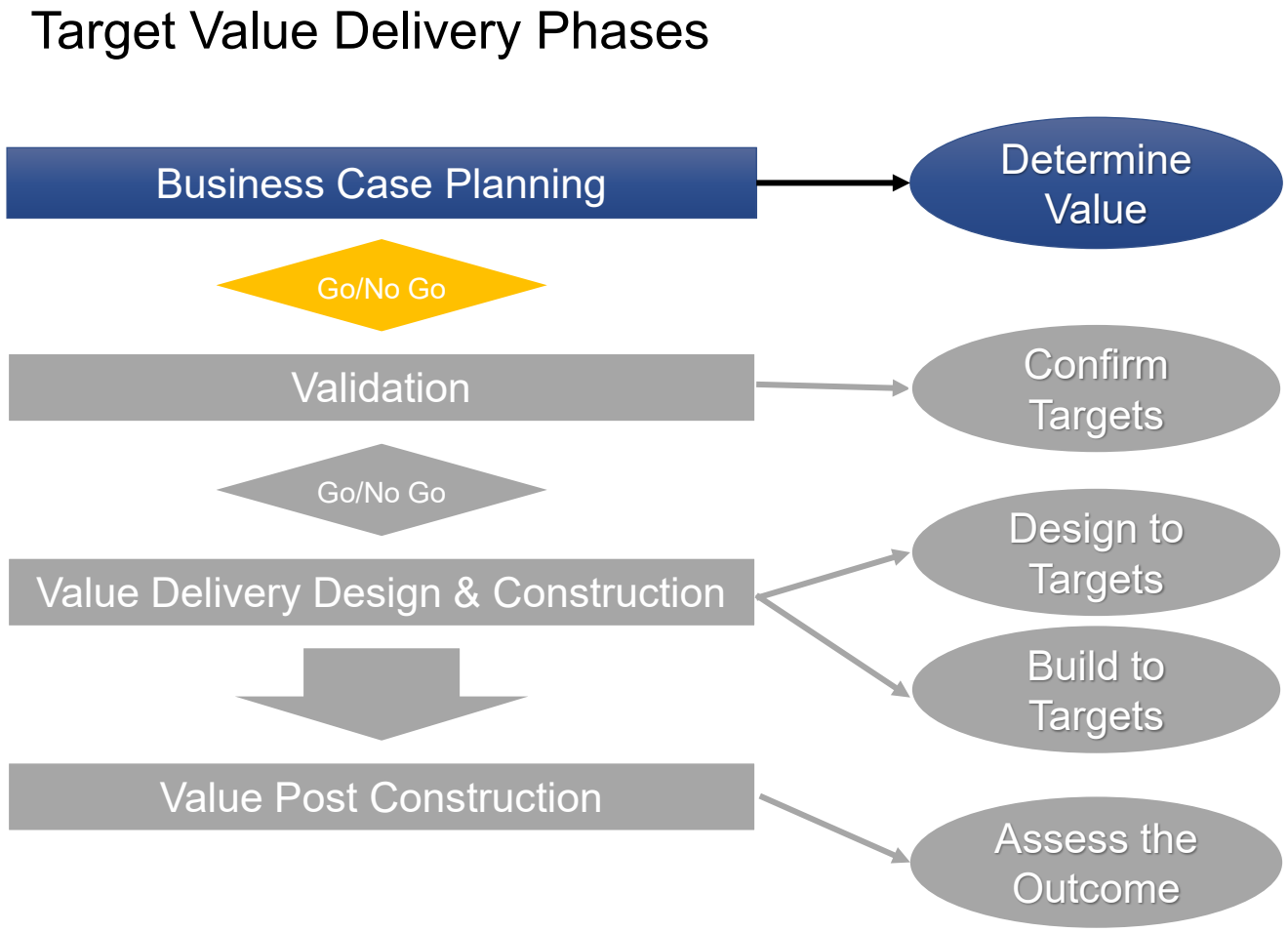
The amount the owner is willing to spend for the total project.

Business Case Planning Phase

TVD Phases Overview

The output of the ***Business Case Planning Phase*** includes:

- Value Definition Statements
- Allowable Cost
- Time Frame
- Other Relevant Information



Validation Phase

Lean Construction Institute
Immersive Education Program

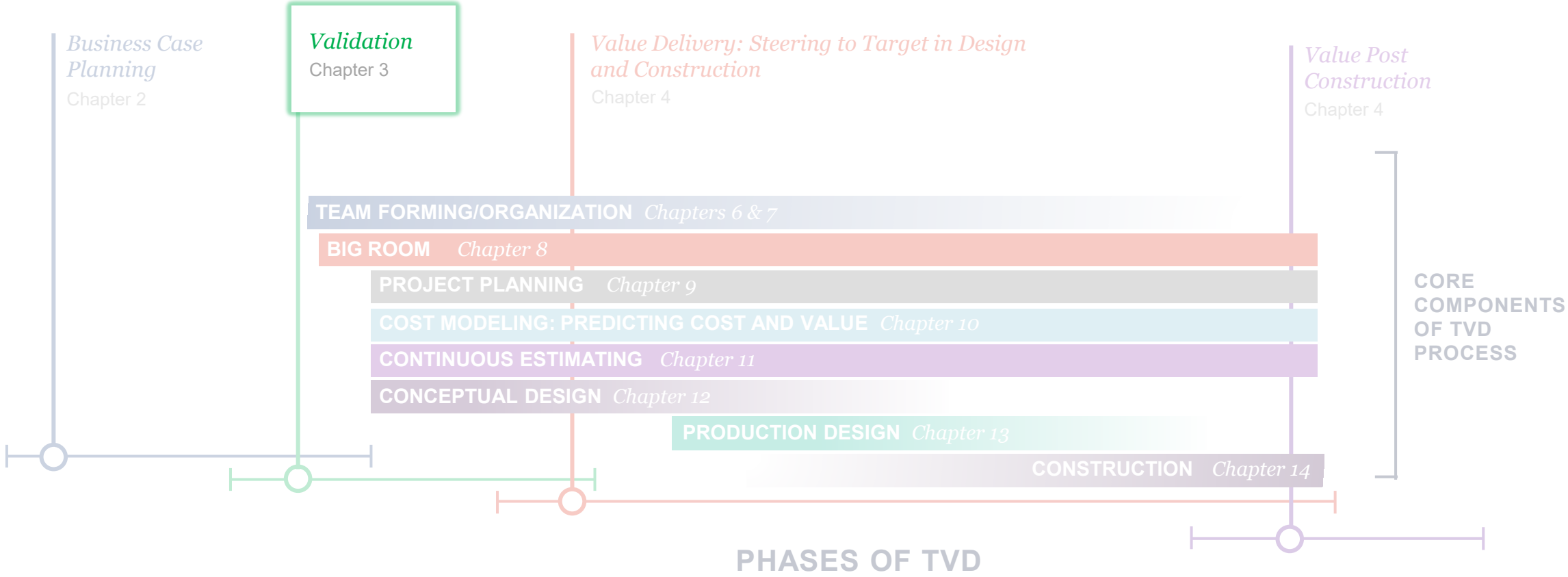


Image courtesy of InsideOut Consulting & Southland Industries

Validation Phase

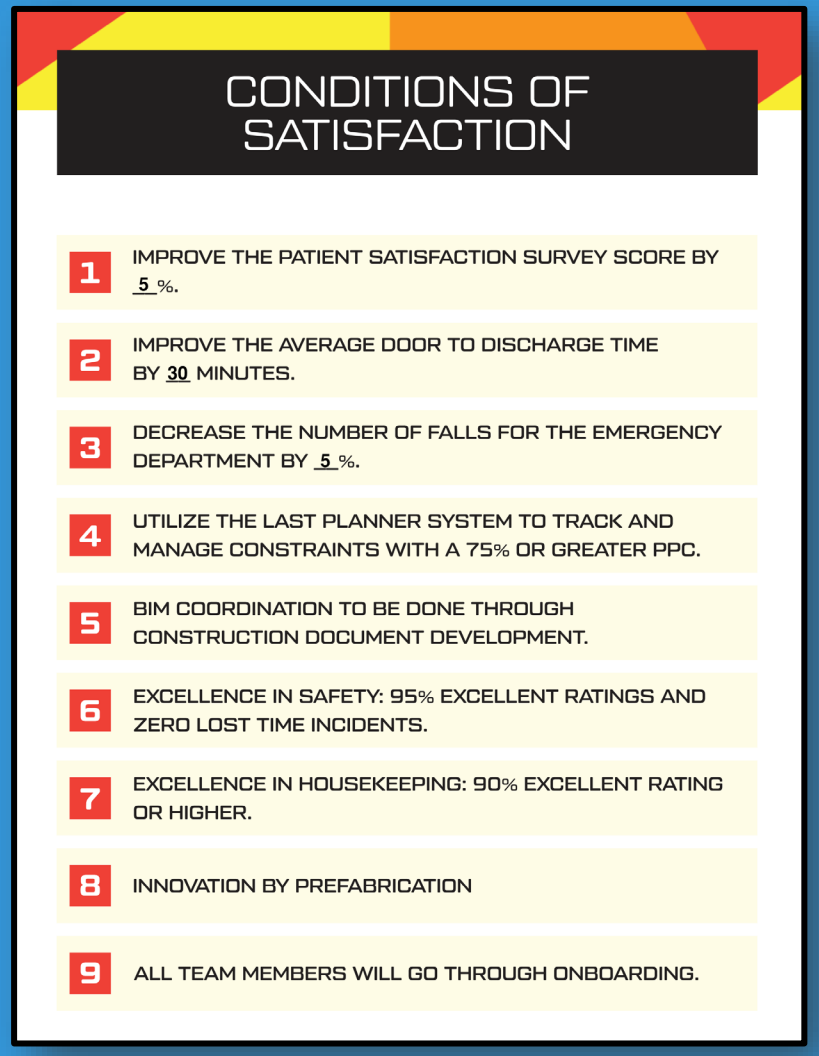
The project team determines whether the project is viable based on the outputs of the ***Business Case*** Phase.

- Output is the team understanding and alignment:
  - Scope definition
  - Value Definition & Conditions of Satisfaction
  - Expected Cost
  - Target Cost

Conditions of Satisfaction (CoS):

Lean Construction Institute
Immersive Education Program

- Are developed by the team informed by the ***Value Definition Statements***.
- Measurable statements that inform a project team about which tests a project must pass to be accepted as a success.
- Inform the decision-making process of the team.
- Are developed by the team including the owner.



Lean Construction Institute
Immersive Education Program

Expected Cost

Is an expression of the team's best estimate at the conclusion of the ***Validation Phase*** of what current best practice would produce as a price for the facility reflected in the accompanying basis-of-design documents.

Typically will also be supported by benchmarking or other market data to calibrate the Expected Cost in light of the market context.

Expected Cost

Lean Construction Institute
Immersive Education Program

Target Cost

- Is the cost goal that a project team is striving to achieve for its design and delivery efforts.
- Should be either equal to or less than the **Allowable Cost** and **Expected Cost.**
- Should be set at less than best-in-class past performance.
- Creates a sense of necessity to drive innovation and waste reduction into the design and construction process.

Target Cost

Lean Construction Institute
Immersive Education Program

TVD Cost Terminology

Allowable Cost

The amount the owner is willing to spend for the total project.

Business Case Planning Phase

≥

Expected Cost

The best estimate that the team projects the project will cost

Validation Phase

≥

Target Cost

The team goal for the total project.

Validation Phase

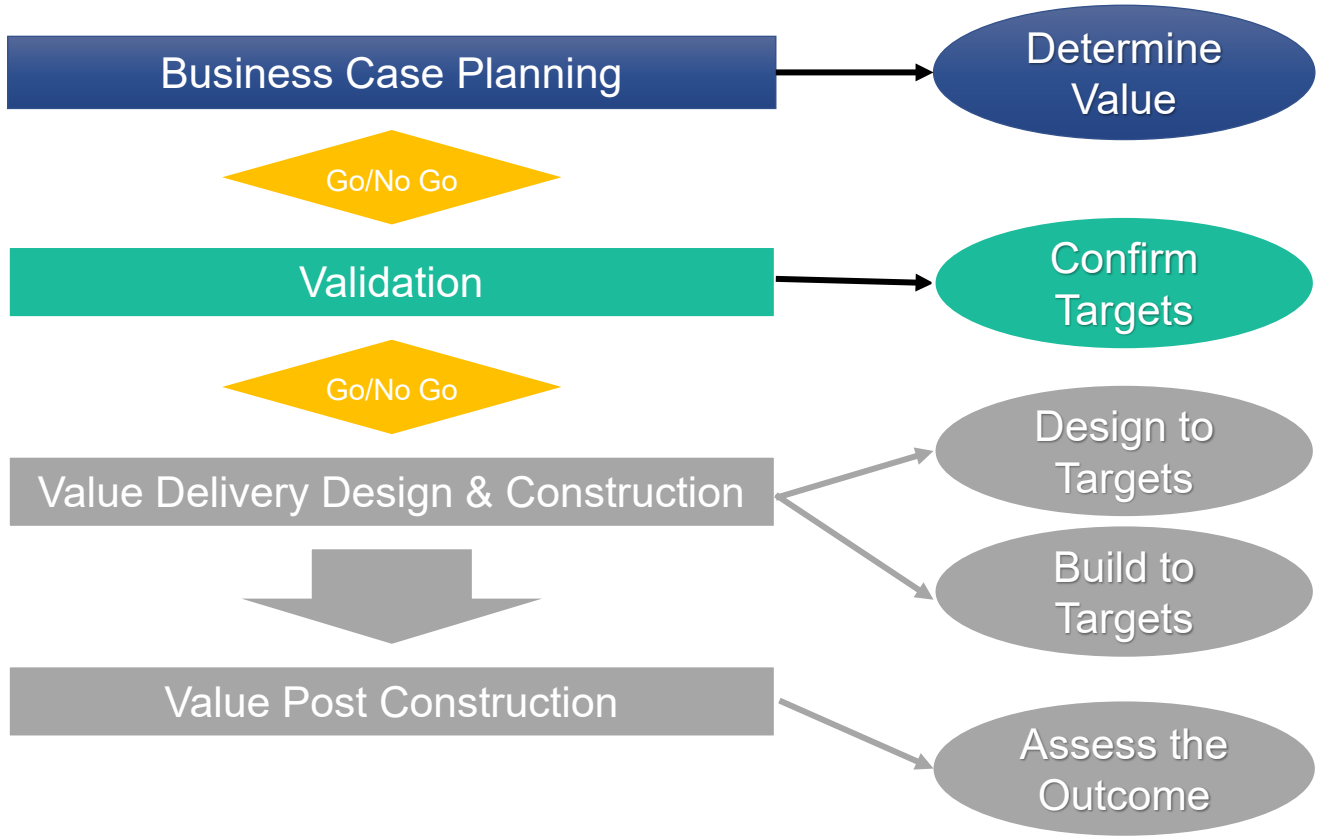
TVD Phases Overview

Lean Construction Institute
Immersive Education Program

Output of the ***Validation Phase*** includes:

- Team alignment and understanding of the **Targets**, and confidence in delivering to the **Targets.**

Target Value Delivery Phases



Value Delivery: Steering to the Target

Lean Construction Institute
Immersive Education Program

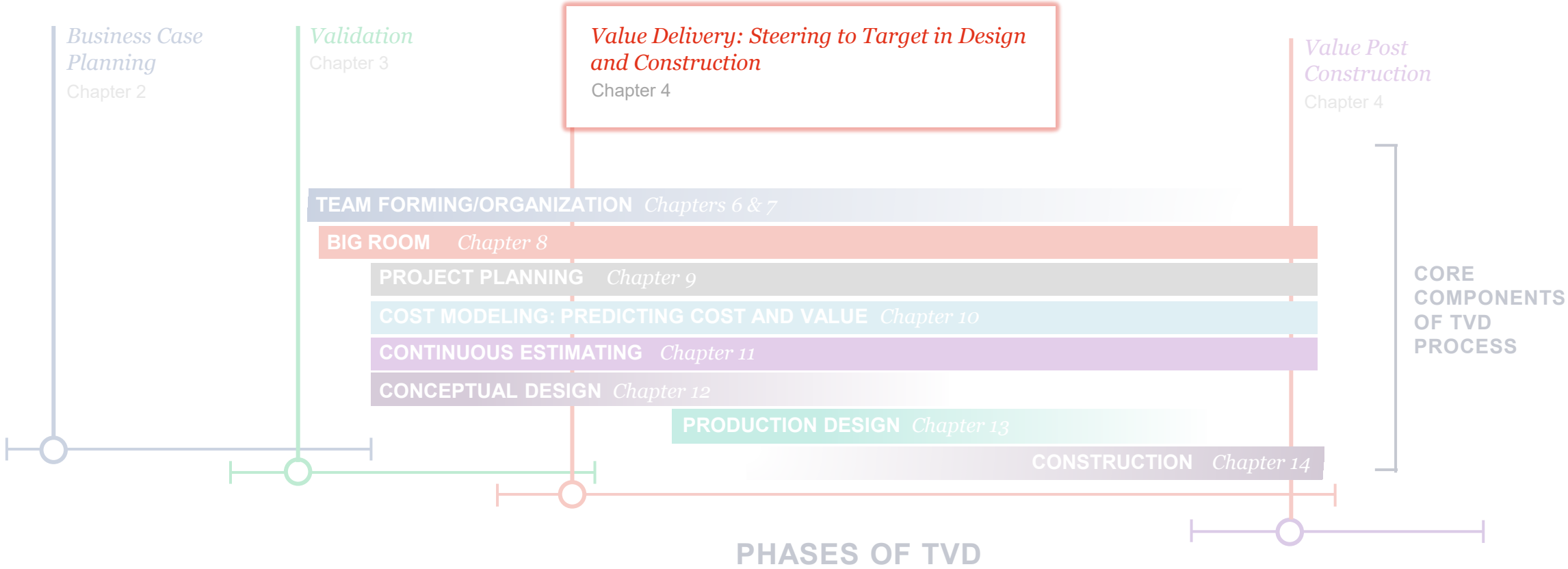


Image courtesy of InsideOut Consulting & Southland Industries

Value Delivery Phase

Work progresses in small batches toward intermediate milestones/decision points.

- The design is continually evaluated to the *Target Cost & CoS.*
- Teams explore innovative ways to achieve goals and add more value.
- An output of the phase is the *Actual Cost.*

TVD Cost Terminology

Lean Construction Institute
Immersive Education Program

Allowable Cost

The amount the owner is willing to spend for the total project.

Business Case Planning Phase

≥

Expected Cost

The best estimate that the team projects the project will cost

Validation Phase

≥

Target Cost

The team goal for the total project.

Validation Phase

≥

Actual Cost

The final cost at the end of the project.

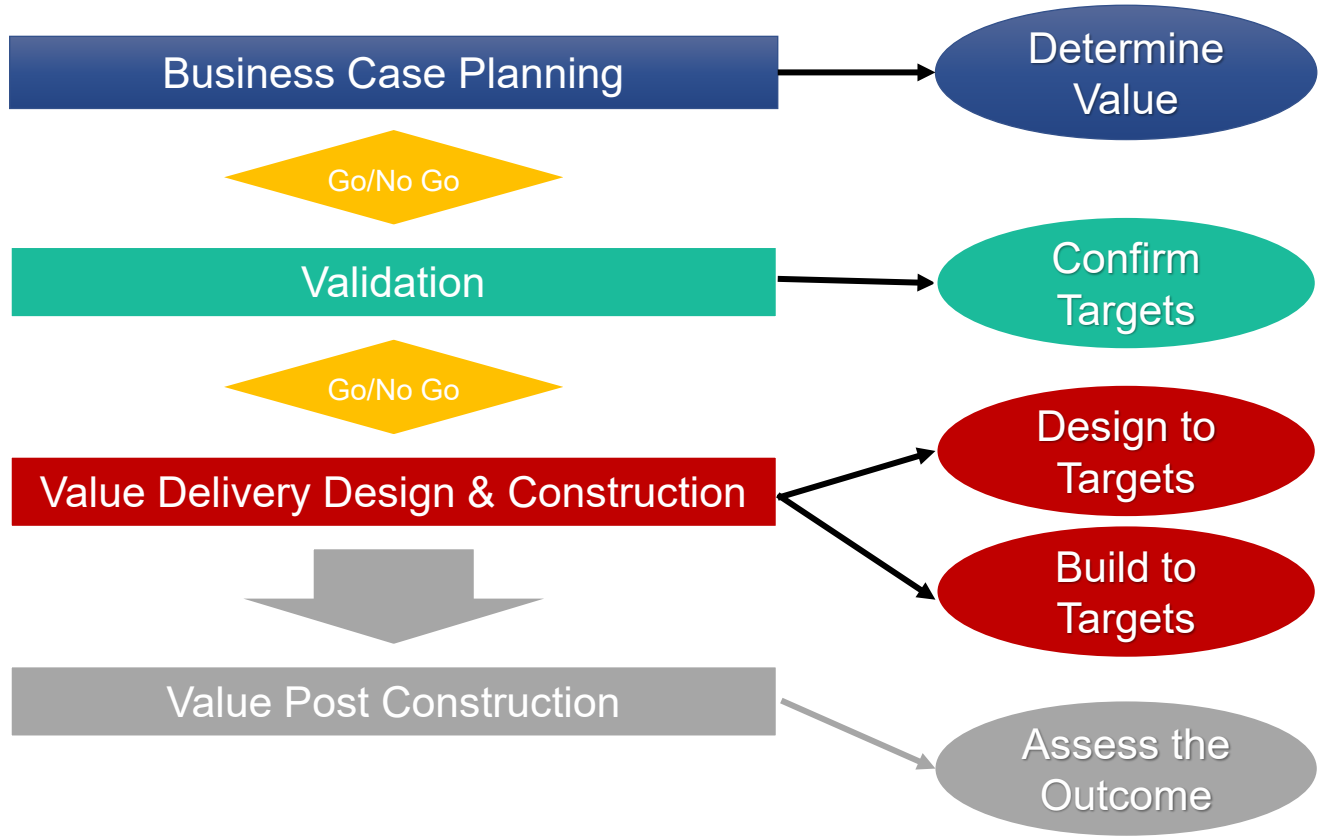
Value Delivery Phase

TVD Phases Overview

The output of the ***Value Delivery Phase*** includes:

- Turnover of the actual finished project.
- The **Actual Cost** of the project.

Target Value Delivery Phases



Value Post Construction

Lean Construction Institute
Immersive Education Program

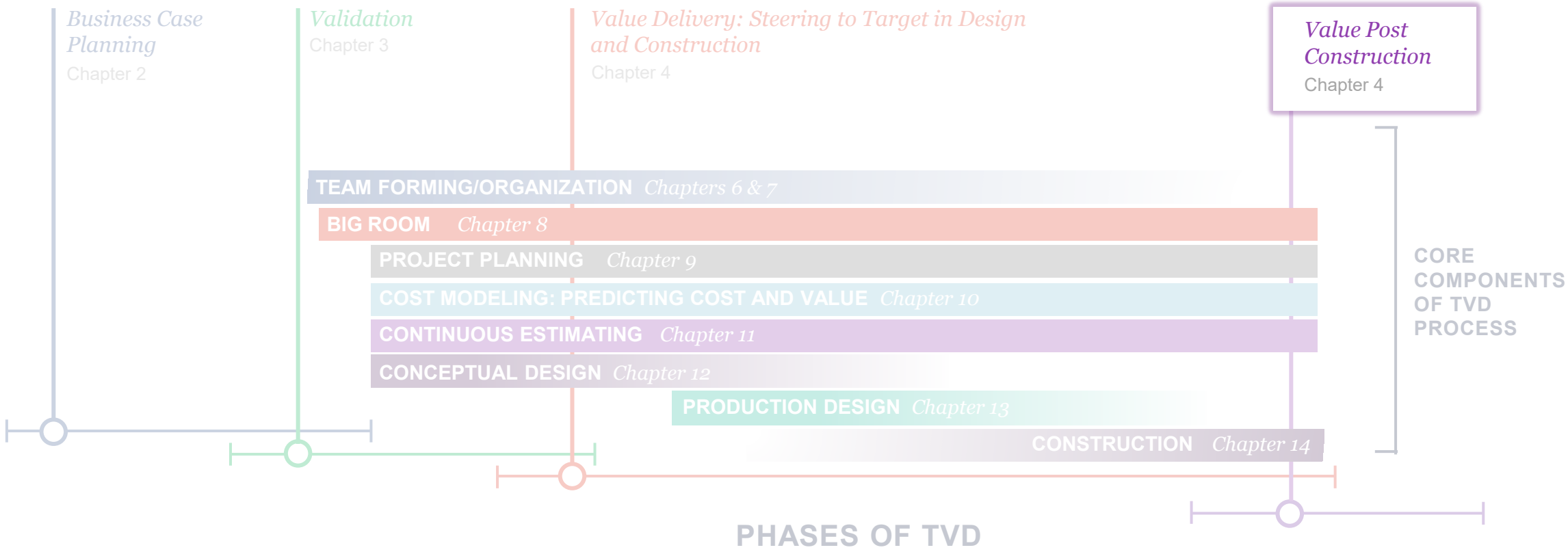


Image courtesy of InsideOut Consulting & Southland Industries

Value Post Construction

Lean Construction Institute
Immersive Education Program

- For the owner, value is realized only after the facility is constructed and serving its intended purpose.
- The business case and values are reviewed for actual outcomes.

Measuring Outcomes

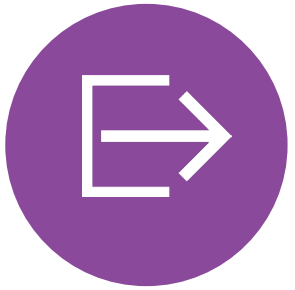
Lean Construction Institute
Immersive Education Program

Business outcomes

- Final cost of design & construction
- Final schedule
- Operational performance of finished building
- Quality & use

Project process outcomes

- Project quality, safety & appropriate integration of stakeholder input



Value outcomes

- Revisit the value-based decisions team made throughout process

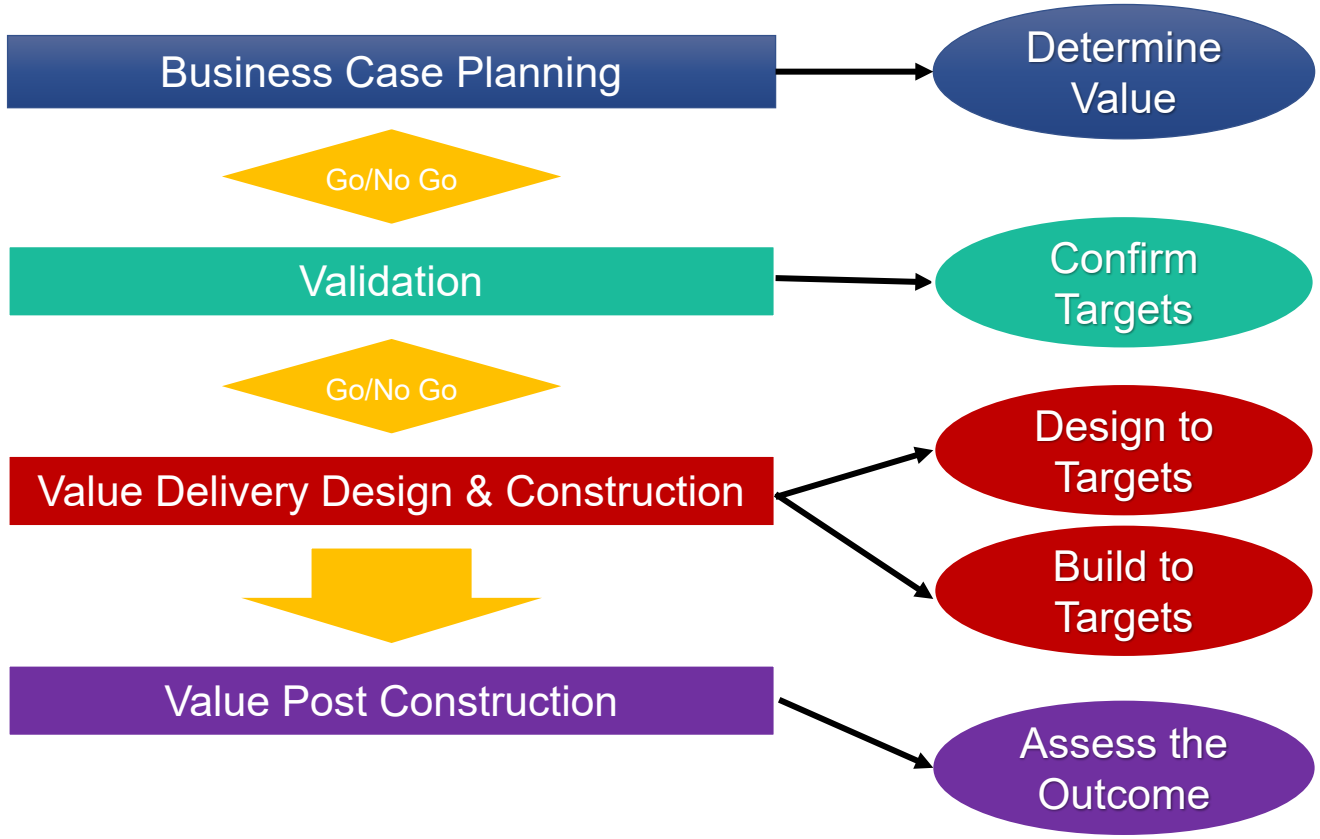
TVD Phases Overview

Lean Construction Institute
Immersive Education Program

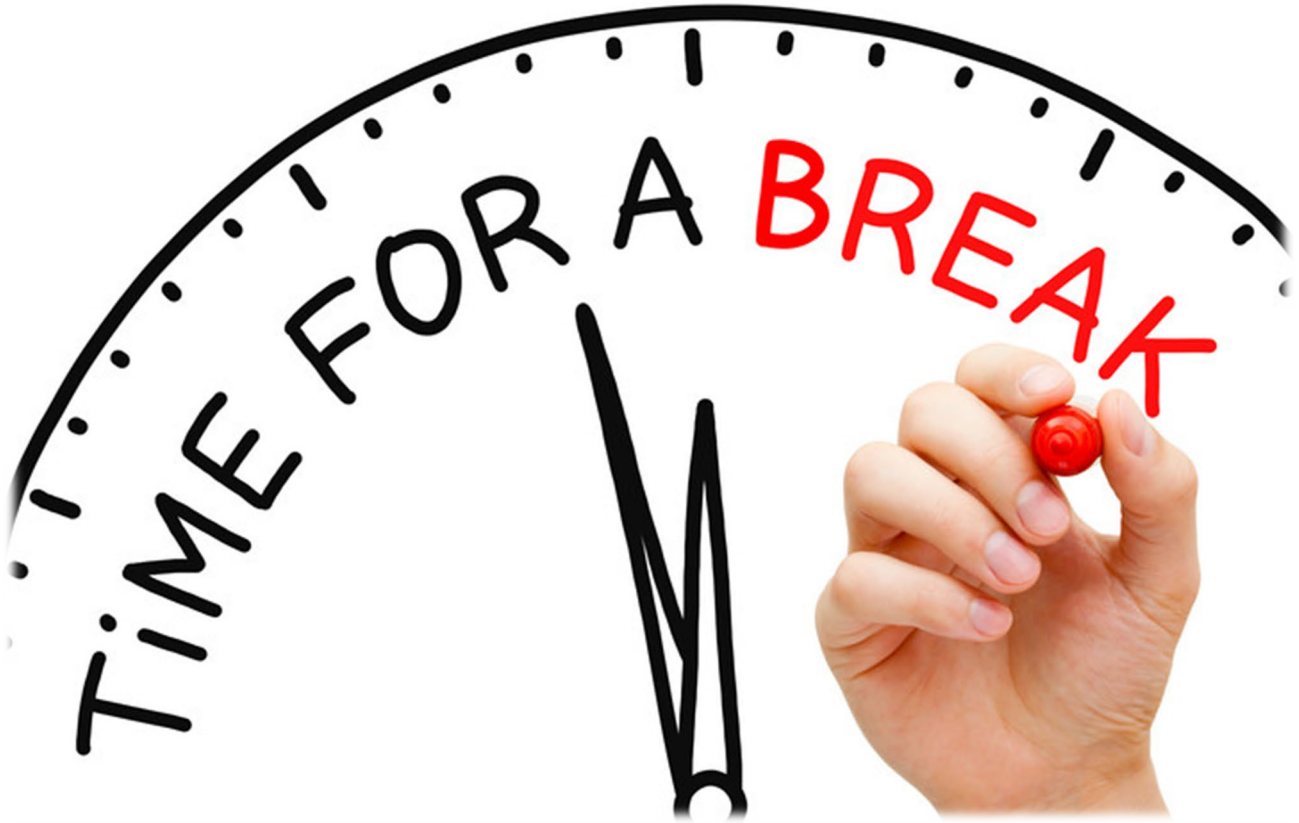
The output of the ***Value Post Construction Phase*** includes:

- Assessing the outcome to the business case plan expectations.

Target Value Delivery Phases



Lean Construction Institute
Immersive Education Program



10 Minute Break

Learn in Action

Lean Construction Institute
Immersive Education Program

Target Value Delivery Game

CIAC+TAMU

Acknowledgements

For the design and preparation of these slides, we gratefully acknowledge the generous sponsorship of the **Construction Industry Advisory Council** of the **Department of Construction Science**, **Texas A&M University**, as well as assistance from the following graduate students:

- **Josh Hullum**
- **Aditi Kulkarni**
- **Manish Munankami**
- **James Smith**

We also wish to acknowledge the contributions of:

- **Darren Smith, Cima Strategic Services**
- **Manish Munamkami**
- **Zofia K. Rybkowski, PhD**

Department of Construction Science
College of Architecture
Texas A&M University
College Station, TX

CIAC+TAMU

TVD Simulation:

Build A Tower/ Marshmallow Challenge

- Learning Objective:
  - Understand basic principles of Target Value Delivery (TVD)

- Simulation Exercise
  - Played in two rounds
  - First round simulates traditional **Design-Bid-Build**
  - Second round simulates **TVD-ILPD Process**

Build A Tower ~ Marshmallow Challenge

Tallest Building in the US?
(as of 2024)

One World Trade Center
(Lower Manhattan, NYC)
1,776 ft (541 m)
Completed in 2014

Tallest Building in the World?
(as of 2024)

Burj Khalifa
(Dubai, United Arab Emirates)
2,722 ft (829.8 m)
Completed in 2010

Build A Tower Materials List

- Only use these items
- As much or as little

10 Bamboo Skewers

8 Flexible Straws

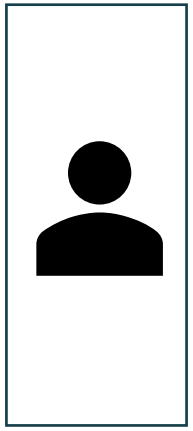
8 coffee stir sticks

10 pc of spaghetti

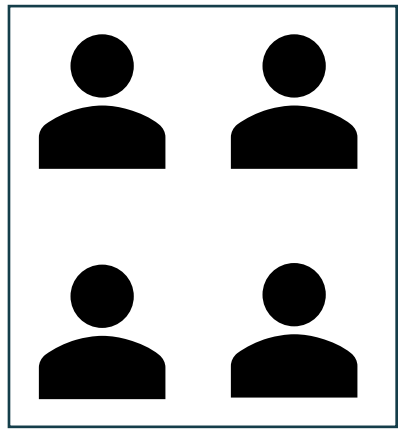
1 Marshmallow

3 ft of Masking Tape

Owner



Architect



Construction Team

- Estimator
- Project Manager
- Project Engineer
- Trade Partner

THE PROJECT TEAM – Assigning Roles

TVD Simulation: Round 1

Delivery Method

- Traditional Design-Bid-Build
- Identify Roles (O, A/E, CM, T)
- Owner-A/E Design
- Submittal must be provided for Architect/Owner review
- Construction can begin ONLY following an approved submittal

Scope

- Design and construct a tower with a marshmallow on top.
- Program: 10”L x 10”W base

Successful Build

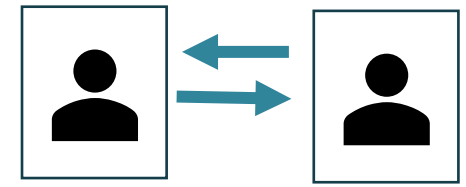
- Highest Free-Standing Tower

You may not tape the structure to the table/floor
You may not break/cut materials

Schedule

- 5 minutes – Design
- 5 minutes – RFIs, and Approved Submittal
- 8 minutes – Construction

Design – 5 minutes



Owner Architect

Construction Team

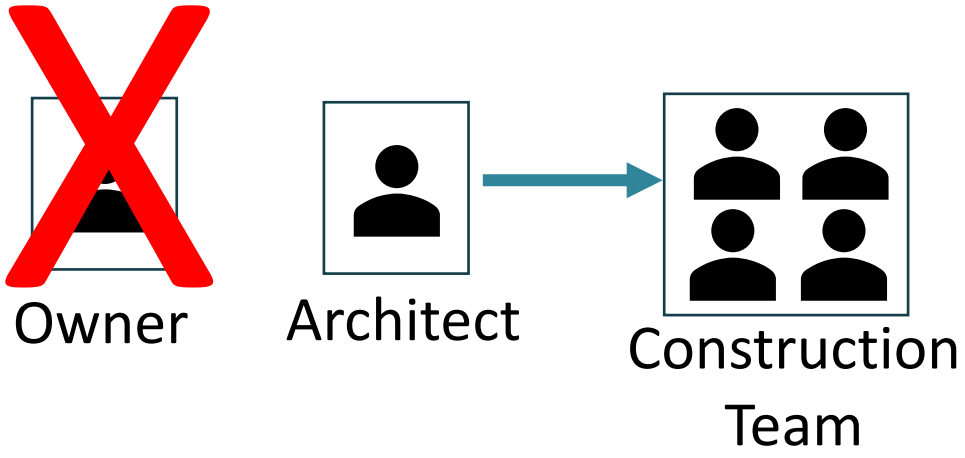
GOAL:

- Owner and Architect work together to create a design idea for the Tower
  - *A rendering that can be given to the Construction Team to represent the vision of the Tower*

Round 1

Traditional Design-Bid-Build

RFIs and Approved Submittal – 5 minutes



GOAL:

- The Construction Team reviews the design and asks questions to confirm design intent
- The Construction Team submits shop drawings for A/E approval
- The A/E approves final submittal
- The Estimator records the material quantity take-offs “Round 1 Bid”

Round 1

Traditional Design-Bid-Build

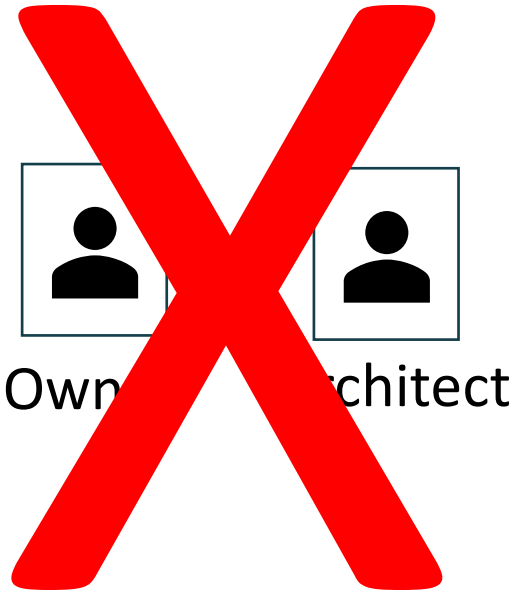
ESTIMATOR – Recording The Take-Offs

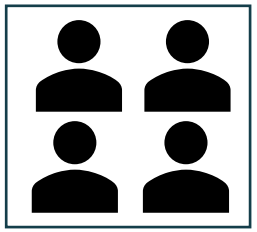
Before You Build

Team: # 1	Round 1 Bid	Round 1	Round 2
Materials	*Qty*	*Qty*	*Qty*
Spaghetti sticks	4		
Coffee Stir Sticks	2		
Drinking straws	4		
Bamboo skewers	6		
Masking tape (per joint)	6		
Official Tower Height:			

1. Team # - Write your Team # _____
2. "Round 1 Bid" - Record ***HOW MANY*** of each material are being proposed
   - AFTER the approved submittal
   - BEFORE you build

Construction – 8 minutes





GOAL:

- The Construction Team builds the Tower
  - Additional building materials may be used as needed, but must be recorded

Round 1

Traditional Design-Bid-Build

ESTIMATOR – Recording The Materials Used

After You Build

Team: # 1	Round 1 Bid	Round 1	Round 2
Materials	*Qty*	*Qty*	*Qty*
Spaghetti sticks	4	1	
Coffee Stir Sticks	2	5	
Drinking straws	4	4	
Bamboo skewers	6	6	
Masking tape (per joint)	6	5	
Official Tower Height:			

1. "Round 1" - Record ***HOW MANY*** of each material were actually used to Build the Tower
   - AFTER you Build A Tower

Questions Before We Start?

ROUND #1

Design – 5 min

RFIs/Responses & Approved Submittal – 5 min

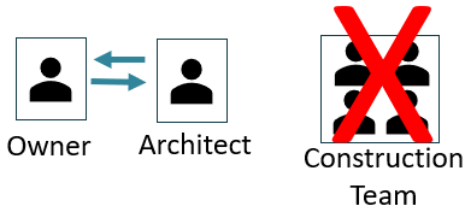
Construction – 8 min

00:00

ROUND #1 RULES:

1. You may only use materials from the "Round #1" bag + 3' of masking tape.
2. Marshmallow must be ON TOP of the tower.

Design – 5 minutes



GOAL:

- Owner and Architect work together to create a design idea for the Tower
  - *A rendering that can be given to the Construction Team to represent the vision of the Tower*

Round 1

Traditional Design-Bid-Build

ROUND #1

Design – 5 min

RFIs/Responses & Approved Submittal – 5 min

Construction – 8 min

ROUND #1 RULES:

1. You may only use materials from the "Round #1" bag + 3' of masking tape.
2. Marshmallow must be ON TOP of the tower.

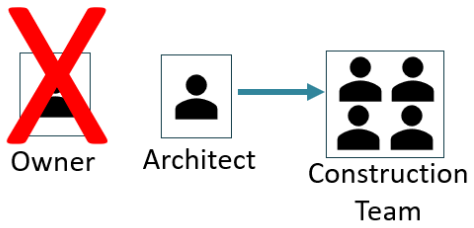
05:00

Start | Stop | Reset | mins: 5 | secs: 0 | type: None

Breaktime for PowerPoint by Flow Simulation Ltd.

Pin controls when stopped

RFIs and Approved Submittal – 5 minutes



GOAL:

- The Construction Team reviews the design and asks questions to confirm design intent
- The Construction Team submits shop drawings for A/E approval
- The A/E approves final submittal
- The Estimator records the material quantity take-offs "Round 1 Bid"

Round 1

Traditional Design-Bid-Build

ESTIMATOR – Recording The Take-Offs

Before You Build

Team: # 1	Round 1 Bid	Round 1	Round 2
Materials	*Qty*	*Qty*	
Spaghetti sticks	4		
Coffee Stir Sticks	2		
Drinking straws			
Bamboo skewers			
Masking tape (per joint)			
Official Tower			

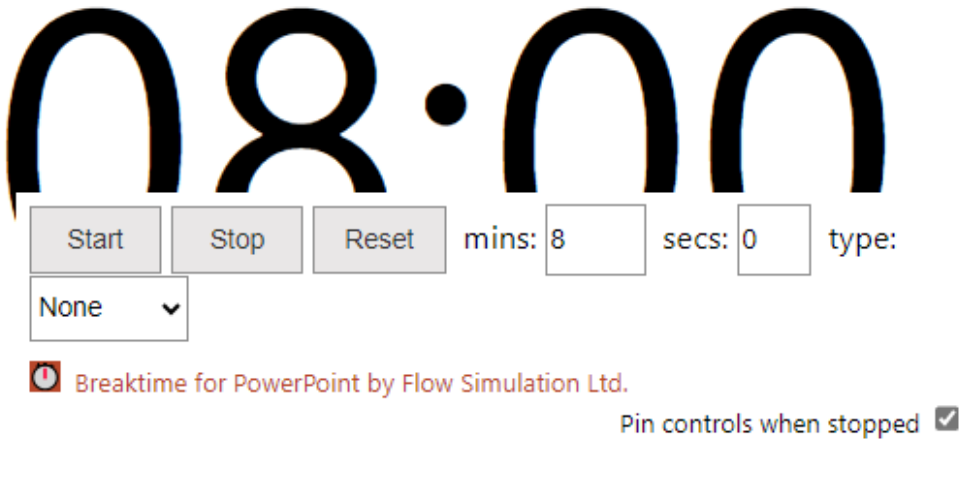
REMINDER: Did you record your take-offs?

…m # - Write your Team # _____

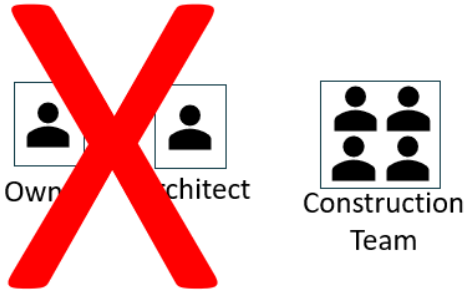
2. "Round 1 Bid" - Record ***HOW MANY*** of each material are being proposed
   - AFTER the approved submittal
   - BEFORE you build

ROUND #1
Design – 5 min
RFIs/Responses & Approved Submittal – 5 min
Construction – 8 min

ROUND #1 RULES:
1. You may only use materials from the "Round #1" bag + 3' of masking tape.
2. Marshmallow must be ON TOP of the tower.



Construction – 8 minutes



GOAL:

- The Construction Team builds the Tower
  - Additional building materials may be used as needed, but must be recorded

Round 1
Traditional Design-Bid-Build

ESTIMATOR – Recording The Materials Used

After You Build

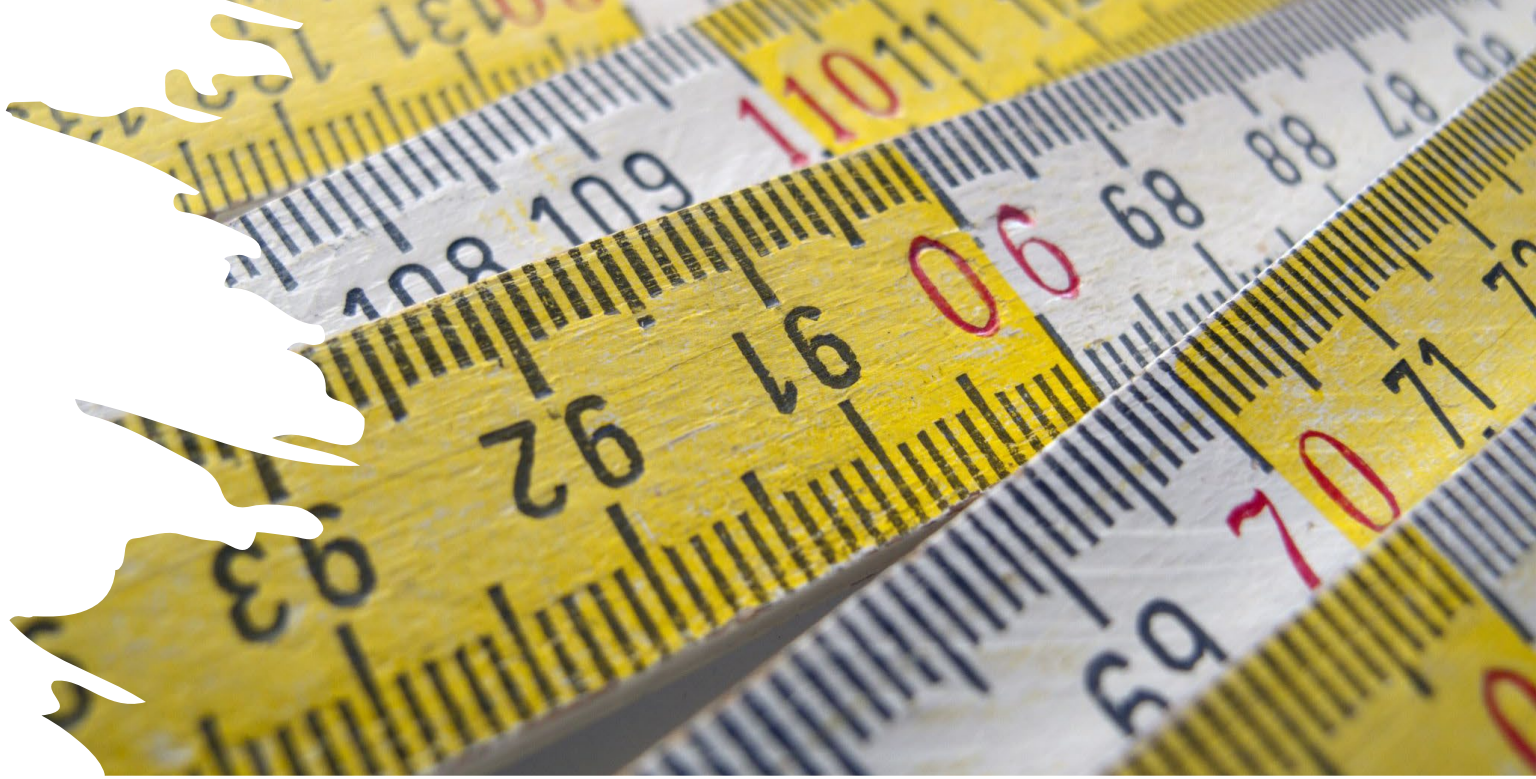
Team: # 1	Round 1 Bid	Round 1	Round 2
Materials	*Qty*	*Qty*	*Qty*
Spaghetti sticks	4	1	
Coffee Stir Sticks	2	5	
Drinking straws	4	4	
Bamboo skewers	6	6	
Masking tape (per joint)	6	5	
Official Tower Height:			

1. "Round 1" - Record ***HOW MANY*** of each material were actually used to Build the Tower
   - AFTER you Build A Tower

REMINDER: Did you record your Round 1 materials used?

It’s time to measure!

- Tower must be standing
- 10” x 10” Base
- Marshmallow must be on top



	Round 1 Bid	Round 1	R
	Qty	*Qty*	
	4	1	
	2	5	
	4	4	
	6	6	
	6	5	
		13"	

TVD Simulation: Round 1 – Let's talk $$$

ROUND 1: Traditional Design-Bid-Build

Part I: Bid Cost

		Group 1		Group 2		Group 3		Group 4		Group 5		Group 6		Group 7		Group 8		Group 9		Group 10	
Materials	$/unit	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal
Spaghetti sticks	$1.00	8	$8.00	10	$10.00	16	$16.00	8	$8.00	3	$3.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Q-tips	$5.00	4	$20.00	12	$60.00	0	$0.00	9	$45.00	4	$20.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Drinking straws	$2.00	16	$32.00	20	$40.00	8	$16.00	8	$16.00	12	$24.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Bamboo skewers	$3.00	4	$12.00	8	$24.00	12	$36.00	9	$27.00	5	$15.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Masking tape (per joint)	$0.50	64	$32.00	18	$9.00	40	$20.00	14	$7.00	22	$11.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Subtotal			$104		$143		$88		$103		$73		$0		$0		$0		$0		$0
Profit (10%)			$10		$14		$9		$10		$7		$0		$0		$0		$0		$0
Final Cost			$114		$157		$97		$113		$80		$0		$0		$0		$0		$0

Part II: Establish Market/Benchmark Cost

			8'		21"		8'														
		Group 1		Group 2		Group 3		Group 4		Group 5		Group 6		Group 7		Group 8		Group 9		Group 10	
Materials	$/unit	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal
Spaghetti sticks	$1.00		$0.00		$0.00		$0.00		$0.00		$0.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Q-tips	$5.00		$0.00		$0.00		$0.00		$0.00		$0.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Drinking straws	$2.00		$0.00		$0.00		$0.00		$0.00		$0.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Bamboo skewers	$3.00		$0.00		$0.00		$0.00		$0.00		$0.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Masking tape (per joint)	$0.50		$0.00		$0.00		$0.00		$0.00		$0.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Subtotal			$0		$0		$0		$0		$0		$0		$0		$0		$0		$0
Profit (10%)			$0		$0		$0		$0		$0		$0		$0		$0		$0		$0
Final Cost			$0		$0		$0		$0		$0		$0		$0		$0		$0		$0

Part III: Establish Target Cost

Market/Benchmark
(Ave of Similar Completed Projects)

% Below **Benchmark** to Achieve **Allowable**	10%	Owner has an "Allowable" amount of funds that have been reserved to complete this project. Enter the % to achieve the Allowable based on the calculated Benchmark costs.
Allowable		Owner's available funds to complete the project.
% Below Allowable to Achieve Target	20%	Design/Construction Team's Target goal is a % below the Owner's Allowable.

		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
		GAP TO TARGET									
Target (Teams set at or below **Allowable**)	---	---	---	---	---	---	---	---	---	---	---

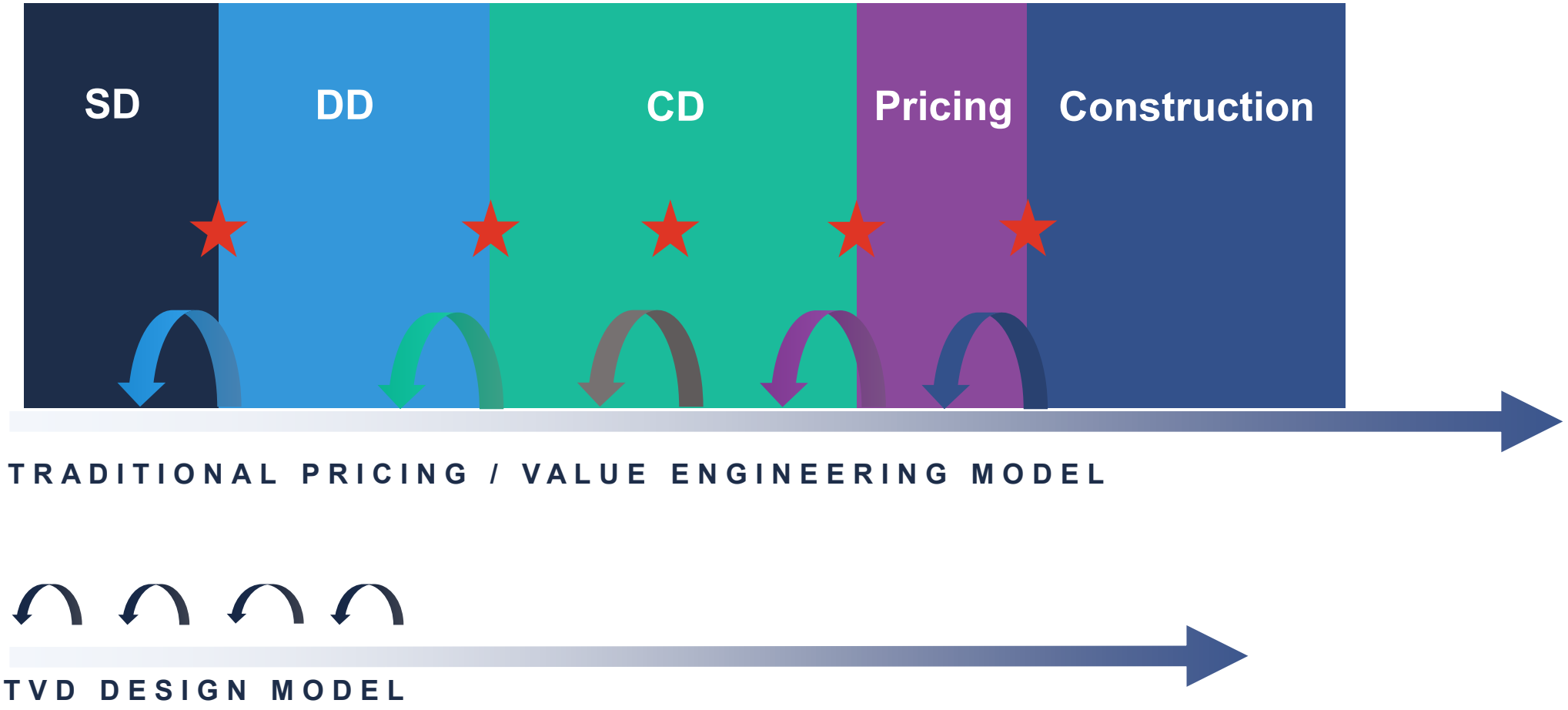
Debrief

What happened?
What could be improved?
How is this like what happens on projects?

Large Group Discussion

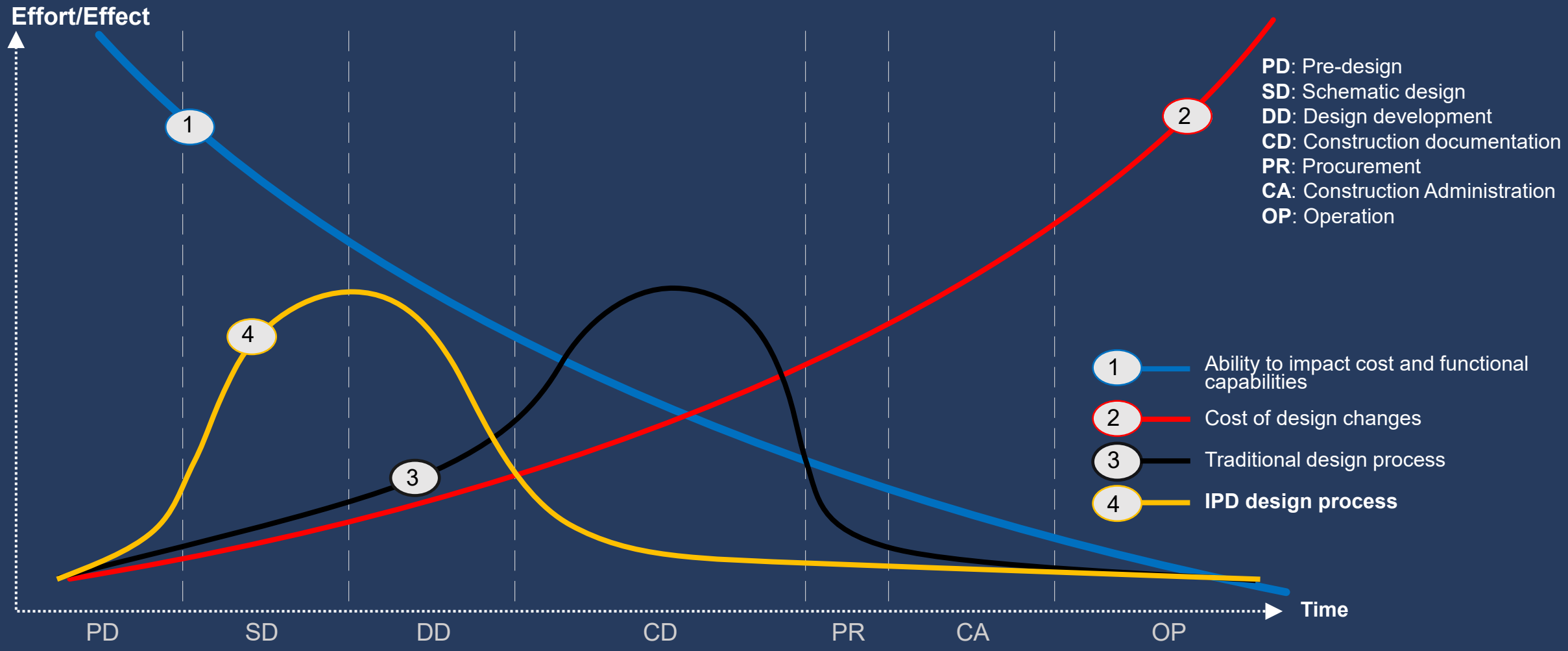
TVD Continuous Estimating Model

Lean Construction Institute
Immersive Education Program



Team Formation

Lean Construction Institute
Immersive Education Program



Graphic courtesy of Patrick MacLeamy AIA / HOK

Lean Construction Institute
Immersive Education Program

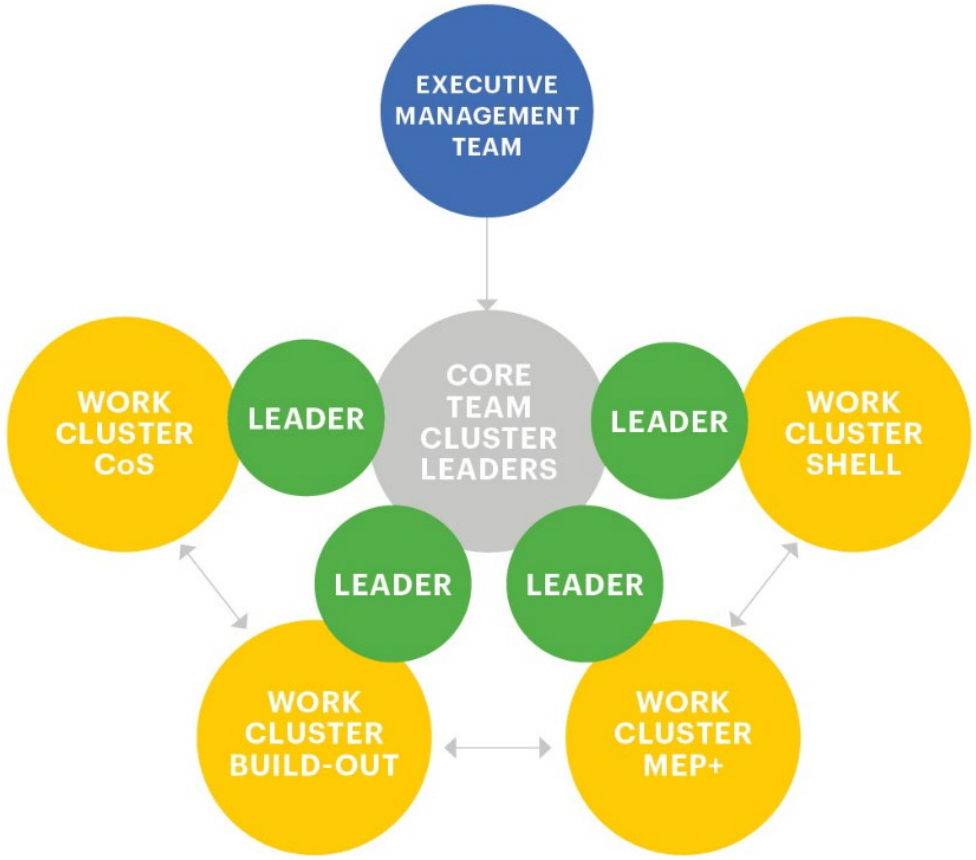
Work Cluster Organization

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



Lean Construction Institute
Immersive Education Program

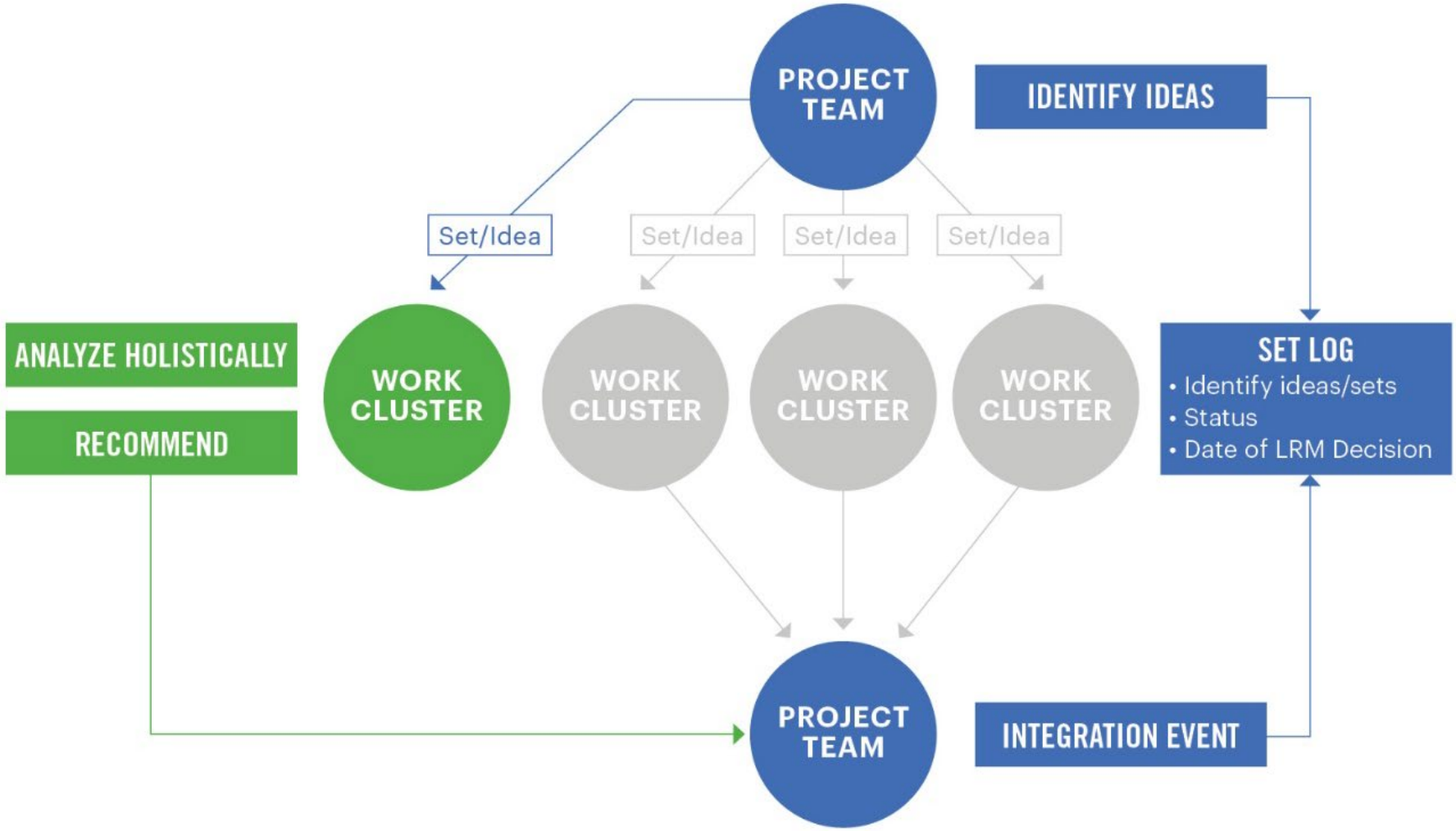
Big Room

Big Room refers to a project approach of bringing key individuals together to:

Collaborate, plan, update, solicit resources, invite feedback, demonstrate accountability, and schedule events in order to:

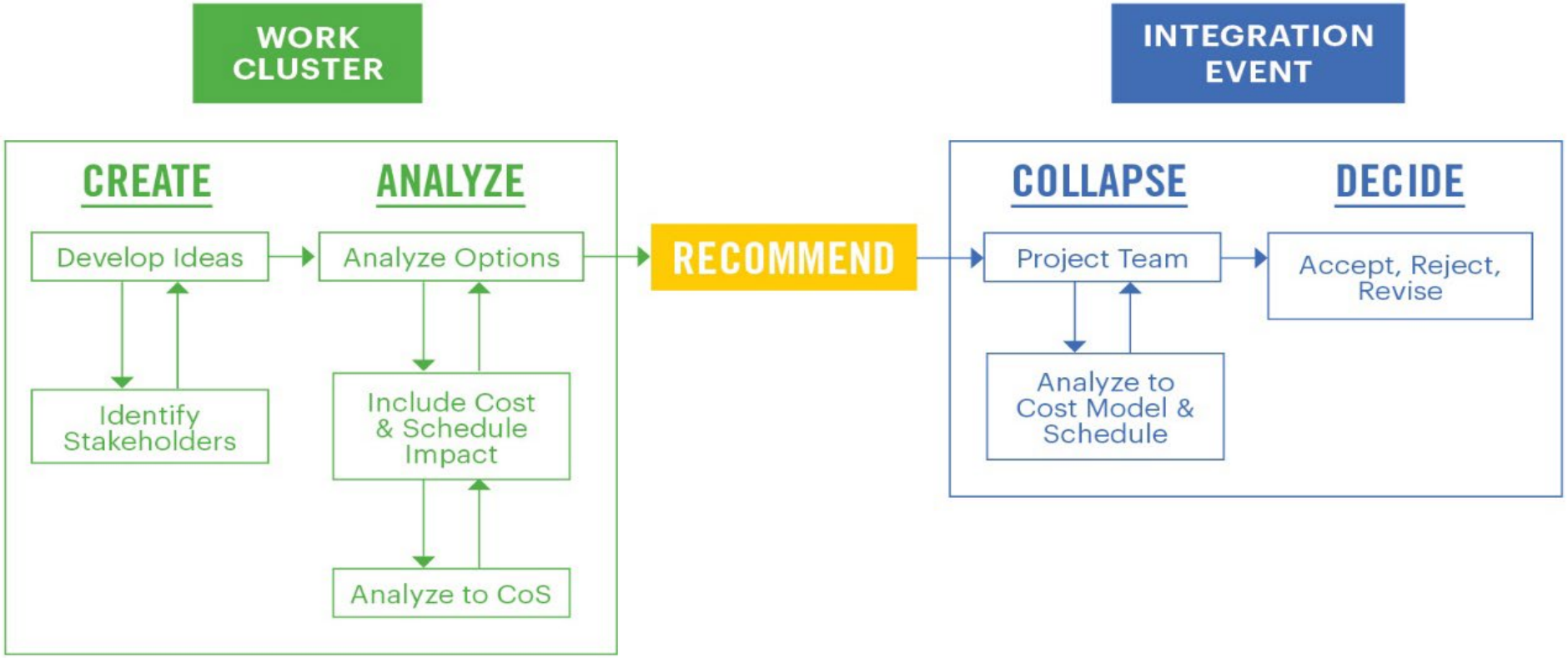
- Speed communication and decision-making.
- Reduce siloed thinking or approaches.
- Compare the project's current state to the published goals or Conditions of Satisfaction.

Work Cluster Flow in Big Room Setting



Decision Flow Model

Lean Construction Institute
Immersive Education Program



Resource

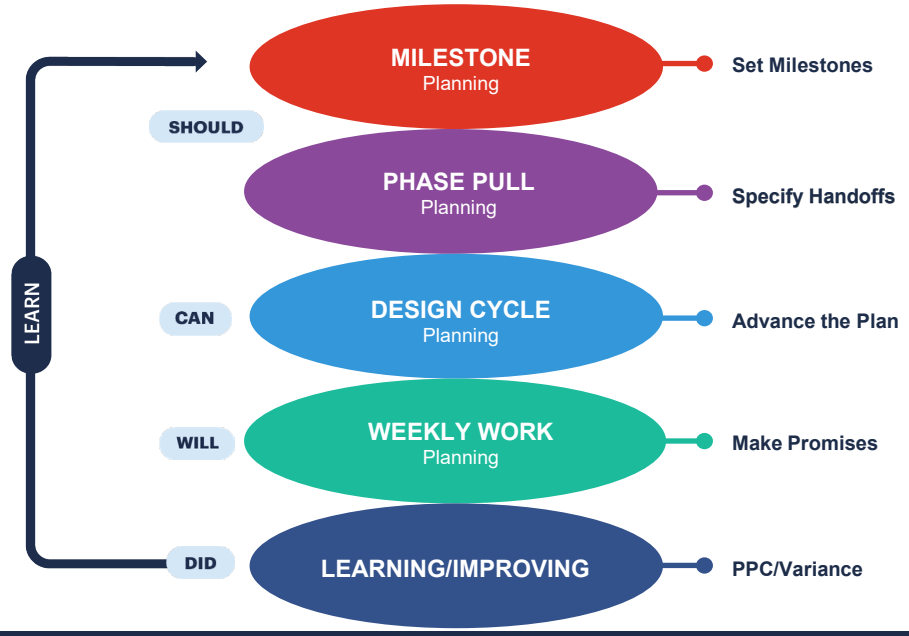
Lean Construction Institute
Immersive Education Program

Project Planning

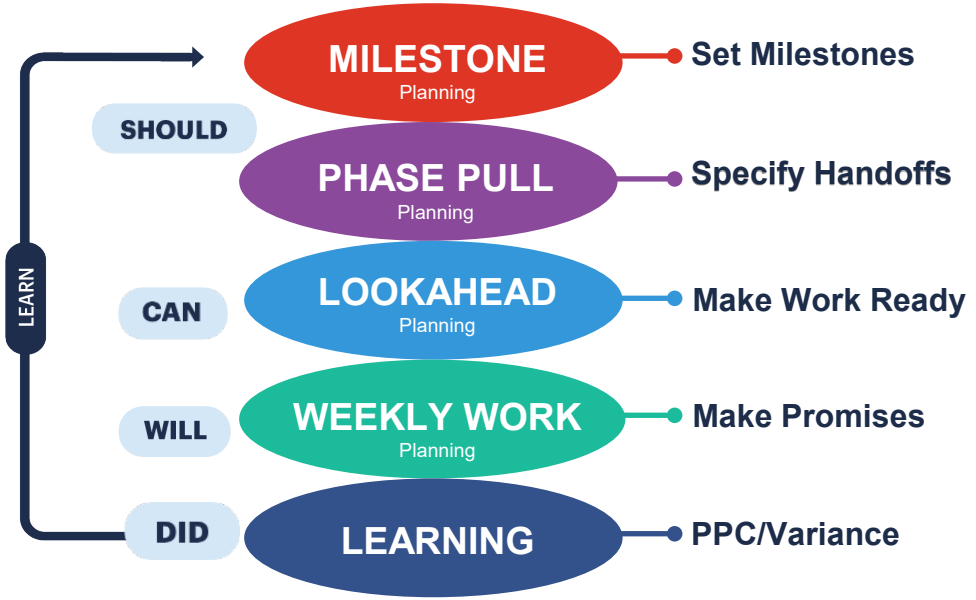
LPS® 5 Connected Conversations Design through Construction Phases

Identify Major Decisions vs. Depending on Traditional Design Milestones

LPS Design Phase



LPS Construction Phase



Lean Construction Institute
Immersive Education Program

Cost Modeling: Predicting Cost & Value

The cost modeling process begins in the ***Business Case Planning Phase*** with benchmarking estimating to determine the **Allowable Cost**.

Allowable Cost

The amount the owner is willing to spend for the total project.

Project Cost Model

The Allowable Cost process informs the development of the initial **Project Cost Model.**

- The initial cost model should be developed *before* the design team makes the first quantifiable decision.

- Before any design begins, the team must collectively understand the preliminary cost model for the project.

Types of Estimating

Lean Construction Institute
Immersive Education Program

1. Benchmarking
2. Conceptual
3. Production

Lean Construction Institute
Immersive Education Program

Continuous Estimating

Continuous estimating is the effort of regular, frequent updating of the estimate, while also tracking specific variances from the last update.

This practice

- Integrates the cost professionals for ongoing cost input to the design development and decision-making
- Cost professionals understand the potential ramifications to the cost model from collaborative conversations not highly developed deliverables

Types of Estimating

Lean Construction Institute
Immersive Education Program

1. Benchmarking
2. Conceptual
3. Production

Conceptual Estimating

Lean Construction Institute
Immersive Education Program

- Process of projecting likely costs of components supporting program needs, *without detailed documentation*.

Level of Accuracy: Best +/- 5% Good +/- 10%

Conceptual Design

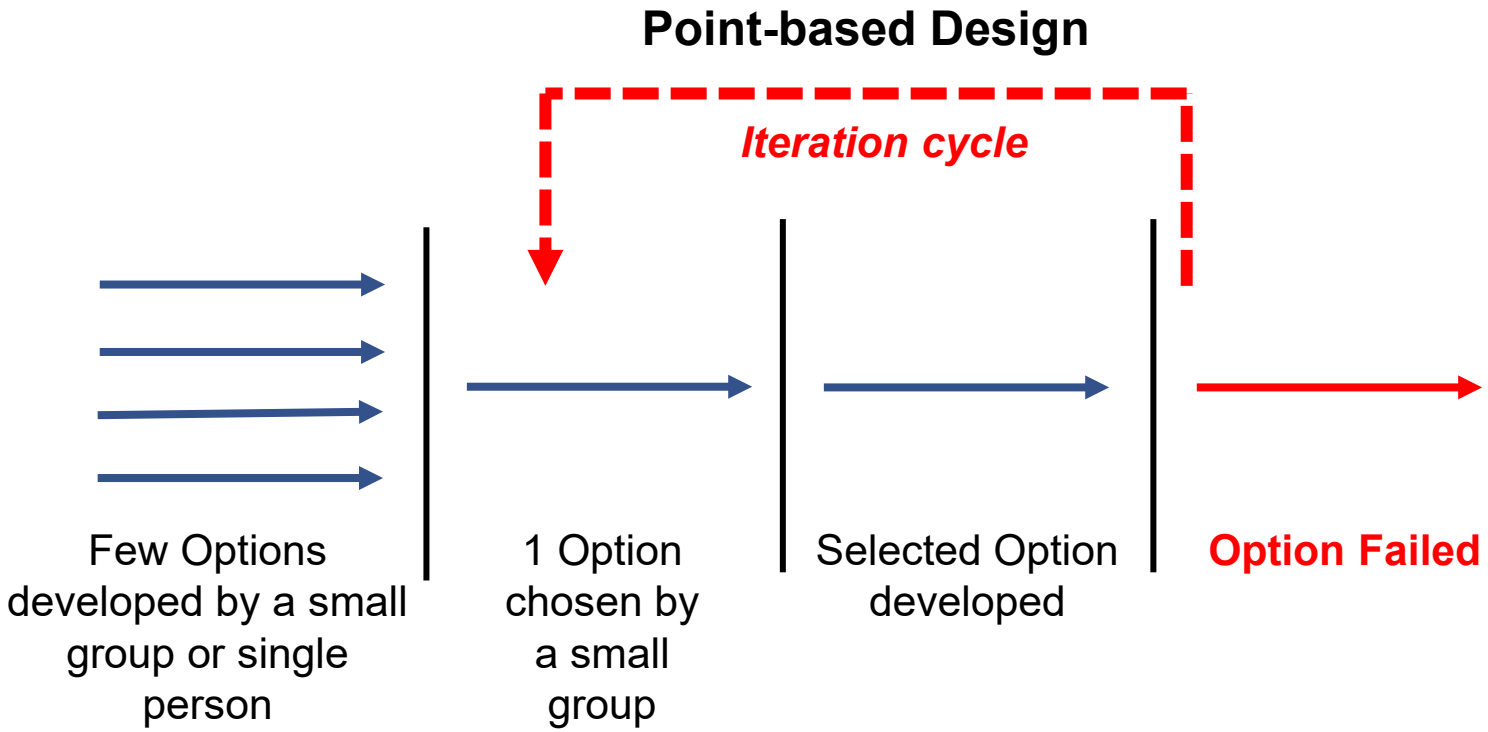
Lean Construction Institute
Immersive Education Program

1. Criteria development
2. Organize information
3. Set-based design
4. Integration

UHS Temecula Valley Hospital Team

Lean Construction Institute
Immersive Education Program

Point-based Design

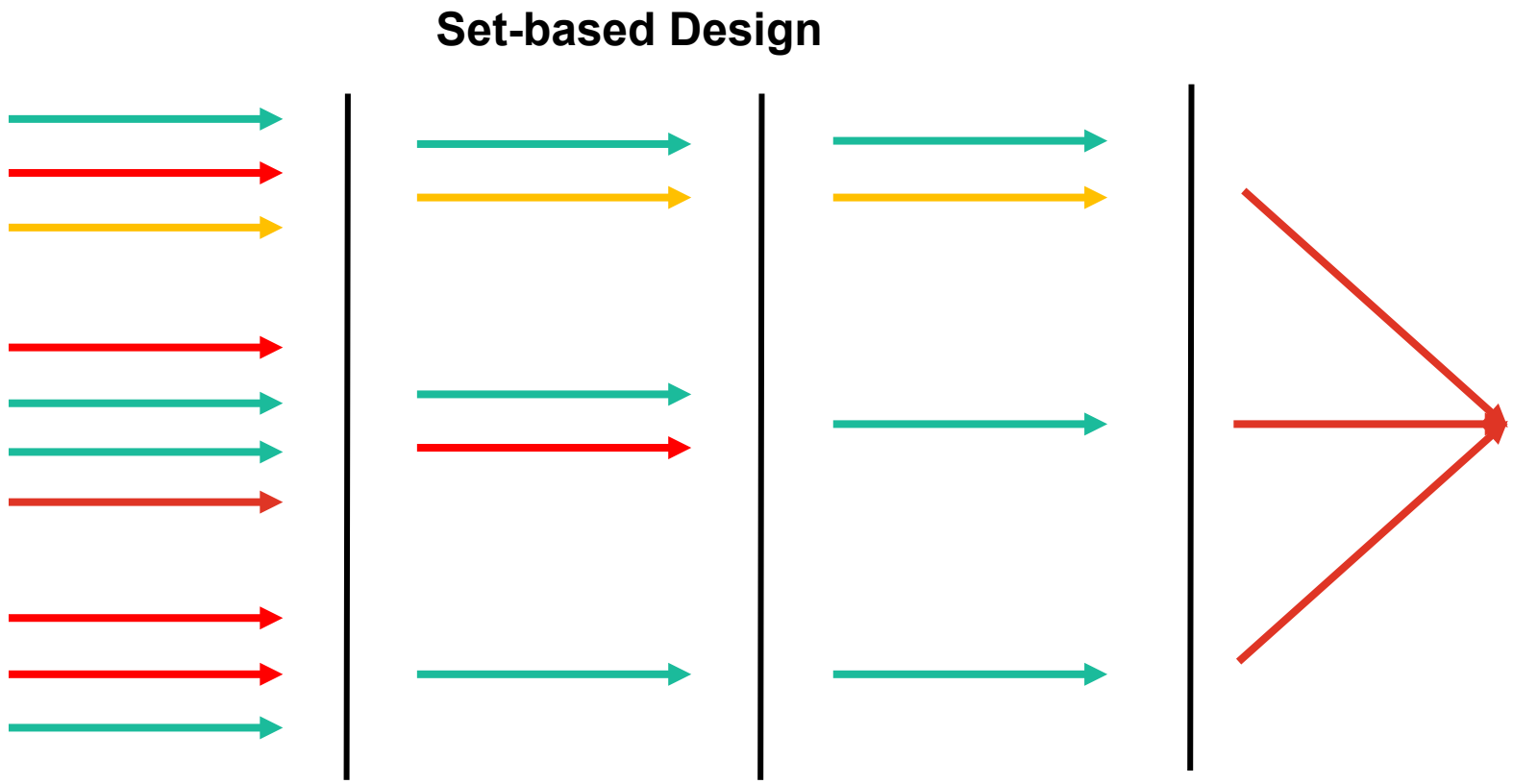


Lean Construction Institute
Immersive Education Program

Set-based Design

1. Many options developed by a diverse group for subsystems.
2. Evaluate against risks and in consideration of the project as a whole.
3. Weaker options are eliminated
4. Options are continually evaluated and narrowed.
5. Final options selected

No iterative cycles!



Courtesy of HMC Architects

Types of Estimating

Lean Construction Institute
Immersive Education Program

1. Cost Benchmarking
2. Conceptual
3. Production

Lean Construction Institute
Immersive Education Program

Production Estimating

- Most traditional form of estimating.
- Driven by what *has been* documented in the design phase and confirms estimates developed during earlier conceptual stages.

Level of Accuracy: Best +/- 1% Good +/- 3%

Production Design

Production Design start when the design concepts are:

- Accepted by the project team, including owners and users
- Have been validated as aligning with the CoS and cost model.

Allowable Cost

The amount the owner is willing to spend for the total project.

≥

Actual Cost

The final cost at the end of the project.

Confidence that the ***actual cost*** will be at or below ***allowable cost***

Lean Construction Institute
Immersive Education Program

Production Design to Construction

- **Production Design** starts to release work to the field
- The focus transitions to supporting the Last Planners® in execution of the work
- Measuring actual execution against targets.

Lean practices and approaches including:

- Prefabrication
- Team tracking of labor productivity
- Last Planner System®
- Continuing to implement a Big Room approach
- Eliminating waste in the construction process
- 5S Implementation

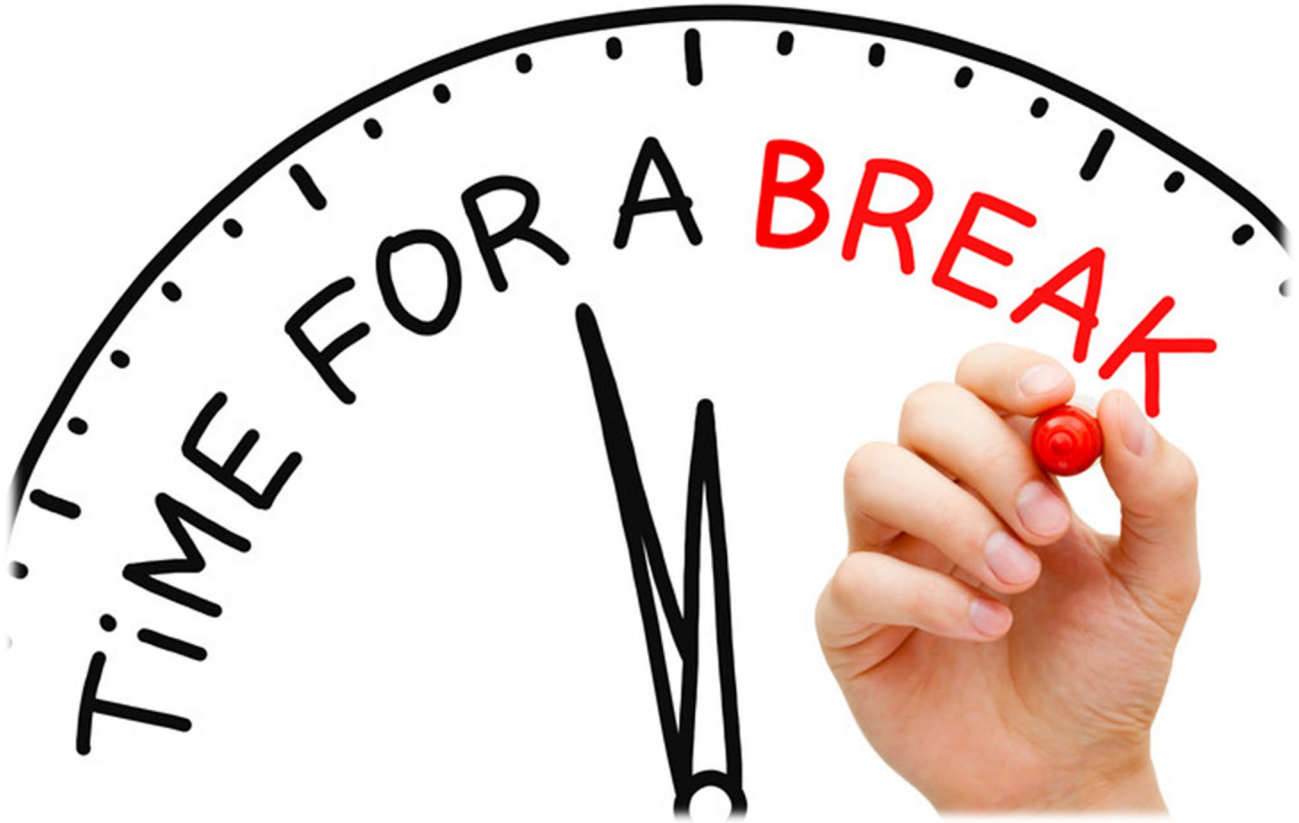
Construction

As **Production Design** starts to release work to the field the focus of the Target Value Delivery (TVD) process transitions to supporting the Last Planners® in execution of the work and measuring actual execution against targets.

In the **Construction Phase,** TVD is supported by and Lean practices and approaches including:

- Prefabrication
- Team tracking of labor productivity
- Last Planner® System
- Continuing to implement a Big Room approach
- Eliminating waste in the construction process
- Reimagining the role of the designer during construction
- 5S Implementation

Lean Construction Institute
Immersive Education Program



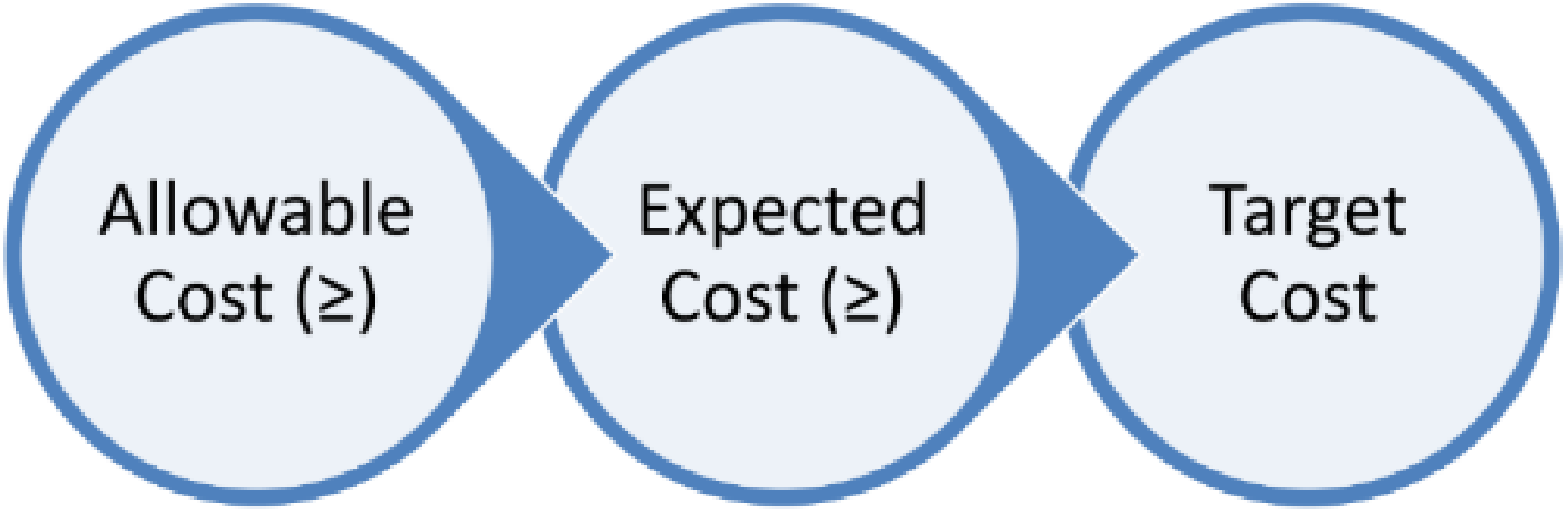
10 Minute Break

Learn in Action

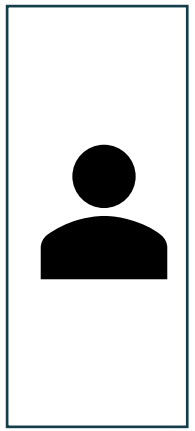
Lean Construction Institute
Immersive Education Program

Target Value Delivery Game
Tower 2

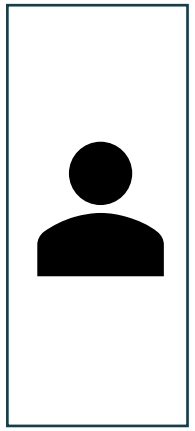
CIAC+TAMU



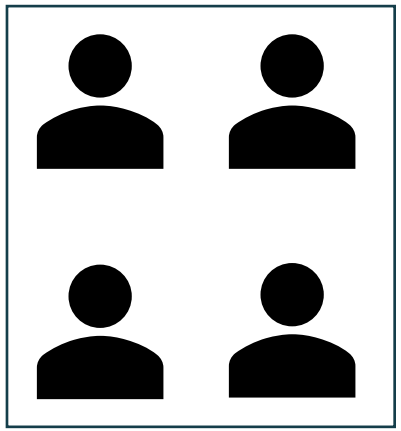
TVD: Setting Targets



Owner



Architect



Construction Team

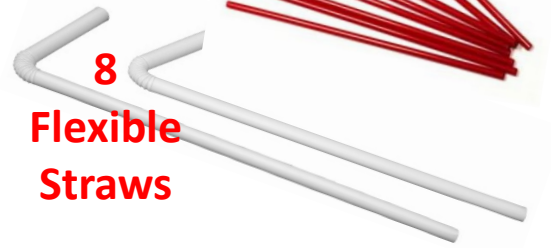
- Estimator
- Project Manager
- Project Engineer
- Trade Partner

Integrated Project Delivery (IPD)

Collaboration ~ Cohesion ~ Teamwork

THE PROJECT TEAM

TVD Simulation: Round 2



Delivery Method

- Integrated Lean Project Delivery
- Owner/Architect/Engineer/Contractor/Trade Partner Engaged

Program

- Design and construct a tower with a marshmallow on top
- Minimum 100 in^2 base

Quality

- Must be at least 2’-0” tall
- Marshmallow no more than 2” out-of-plumb
- Must only use supplied materials
- **Must be free-standing**

Schedule

- 15 minutes to complete
- Bonus for Early Completion

You may not tape the structure to the table/floor
You may not break/cut materials

Schedule

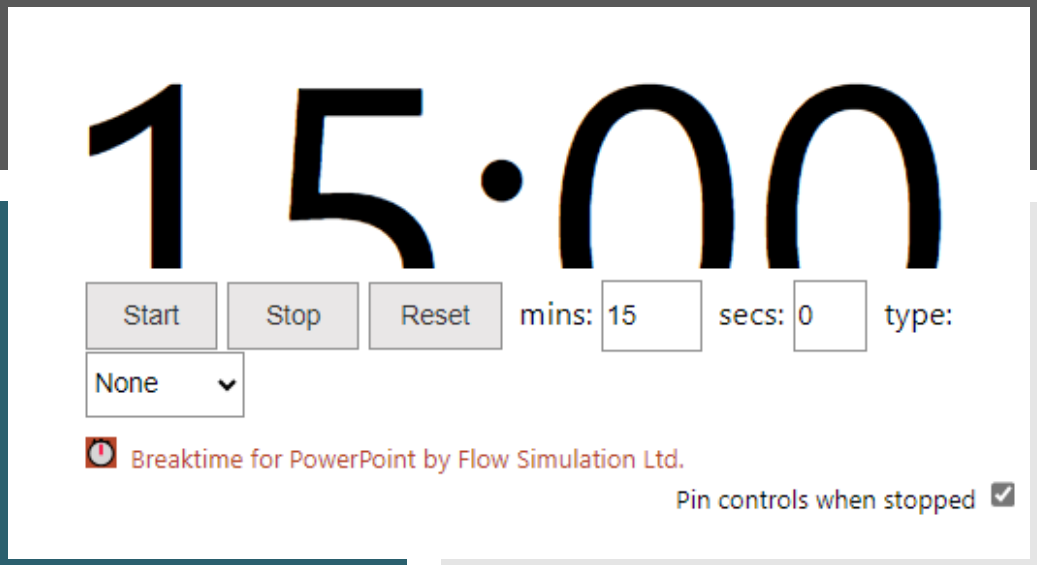
- 15 minutes

UNIT COSTS	
Spaghetti sticks	$1.00
Coffee Stir Sticks	$5.00
Drinking straws	$2.00
Bamboo skewers	$3.00
Tape (per joint)	$0.50

Questions Before We Start?

ROUND #2

Build A Tower – 15 min.



ROUND #2 RULES:

1. You may only use materials from the "Round #2" bag + 3' of masking tape.
2. Tower MAY NOT be taped or fastened to the table/floor.
3. Marshmallow must be ON TOP of the tower; Less than 2" out of plumb.
4. Tower must be at least 2 ft tall.
5. Minimum 100 in^2 base

UNIT COSTS	
Spaghetti sticks	$1.00
Coffee Stir Sticks	$5.00
Drinking straws	$2.00
Bamboo skewers	$3.00
Tape (per joint)	$0.50

ESTIMATOR – Recording The Materials Used

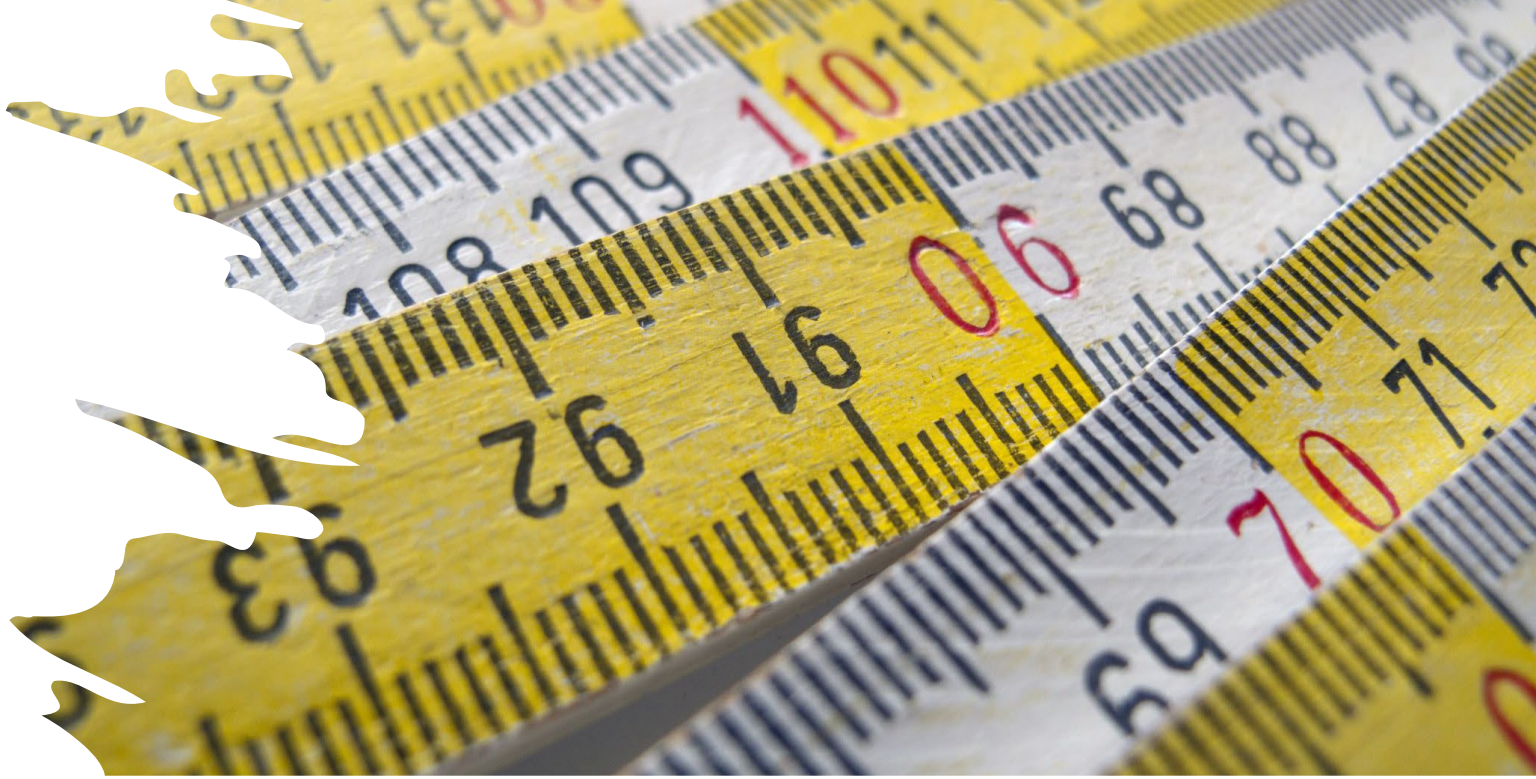
After You Build

Team: # 1	Round 1 Bid	Round 1	Round 2
Materials	*Qty*	*Qty*	*Qty*
Spaghetti sticks	4	1	3
Coffee Stir Sticks	2	5	3
Drinking straws	4	4	4
Bamboo skewers	6	6	2
Masking tape (per joint)	6	5	6
Official Tower Height:		13"	

1. "Round 1" - Record ***HOW MANY*** of each material were actually used to Build the Tower
   - AFTER you Build A Tower

REMINDER: Did you record your Round 2 materials used?

It’s time to measure!



- Tower must be free-standing
- Minimum 100 in^2 Base
- Marshmallow must be on top

Team: # 1	Round 1 Bid	Round 1	Round 2
Materials	*Qty*	*Qty*	*Qty*
Spaghetti sticks	4	1	3
Coffee Stir Sticks	2	5	3
Drinking straws	4	4	4
Bamboo skewers	6	6	2
Masking tape (per joint)	6	5	6
Official Tower Height:		13"	27"

TVD Simulation: Achieving Target Cost

ROUND 2: Target Value Design with Integrated Delivery Model (Design to Target Cost)

		Group 1		Group 2		Group 3		Group 4		Group 5		Group 6		Southern 2		Group 8		Group 9		Group 10	
Materials	$/unit	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal	Qty	Subtotal
Spaghetti sticks	$1.00		$0.00		$0.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Q-tips	$5.00		$0.00		$0.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Drinking straws	$2.00		$0.00		$0.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Bamboo skewers	$3.00		$0.00		$0.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Masking tape (per joint)	$0.50		$0.00		$0.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00		$0.00		$0.00		$0.00		$0.00
Subtotal			$0		$0		$0		$0		$0		$0		$0		$0		$0		$0
Profit (10%)			$0		$0		$0		$0		$0		$0		$0		$0		$0		$0
Final Cost			$0		$0		$0		$0		$0		$0		$0		$0		$0		$0

Part IV: Calculate Final Cost

VARANCE TO TARGET	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
Final Cost	---	---	---	---	---	---	---	---	---	---
Target	---	---	---	---	---	---	---	---	---	---
$ Variance to Target	---	---	---	---	---	---	---	---	---	---
% Variance to Target	---	---	---	---	---	---	---	---	---	---

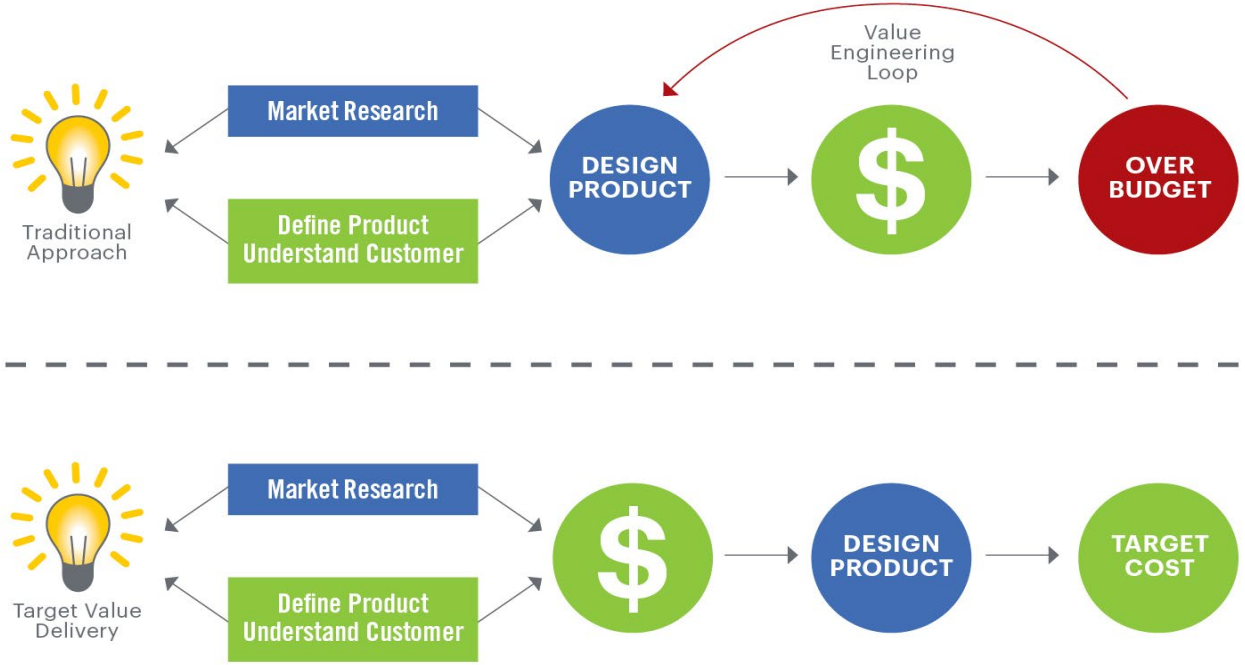
PROFIT		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
Original Profit		---	---	---	---	---	---	---	---	---	---
Shared Savings Incentive (Sharing of Savings below Target)	50%	---	---	---	---	---	---	---	---	---	---
Schedule Bonus	$1.00	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Profit $		---	---	---	---	---	---	---	---	---	---
Total Profit %		---	---	---	---	---	---	---	---	---	---

RESULTS	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10
Round 1: % Variance to **Allowable**	---	---	---	---	---	---	---	---	---	---
Round 2: % Variance to **Allowable**	---	---	---	---	---	---	---	---	---	---
Round 2: % Variance to **Target**	---	---	---	---	---	---	---	---	---	---
Round 2: % Below **Benchmark**	---	---	---	---	---	---	---	---	---	---

Lean Construction Institute
Immersive Education Program

Traditional vs. Target Value Delivery

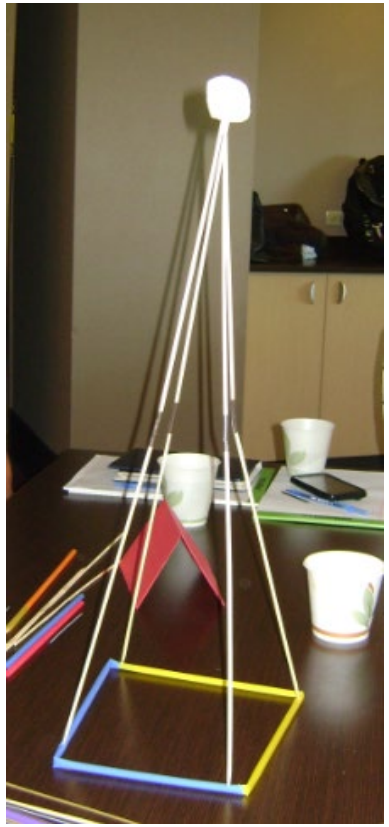
Cost is an *output* of design



Cost is an *input* of design

Courtesy of HKS Architects

Tower 1 Examples



(RED TEAM)

(BLUE TEAM)

(GREEN TEAM)

(YELLOW TEAM)

CIAC+TAMU

Tower 2 Examples

(YELLOW TEAM)

(RED TEAM)

(GREEN TEAM)

(BLUE TEAM)

CIAC+TAMU

Lean Construction Institute
Immersive Education Program

Discuss Results

1. What were some basic differences between two rounds?
2. How did the decision-making processes differ between the two rounds?
3. Which round was more stressful to you? Less stressful?
4. Which round offered better cooperation?
5. In which real-life circumstances might Round 1 be more appropriate? How about Round 2?
6. How might these process be applied to your real-life projects?

CIAC+TAMU

Discussion Question

Lean Construction Institute
Immersive Education Program

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

Learning Objectives Review

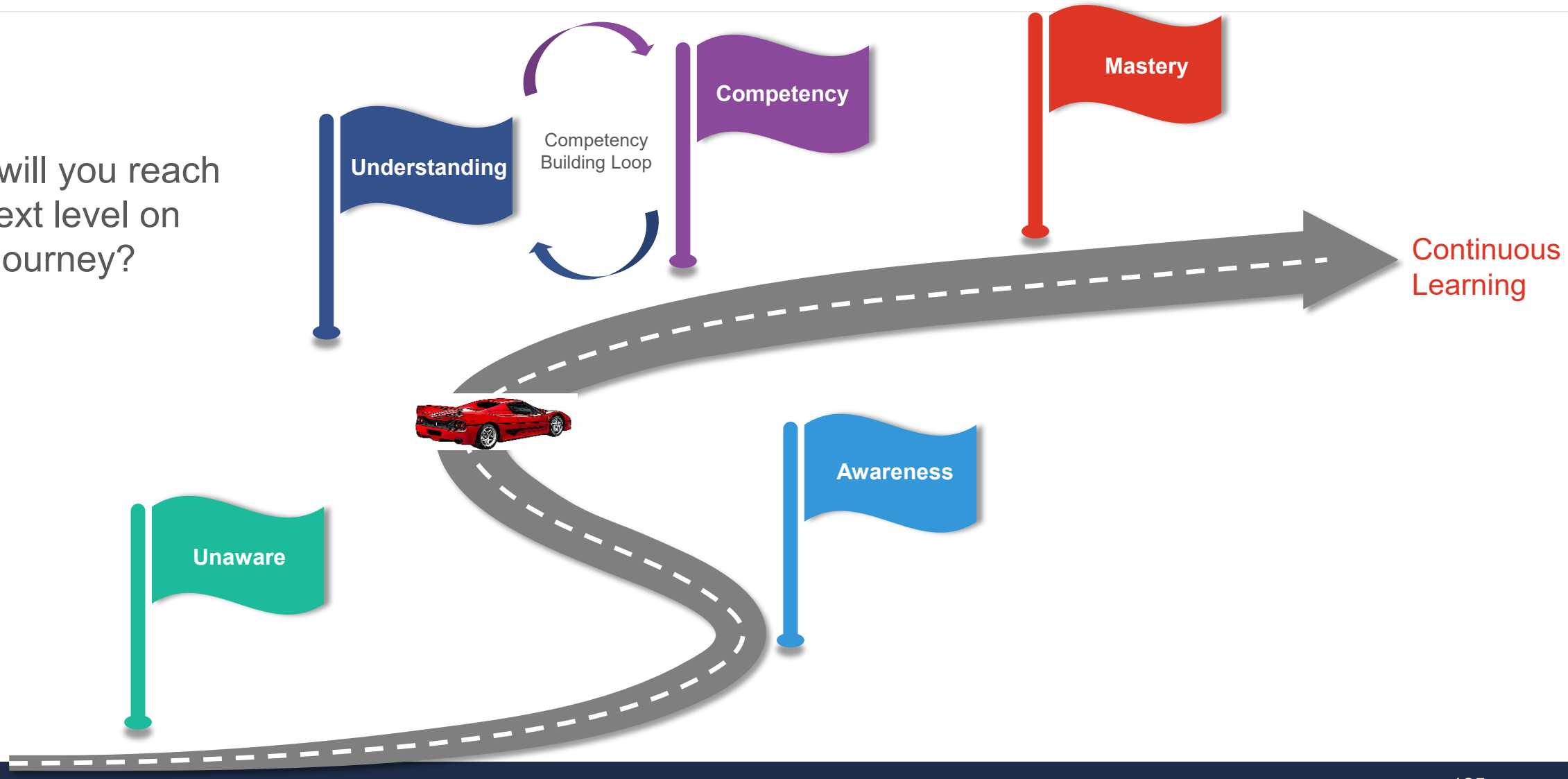
Lean Construction Institute
Immersive Education Program

- ☑ Define the meaning of Target Value Delivery and understand the intent of the approach.
- ☑ Identify the four phases, including the actions and outputs of each phase.
- ☑ Identify key Core Components of TVD.
- ☑ Discover how implementing TVD approaches improves project outcomes.

Lean Journey to Mastery

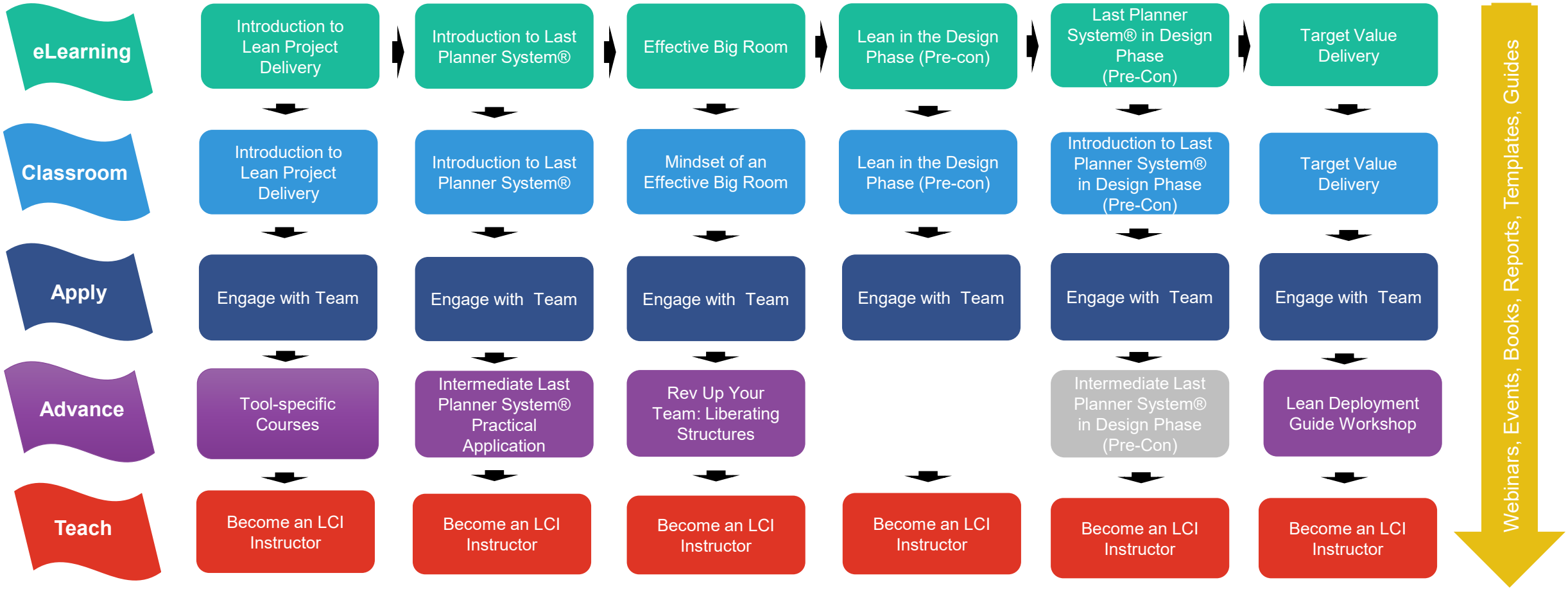
Lean Construction Institute
Immersive Education Program

How will you reach the next level on your journey?



Define Your Journey

Lean Construction Institute
Immersive Education Program



Lean Construction Institute
Immersive Education Program

LCI Certification

https://leanconstruction.org/lean-certification/

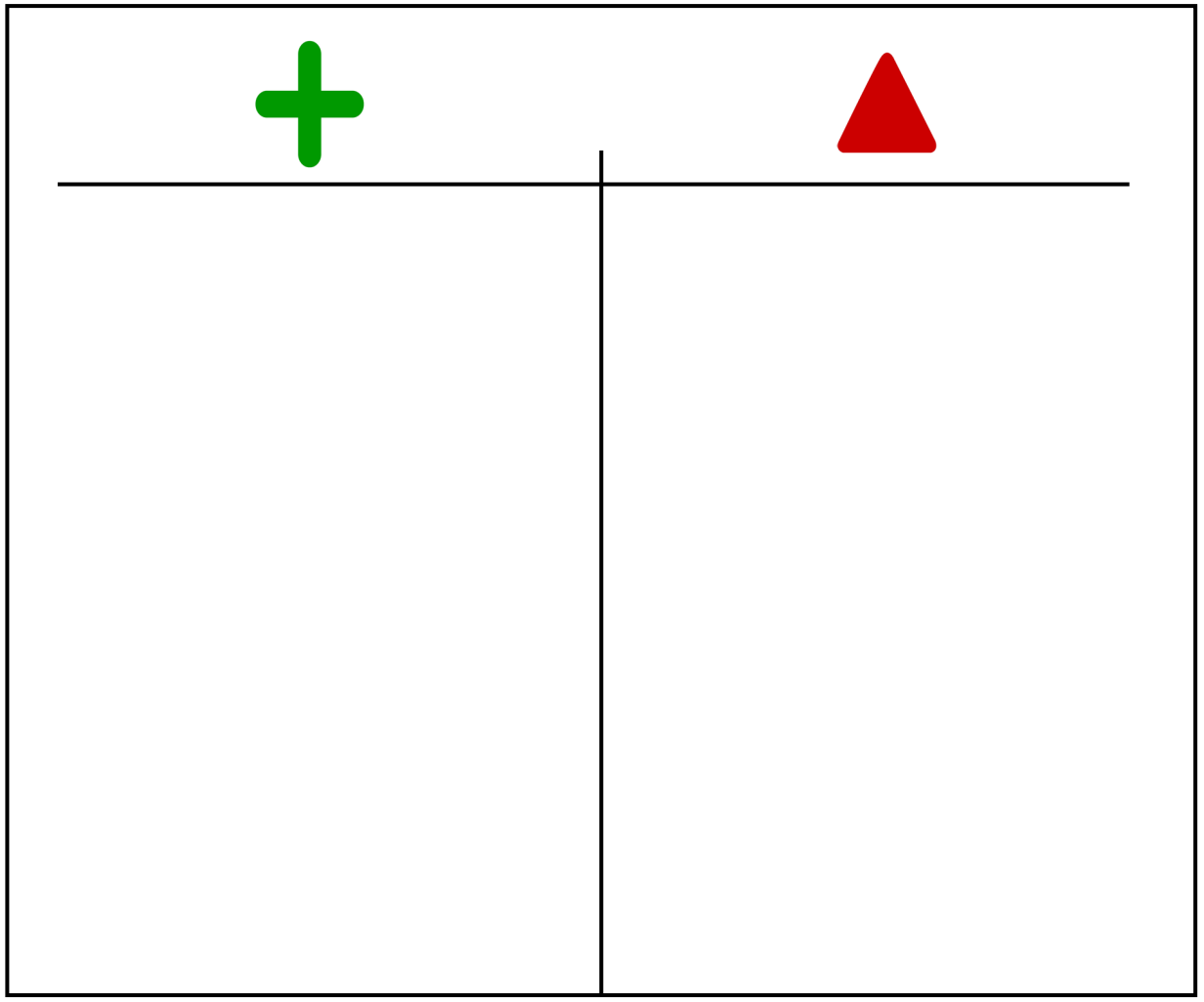
Questions?

Conduct Plus/Delta

Lean Construction Institute
Immersive Education Program

Plus: What produced *value* during the session?

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



Presenter Contact Information

Elizabeth Taylor
Elizabeth.taylor@jedunn.com
952.374.9210

Emily Lowe
emily.lowe@butz.com
717.648.8353

Lean Construction Institute
Immersive Education Program

LCI Website Information

www.LeanConstruction.org