

Lean Construction Institute - Qatar

Transforming the Built Environment

هيئة الأشغال العامة
Public Works Authority



Strategic Partner



Dr. Tariq Abdelhamid Chief Lean Enterprise Officer Michigan State University

Tariq Sami Abdelhamid is Chief Lean Enterprise Officer with the Residential and Hospitality (RHS) Division at Michigan State University (MSU), working with colleagues on a lean transformation journey since 2013. He is also an Associate Professor at MSU. Tariq was mentored in Lean Construction by Greg Howell & Glenn Ballard (Lean Construction Institute co-founders).

Tariq is the co-Editor of the Lean Construction Journal, an Improved LCI instructor, a current LCI Research Fellow, and a Steering Committee member of the Lean in the Public Sector (LIPS) organization. Tariq was a member of the first Associated General Contractors of America Lean Construction Steering Committee. He was also involved from 2009 to 2012 as a program designer and content developer in the AGC Lean Construction Education Program (LCEP). He consults and coaches with project teams in Lean Construction and Production. Prior to joining MSU in 2000, he was a Lean Production subject matter expert at Ford Motor Company. A civil engineer by training, he earned a master's degree in Industrial and Operations Engineering and another in Construction Engineering and Management, and a PhD in Civil Engineering - all from the University of Michigan.

Platinum Sponsors



Gold Sponsors

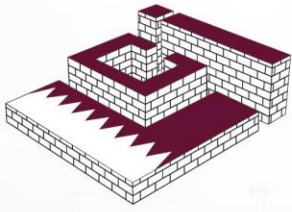


Silver Sponsor



Bronze Sponsor





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Case Study - Shaw Hall



Dr. Tariq Abdelhamid
Chief Lean Enterprise Officer
Michigan State University

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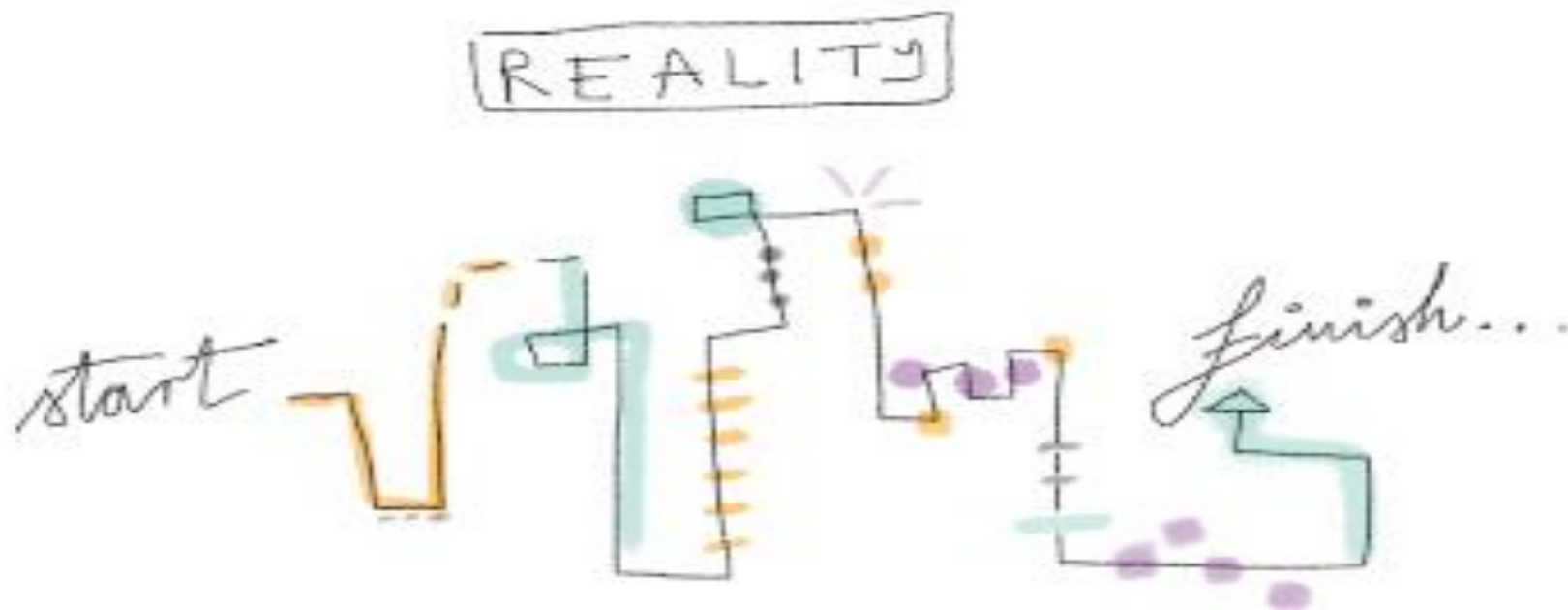
Lean Project Delivery at Michigan State University

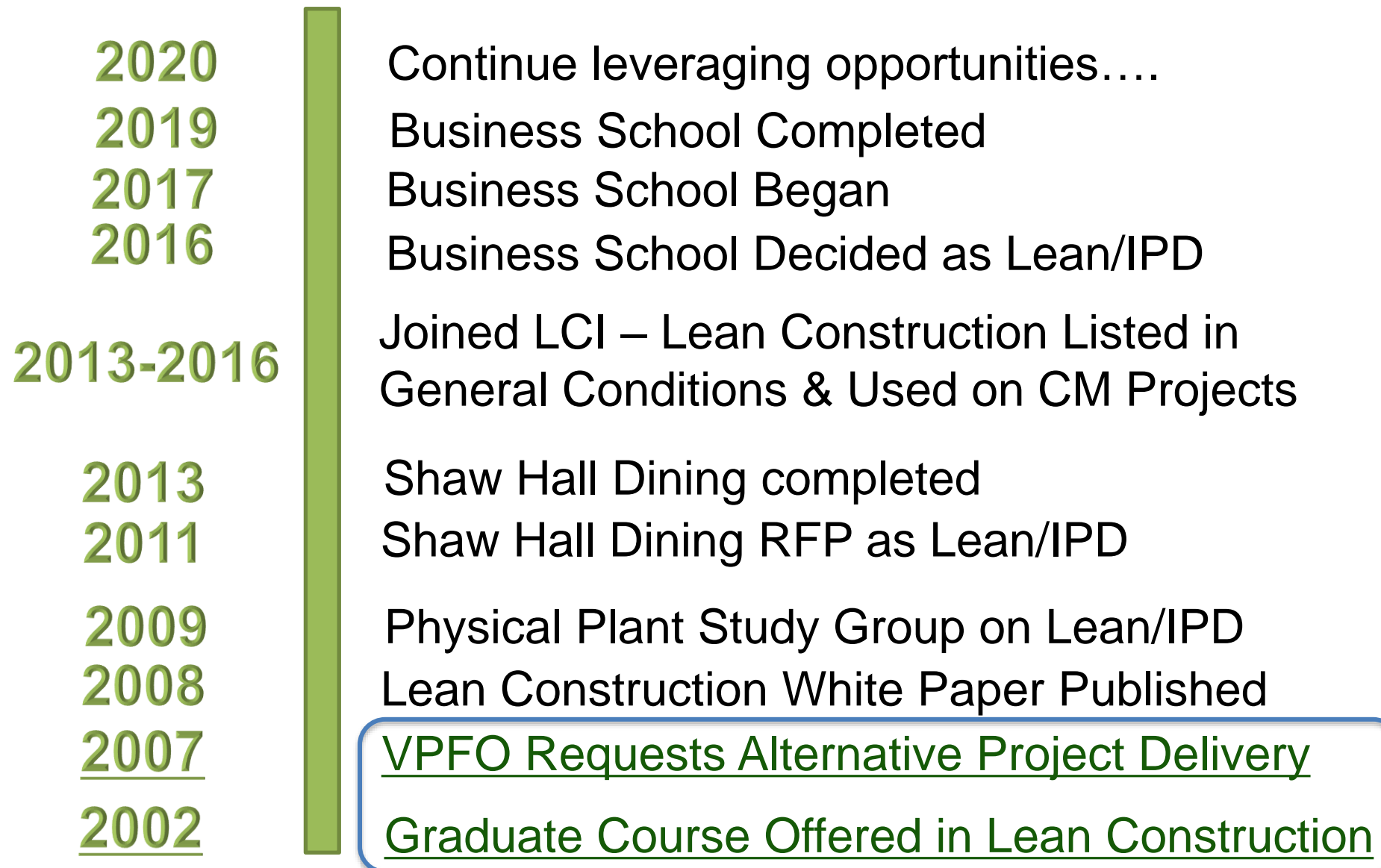
Presented by
Tariq Sami Abdelhamid, PhD, CM-Lean

Chief Lean Enterprise Officer
Residential and Hospitality Service
Associate Professor of Lean Construction
School of Planning, Design and Construction



Lean/IPD @ MSU





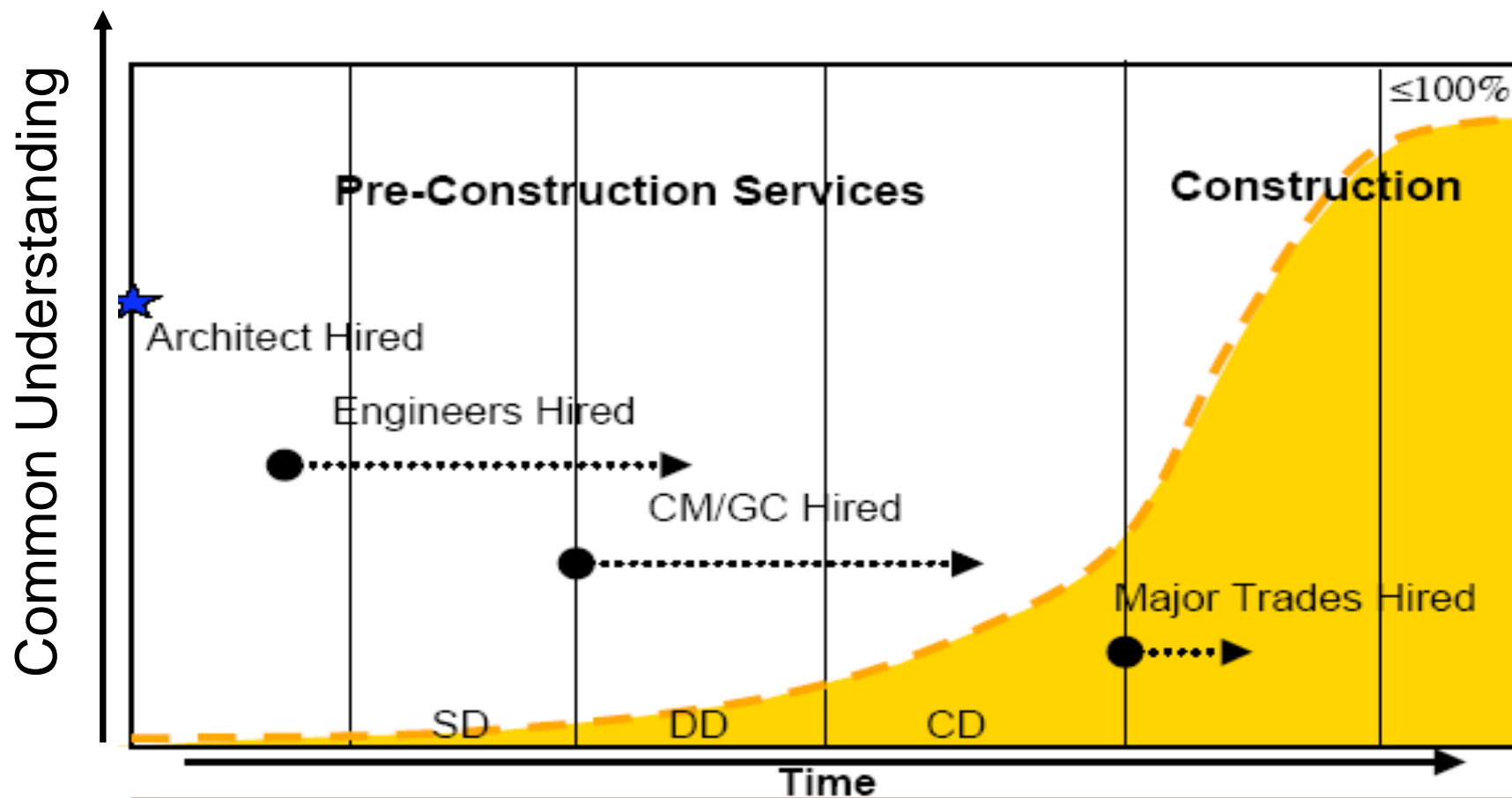


Why Lean/IPD @ MSU?

- In 2007, former VP of Finance and Operations Fred Poston asked:
 - Is there a project delivery method that can spare me the embarrassment of having to go back to the BOT and ask for more money to complete projects? And I want 'Best Value' not 'Price Certain' because any fool can give me that.

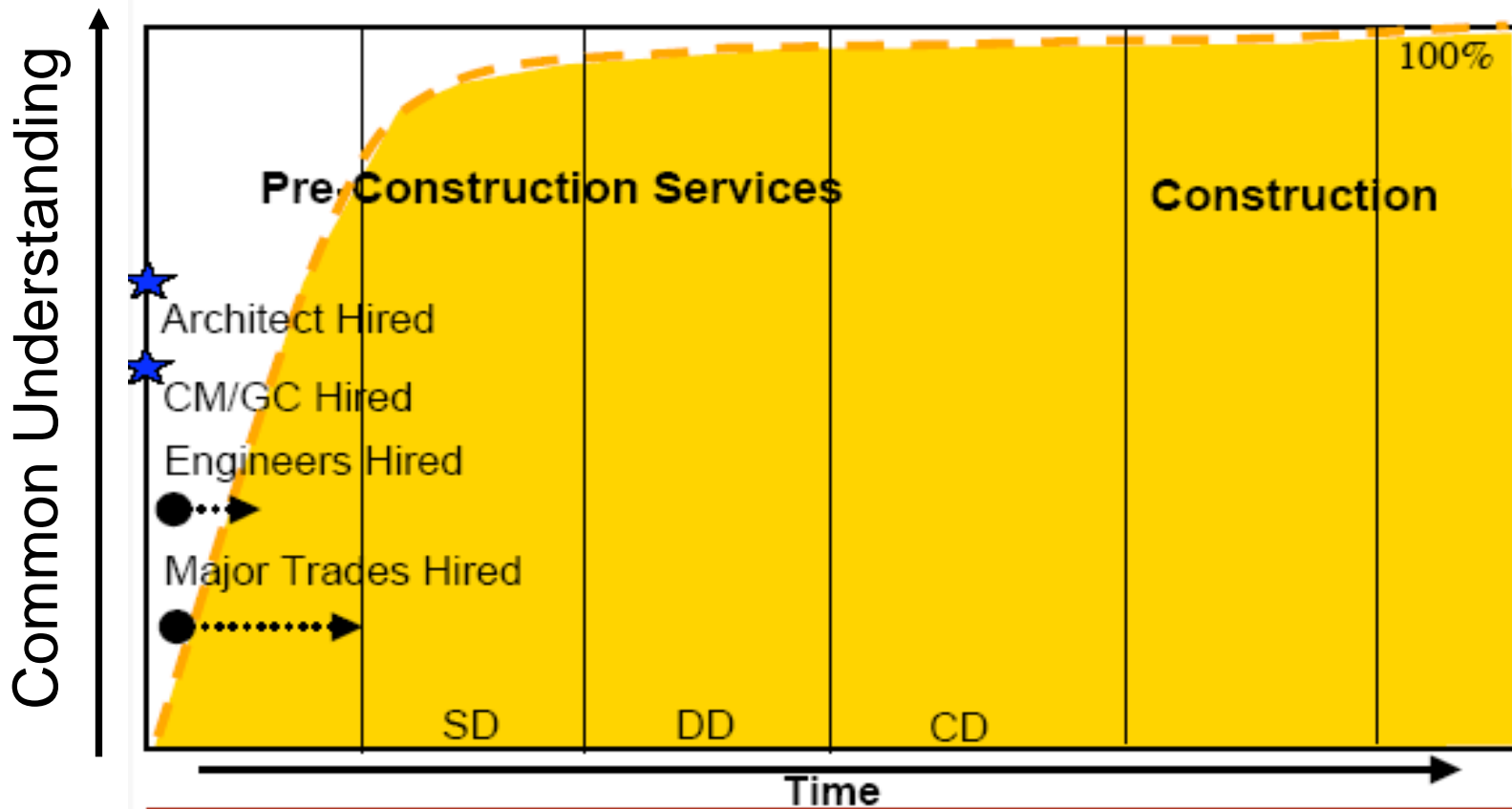


Traditional Project Delivery Level of Common Understanding





Integrated Project Delivery Level of Common Understanding



MHA McDonough Holland & Allen PC
Attorneys At Law



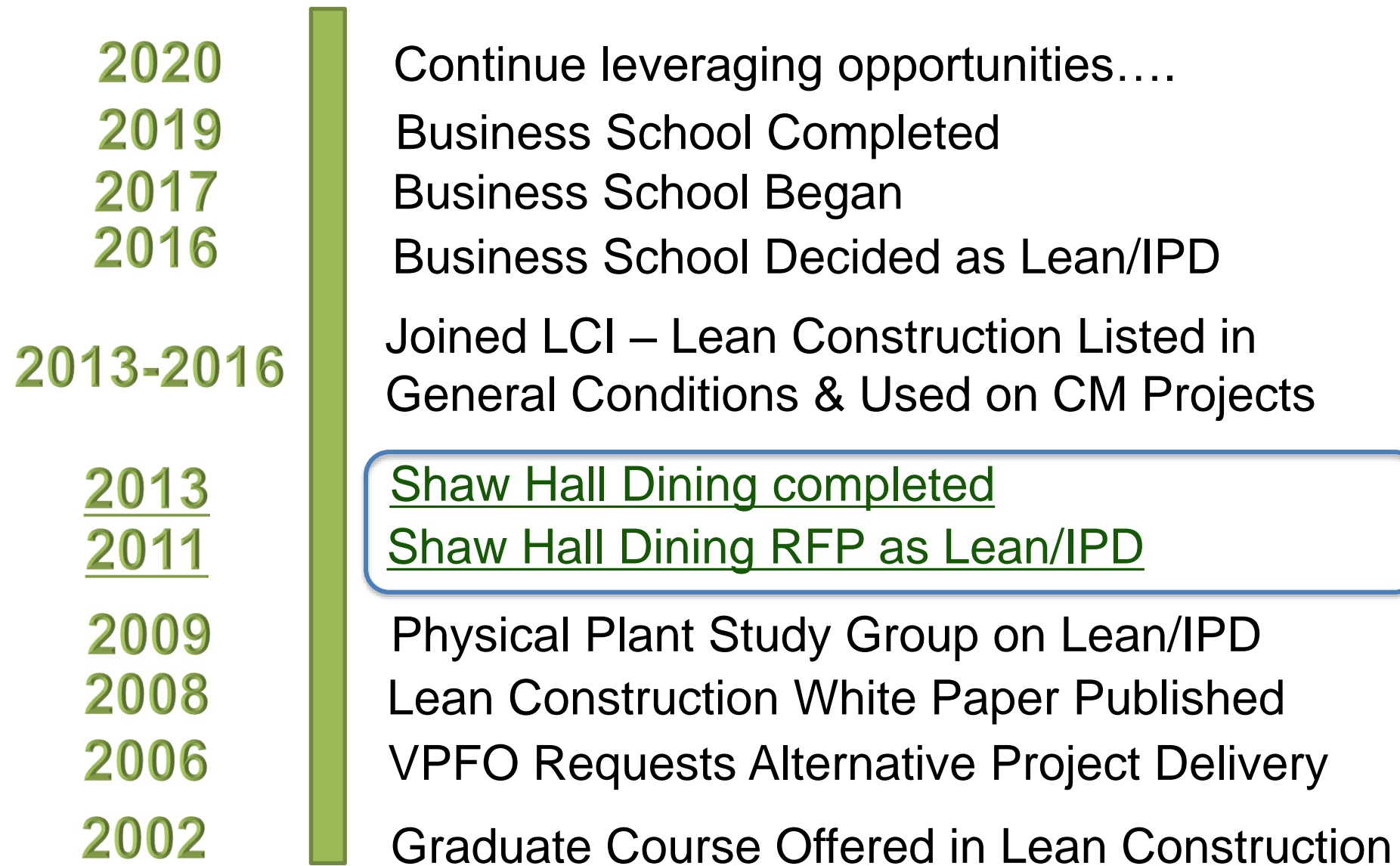
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2019	Business School Completed
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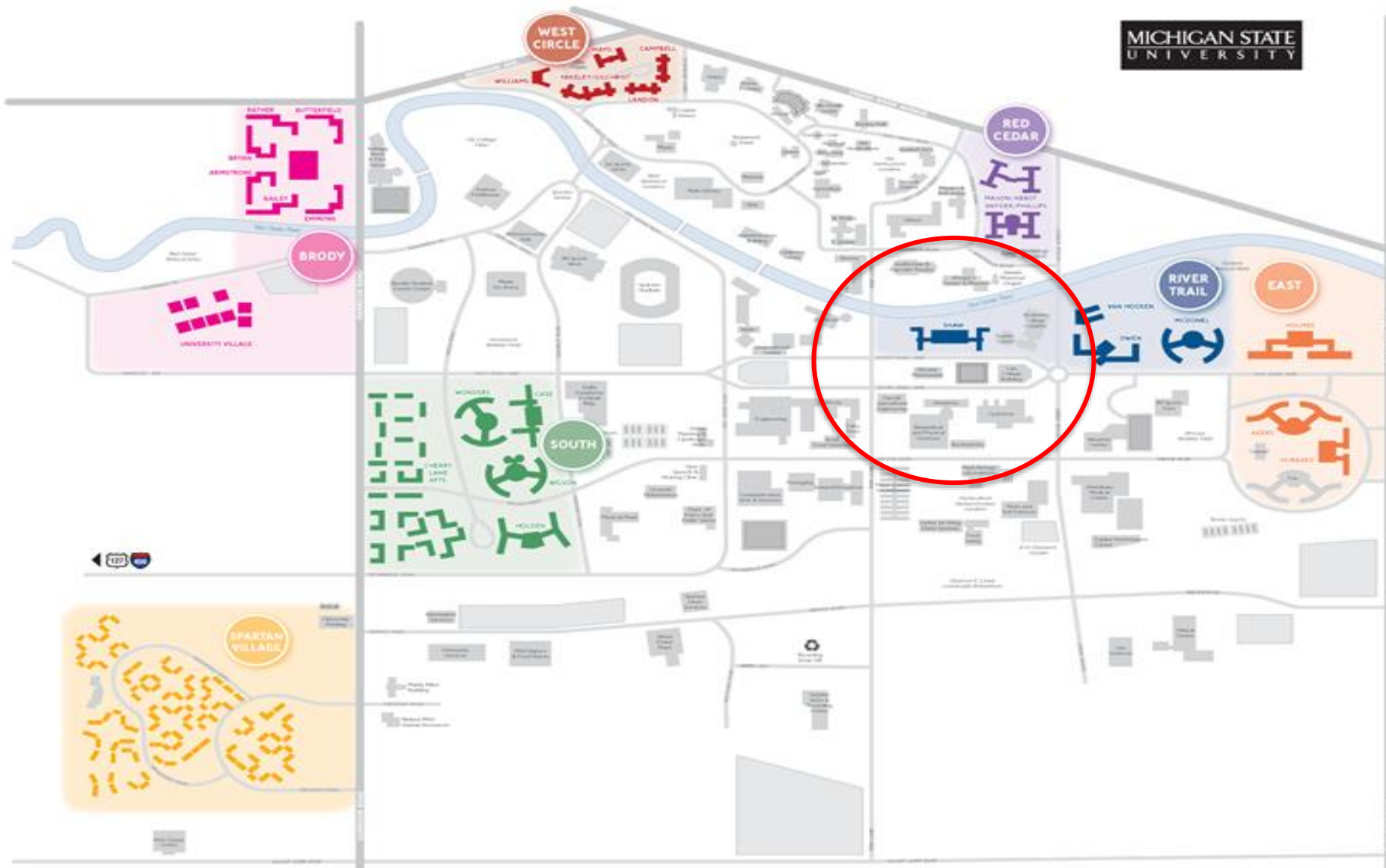


Physical Plant Study Group on Lean/IPD

- Responsibility to customers to provide maximum value
- Strive for constant improvement... and prove it
- MSU wants to be a leader and innovator
- Intrigued by stories of successful Lean IPD projects









Shaw Hall





Shaw Hall





Shaw Hall Dining Center



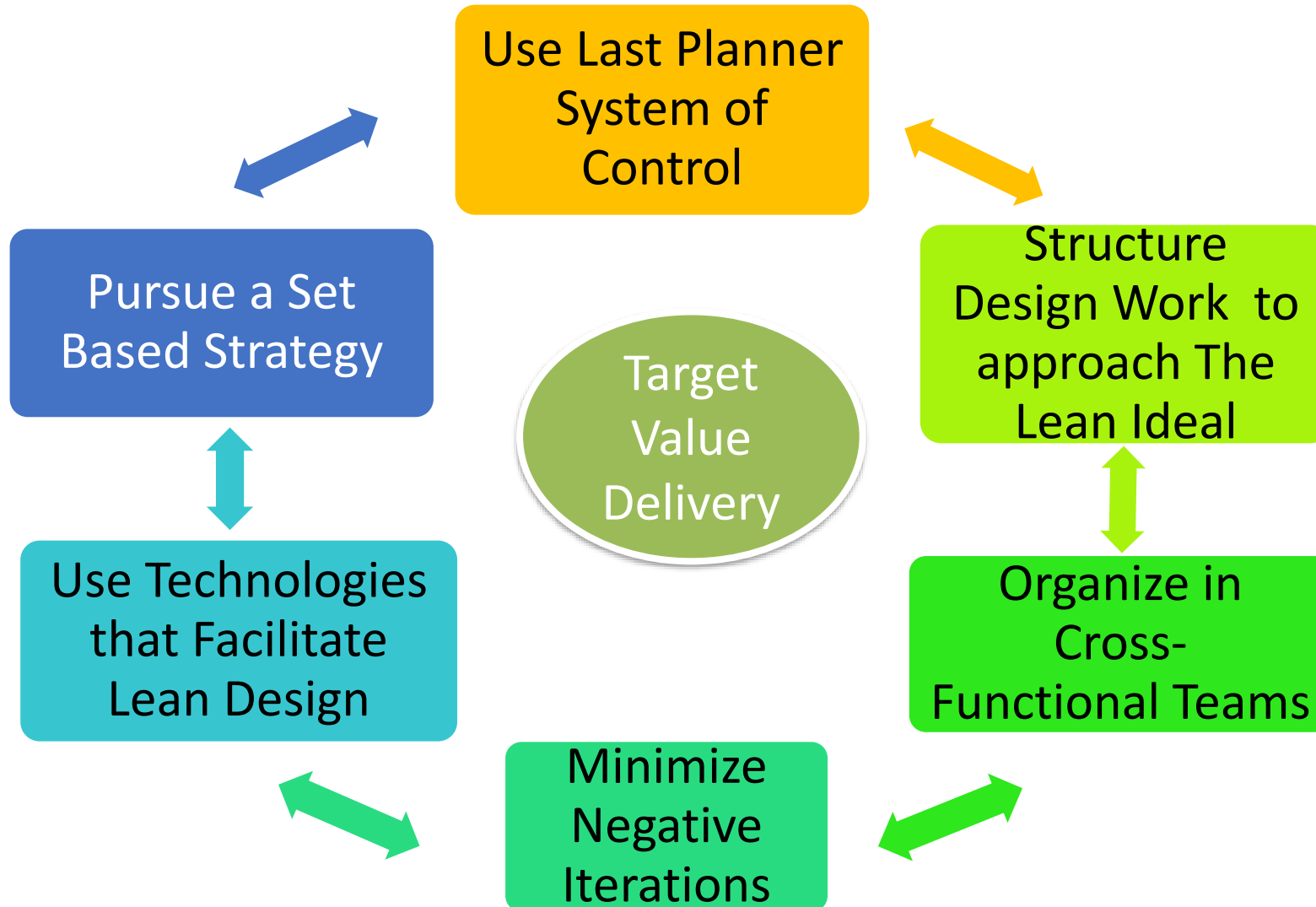


Lean/IPD Coaching



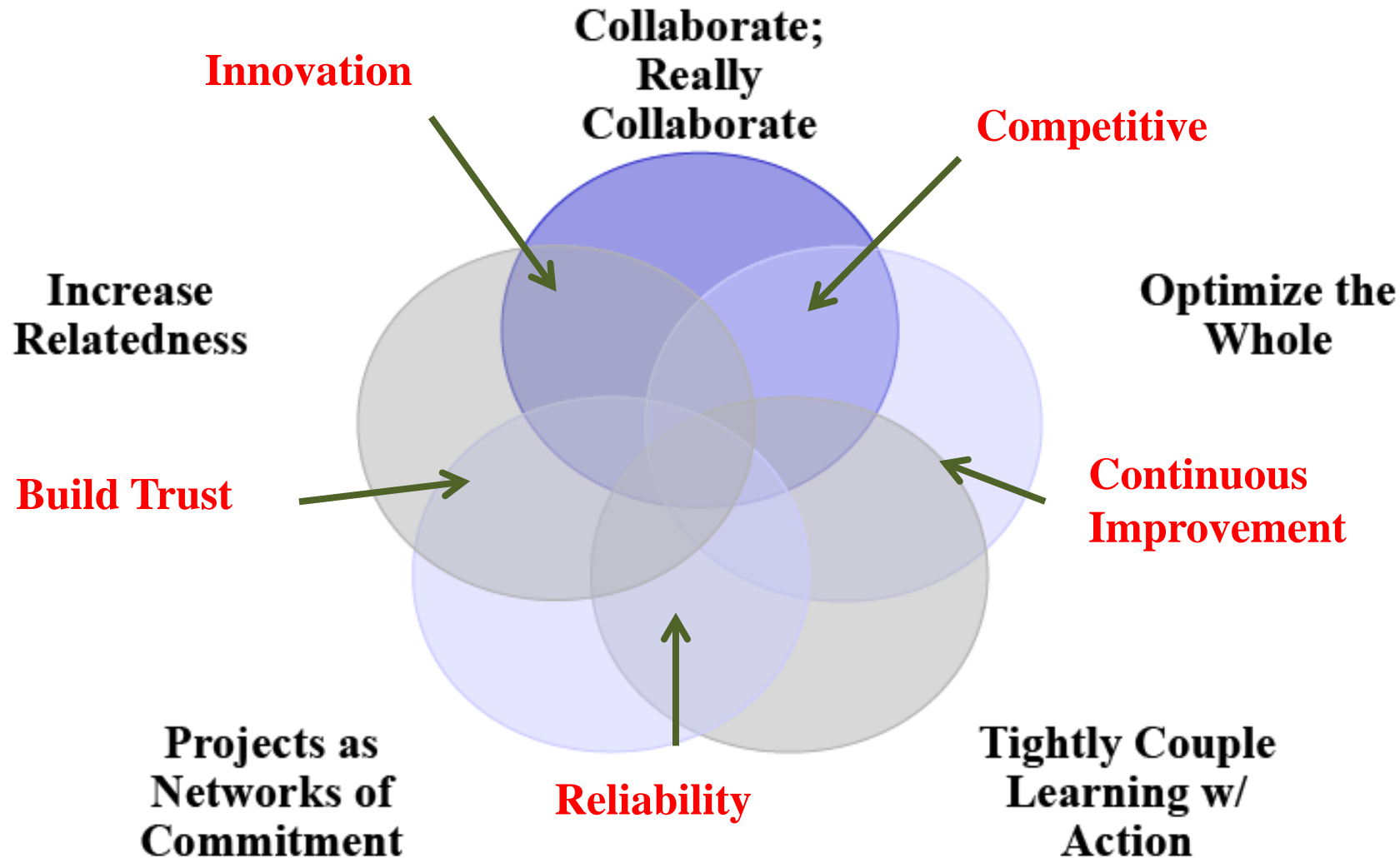


Lean Design/Lean Supply/Lean Assembly/Lean Use





Five Big Ideas (courtesy LPC, Inc): Behaviors enabling Lean/IPD

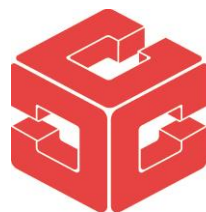


Jan 25, 2021





Multiparty Agreement: A/E–Constructor–Owner



CLARK
Construction Company





CONSENSUSDOCS 300

Standard Form of Tri-Party Agreement for Collaborative Project Delivery

- Tri-Party Signatures
- Collaborative Principles
- Management Group
- Incentives and Risk Sharing
- Mutual Waiver of Consequential Damages
- Trade Contractors Involved During Design
- Dispute Resolution
- Risk Pool
- Performance Reviews



Joining Agreement

(Engineering Consultants and Specialty Contractors)



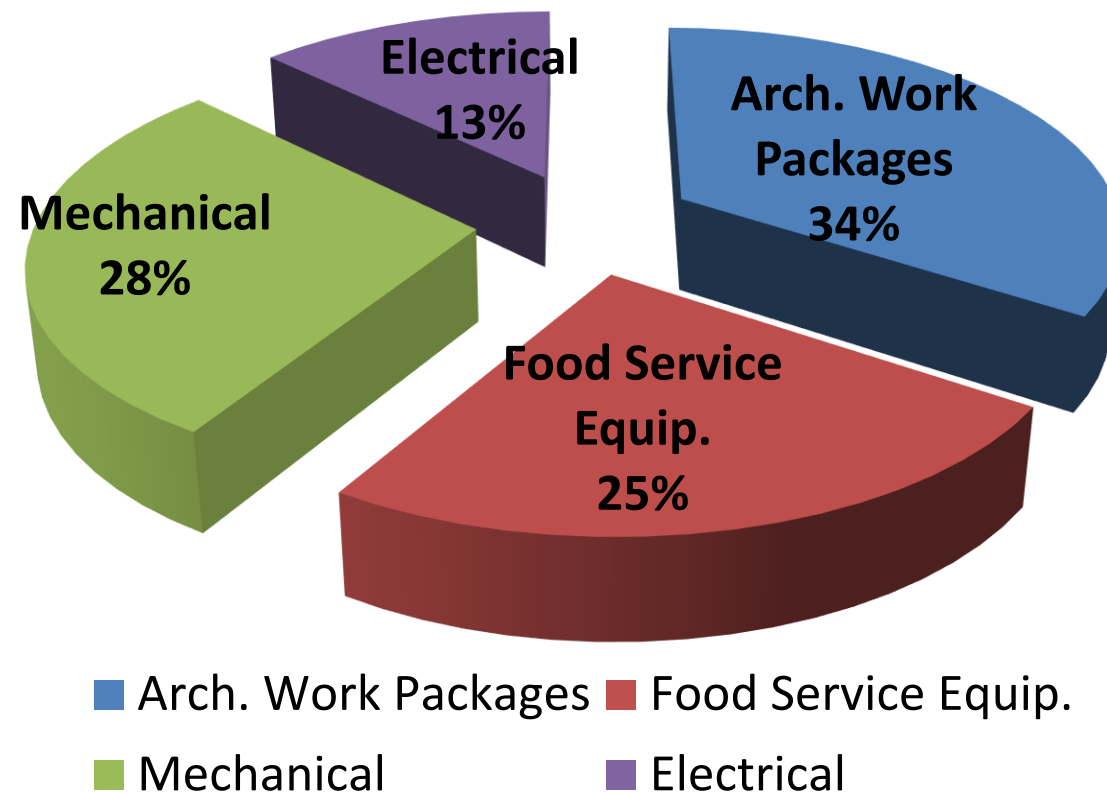


Validation Phase

- What assumptions are embedded in the numbers that can be exposed, discussed and possibly mitigated other than with \$\$?
- What risks are included within the pricing that might be eliminated if certain preconditions were met?
- What different types of materials, work structures, work days could be contemplated?
- Where does the team feel that the designers are including too much legacy fear factor? What does the team feel is over designed? How could the design be modified, simplified, reconsidered to provide the owner the same basic outcome faster, cheaper, or both.



% of Trade Partners and Bid Package Work





Big Room



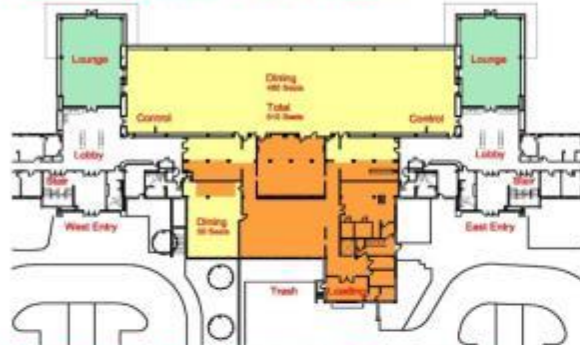


A3

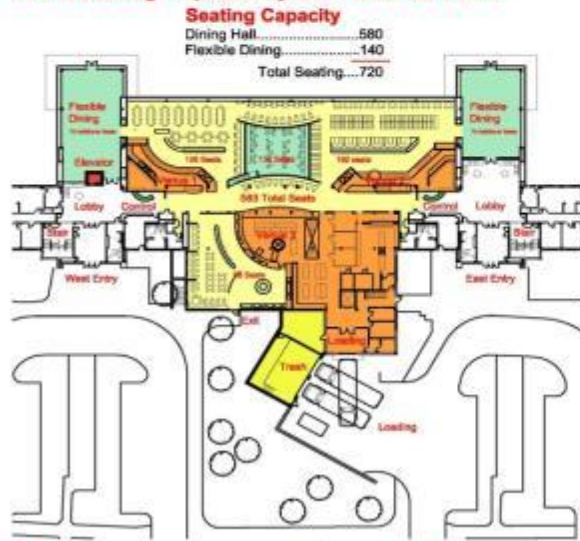
Shaw Hall - Dining Center Renovation - Concept Design Phase

A3 - 100 May 17, 2011

Plan of Existing Layout - Shaw Lane Level



Plan of Existing Proposed Layout - Shaw Lane Level



Seating Capacity

Dining Hall	580
Flexible Dining	140
Total Seating	720



Scale: 0' 8' 16' 32' 64'



Conceptual Phase Narratives

The Shaw Hall dining project is consistent with the RHS Strategic Plan, the RHS-Culinary Services Master Plan and the vision for integrated dining as defined by these two plans. This project will transform Shaw Hall, enabling RHS to provide a seamless experience for the customer and leverage shared resources, such as leadership, human resources and administrative support together with a newly renovated state of the art dining facility.

The project is being undertaken using a collaborative approach. This methodology has allowed the project team and stakeholders to identify approximately \$1,500,000 of cost reductions in the conceptual phase of the project to date. This savings has been achieved with no scope reductions. This A3 document summarizes the project success to date and provides a vision of the future successes of the project.

Project Budget

Allowable Project Cost.....\$11,700,000

Validation Expected Project Cost Estimate - Jan, 28 2011:

1. Dining Area, w/ Support Work At Lower Level	\$ 12,500,000
2. Elevator, Loading Dock and Renovated Lobbies	\$ 1,340,000
Total	\$ 13,840,000

Expected Design Concept Project Cost Estimate:

1. Dining Area, w/ Support Work At Lower Level	\$ 11,312,829
2. Elevator, Loading Dock and Renovated Lobbies	\$ 923,943
Total	\$ 12,236,772

Desired Elements - Not In Project Cost Estimate:

1. Private Dining Room in Main Dining Area	\$ 60,000
2. Curtain Wall	\$ 40,000 - \$ 210,000
3. Terrace Level 50 Person Training Room	\$ 80,000
4. Terrace Level Locker Rooms	\$ 58,000

Project Schedule

Construction Junction	June 9, 2011
CIPWG Meeting	June 15, 2011
CIPWG Meeting	July 20, 2011
Board Of Trustees Step 2 Meeting	September 9, 2011
Construction Start	May 2012
Owner Training And Turnover	December 14, 2012
Food Service Resumes	January 2013

Anticipated LEED Rating - Silver

LEED 2009	Certified 40-49, Silver 50-59, Gold 60-79, Platinum 80-points
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Proposed Operational Summary

The Dining Hall will operate from 7am to 8pm 7days a week. Food venues will include vegetarian, breakfast, salad, desserts, beverages, comfort food, burgers, sandwiches, pizza and international food. Not all food venues will be open 7am to 8pm. There will be two points of entry into the dining area.



Conditions Of Satisfaction

"Create a dining experience at Shaw Hall that is unique and impressive, yet supports the Resident's living / learning experience by providing an at-home feeling as they use the dining facility for social, academic, and nutritional needs. Maximize the opportunity to provide culinary excellence to the Shaw Hall neighborhood community".

The goals of the Shaw Hall Renovation are to:

- maintain 100% occupancy at Shaw Hall;
- increase student satisfaction as measured by Educational Benchmarking Inc. (EBI) and National Association of College & University Food Services (NACUFS) questionnaires;
- increase cash sales; and
- increase meal plan usage by faculty, staff and off-campus students.

Design Sustainability Efforts

The following are design efforts proposed for the project:

MEP features which will be incorporated into the project:

- More energy efficient HVAC system
- Automatic control of ventilation during periods of low occupancy
- Energy efficient lighting and controls
- Water-conserving plumbing devices

MEP features which will be evaluated for the project:

- Daylight controls
- Variable air volume for kitchen hoods
- Variable volume pumps
- Sub-metering of utilities
- RHS is considering tray-less food service

Architectural features which will be incorporated into the project:

- Construction waste management
- Recycle content
- Regional materials
- Low VOC materials

Architectural features which will be evaluated for the project:

- Composting of food waste - pre and post

Project Investigation

The following items are incorporated into the conceptual Design package:

- Existing Building and Building Systems Condition Review
- Just In Time Needs for Shaw Hall
- Retro Commissioning and New Commissioning
- Hazardous Material Review

Project Team

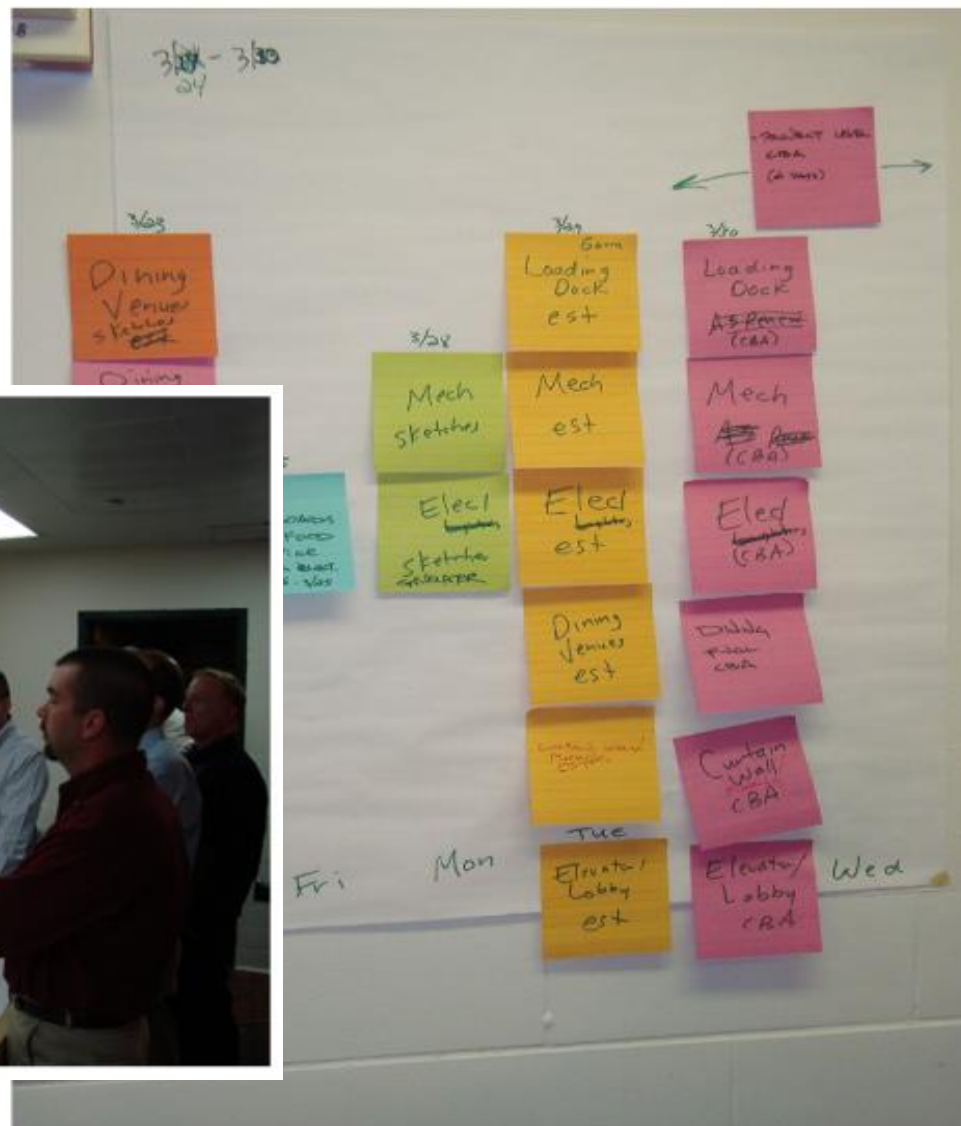
Michigan State University
Neumann/Smith Architecture
Peter Basso and Associates
Mesher, Shing, McNutt
The Hysen Group

Clark Construction Company
Motor City Electric Company
John E. Green
Dee Cramer





Pull Planning



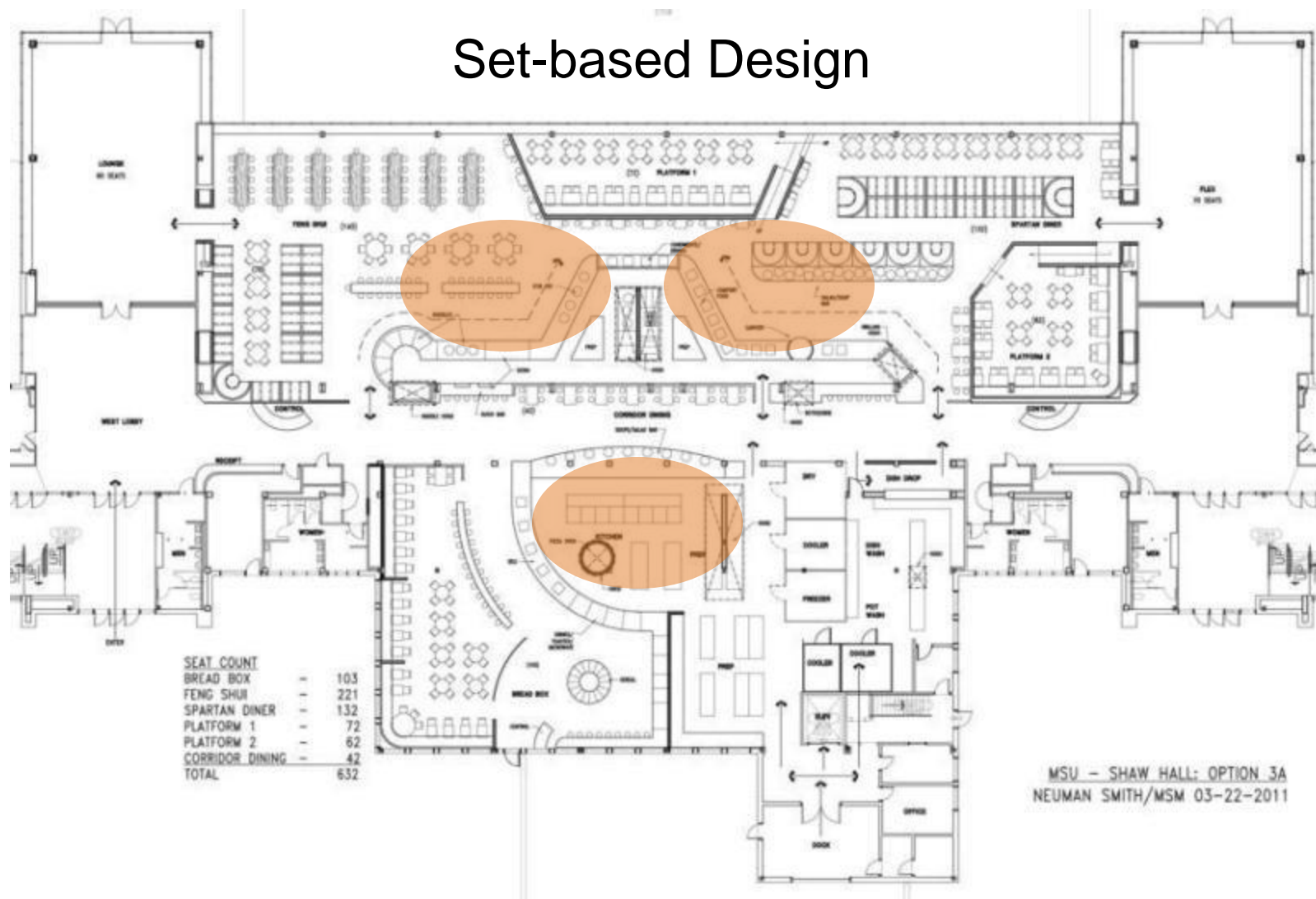


Shaw Project Commitment Log

Item No	Conditions of Satisfaction	Performer	Customer	Date Promised	Date Completed	Notes
96	Mechanical - Exhaust duct shaft size	Dennis Sczomak	Stan Cole	6/29/2011	6/29/2011	Moved forward from 7/5 to 6/29
	<input checked="" type="checkbox"/> Promise Kept	Reason for Variance: Promise Kept, so no variance				
	<input checked="" type="checkbox"/> Pull Planning Item					
97	Electrical - Preliminary distribution equipment locations	Terry Cleis	Matt McKune	6/29/2011	6/29/2011	Promise date needs to change based on when they get Hysen's plan. Moved from 6/21 to 6/28.



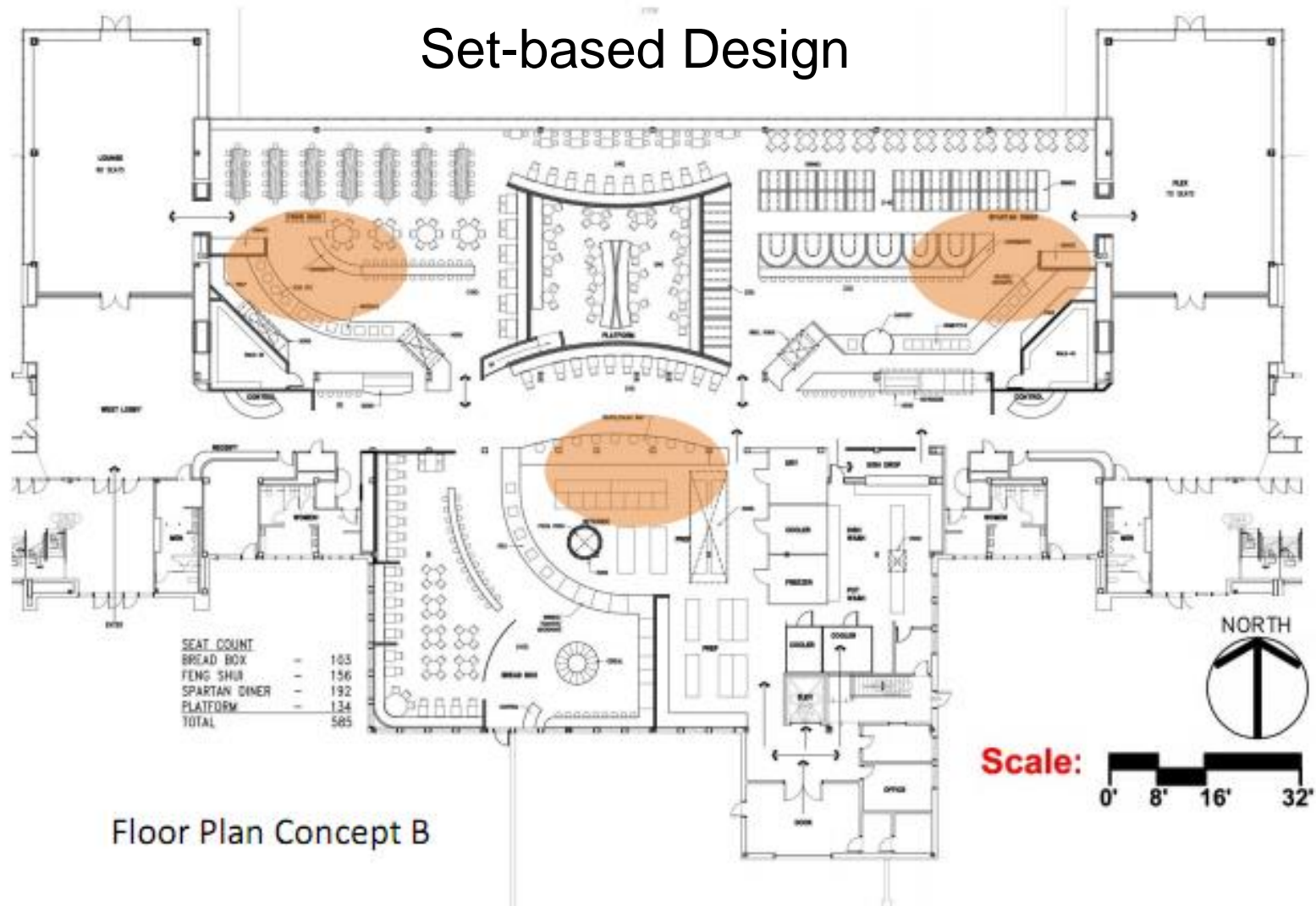
Set-based Design



Floor Plan Concept A



Set-based Design



Floor Plan Concept B



Choosing By Advantages (CBA)

FACTORS	DINING VENUE LOCATION CONCEPT ALTERNATIVES			
	3A		3C	
1. Number of seats				
Attribute:	632 seats		<u>585 seats</u>	
Advantage:	47 more seats	100		
2. Venue proximity				
Attribute:	Back-to-back venues		<u>No back-to-back venues</u>	
Advantage:	Possible combined MEP systems	50		
4. Abatement at Terrace Level				
Attribute:	<u>3053 sf to be abated</u>		2035 sf to be abated	
Advantage:			1018 sf less area to be abated	50
5. Dedicated venue walk-in coolers				
Attribute:	0 dedicated walk-ins		2 dedicated walk-ins	

FACTORS	DINING VENUE LOCATION CONCEPT ALTERNATIVES			
	3A		3C	
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Attribute:	<u>3053 sf to be abated</u>		2035 sf to be abated	
Advantage:			1018 sf less area to be abated restrooms from lobby	50
TOTAL IMPORTANCE:		245		<u>390</u>

Circulation Concepts

Advantage:	<u>dining area</u>		dining area	
			More opportunity for access to restrooms from lobby	0
TOTAL IMPORTANCE:		245		<u>390</u>



Shaw Dining Hall - Target Value Design





Target Discussions







Construction Phase

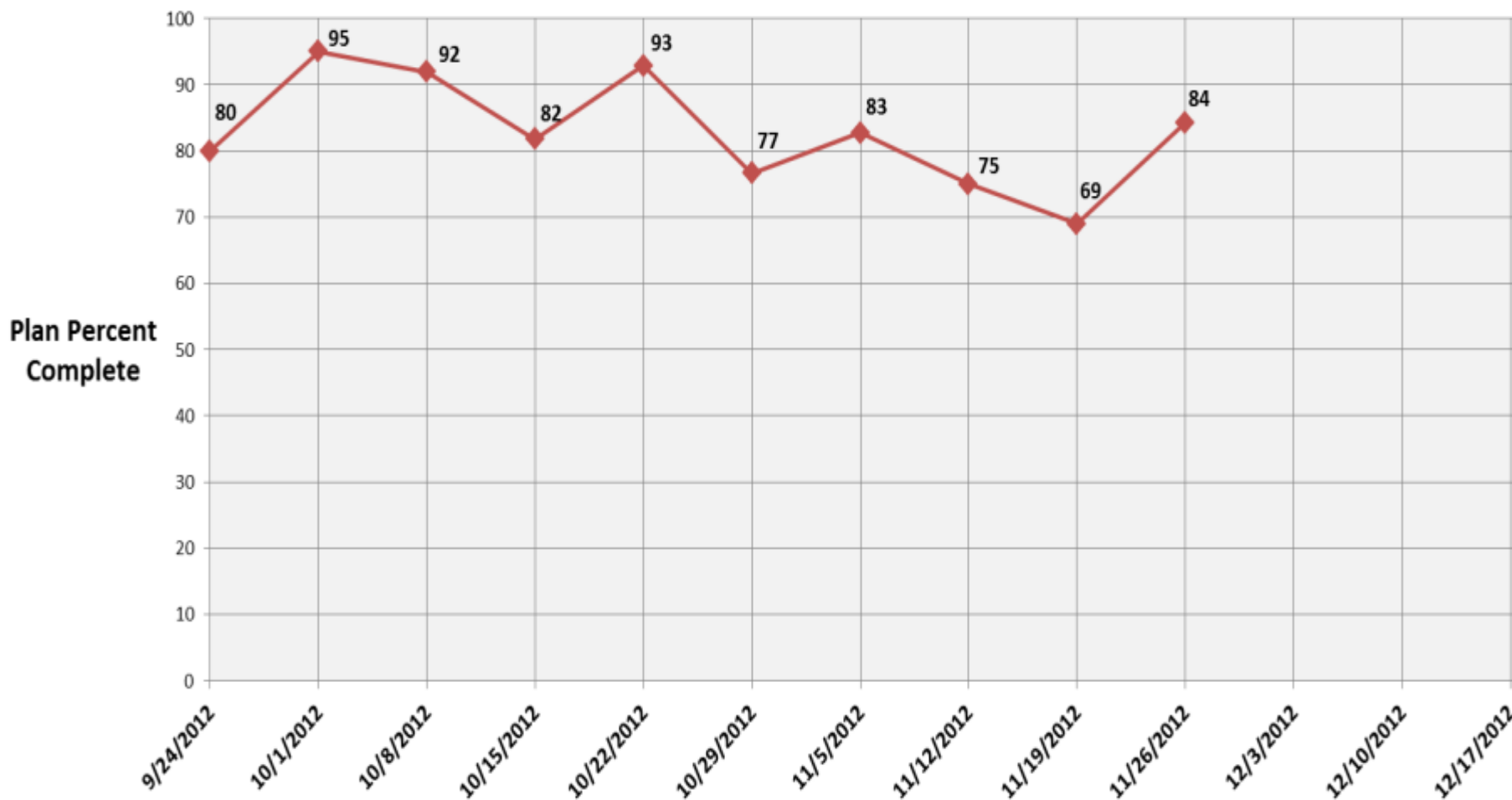


Last Planner[®] System





MSU Shaw Hall Lean Construction – Tracking Weekly Progress



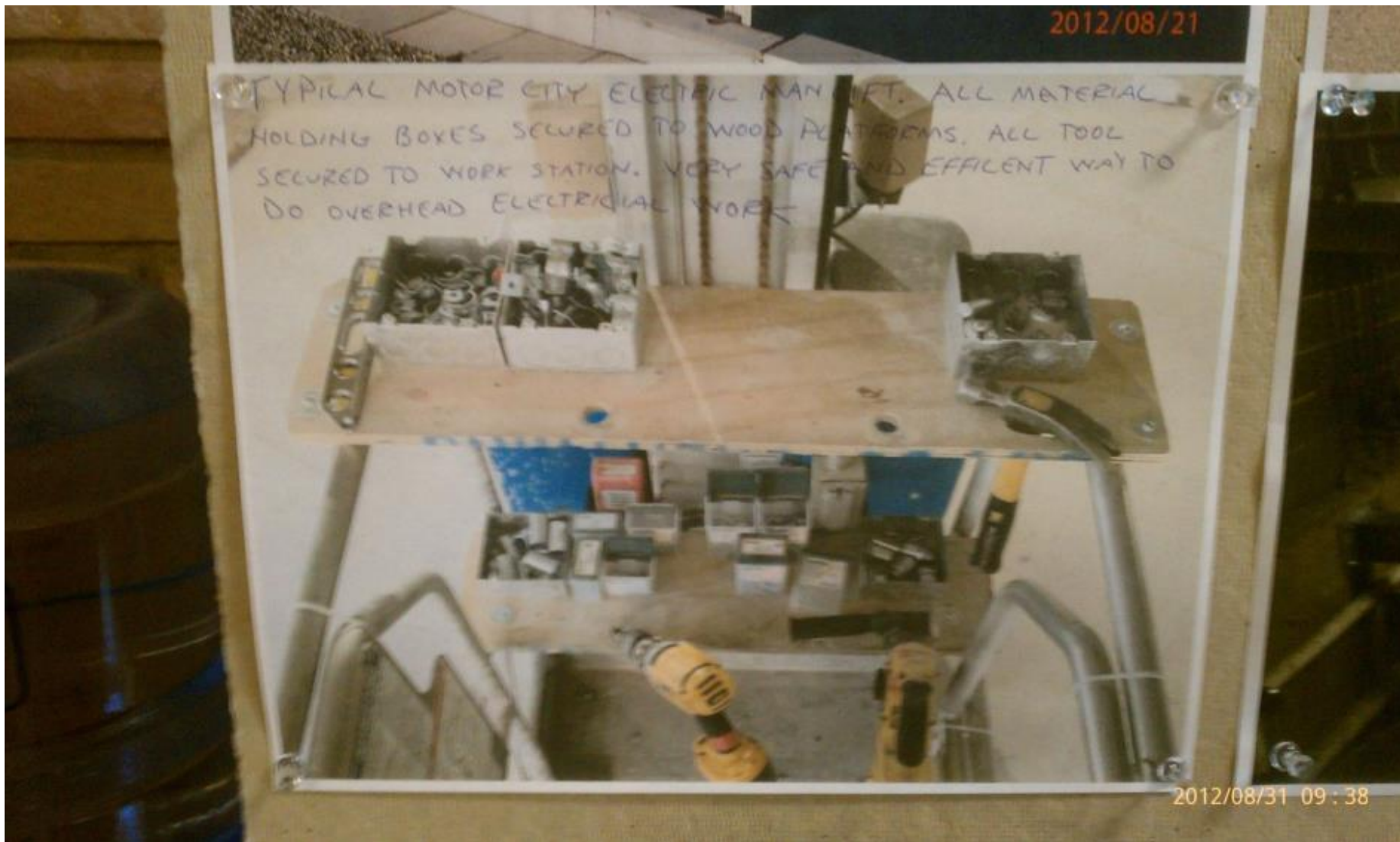


5S: Place for everything and everything in its place (Sort, Straighten, Shine, Standardize, Sustain)





5S: Scissor Lift



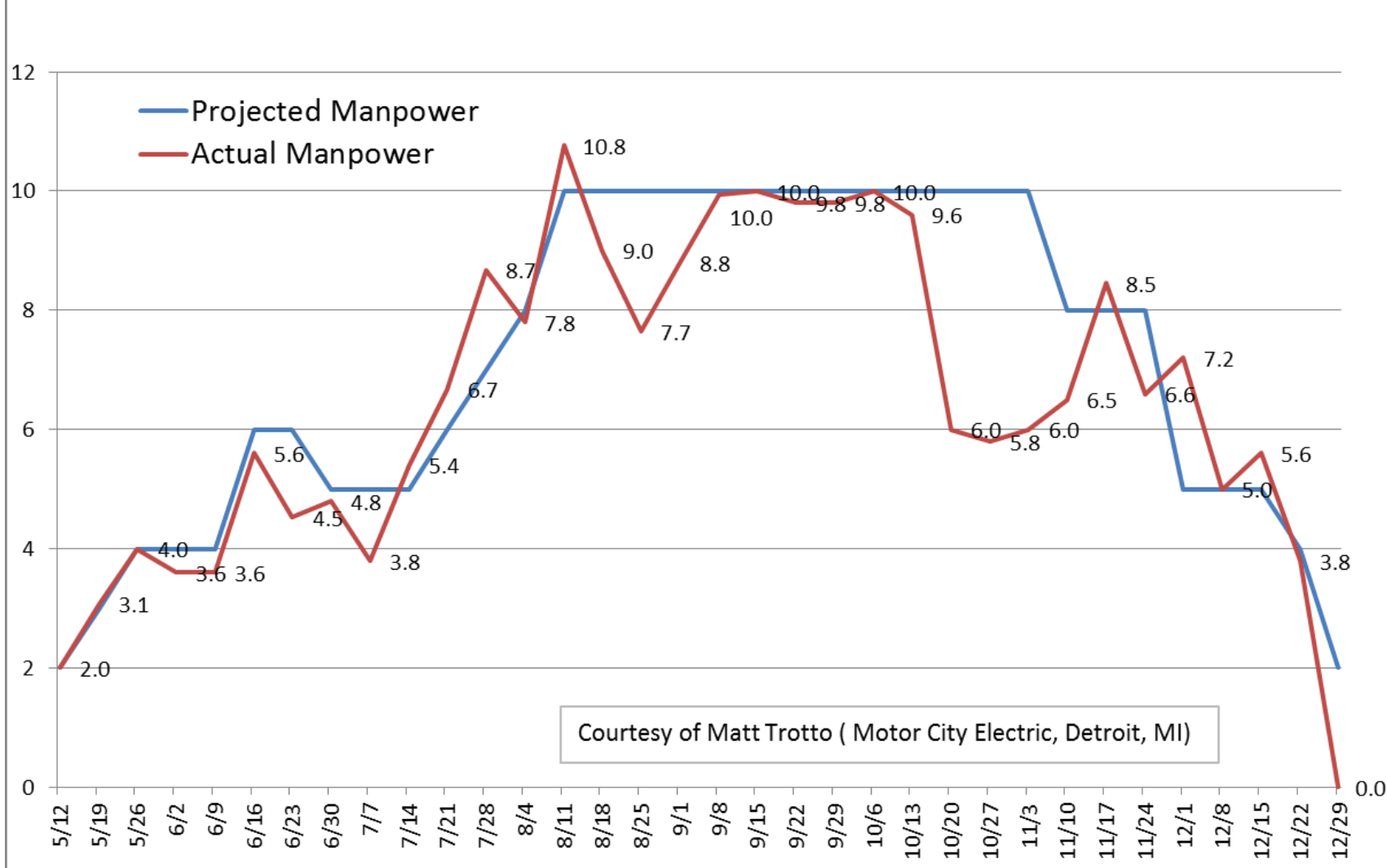


Construction Administration/Management Hours

- Neumann Smith
 - Turned the table around and met when we had to!
 - Reduced in the range of 25-30%
 - Contributed to meeting project target budget
- Clark Construction
 - Less staff compared to other jobs
 - Contributed to meeting project target budget



MSU Shaw Dinning Hall Project - Electrical Work





Shaw Hall Dining Center (Before)





Shaw Hall Dining Center (After)



Shaw Hall Dining Center (After)



Shaw Hall Dining Center (After)



Benefits and Risks (Partner View)





Partners

- Know exactly what I am going into!
- Risk of losing is not there; Offset risk by lowering profit
 - This is not a cost-plus; I had an existing conduit that was cored thru by mechanical; another buried conduit we didn't know about – but I didn't charge for all this because I was going to make my target and the 8% profit at the end.
- Fabrication dwgs in hand; submittal process is not going back and forth in 15 days.



- Construction completed < 7 months
- 12 RFIs (165 on average)
- Owner's Contingency expended < 3% of Total Project Cost.
- Trade Contractor Contingency held to 1% of the Construction Cost
- Punch-list: in 30 days of SC
- Arch "Construction Admin" fee reduced by 30%.



Are we getting our intended value?





<u>2020</u>	Continue leveraging opportunities....
<u>2019</u>	Business School Completed
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Takeaways/Questions

