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Public Works Authority
ASHGHAL
قطر تستحق الأفضل
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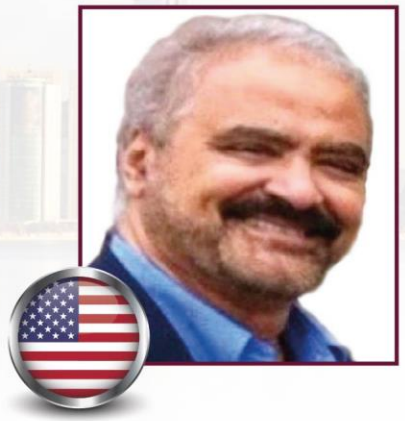

Amr Abdel-Azim
Senior Architect
Michigan State University

TAmr Abdel-Azim is a pioneer in the area facilities management in higher education. He spent most of his professional career leading major capital projects at Michigan State. Amr has been leading innovative Lean practices in Campus facilities planning and design, including two major (IPD) projects on the MSU main campus.

His professional achievements include building the American University of Sharjah. Founded in 1997, AUS is a private comprehensive university that has five colleges residing on a beautiful 330-acre located in the City of Sharjah, United Arab Emirates and was ranked the top private university in the Gulf Area by Forbes Middle East. He was the Director of Physical Plant at AUS and created a plant that reflects a distinctive Arabic architectural style, servicing 90 administrative, classroom, athletic/recreational, and residential buildings totaling over 2,300,000 square feet.

Amr served as the Senior Executive for Capital Projects at Rensselaer Polytechnic Institute (RPI). His work included a $400-million state-of-the-art interdisciplinary research Center and world-class performing art Center (EMPAC).

Amr holds a BS in Architecture and a Masters in Urban Planning. He is a Certified Educational Facilities Professional. He is the Chairperson of Lean In Public Service, an international organization that promotes Lean principles and applications in public sector agencies world wide.

Platinum Sponsors

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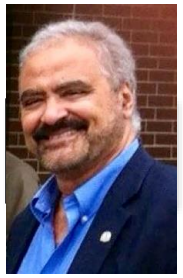
Case Study – Business School

Amr Abdel-Azim
Senior Architect
Michigan State University

MSU Business Pavilion IPD Project
Collaborative Process, Collaborative Building



Speaker:

Amr Abdel-Azim

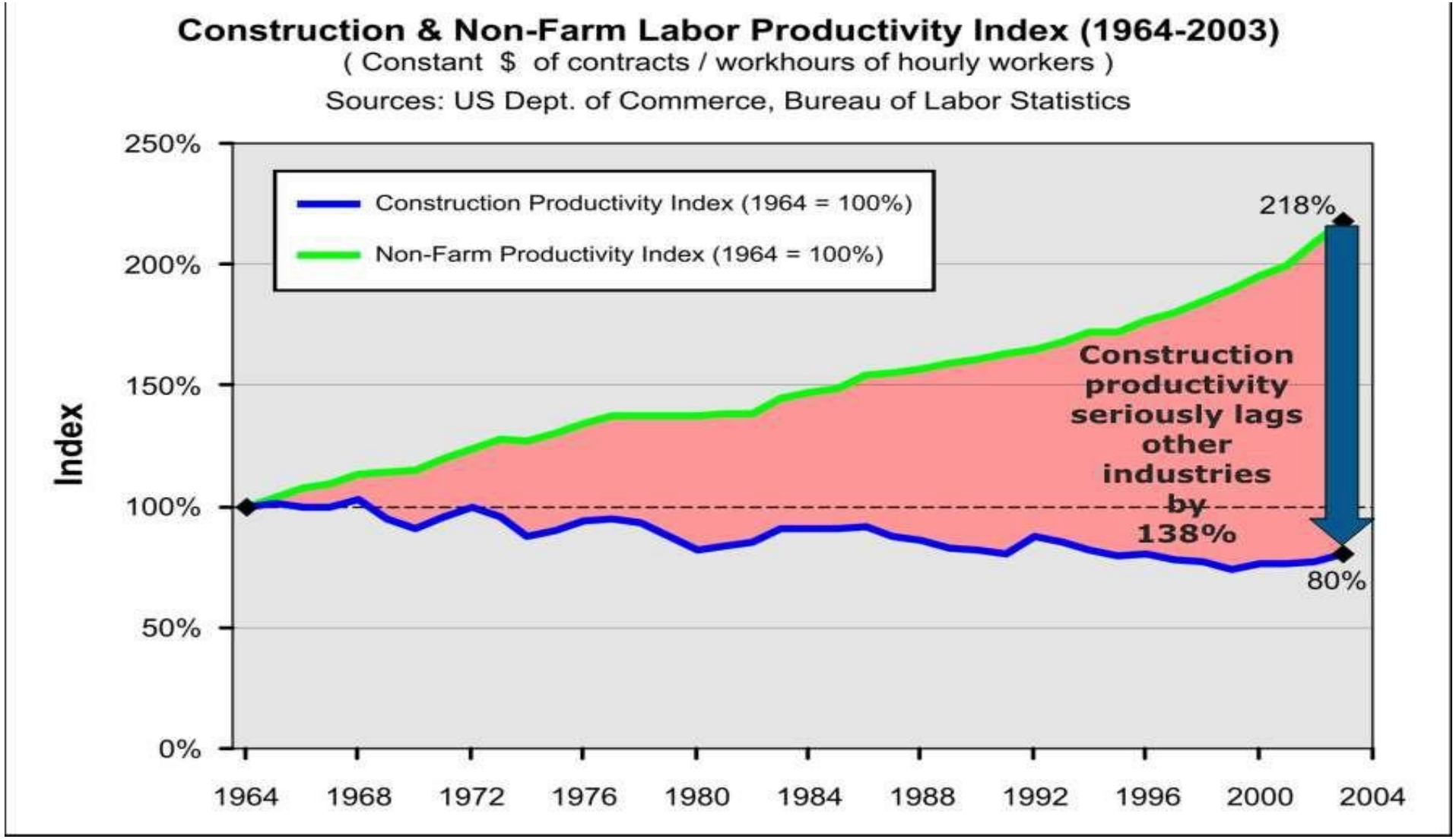
Chairperson– Lean In Public Sector (LIPS)

Architectural Planner, Michigan State University

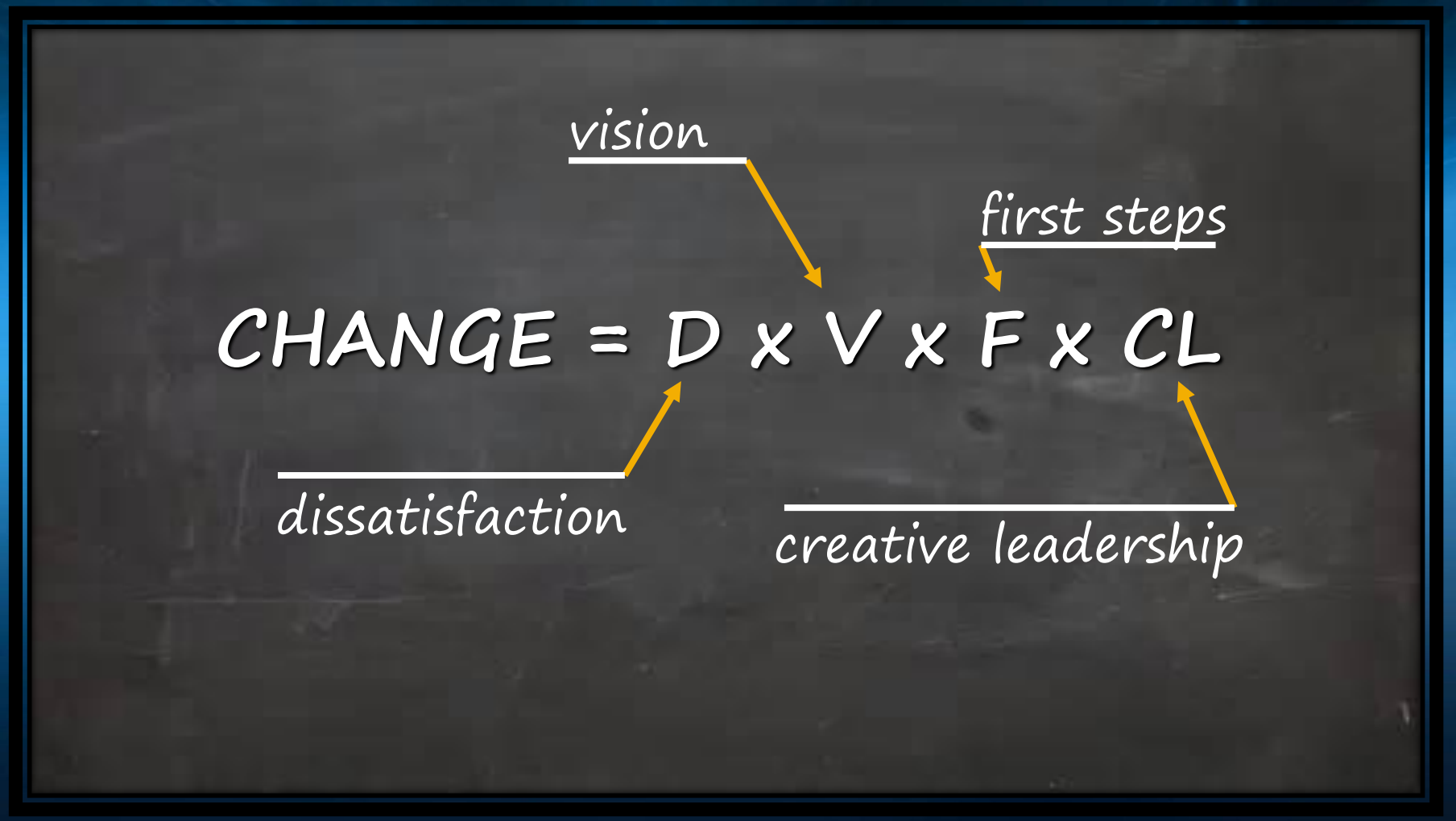
TODAY'S AGENDA

- IPD Principles
- IPD Team Structure
- Risk and Reward Structure
- Unlock Lean Approaches
- Business College Case Study at Michigan State University

Productivity Improvement



We have a Mandate for Change



IPD PRINCIPLES

- ALIGNED GOALS
- CONSENSUS DECISIONS
- SHARED RISKS & REWARDS
- LEAN APPROACHES & TOOLS
- MORE VALUE
- HUMAN ELEMENT CORE COLLABORATION

Integrated Project Delivery

IPD TEAM

OWNER
MSU IPF
MSU FPSM/OPB

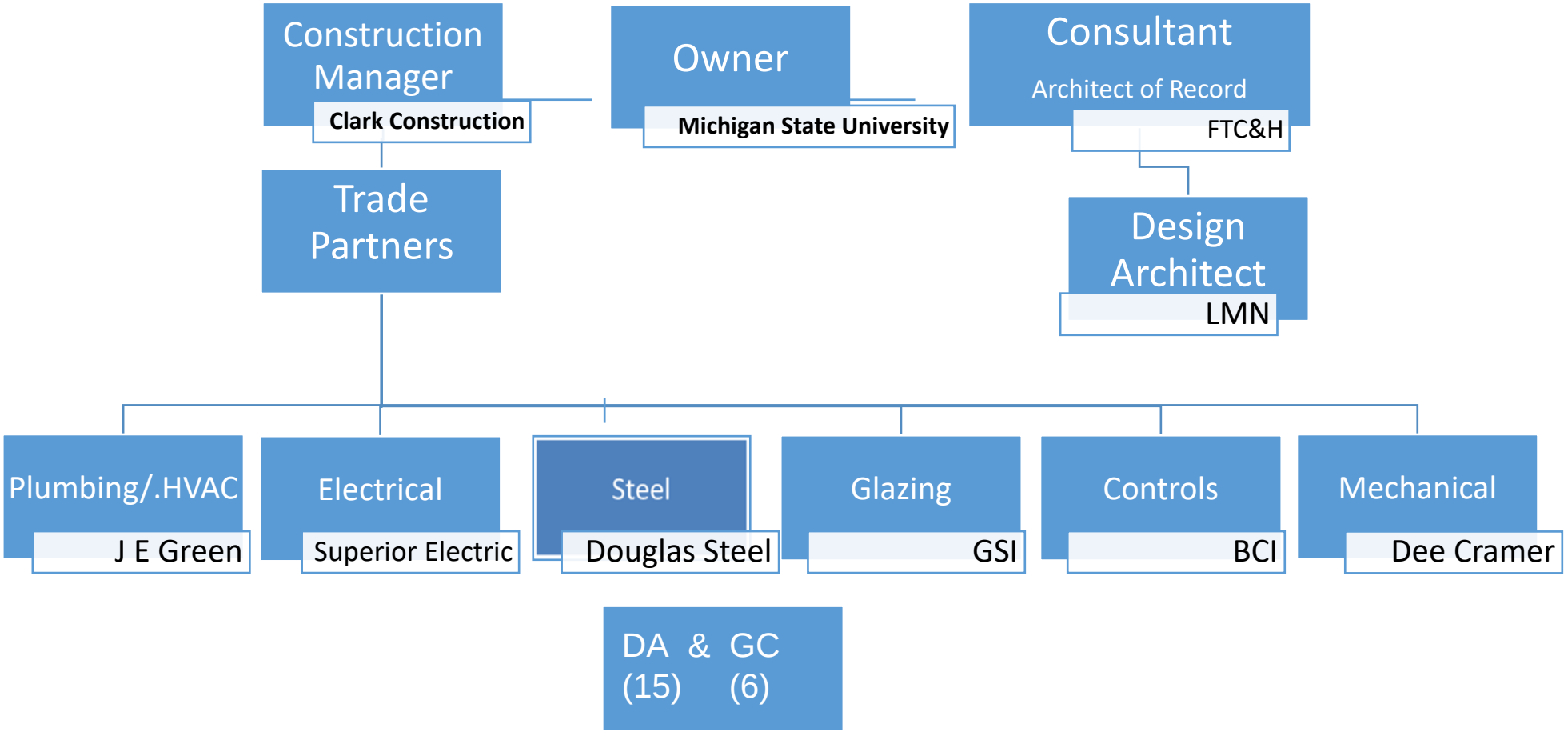
CLIENT
MSU Broad College of Business

ARCHITECT / MEPS
Fishbeck, Thompson, Carr & Huber
LMN Architects

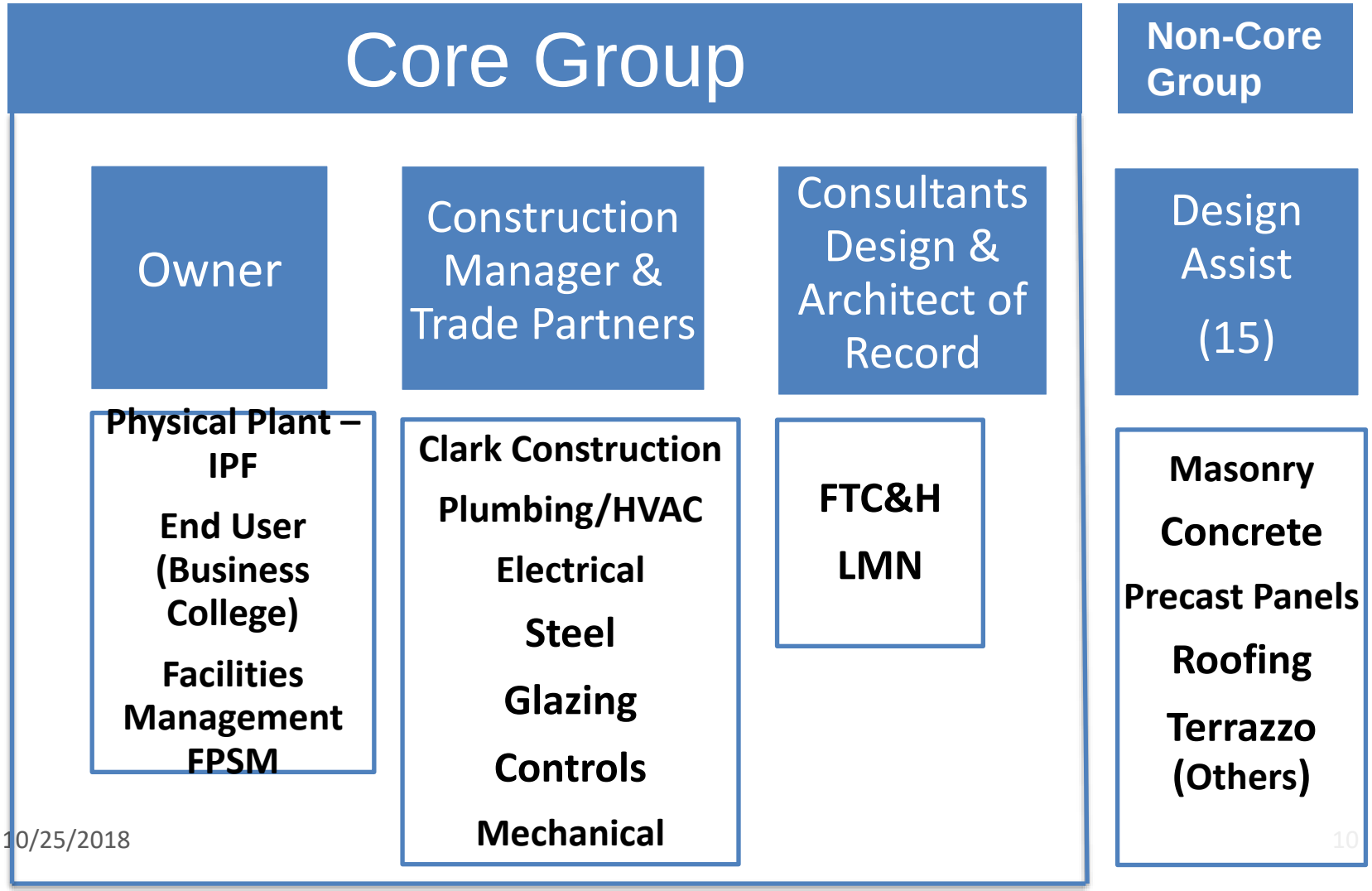
DESIGN ASSIST TRADE PARTNERS
Glazing Solutions
Douglas Steel
Superior Electric
John E. Green / Dee Cramer
BCI

CONSTRUCTION MANAGER
Clark Construction Company

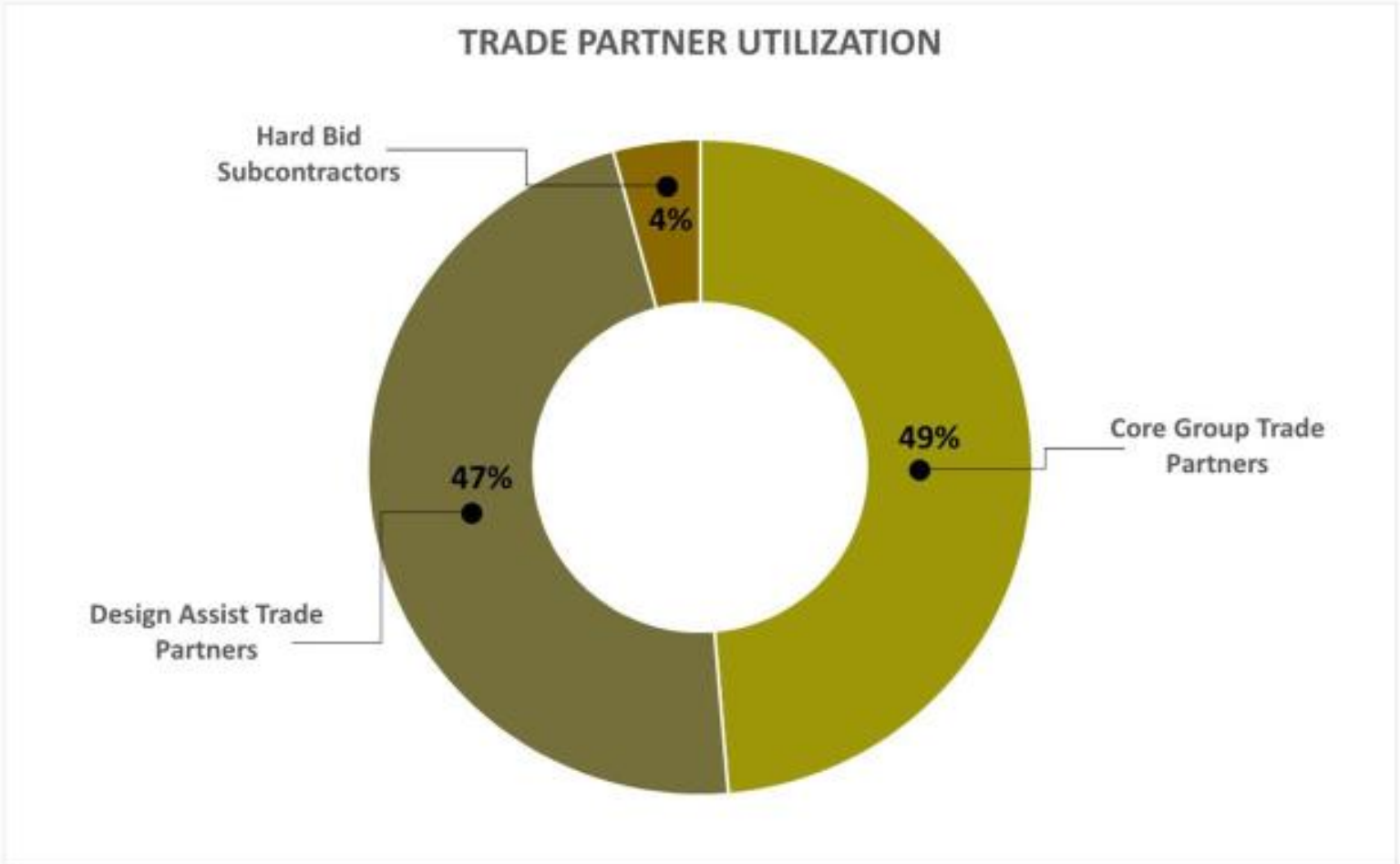
Multi-Agreement Contract Structure

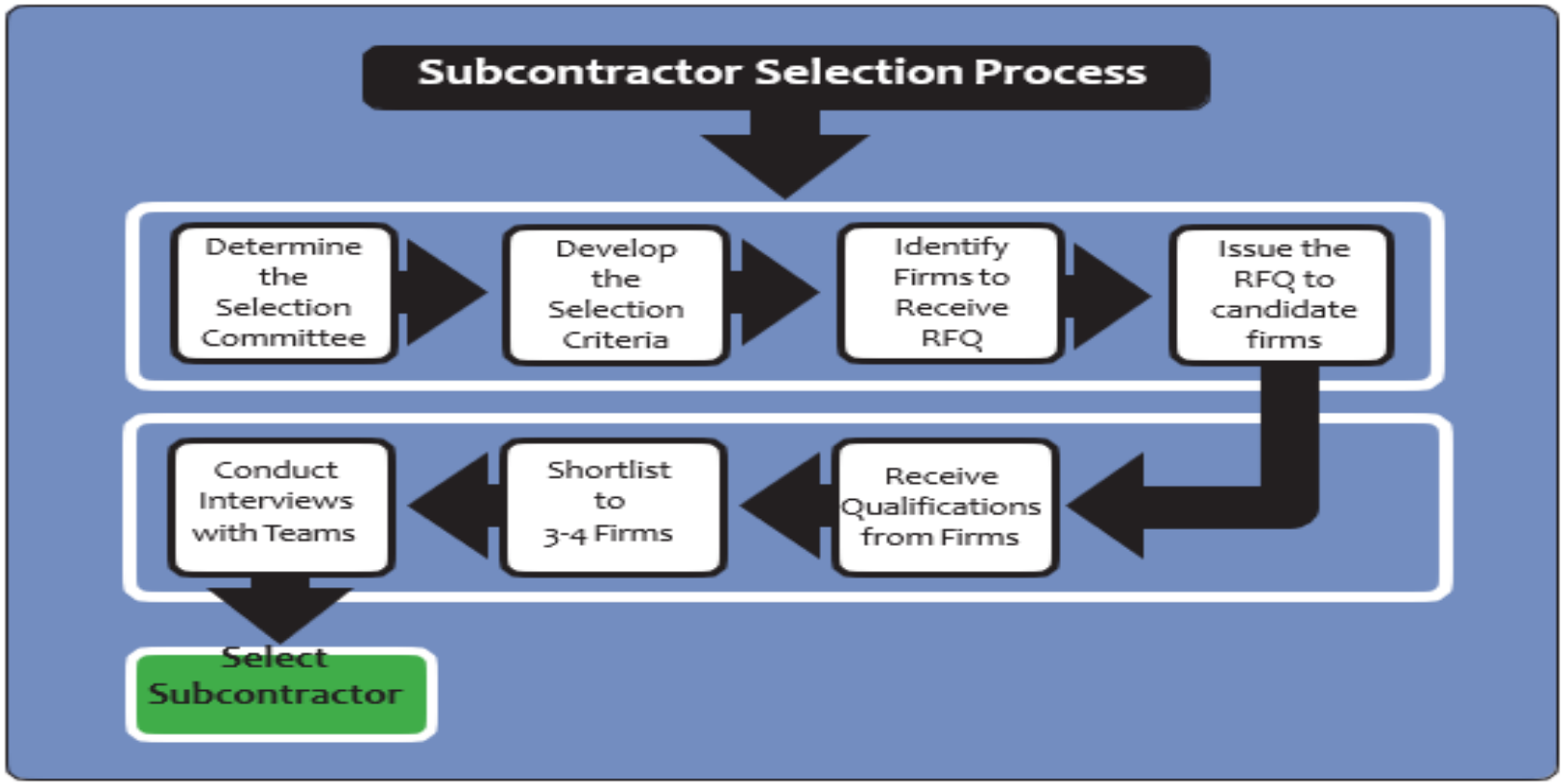


Project Management – Core Team



Trade Partner Utilization – 96% Preconstruction

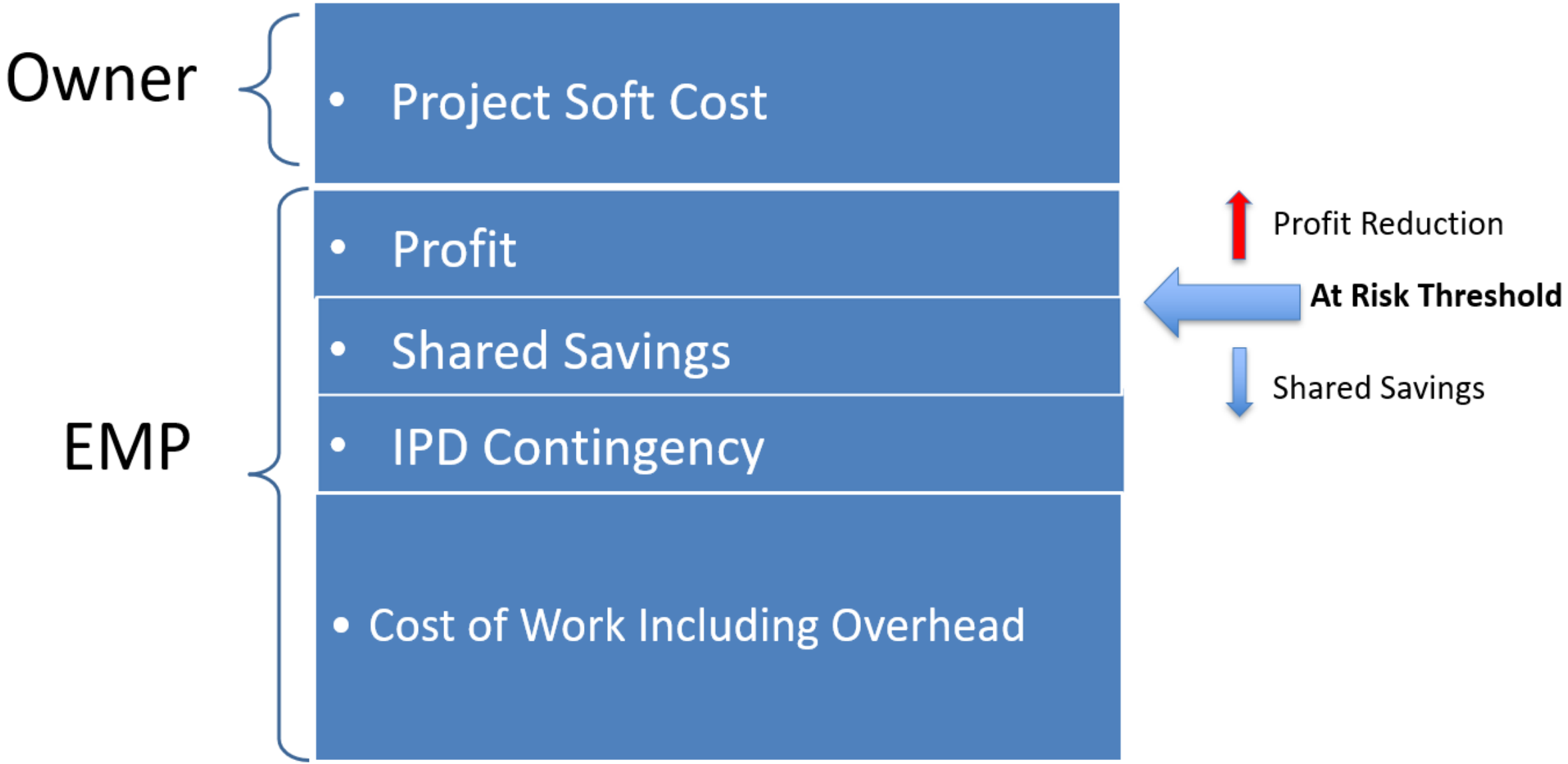




Proposed Selection Criteria

1. Technical competence, experience and track record.
2. Approval through Clark Construction Company's Trade Contractor Qualification process.
3. Ability to provide input regarding design, schedule, constructability and cost.
4. Commitment to the IPD process and principles.
5. Proposed fee and other quantifiable, competitive elements.
6. Choosing By Advantages and employing CBA principles.

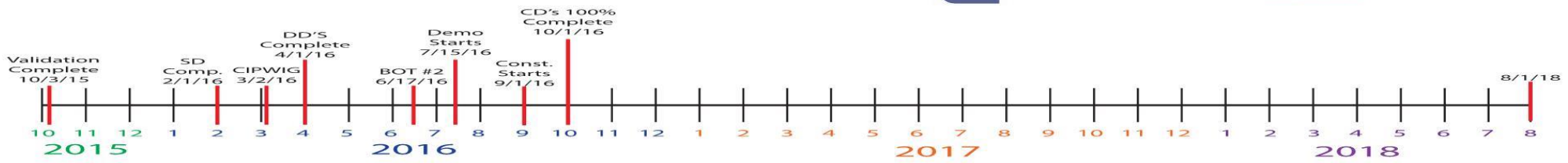
Project Contract: Risk/Reward Structure



Lean Execution Plan

Revision 10 - Dated 8/4/2015

MICHIGAN STATE UNIVERSITY · FTC&H · LMN · CLARK Construction Company · Southland



Section 1: Conditions of Satisfaction (to be completed and approved by SET)

1. Broad College Goals
   a. Recognition
   b. Reputation
   c. Ranking
2. Enrich Student Experience
3. Iconic / Design Excellence
4. Lean Business Practices to Increase Project Value by 20%

Section 2: How do we define and quantify VALUE?

1. Value Log
2. Core Group or SET to approve all fine Value Log Values
3. The Team recognizes that not all value is easily transferred into dollar figures
4. Criteria
   a. Savings
   b. Life Cycle Costs
   c. Justified Standard Change
   d. Team Value Based Decision
   e. Innovation
   f. Safety

Section 3: Challenges

- Don't stifle iconic design with TVD process
- Maximize value of project dollars
- Integrate users into design process
- Fundraising
- Site Logistics
- Opportunities
- Minimize

Opportunities

-
-
-

Section 4: Terminology

- TVD - Target Value Design
- PV - Project Validation
- CBA - Choosing By Advantages
- VCP - Value Centric Proposal
- PTCE - Project Target Cost Estimate
- CPD - Collaborative Project Delivery Team
- CG - Core Group
- SCT - Steering Committee Team
- SET - Senior Executive Team

Section 5: Resources

Person	Email	Phone Number	Role
Bill Seed			Potential Consultant
Victor Sanvido	vsanvido@southland.com		Team Resource
Tariq Sami Abdelhamid, Ph.D.	tariq@msu.edu	517-884.4557	Team Resource

Section 6: Lean Tools

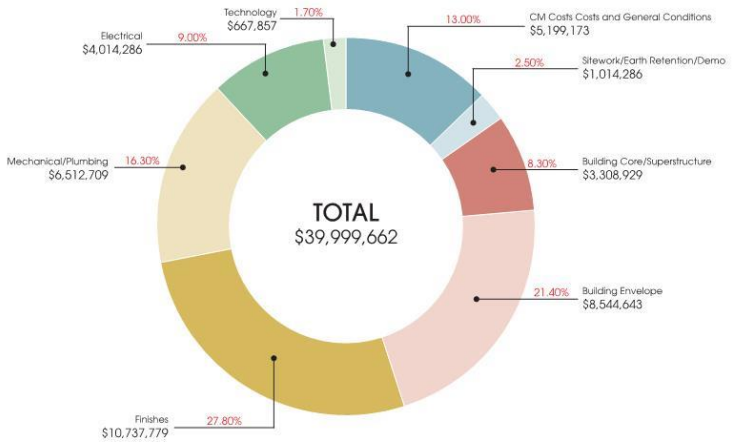
	Item	Primary Owner	Comments	Timing
Validation	Design Pull Planning Session	FTC&H/LMN	Clark to lead and coach the process	Week of 07/13 for kickoff
Validation	TVD		Team to discuss TVD Implementation as it pertains to the validation phase of the project.	
Validation	Cluster Groups		Defined in Section 9	Starting 07/29/2015
Validation	Big Room - Clark Learning Center		Currently investigating. Co-location is not likely. IT priorities need to be discussed.	Starting 07/29/2015
Validation	Team Huddles		Twice a week to line up team efforts and follow up on comments.	
Schematic Design	Pre-Fabrication for increased value			
Schematic Design	DA/DB Trade Partner Procure-ment		Phase 1 trades selected	
Schematic Design	Huddles/Breakouts		Define MSU goals and objectives to move forward.	
Schematic Design	Onboarding of new team members		The LEAN Execution Plan will be utilized during this exercise	
Design Development	DA Trade Partner Procurement		Phase 2 trades selected	
Design Development	Continuous Estimating		Not just takeoffs of design documents	
Design Development				
Construction Documents	Pre-Fabrication for logistics			
Construction Documents	Construction Pull Planning Session			
Construction Documents	BIM for FM applications			
Construction	Pull Planning			
Construction				

* Note: All LEAN tools will have a separate section that will describe them in detail.

Section 7: Target Value Design Approach

Item	Timing
Establish Benchmark Costs	07/27/2015
Project Programming Complete	08/12/2015
Design Activities TBD	
Initial Cluster Group Meetings	07/27 - 09/04
Ongoing Conceptual Design	08/12 - 09/18
Final Cost Validation	09/18/2015
Preparation of Concept Design Packet	09/13 - 10/03
Conceptual Design Complete	10/03/2015

Project Target Cost Estimate $40,000,000



Section 8: Communication Plan

Responsibility	Participants	Frequency & Time
Tuesday Huddle	Tony R., Amr, Rick H., Don L., Robert S.	11:00am weekly
Thursday Huddle	Tony R., Amr, Rick H., Don L., Bobby L., George S., Robert S., Dave Clark	11:00am weekly
Core Group Meetings	Core Group	
SET Meetings	SET	Every 3 weeks
Programming Meetings		Every 3 weeks
Cluster Groups	See Section 9	Starts: 7/29 weekly

Section 9: Cluster Groups

Components	Constraints	Members	1st Meeting
Site		Amr/Tony R., Traci Osman, Rick H., Deb Kinney	7/29/15
Building Superstructure	Rough Building Footprint	Amr/Tony R., Rick Sageman, Bobby L.	7/29/15
Mechanical & Plumbing		Amr/Tony R., Mark C., Pat O., Phuong N., Stacey N.	7/29/15
Electrical		Amr/Tony R., Tom M., Mike S., Ken B.	7/29/15
Building Envelope		Structural, Arch, Mech., Clark, Owner's Rep.	+/- 8/20
Finishes		Arch., Clark, Owner's Rep.	+/- 9/1
Technology		Arch., Sexton, Clark, Owner's Rep.	After 10/1

Section 10: Measurables

1. # of RFIs
2. Value Log
3. Schedule (Early Completion)?
4. Planned vs. Actual (Spending/Schedule)
5.
6.

Section 11: Management Groups

Core Group (CG)

MSU

- Amr Abdel-Azim
- John Wagner
- David Frayer
- Tony Rhodes

FTCH+LMN

- Dan Launstein or Dave Clark
- Robert Smith or George Shaw

Clark Construction

- Rick Hutter
- Bobby LaLonde
- Mark Crawford
- Vivian Leung
- Jack Mumma
- Tony Rhodes
- Lisa Sudia
- John Wagner
- Leisa Williams-Swedberg

FTCH+LMN

- Dave Clark
- Dan Launstein
- Robert Smith
- George Shaw

Clark Construction

- Bobby LaLonde
- Rick Hutter

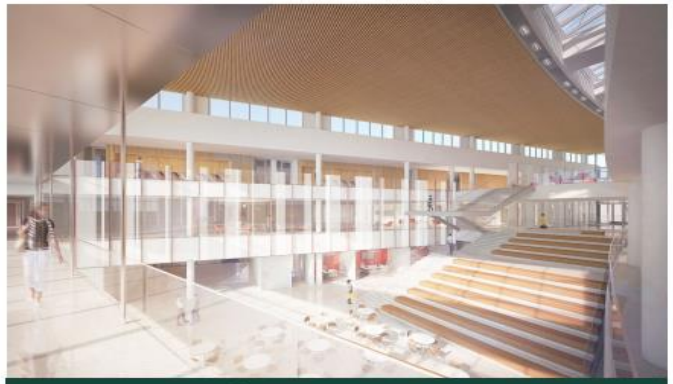
Senior Executive Team (SET)

MSU

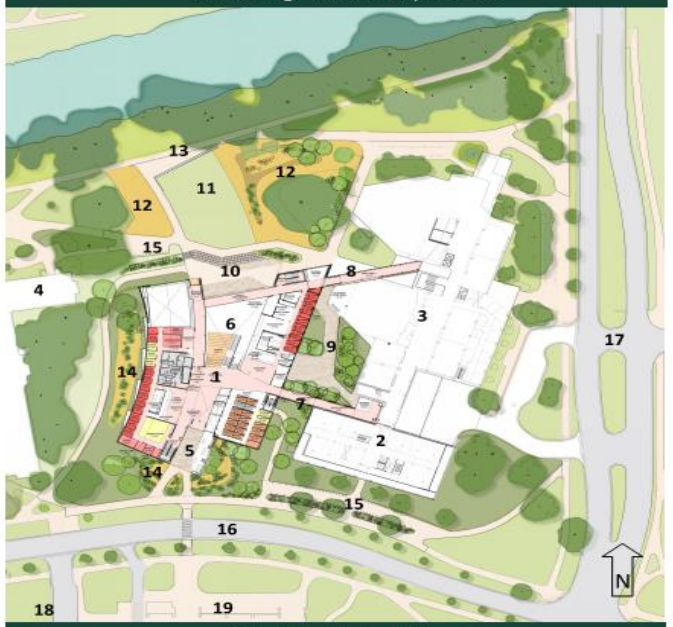
- Amr Abdel-Azim
- Linda Boomer
- Cheri DeClerq
- Dave Frayer
- Sanjay Gupta
- Susan Haka
- Jeff Kacos
- Deb Kinney

Project Summary *for the* MSU Broad College of Business Pavilion

December 9, 2016



Rendering · Atrium Experience



Site Plan / Floor Plan

CURRENT SCORE · 68 (GOLD)

LEED Expectations Gold

30% Targeted Minimum Annual Energy Savings

SITE / BUILDING LEGEND

1. BUSINESS PAVILION
2. EPPLEY BUILDING
3. NORTH BUSINESS COMPLEX
4. SHAW HALL
5. PAVILION ENTRY PLAZA
6. PAVILION ATRIUM
7. SOUTH CONNECTOR
8. NORTH CONNECTIOR
9. INTERIOR COURT
10. NORTH TERRACE
11. GREAT LAWN
12. MEADOW
13. RIVER WALK
14. STORMWATER LANDSCAPE
15. BIKE PARKING
16. SHAW LANE
17. BOGUE STREET
18. SHAW RAMP
19. COLLEGE OF LAW

- ◊ EFFICIENT DISPLACEMENT VENTILATION HVAC SYSTEMS
- ◊ HIGH PERFORMANCE BUILDING EVELOPE
- ◊ LED LIGHTING - SITE AND BUILDING
- ◊ DAYLIGHTING
- ◊ STORMWATER QUALITY LANDSCAPE FILTERING
- ◊ LOW VOC BUILDING PRODUCTS
- ◊ CONSTRUCTION WASTE MANAGEMENT

Project Description

This project will redefine MSU's Broad College of Business identity by providing a new 100,000 square foot pavilion located at the Business College Complex site. The new pavilion will house a variety of classroom types, teaching labs, program offices, career management offices, interaction spaces, multi-purpose spaces, and amenity spaces creating a new nexus for the College in support of its mission, culture, and goals. This new facility will improve the recognition, recruitment, and rankings of the Business College and the University.

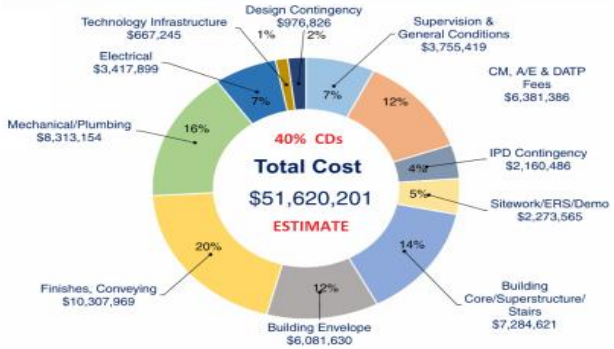
Integrated Project Delivery

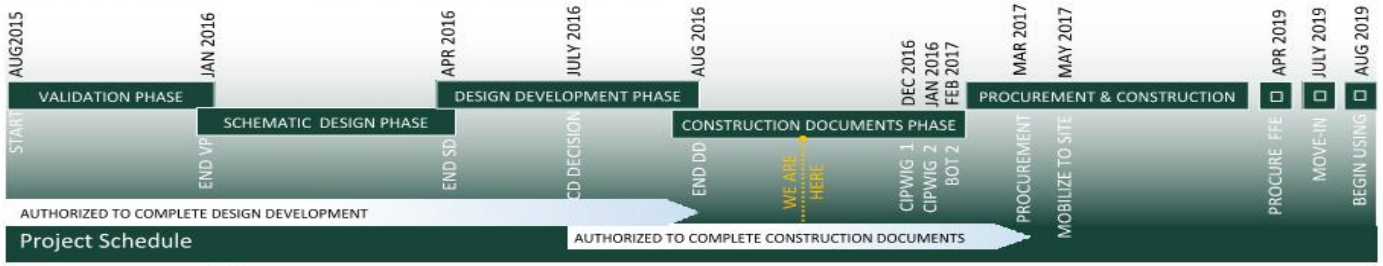
The University is planning to deliver this project using an Integrated Project Delivery (IPD) contract which encourages collaboration between the client, design team, and construction team throughout the design and construction process and leverages lean construction techniques to deliver enhanced project value.

Project Conditions of Satisfaction (at end of validation phase)

- Provide an iconic design embodying the "Spartan" ethos.
- Deliver this project for $62 million total project budget.
- Turnover building to MSU including certificate of occupancy on July 2019.
- Project to be a minimum of certified LEED silver, version 3-(2009).

Construction Cost Estimate





Project Schedule

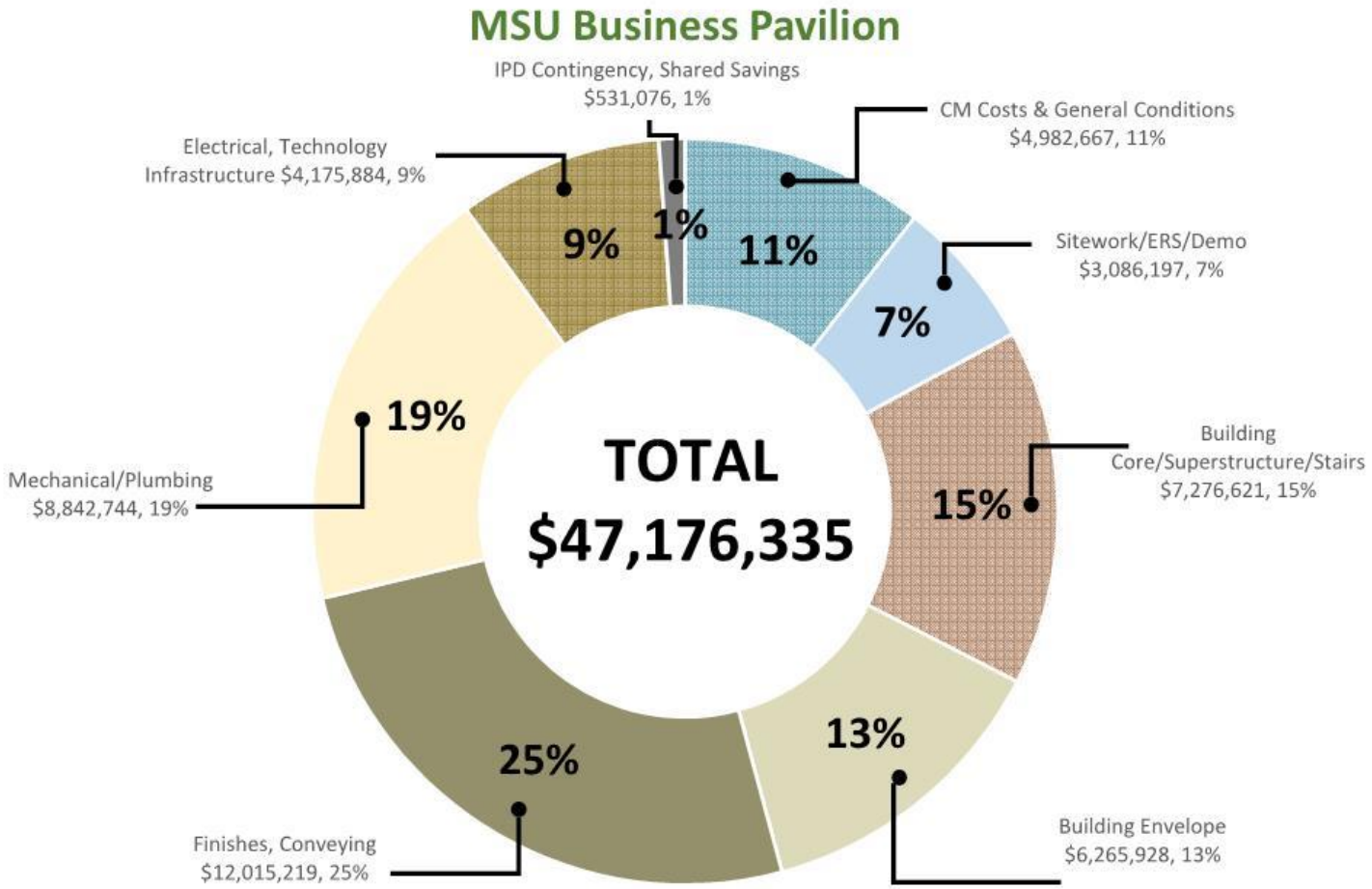
FTCH + LMN

MICHIGAN STATE UNIVERSITY

CLARK Construction Company

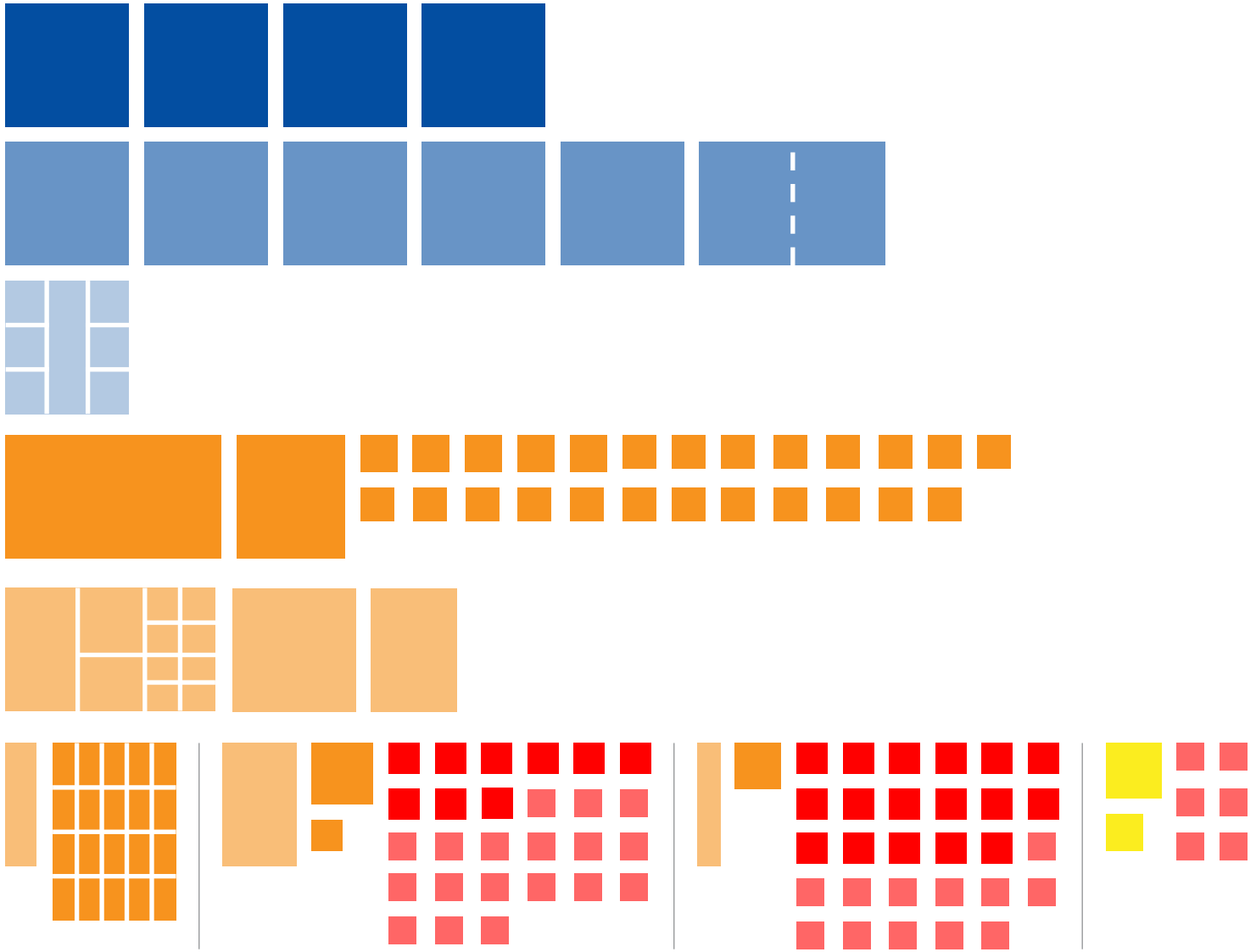
MSU · Clark Construction · FTCH · LMN Architects · Olin Studio · Sextant Group · HLB Lighting · Catalyst Partners · CodeSource · Bob Pielow · John E Green · Superior Electric · BCI ·Douglas Steel · Glazing Solutions Inc · Architectural Metals Inc · Davenport Masonry · Michielutti Brothers · Couturier Iron Craft · Egg Office

TARGET COST
Construction Contract Breakdown



Spreadsheet Level	Takeoff Quantity	Total Cost/Unit	Total Amount
2 Site Utilities			
G3010 Water Supply			
2615.00 Pipe - Ductile Iron			
8" Class 53 DIP-Water Main	396.00 lnft	70.00	27,720
Tapping Sleeve & 8" Valve in Well	1.00 each	1,600.00	1,600
Earth Retention - Allowance	1.00 allw	100,000.00	100,000
Pipe - Ductile Iron			129,320
2668.00 Distrib Line- Reg. Water			
Water Meter Relocation	1.00 each	4,725.00	4,725
Distrib Line- Reg. Water			4,725
G3010 Water Supply	**143,130.00 SF**	**0.94**	**134,045**
G3020 Sanitary Sewer			
2620.10 Pipe - Waste WaterCollect			
12" Sanitary Sewer SDR 23.5	568.00 lnft	90.00	51,120
Pipe - Waste WaterCollect			51,120
2726.00 Drainage Site Manholes			
Sanitary Tie-in	2.00 each	2,750.00	5,500
Sanitary Manhole	4.00 each	2,750.00	11,000
Drainage Site Manholes			16,500
G3020 Sanitary Sewer	**143,130.00 SF**	**0.47**	**67,620**
G3030 Storm Sewer			

Program



- **4 Tiered Case-Study Classrooms**

- **7 Flat Flexible Classrooms**
  2 Joined, 1 REAL Classroom

- **Team Effectiveness Lab**

- **Multi-Purpose Room**
- **MBA Lounge**
- **25 Team Rooms**

- **Informal Seating Areas**
- **Student Lounge**
- **Cafe Seating**

- **Interview Suite**
  20 Study Rooms
- **Career Management Suite**
- **Graduate Program Offices Suite & Center of Centers**
- **Media Studio**

Sustainability

- LEED Gold target
- Rain gardens for stormwater quality
- Low-intensity, irrigation-free landscaping
- All LED lighting
- Daylight harvesting
- Enhanced envelope insulation
- Enhanced envelope air tightness
- Efficient mechanical systems with heat recovery
- Low-flow plumbing fixtures
- Locally-sourced materials
- Low-VOC materials

LEED GOLD

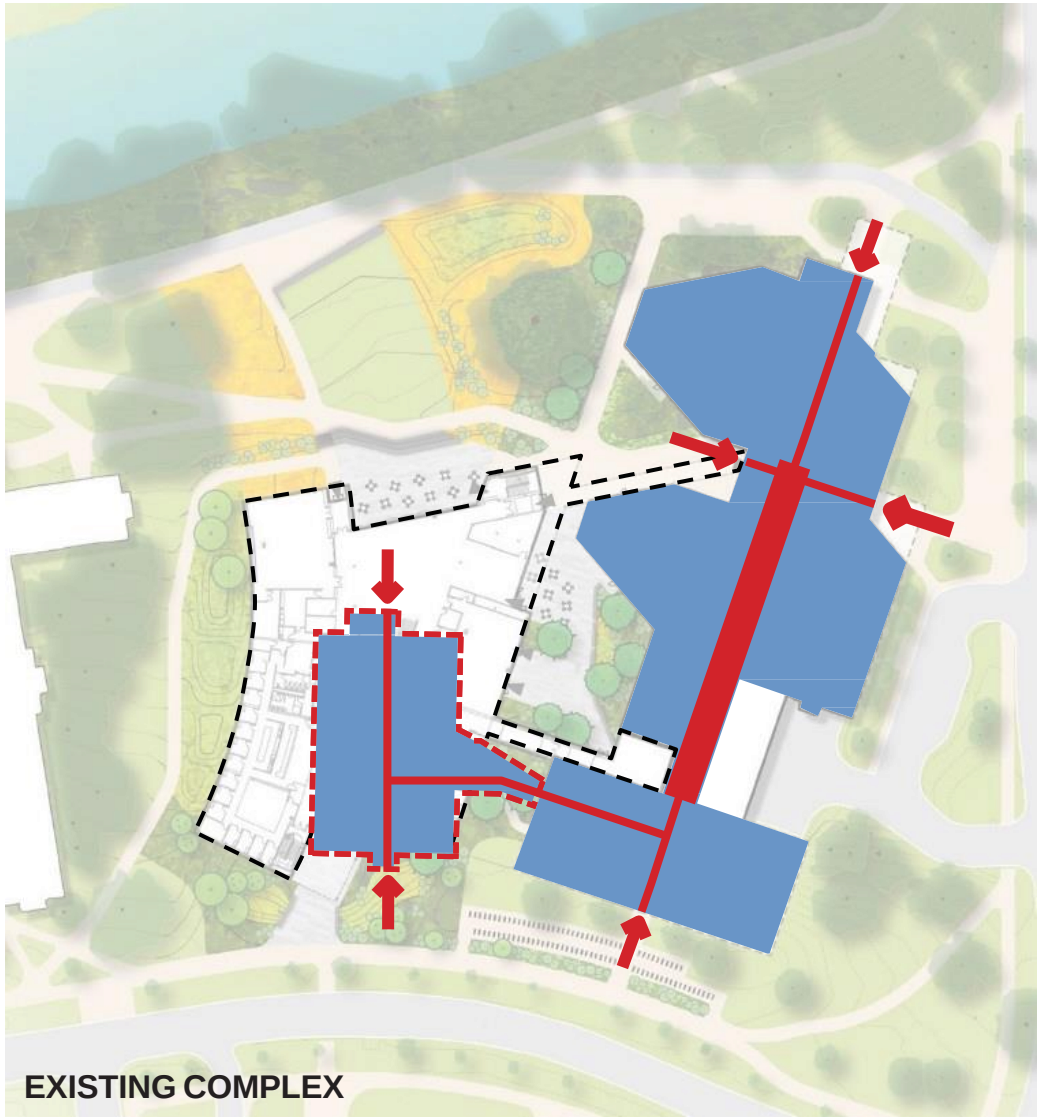
34%

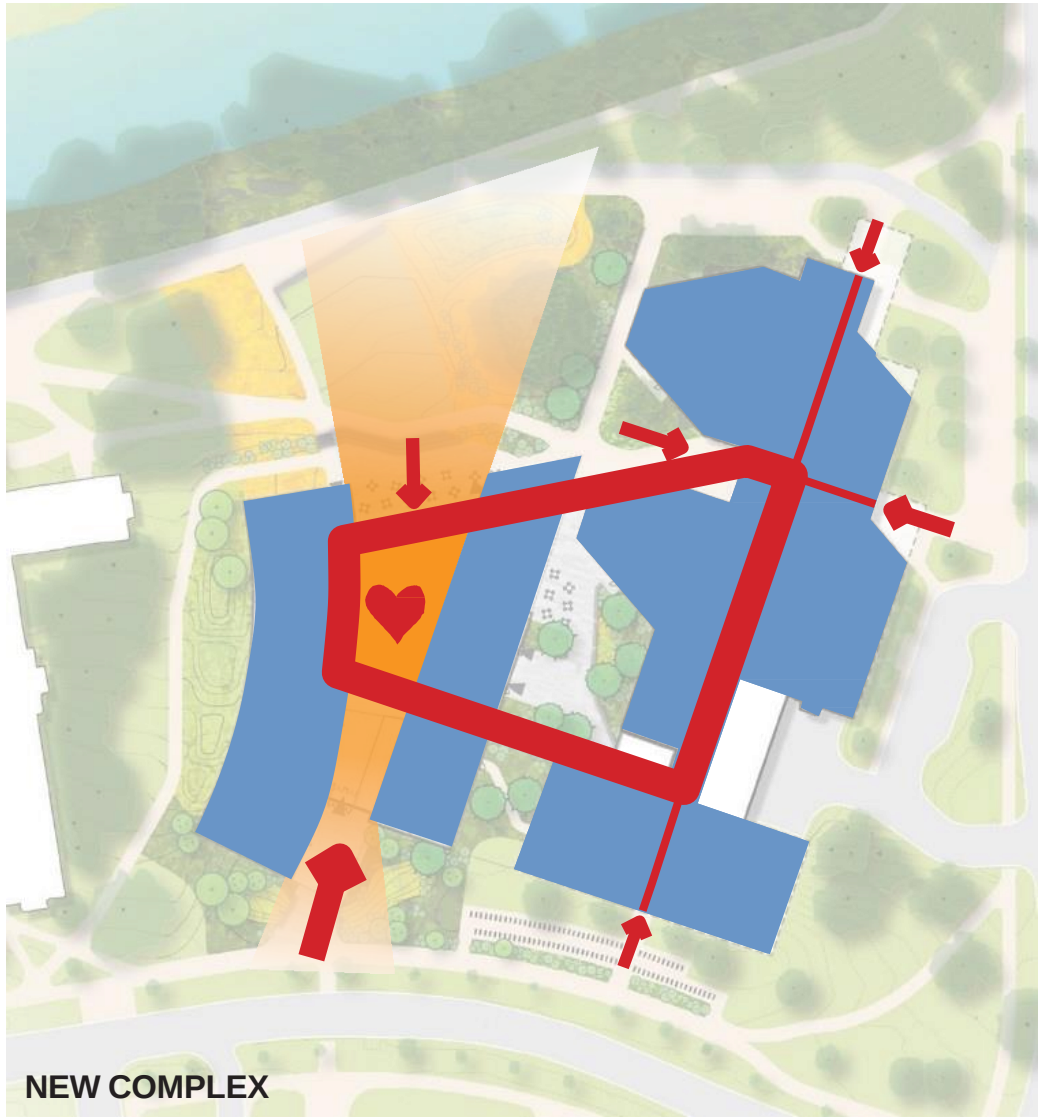
ENERGY REDUCTION

100%

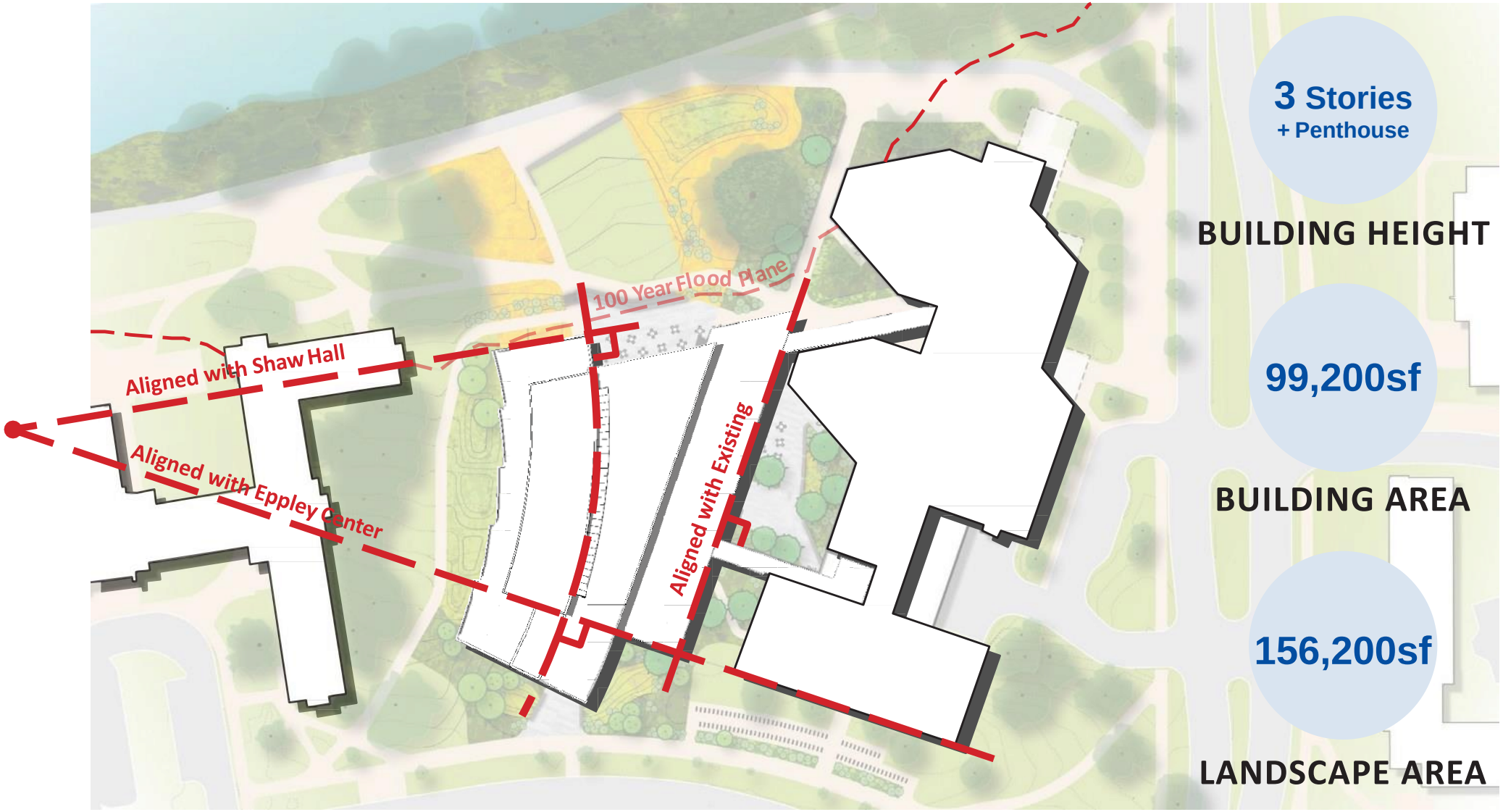
STORMWATER TREATED ON SITE

Design Concept



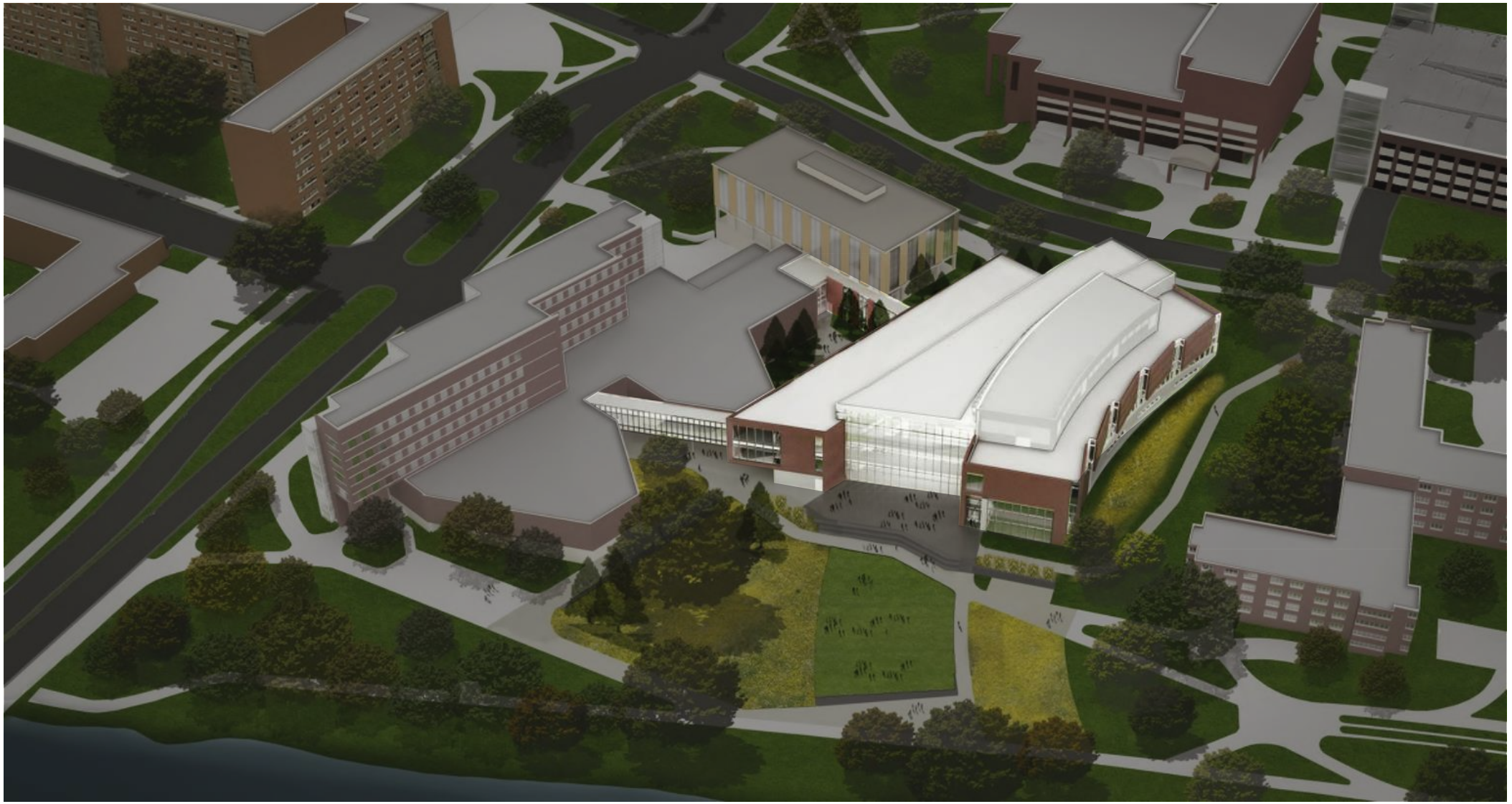


Building Alignment and Massing



Site Design

Building Massing



Landscape Areas

SOUTH ENTRY

GREAT LAWN

NORTH TERRACE

GARDEN COURTYARD

South Elevation

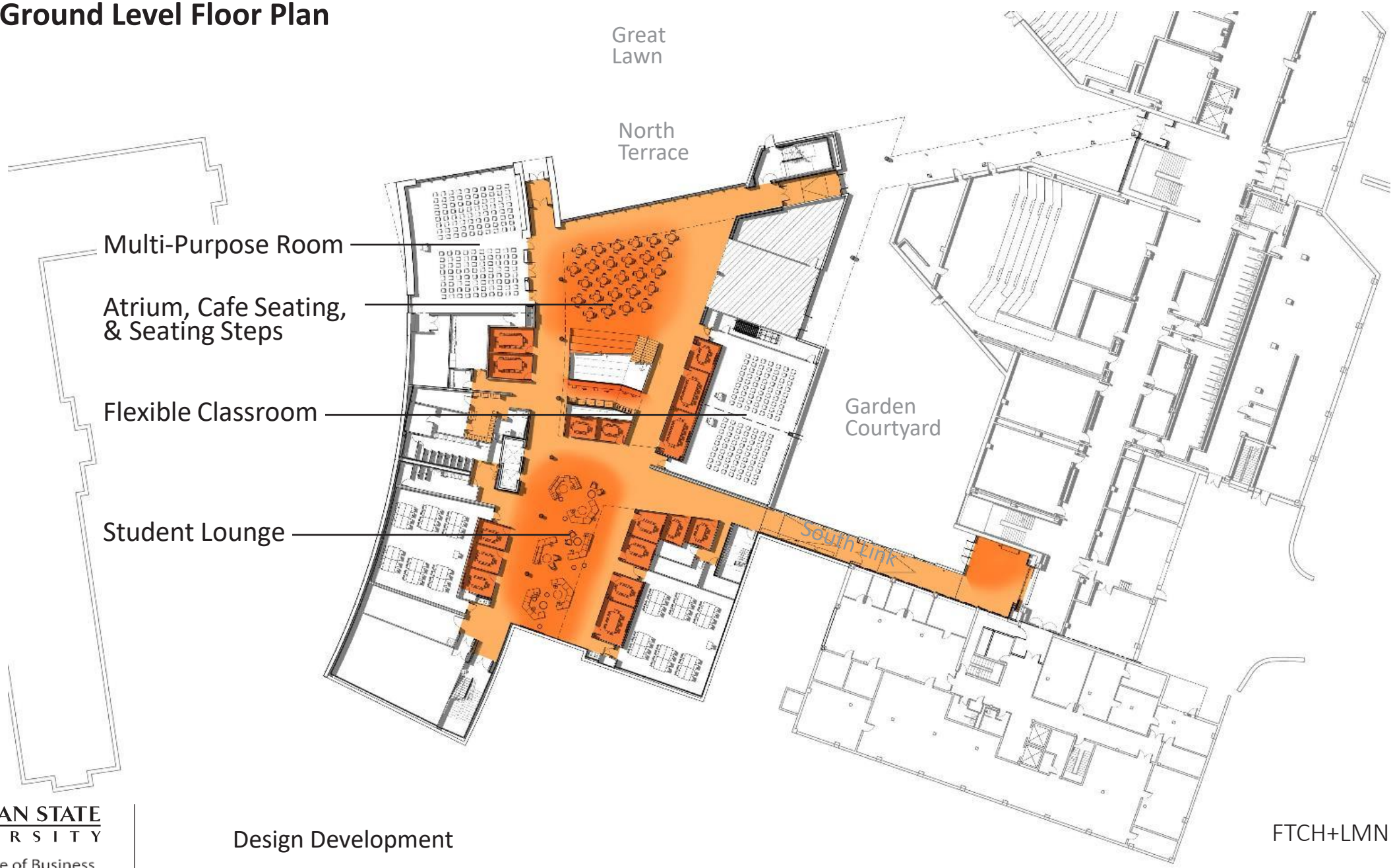
South Elevation

North Elevation

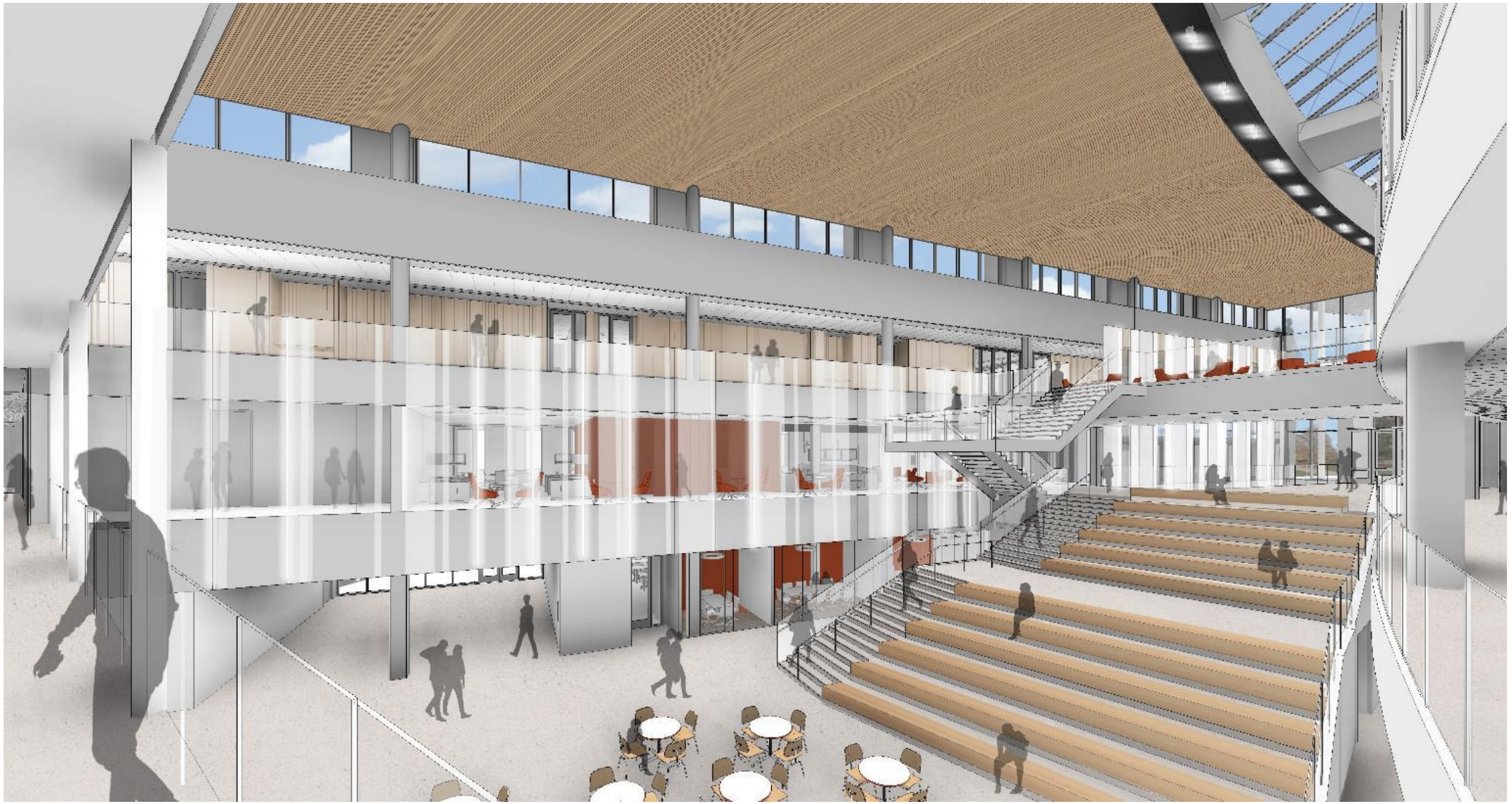
North Elevation

Garden Courtyard

Ground Level Floor Plan

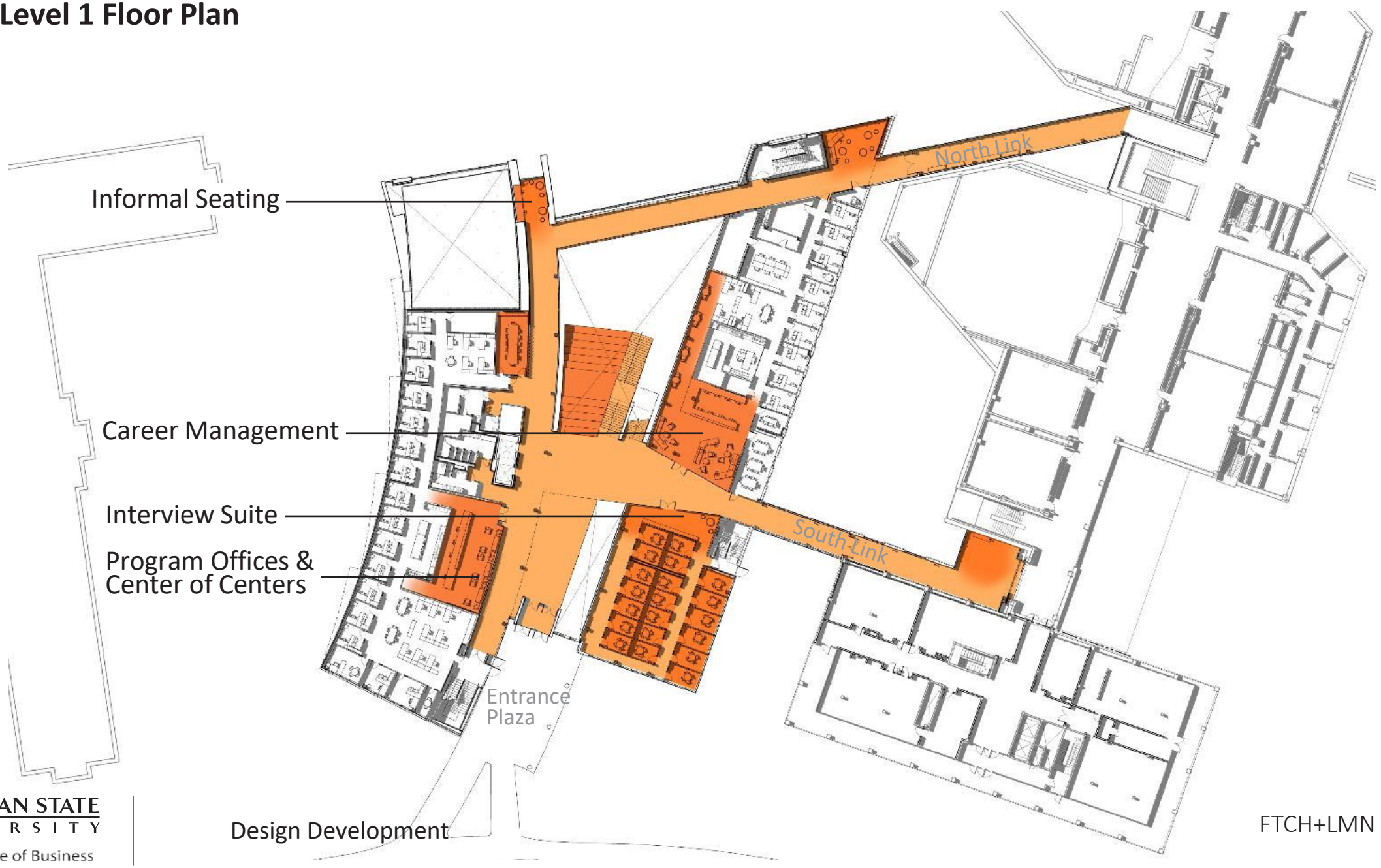


Atrium, Cafe Seating, & Seating Steps



Atrium, Cafe Seating, & Seating Steps

Level 1 Floor Plan



Interior Renderings - Classrooms

TIERED CLASSROOM

FLAT CLASSROOM

FLEX CLASSROOM (DIVIDED)

FLEX CLASSROOM (OPEN)

Level 2 Floor Plan

Interior Materials

Coordinated Furniture

Acoustic Ceilings

Integrated Lighting

Glass

Acoustic Wood Slats

Terrazzo

Metal Panels

Carpet Tiles

REFLECTION

- Questions

MICHIGAN STATE
UNIVERSITY
Broad College of Business

Broad College of Business

Business Pavilion

MICH
UNI
Broad C

FTCH+LMN

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هيئة الأشغال العامة
Public Works Authority

ASHGHAL
قطر تستحق الأفضل
Qatar Deserves The Best

Strategic Partner

Translating IPD: The Canadian Experience

Angelo Presta
Mark Breslin
Duncan Broyd
Geza Banfai
Moderated by Dick Bayer