ASSOCIATION OF
Texas College & University Facilities
PROFESSIONALS

Managing Metamorphosis. Building for Change

SESSION 100104

DATE Wednesday, October 1, 2014

TIME 1:00 pm – 3:00 pm

CONTINUING EDUCATION AIA

ASSOCIATION OF
Texas College & University Facilities
PROFESSIONALS

Managing Metamorphosis. Building for Change

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services may be addressed at the conclusion of this presentation.

CONTINUING EDUCATION AIA

Innovating with Limited Resources at The University of Texas at Austin

RICK ARCHER | PRINCIPAL, OVERLAND

JIM TAYLOR, AIA, MBA, LEED AP | CONSULTING ARCHITECT

MICHAEL UYEDA | SENIOR PROJECT MANAGER, UT OFPC

ERIC KENNEDY | OPERATIONS MANAGER, SPAWGLASS

College of Liberal Arts Building

Rick Archer

2 Phase Project

Partnering Agreement

A Building of Ideas:
The New College of Liberal Arts Building

University of Texas at Austin
December 15, 2010

Partnering Agreement

GOALS FOR THE PROJECT

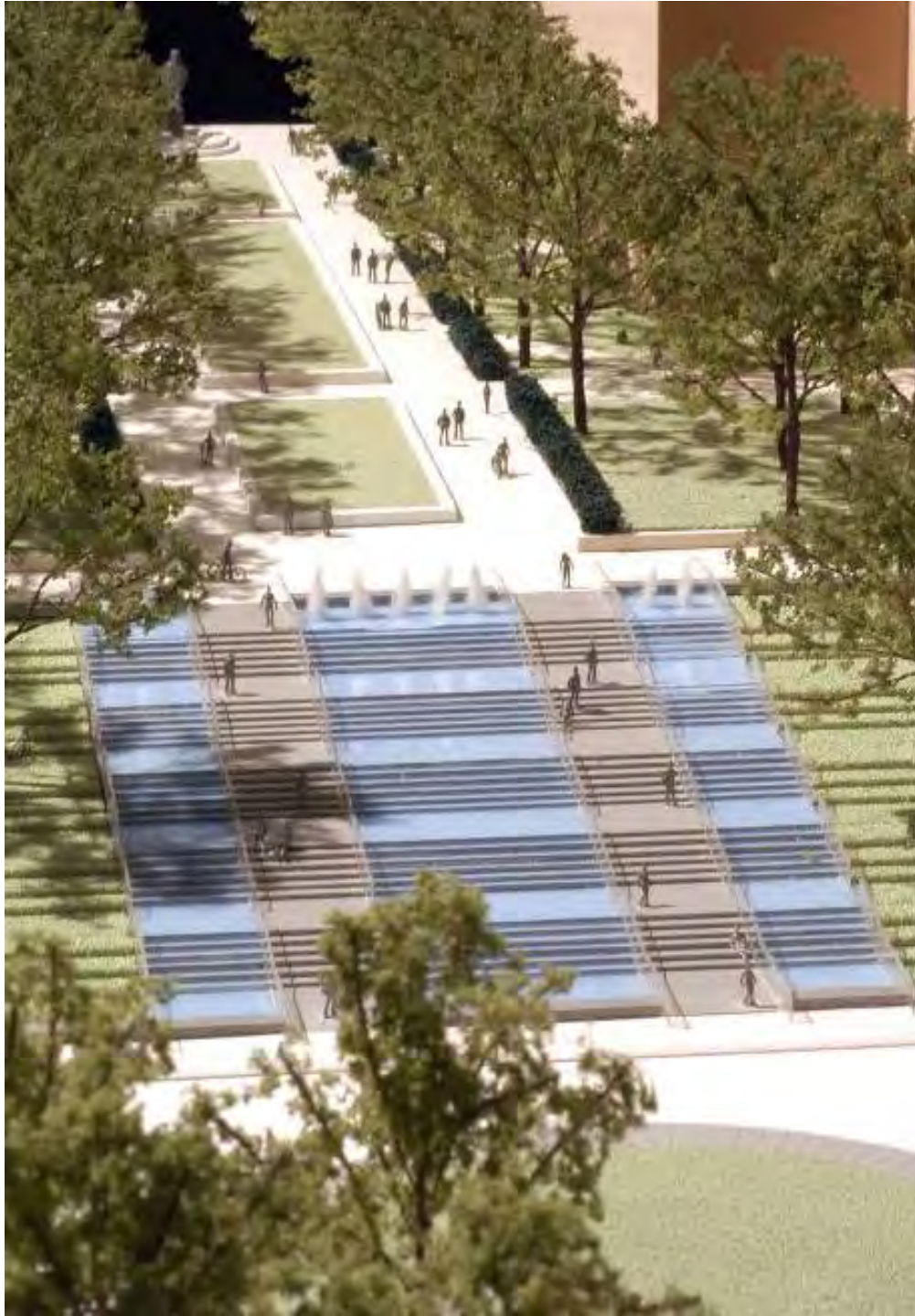
1. TEAMWORK - BUILD ON TRUST SO EVERYONE SUCCEEDS
2. BEGIN W/ END IN MIND - ON BUDGET, ON TIME, EXCELLENT QUALITY
3. OPTIMIZE CA SUPPORT FROM ALL PARTIES
4. COMMUNICATE - LISTEN; UNDERSTAND WHY; BE HONEST
5. SET STANDARD FOR BIM AT UT
6. HAVE FUN! BECOME EVEN BETTER FRIENDS
7. REMEMBER LIBERAL ARTS IS THE ULTIMATE CUSTOMER
8. MODEL SUSTAINABILITY
9. PLAN FOR SAFETY - GOLD STEP AWARD
10. DO THE NEXT JOB TOGETHER!

SIGNED

Original Campus Masterplan

Campus Context

Landscape Masterplan

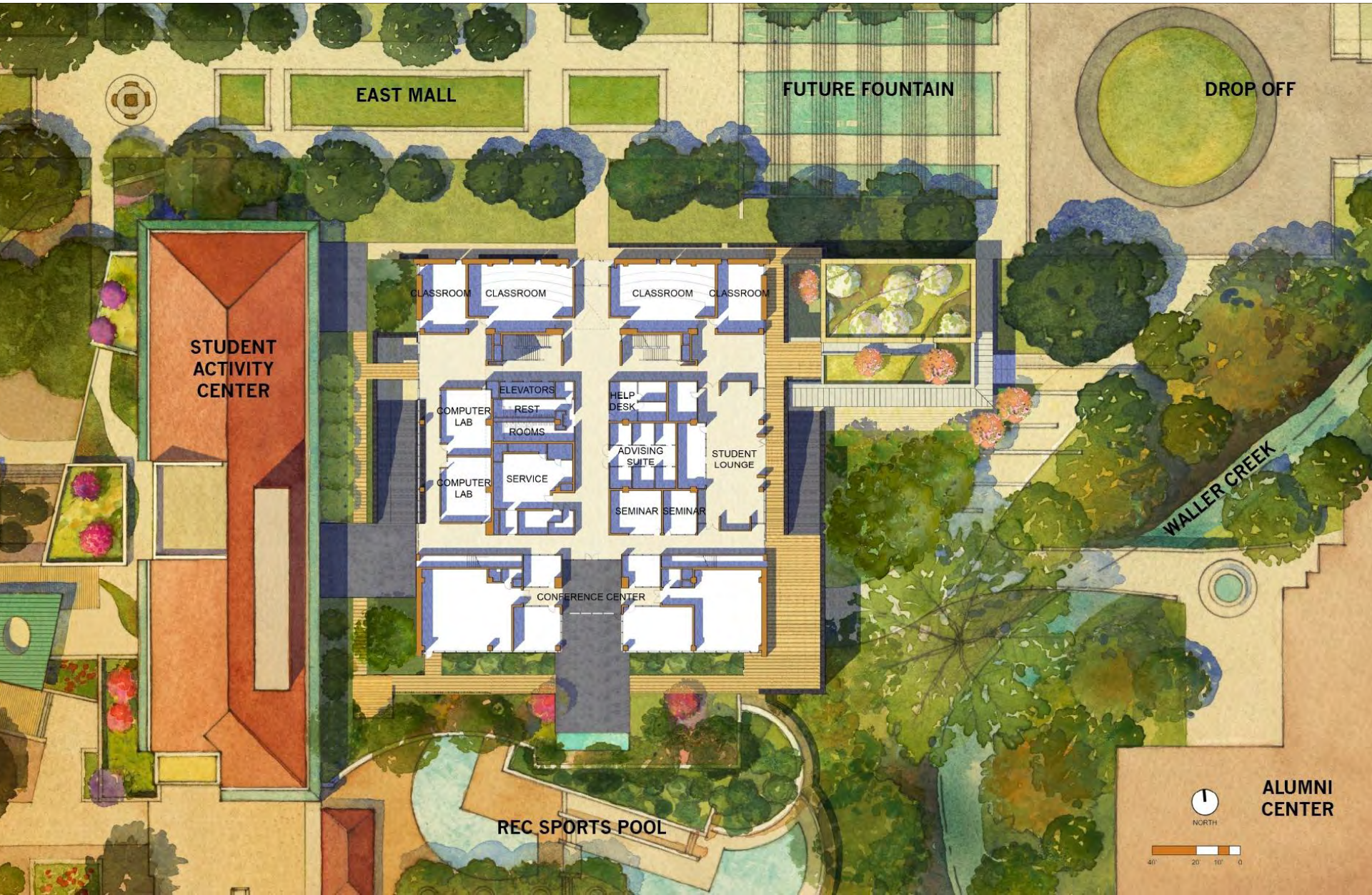


Site Context

Site Context

Site Context

Site Plan


EAST MALL
FUTURE FOUNTAIN
DROP OFF
STUDENT ACTIVITY CENTER
CLASSROOM
CLASSROOM
CLASSROOM
CLASSROOM
ELEVATORS
REST ROOMS
HELP DESK
COMPUTER LAB
COMPUTER LAB
SERVICE
ADVISING SUITE
STUDENT LOUNGE
SEMINAR
SEMINAR
CONFERENCE CENTER
WALLER CREEK
REC SPORTS POOL
ALUMNI CENTER
NORTH
40'
20'
10'
0

Guiding Principles

Key to college's future - excellence, ease space shortage, allow growth.

Maximize programmable space within budget. Optimize footprint.

Balance quality and efficiency. Students and taxpayers footing bill.

Encourage interaction among Liberal Arts students and **foster community.**

Easily modified for changing priorities of college and needs of departments.

Research facilities for flexibility and growth to enhance **faculty recruitment.**

Shared spaces across departments.

Goals

Contracted

200,000 GSF
60% Efficient (120,000 NSF)
LEED Silver
Summer 2013 Completion
$100 Million Total Project Cost

Results

Delivered

212,000 GSF

68% Efficient (144,000 NSF)

LEED Gold (2 points from Platinum)

Fall 2012 Completion

$85 Million Total Project Cost

AIA Design Award Winner

Innovative Funding Strategies

Michael Uyeda

Available Funding Sources

- Permanent University Fund (PUF)
- Tuition Revenue Bonds (TRB)
- Revenue Finance System Bonds (RFS)
- Gifts and Donations
- Available University Funds
- Unexpended Plant Funds
- Designated Funds
- Interest on Local Funds
- Auxiliary Enterprises Balances
- Higher Education Assistance Fund
- FEMA

Funding of The College of Liberal Arts Building

Original Funding Model

RFS	$60,000,000
Gifts	40,000,000
Total Project Cost	$100,000,000

Final Funding Model

RFS	$59,420,000
Gifts	5,280,000
Designated Funds	17,000,000
Available University Funds	2,000,000
Unexpended Plant Funds	12,000,000
Total Project Cost	$95,700,000

So… for Liberal Arts

$42,000,000 in RFS Bond debt paid from Liberal Arts operations

How?

- Consolidate Liberal Arts departments in CLA
- Defer Departmental Expenditures
- Reduction in Force (RIF)
- Reduce Cost of CLA project

And Liberal Arts…

- Became more empowered to make rapid decisions
- Became motivated and focused on cost efficiency
- Focused on value vs quantity
- Supported innovative design for cost efficiency
- Pushed to finish project ahead of schedule
- Performed a 10% Reduction in Force (RIF)

Funding of The College of Liberal Arts Building

Results

RFS (Liberal Arts funded)	$42,000,000
RFS (Campus funded)	17,420,000
Gifts	5,280,000
Designated Funds	17,000,000
Available University Funds	2,000,000
Unexpended Plant Funds	12,000,000
Total Project Cost	$95,700,000

Current Unexpended Funds to be returned to Campus	$ 7,535,000
Total Project Cost Trend	$ 88,165,000

Project finished 5 months ahead of schedule.

Collaborative Process / Innovative Design

Jim Taylor

Build a Better Project and a Better Bottom Line

U.S. GREEN BUILDING COUNCIL
LEED GOLD
USGBC

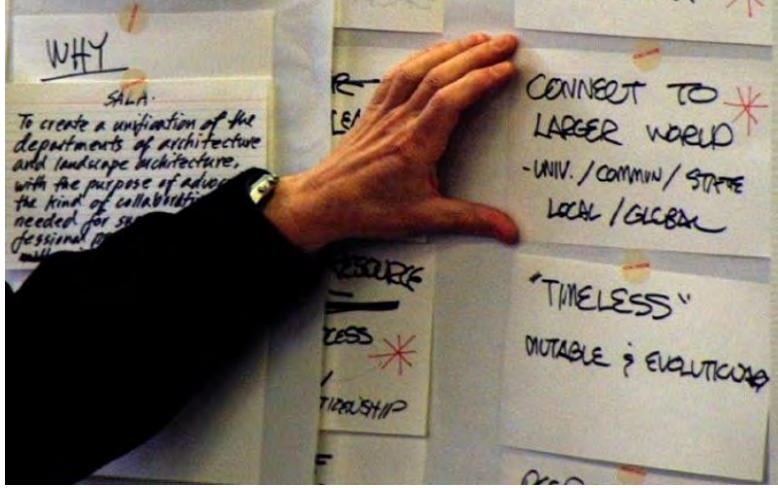
Collaborative Process

First, Design the Design Process

UNDERSTAND
- Use words, images, metaphors

EXPLORE
- Use metaphors, drawings, models

DECIDE
- Use drawings, models, numbers



Think well to the end. Consider the end first.

– Leonardo da Vinci

Mission

Build a highly **flexible** and **efficient** new center of life for the students, staff, and faculty of the College of Liberal Arts.

Integrate multiple programs, centers, and departments, each with its own identity, in a **collaborative and engaging environment**.

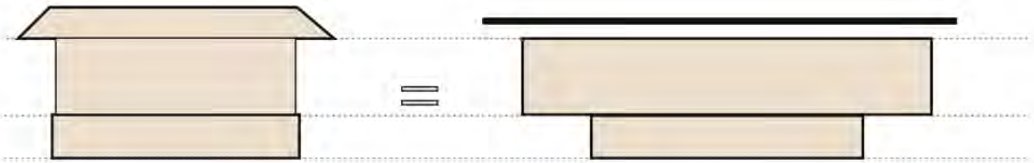
Create spaces that promote the exchange of ideas, facilitate teaching and innovation, foster interdisciplinary research, and **adapt to change** over the long life span of the building.

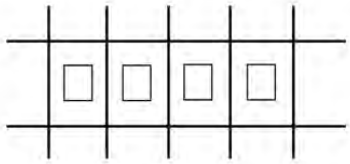
Context

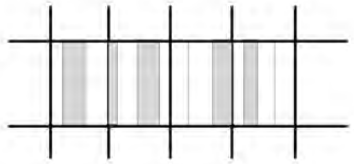
Massing & Facade











Context

Material & Color Palette

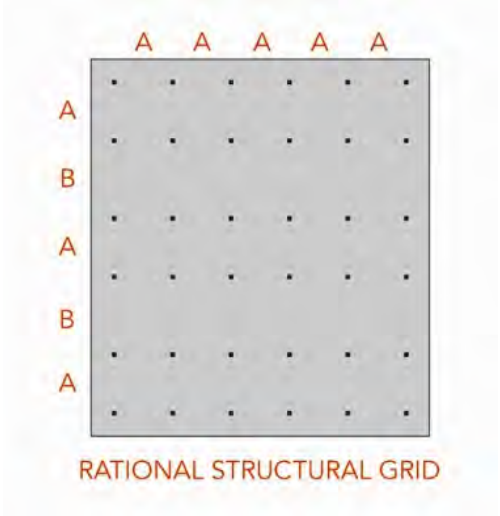
COLOR SAMPLING OF CAMPUS BUILDINGS

AND ANDREWS DORMITORY
BTL BATTLE HALL
BEN BENEDICT HALL
BIO BIOLOGICAL LABORATORIES
CBA MCCOMBS SCHOOL OF BUSINESS
CAL CALHOUN HALL
CRD CAROTHERS DORMITORY
GAR GARRISON HALL
LTD LITTLEFIELD DORMITORY
MAI MAIN BUILDING

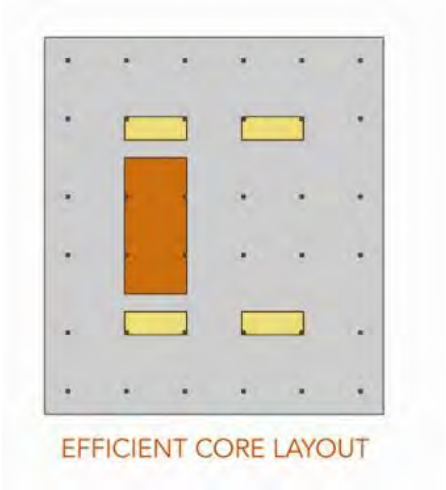
Context

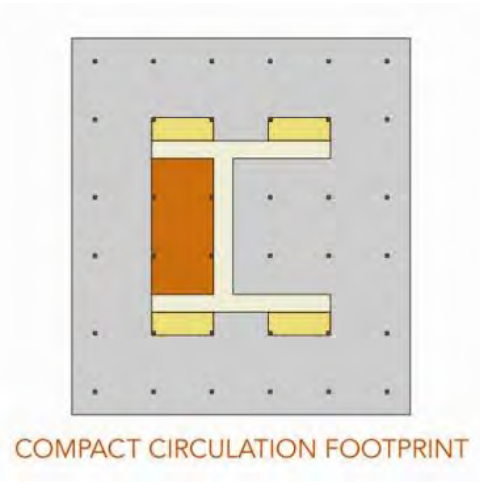
Image & Result

Innovative Design

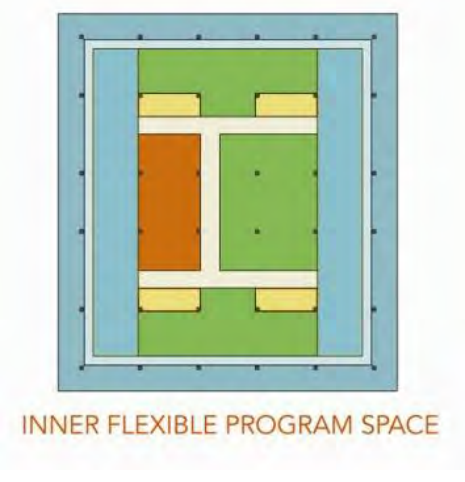


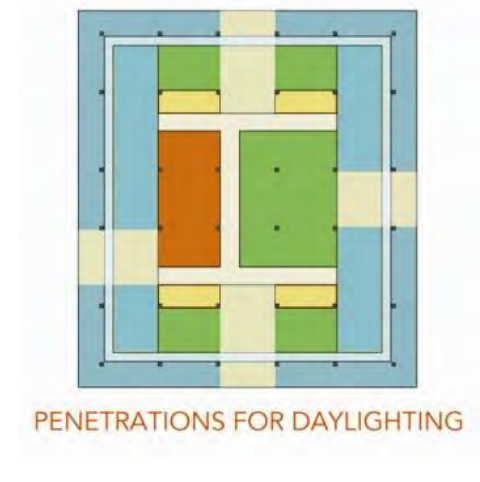
RATIONAL STRUCTURAL GRID


EFFICIENT CORE LAYOUT


COMPACT CIRCULATION FOOTPRINT

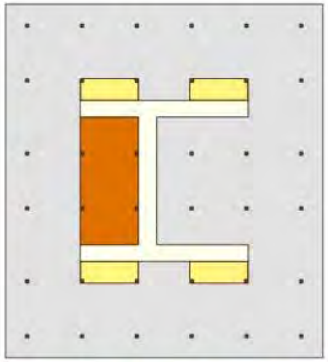

OUTER FLEXIBLE OFFICE RING


INNER FLEXIBLE PROGRAM SPACE

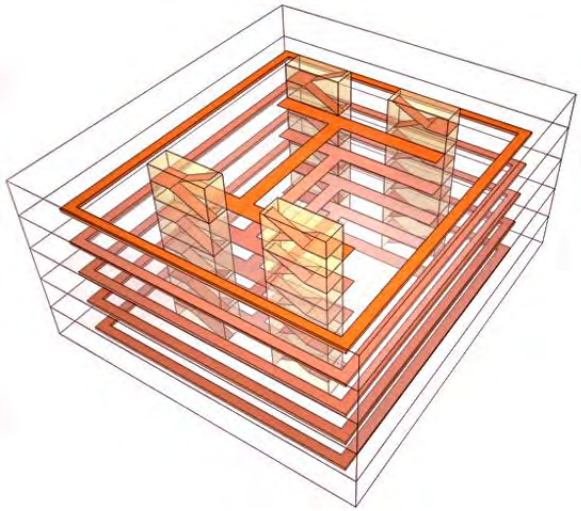

PENETRATIONS FOR DAYLIGHTING

Efficiency

Grid: Core: Circulation

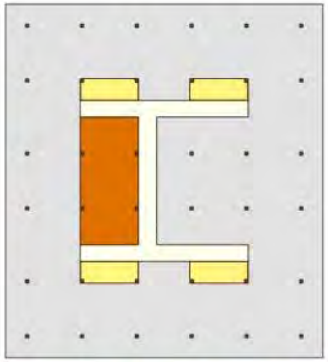


COMPACT CIRCULATION FOOTPRINT

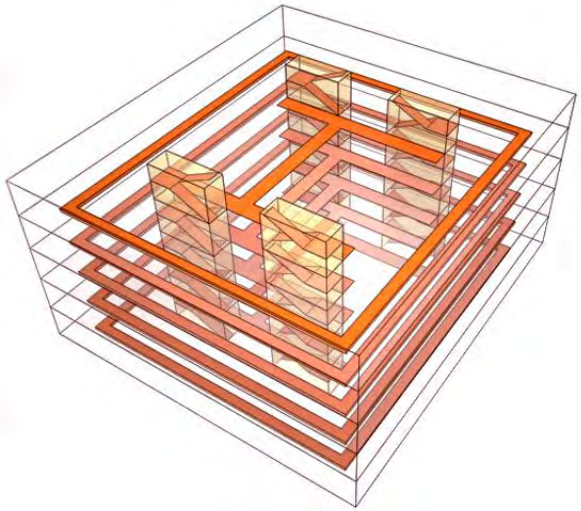


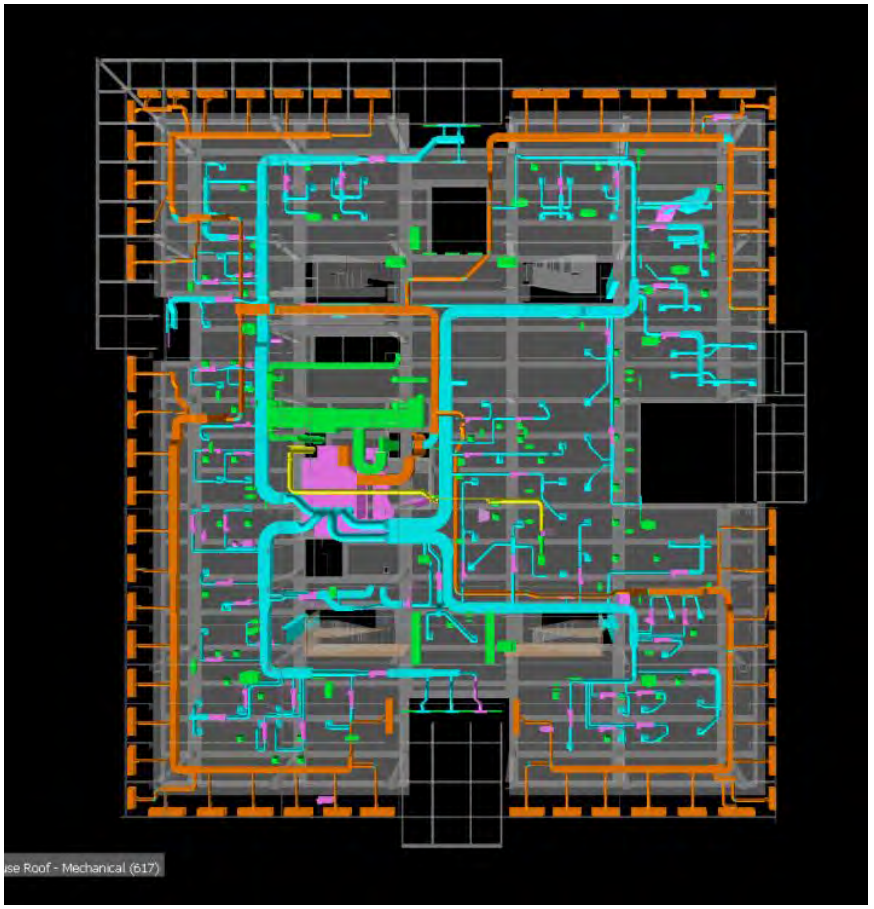
Efficiency

Grid: Core: Circulation



COMPACT CIRCULATION FOOTPRINT

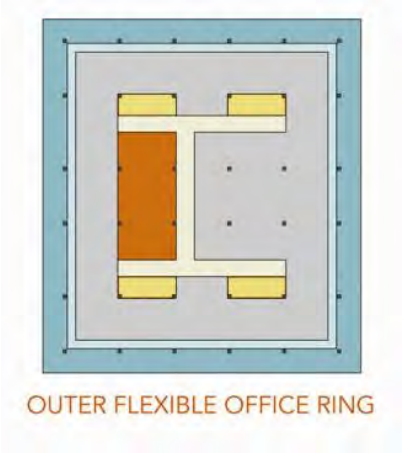


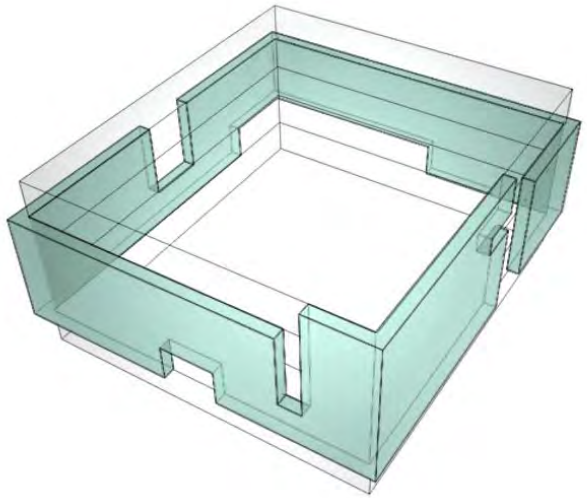


Level 2 – HVAC Circulation

Flexibility

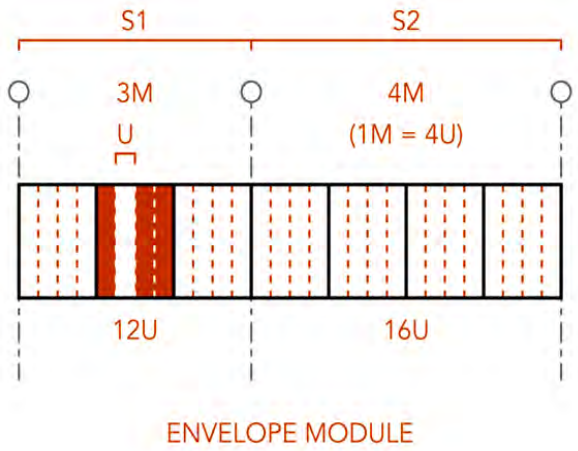
Office Layout



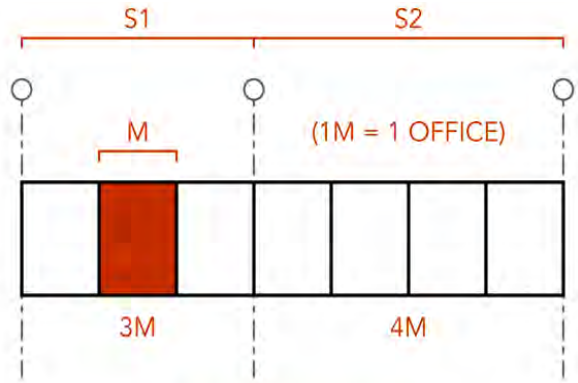


Flexibility

Office Layout



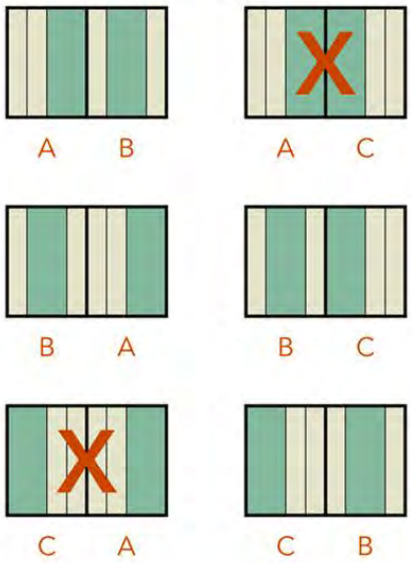
ENVELOPE MODULE



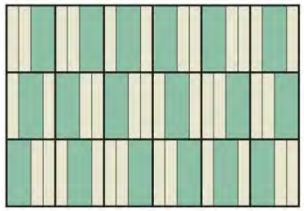
PLANNING MODULE

Flexibility

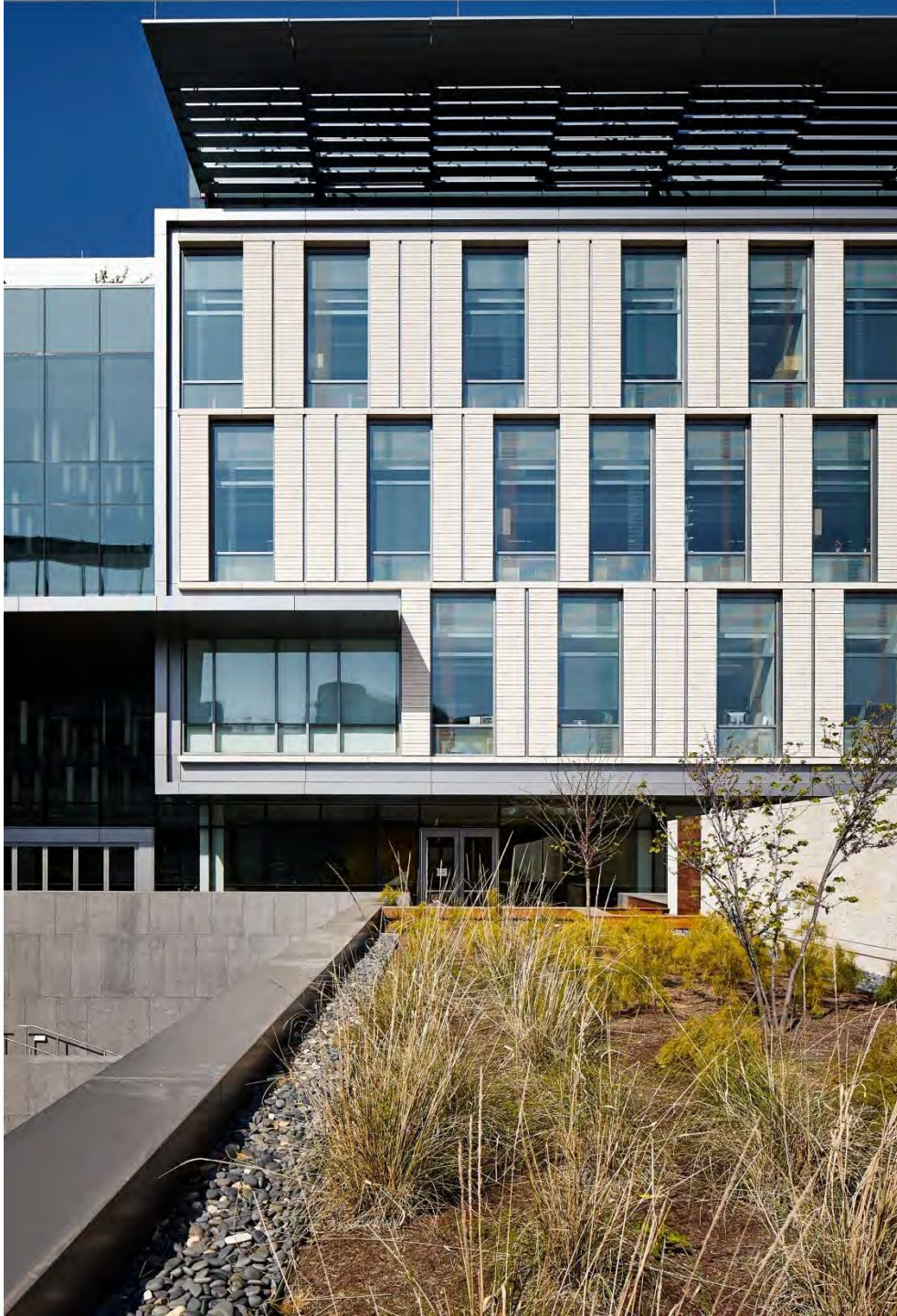
Office & Façade Layout



ADJACENCIES



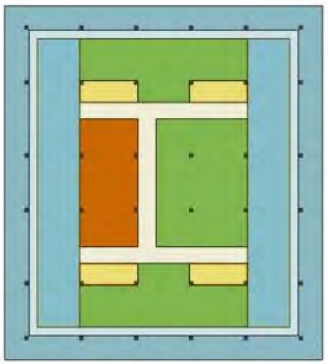
TILING



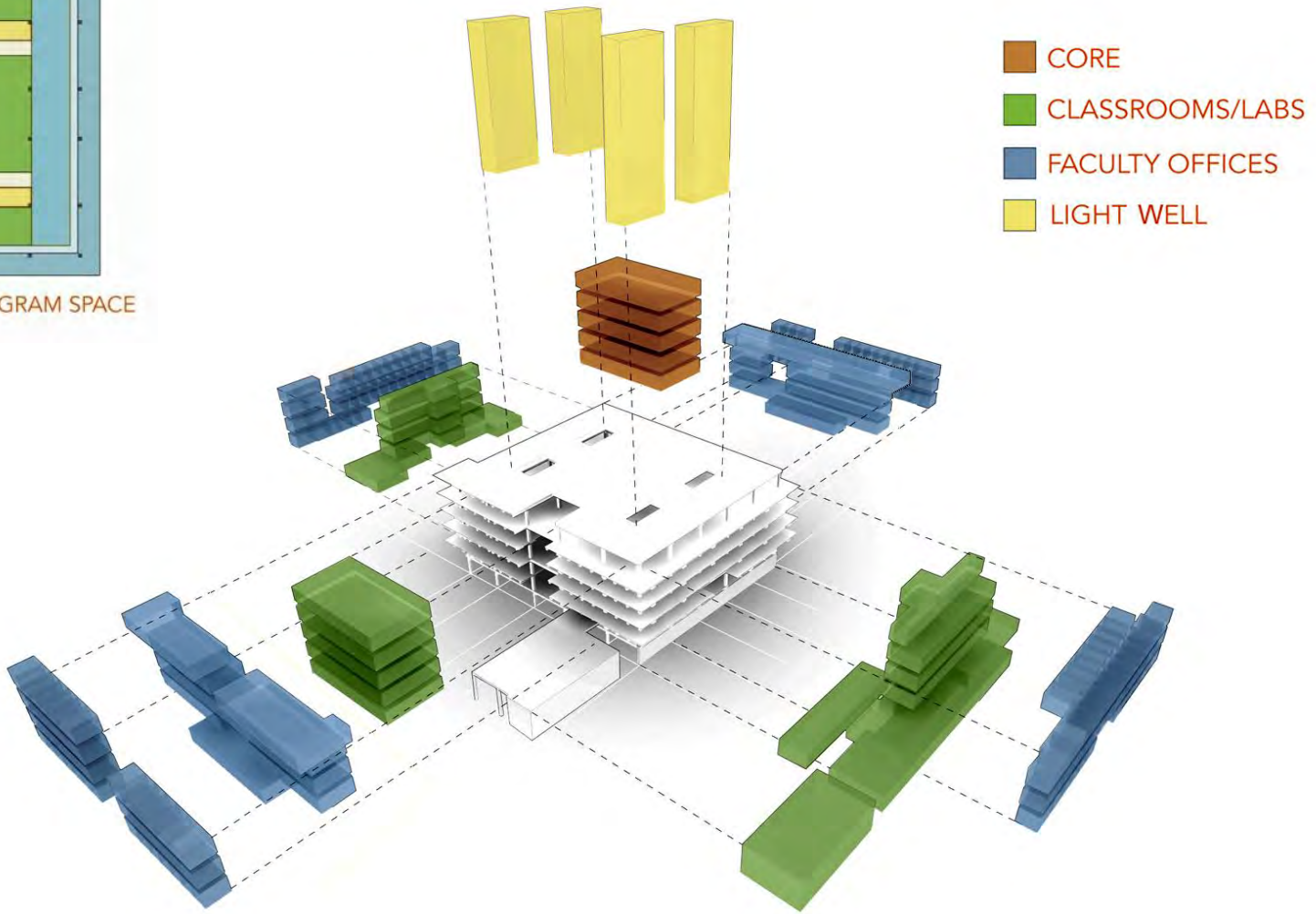
Flexibility

Office & Façade Layout

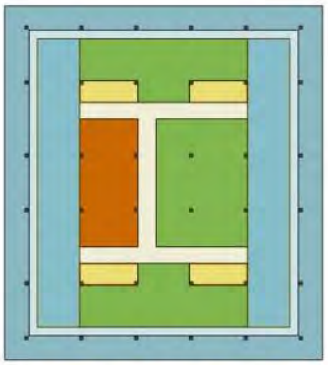
Adaptability



INNER FLEXIBLE PROGRAM SPACE

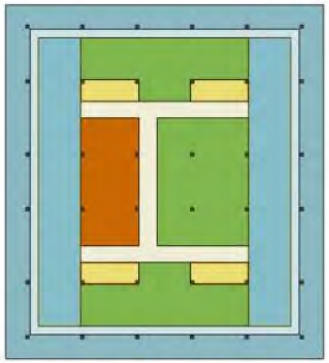


Adaptability



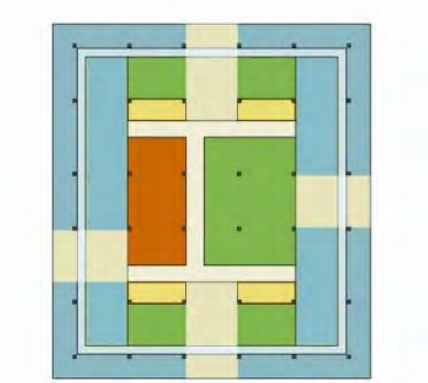
INNER FLEXIBLE PROGRAM SPACE

Adaptability



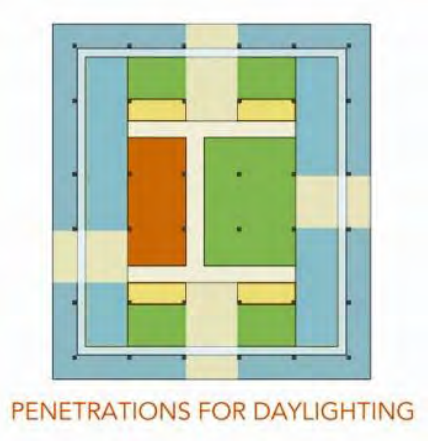
INNER FLEXIBLE PROGRAM SPACE

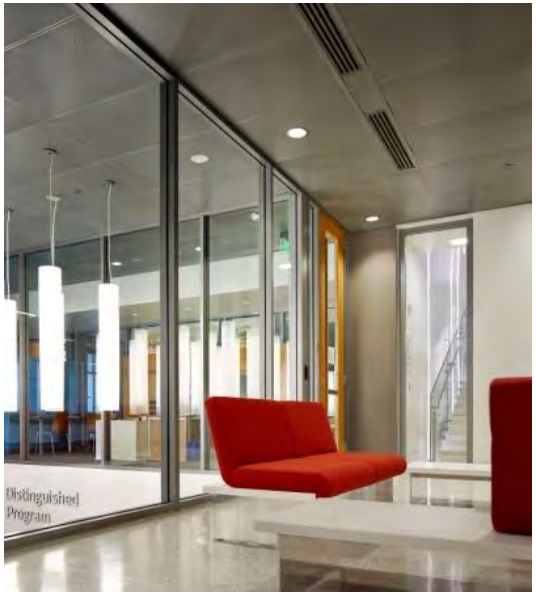
Daylighting



PENETRATIONS FOR DAYLIGHTING

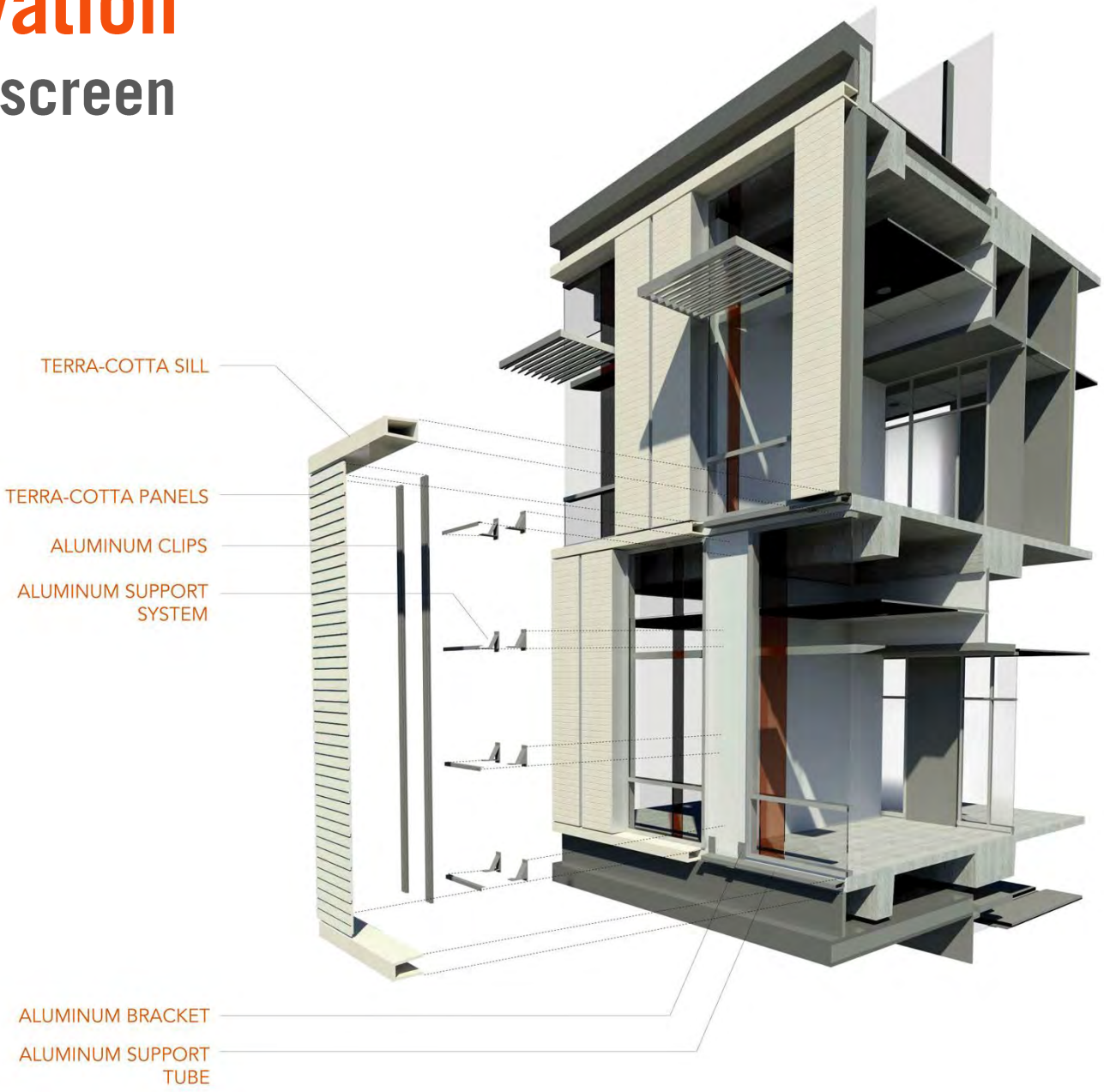
Daylighting





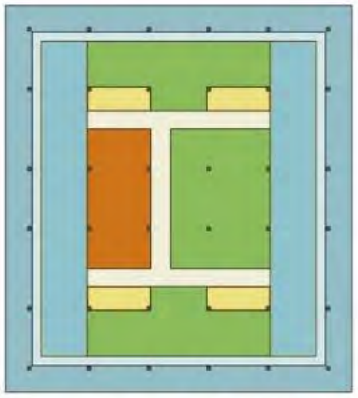
Design Innovation

Terra Cotta Rainscreen

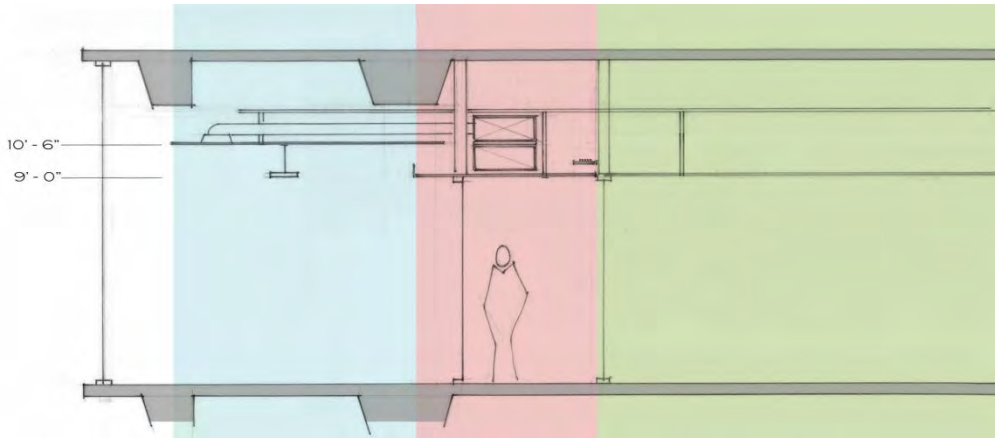


Design Innovation

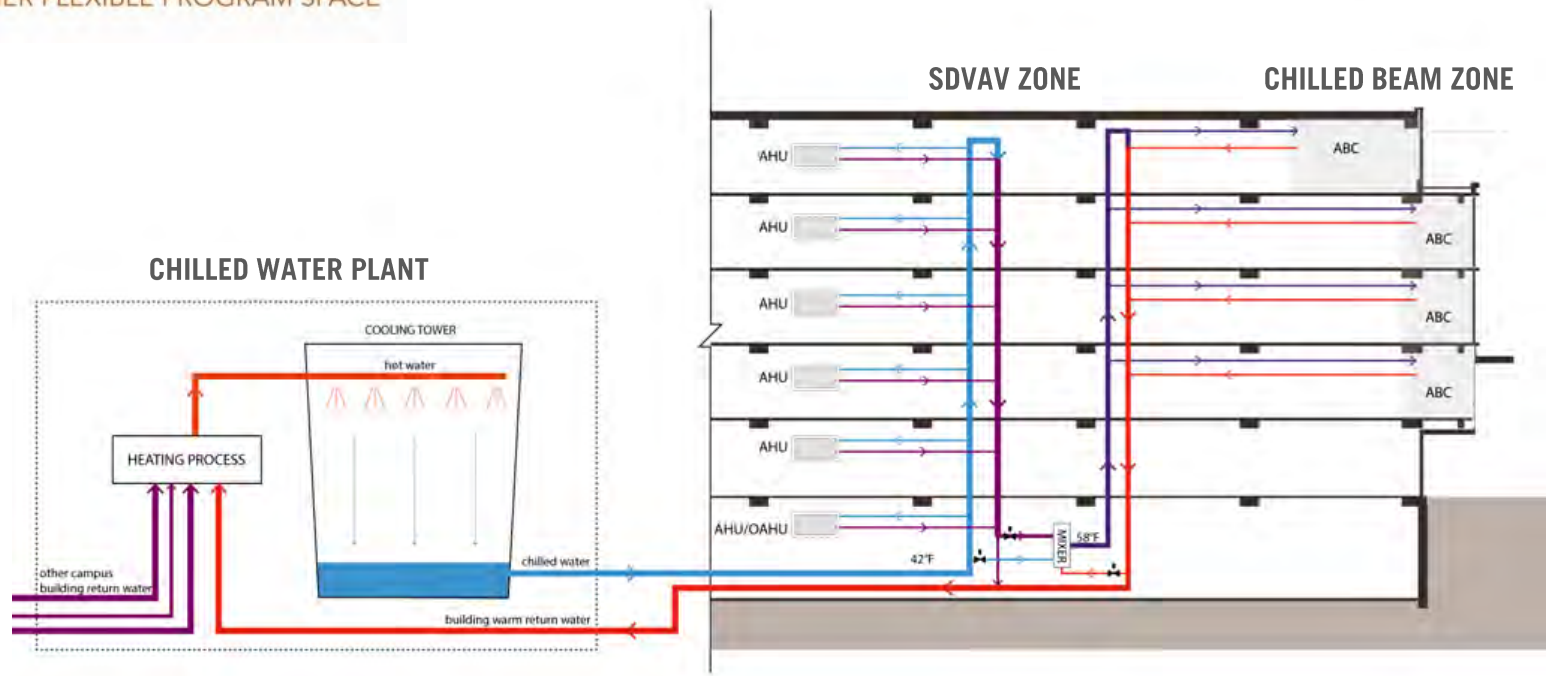
Chilled Beams



INNER FLEXIBLE PROGRAM SPACE

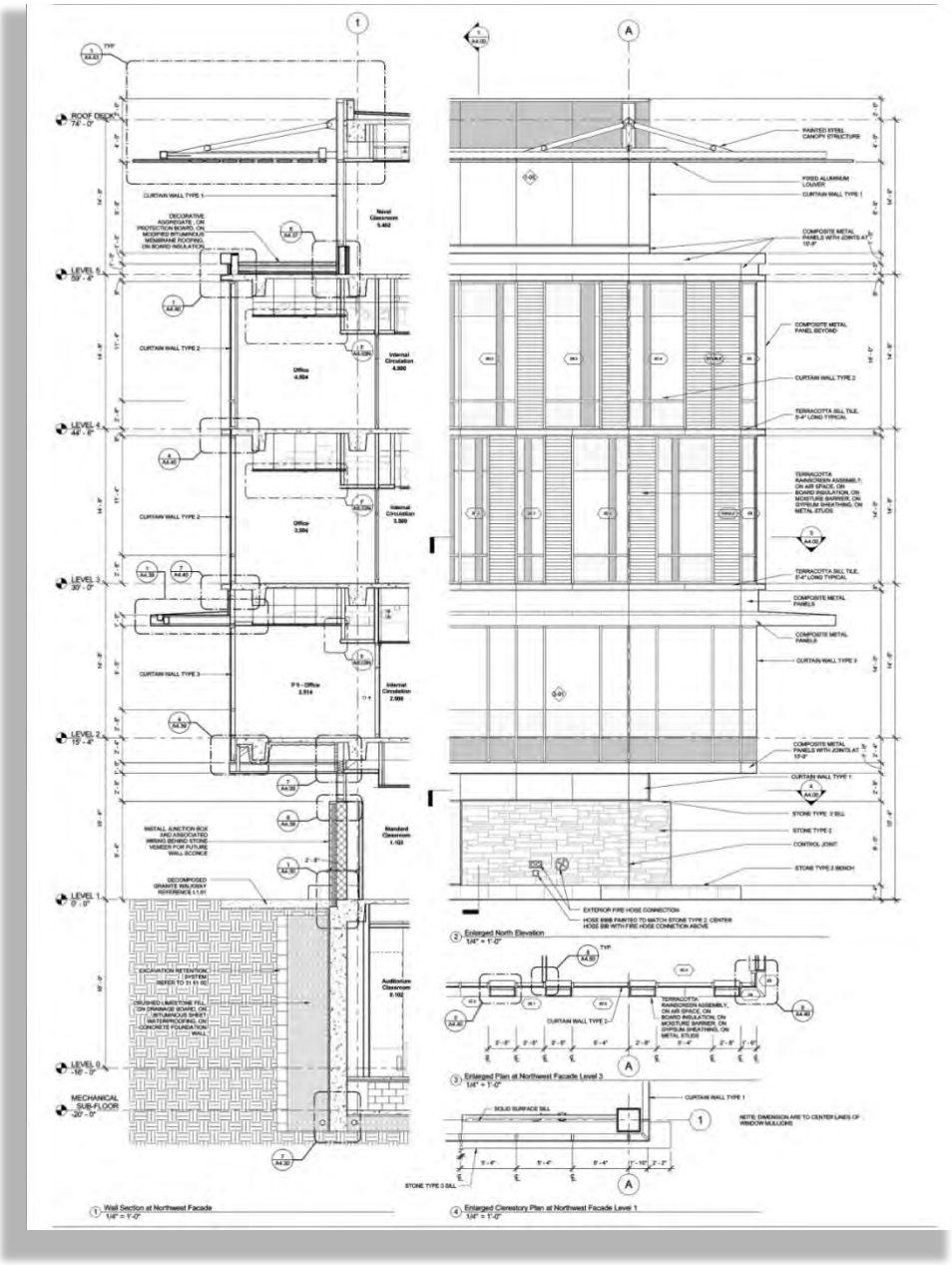


PERIMETER OFFICE | CORRIDOR "The Highway" | OPEN PLAN OFFICES/ OTHER PROGRAM AREA



Design Innovation

Integrated Design



Build a Better Project and a Better Bottom Line

- *Engage* the client and user groups
- *Align* with the client and user groups
- *Extend* relationships
  - … which creates value
  - … improves quality (better alignment)
  - … helps save time (stay on track)
  - … and saves everyone money

Innovative Construction Strategies

Eric Kennedy

Constraints

- Heart of Campus
- Projects 6 months Ahead of Program
- Existing Utility Tunnel
- New Student Activity Center 20 ft. Away
- Existing Swimming Pool 30 ft. Away
- Waller Creek
- Multiple Owners

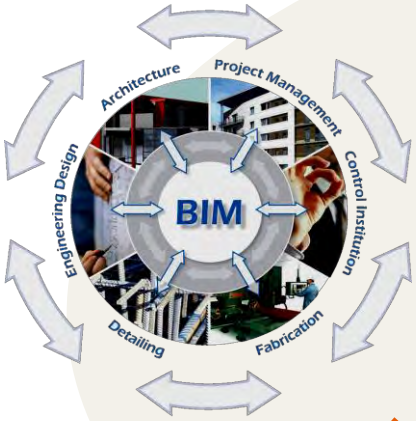
Communication

- Clients
- Architect & Consultants
- Specialty Contractors

What is AIM ?

Applied Information Model

APPLIED INFORMATION MODELING



TOOL
3D, 4D, 5D, nD

FACILITY
MANAGEMENT

V2F Virtual To Field ™

PROCESS

TECHNOLOGY

How AIM™ Applied Information Model was Implemented at UTCLA

AREA	210,000 SF
COST	$69,000,000
LOCATION	Gregory Gymnasium to the south New Student Activity Center to the west East Mall to the north Waller Creek to the east
USE	Anthropology, Geography, Sociology, and Linguistics Departments, Population Research Center, and additional Liberal Arts academic centers

AIM™ Process

Applied Information Model

RFI's, PR's Up-to-Date on Subcontractor's Tablet

RFI Answered

- SpawGlass Controls the Process
- PR's, RFI's, ASI's PM's Approval
- Clear Direction

Transmittal Page - Trades Affected

Superintendent to Review

Red File Travels to PM's Desk

PM to Review

Proceed – No Cost/Cost

Do not Proceed – Submit Pricing

Upload to the Server

Email it to Subcontractor

Highlights of AIM Applied Information Model at UT CLA

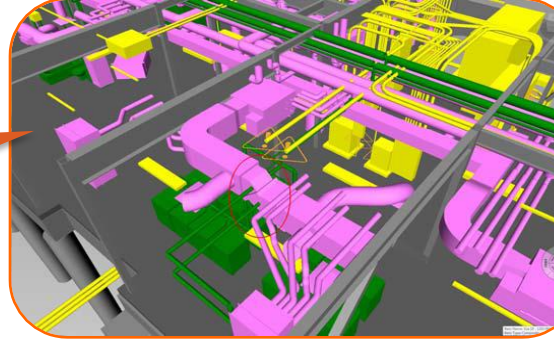
Faster Response

- Less RFI's "Avoid Crisis RFI"
- Pre-Fabrication

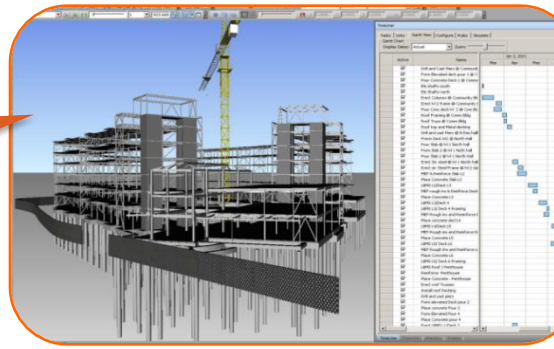
Leaner Project

- Less wasted time, effort and material

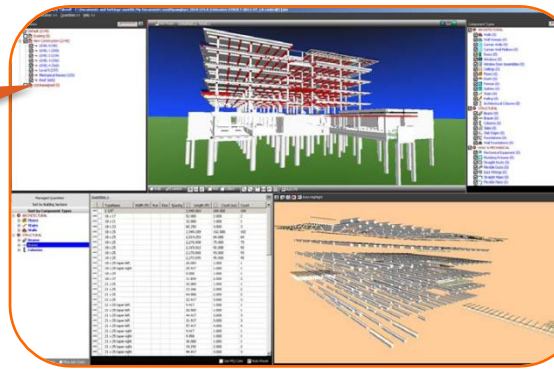
3D



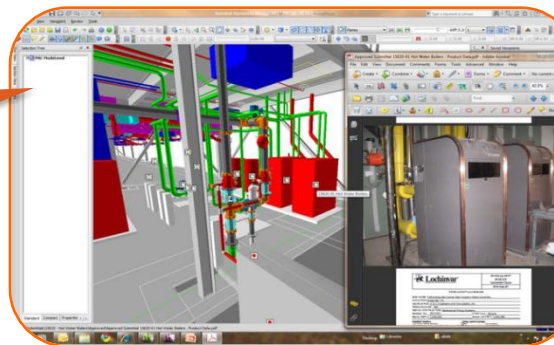
4D



5D



nD

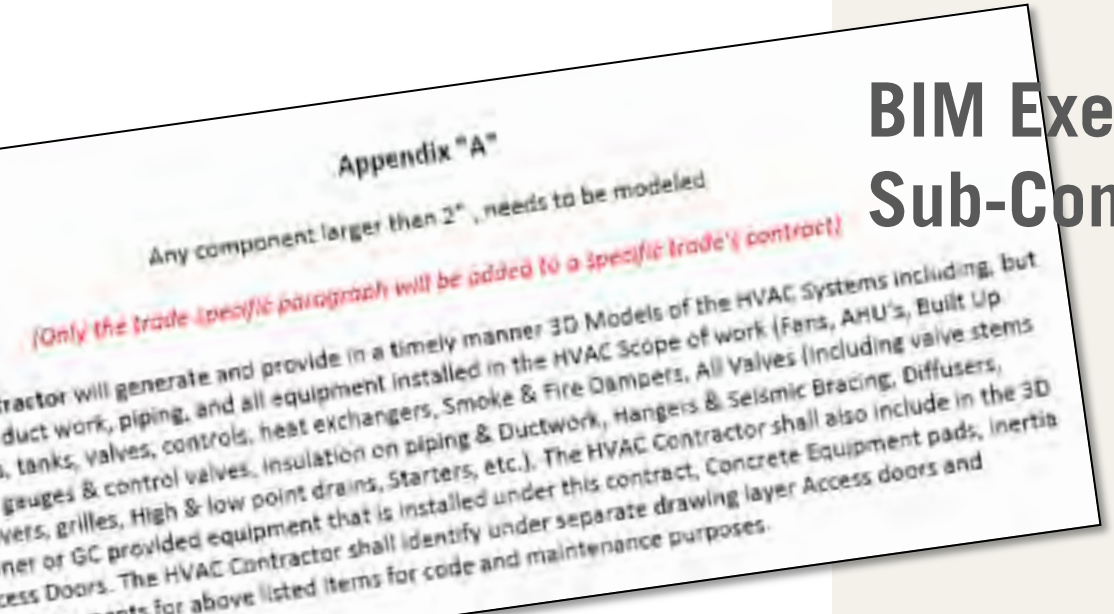


AIM™ Process

Applied Information Model

Owner's Goal to Implement Technology

Design and Build Team Buy-in
(No loose link in the chain)



Appendix "A"

Any component larger then 2" , needs to be modeled

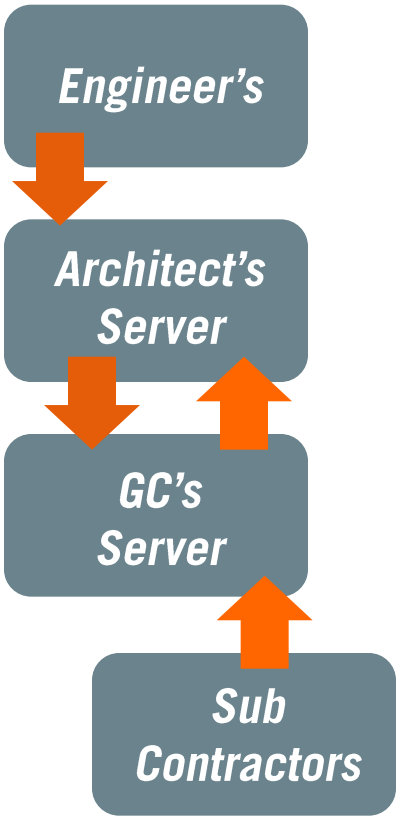
(Only the trade specific paragraph will be added to a specific trade's contract)

tractor will generate and provide in a timely manner 3D Models of the HVAC Systems including, but
duct work, piping, and all equipment installed in the HVAC Scope of work (Fans, AHU's, Built Up
, tanks, valves, controls, heat exchangers, Smoke & Fire Dampers, All Valves (including valve stems
gauges & control valves, insulation on piping & Ductwork, Hangers & Seismic Bracing, Diffusers,
vers, grilles, High & low point drains, Starters, etc.). The HVAC Contractor shall also include in the 3D
ner or GC provided equipment that is installed under this contract, Concrete Equipment pads, inertia
cess Doors. The HVAC Contractor shall identify under separate drawing layer Access doors and
nts for above listed items for code and maintenance purposes.

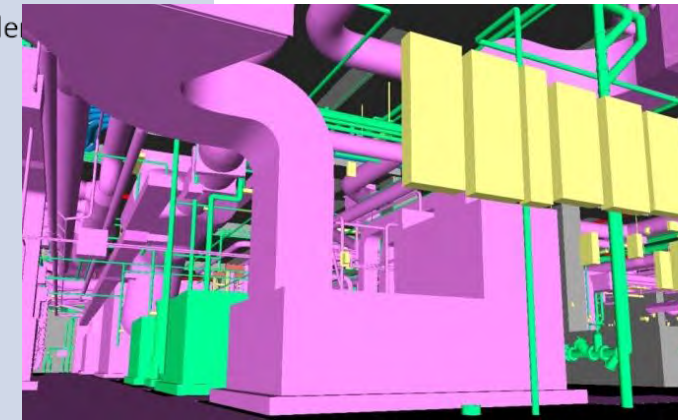
BIM Execution Plan and Sub-Contractor BIM Contract

AIM Process

- Level of Detail
- No Fly Zones
- Designated BIM File Share Server

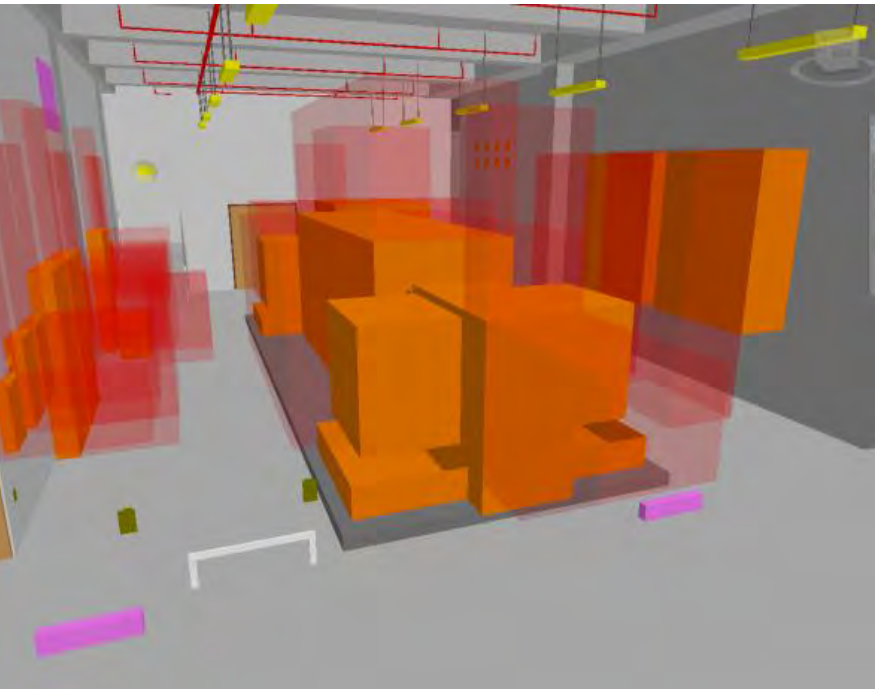


Mechanical	Electrical	Plumbing	Fire Protection
❑ AHU's ❑ Mechanical Duct Run ❑ Mechanical Piping Run ❑ Insulation on Piping & Ductwork ❑ Pumps ❑ VFD's ❑ Tanks ❑ Valves (including valve stems and handles) ❑ Gauges & Control Valves ❑ Access Doors ❑ Exhaust Fan Location ❑ Heat Exchangers ❑ Smoke and Fire Dampers	❑ Cable tray in Ceiling ❑ All Racks ❑ VFD's ❑ Any oversize equipment ❑ Panel Layout in Electrical Room ❑ Light Fixtures ❑ AV Equipment and devices	❑ Domestic water ❑ Chilled Water ❑ Roof Drain/ Overflow Drain ❑ Pumps ❑ Tanks ❑ Water Heaters ❑ In wall Plumbing Equip ❑ All Valves, Gauges and Control Valves	❑ All Risers ❑ Mains ❑ Branch piping (Including heads) ❑ Pumps ❑ Controlle ❑ Valves

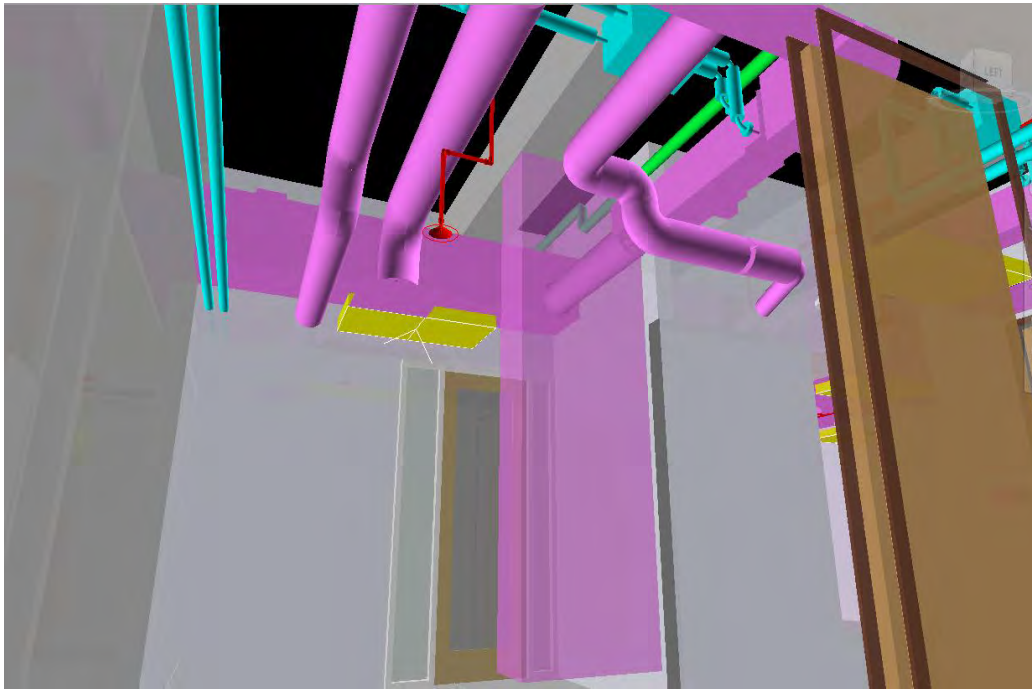


AIM Process

No Fly Zone & Virtual Walk-Throughs



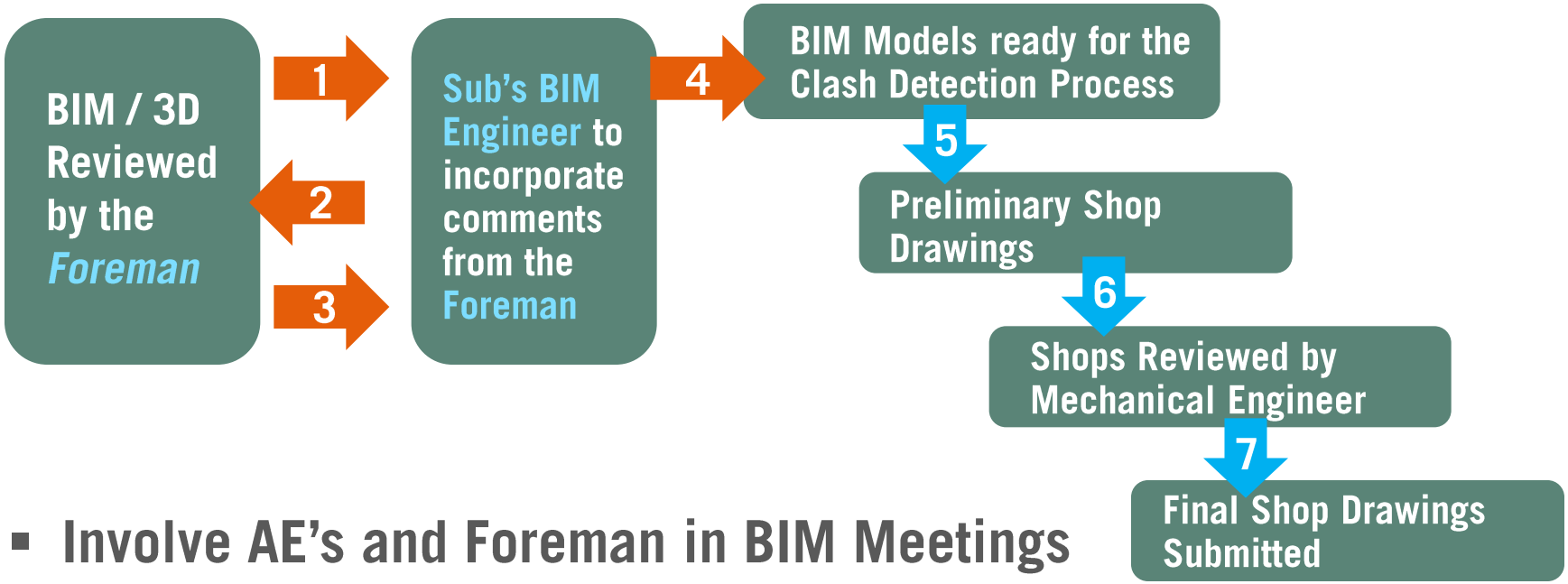
Main Electrical Room –
Panels Clearance Zones



Typical VAV Clearance Zone

AIM Process

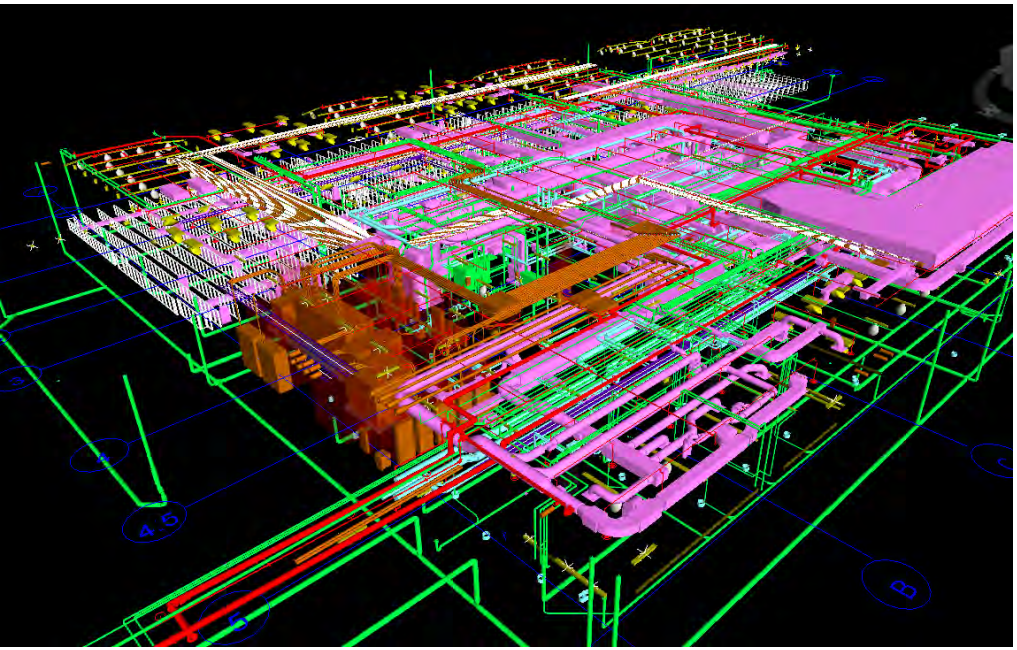
- Identify the Key Players

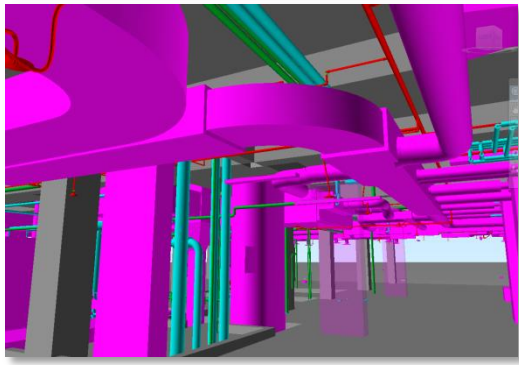


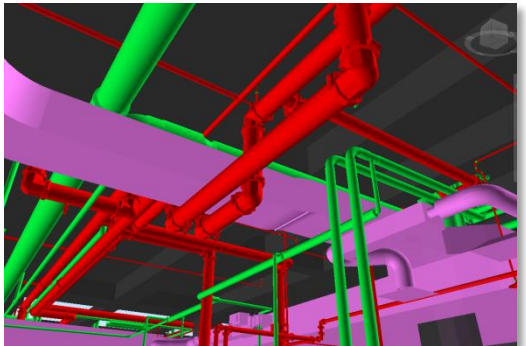
- Involve AE's and Foreman in BIM Meetings
- Live Work Session – Go to Meetings

AIM™ Process

Applied Information Model



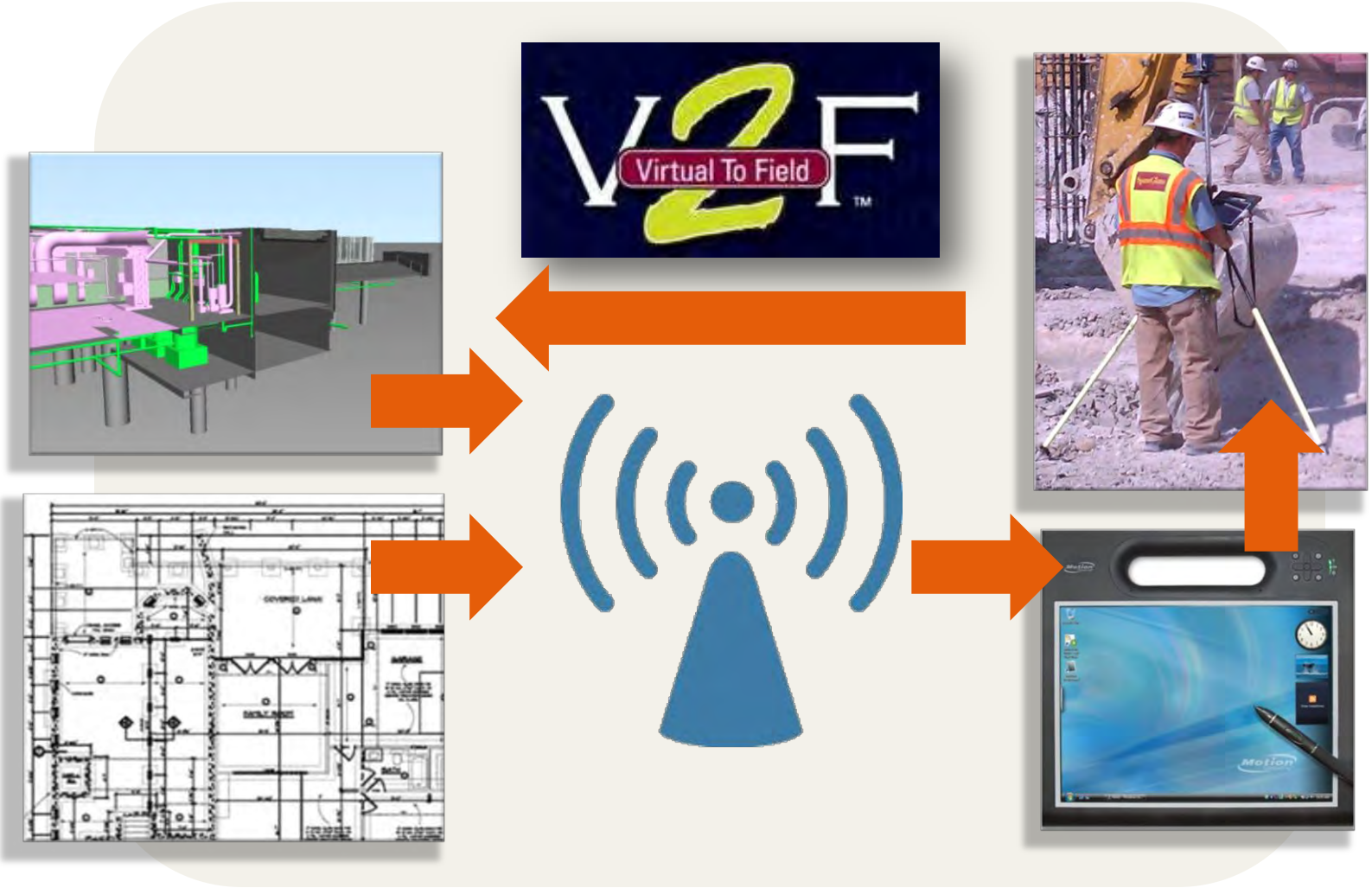




- Less Rework (MEP & Fire) -
  More Focus on Production & Installation
- Better Product for the Owner to
  Maintain the Facility
- Aesthetically Organized Installation

Process in the Field

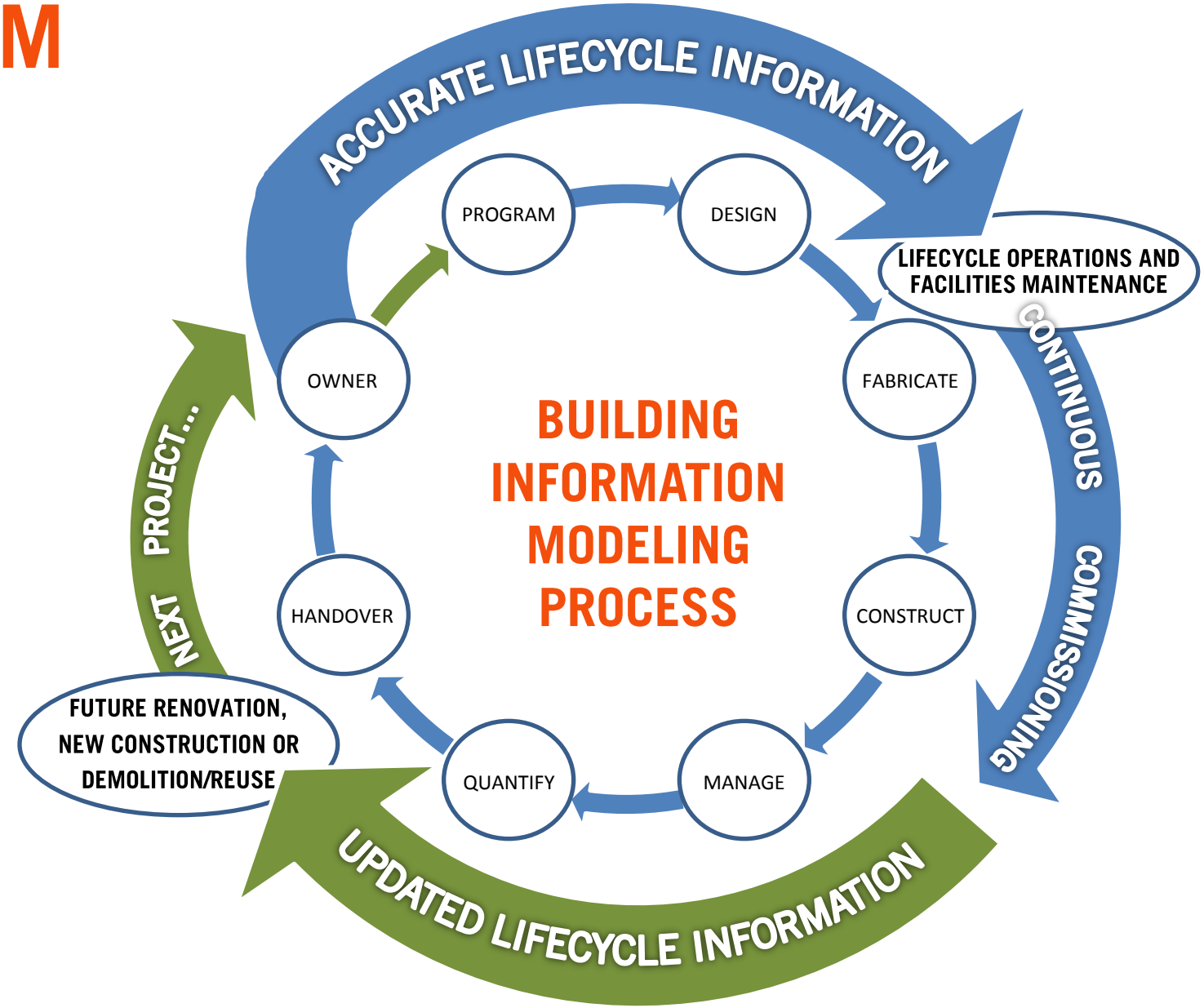
Virtual to Field Work Flow



“KISS”

- Have a plan
  - Chilled Beams
- Construction Sequence
  - Cistern
  - Level 1 East
- ROCIP - Prefabrication

BIM



BIM: BEGINNING WITH THE END IN MIND

3D Models: Potential Uses

EXAMPLES

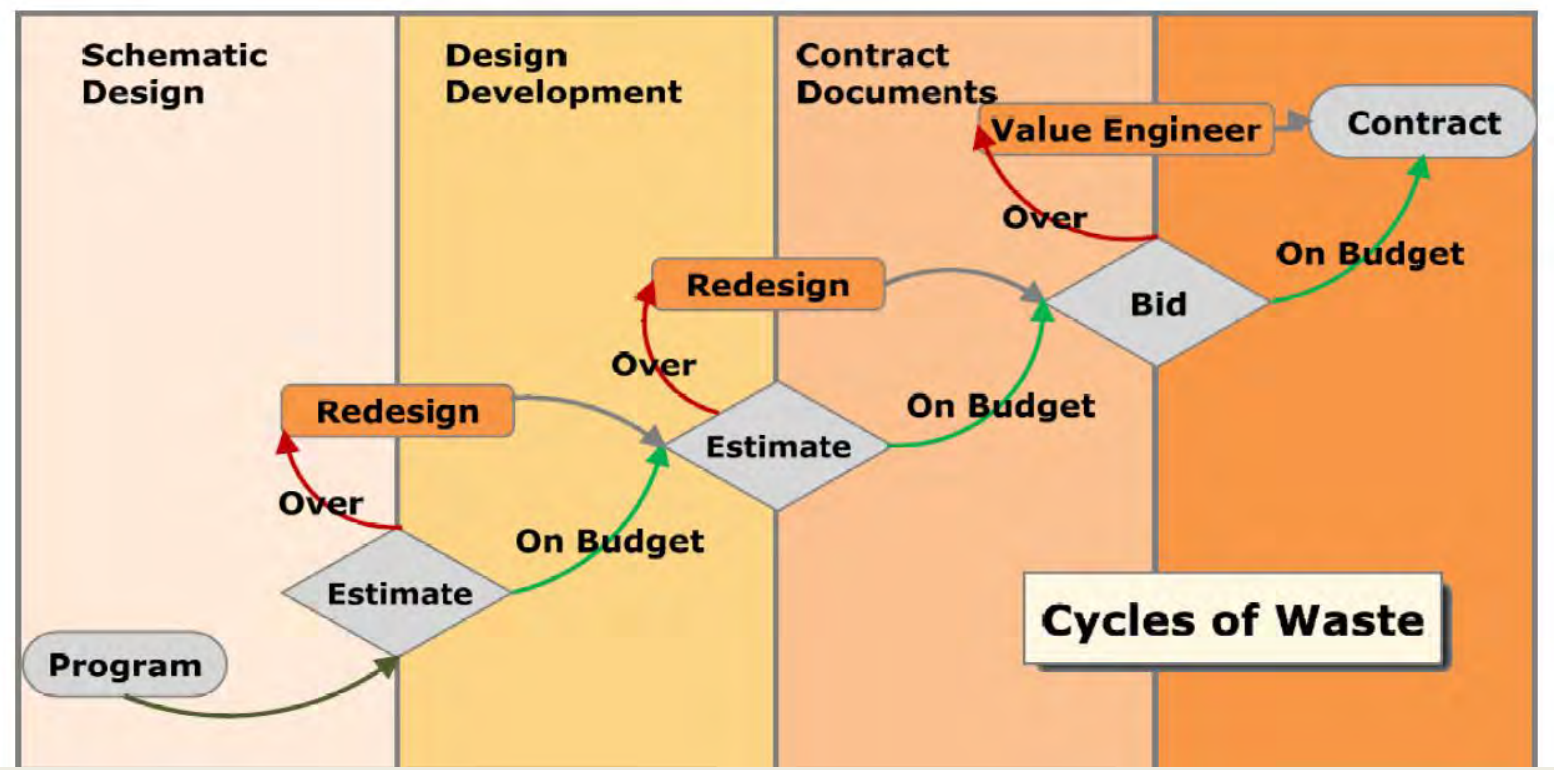
- Underground Utilities – Coordination
- MEP Coordination –
  Duct vs. Sprinkler *vs.* Plumbing *vs.* Electrical
- Visualization – 4D Scheduling
- Cost Estimating
- As-Built Package for the Owner

BIM Skill Sets

SKILLSET	RESPONSIBILITIES & FUNCTIONS	SOFTWARE	ROLE
Model	Model/Update, track/Log/Metrics Coordinate, Clash detection Analyze, View, Compile	Autodesk Revit Architecture, Revit MEP Navisworks Manage AutoCAD	Model Manager BIM Modeler Field BIM Modeler
Coordinate	Track/Log/Metrics Coordinate, Analyze, View/ Navigate Compile Cut Sections	Navisworks Simulate, AutoCAD	Field BIM Coordinator (Training Duration: 3 wks)
View	View/Navigate	Navisworks Freedom Viewer	All Members (Training Duration : 6 Hrs)

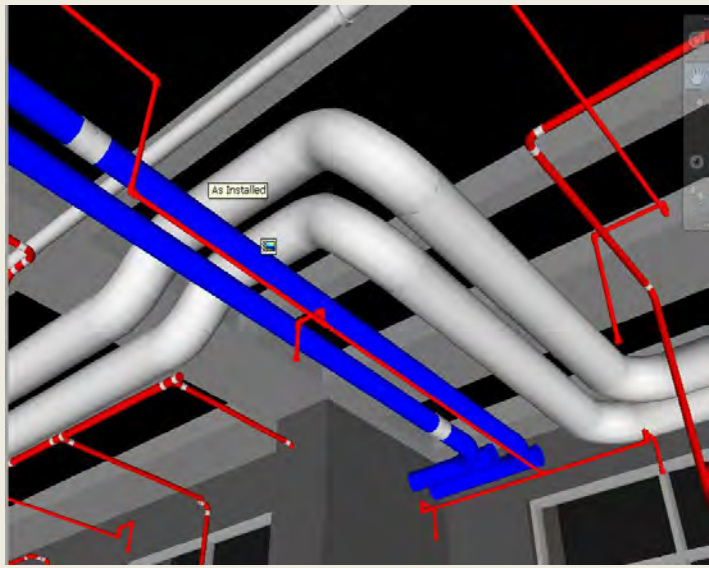
The Owner Benefits from BIM

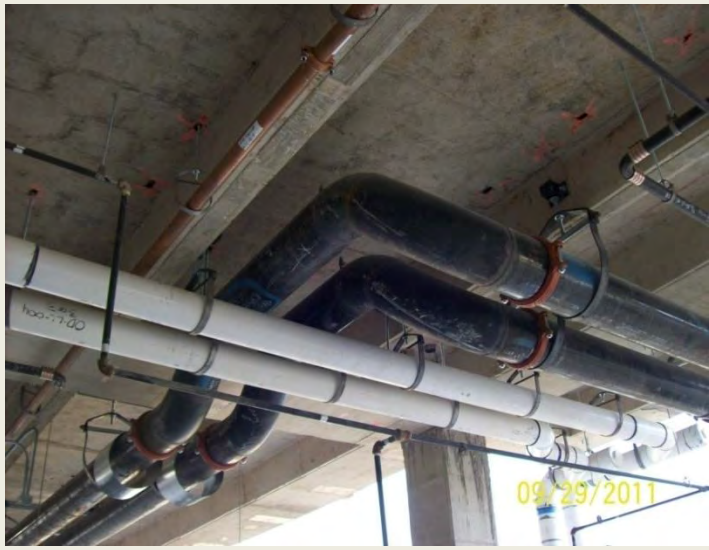
- Achieving greater certainty in outcomes with respect to project cost and time that can be better estimated when 4-D & 5-D BIM are integrated into the process earlier
- A completely coordinated as-built package for the lifecycle of the building



The GC Benefits from BIM

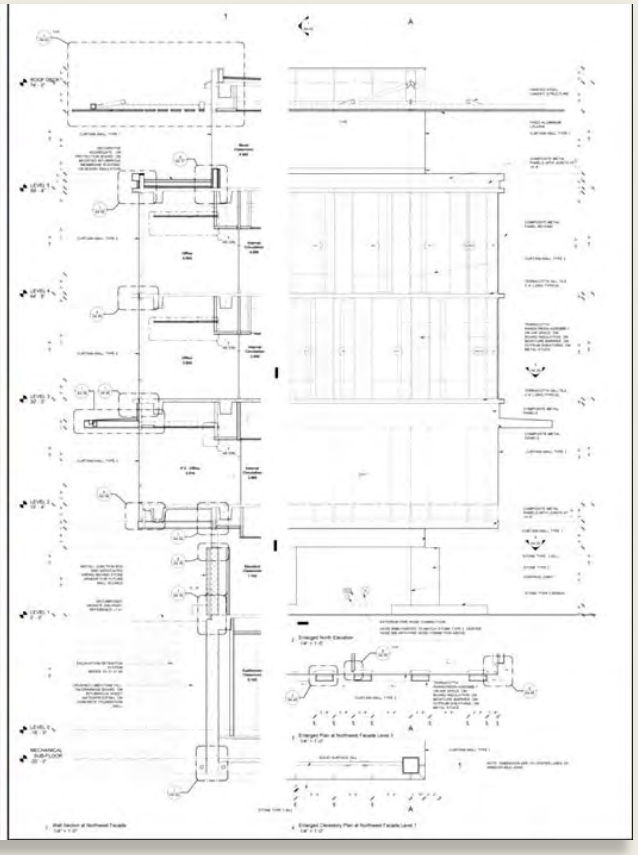
- Better Coordination
- Better Cost Estimating
- Procurement Management
- Automation of Off-Site Fabrication
- Better Scheduling
- Cleaner, Safer Construction Sites
- Shorter Construction Duration





The Architect Benefits from BIM

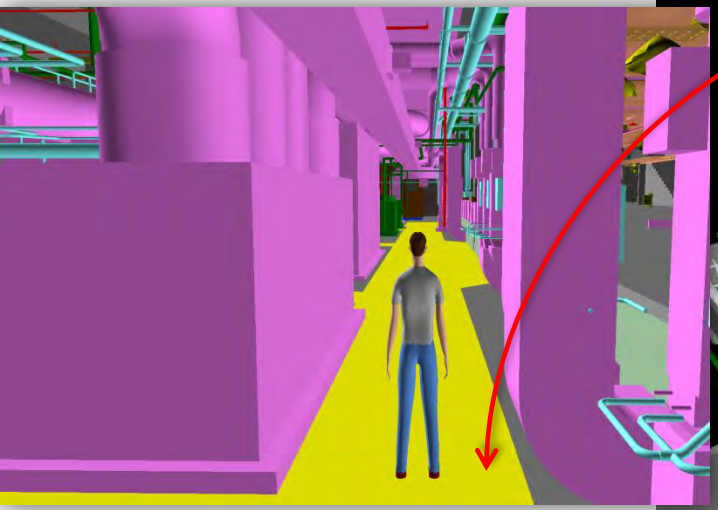
- Reduces Design and Production Cost
- More Efficient Use of Time & Better Visualization
- Makes the Process Easier & More Enjoyable

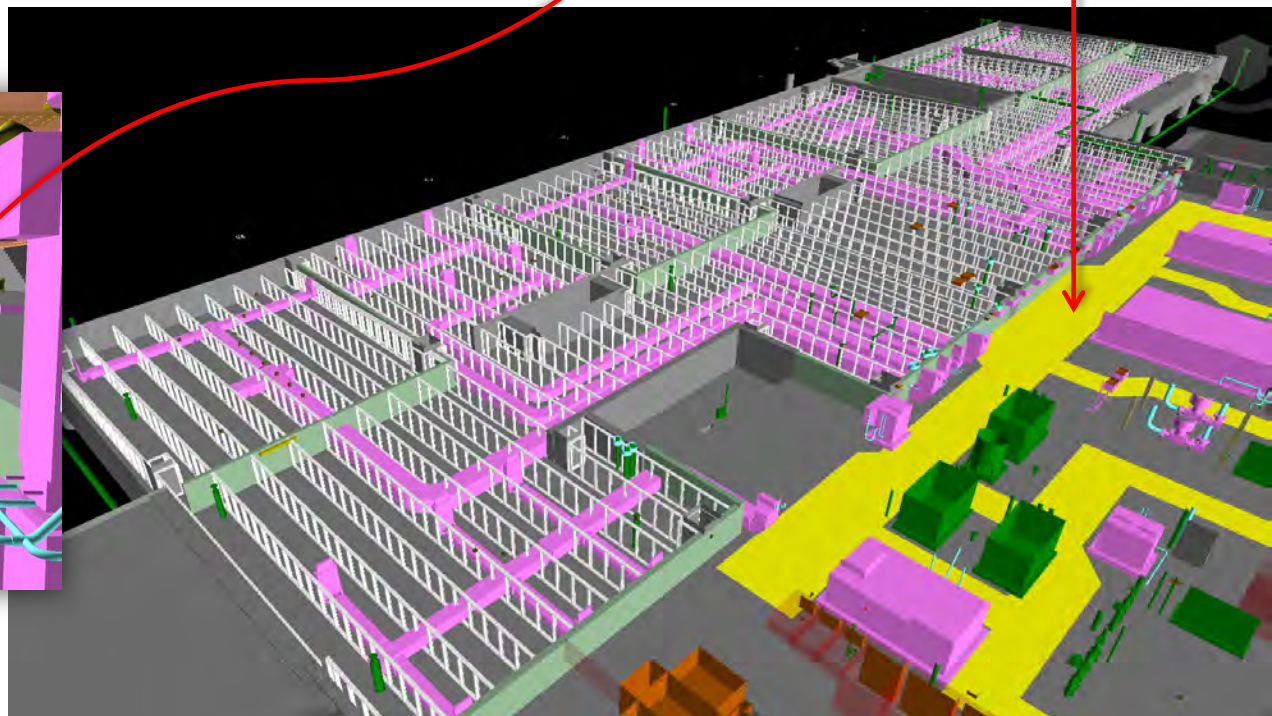


PLAN VIEW

EGRESS PATH

3D VIEW

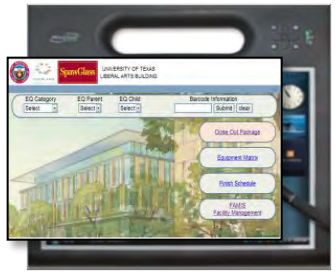




FACILITIES MAINTENANCE & OPERATIONS

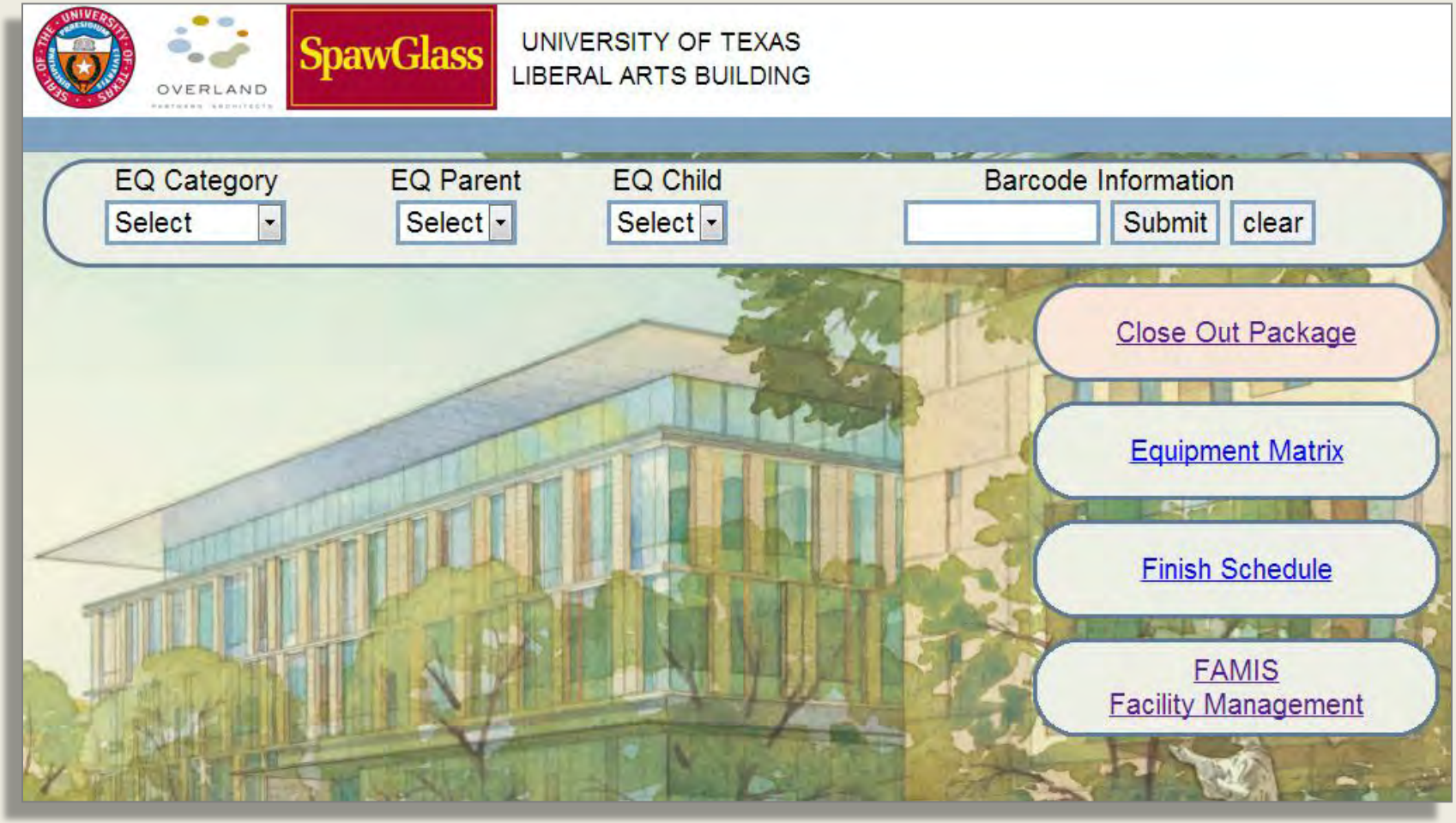
Table Column	E.EQUIPMENT_NO	E.NOMENCLATURE	E.PARENT	E.MFR	E.MFR_PART_NO	E.MODEL	E.SERIAL_NO	E.SITE	E.BLDG	E.FLOOR	E.ROOM	E.KEYWORD	E.EQUIP_TYPE	E.ASSET_NO	E.EQUIP_GROUP	E.ACQUISITION_DATE	E.COST	E.ACQUISITION_PO_NUMBER	E.ACQUIS
Data Type		TEXT	LOVs	LOVs	TEXT	TEXT	TEXT	LOVs	LOVs	LOVs	LOVs	LOVs	LOVs	TEXT	LOVs	MMDDYYYY	NUMBER	TEXT	LOVs
Required?		Yes	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	No	No	No	No
Field Name		Nomenclature	Parent	Manufacturer	Mfr. Part No.	Model	Serial No.	Site	Building number	Floor	Room	Keyword	Type	Asset No.	Equip Group	Date Acquired	Cost	PO Number or CP Number	Vendor
Sample Entry		*FAN SUPPLY 003 AHU-3B*	*EQ100003*	*ARMSTRONG*	*AH-0897456*	*BRG036024*	*15874698-956623*	*UTM*	*0540*	*001*	*3.102*	*AC SPLIT*	*COOLING*	*DEV-ACC-030*	*HVAC*	*11191998*	*4398.62*	*2008C56789*	*2PVTI8Z*
OAHU		FLTR BANK OAHU.S	EQ048855								0.308								
		COIL PREHE OAHU, STEAM	EQ048856								0.308								
		VALVE OAHU.1 (1/3 CONTROL, COIL PREHE)	EQ048857								0.308								
		VALVE OAHU.2 (2/3 CONTROL, COIL PREHE)	EQ048858								0.308								
		STRAINER OAHU.0 (COIL PREHE, SUPPLY)	EQ048859								0.308								
		STEAMTRAP-OAHU.1 (OAHU, COIL PREHE, SUPPLY, DRIP)	EQ048860								0.308								
		STRAINER OAHU.1 (STEAMTRAP-OAHU.1)	EQ048861								0.308								
		STEAMTRAP-OAHU.2 (OAHU, COIL PREHE, COND)	EQ048862								0.308								
		STRAINER OAHU.2 (STEAMTRAP-OAHU.2)	EQ048863								0.308								
		COIL COOL OAHU, CHW	EQ048864								0.308								
		VALVE OAHU.3 (CONTROL, COIL COOL, SUPPLY)	EQ048865								0.308								
		STRAINER OAHU.3 (COIL COOL, SUPPLY)	EQ048866								0.308								
		FAN SUPPLY Motor OAHU-A	EQ048867	Baldor	EM2543T	42F056W387					0.308								
		VFD OAHU-A FAN	EQ048868								0.308								
		FAN SUPPLY Motor OAHU-B	EQ048869								0.308								
		VFD OAHU-B FAN	EQ048870								0.308								
		AHU ASSEMB 000 (AHU-0) PARENT, CHW	EQ048871								0.308								

VS.



FACILITIES MAINTENANCE & OPERATIONS

Demo



AIM Results

- BIM - Information Repository
- Fewer Change Orders
- Higher Quality Product
- More Accurate As-Built
- Better Communication

Ultimate Goal

Customer Service & Client Satisfaction

- What Does Your Owner Need?
- Know Expectations Early and Exceed

  SpawGlass -BIM & OFPC - FAMIS

College of Liberal Arts Building Q&A

TCUF

ASSOCIATION OF
Texas College & University Facilities
PROFESSIONALS

Managing Metamorphosis.
Building for Change

Seminar Evaluation

We hope you enjoyed this session…

Please take a moment to complete the evaluation form.

Thank you!

CONTINUING EDUCATION
AIA