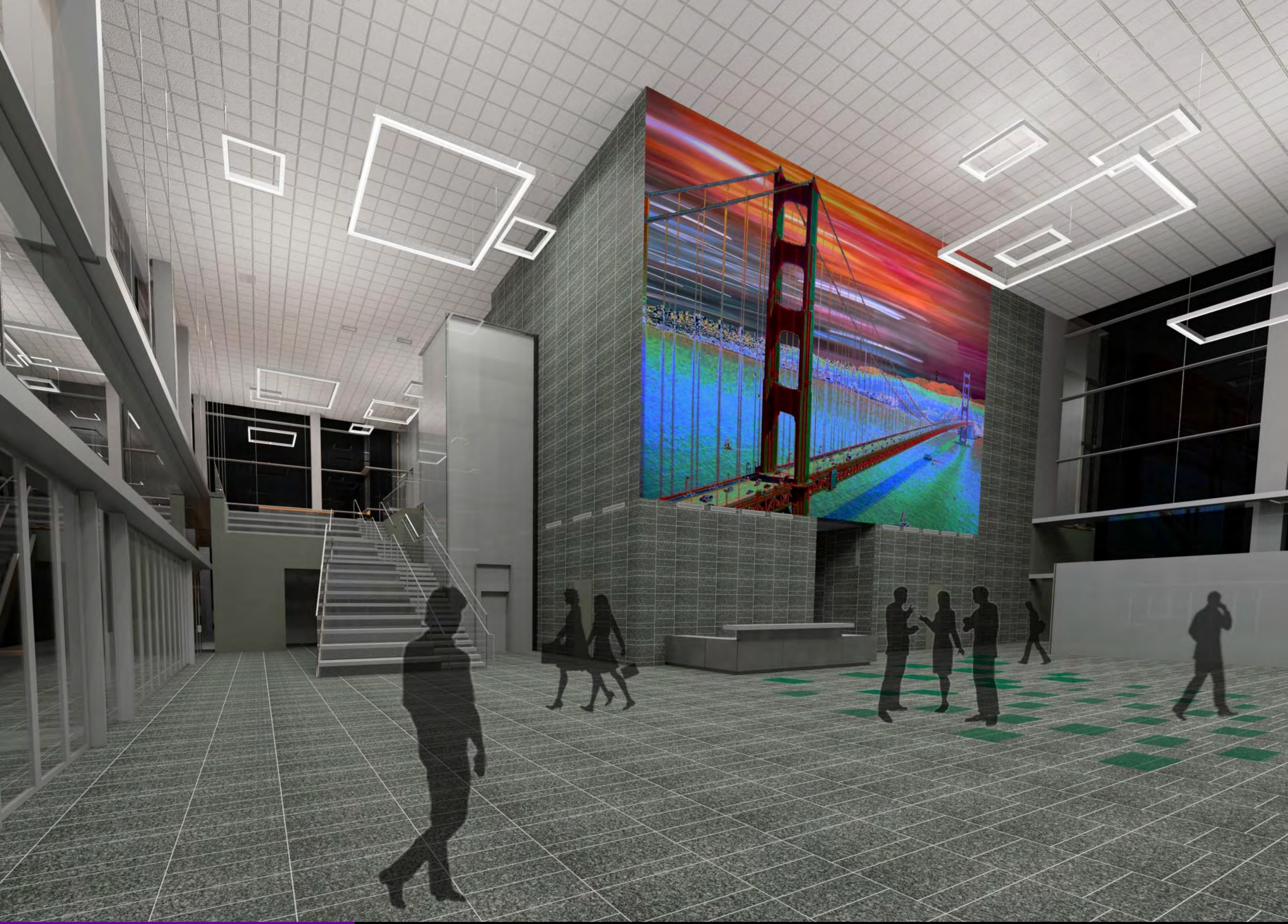
AEVITAS

UNENDING COMMITMENT TO INTEGRATED DESIGN.

CANFIELD – CARLISLE – KAISERIAN – KREIDER – LIVORIO – SHARP – SLIWINSKI – VAN EEDEN



PROJECT LOCATION

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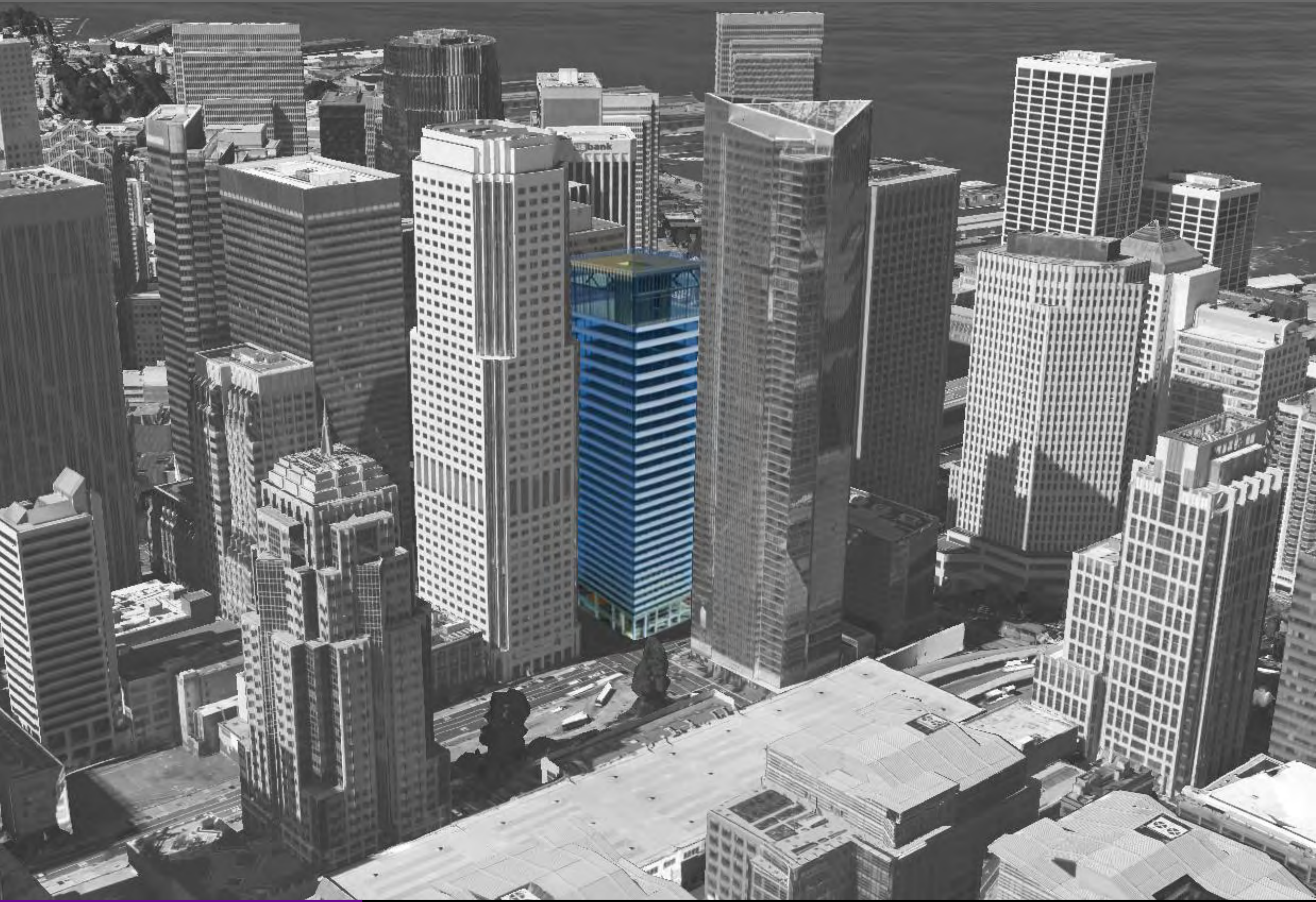
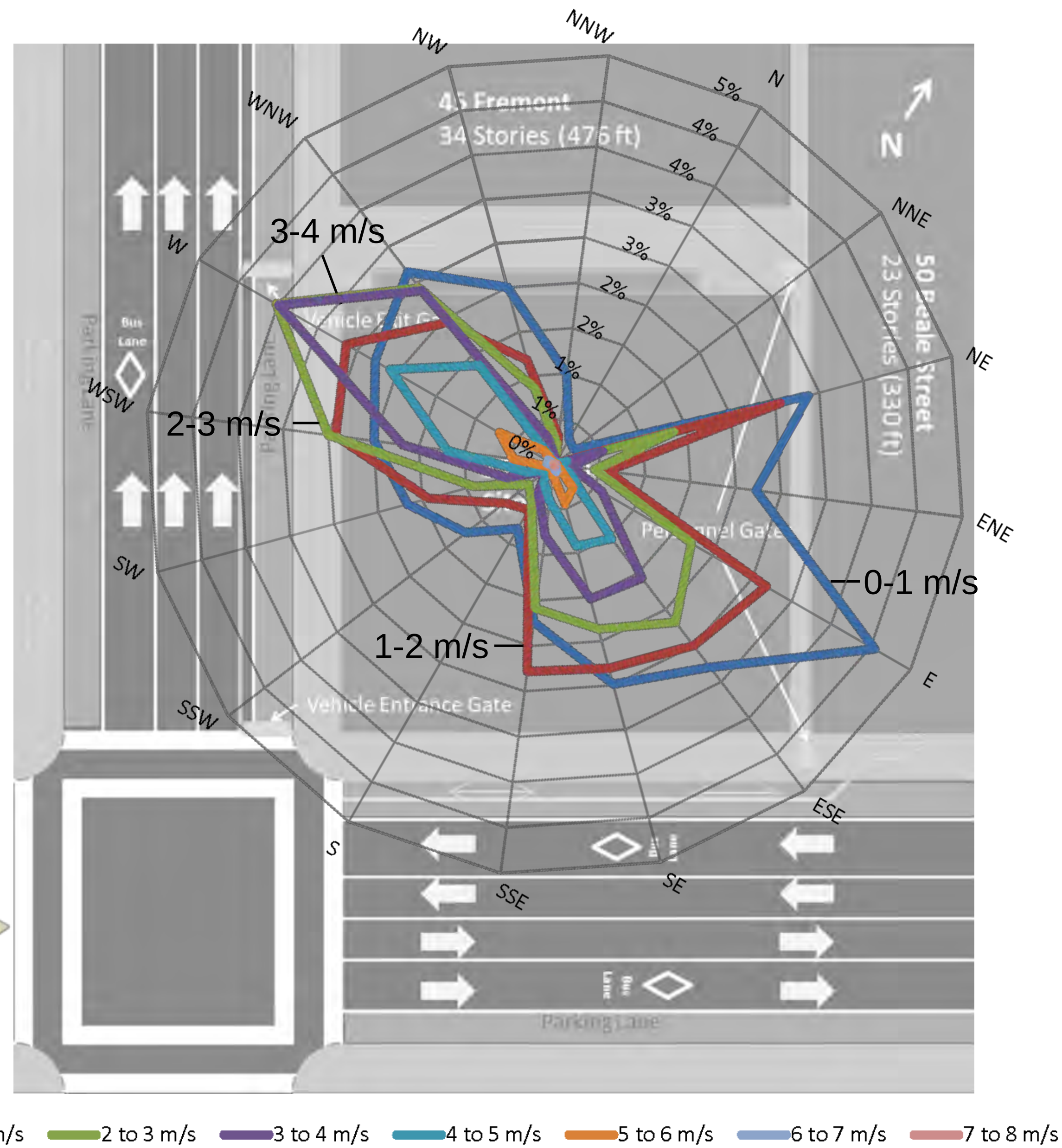
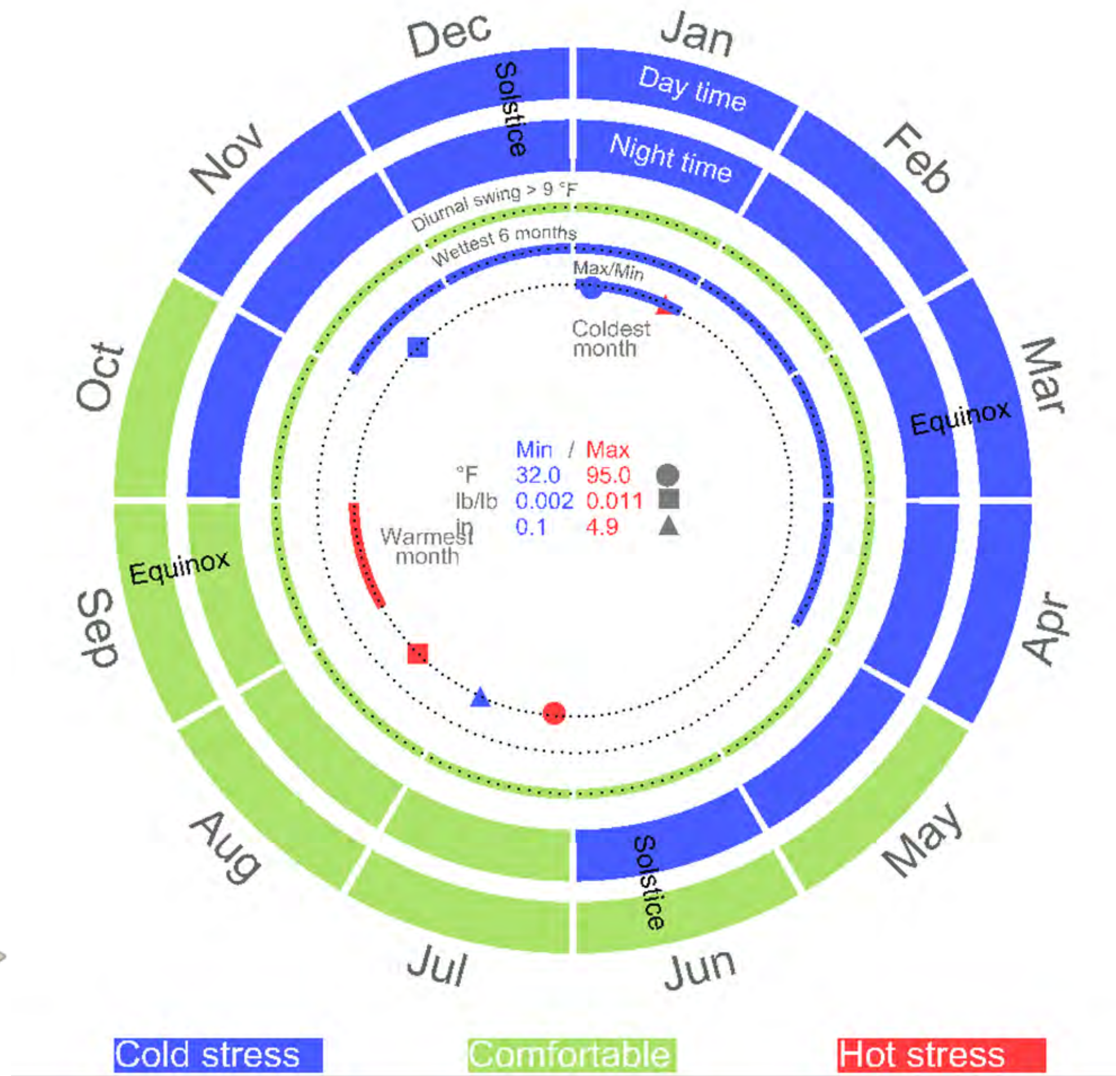


ENVIRONMENTAL CONSIDERATIONS




Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Day time
Night time
Solstice
Equinox
Diurnal swing > 9 °F
Wettest 6 months
Max/Min
Coldest month
Warmest month
Min / Max
°F 32.0 95.0
lb/lb 0.002 0.011
in 0.1 4.9
Cold stress
Comfortable
Hot stress

Taking an **integrated** approach, AEVITAS strives to **minimize environmental influences** by **engaging** our community with **sustainable practices** in **energy conservation** and **emission reduction**.

[ZERO**impact**]

AEVITAS TEAM ATTITUDE

[ZERO**impact**]

ZERO**energy**

ZERO**interruption**

ZERO**waste**

ZERO**emissions**

AEVITAS TEAM ATTITUDE

AEVITAS TEAM ATTITUDE

[ZERO**impact**]

ZERO**energy** ZERO**interruption** ZERO**waste** ZERO**emissions**

AEVITAS TEAM ATTITUDE

[ZEROimpact]

ZEROenergy

ZEROinterruption

ZEROwaste

ZEROemissions

[ZERO**impact**]

ZERO**energy**

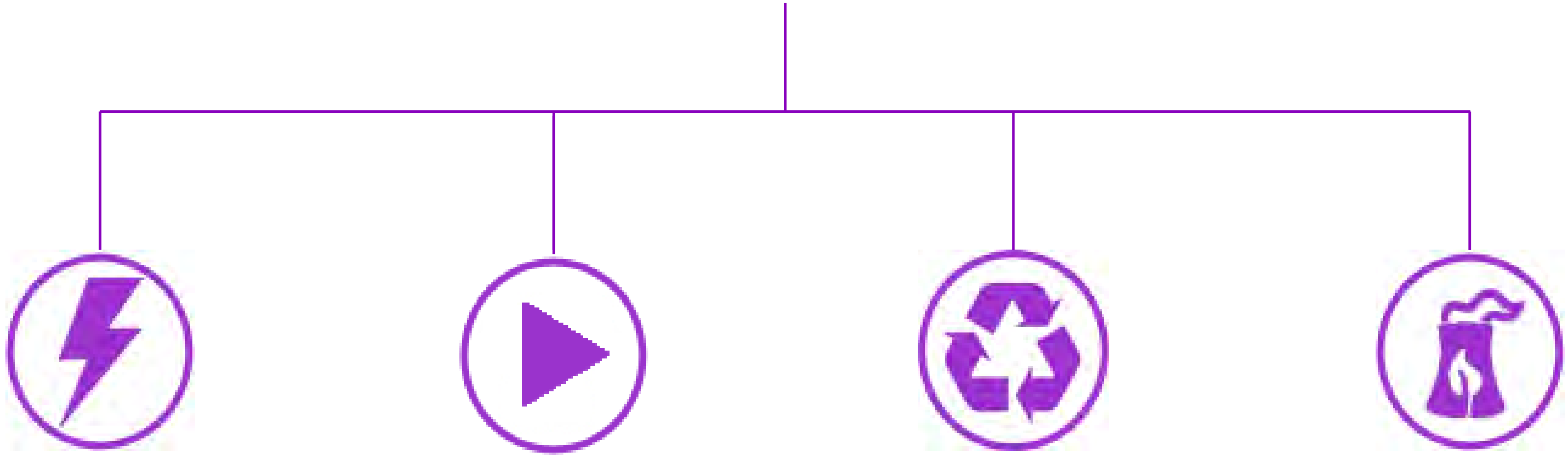
ZERO**interruption**

ZERO**waste**

ZERO**emissions**

AEVITAS TEAM ATTITUDE

[ZERO**impact**]



ZERO**energy** ZERO**interruption** ZERO**waste** ZERO**emissions**

PLANNING DESIGNING CONSTRUCTING OPERATING

PLANNING DESIGNING CONSTRUCTING OPERATING

PHASE PLANNING

PROGRAMMING

DESIGN AUTHORING

PLANNING	DESIGNING	CONSTRUCTING	OPERATING

PHASE PLANNING

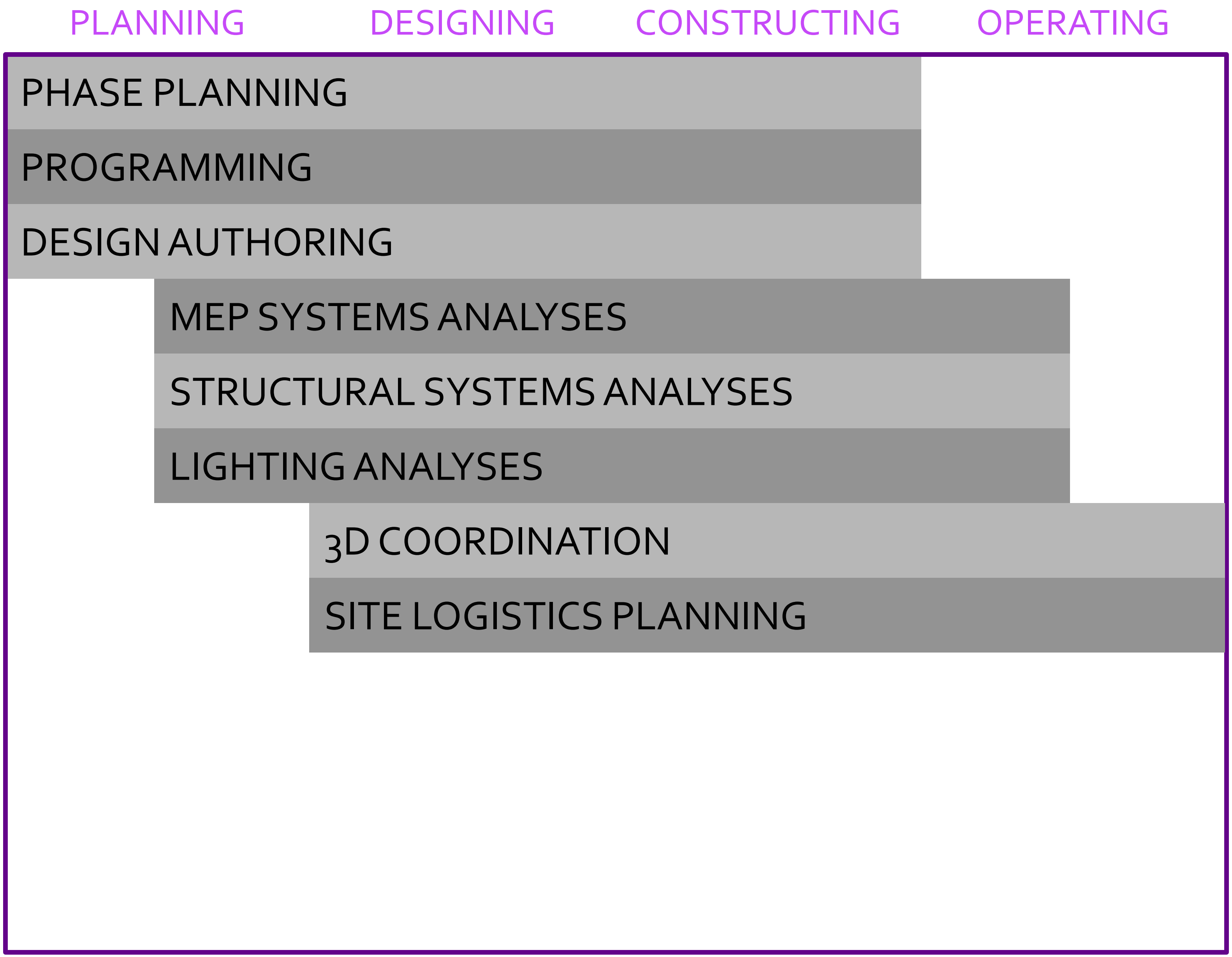
PROGRAMMING

DESIGN AUTHORING

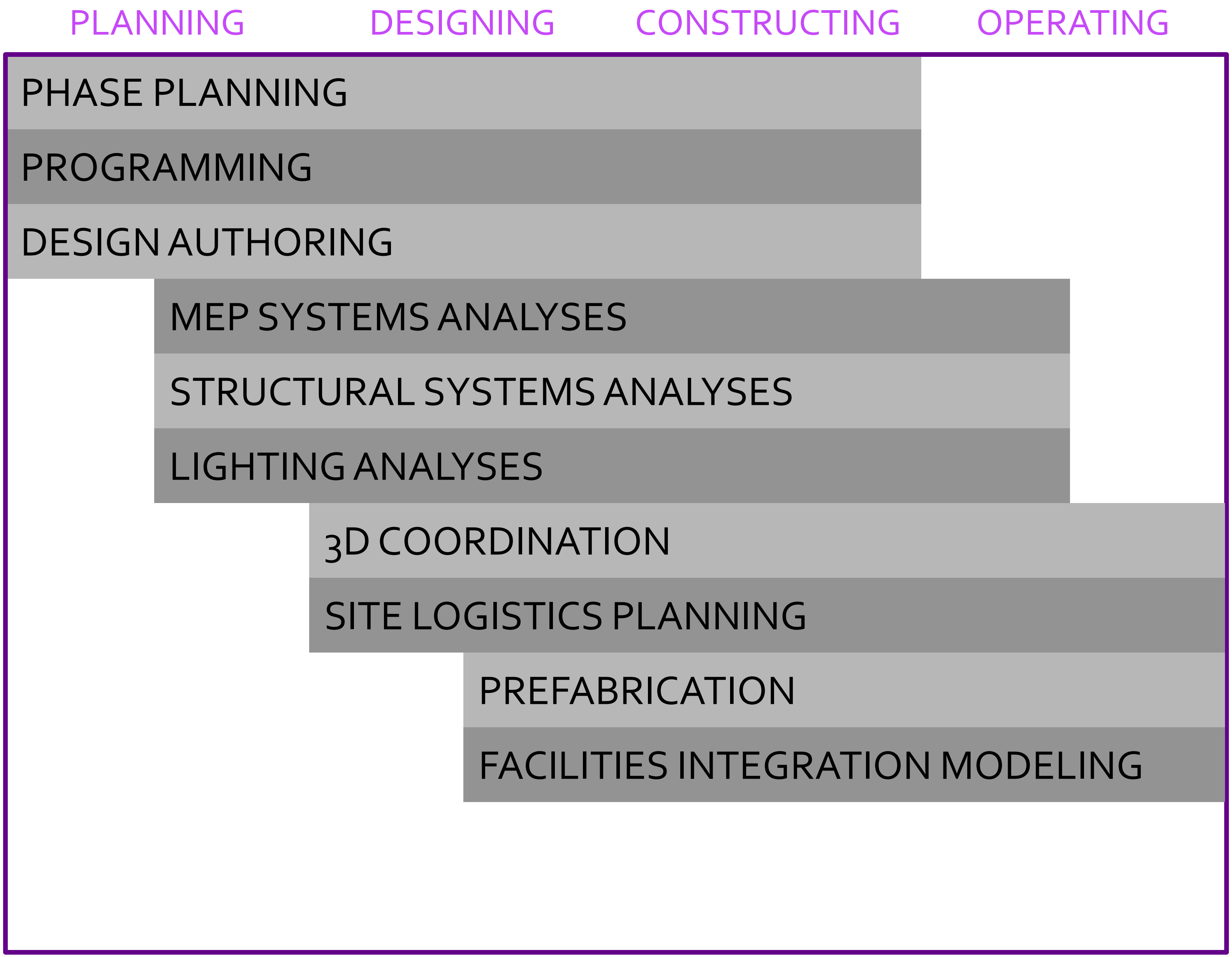
MEP SYSTEMS ANALYSES

STRUCTURAL SYSTEMS ANALYSES

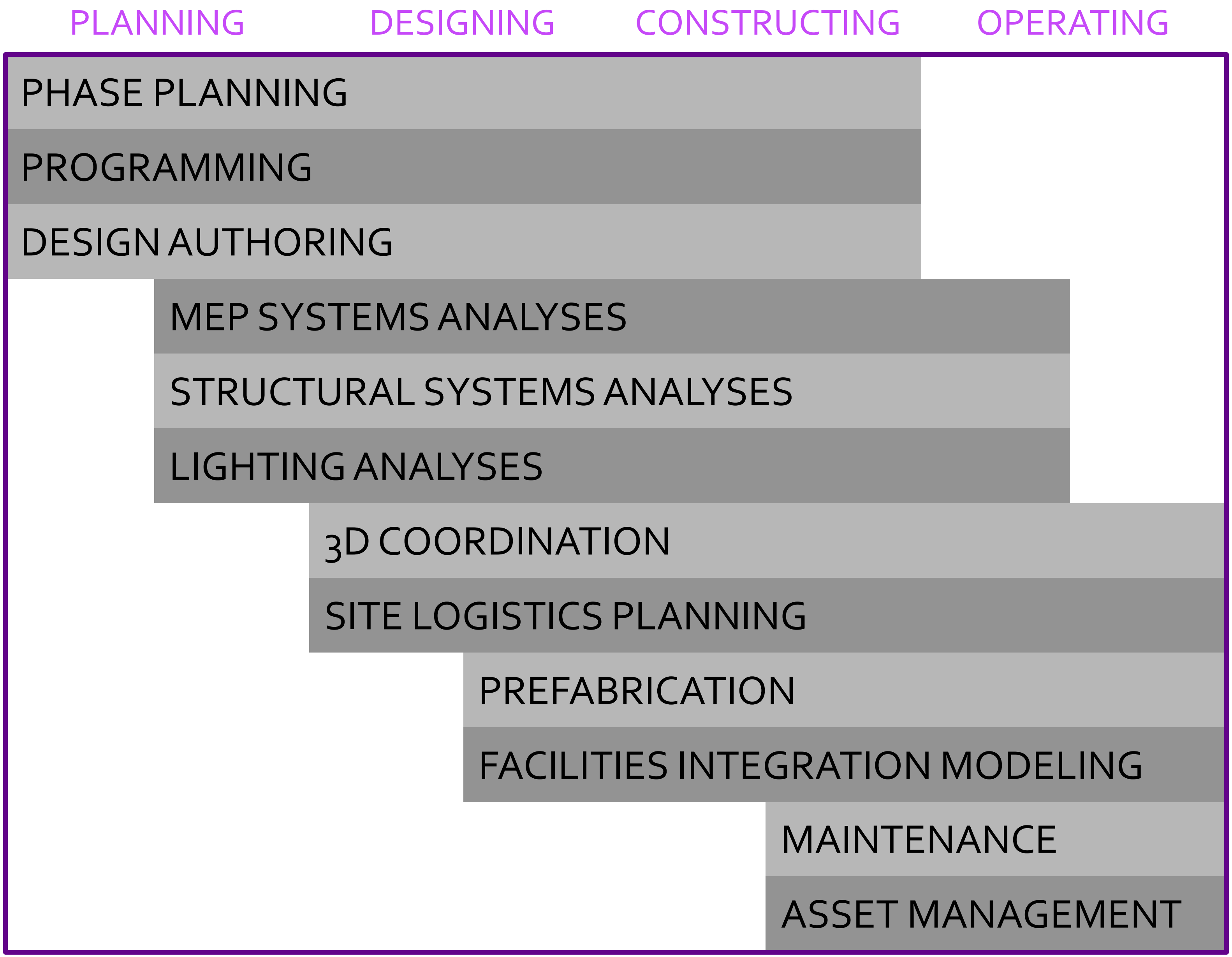
LIGHTING ANALYSES


PLANNING
DESIGNING
CONSTRUCTING
OPERATING
PHASE PLANNING
PROGRAMMING
DESIGN AUTHORING
MEP SYSTEMS ANALYSES
STRUCTURAL SYSTEMS ANALYSES
LIGHTING ANALYSES
3D COORDINATION
SITE LOGISTICS PLANNING

BUILDING INFORMATION IMPLEMENTATION



BUILDING INFORMATION IMPLEMENTATION



COMMUNICATION METHODS

GROUPME

TRELLO

SHARE DRIVE

GOOGLE DRIVE

EXTERNAL DRIVE

COMMUNICATION METHODS

GROUPME

TRELLO

SHARE DRIVE

GOOGLE DRIVE

EXTERNAL DRIVE

GROUPME

TRELLO

SHARE DRIVE

GOOGLE DRIVE

EXTERNAL DRIVE

COMMUNICATION METHODS

GROUPME

TRELLO

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GOOGLE DRIVE

EXTERNAL DRIVE

COMMUNICATION METHODS

GROUPME

TRELLO

SHARE DRIVE

GOOGLE DRIVE

EXTERNAL DRIVE

DECISION POINT SYSTEM

		ZERO IMPACT GOALS				OWNER DRIVEN EVALUATION CRITERIA															
SYSTEM DESCRIPTION	ENERGY	INTERRUPTION	WASTE	EMISSIONS		ENERGY QUANTITY	COST	SUSTAINABILITY	PHASEABILITY	INNOVATION	COMPLEXITY	SPACE NEEDED	MAINTENANCE	INTEGRATION	SITE/CLIMATE ISSUES	TEACHING	PRACTICALITY	LIFECYCLE	EFFECTIVENESS		RECOMMENDED?

++	BEST
+	POSITIVE
0	NO IMPACT
-	NEGATIVE
--	WORST

DECISION POINT SYSTEM

SYSTEM DESCRIPTION	ZERO IMPACT GOALS				OWNER DRIVEN EVALUATION CRITERIA															RECOMMENDED?
	ENERGY	INTERRUPTION	WASTE	EMISSIONS	ENERGY QUANTITY	COST	SUSTAINABILITY	PHASEABILITY	INNOVATION	COMPLEXITY	SPACE NEEDED	MAINTENANCE	INTEGRATION	SITE/CLIMATE ISSUES	TEACHING	PRACTICALITY	LIFECYCLE	EFFECTIVENESS		

++	BEST
+	POSITIVE
0	NO IMPACT
-	NEGATIVE
--	WORST

DECISION POINT SYSTEM

			ZERO IMPACT GOALS				OWNER DRIVEN EVALUATION CRITERIA														
	SYSTEM DESCRIPTION		ENERGY	INTERRUPTION	WASTE	EMISSIONS	ENERGY QUANTITY	COST	SUSTAINABILITY	PHASEABILITY	INNOVATION	COMPLEXITY	SPACE NEEDED	MAINTENANCE	INTEGRATION	SITE/CLIMATE ISSUES	TEACHING	PRACTICALITY	LIFECYCLE	EFFECTIVENESS	RECOMMENDED?

++	BEST
+	POSITIVE
0	NO IMPACT
-	NEGATIVE
--	WORST

DECISION POINT SYSTEM

	SYSTEM DESCRIPTION	ZERO IMPACT GOALS: ENERGY	INTERRUPTION	WASTE	EMISSIONS	OWNER DRIVEN EVALUATION CRITERIA: ENERGY QUANTITY	COST	SUSTAINABILITY	PHASEABILITY	INNOVATION	COMPLEXITY	SPACE NEEDED	MAINTENANCE	INTEGRATION	SITE/CLIMATE ISSUES	TEACHING	PRACTICALITY	LIFECYCLE	EFFECTIVENESS	RECOMMENDED?
GRAVITY SYSTEM	Composite Beams and Deck	0	0	+	-	0	0	+	+	0	0	-	0	+	-	0	+	+	++	Yes
	Wood Floor	+	0	++	++	0	+	++	+	++	-	-	-	0	--	++	--	--	-	No
	Non-Composite Beams and Deck	0	0	-	-	0	-	0	+	0	0	--	0	-	-	0	-	0	-	No
LATERAL SYSTEM	Steel Braced Frame Core	0	+	+	0	0	-	+	++	0	-	+	0	++	+	+	++	+	++	Yes
	Concrete Core	0	+	-	--	0	+	0	-	0	-	0	-	-	-	0	0	-	+	No
	Steel Shear Walls	0	0	+	0	0	-	+	+	+	0	+	0	-	+	+	+	0	+	No
SPECIAL SEISMIC DESIGN	Outriggers	0	+	+	0	0	-	+	-	+	--	-	0	-	+	+	-	+	++	Yes
	Outrigger and Dampers	+	++	+	0	0	--	+	-	++	--	-	--	-	0	+	-	-	++	Maybe
	Base Isolation System	+	++	0	0	0	--	--	--	++	--	--	--	--	0	++	-	0	++	No

++	BEST
+	POSITIVE
0	NO IMPACT
-	NEGATIVE
--	WORST

DECISION POINT SYSTEM

	System Description	Energy	Interruption	Waste	Emissions	Energy Quantity	Cost	Sustainability	Phaseability	Innovation	Complexity	Space Needed	Maintenance	Integration	Site/Climate Issues	Teaching	Practicality	Lifecycle	Effectiveness	Recommended?
		Zero Impact Goals				**Owner Driven Evaluation Criteria**														
Gravity System	Composite Beams and Deck	0	0	+	-	0	0	+	+	0	0	-	0	+	-	0	+	+		Yes
Gravity System	Wood Floor	+	0	--	--	0	+	--	+	--	-	-	-	0	--	++	--	--	-	No
Gravity System	Non-Composite Beams and Deck	0	0	-	-	0	-	0	+	0	0	--	0	-	-	0	-	0	-	No
Lateral System	Steel Braced Frame Core	0	+	+	0	0	-	+	++	0	-	+	0	++	+	+	++	+	++	Yes
Lateral System	Concrete Core	0	+	-	--	0	+	0	-	0	-	0	-	-	-	0	0	-	+	No
Lateral System	Steel Shear Walls	0	0	+	0	0	-	+	+	+	0	+	0	-	+	+	+	0	+	No
Special Seismic Design	Outriggers	0	+	+	0	0	-	+	-	+	--	-	0	-	+	+	-	+		Yes
Special Seismic Design	Outrigger and Dampers	+		+	0	0	--	+	-		++	-	++	-	0	+	-	+		Maybe
Special Seismic Design	Base Isolation System	+		0	0	0	--	--	--		--	--	--	--	0		-	0		No

++	BEST
+	POSITIVE
0	NO IMPACT
-	NEGATIVE
--	WORST

OWNER

ARCHITECT

AEVITAS

MECHANICAL DESIGN TEAM

ELECTRICAL DESIGN TEAM

STRUCTURAL DESIGN TEAM

CONSTRUCTION ENGINEERING TEAM

Mechanical Contractor

Electrical Contractor

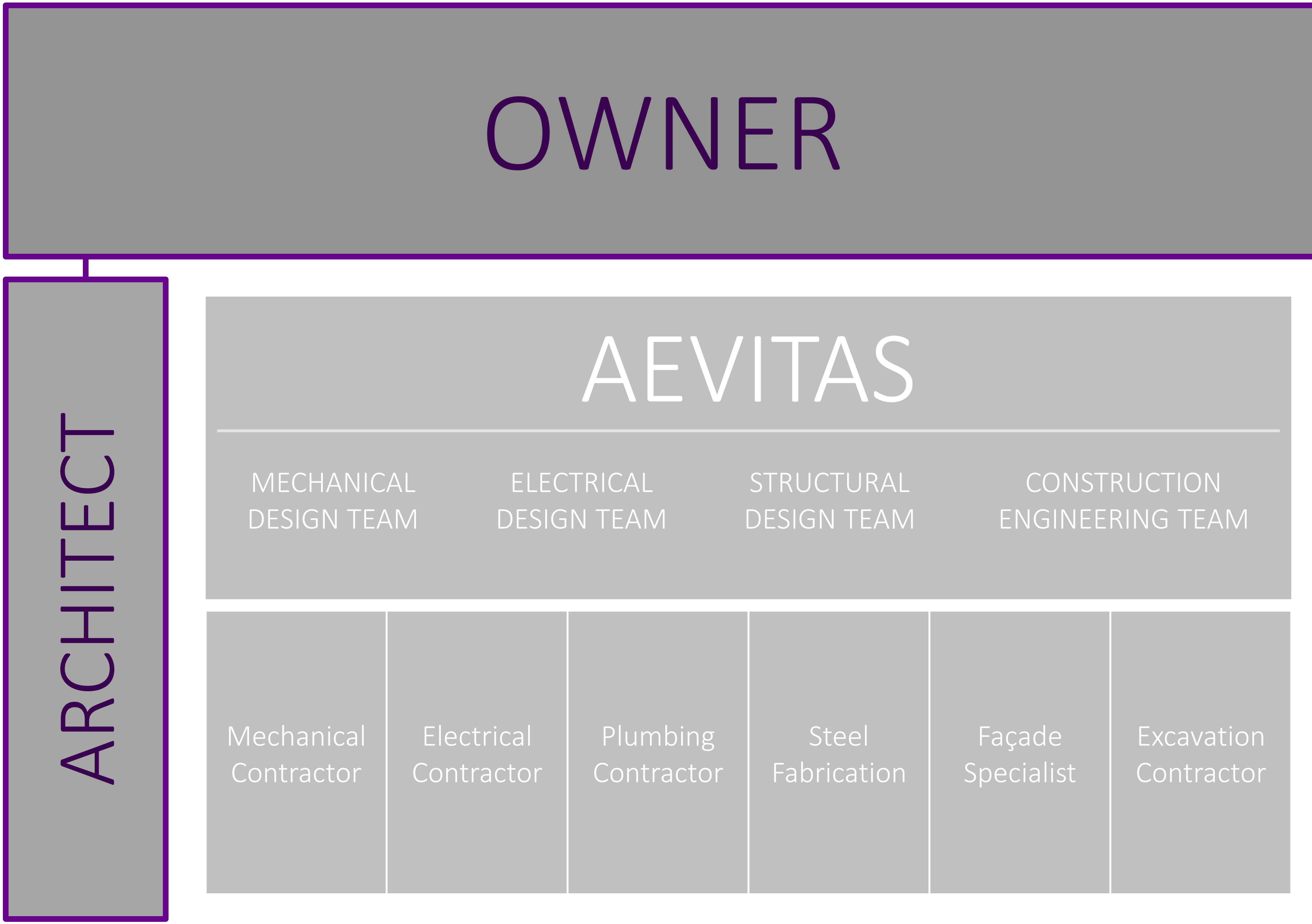
Plumbing Contractor

Steel Fabrication

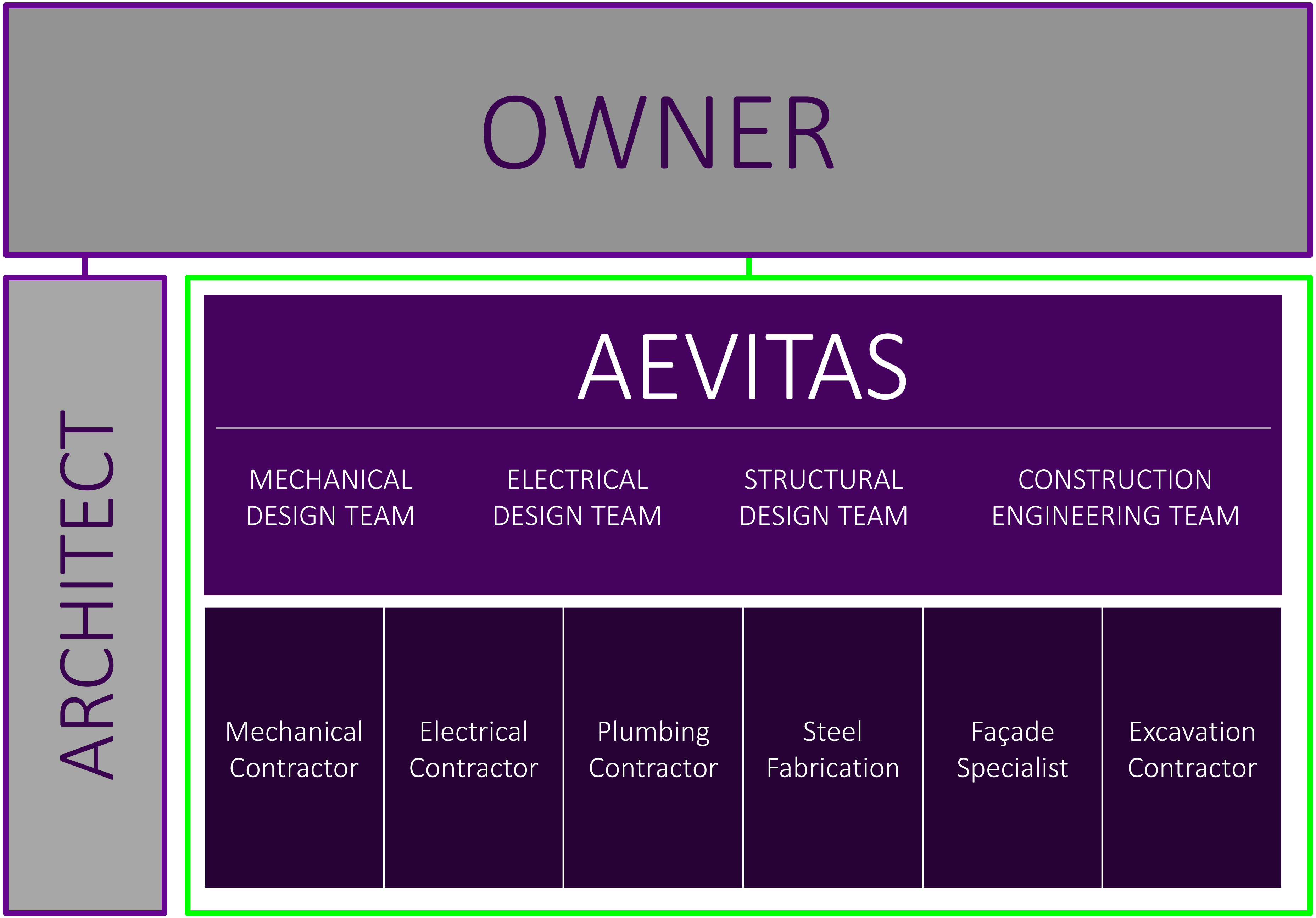
Façade Specialist

Excavation Contractor

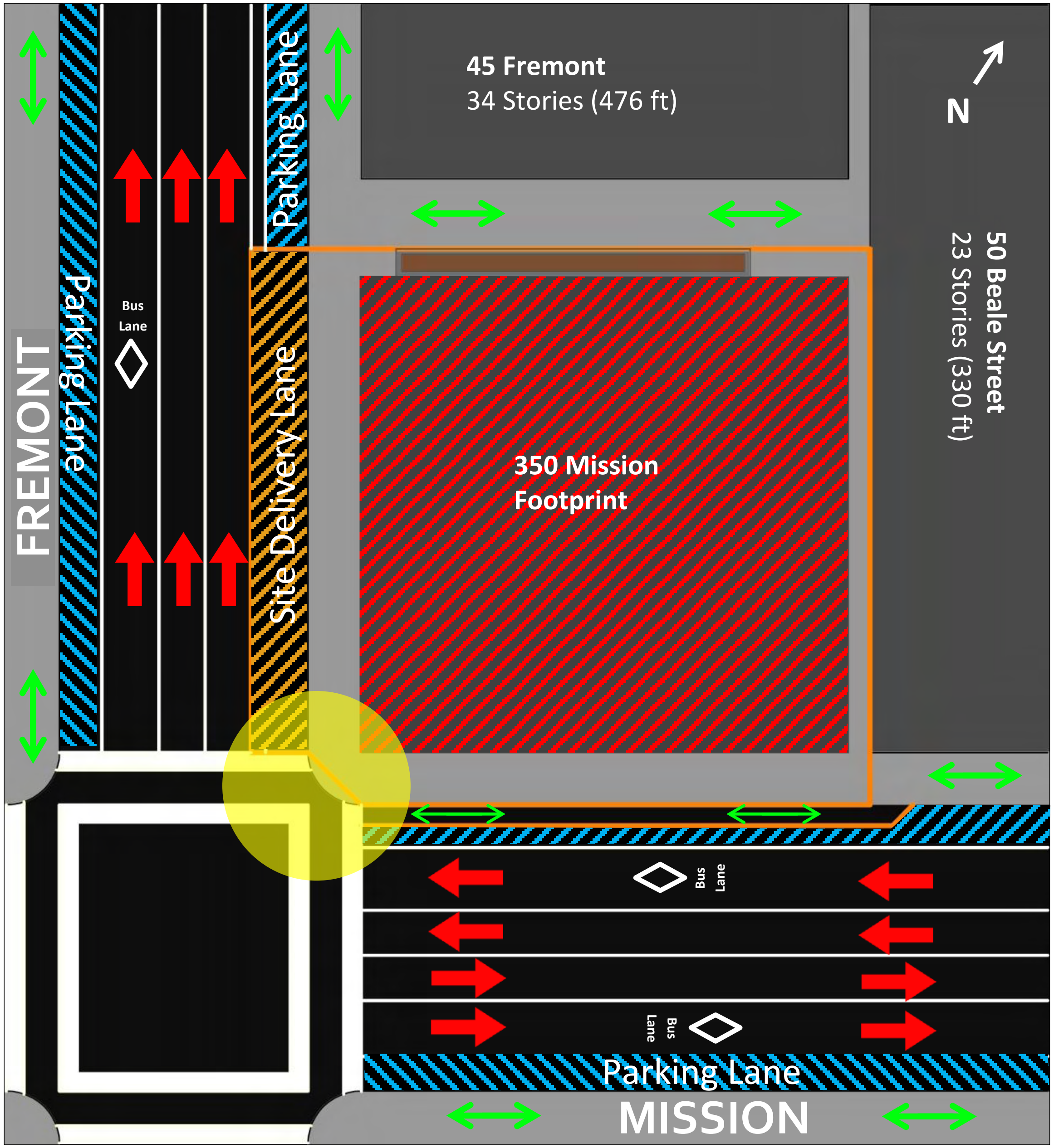
BRIDGING PROJECT DELIVERY METHOD



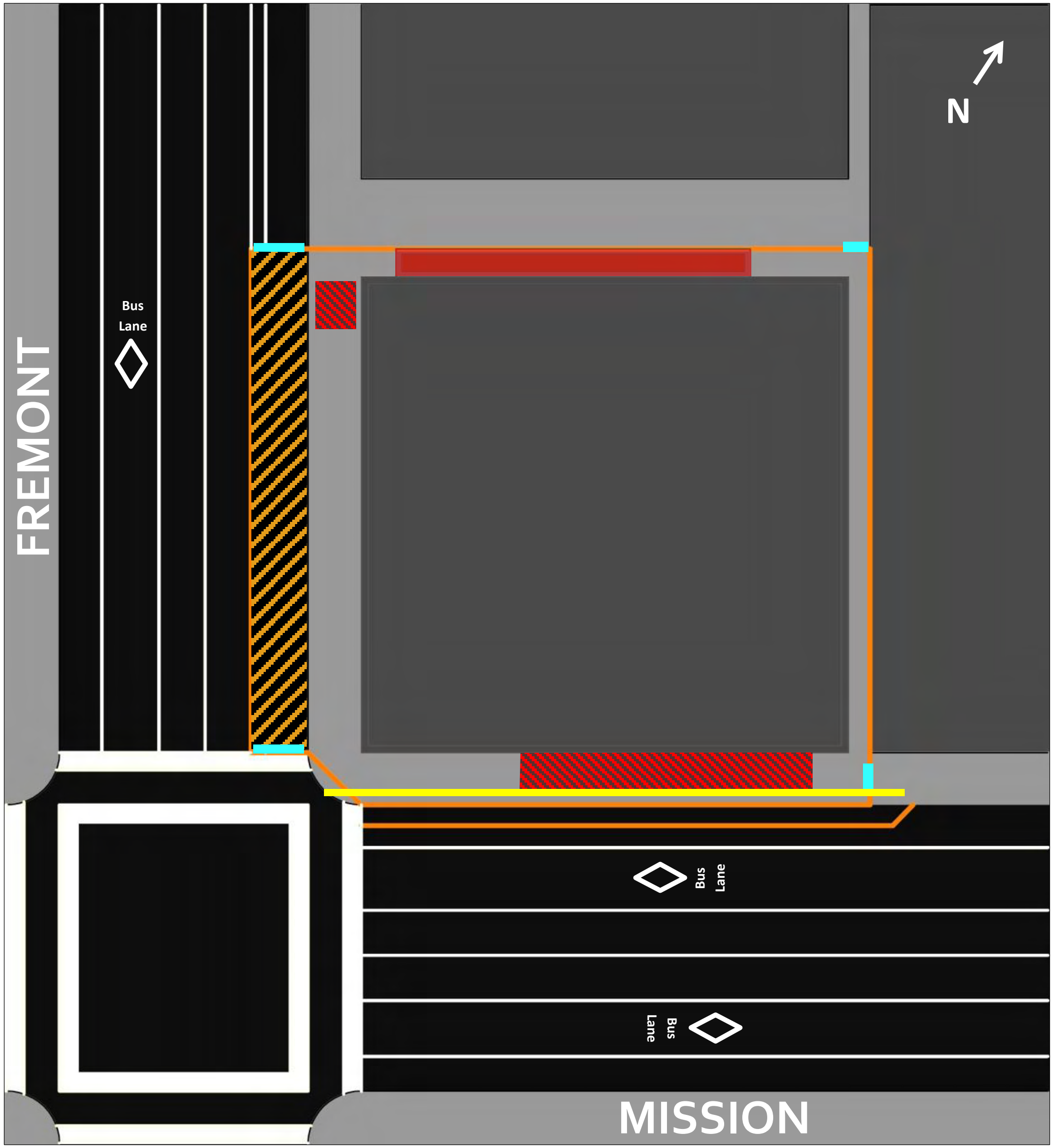
BRIDGING PROJECT DELIVERY METHOD

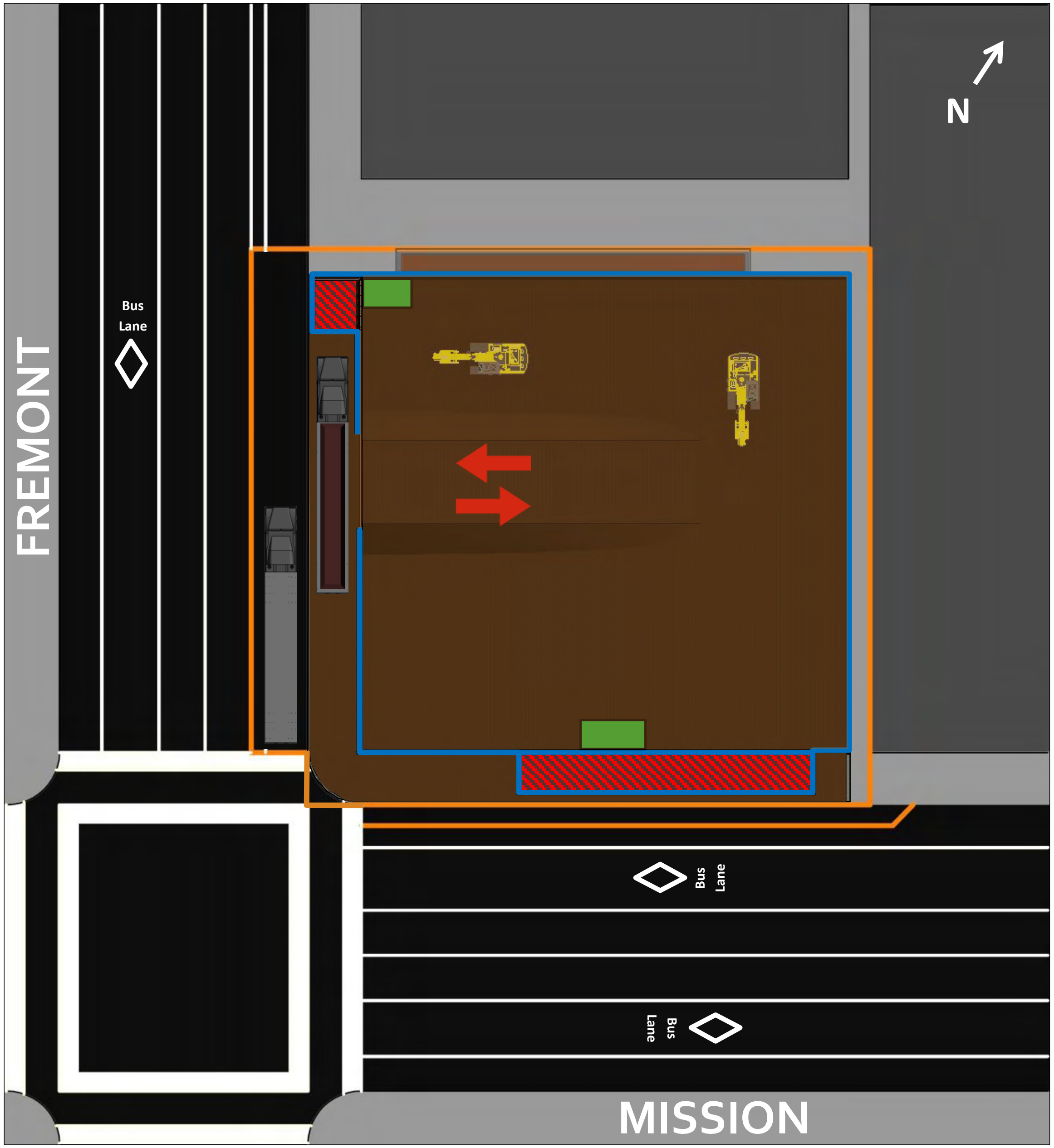


SITE PLANNING: TRAFFIC FLOW PLAN

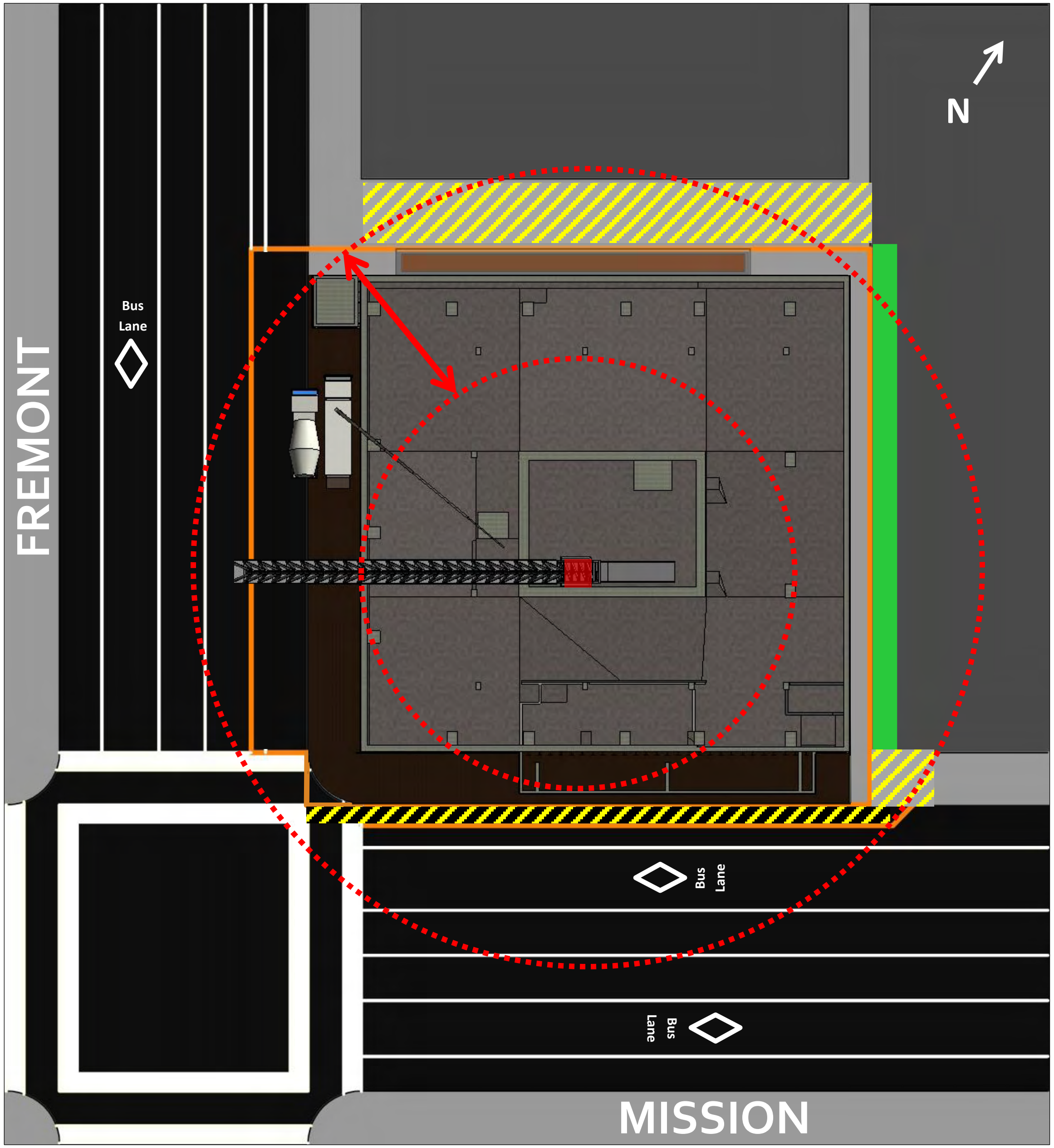


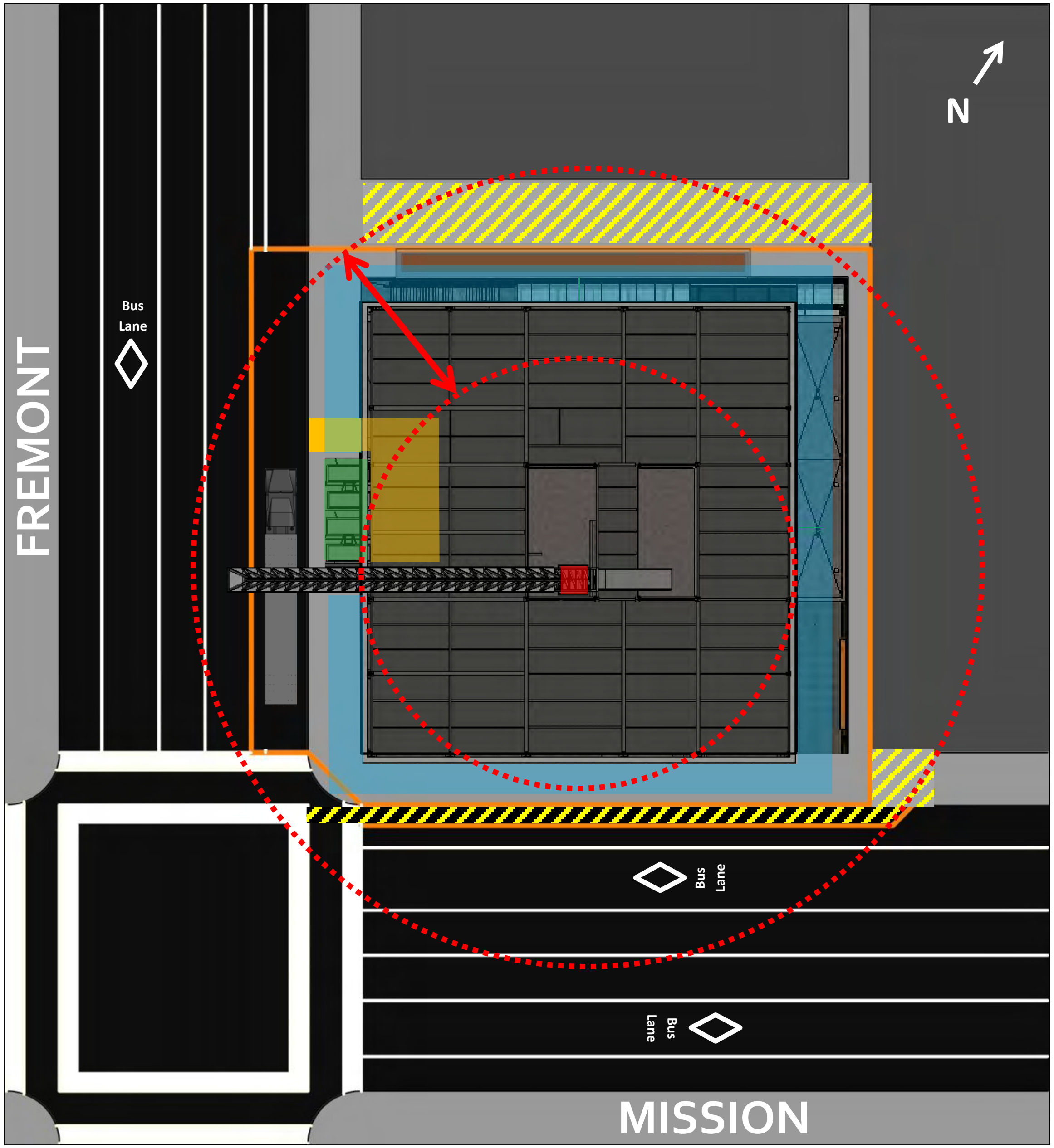
SITE PLANNING: EXISTING CONDITIONS




N
Bus
Lane
FREMONT
Bus
Lane
Bus
Lane
MISSION

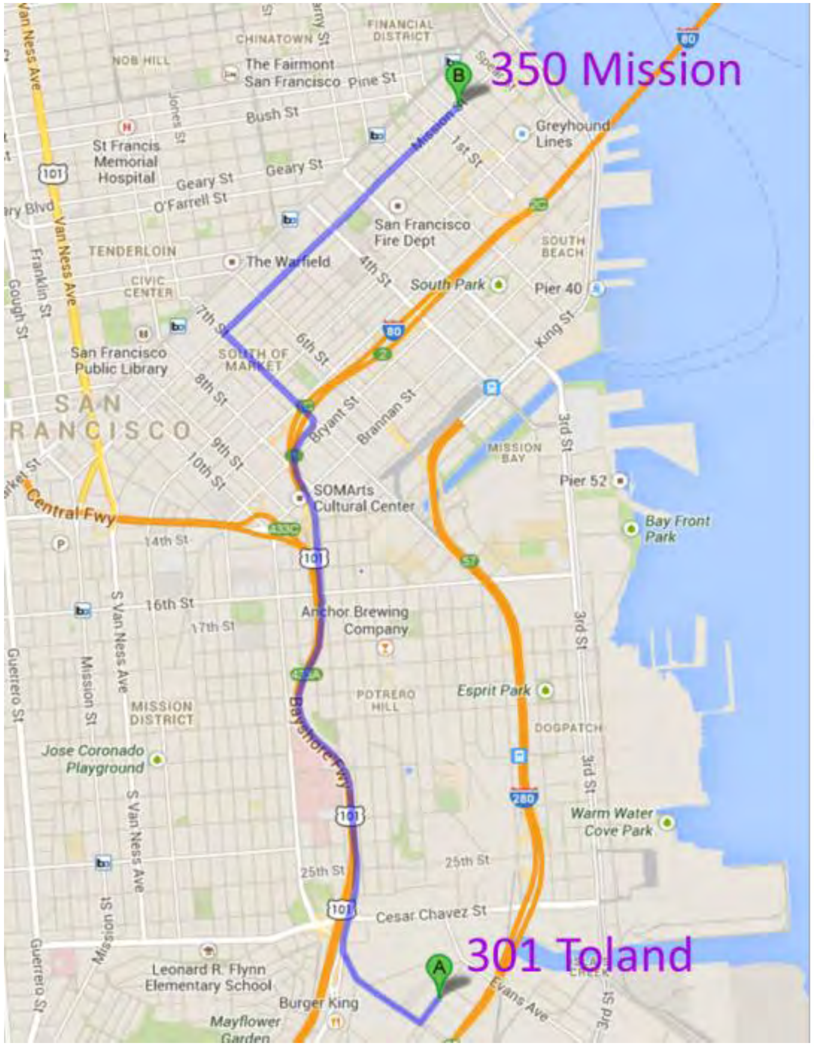
SITE PLANNING: SITE SAFETY AND LOGISTICS IN SUBSTRUCTURE

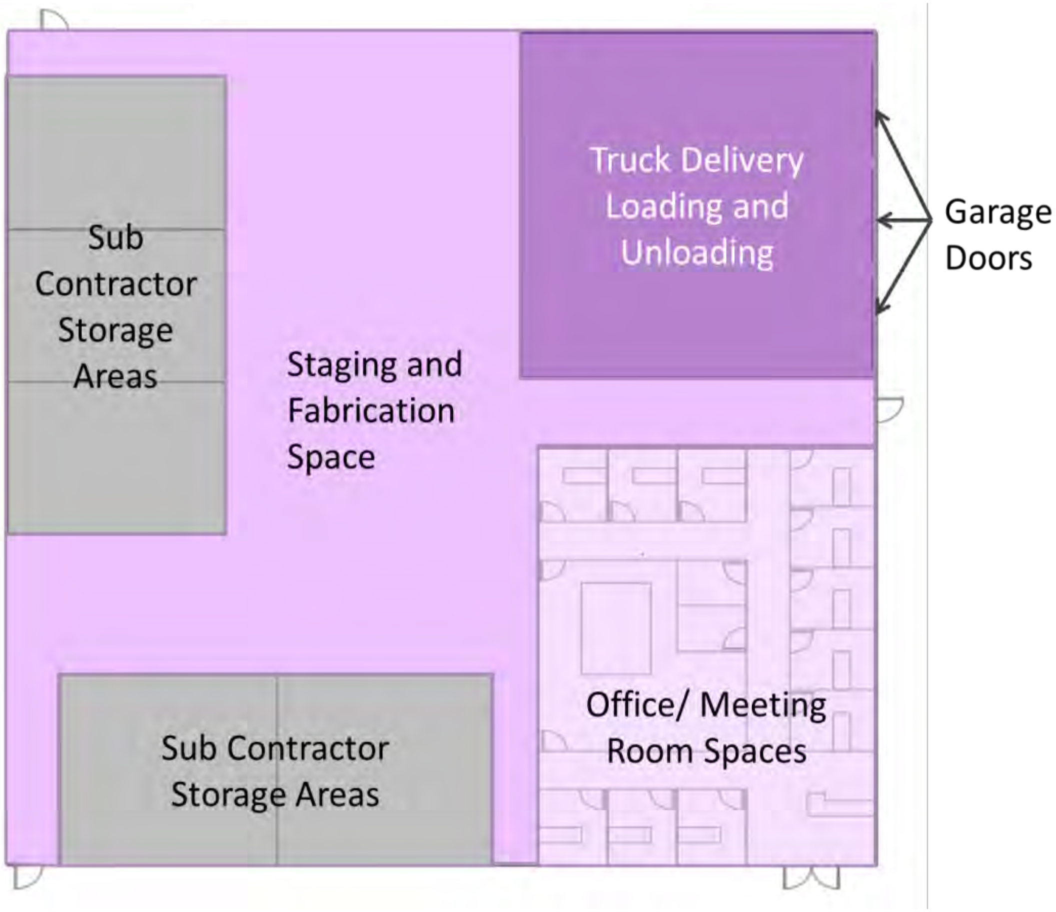



N
Bus
Lane
FREMONT
Bus
Lane
Bus
Lane
MISSION

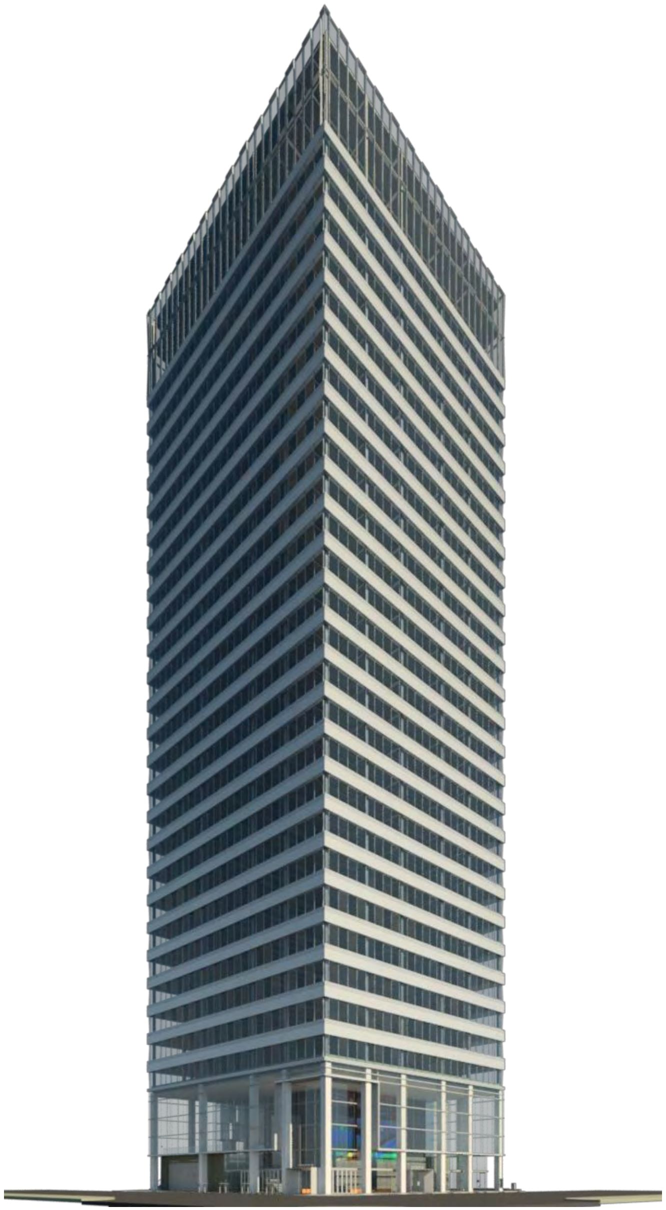
INTERIOR DELIVERY PLANNING

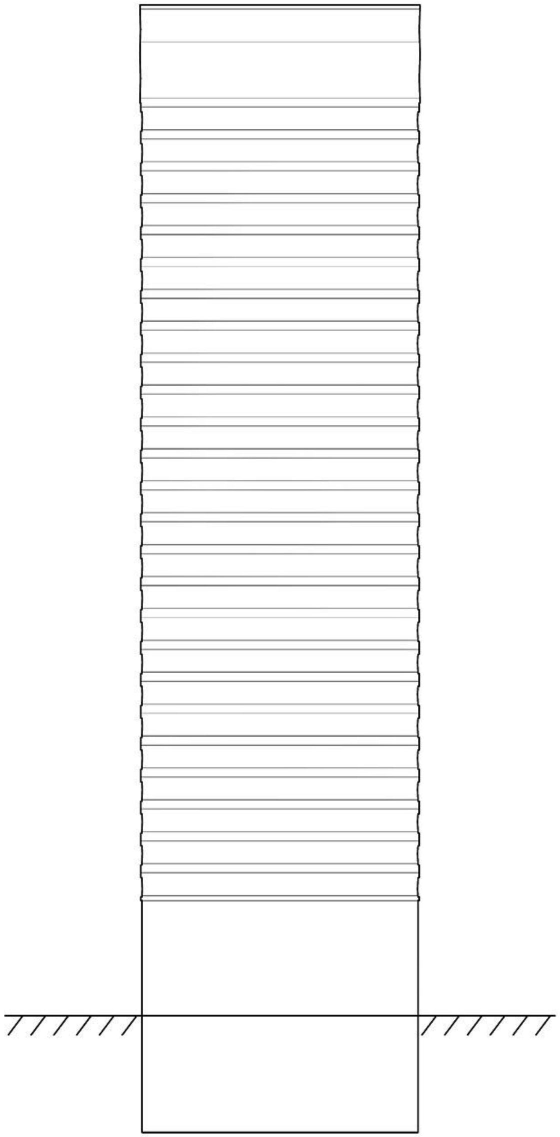
PROJECT FIELD OFFICE INTEGRATIVE SPACE



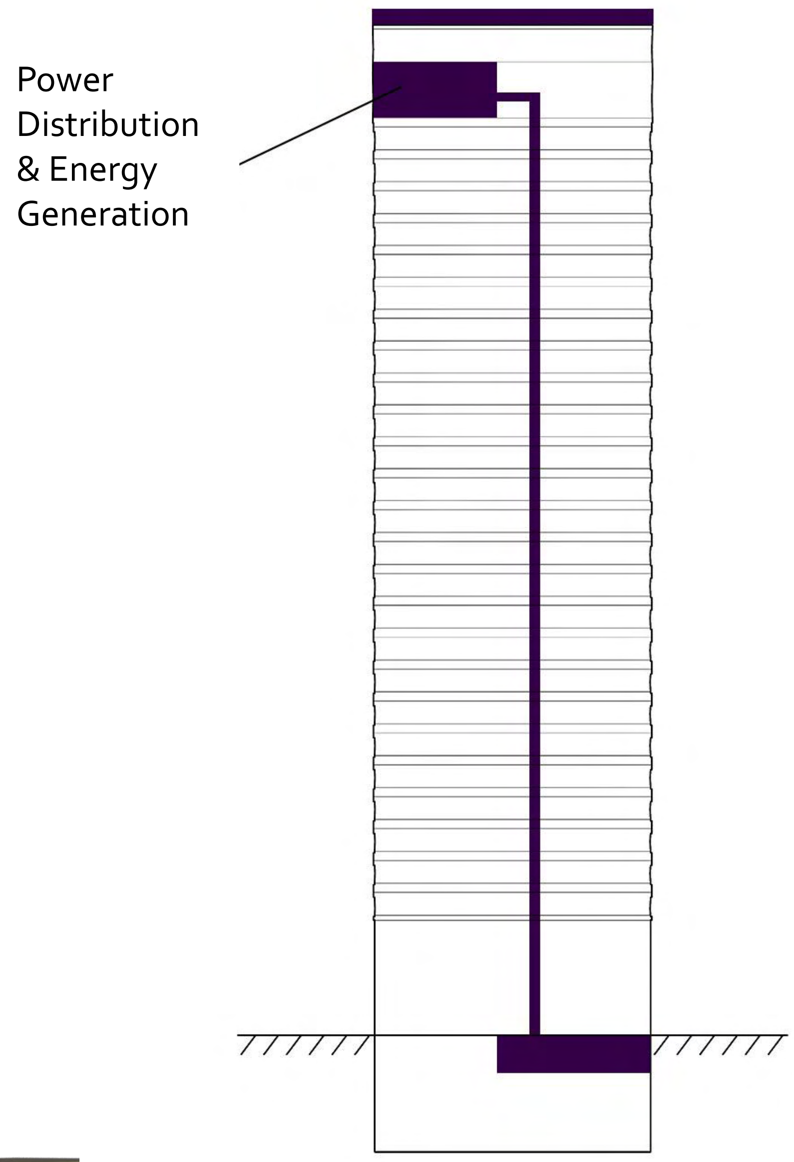


BUILDING SYSTEMS OVERVIEW

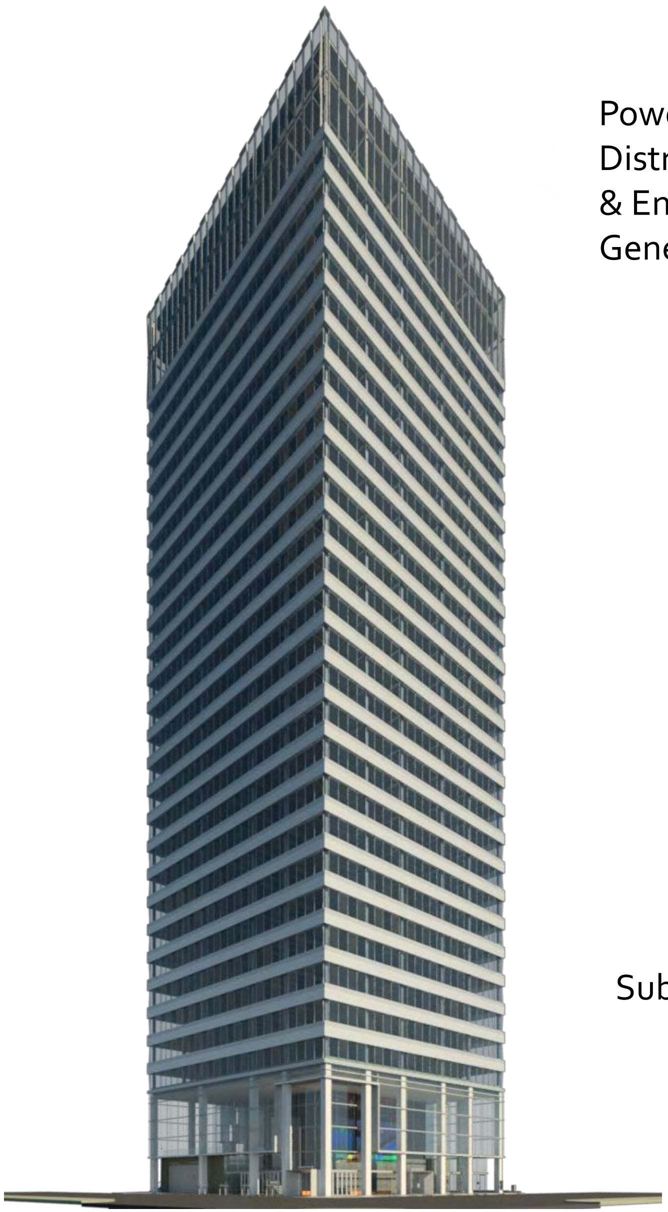


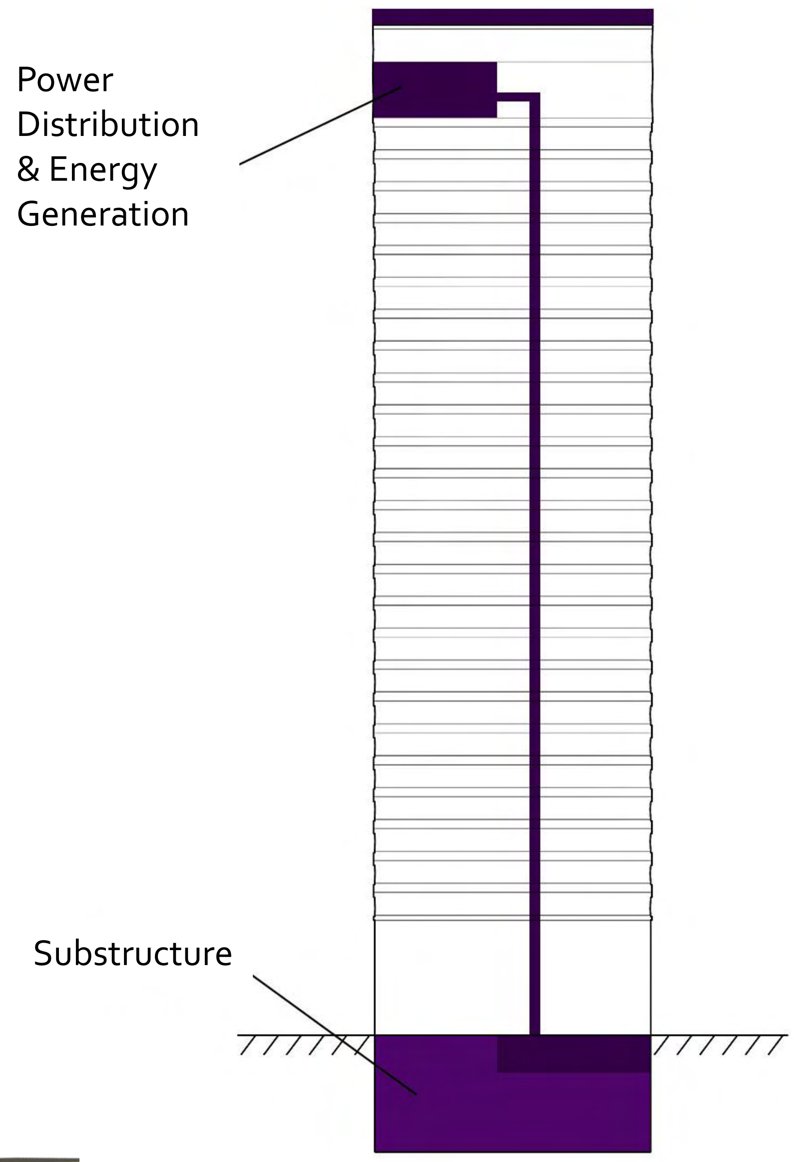


BUILDING SYSTEMS OVERVIEW

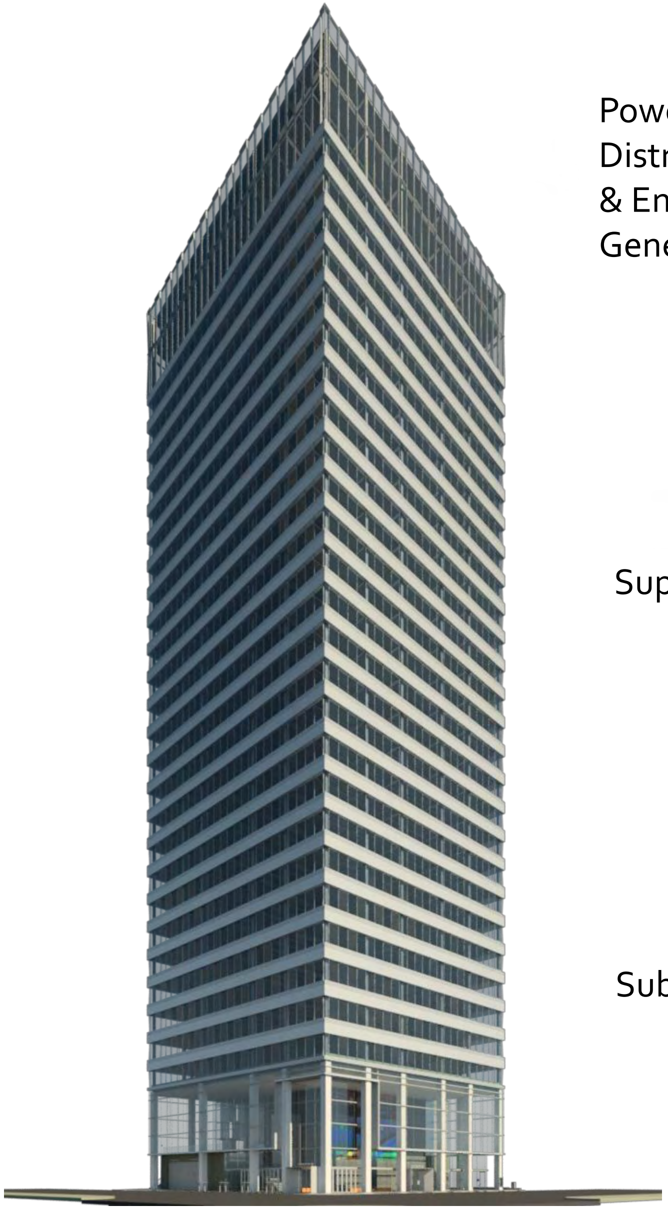


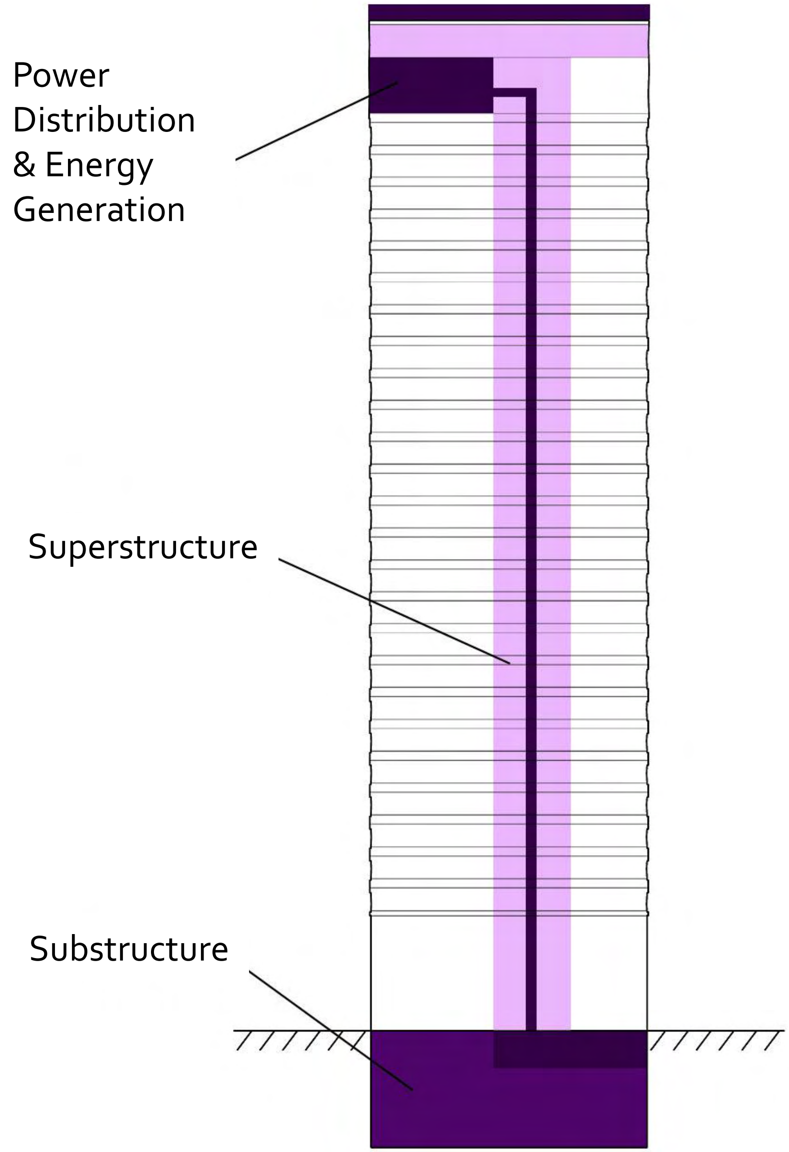
BUILDING SYSTEMS OVERVIEW

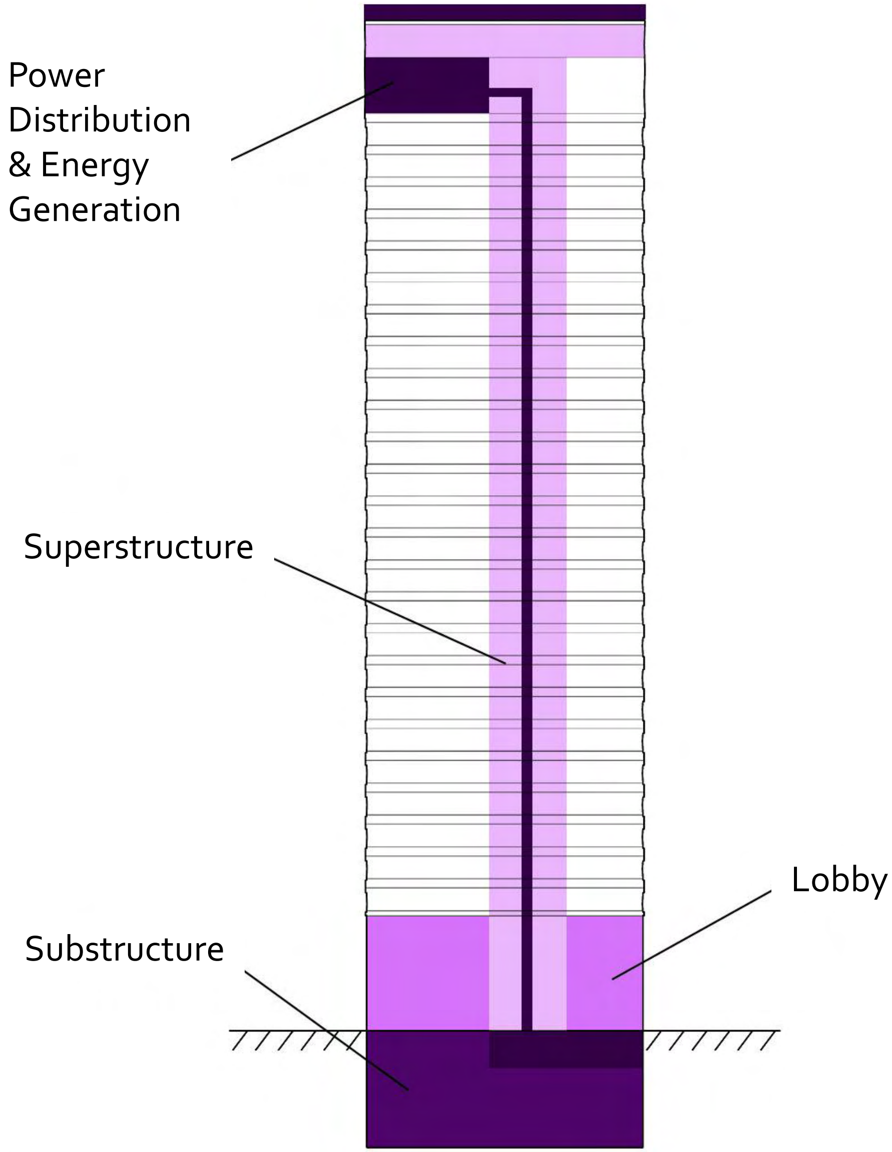




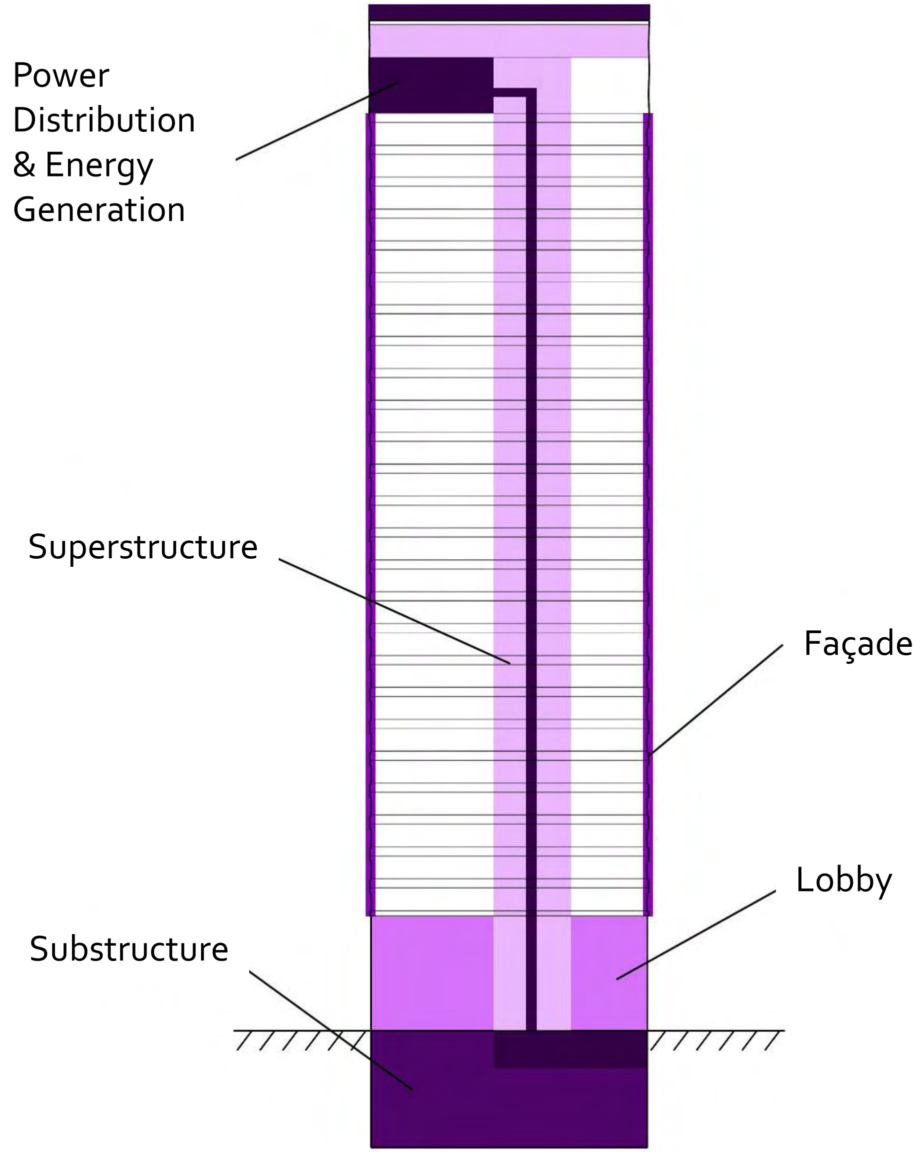
BUILDING SYSTEMS OVERVIEW



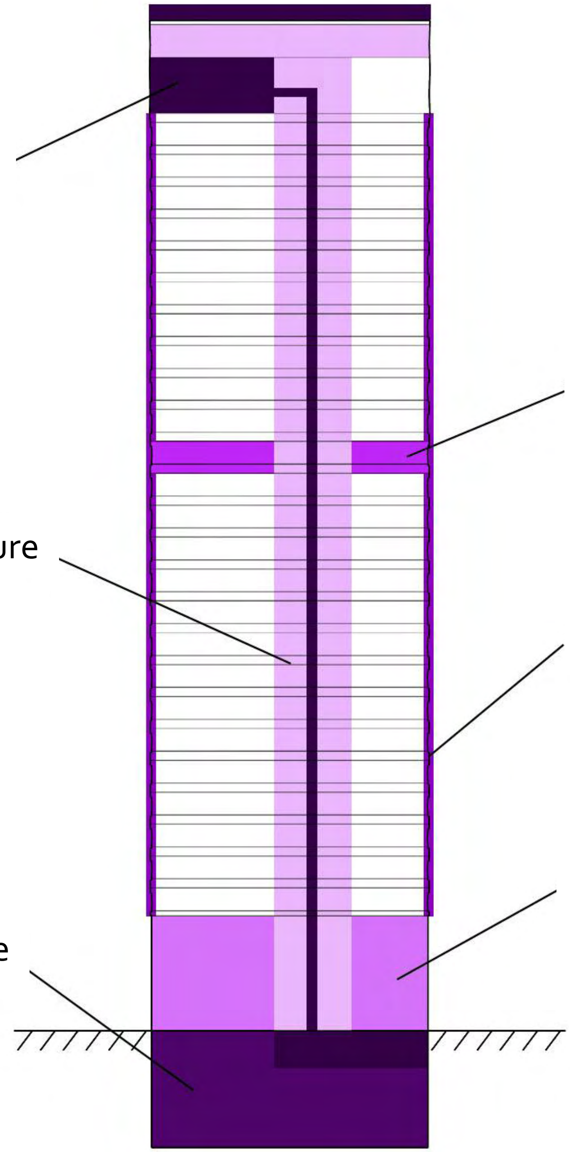



Power
Distribution
& Energy
Generation
Superstructure
Lobby
Substructure

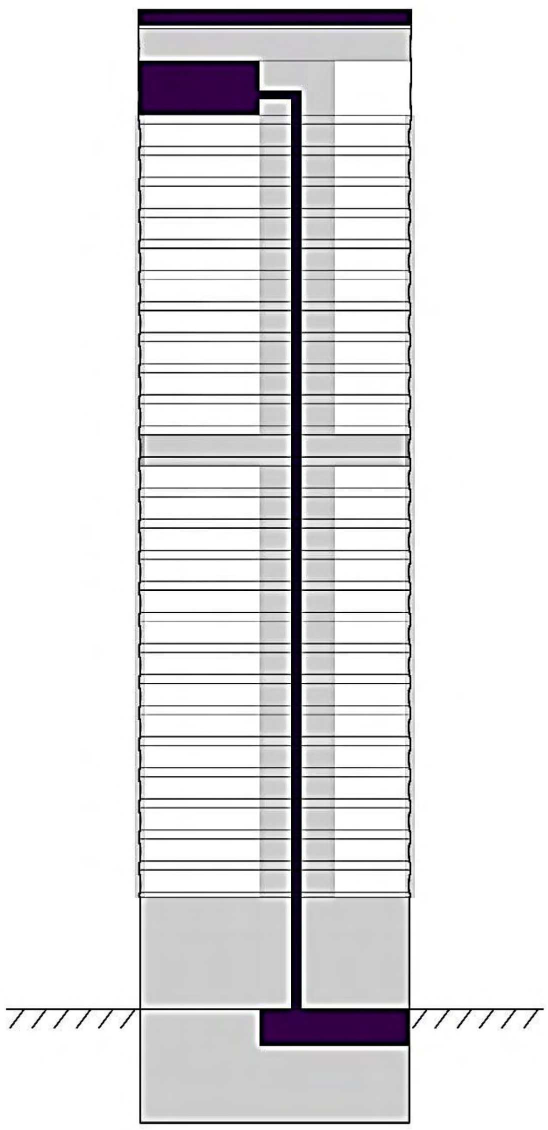
BUILDING SYSTEMS OVERVIEW



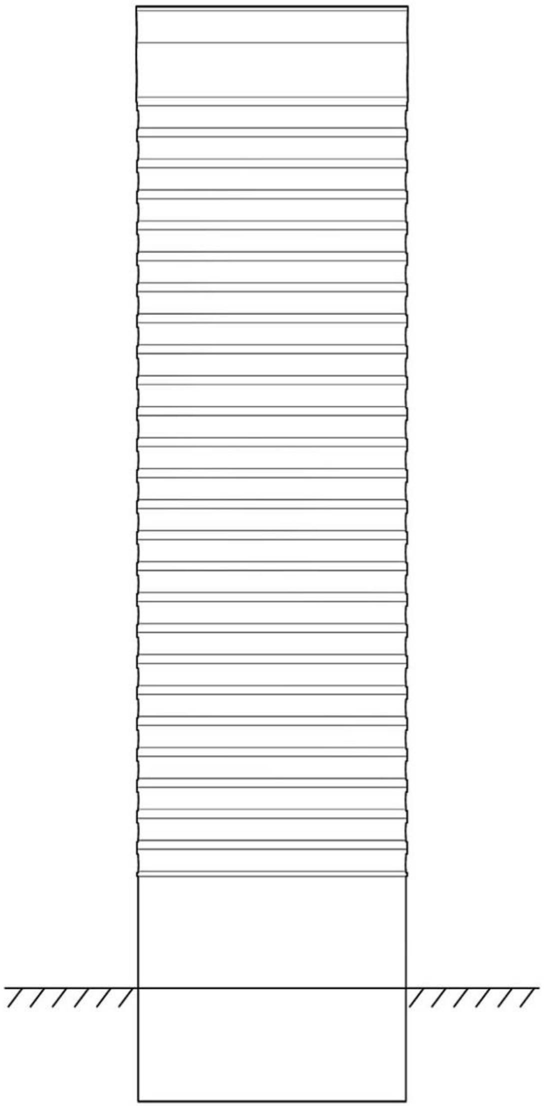
BUILDING SYSTEMS OVERVIEW



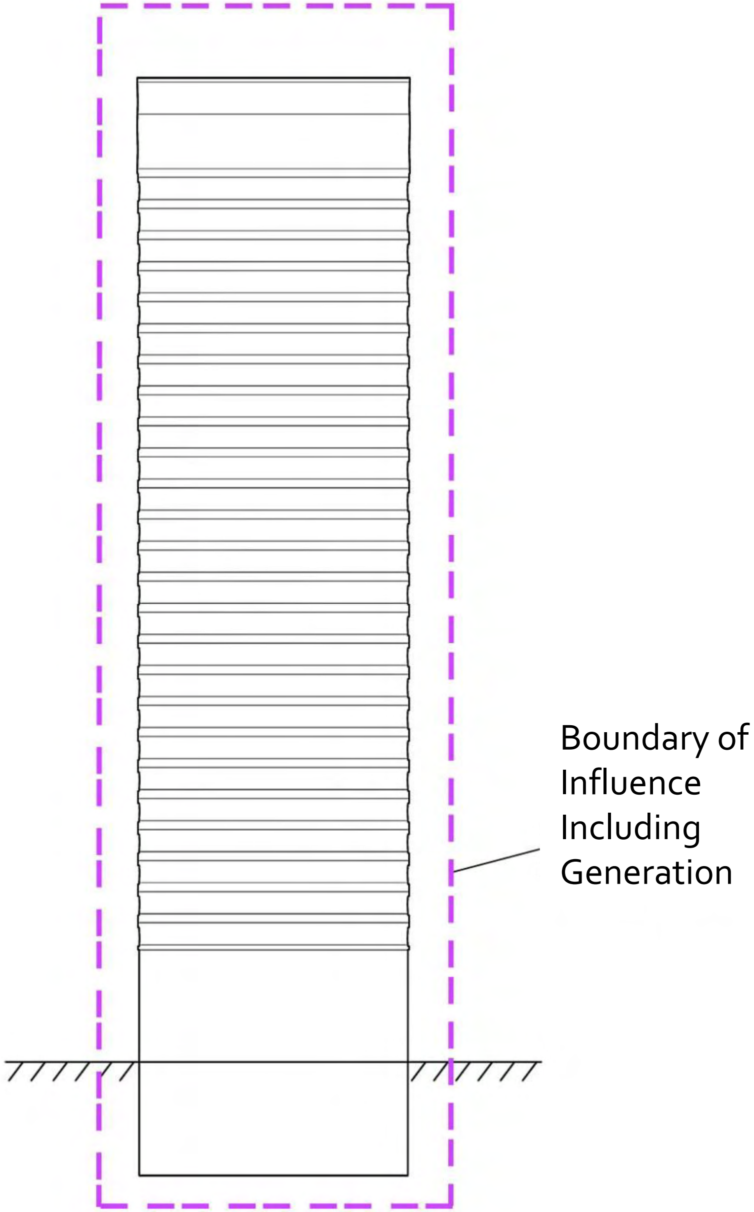
ENERGY GENERATION & POWER DISTRIBUTION SCHEMATIC OVERVIEW



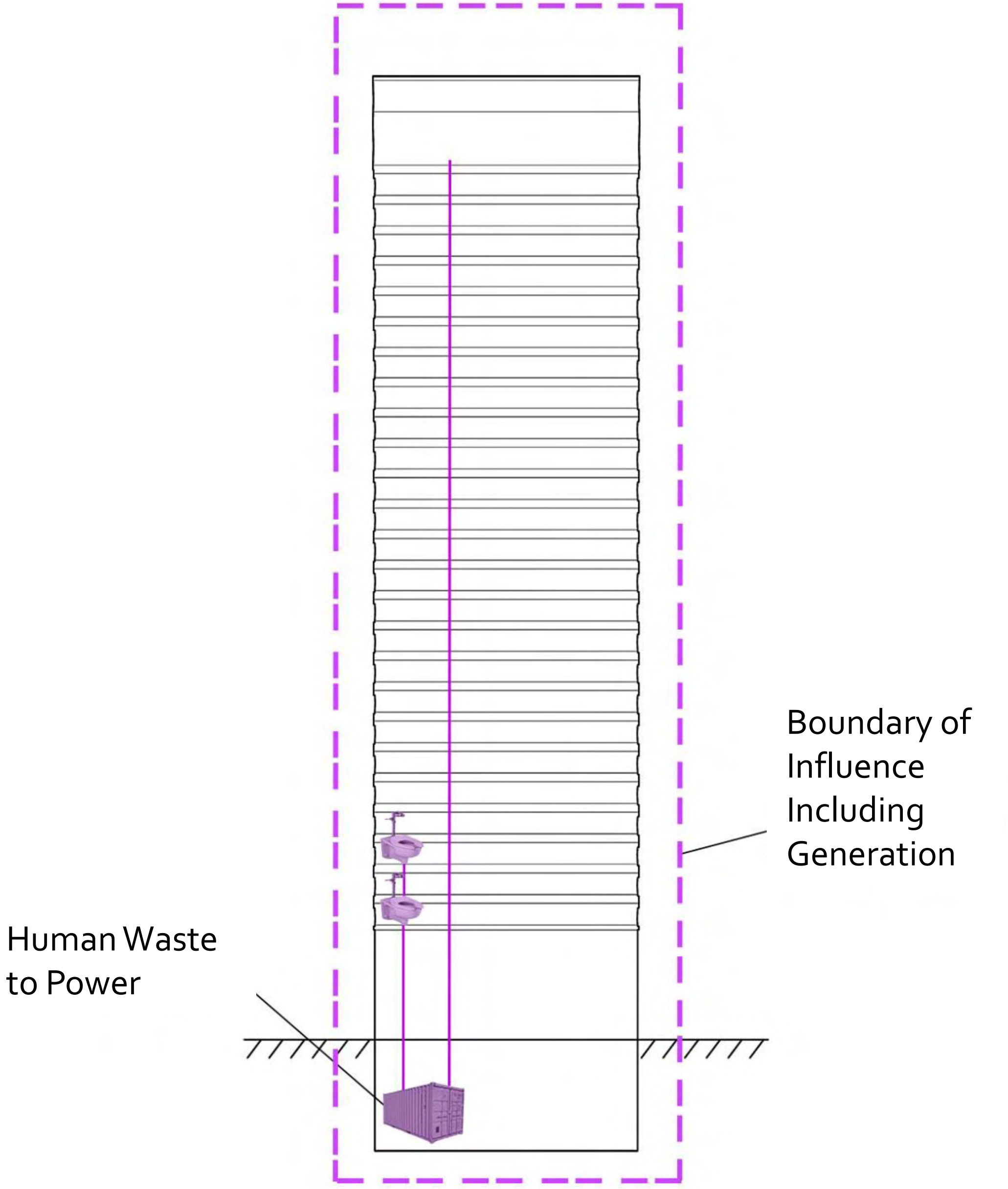
ENERGY GENERATION & POWER DISTRIBUTION SCHEMATIC OVERVIEW



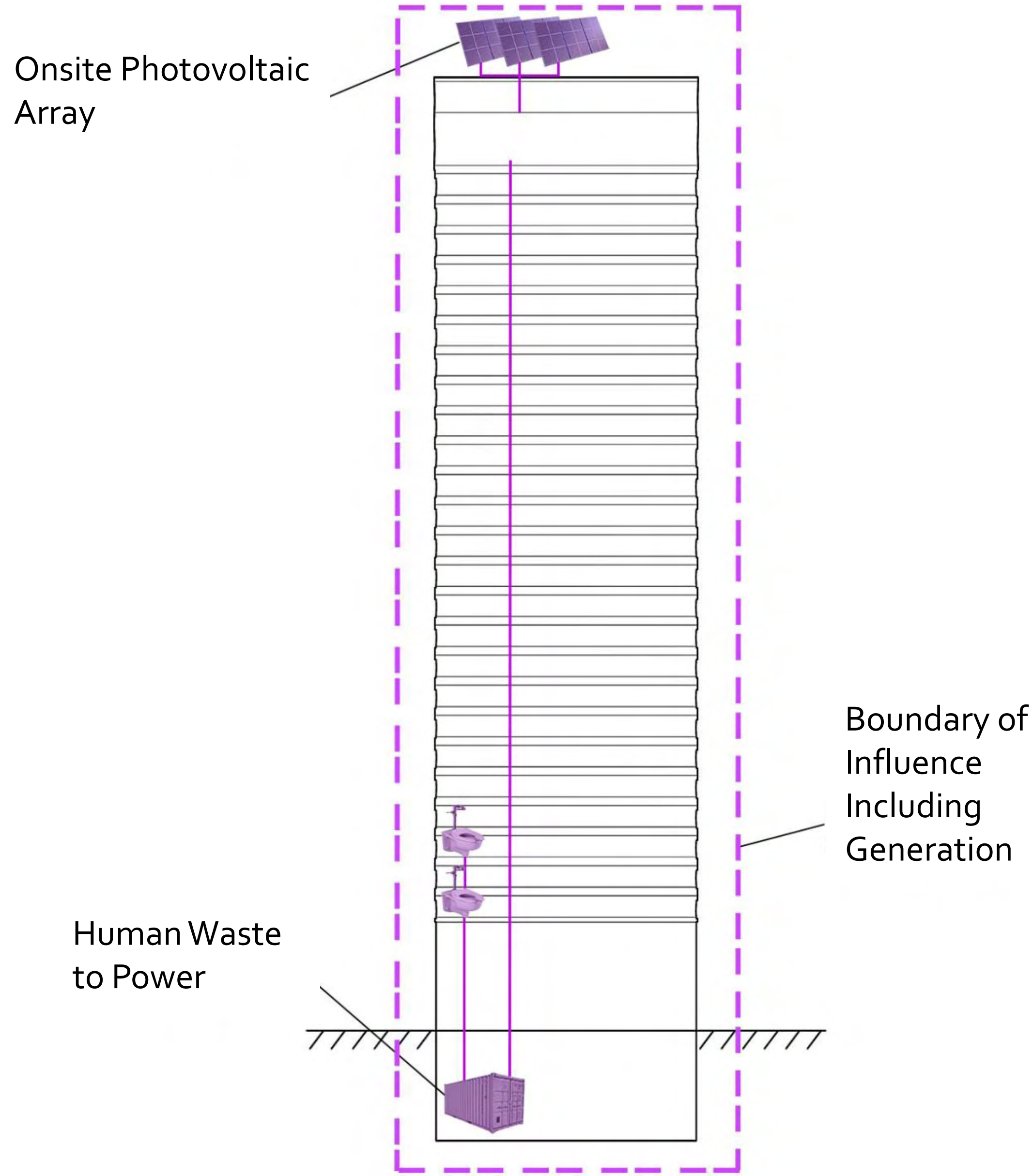
ENERGY GENERATION & POWER DISTRIBUTION SCHEMATIC OVERVIEW



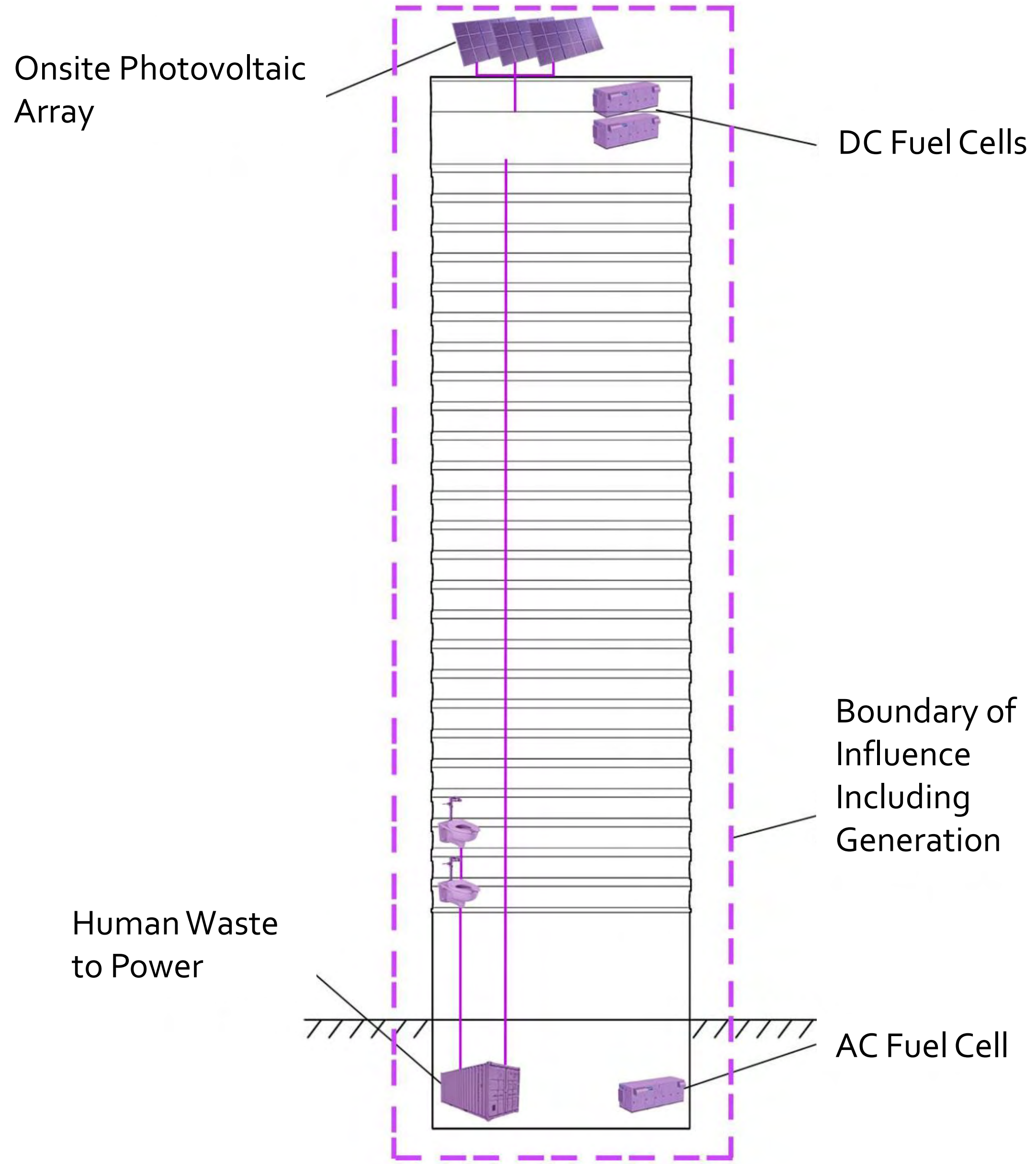
ENERGY GENERATION & POWER DISTRIBUTION SCHEMATIC OVERVIEW



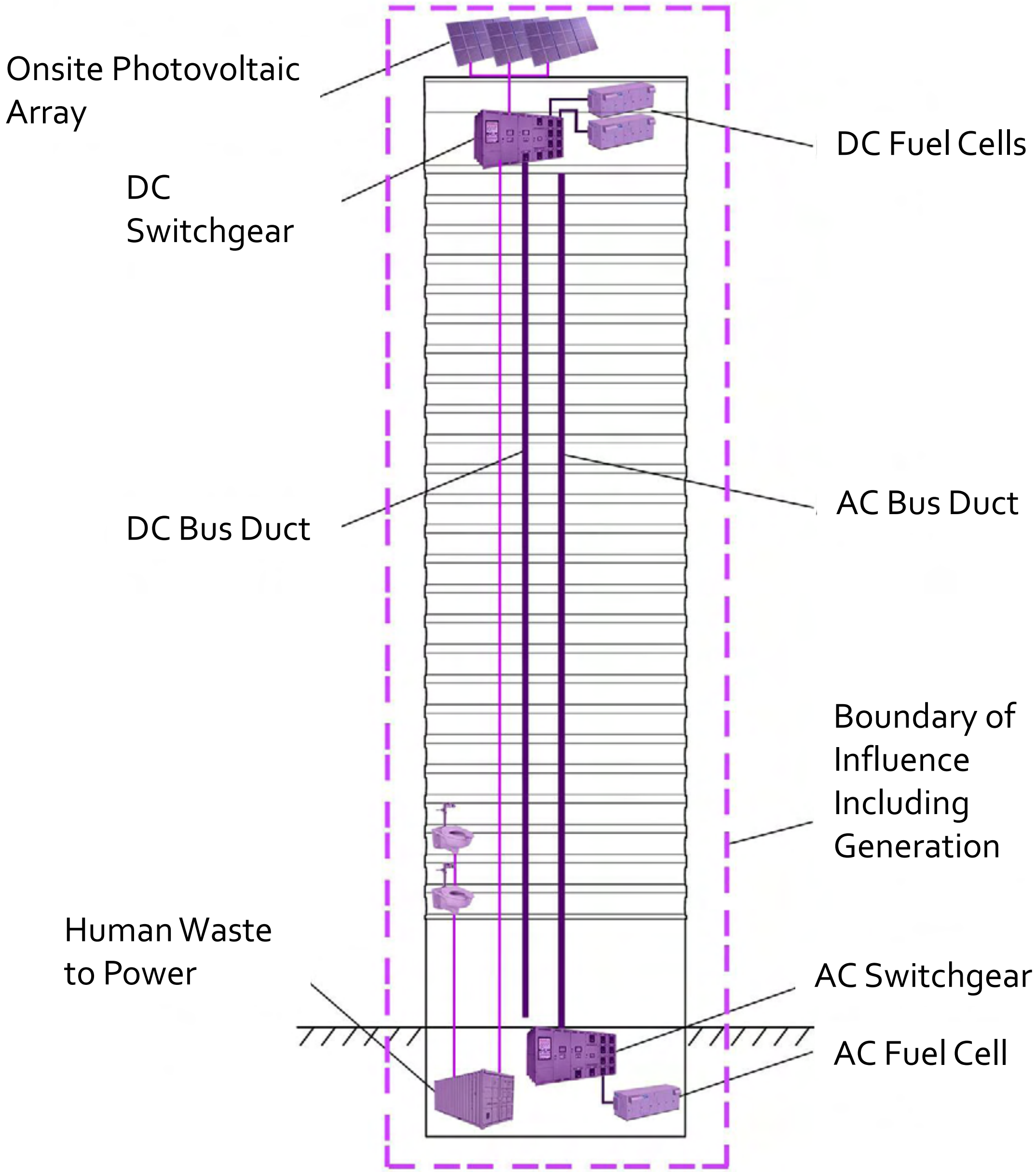
ENERGY GENERATION & POWER DISTRIBUTION SCHEMATIC OVERVIEW



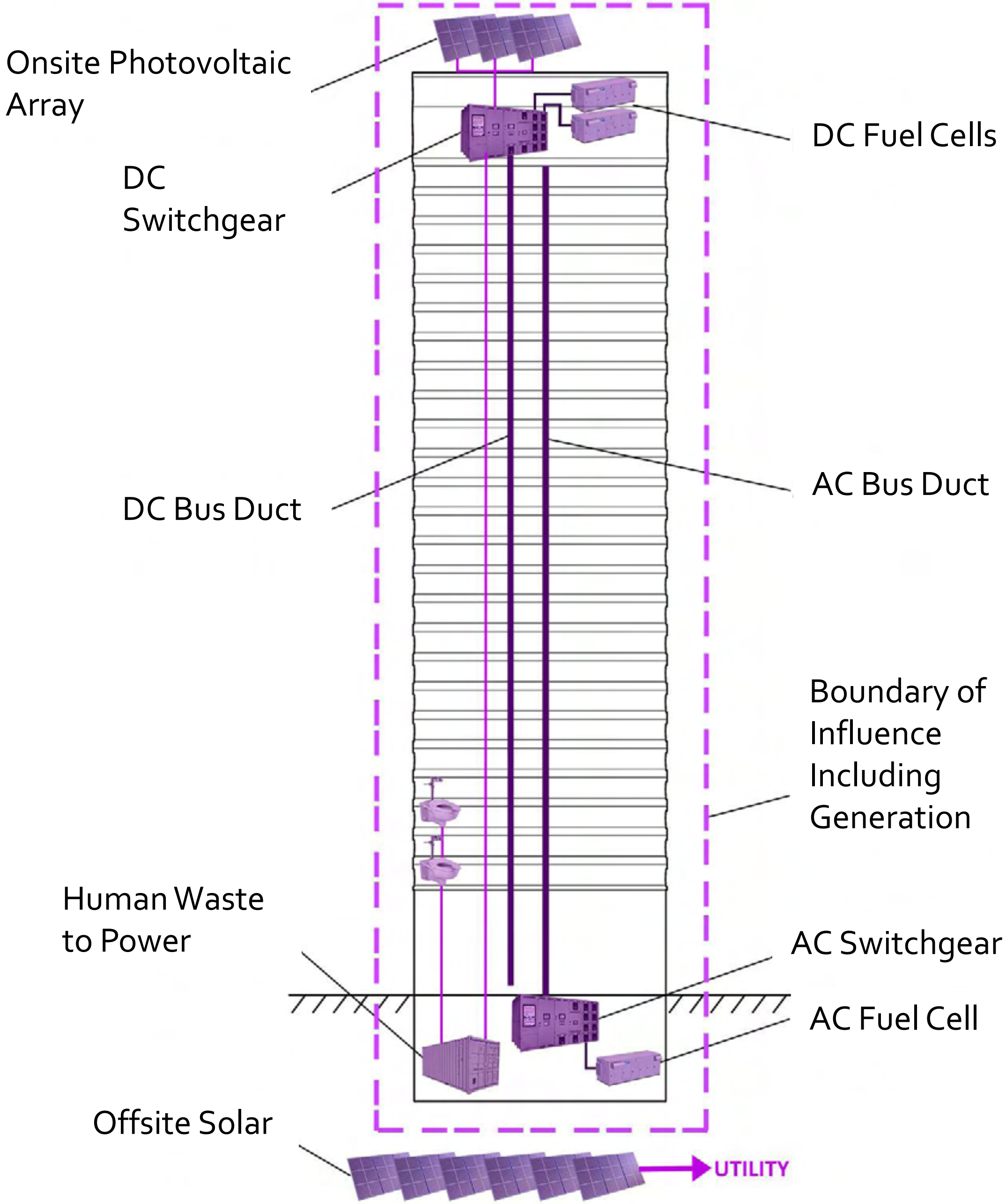
ENERGY GENERATION & POWER DISTRIBUTION SCHEMATIC OVERVIEW



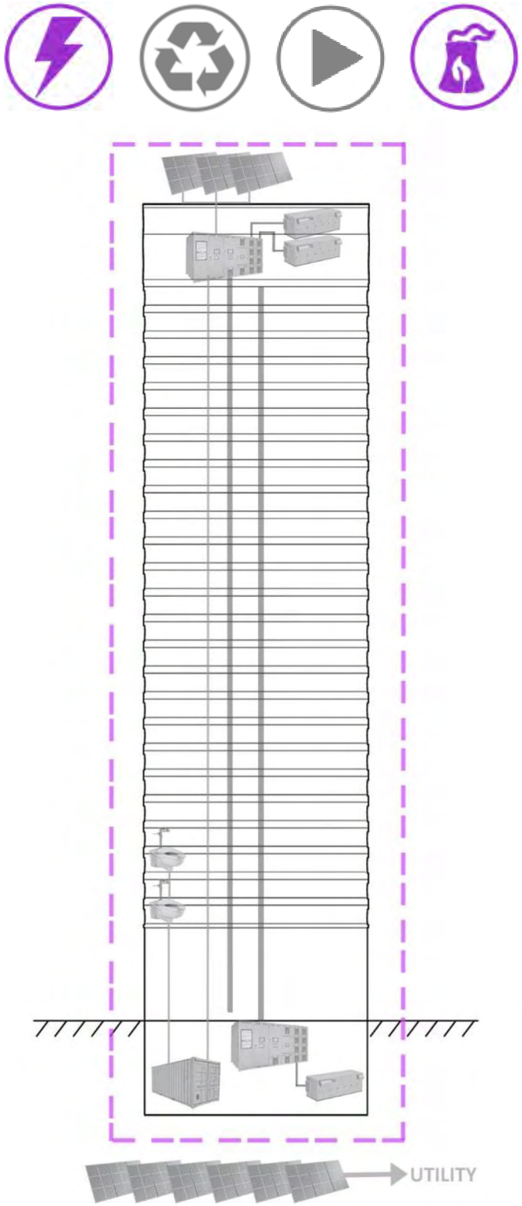
ENERGY GENERATION & POWER DISTRIBUTION SCHEMATIC OVERVIEW

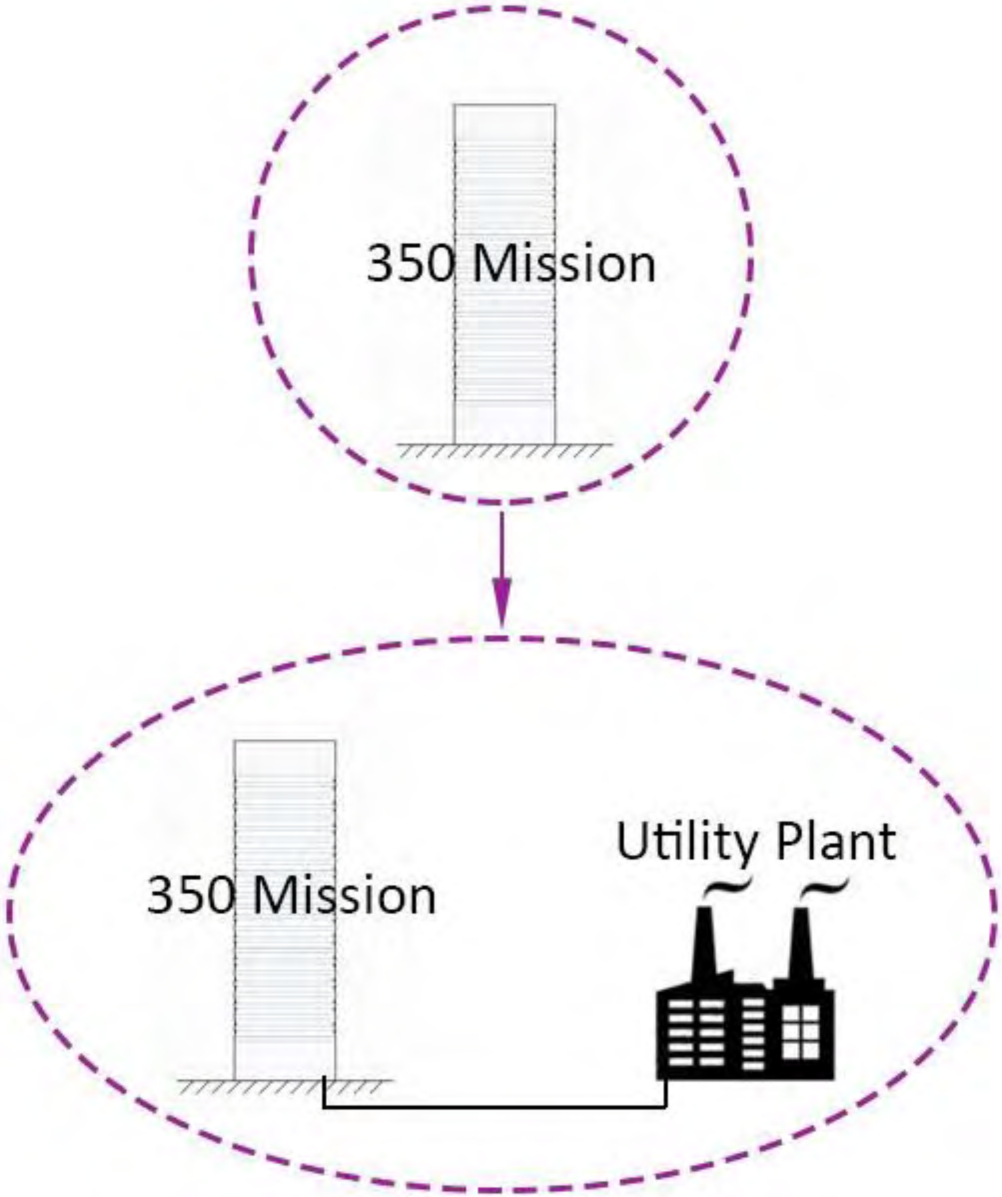


ENERGY GENERATION & POWER DISTRIBUTION SCHEMATIC OVERVIEW

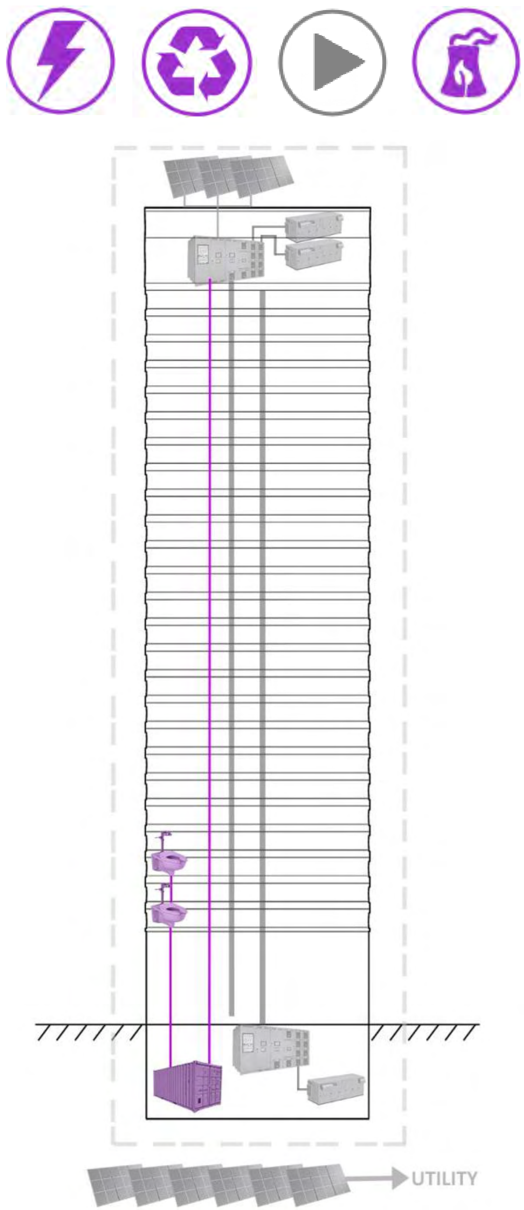


INFLUENCE BOUNDARY

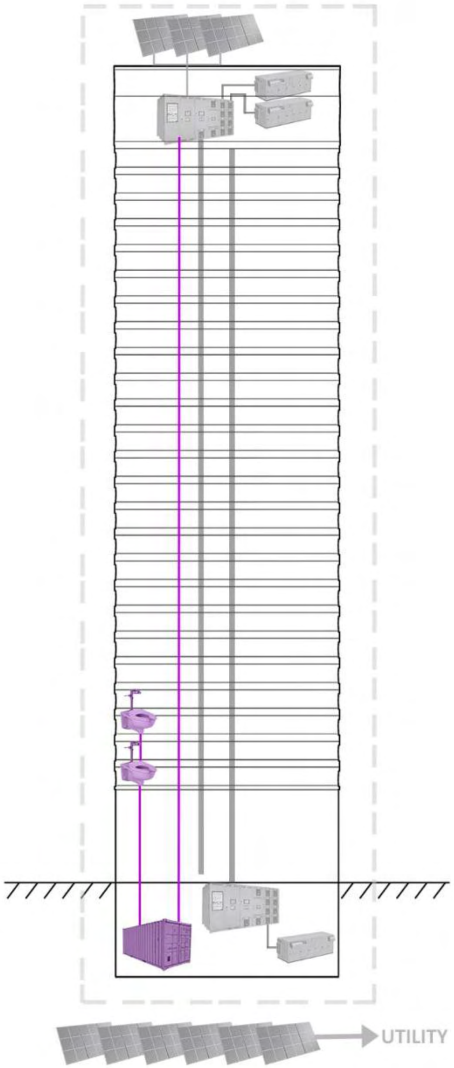


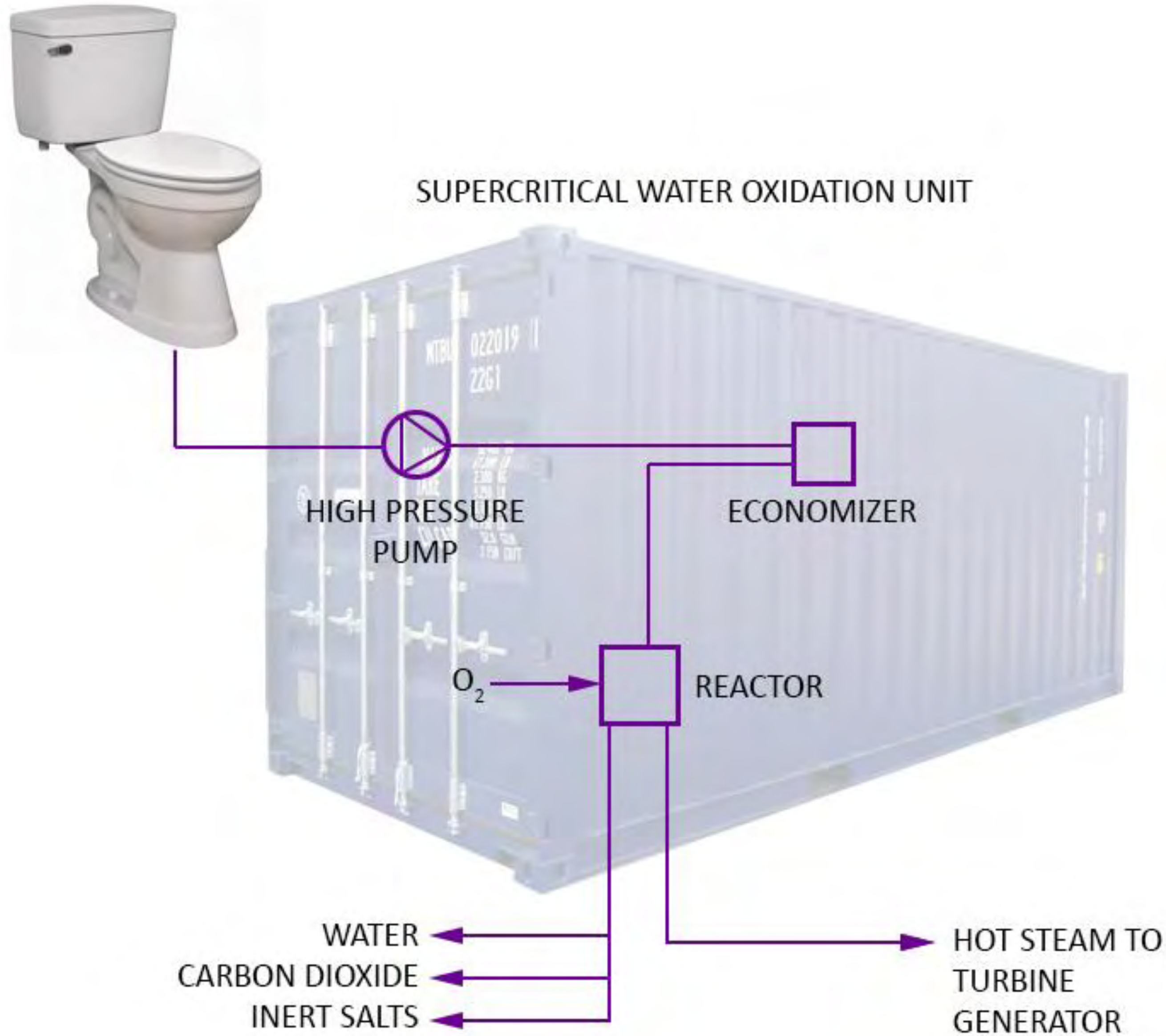


WASTE TO POWER

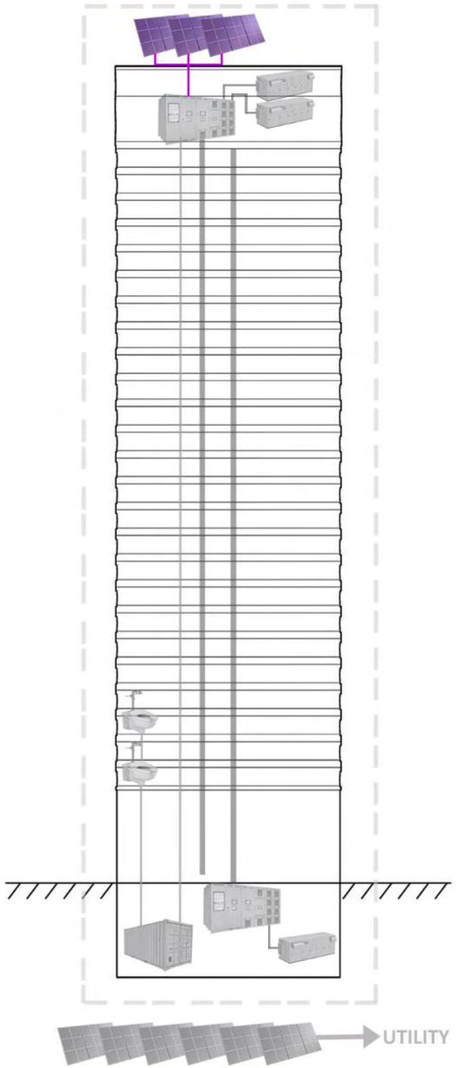


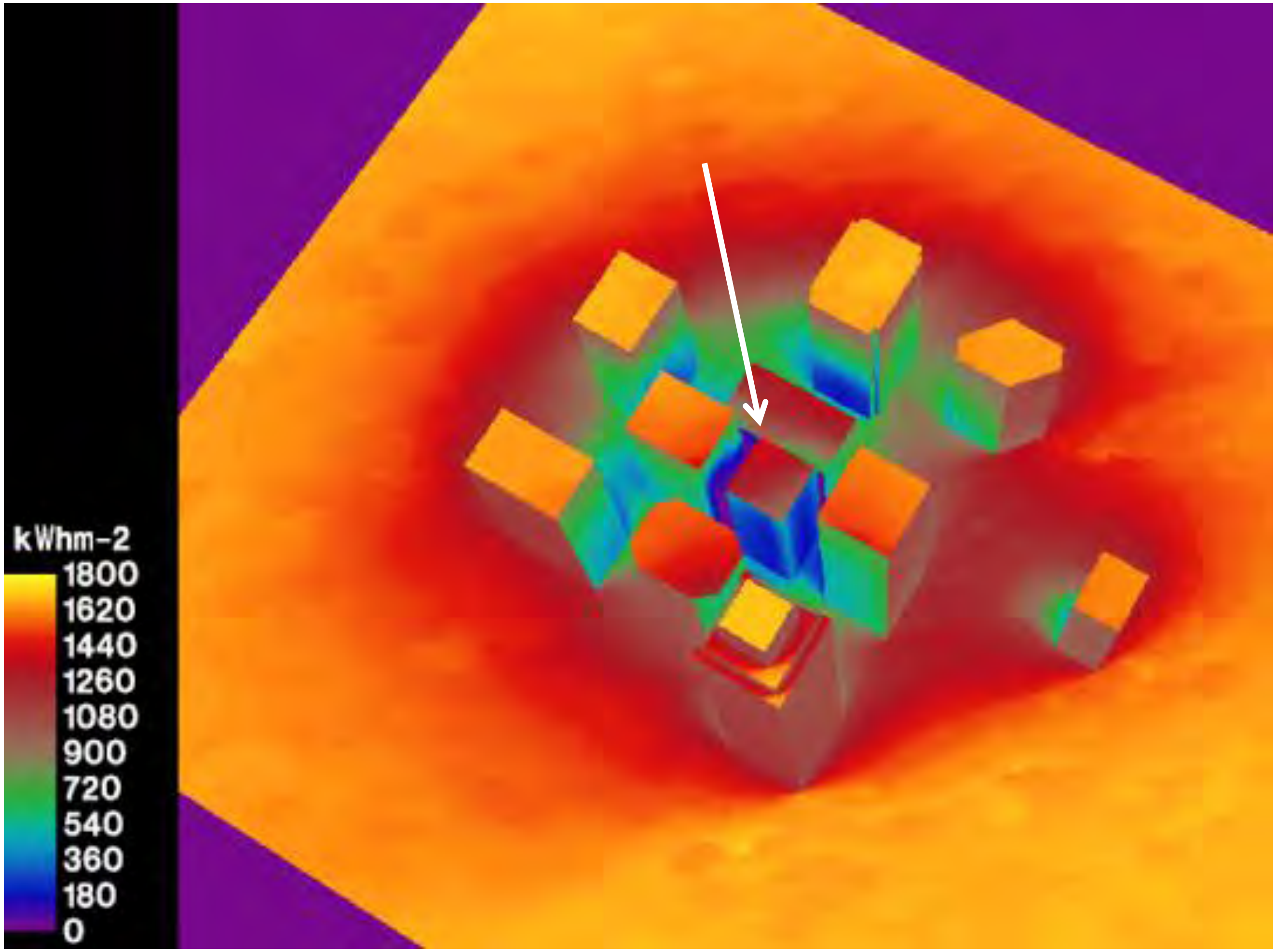
WASTE TO POWER



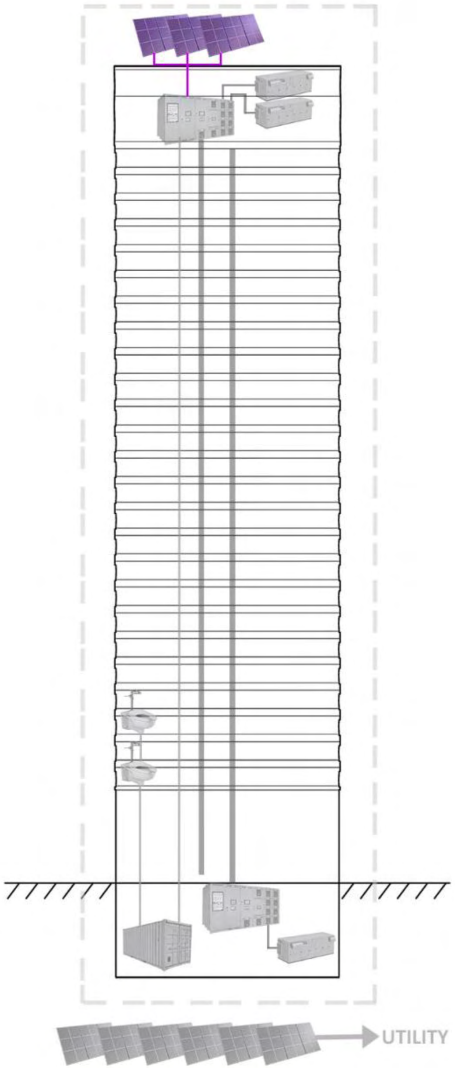


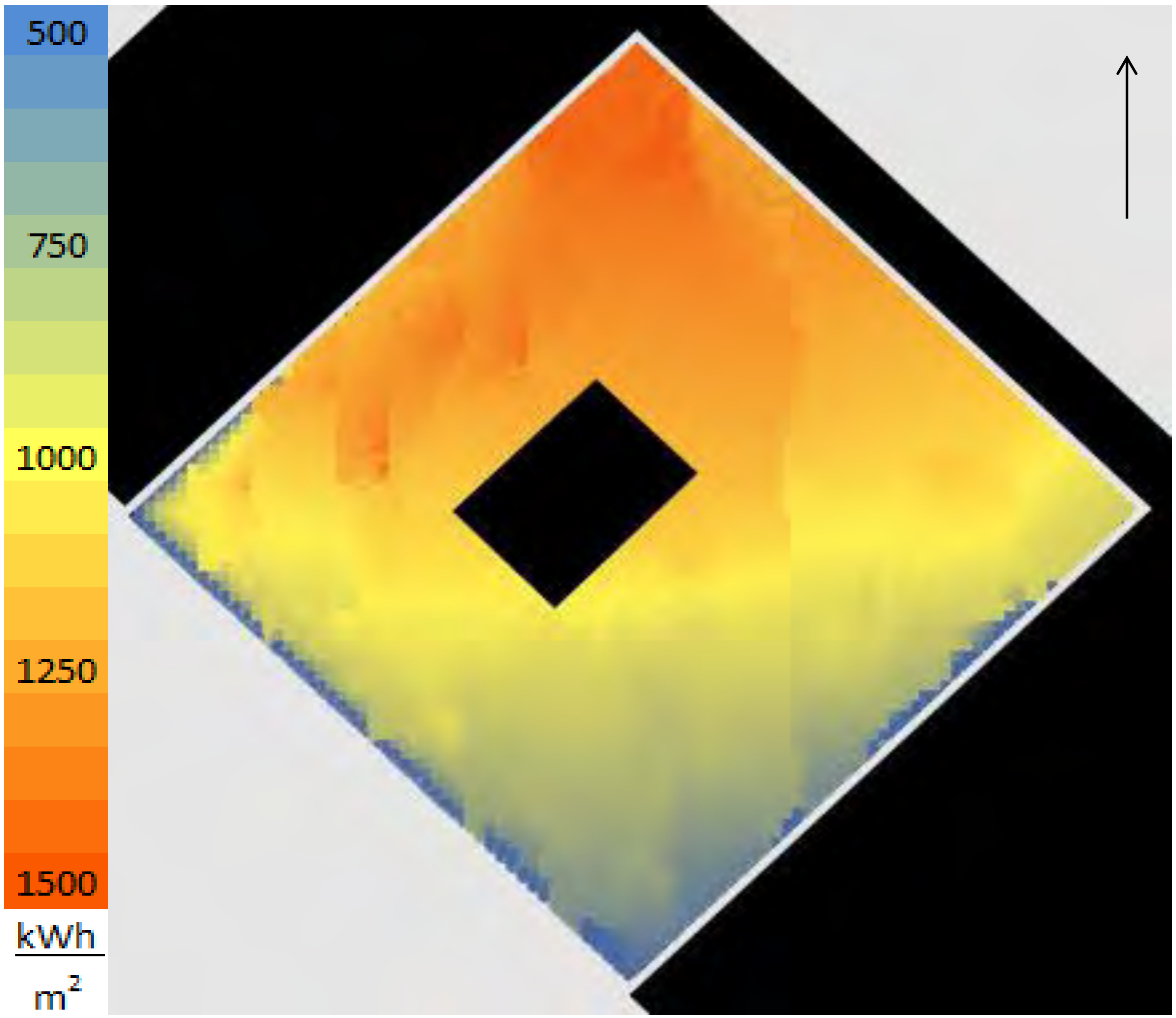
ON SITE SOLAR



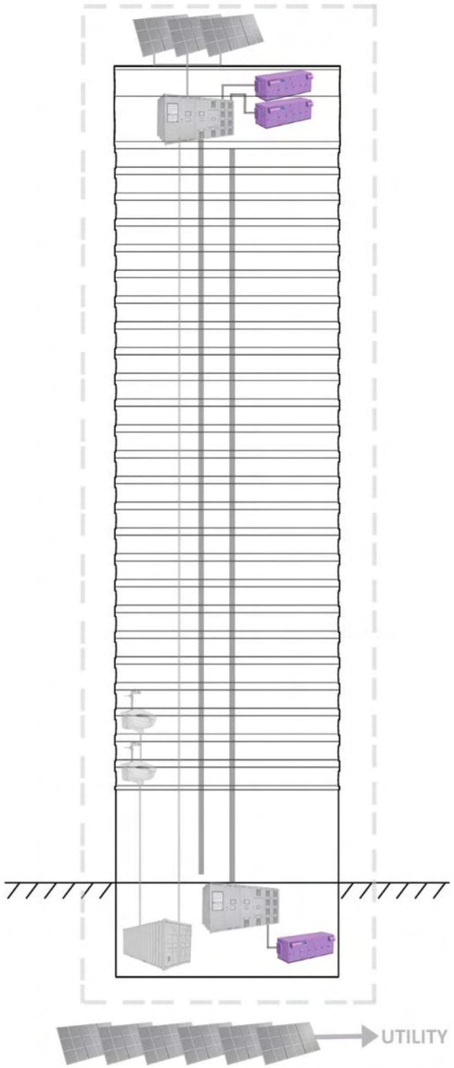


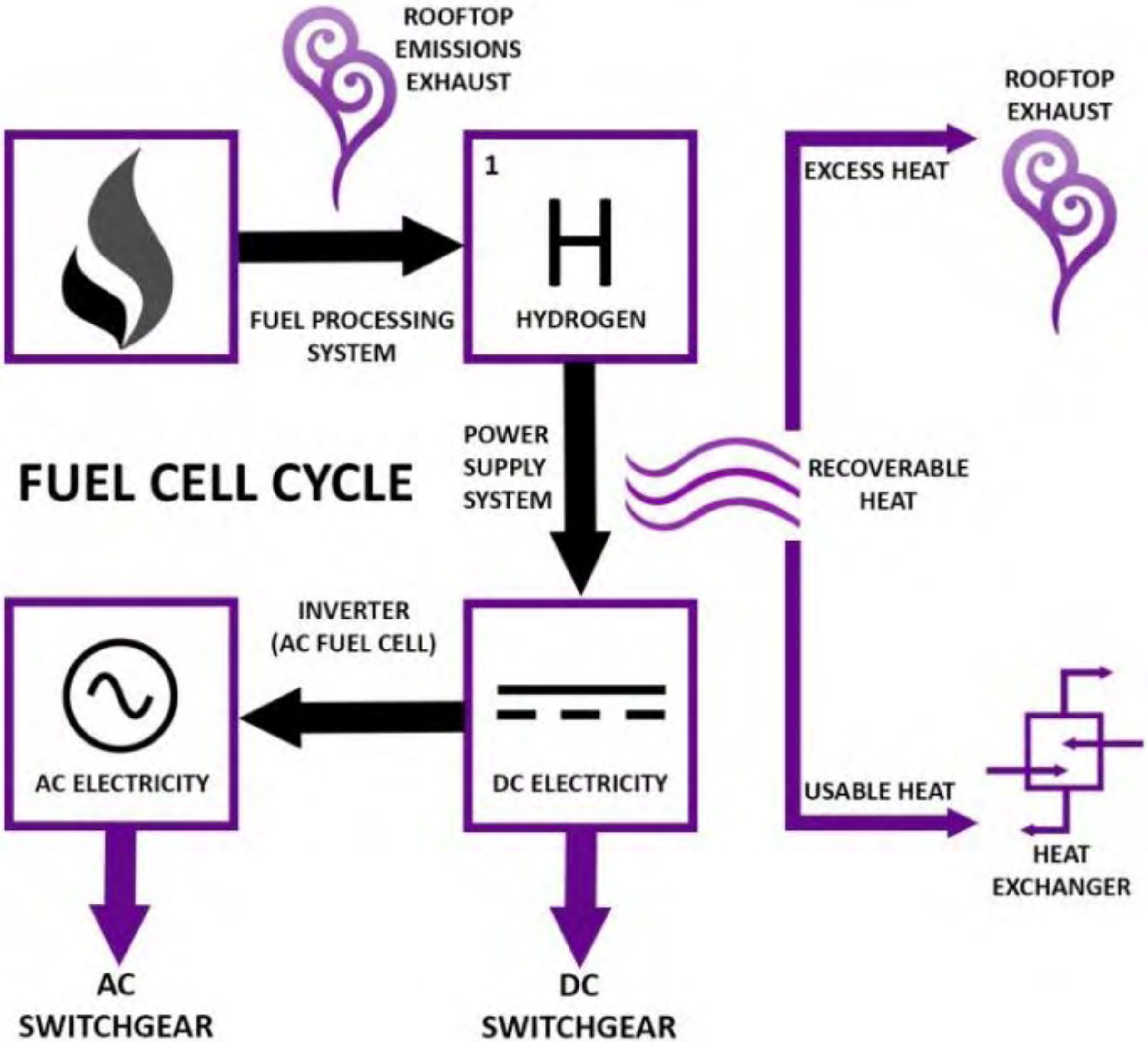
ON SITE SOLAR



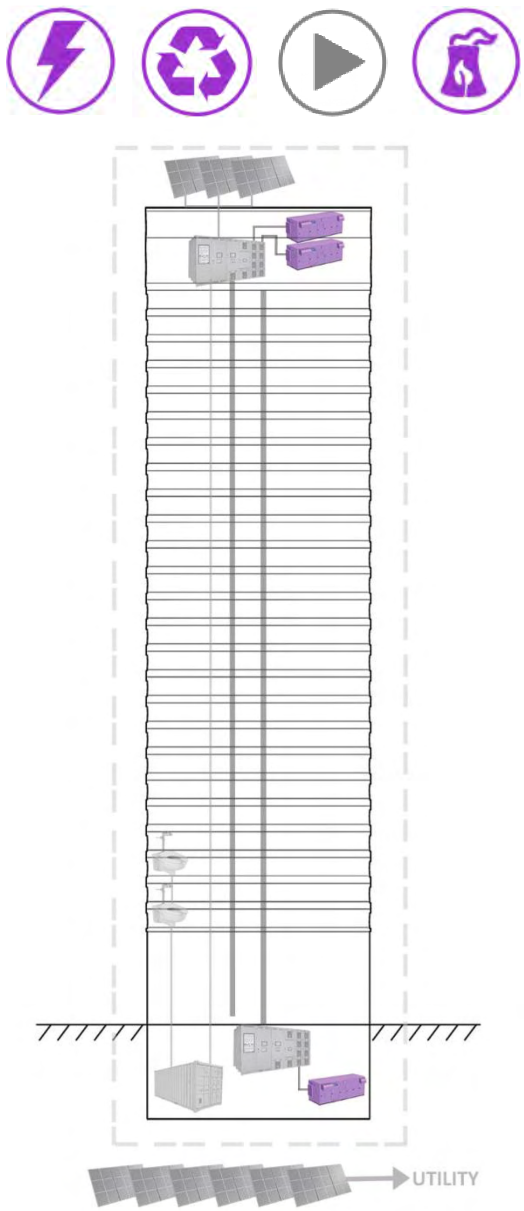


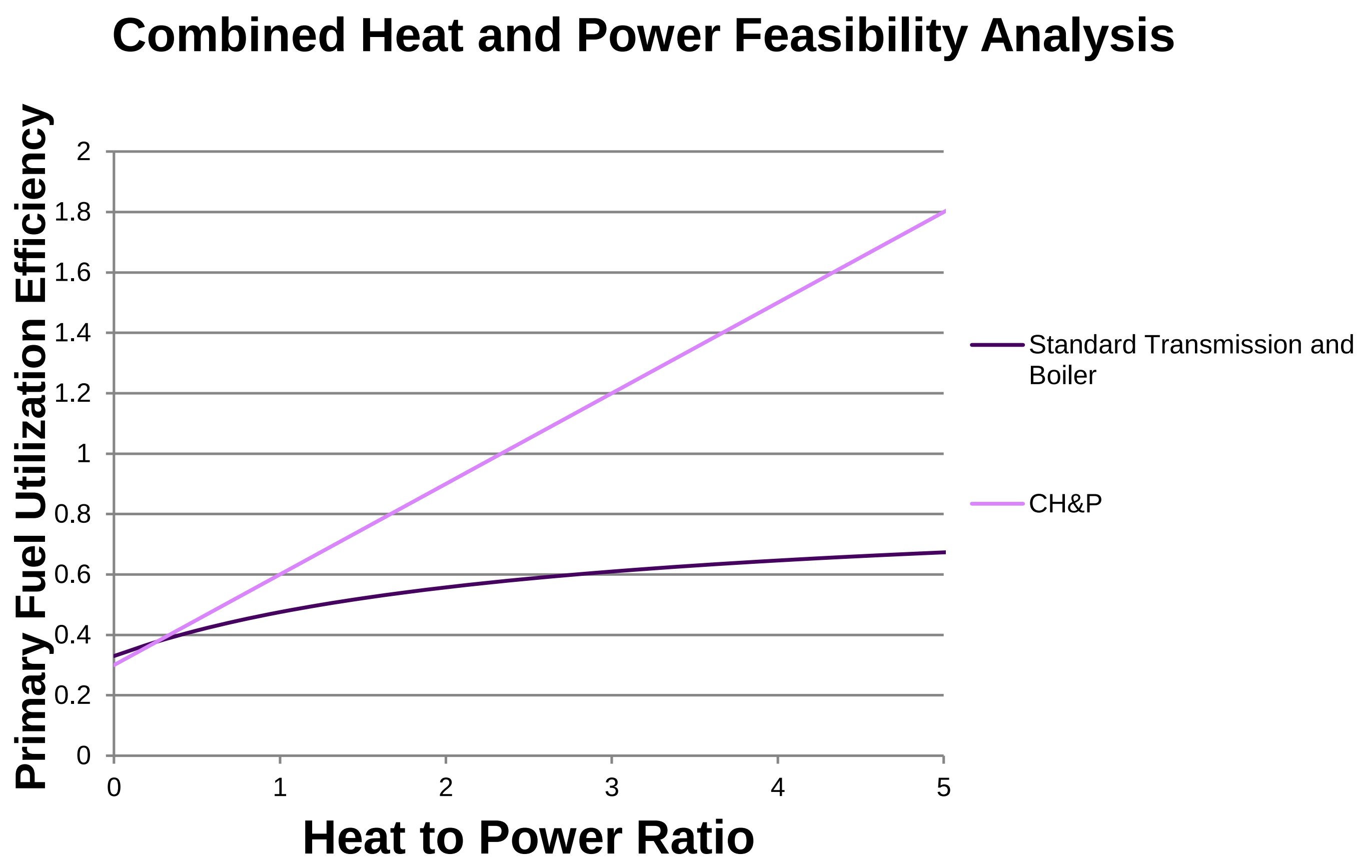
FUEL CELLS


UTILITY

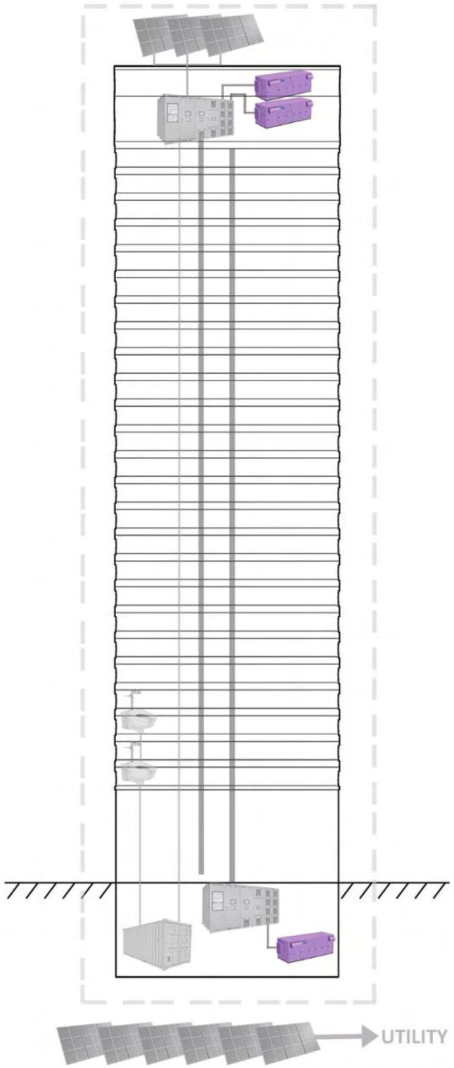

ROOFTOP
EMISSIONS
EXHAUST
ROOFTOP
EXHAUST
FUEL PROCESSING
SYSTEM
1
H
HYDROGEN
EXCESS HEAT
FUEL CELL CYCLE
POWER
SUPPLY
SYSTEM
RECOVERABLE
HEAT
INVERTER
(AC FUEL CELL)
AC ELECTRICITY
DC ELECTRICITY
USABLE HEAT
HEAT
EXCHANGER
AC
SWITCHGEAR
DC
SWITCHGEAR

FUEL CELLS

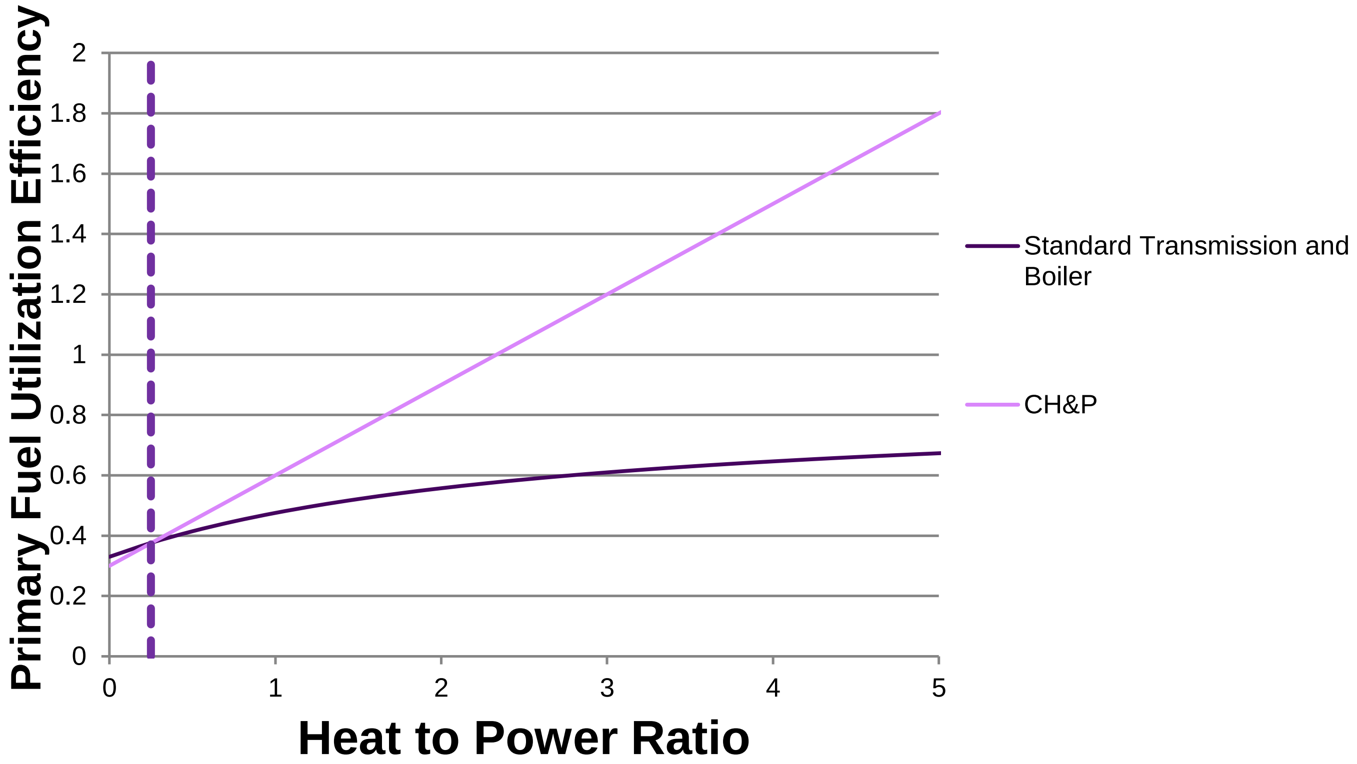

UTILITY


Combined Heat and Power Feasibility Analysis
Primary Fuel Utilization Efficiency
Heat to Power Ratio
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0
1
2
3
4
5
Standard Transmission and Boiler
CH&P

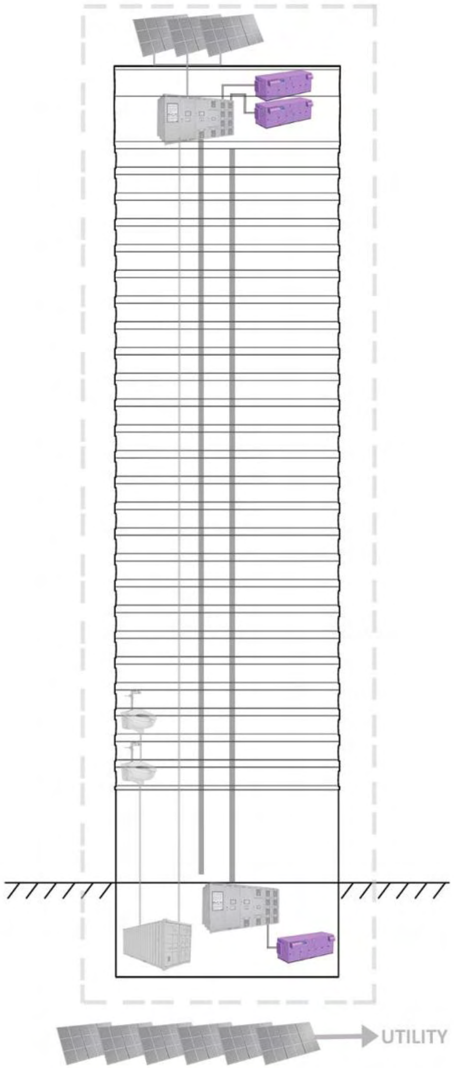
FUEL CELLS



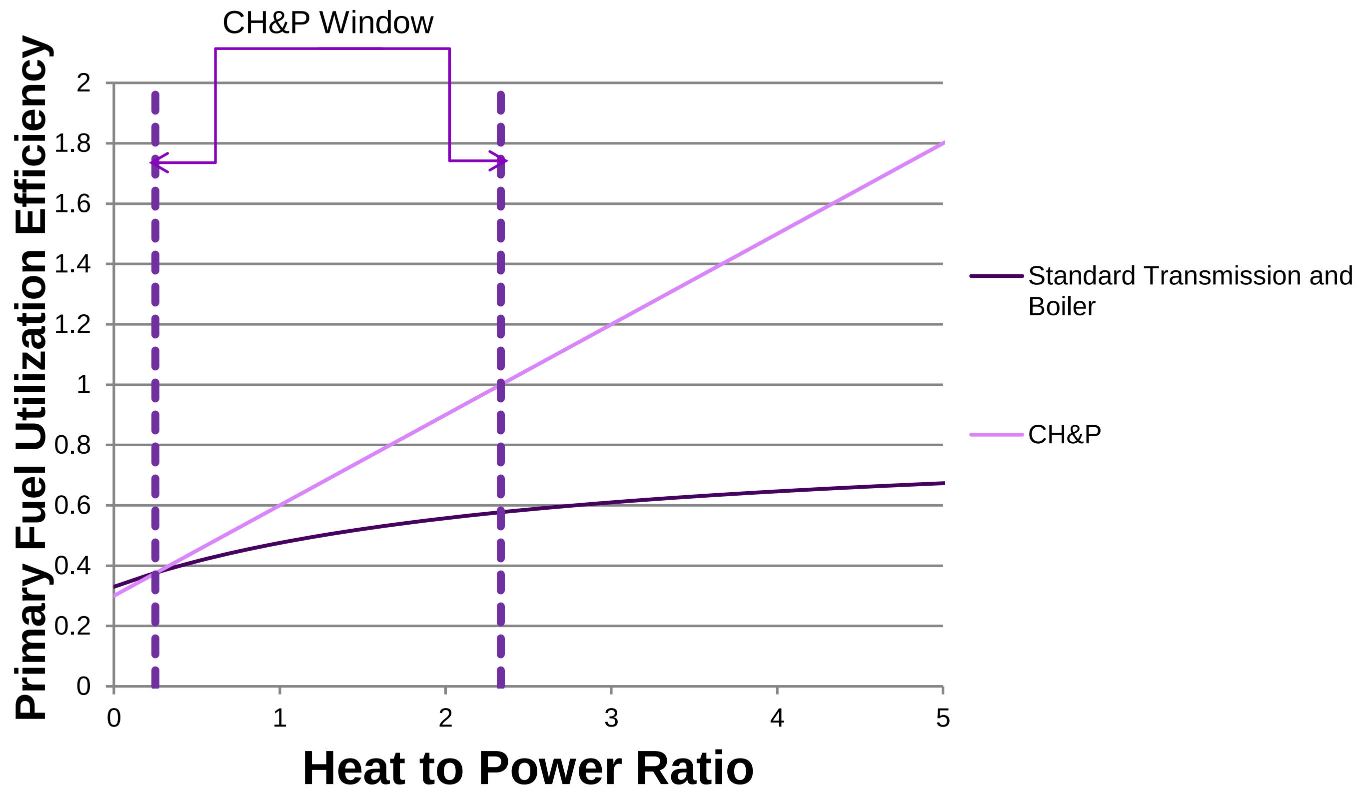
Combined Heat and Power Feasibility Analysis



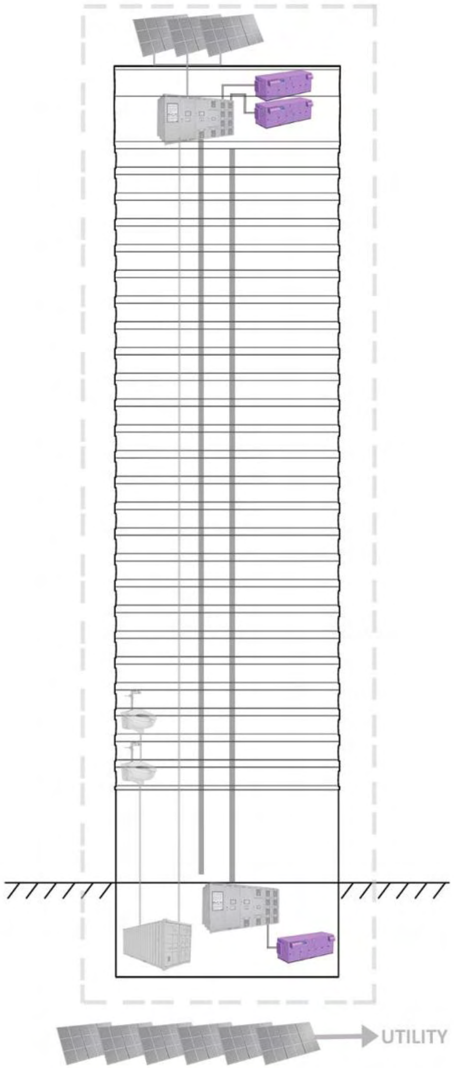
FUEL CELLS

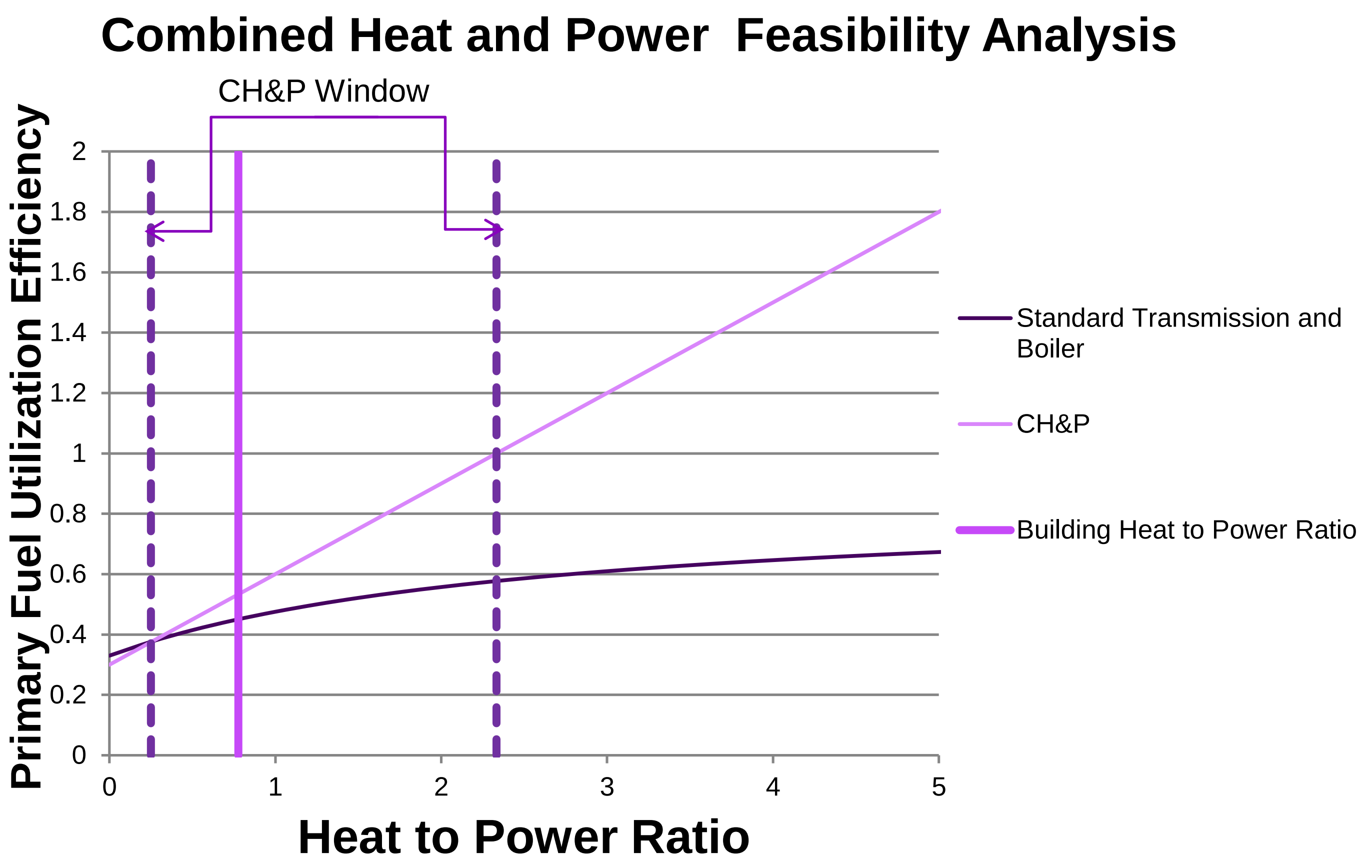


Combined Heat and Power Feasibility Analysis

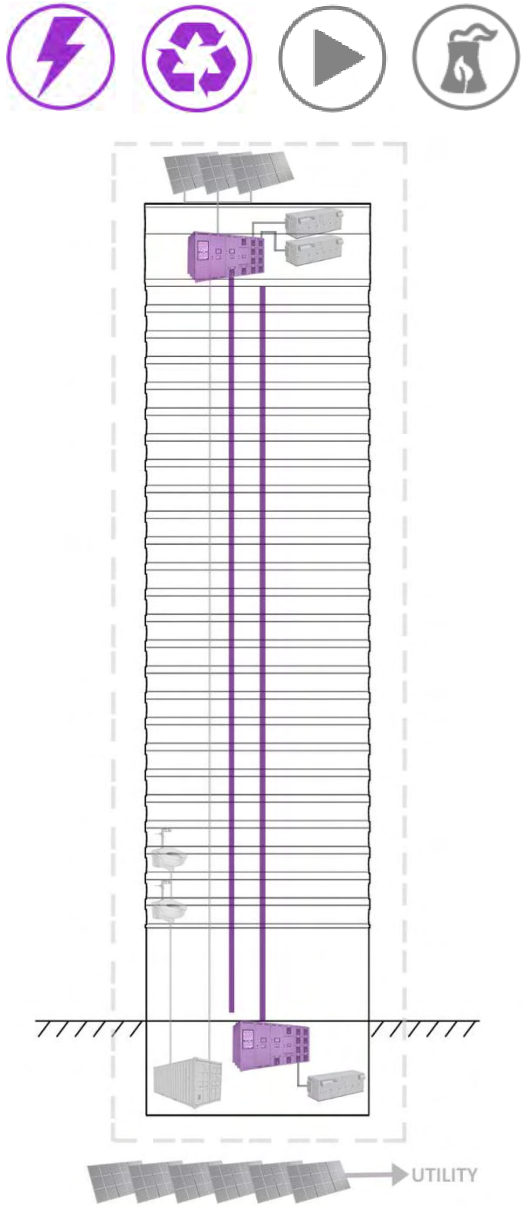


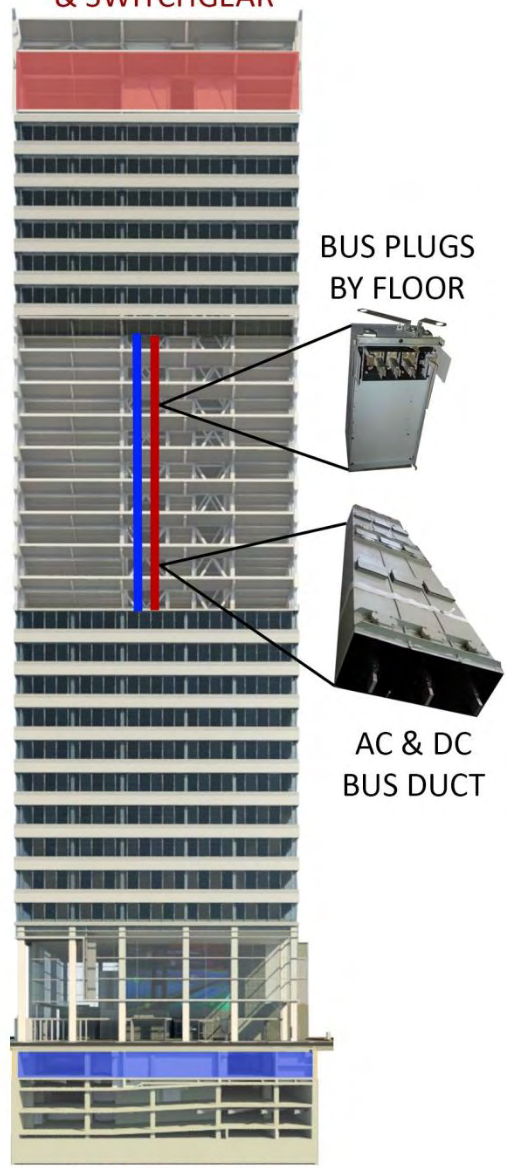
FUEL CELLS


UTILITY

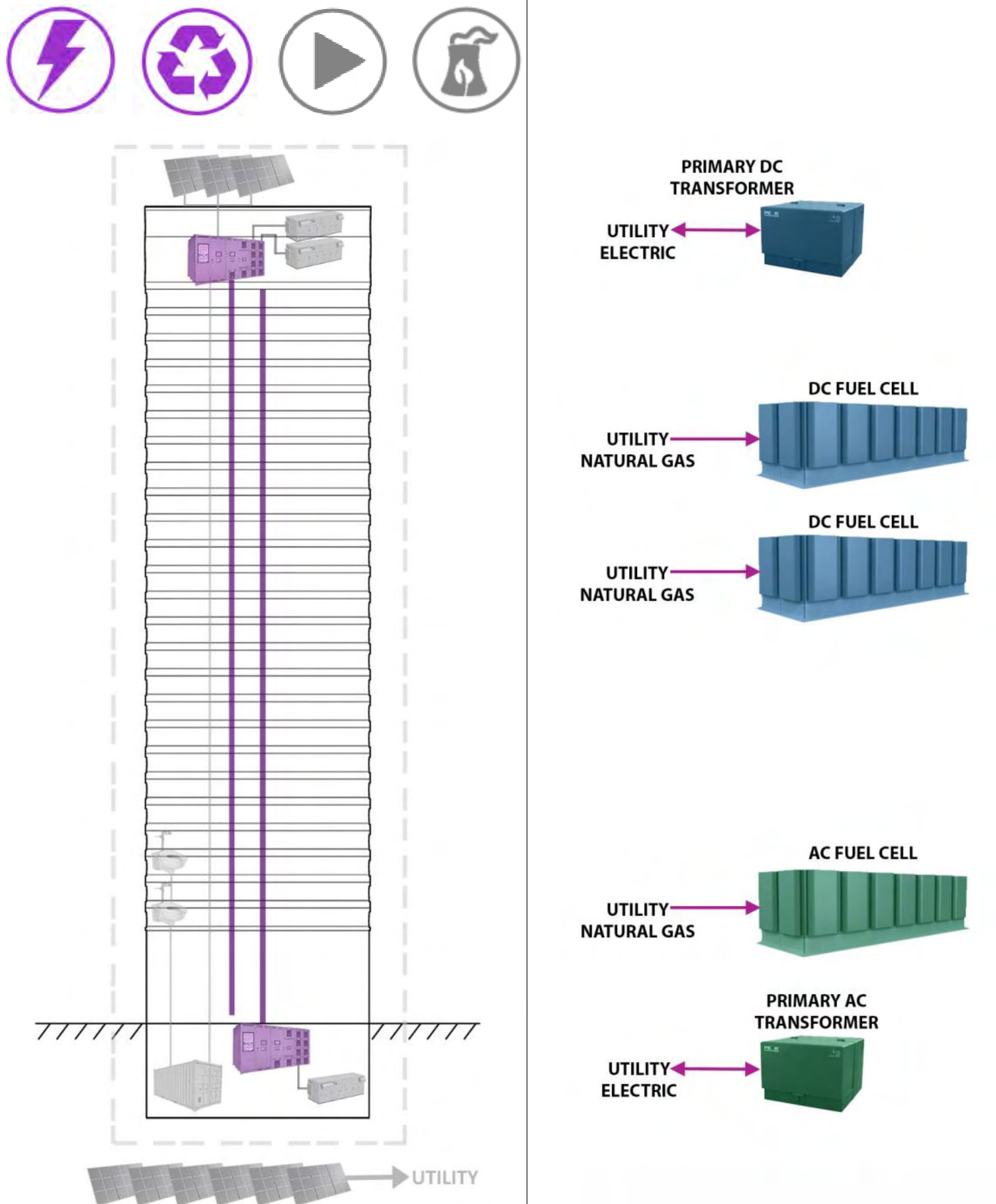

Combined Heat and Power Feasibility Analysis
CH&P Window
Primary Fuel Utilization Efficiency
Heat to Power Ratio
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0
1
2
3
4
5
Standard Transmission and Boiler
CH&P
Building Heat to Power Ratio

AC/DC SYSTEM

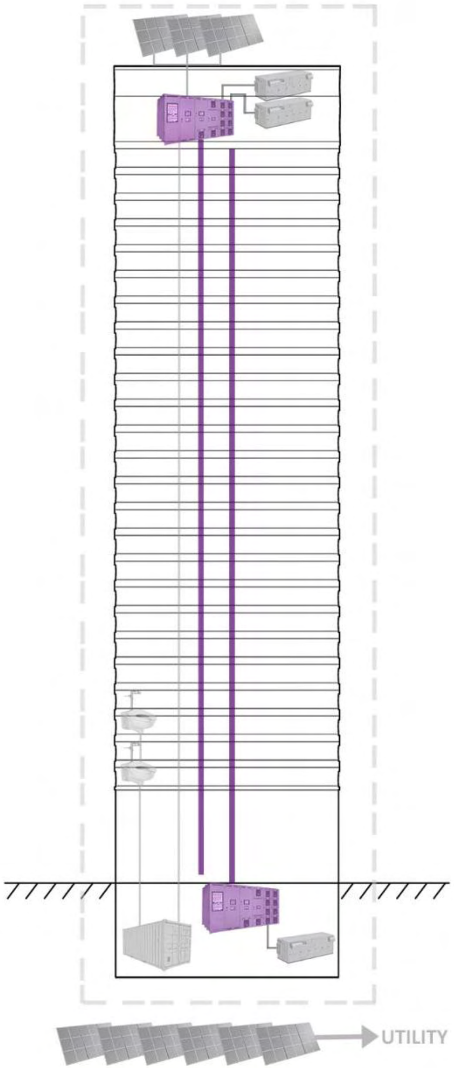

UTILITY

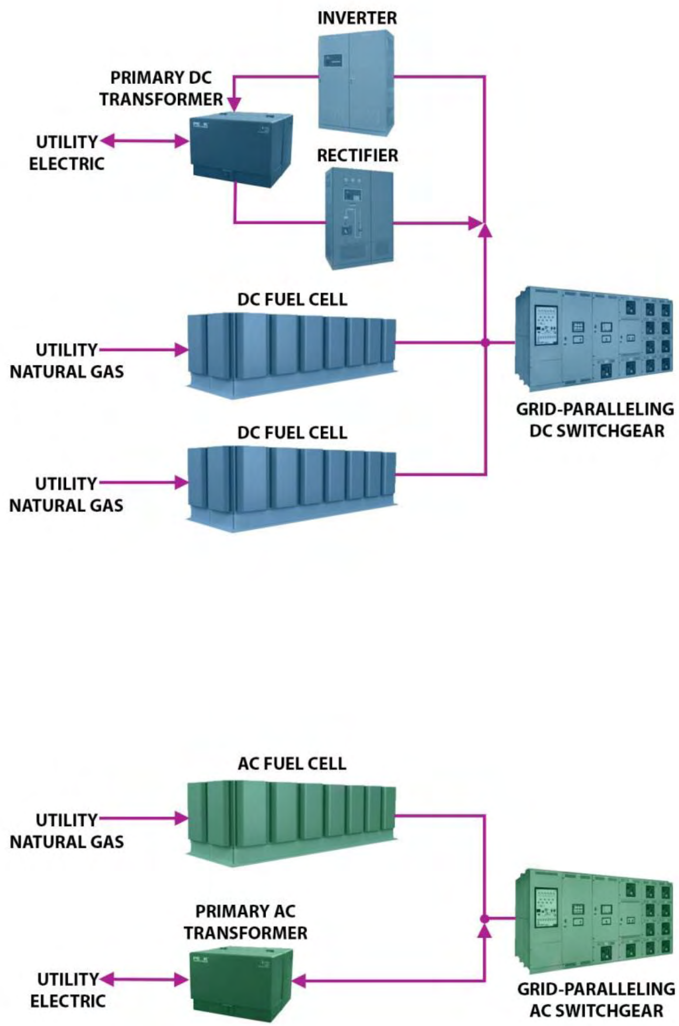

DC FUEL CELLS
& SWITCHGEAR
BUS PLUGS
BY FLOOR
AC & DC
BUS DUCT
AC FUEL CELL &
SWITCHGEAR

AC/DC SYSTEM

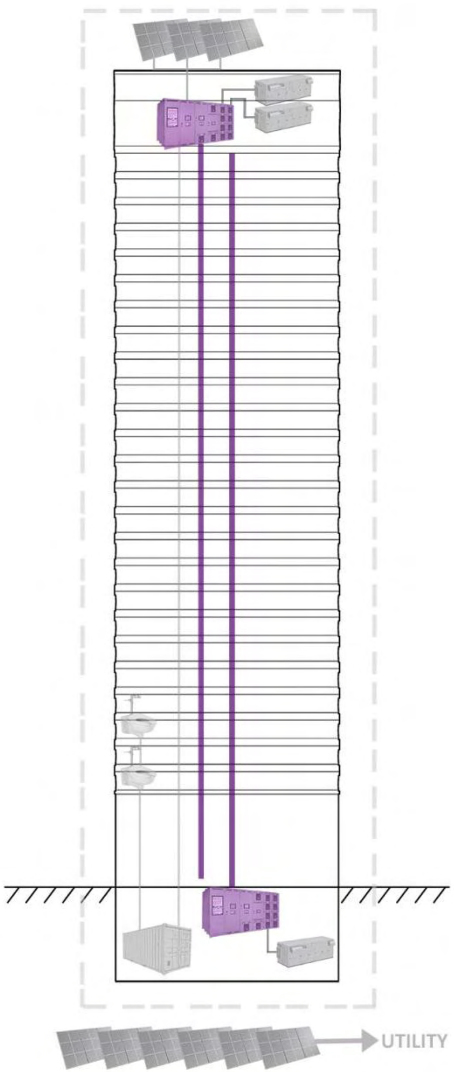

UTILITY
PRIMARY DC
TRANSFORMER
UTILITY
ELECTRIC
DC FUEL CELL
UTILITY
NATURAL GAS
DC FUEL CELL
UTILITY
NATURAL GAS
AC FUEL CELL
UTILITY
NATURAL GAS
PRIMARY AC
TRANSFORMER
UTILITY
ELECTRIC

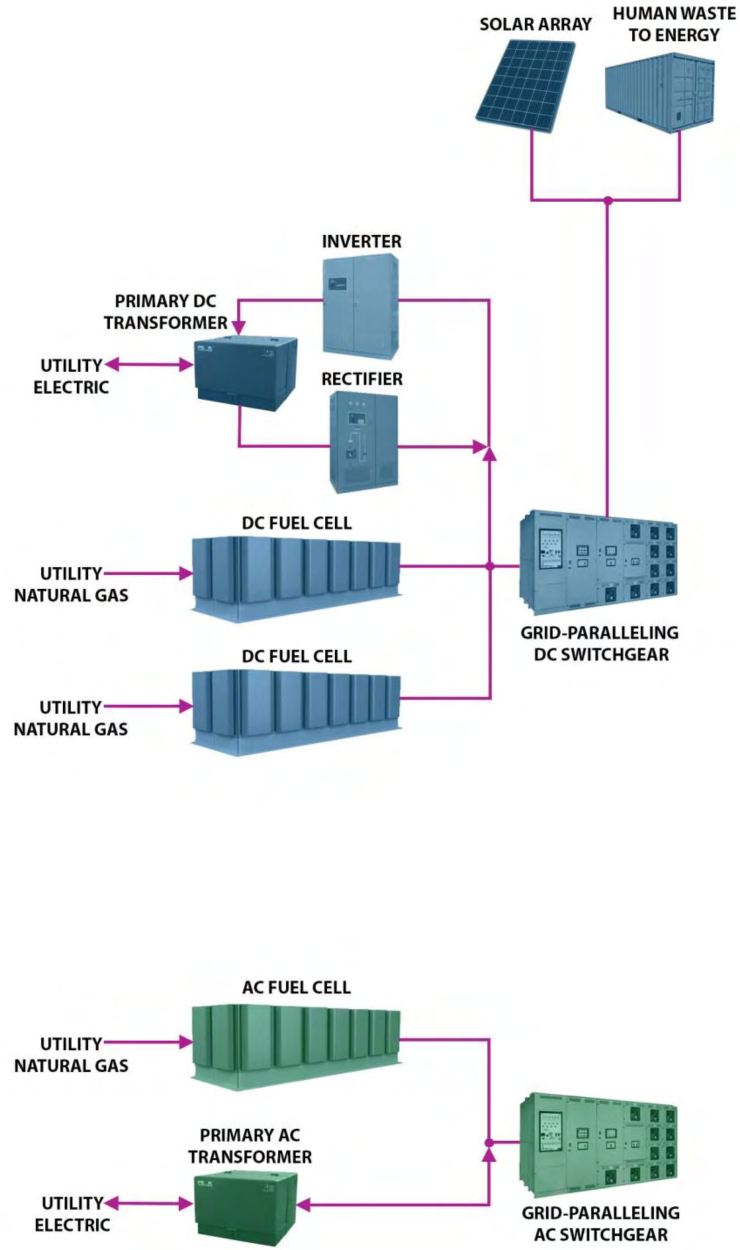
AC/DC SYSTEM


UTILITY

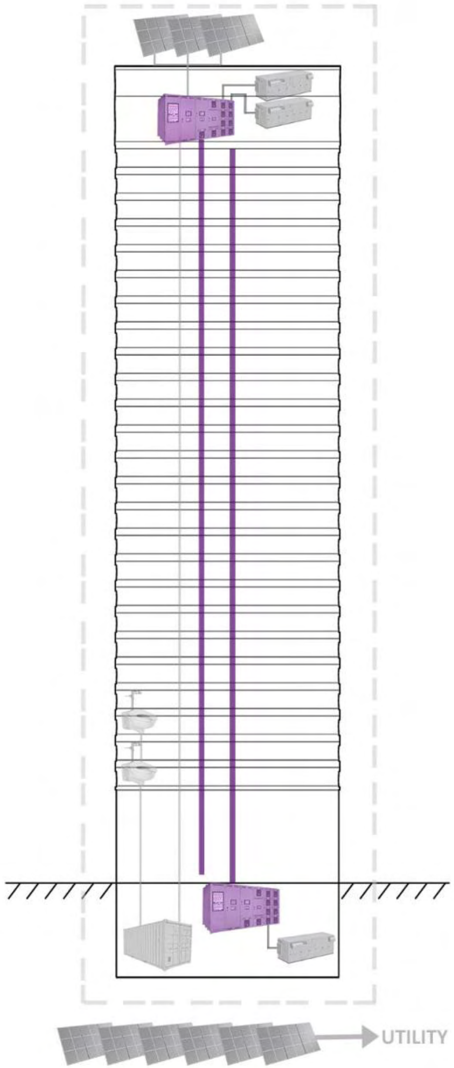

INVERTER
PRIMARY DC TRANSFORMER
UTILITY ELECTRIC
RECTIFIER
DC FUEL CELL
UTILITY NATURAL GAS
GRID-PARALLELING DC SWITCHGEAR
DC FUEL CELL
UTILITY NATURAL GAS
AC FUEL CELL
UTILITY NATURAL GAS
PRIMARY AC TRANSFORMER
UTILITY ELECTRIC
GRID-PARALLELING AC SWITCHGEAR

AC/DC SYSTEM

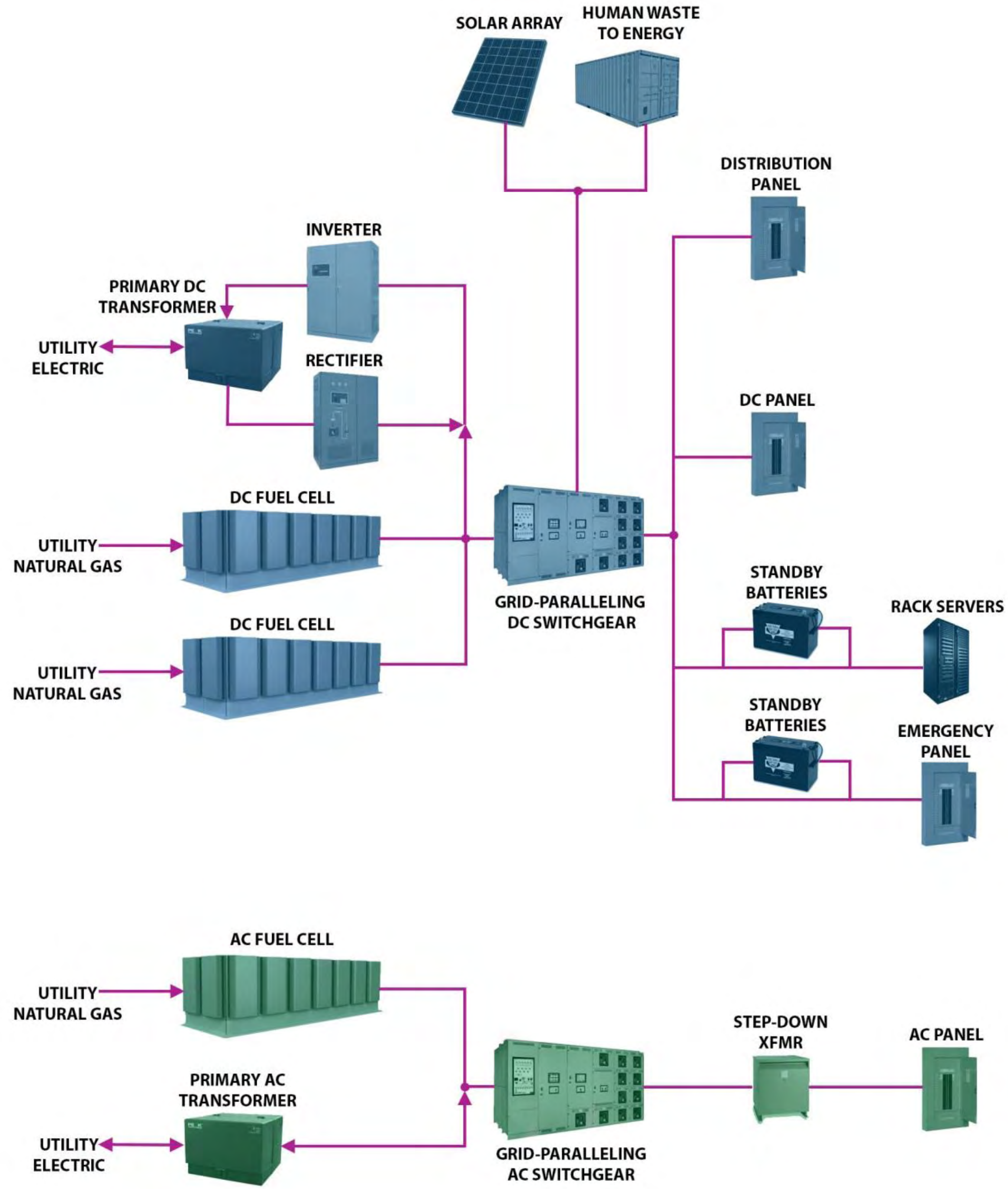

UTILITY


SOLAR ARRAY
HUMAN WASTE TO ENERGY
INVERTER
PRIMARY DC TRANSFORMER
UTILITY ELECTRIC
RECTIFIER
DC FUEL CELL
UTILITY NATURAL GAS
GRID-PARALLELING DC SWITCHGEAR
DC FUEL CELL
UTILITY NATURAL GAS
AC FUEL CELL
UTILITY NATURAL GAS
PRIMARY AC TRANSFORMER
UTILITY ELECTRIC
GRID-PARALLELING AC SWITCHGEAR

AC/DC SYSTEM

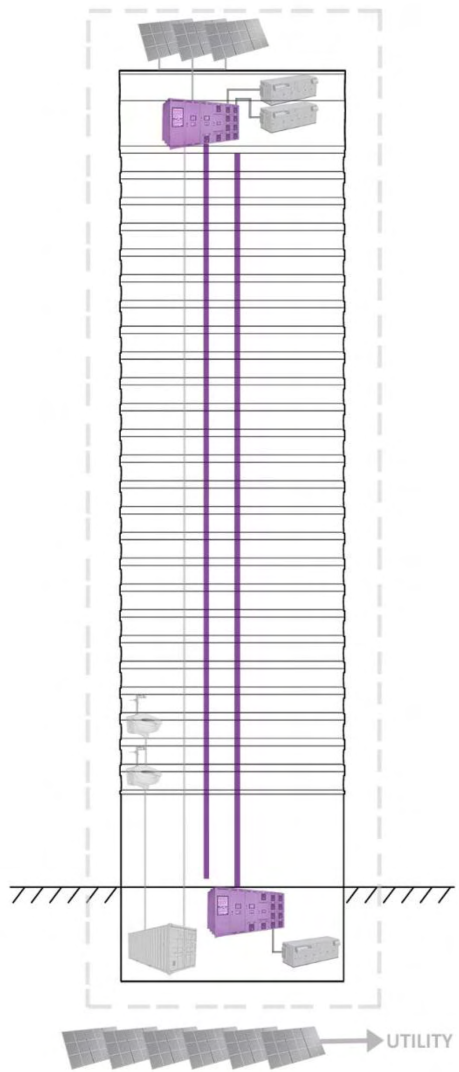


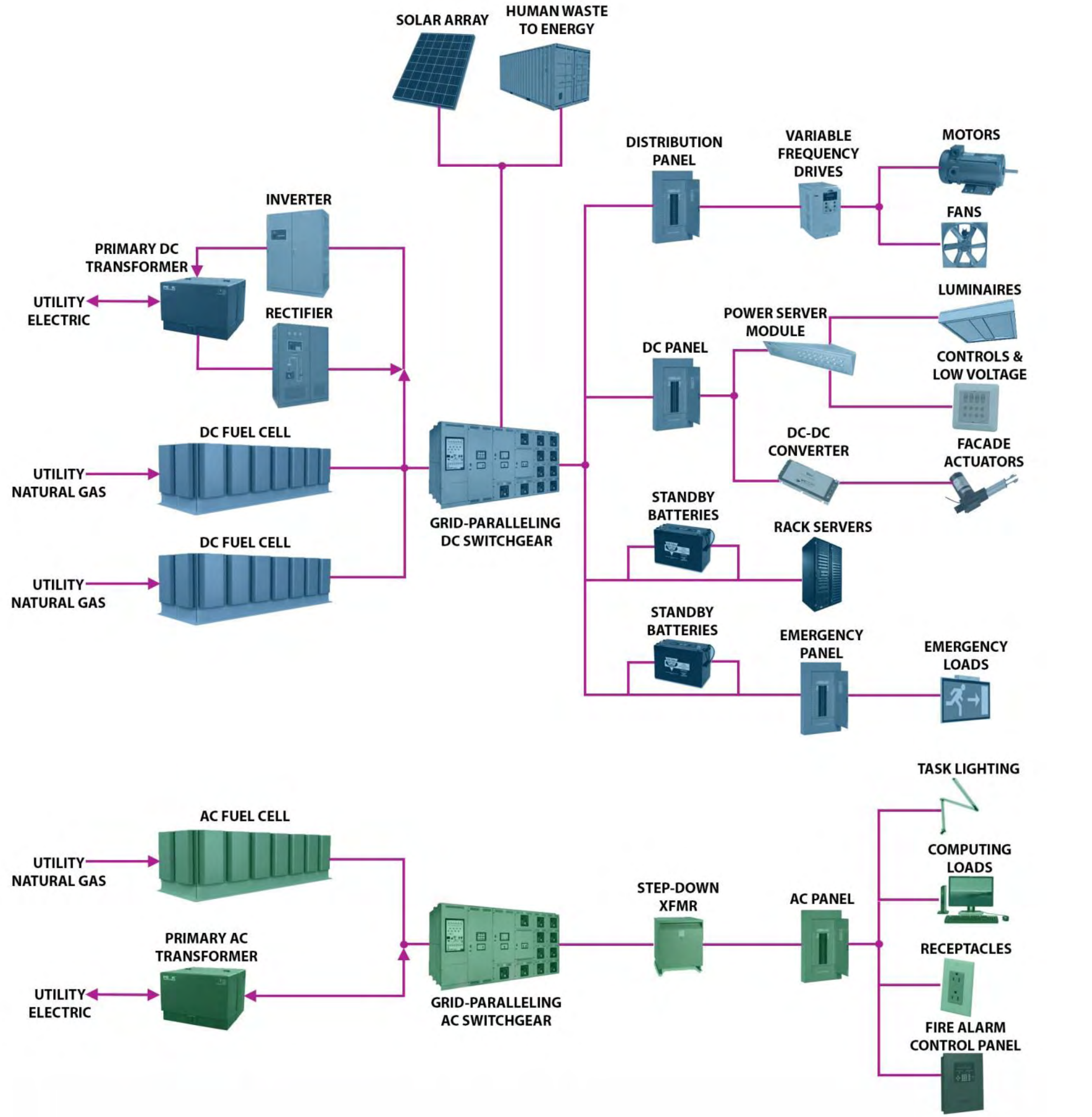
UTILITY



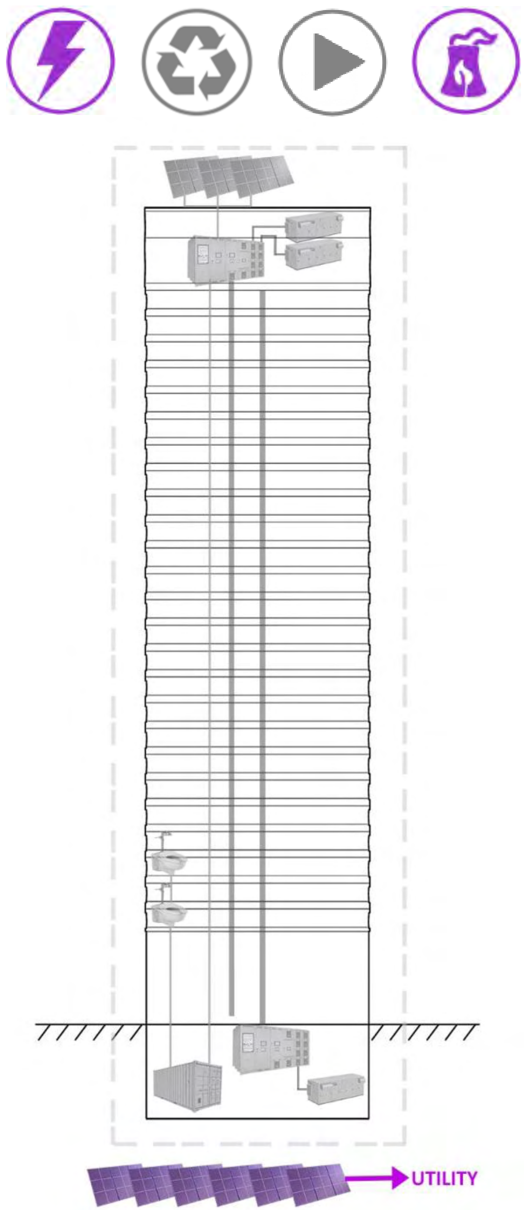
SOLAR ARRAY
HUMAN WASTE TO ENERGY
DISTRIBUTION PANEL
INVERTER
PRIMARY DC TRANSFORMER
UTILITY ELECTRIC
RECTIFIER
DC PANEL
DC FUEL CELL
UTILITY NATURAL GAS
GRID-PARALLELING DC SWITCHGEAR
STANDBY BATTERIES
RACK SERVERS
DC FUEL CELL
UTILITY NATURAL GAS
STANDBY BATTERIES
EMERGENCY PANEL
AC FUEL CELL
UTILITY NATURAL GAS
STEP-DOWN XFMR
AC PANEL
PRIMARY AC TRANSFORMER
UTILITY ELECTRIC
GRID-PARALLELING AC SWITCHGEAR

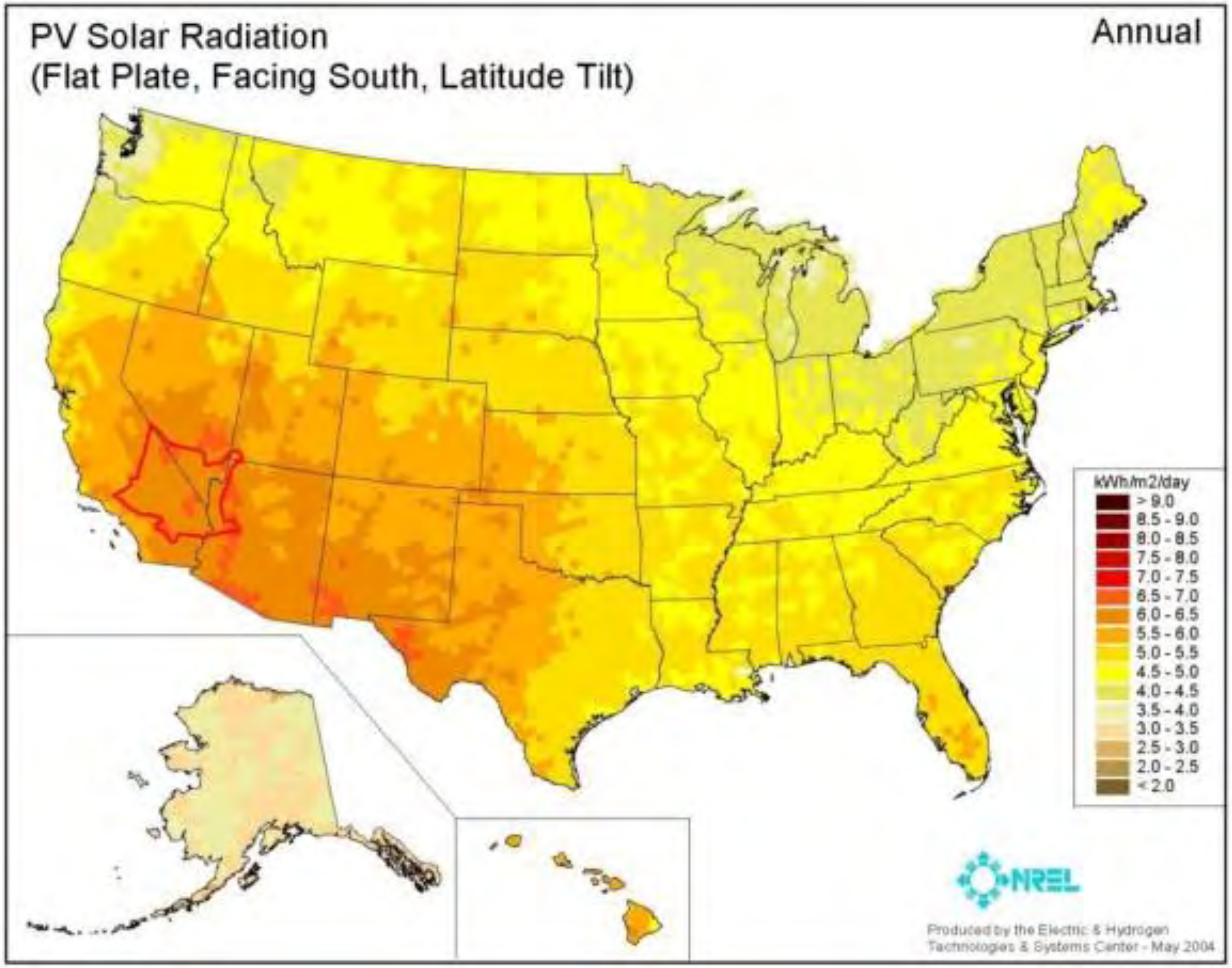
AC/DC SYSTEM


UTILITY

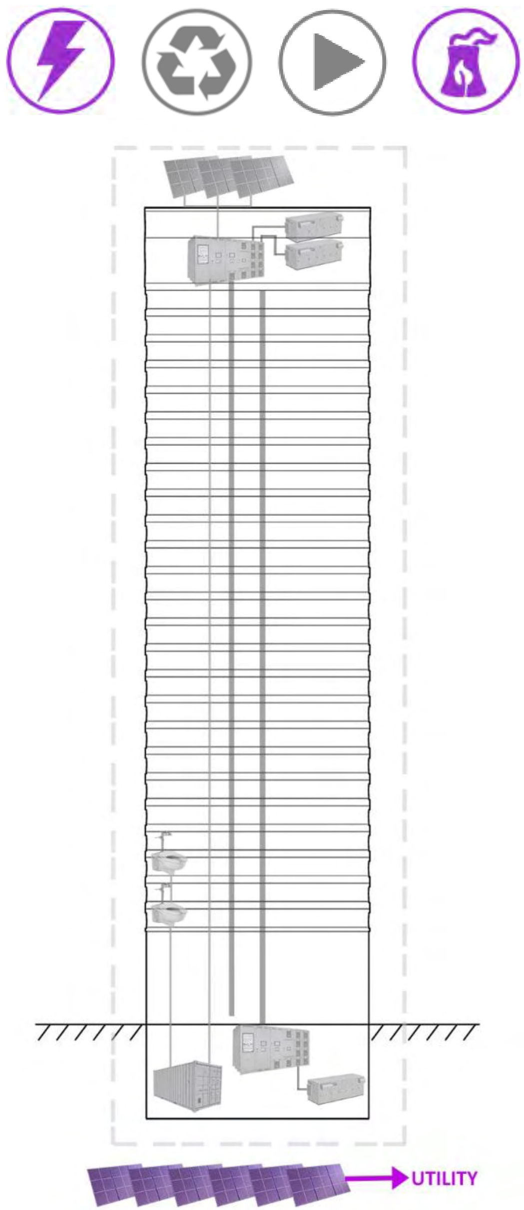

SOLAR ARRAY
HUMAN WASTE TO ENERGY
INVERTER
PRIMARY DC TRANSFORMER
UTILITY ELECTRIC
RECTIFIER
DC FUEL CELL
UTILITY NATURAL GAS
DC FUEL CELL
UTILITY NATURAL GAS
GRID-PARALLELING DC SWITCHGEAR
DISTRIBUTION PANEL
VARIABLE FREQUENCY DRIVES
MOTORS
FANS
LUMINAIRES
POWER SERVER MODULE
DC PANEL
CONTROLS & LOW VOLTAGE
DC-DC CONVERTER
FACADE ACTUATORS
STANDBY BATTERIES
RACK SERVERS
STANDBY BATTERIES
EMERGENCY PANEL
EMERGENCY LOADS
TASK LIGHTING
AC FUEL CELL
UTILITY NATURAL GAS
COMPUTING LOADS
STEP-DOWN XFMR
AC PANEL
PRIMARY AC TRANSFORMER
RECEPTACLES
UTILITY ELECTRIC
GRID-PARALLELING AC SWITCHGEAR
FIRE ALARM CONTROL PANEL

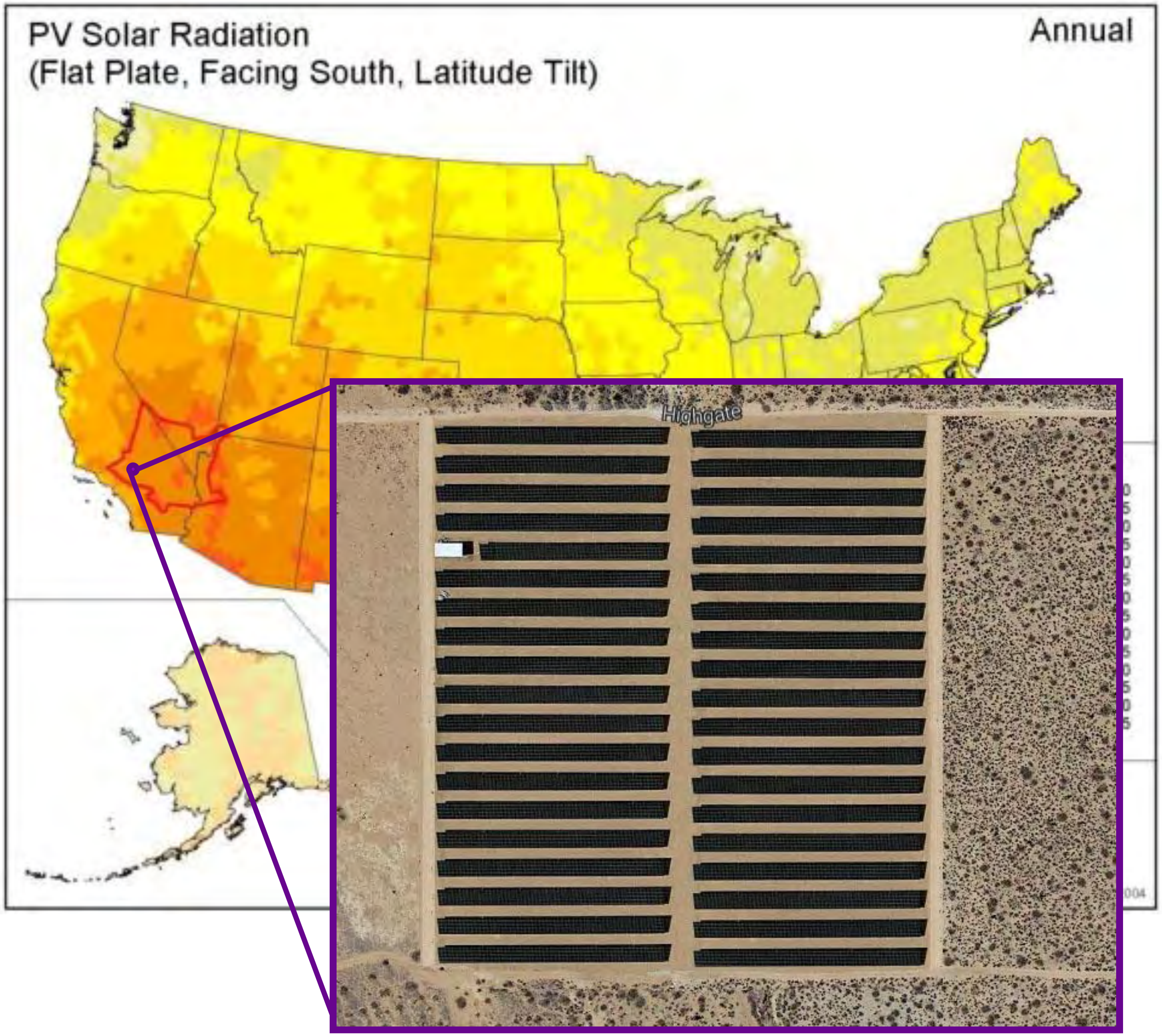
OFF SITE SOLAR



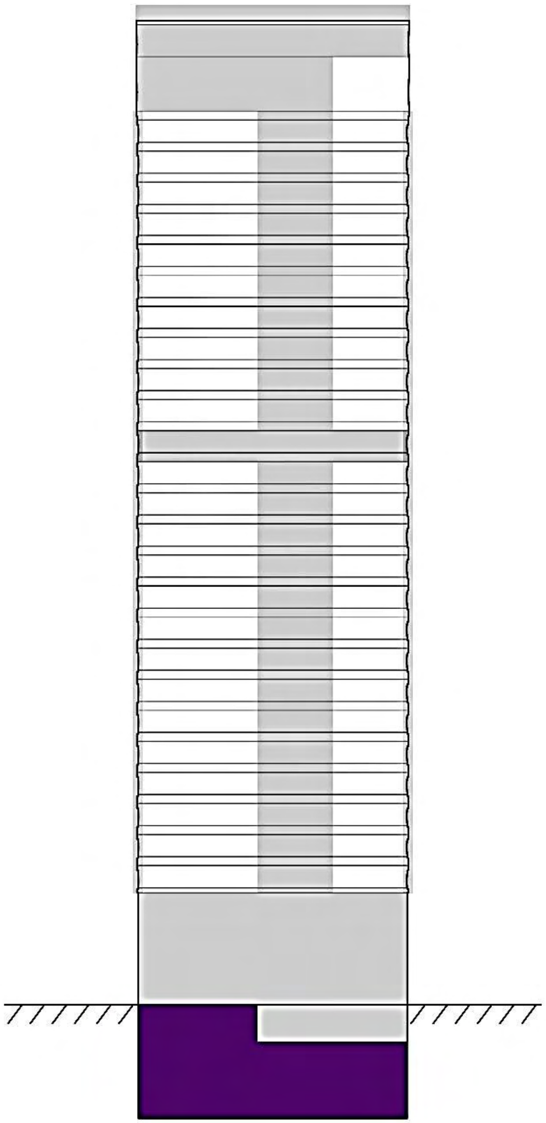


OFF SITE SOLAR

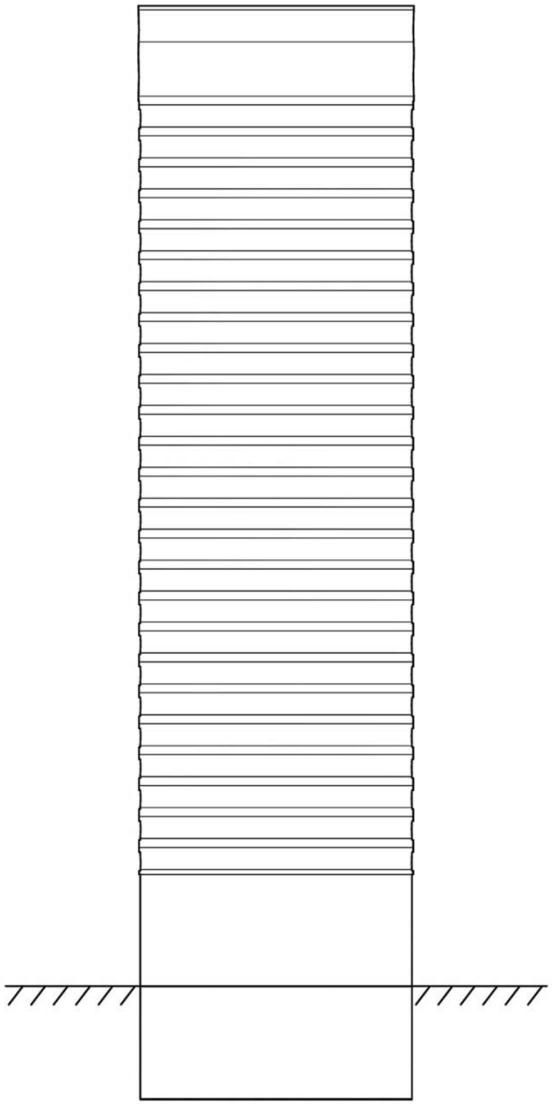




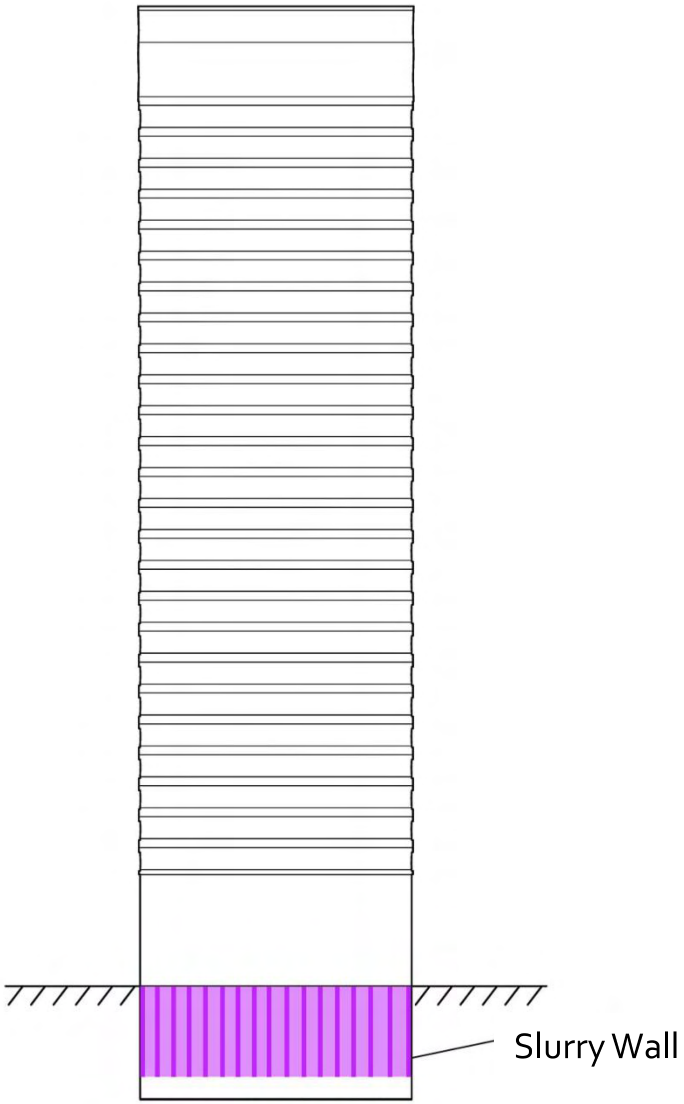
SUBSTRUCTURE SCHEMATIC OVERVIEW



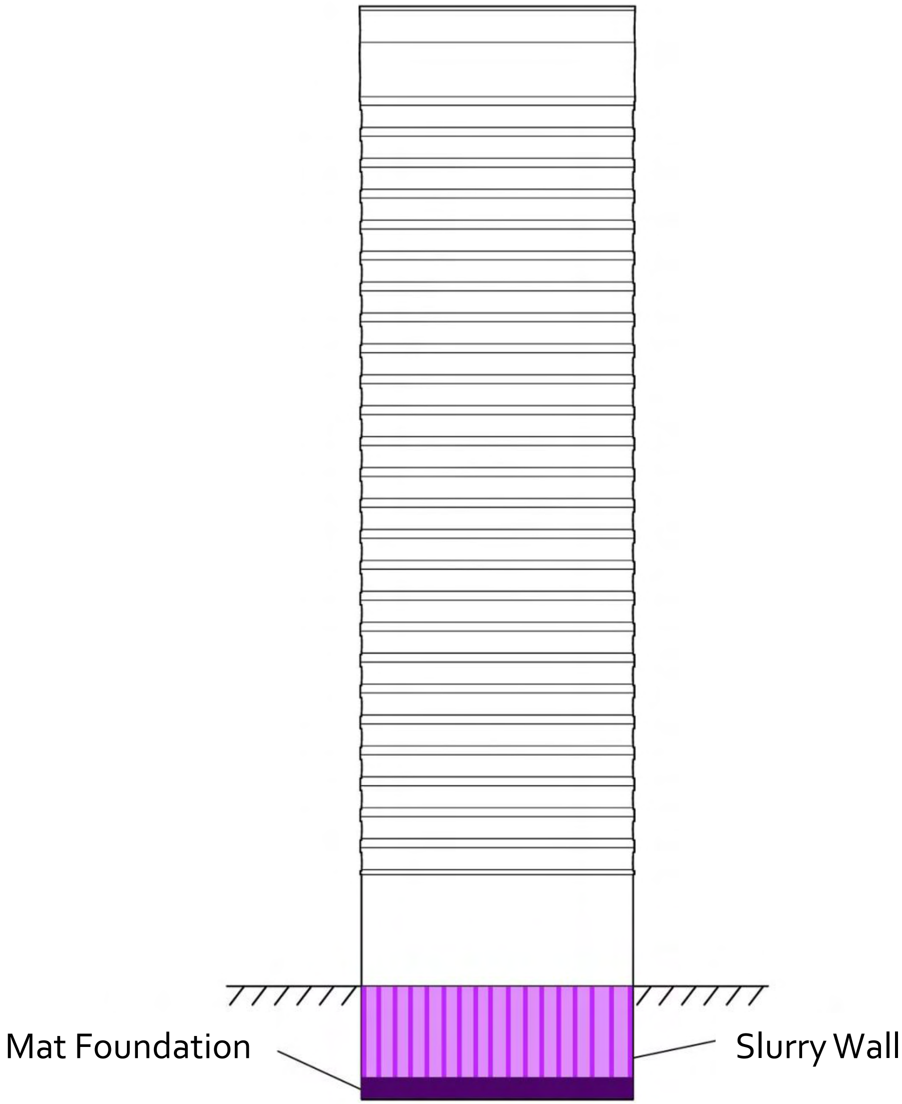
SUBSTRUCTURE SCHEMATIC OVERVIEW



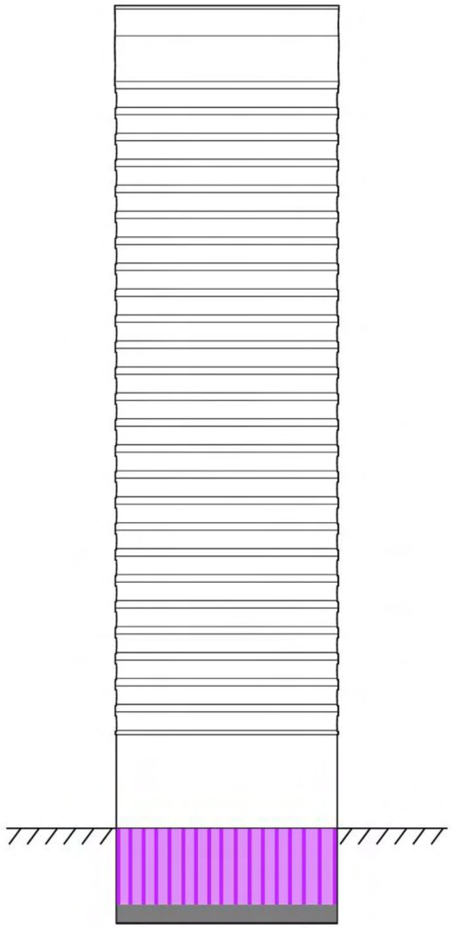
SUBSTRUCTURE SCHEMATIC OVERVIEW

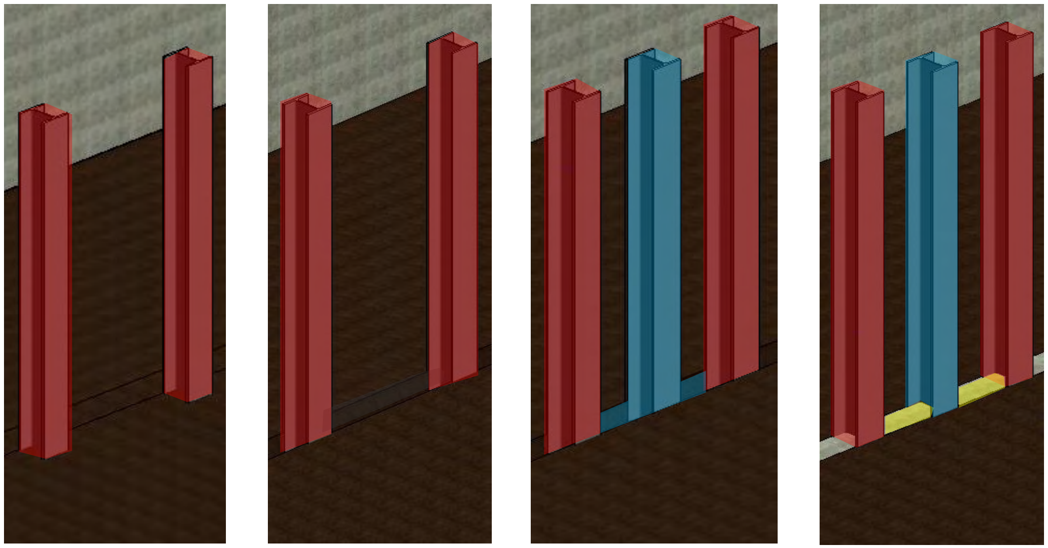


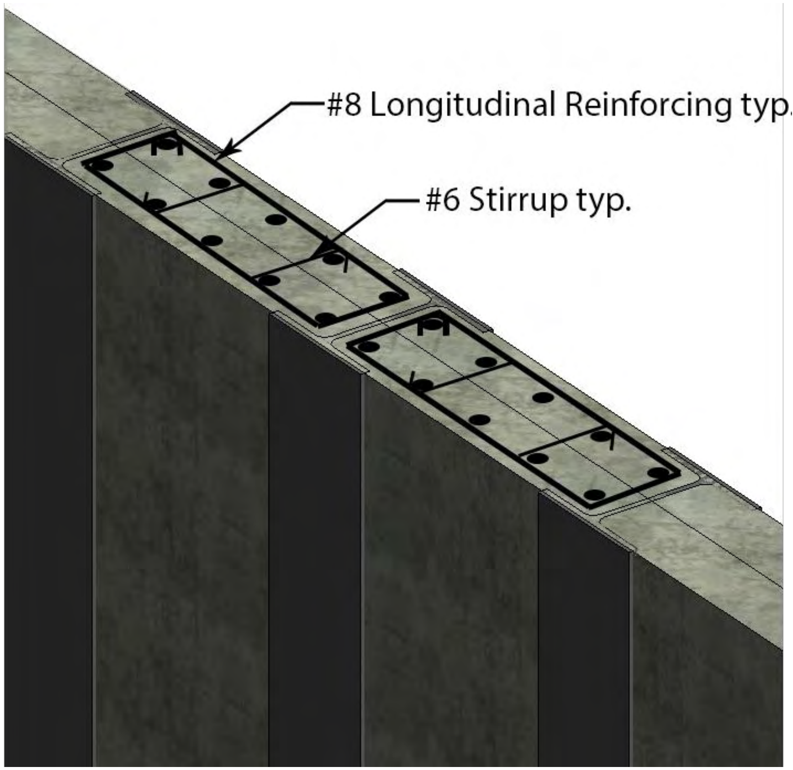
SUBSTRUCTURE SCHEMATIC OVERVIEW



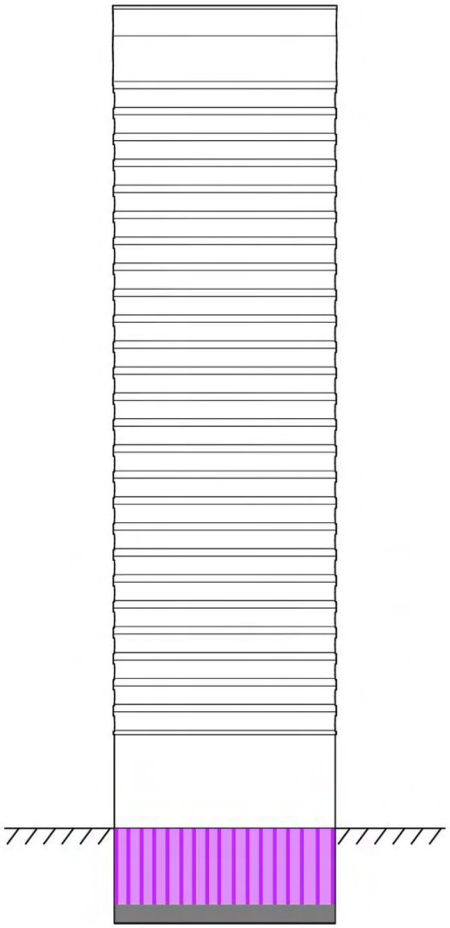
SLURRY WALL SYSTEM

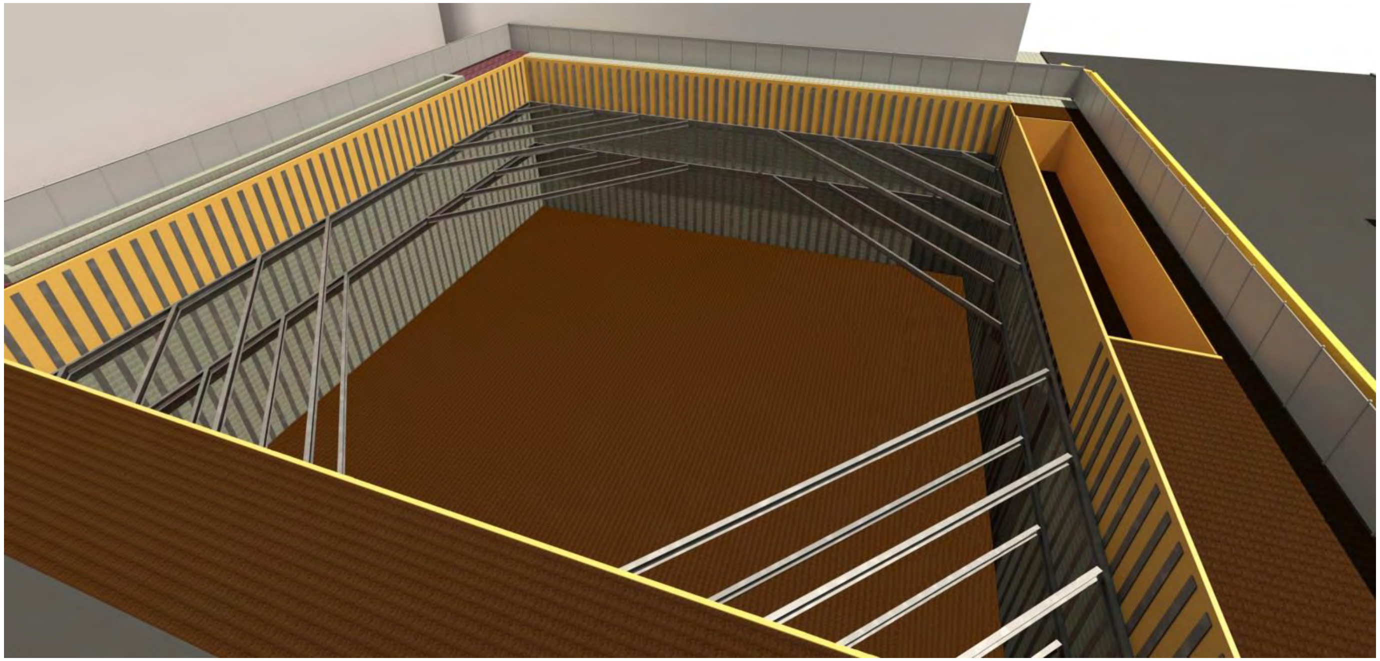




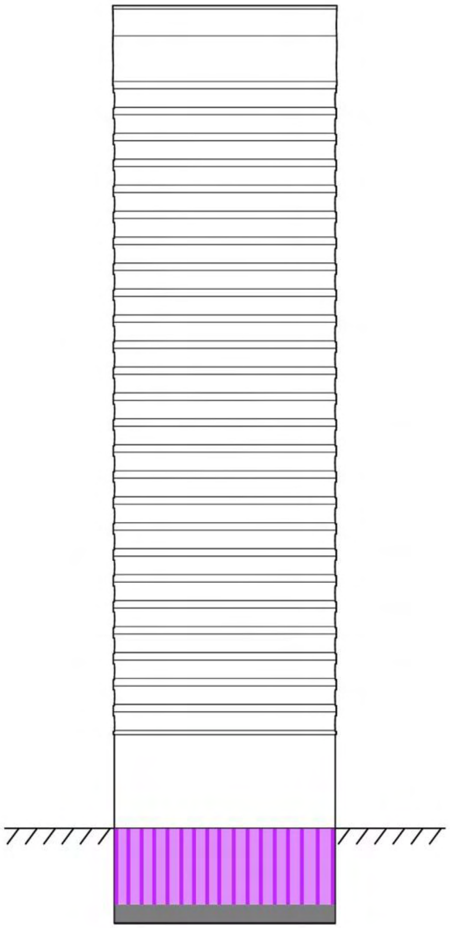


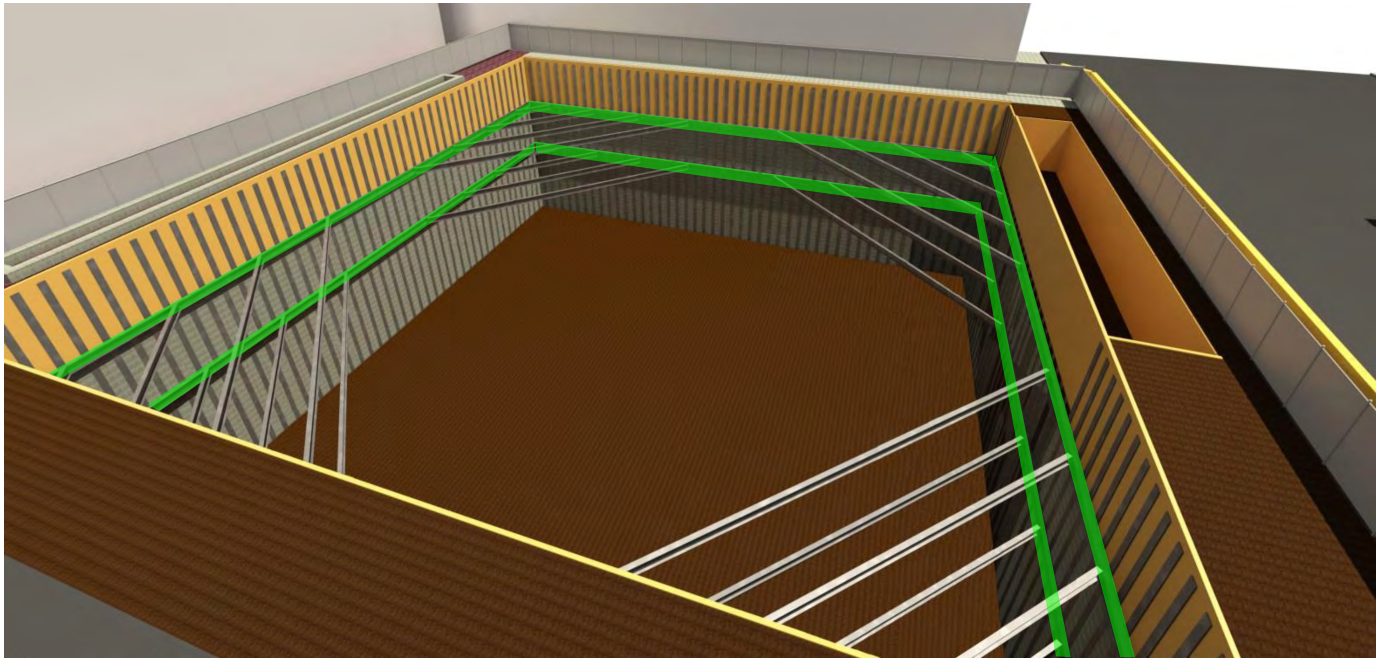
SLURRY WALL SYSTEM



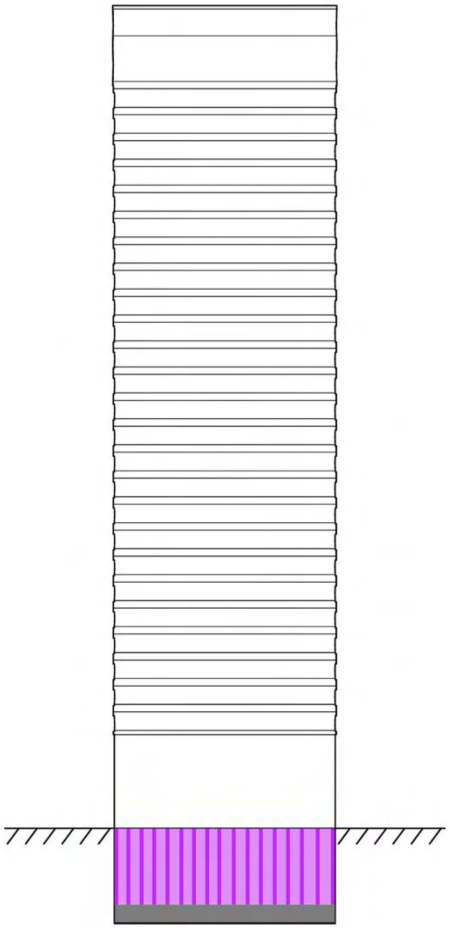


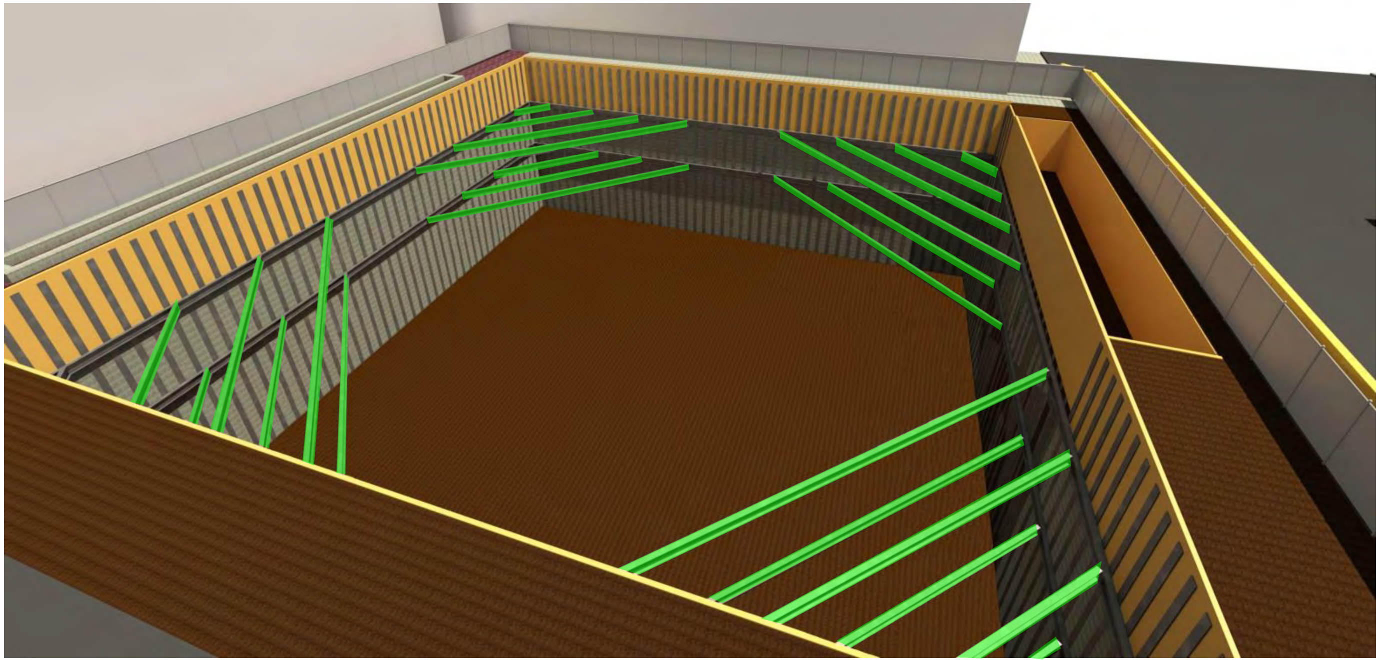
SLURRY WALL SYSTEM



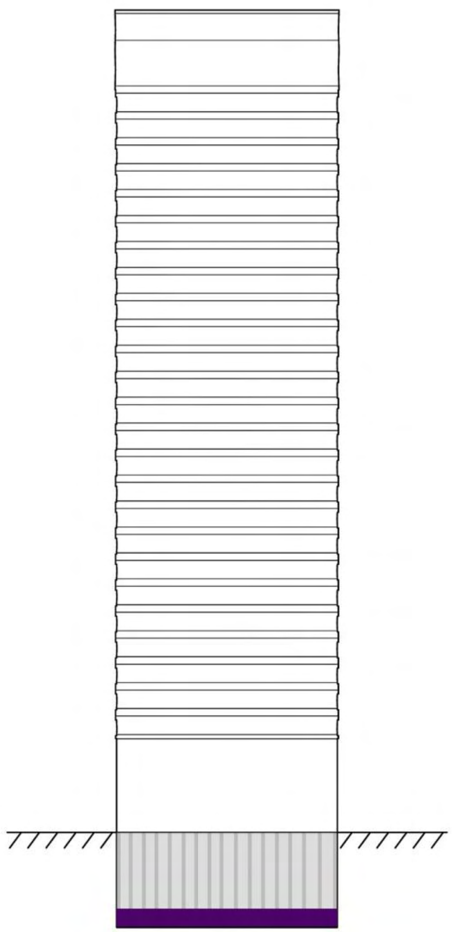


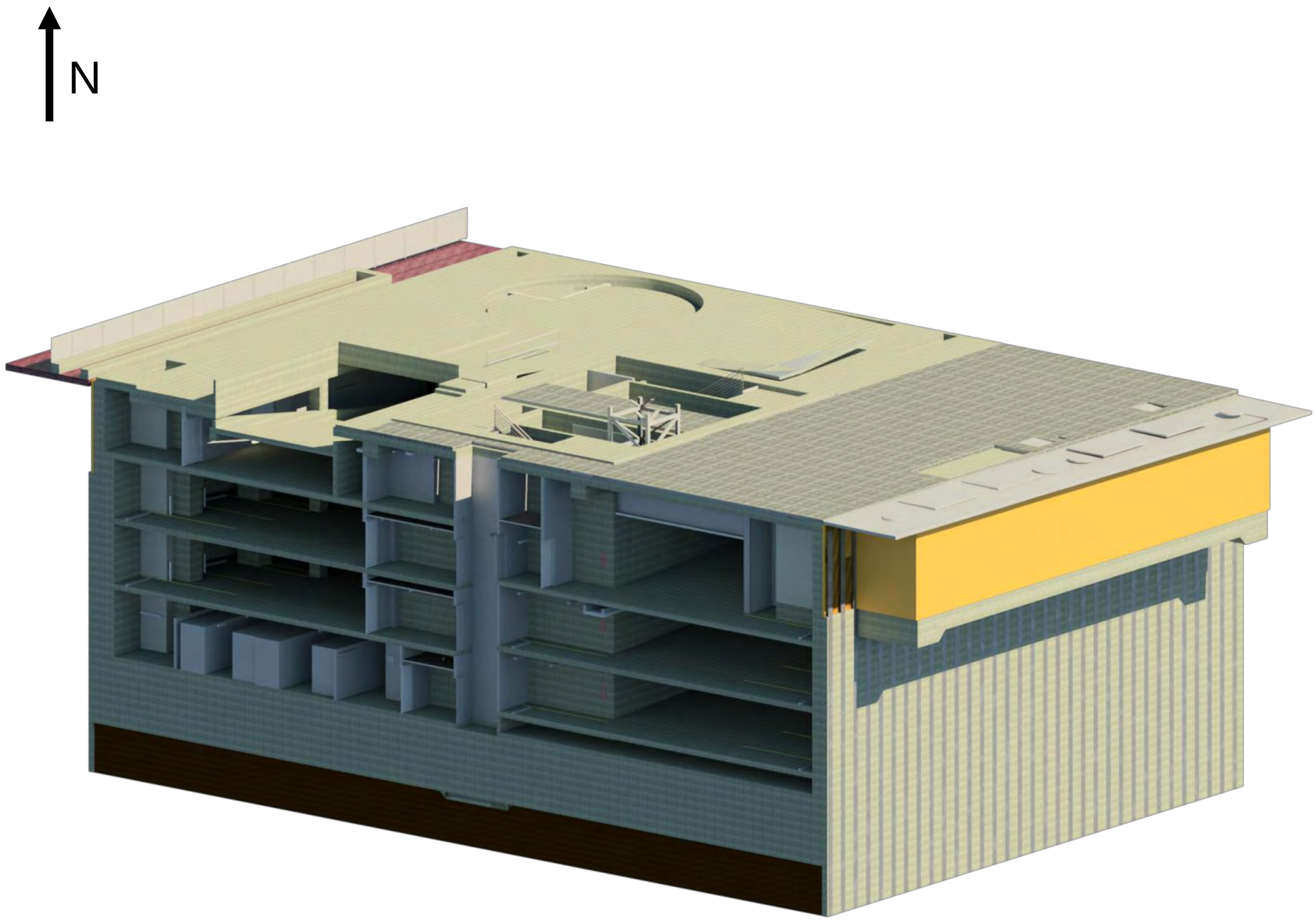
SLURRY WALL SYSTEM





MAT FOUNDATION

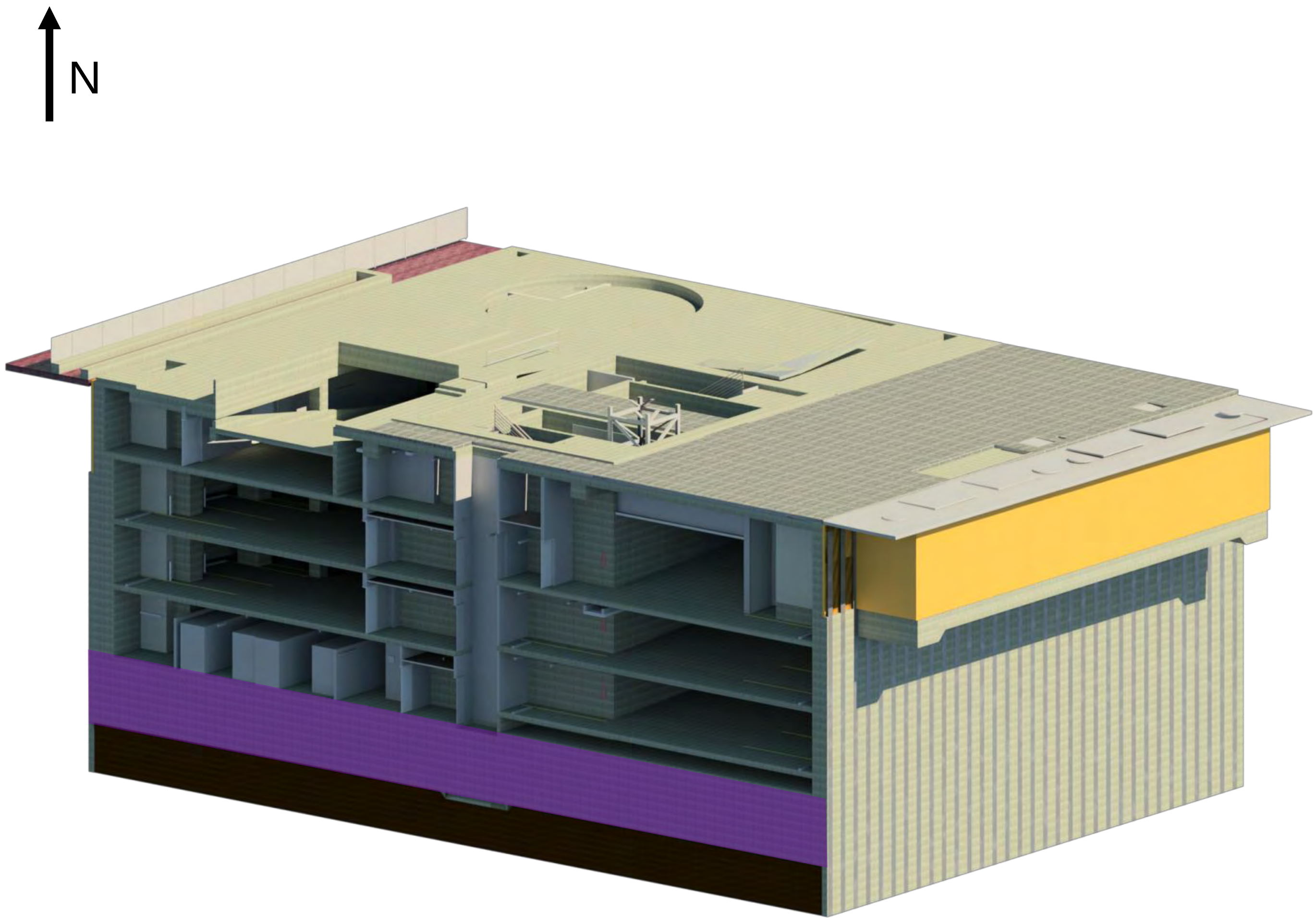


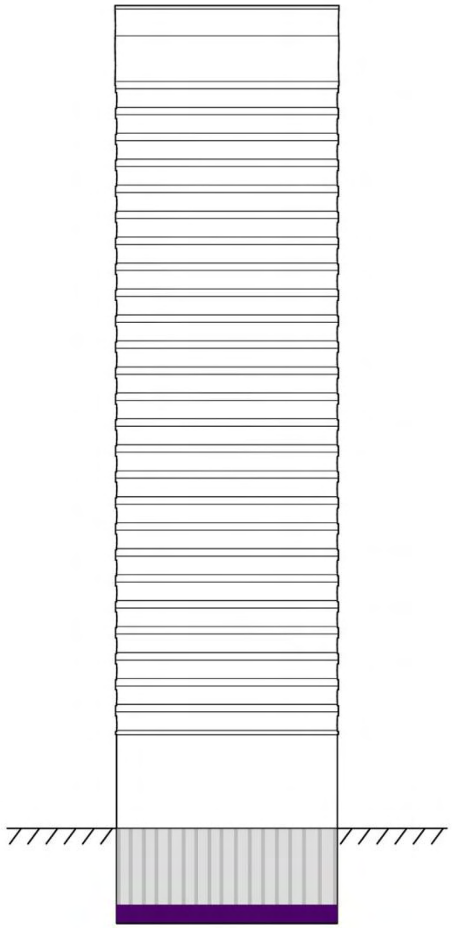


BUILDING SYSTEMS

ENERGY&POWER– SUBSTRUCTURE – SUPERSTRUCTURE – LOBBY – FAÇADE – OFFICE FLOOR

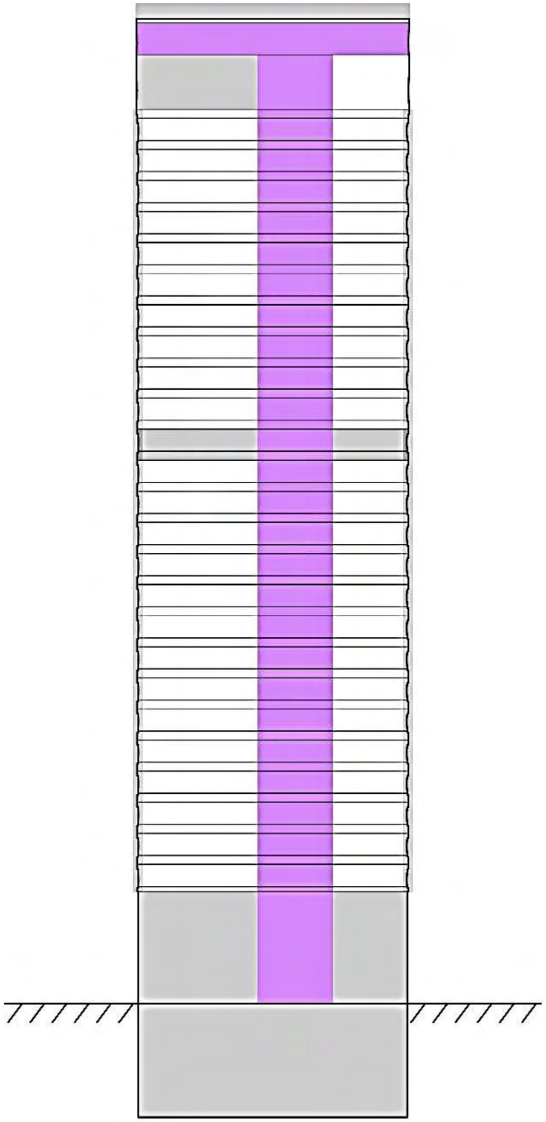
MAT FOUNDATION



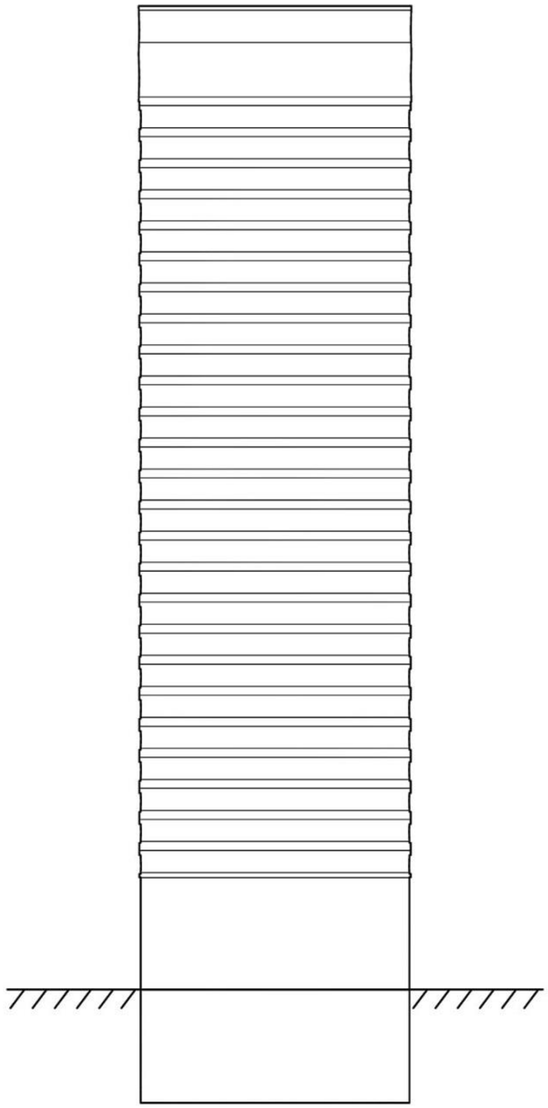


BUILDING SYSTEMS ENERGY&POWER– **SUBSTRUCTURE**–SUPERSTRUCTURE–LOBBY –FAÇADE –OFFICE FLOOR

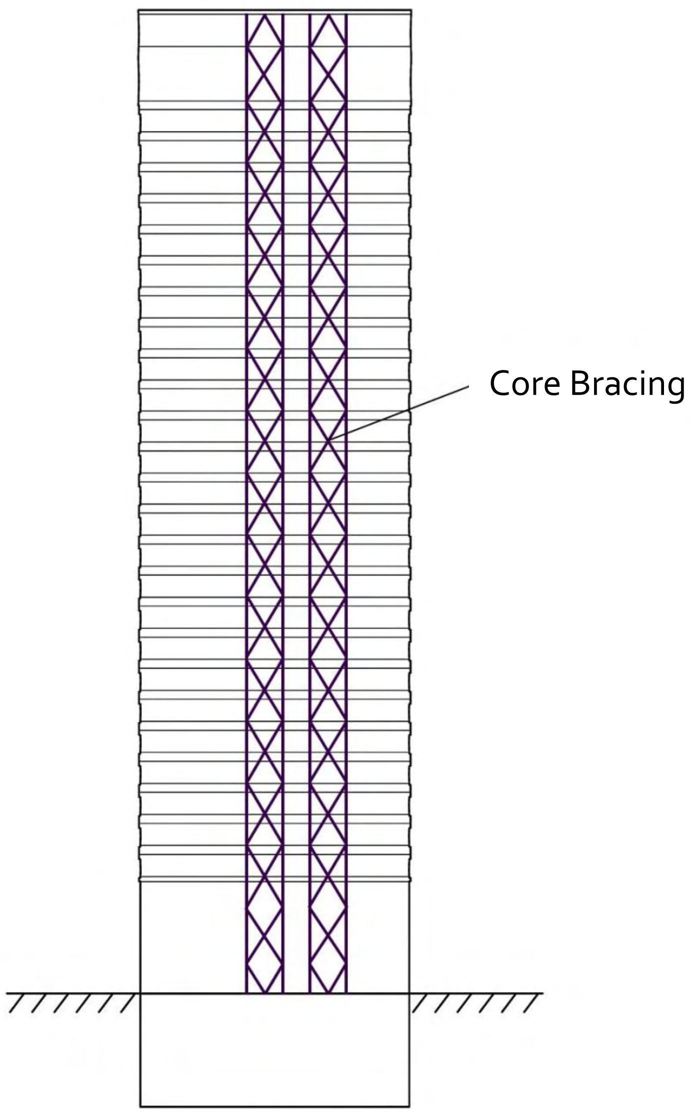
SUPERSTRUCTURE SCHEMATIC OVERVIEW



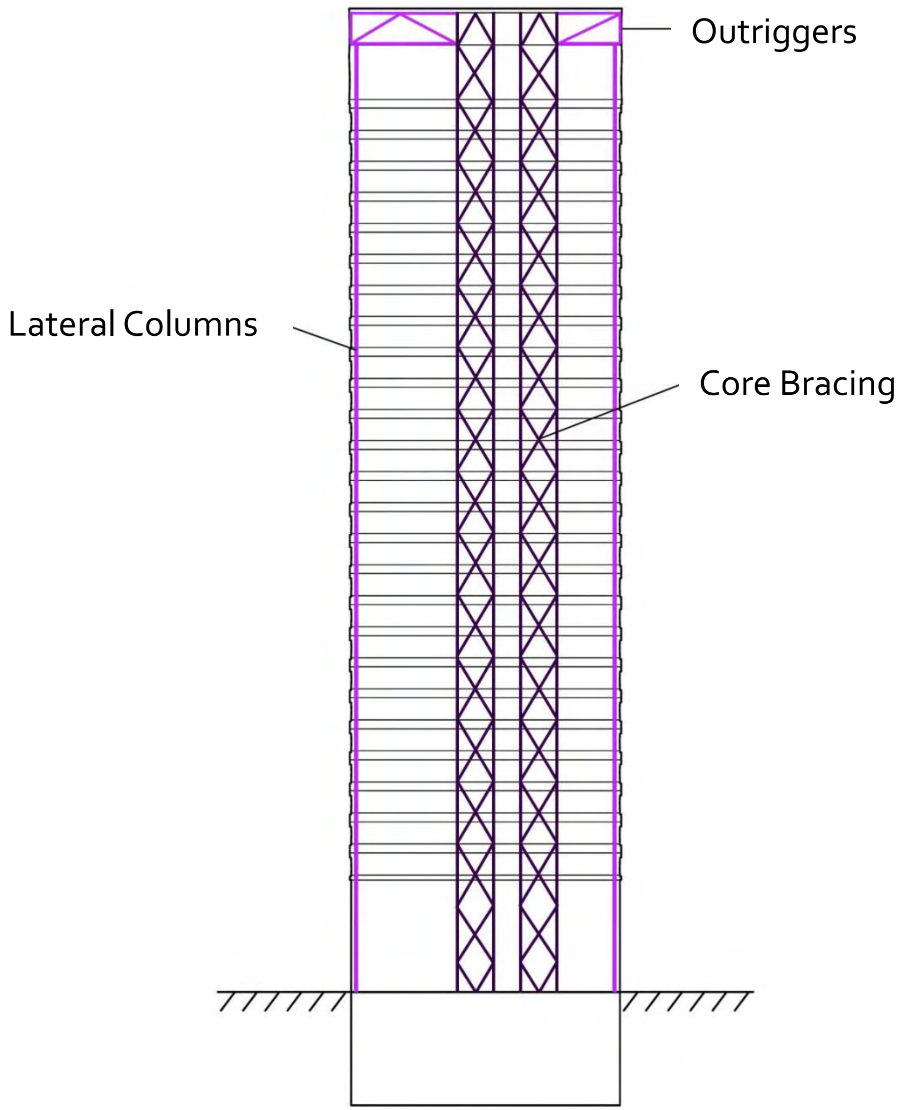
SUPERSTRUCTURE SCHEMATIC OVERVIEW



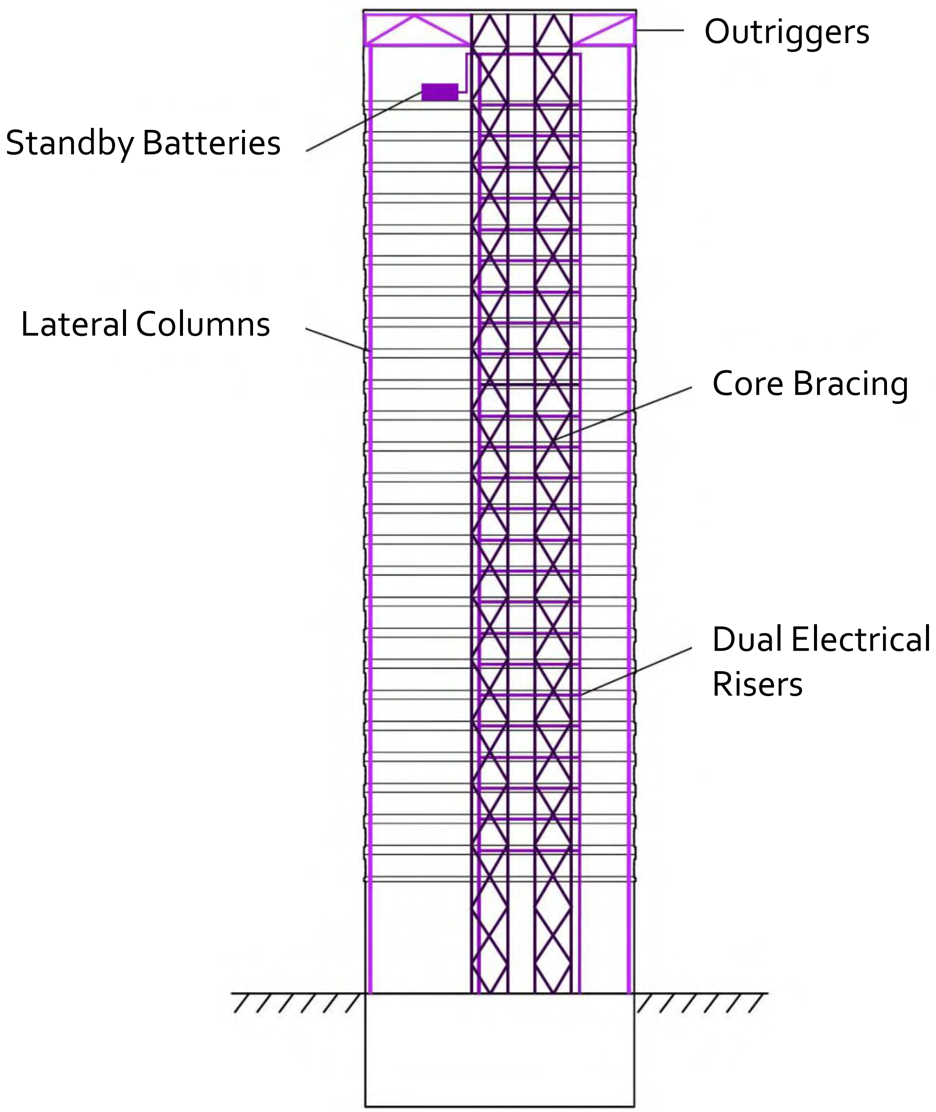
SUPERSTRUCTURE SCHEMATIC OVERVIEW



SUPERSTRUCTURE SCHEMATIC OVERVIEW



SUPERSTRUCTURE SCHEMATIC OVERVIEW



CORE

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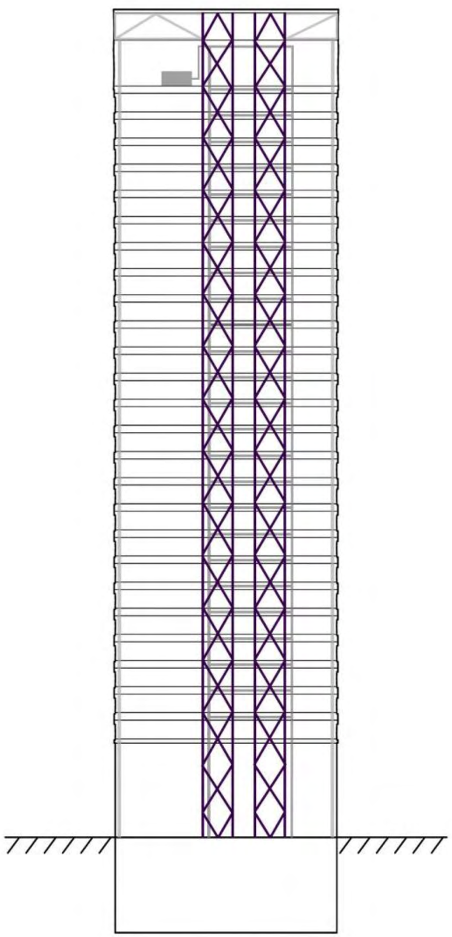
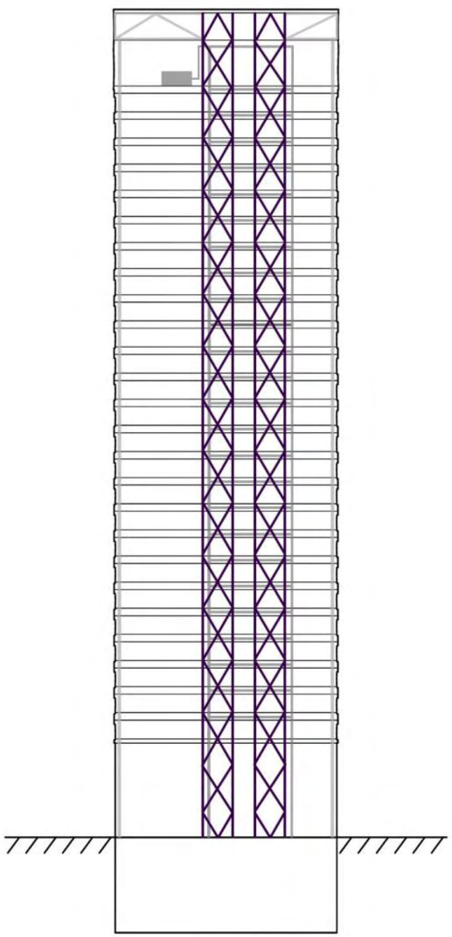
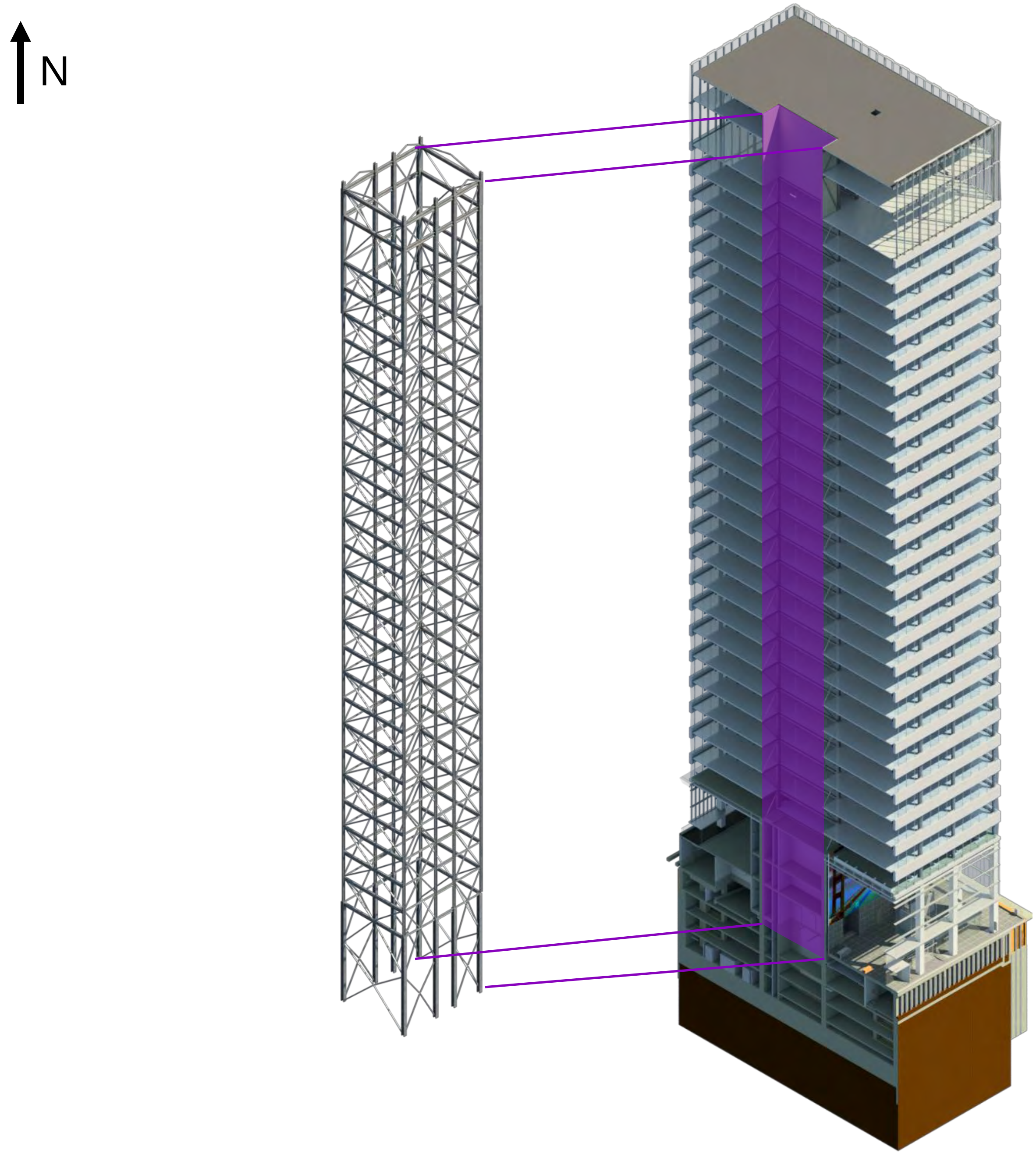


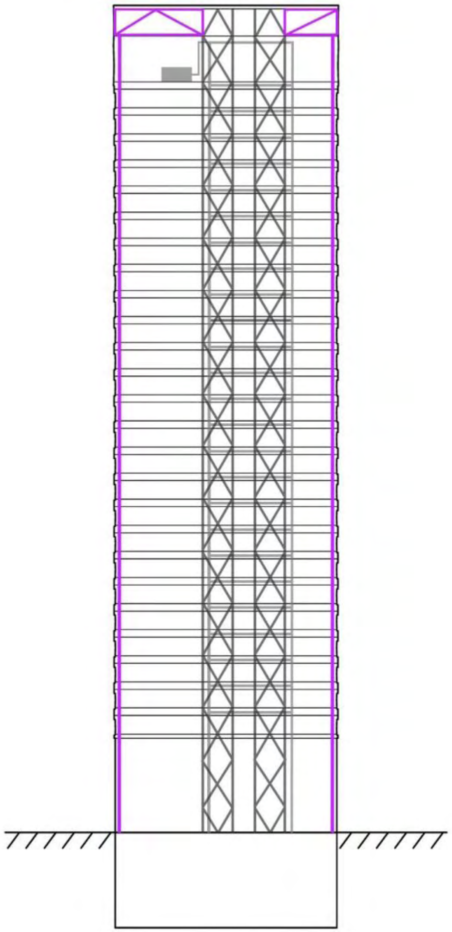
CORE





BUILDING SYSTEMS ENERGY&POWER– SUBSTRUCTURE– **SUPERSTRUCTURE**– LOBBY –FAÇADE –OFFICE FLOOR

OUTRIGGERS & LATERAL COLUMNS



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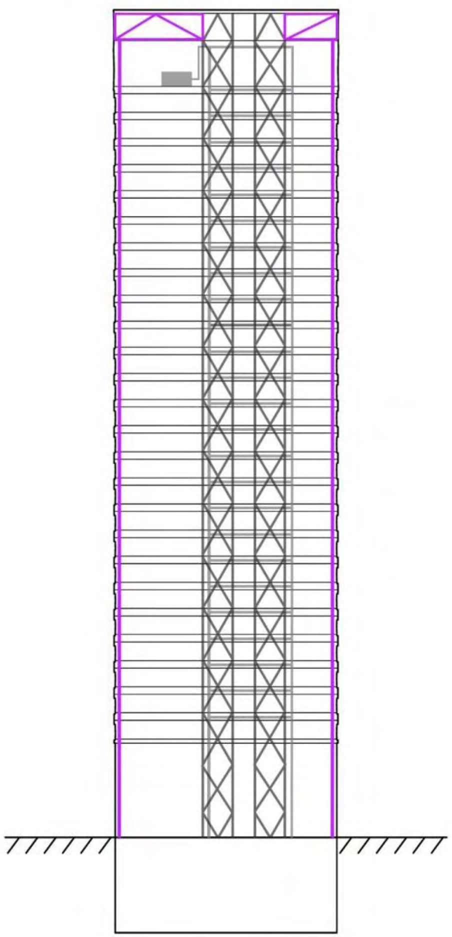
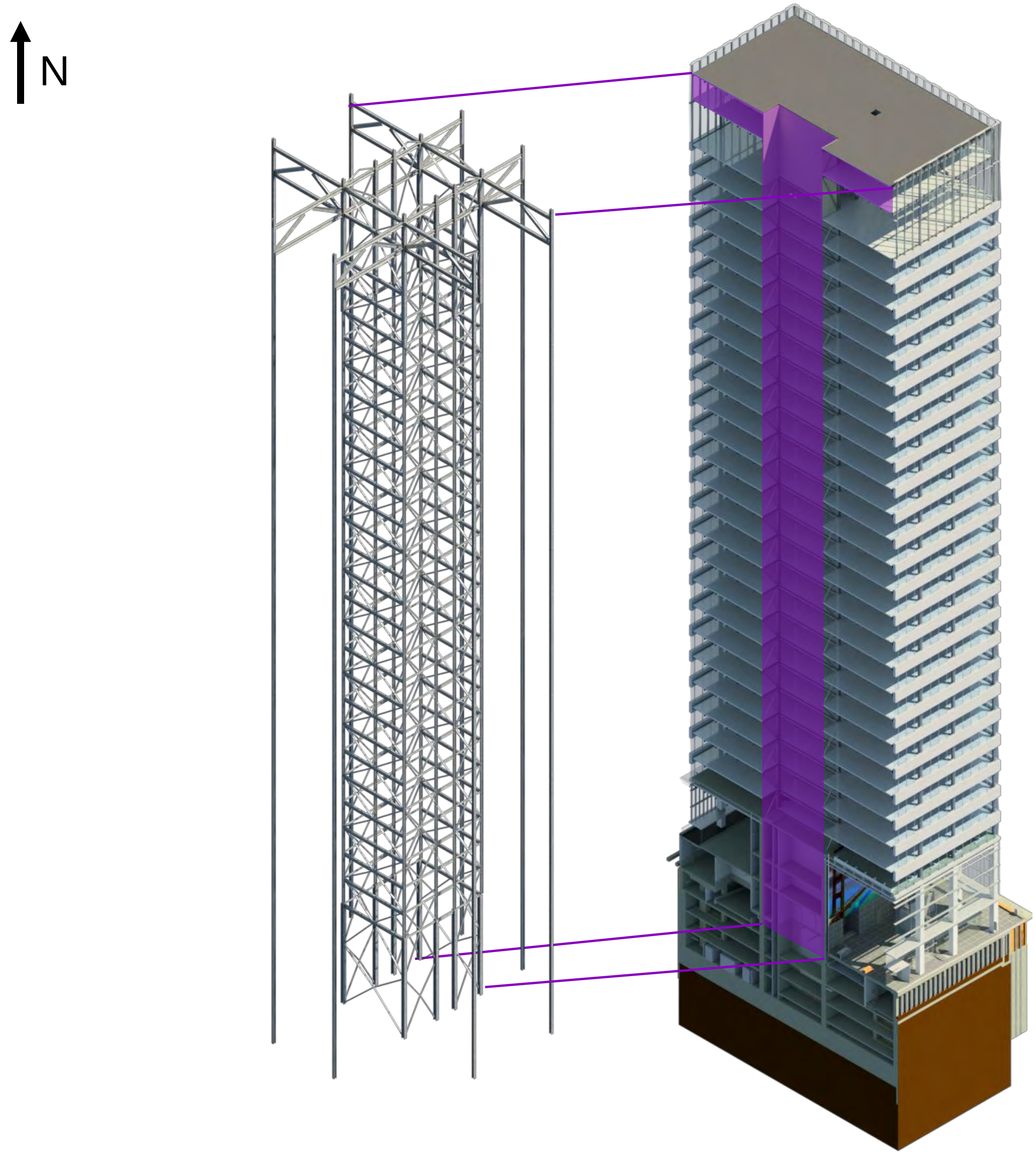
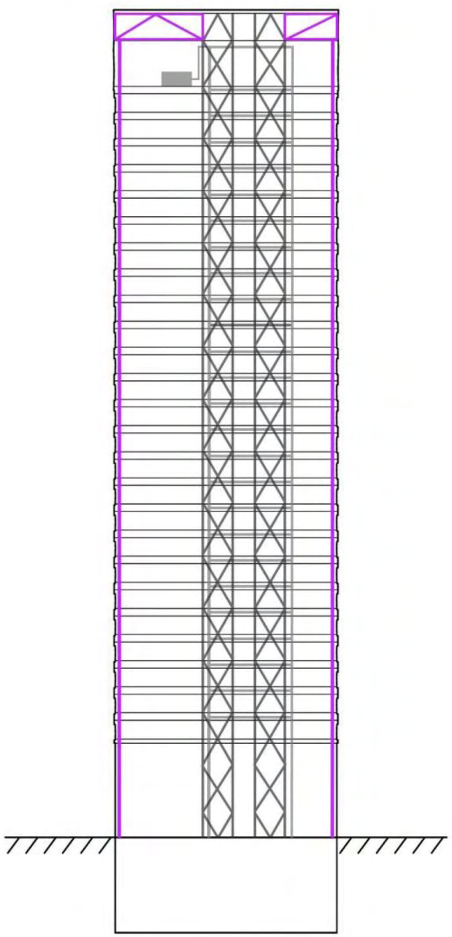
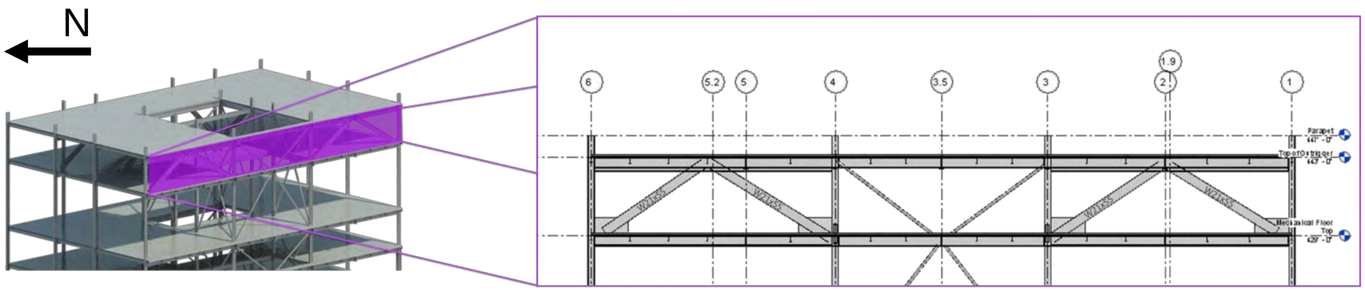
OUTRIGGERS & LATERAL COLUMNS



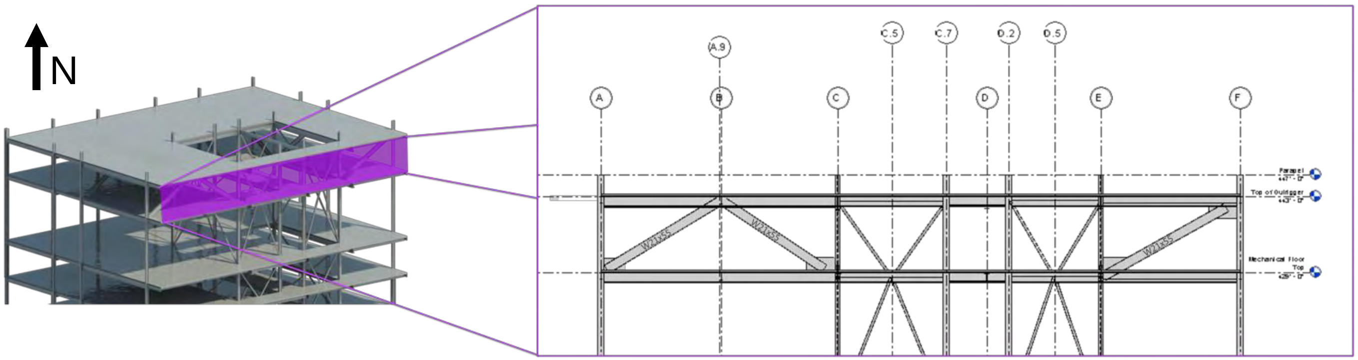


OUTRIGGERS



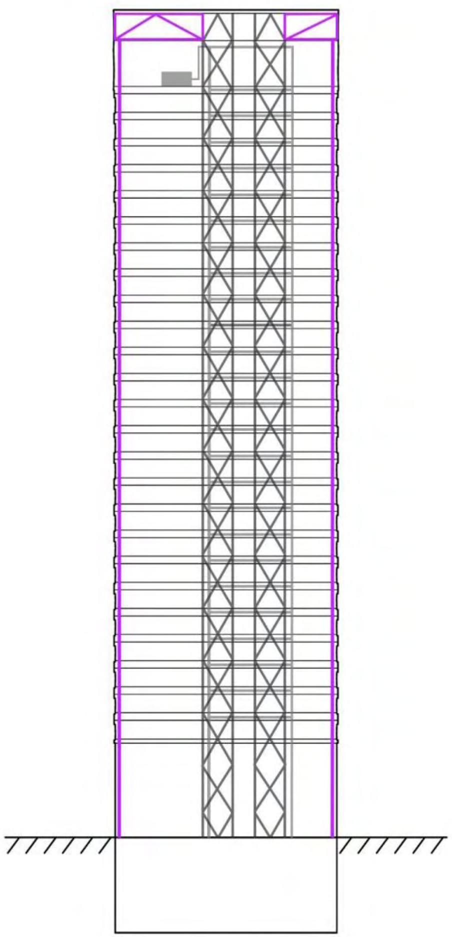


North- South Section



East- West Section

OUTRIGGERS



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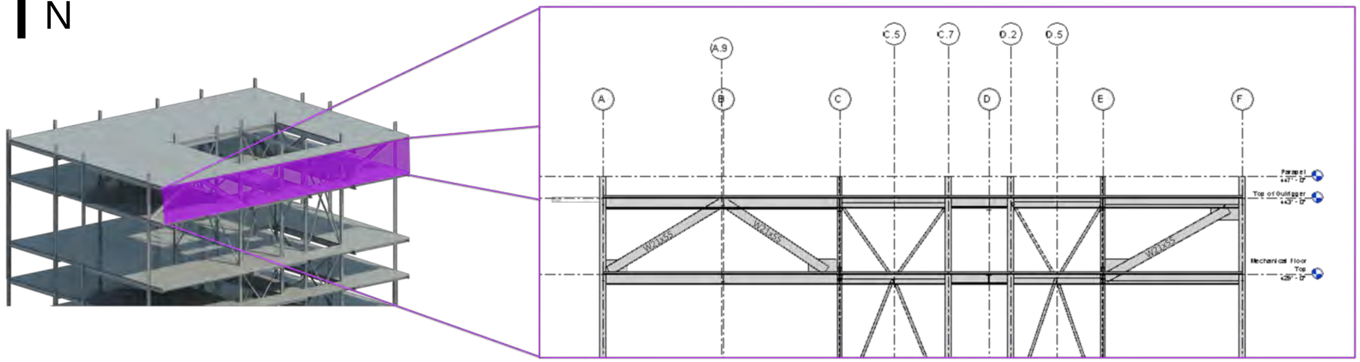
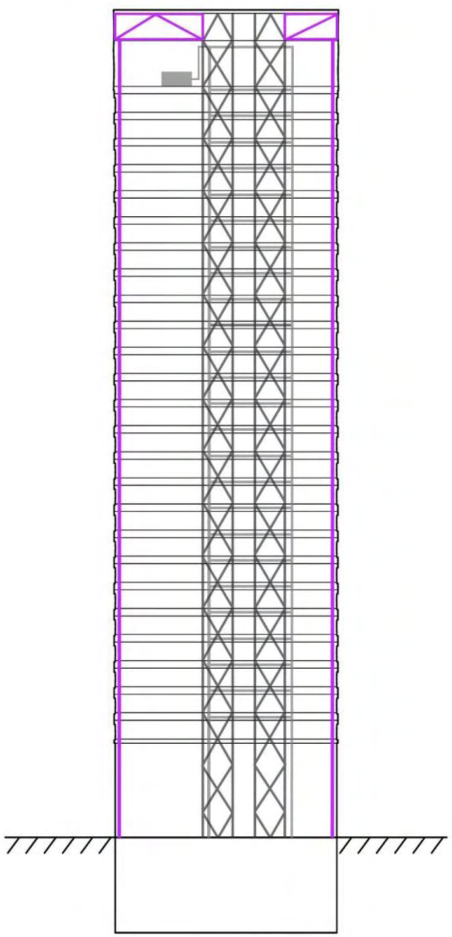
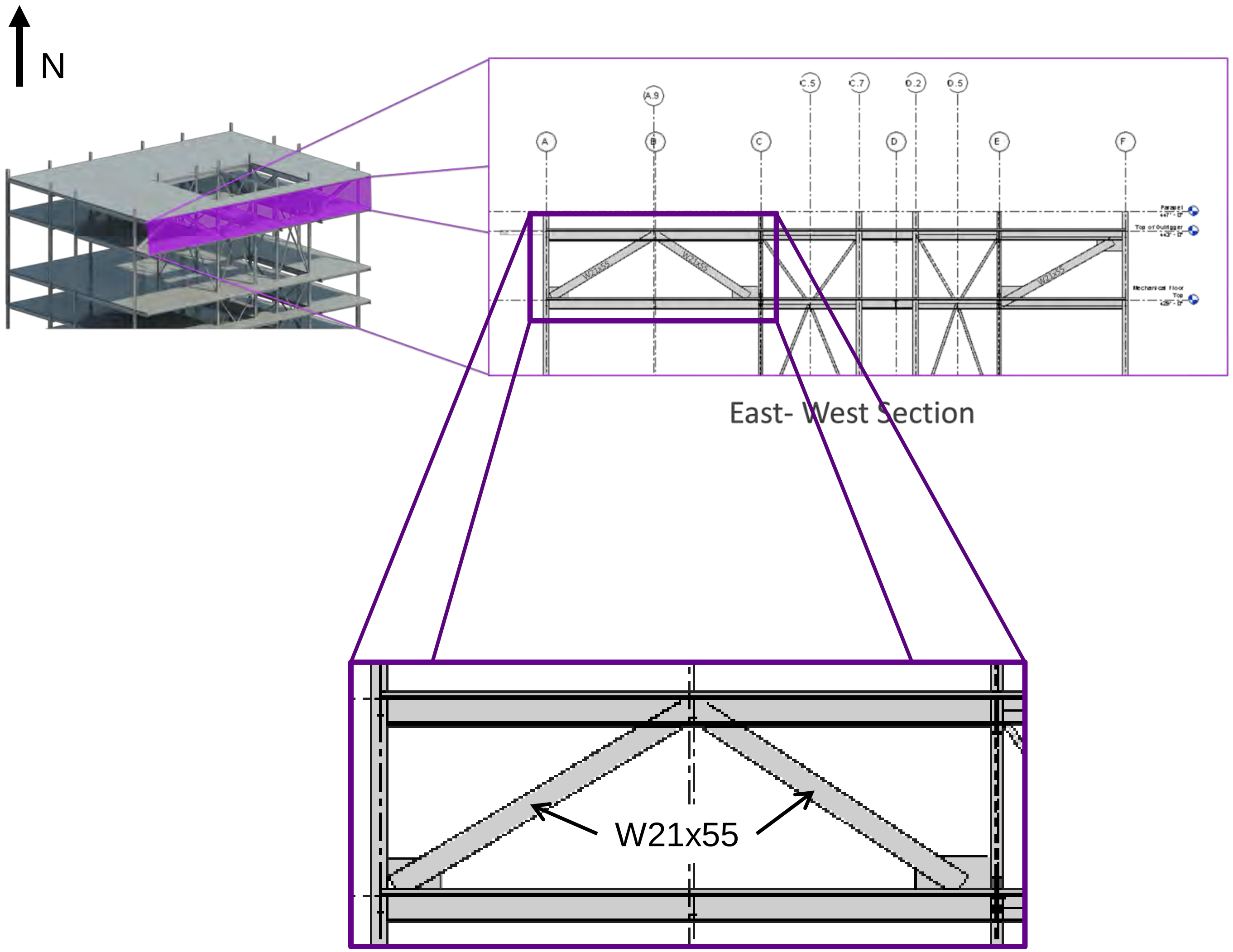


East- West Section

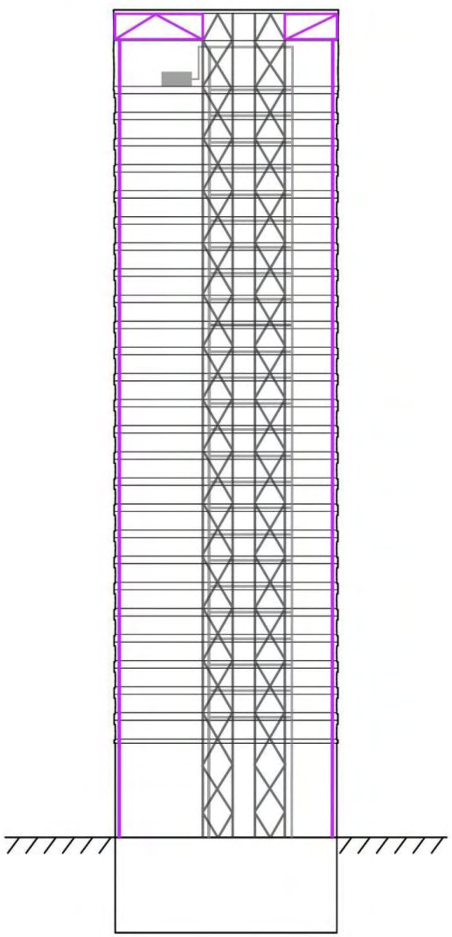
OUTRIGGERS

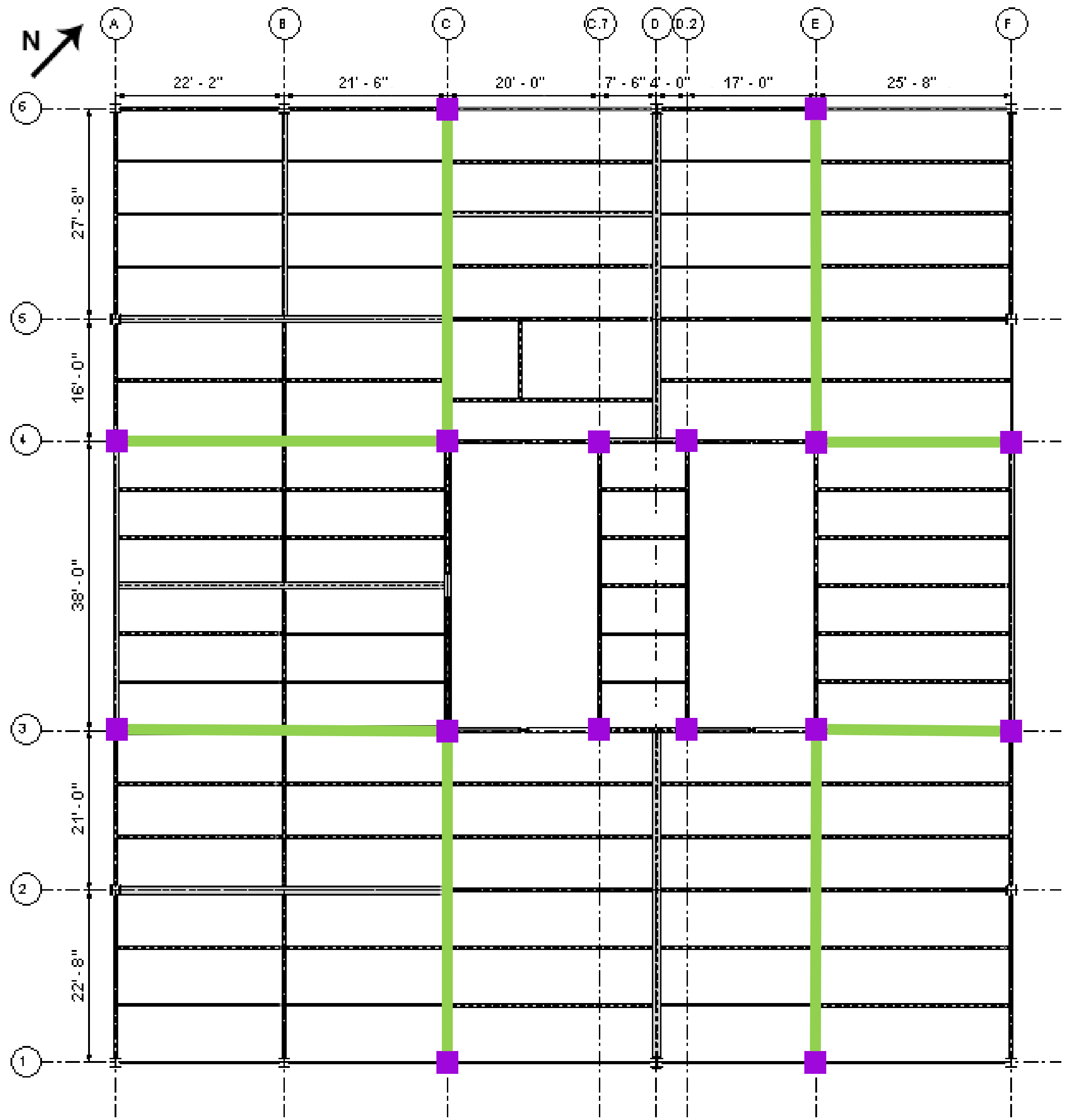




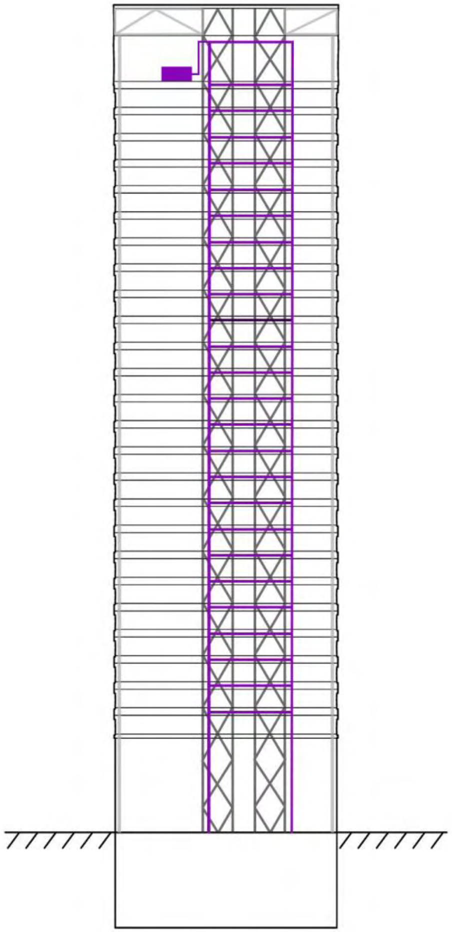
East- West Section

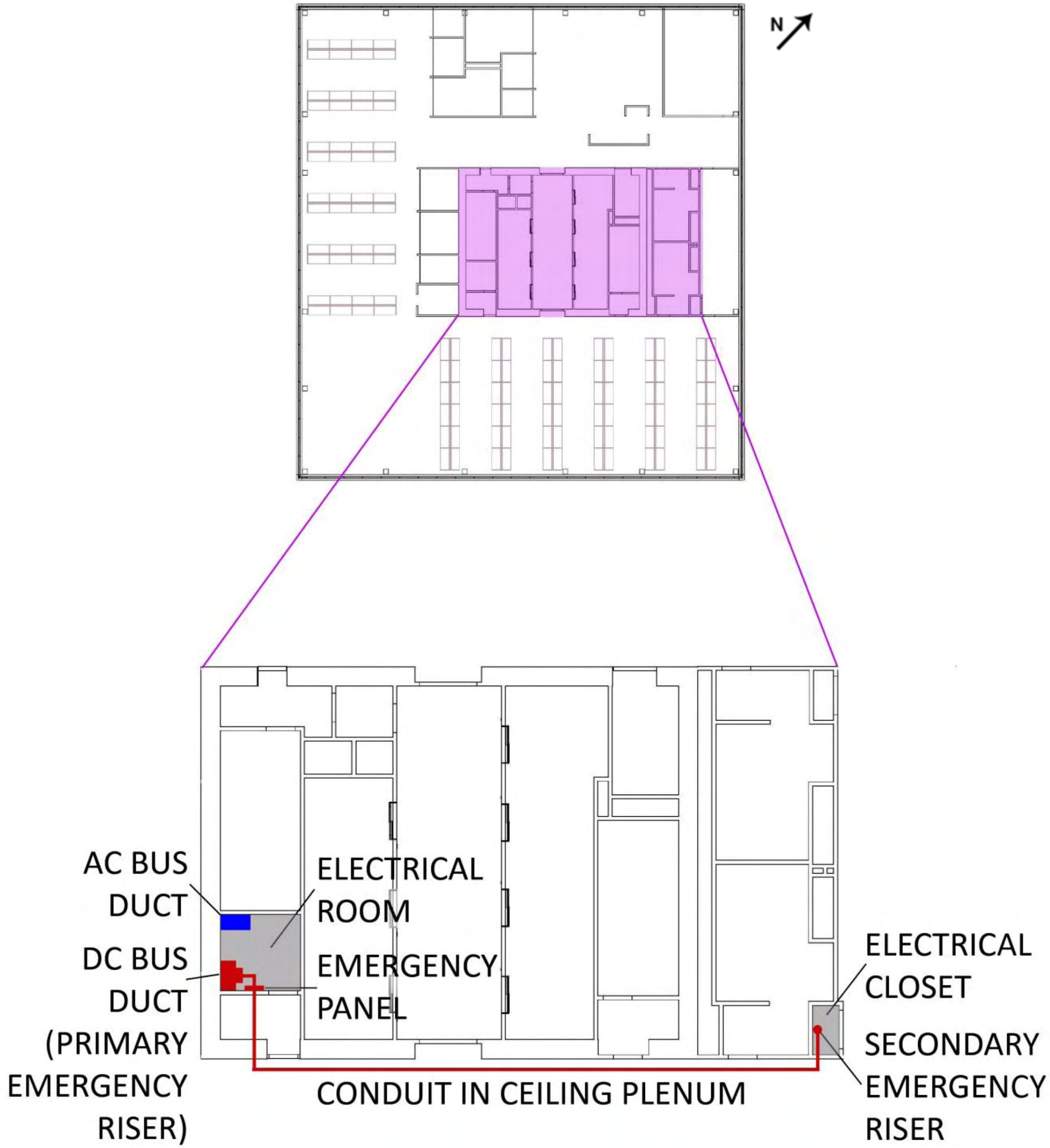
OUTRIGGER PLAN LOCATION



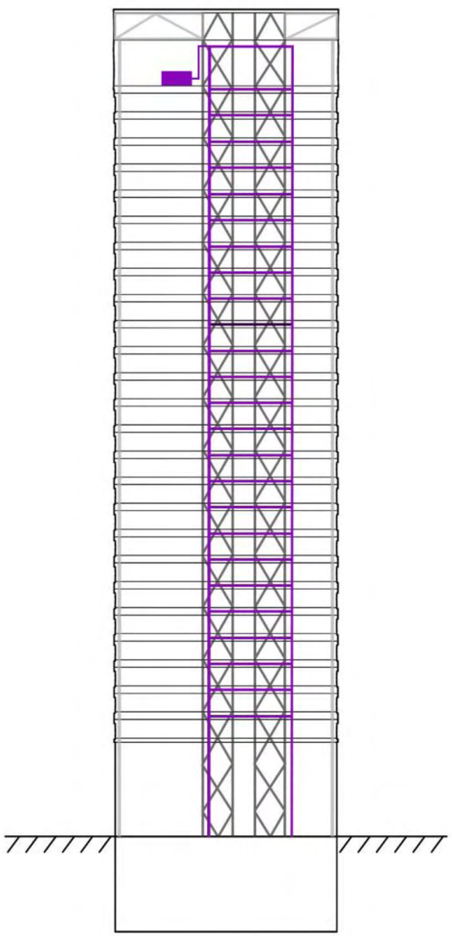


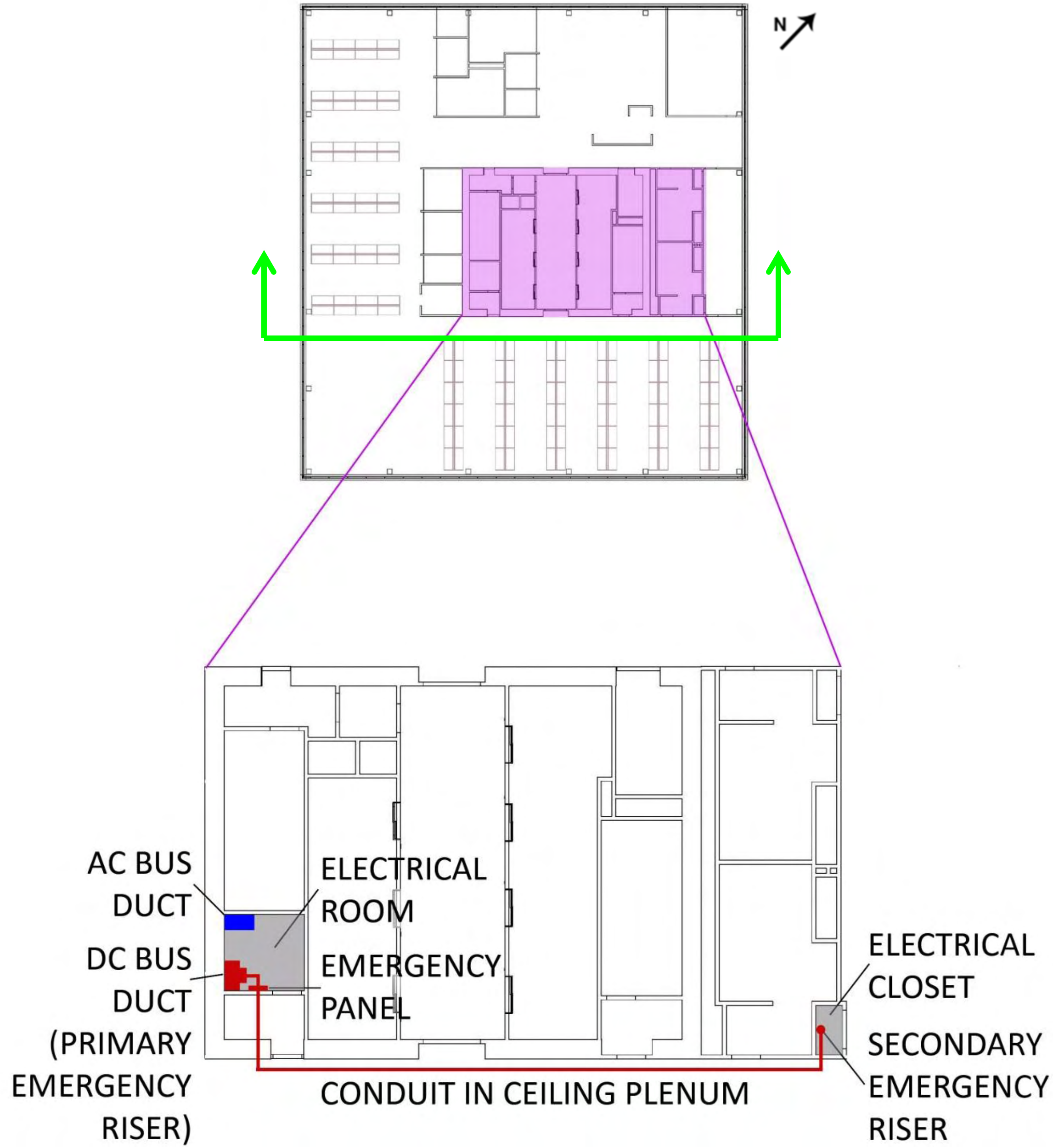
DUAL RISERS



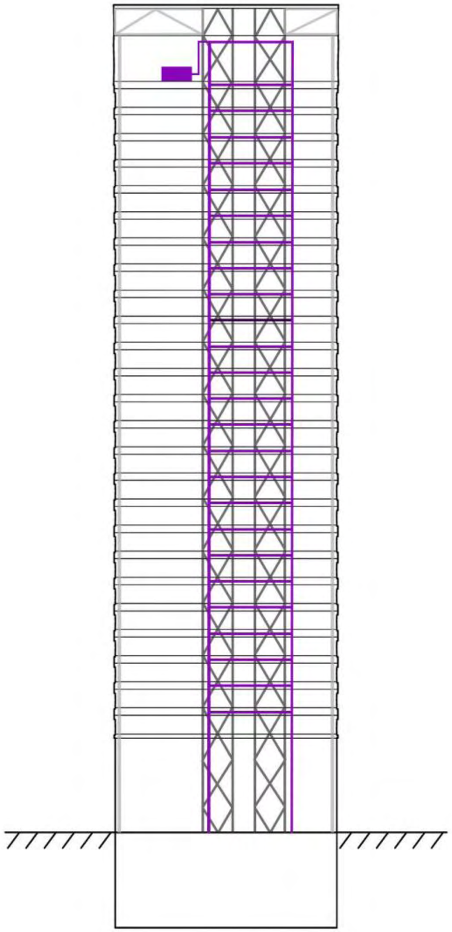

N
AC BUS DUCT
DC BUS DUCT (PRIMARY EMERGENCY RISER)
ELECTRICAL ROOM
EMERGENCY PANEL
CONDUIT IN CEILING PLENUM
ELECTRICAL CLOSET
SECONDARY EMERGENCY RISER

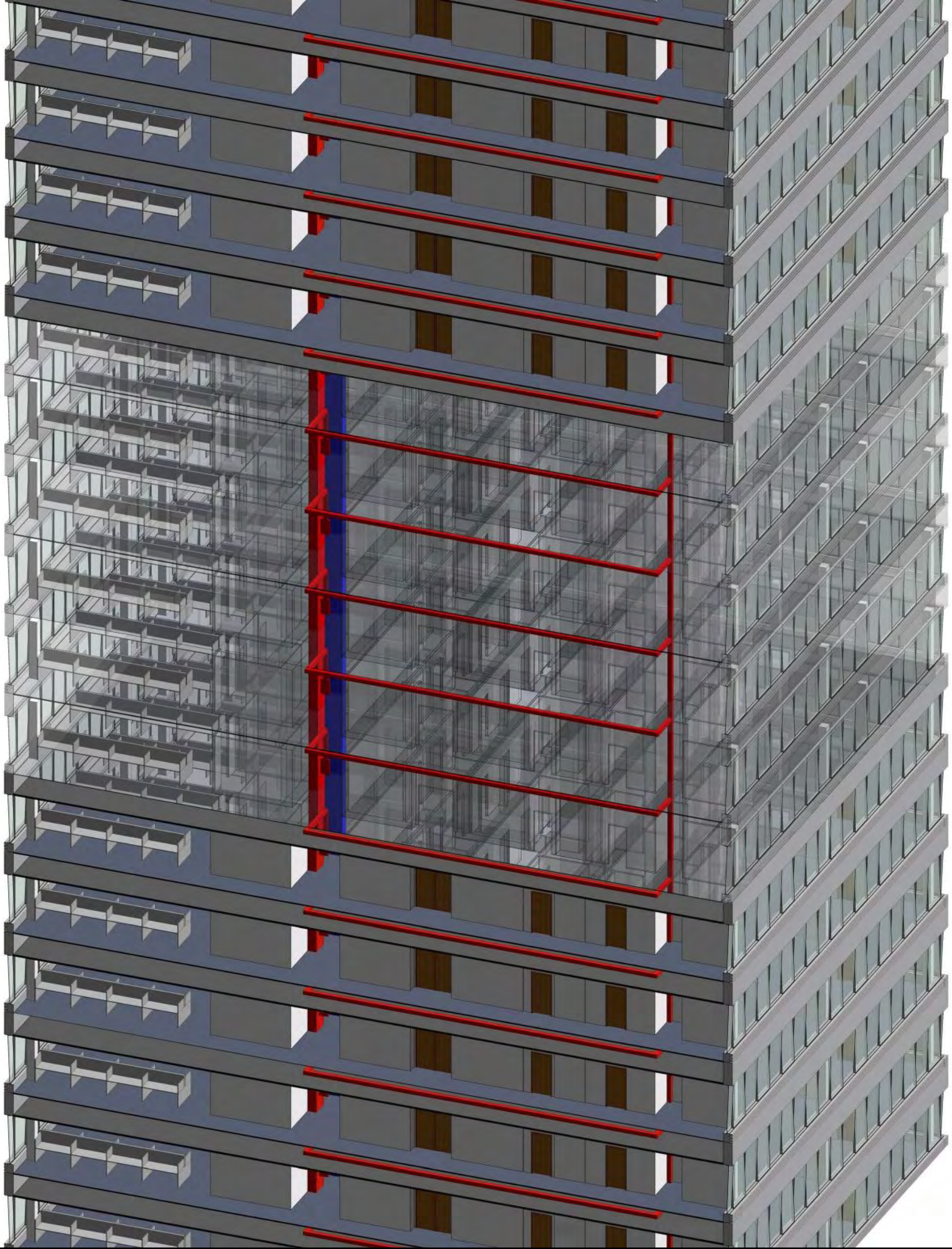
DUAL RISERS

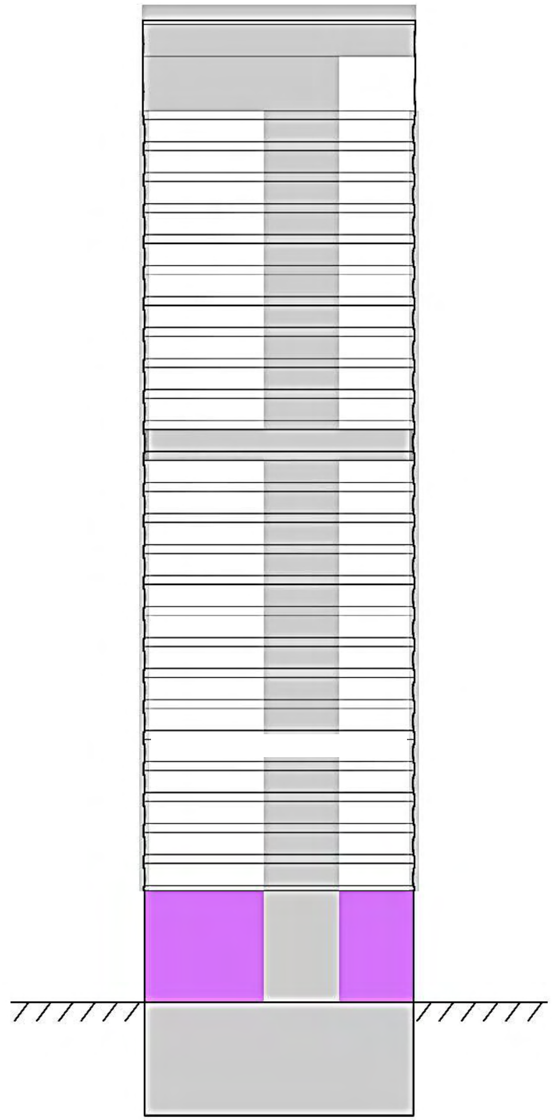


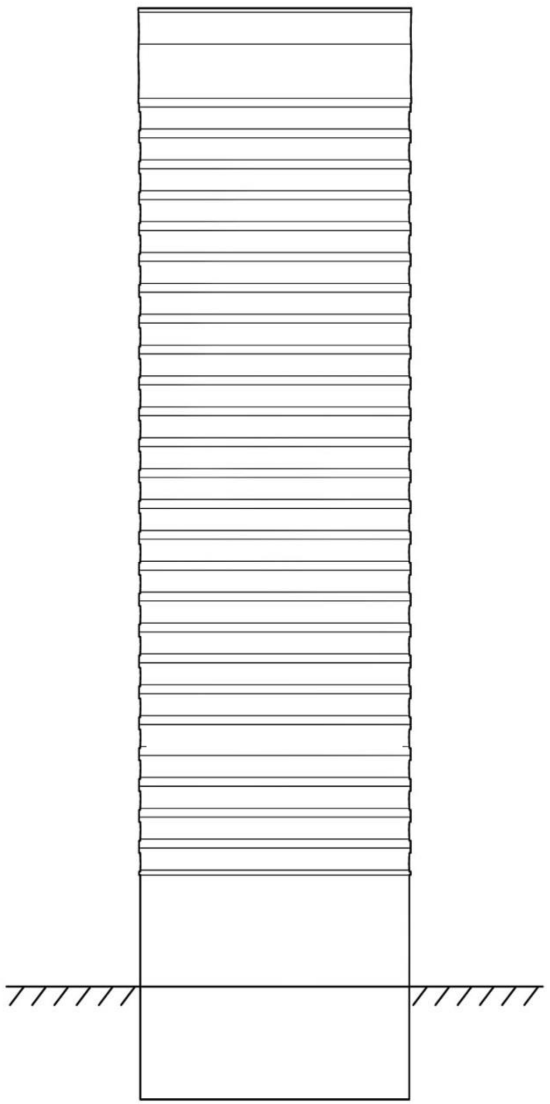

N
AC BUS DUCT
DC BUS DUCT (PRIMARY EMERGENCY RISER)
ELECTRICAL ROOM
EMERGENCY PANEL
CONDUIT IN CEILING PLENUM
ELECTRICAL CLOSET
SECONDARY EMERGENCY RISER

DUAL RISERS

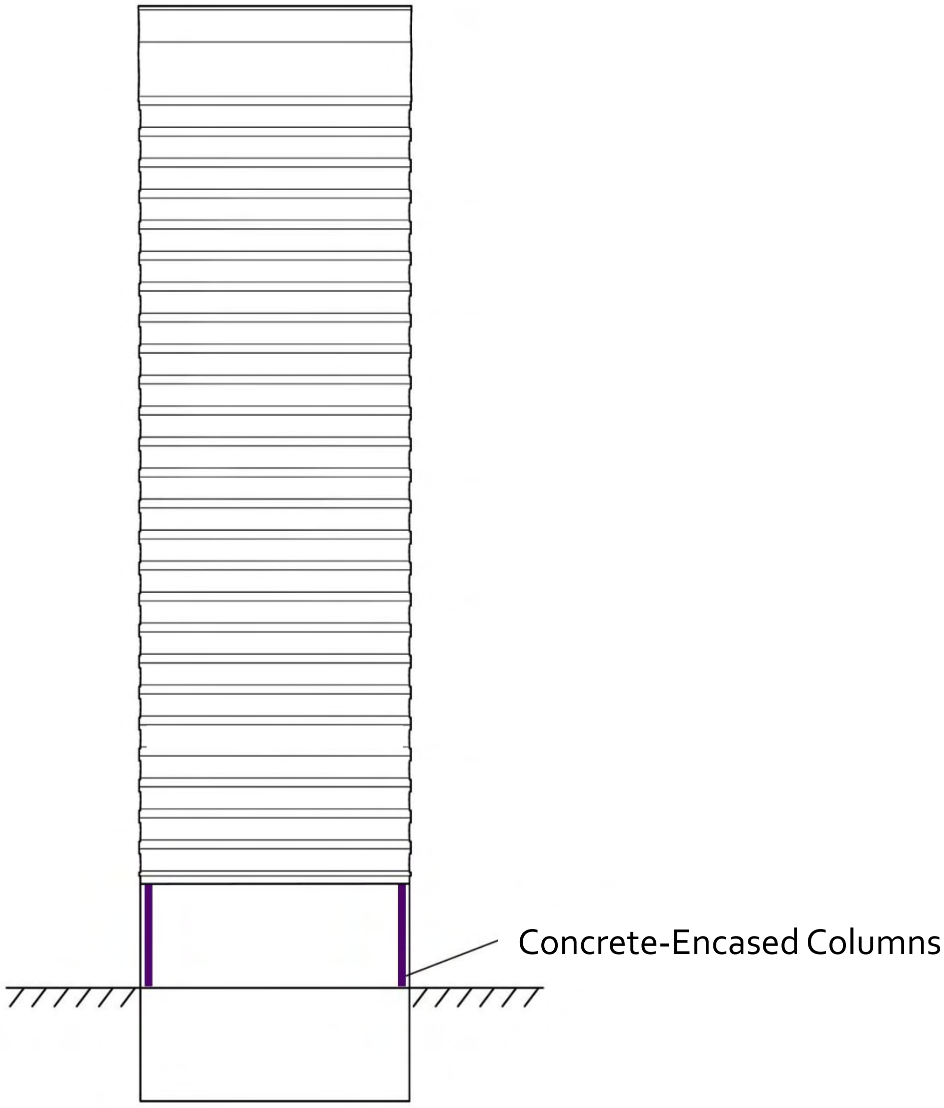


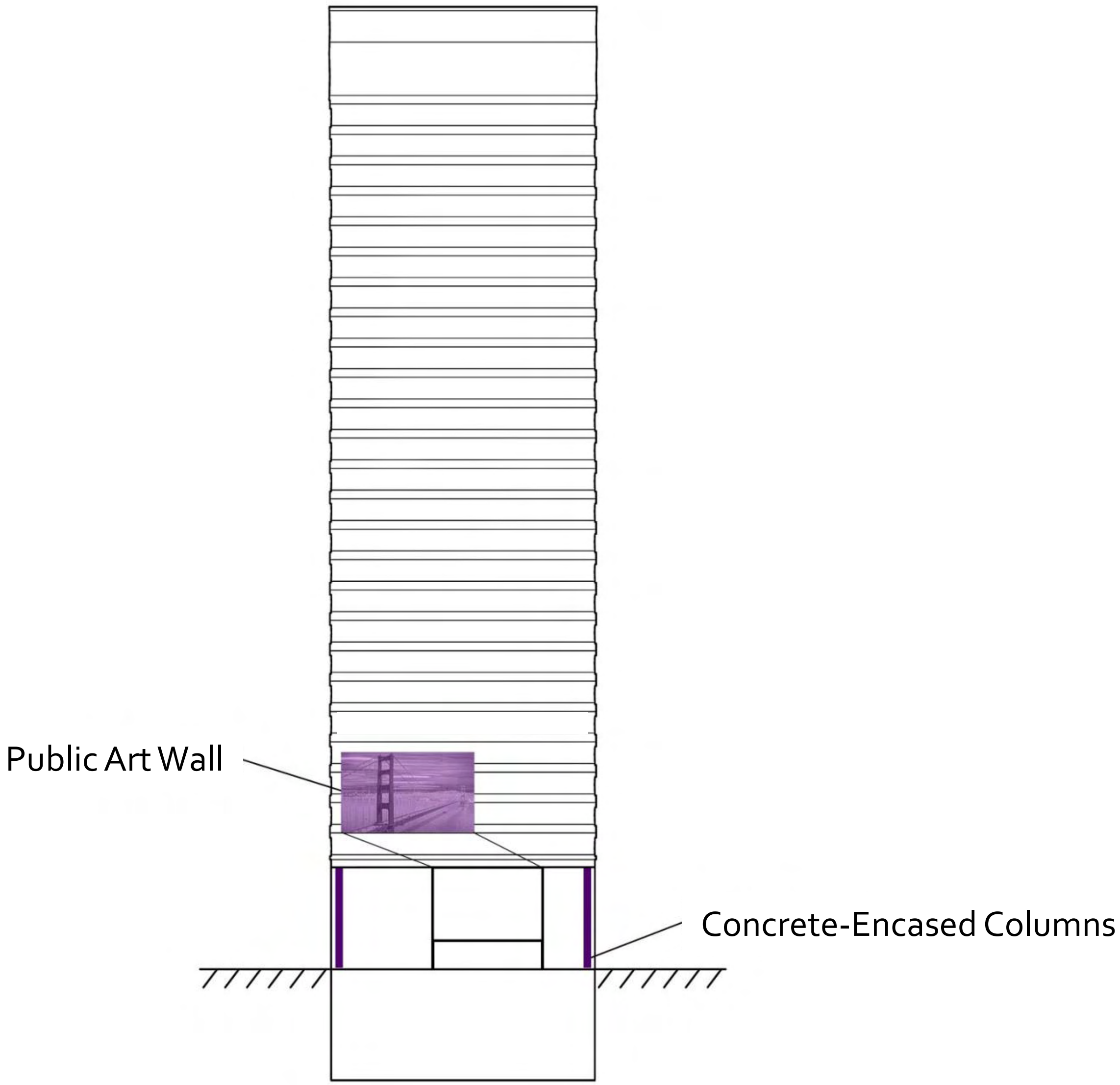




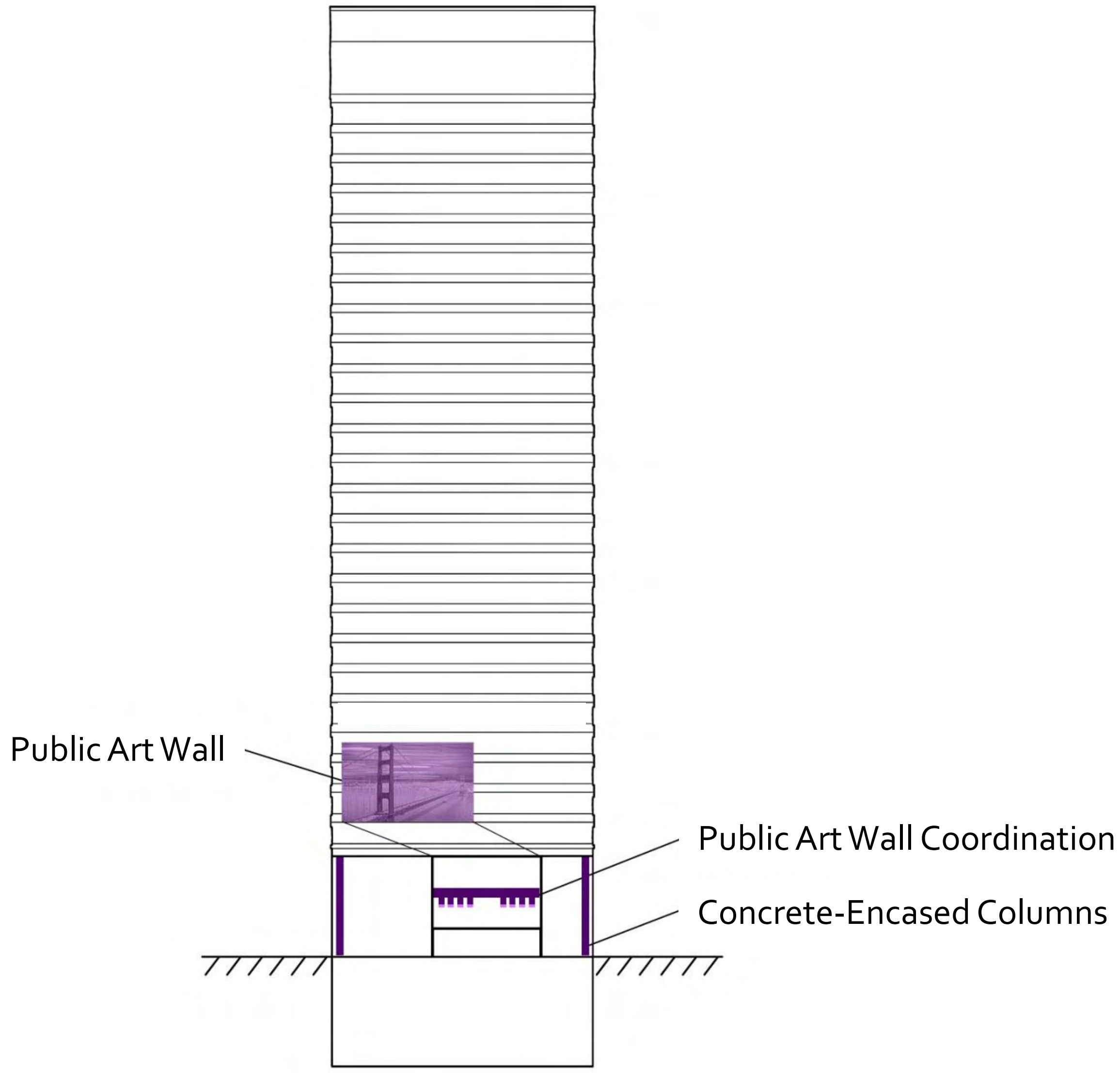


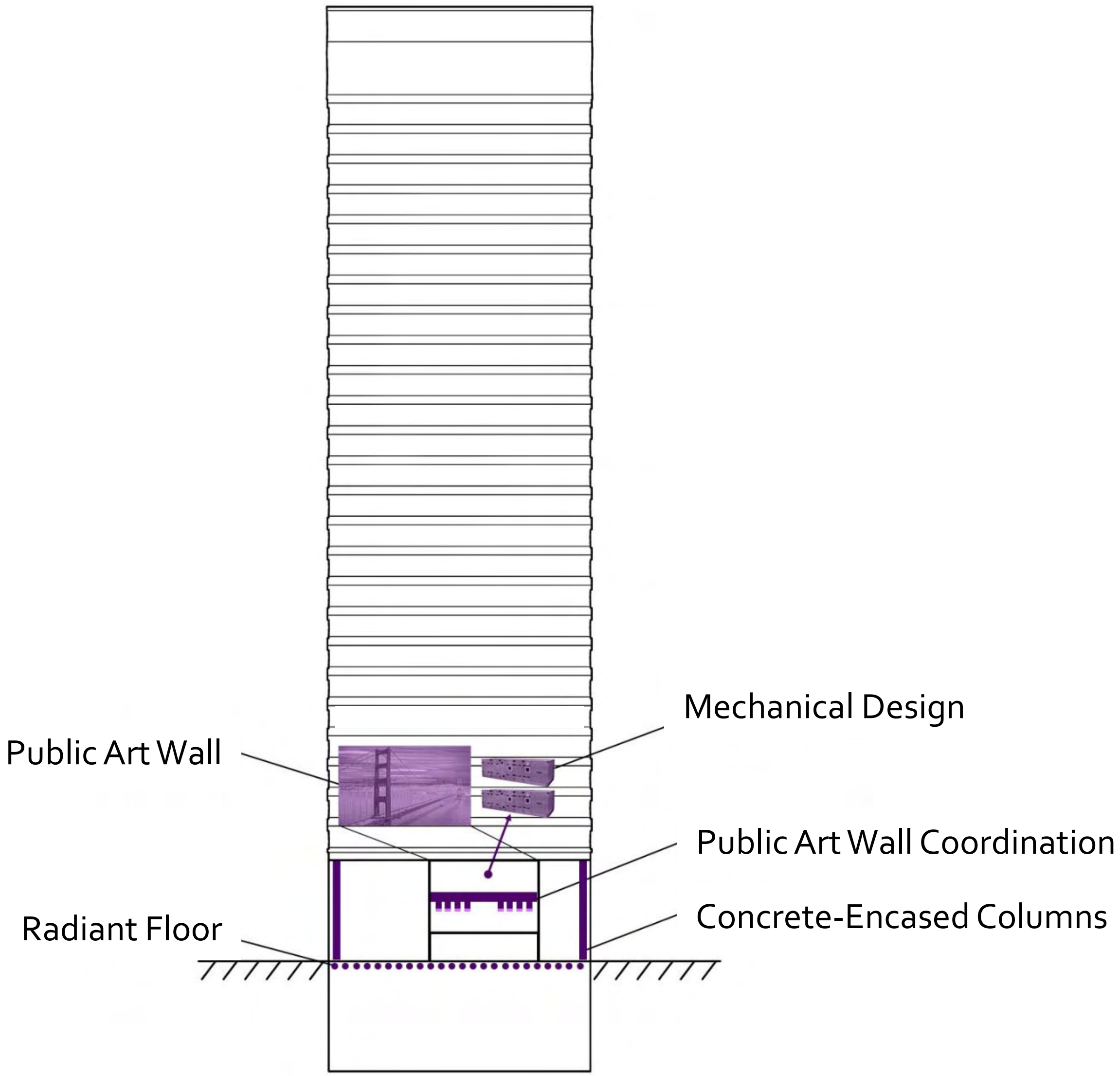
LOBBY SCHEMATIC OVERVIEW

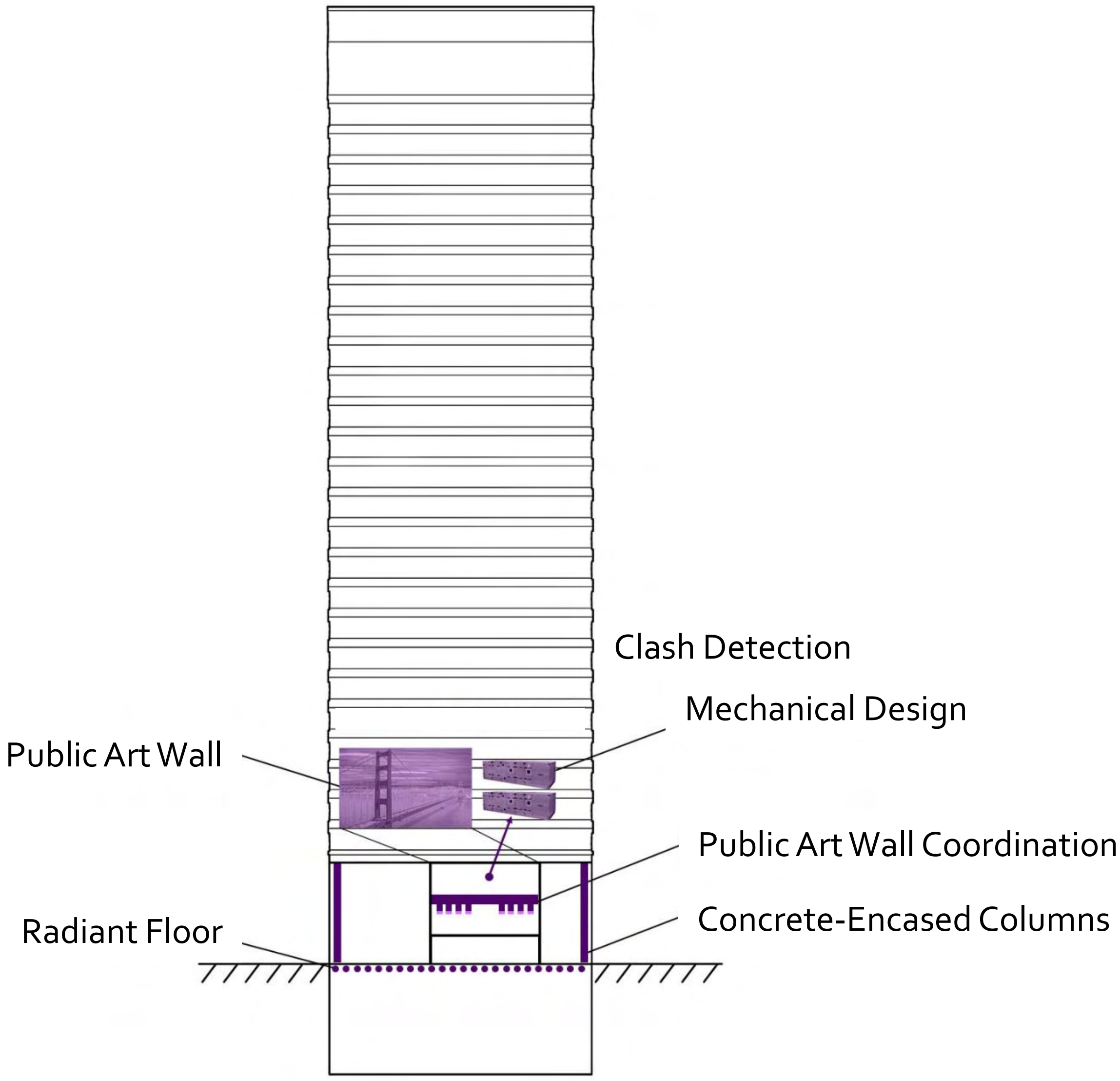



Public Art Wall
Concrete-Encased Columns

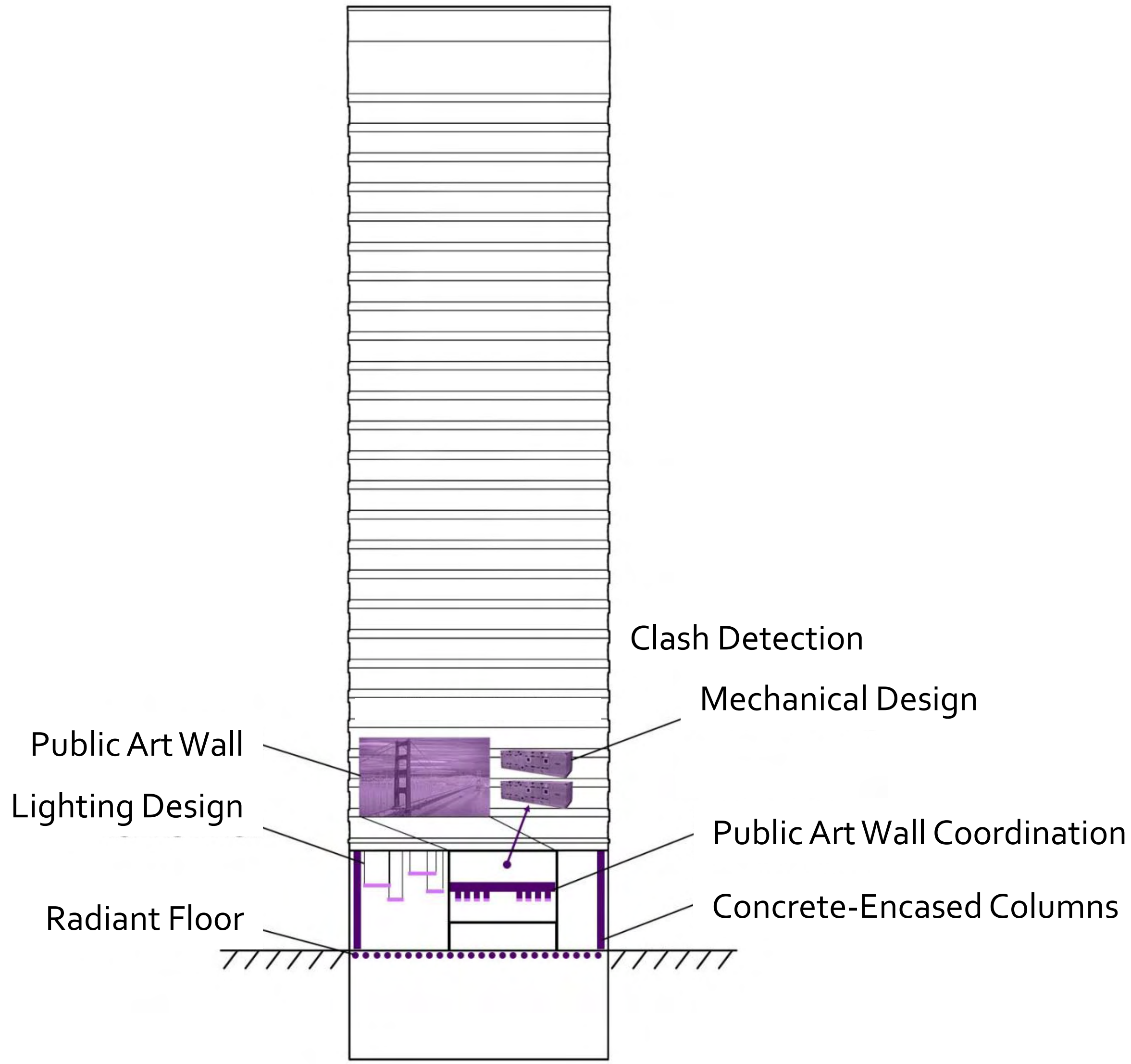
LOBBY SCHEMATIC OVERVIEW



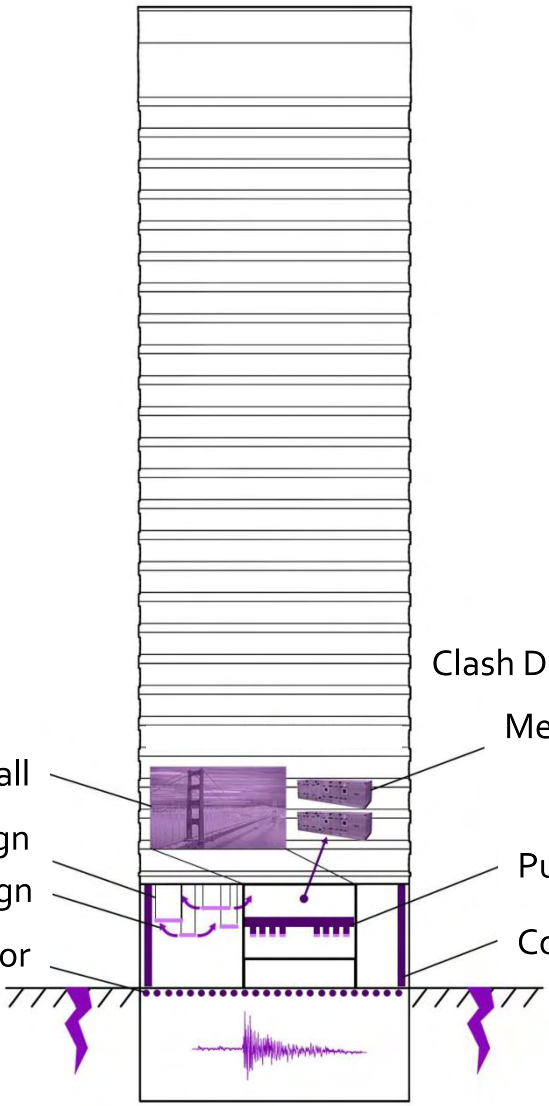

Mechanical Design
Public Art Wall
Public Art Wall Coordination
Radiant Floor
Concrete-Encased Columns


Clash Detection
Mechanical Design
Public Art Wall
Public Art Wall Coordination
Radiant Floor
Concrete-Encased Columns

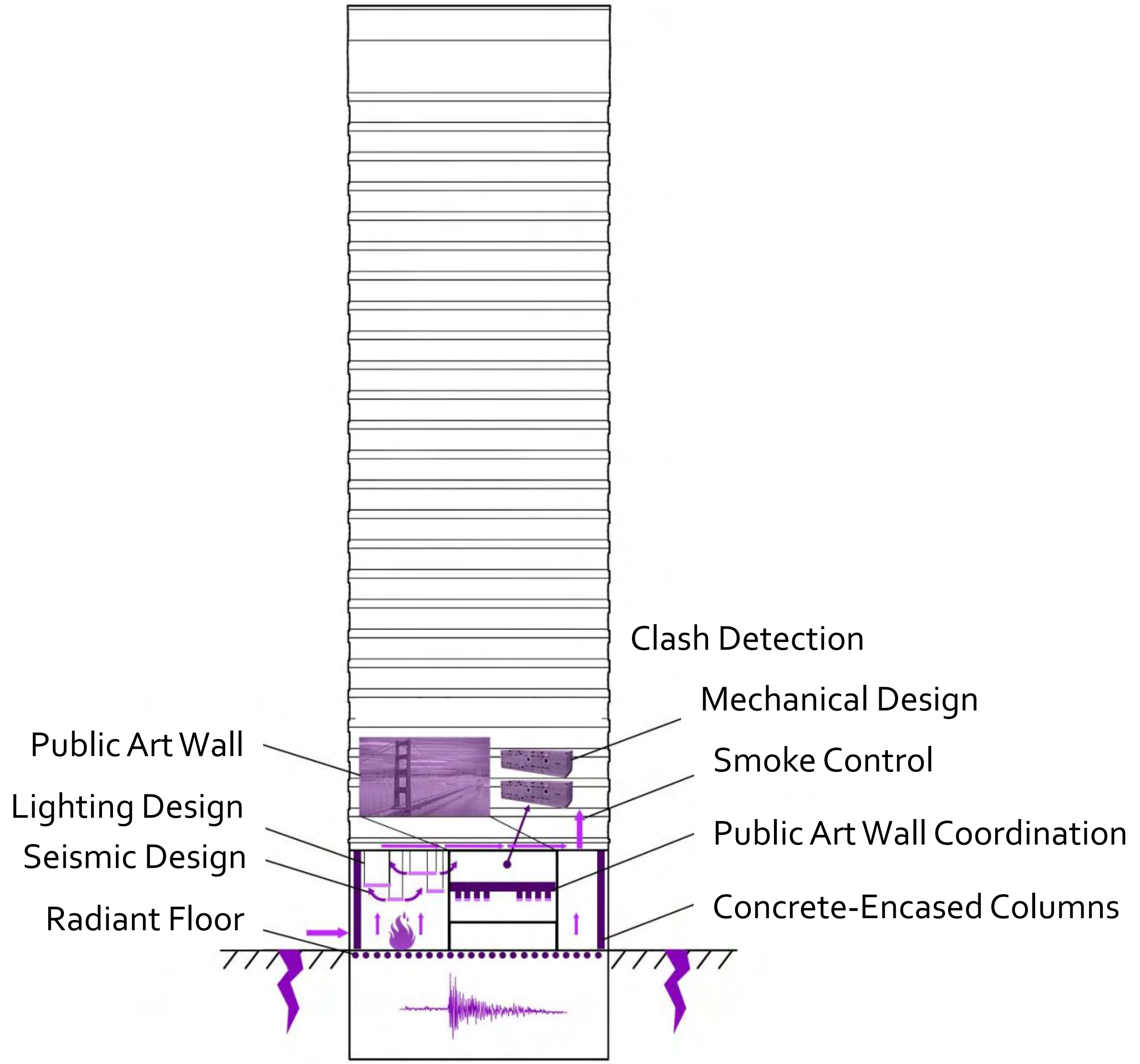
LOBBY SCHEMATIC OVERVIEW



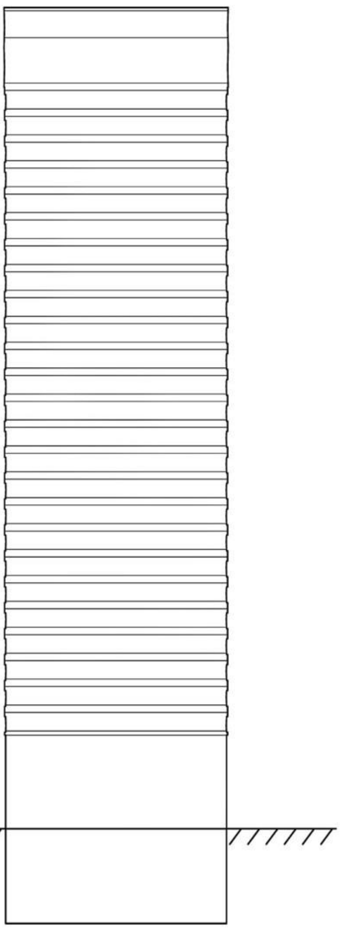
LOBBY SCHEMATIC OVERVIEW



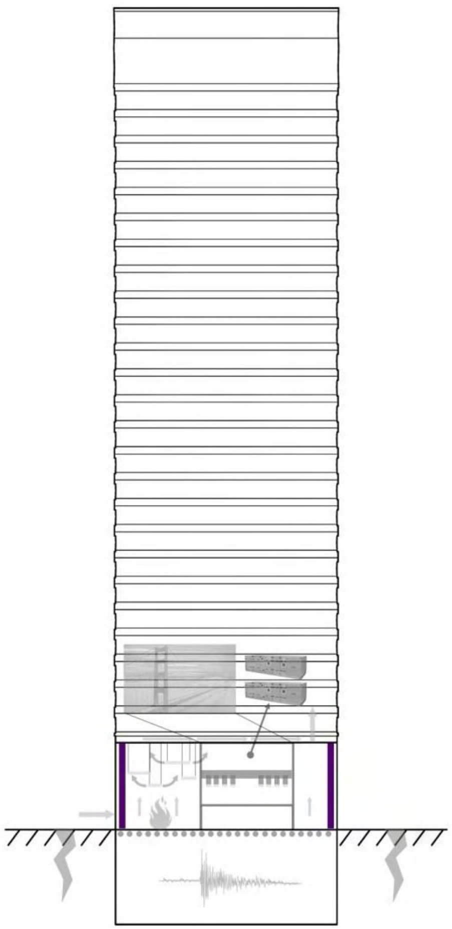
LOBBY SCHEMATIC OVERVIEW

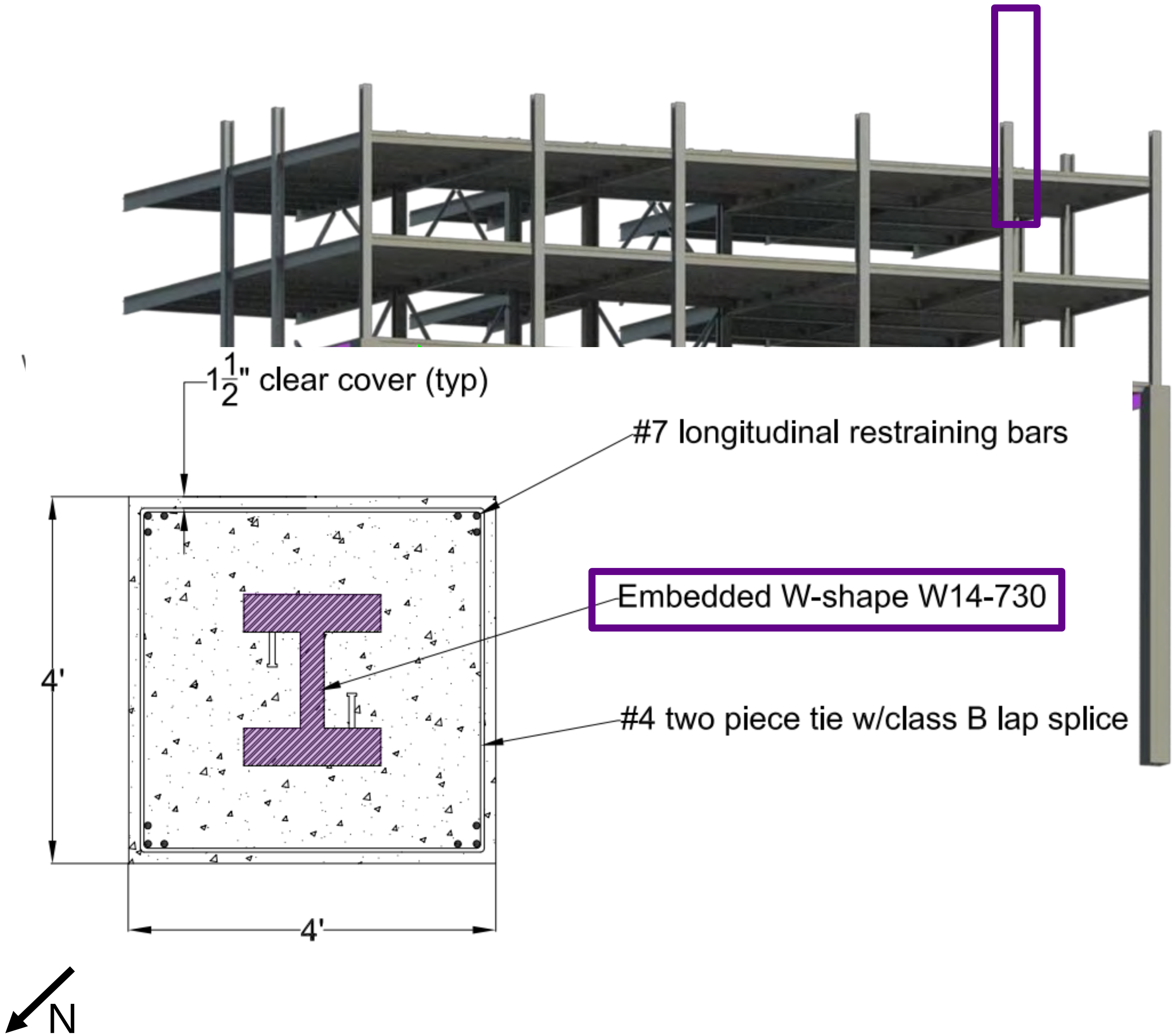


SPACE ALLOCATION



CONCRETE ENCASED COLUMNS





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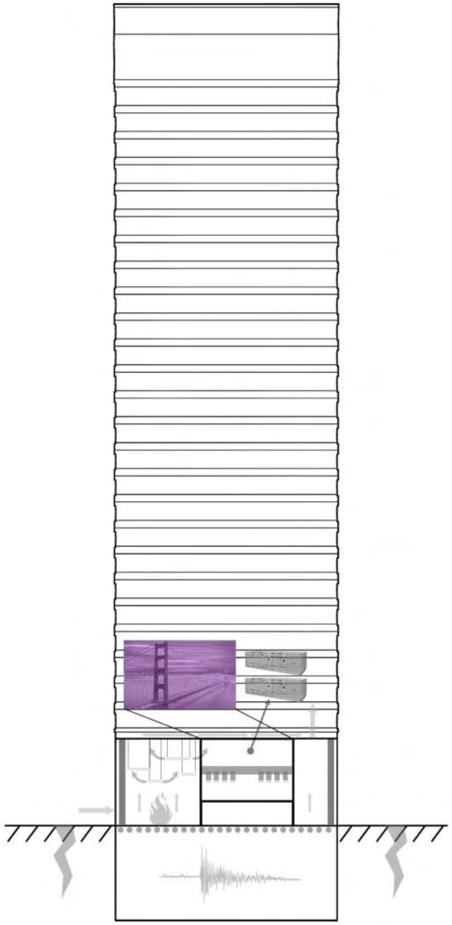

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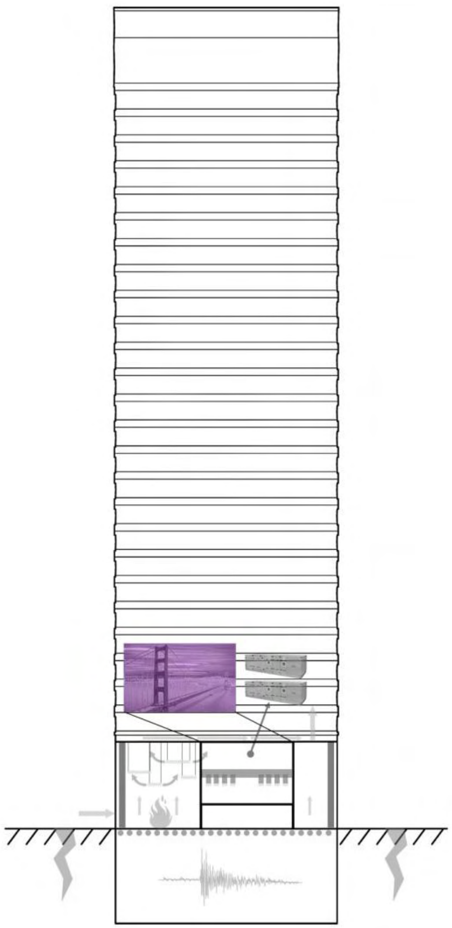

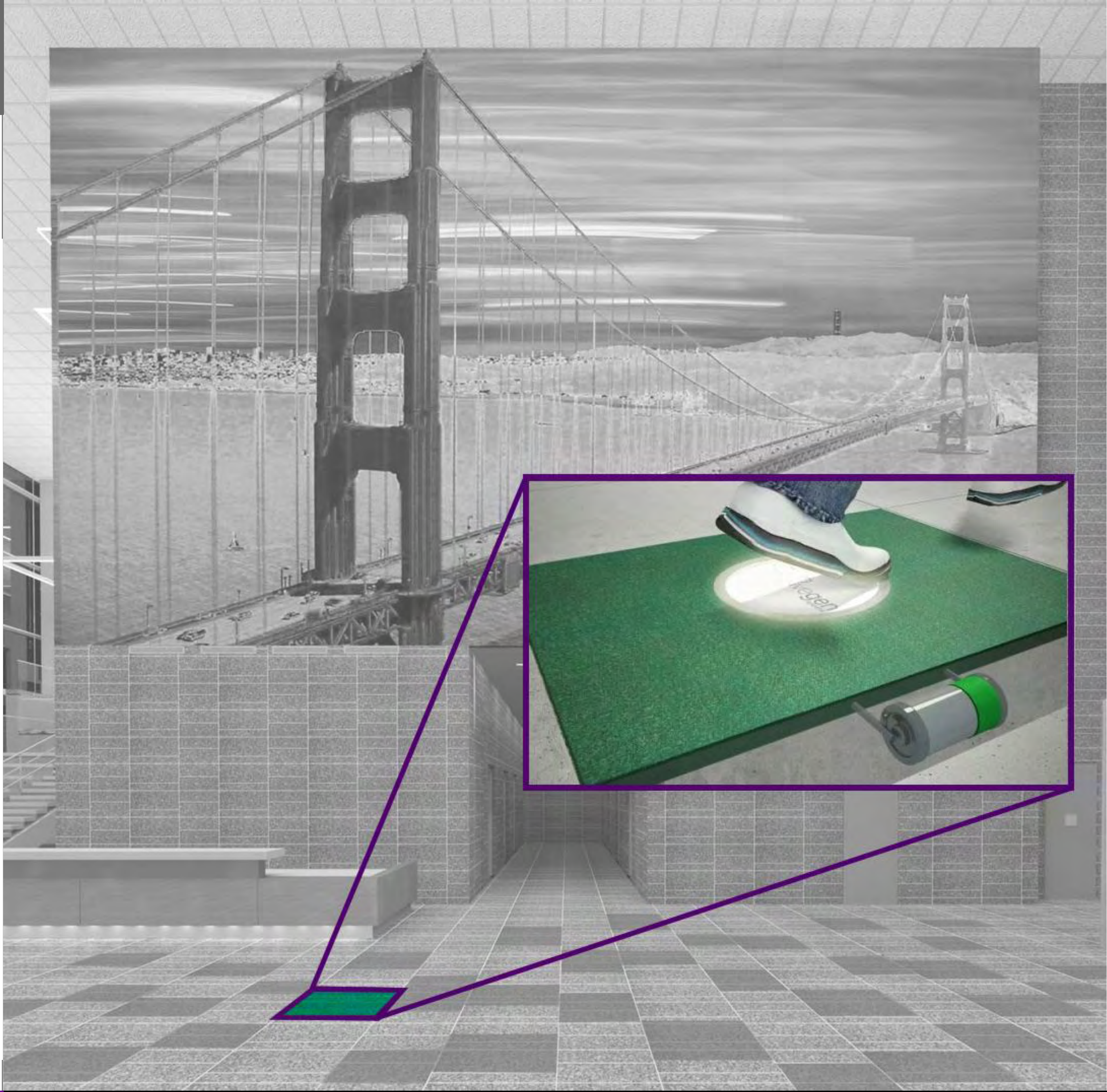

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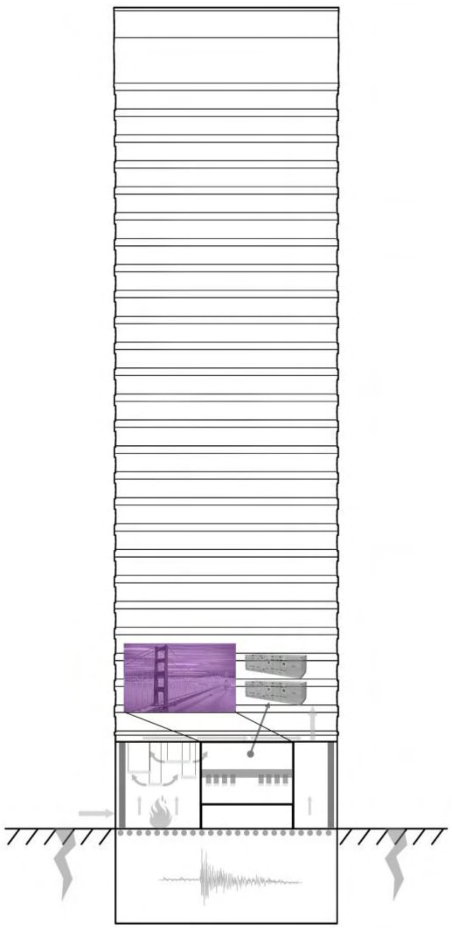

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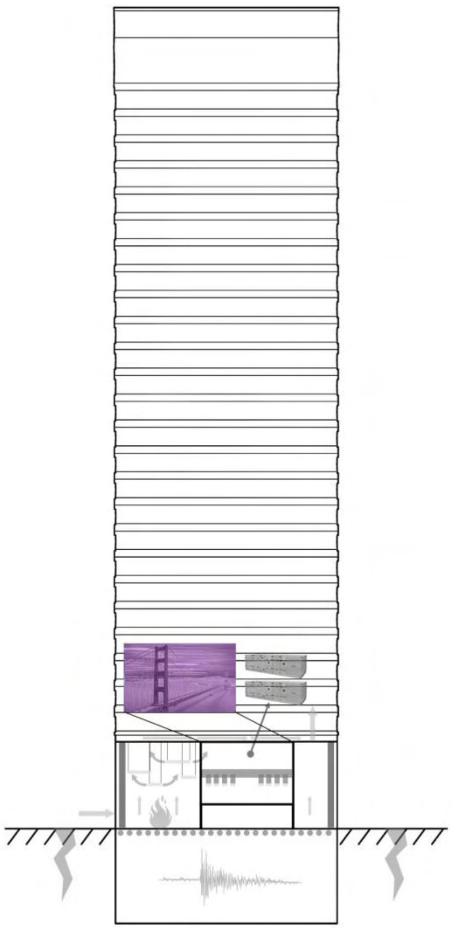

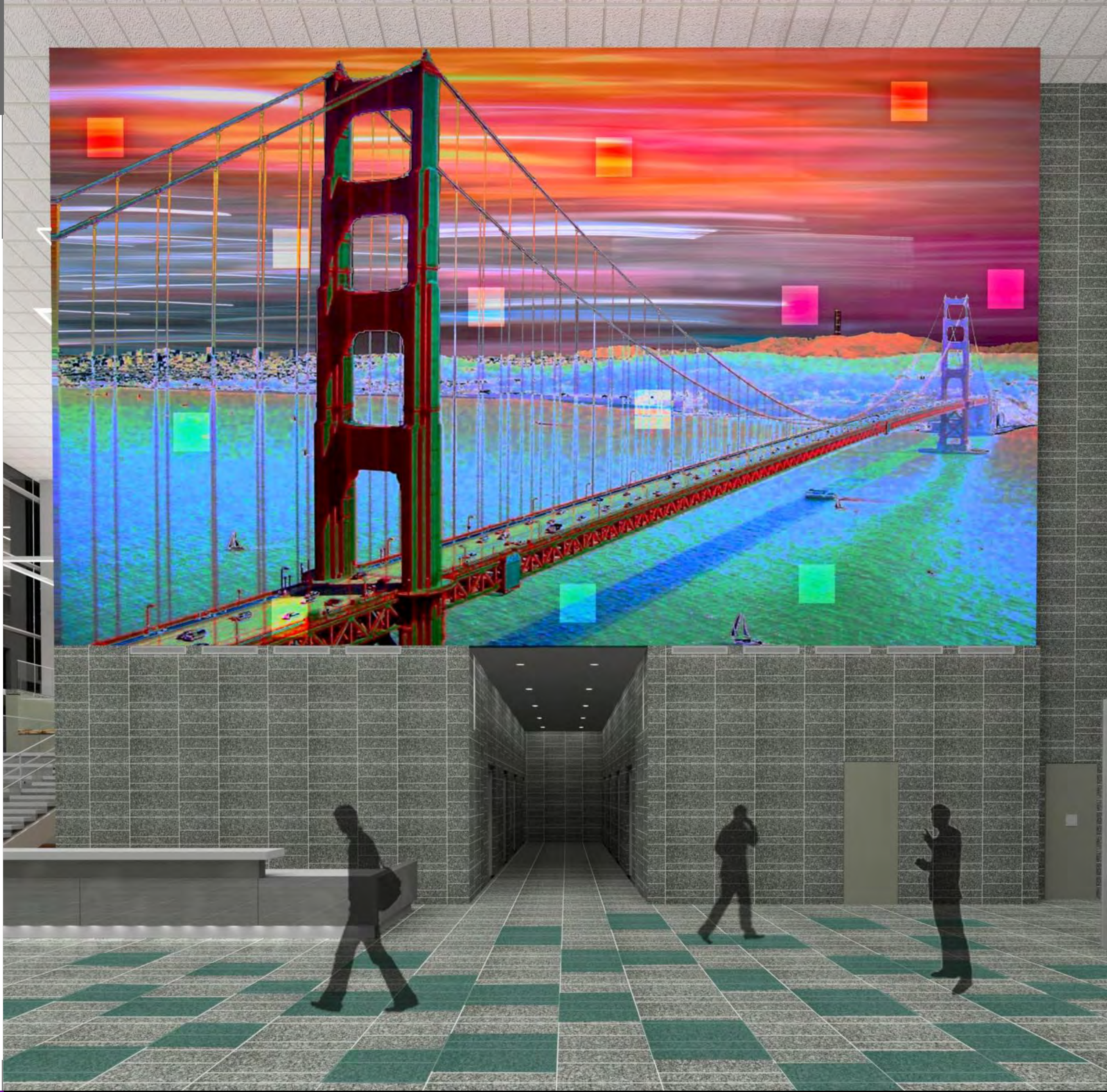

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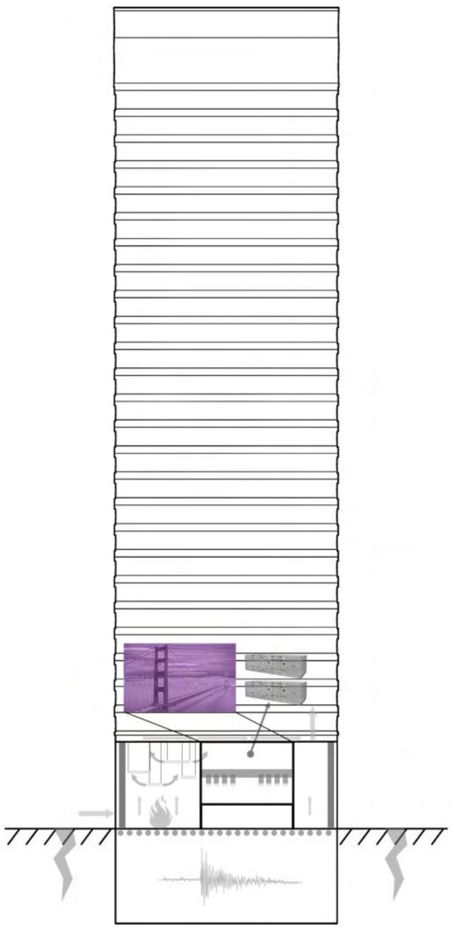
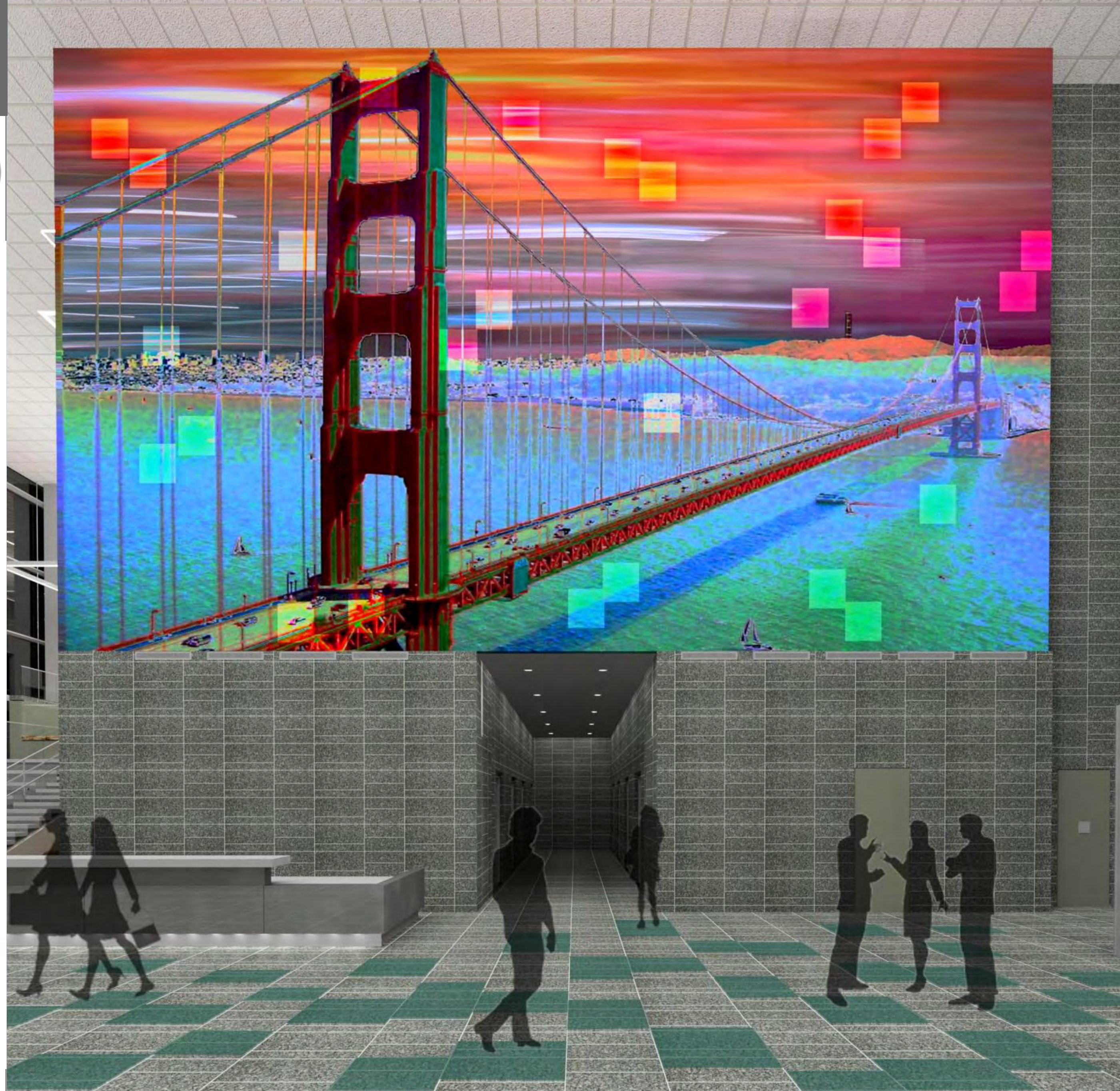
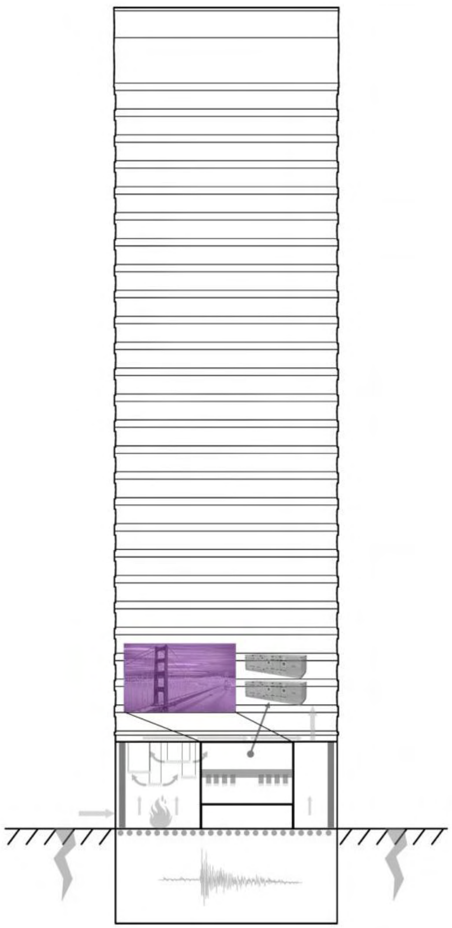
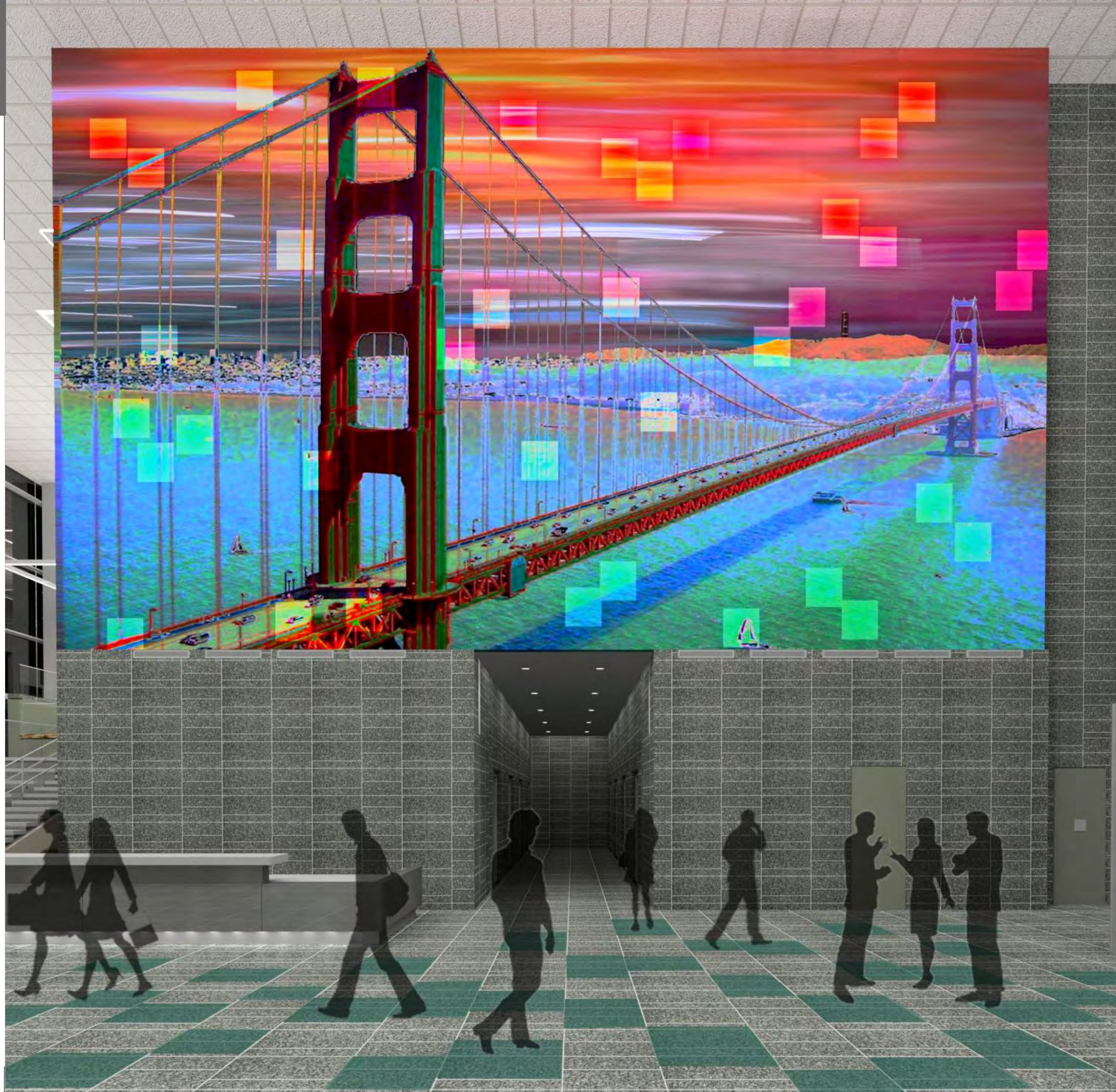




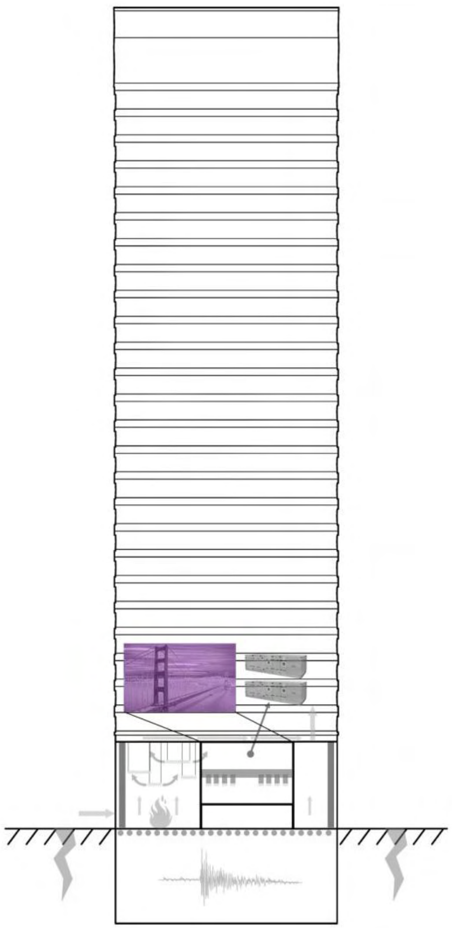
BUILDING SYSTEMS

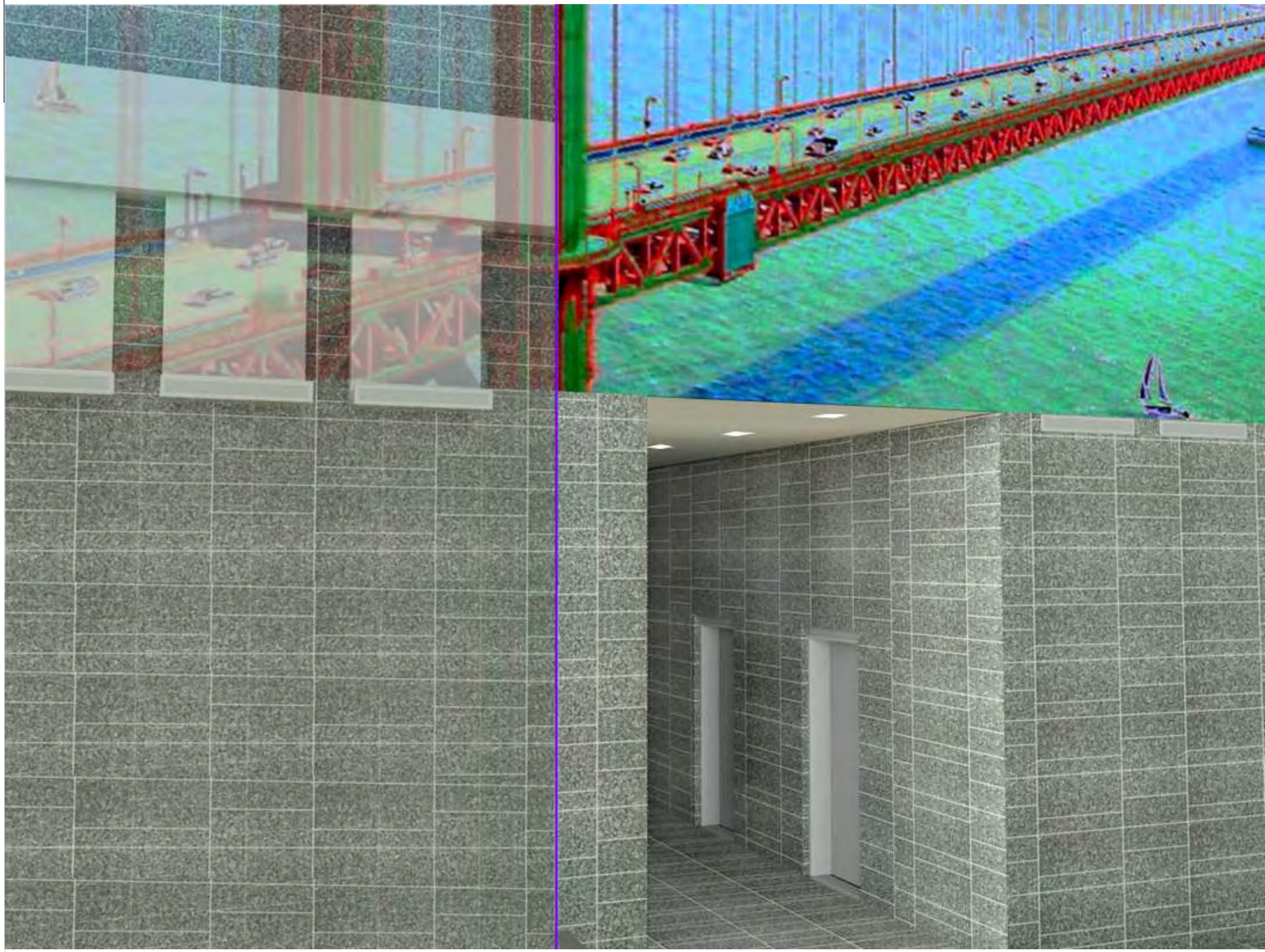
PUBLIC ART WALL



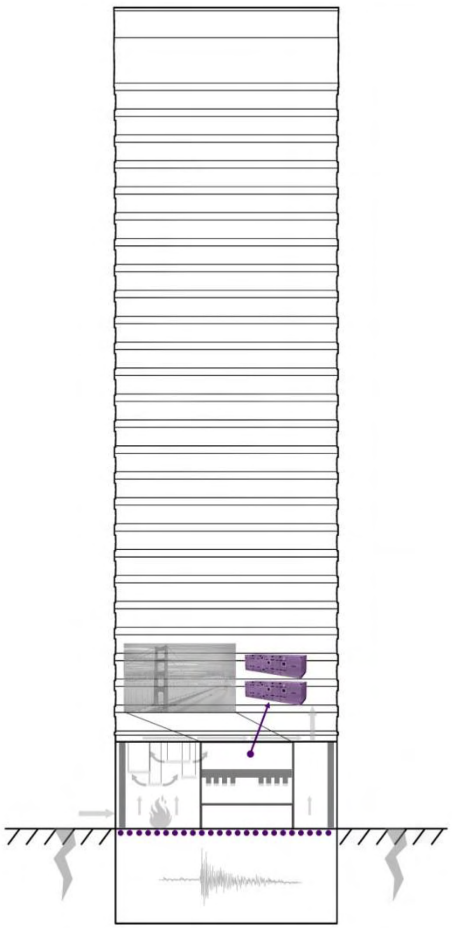


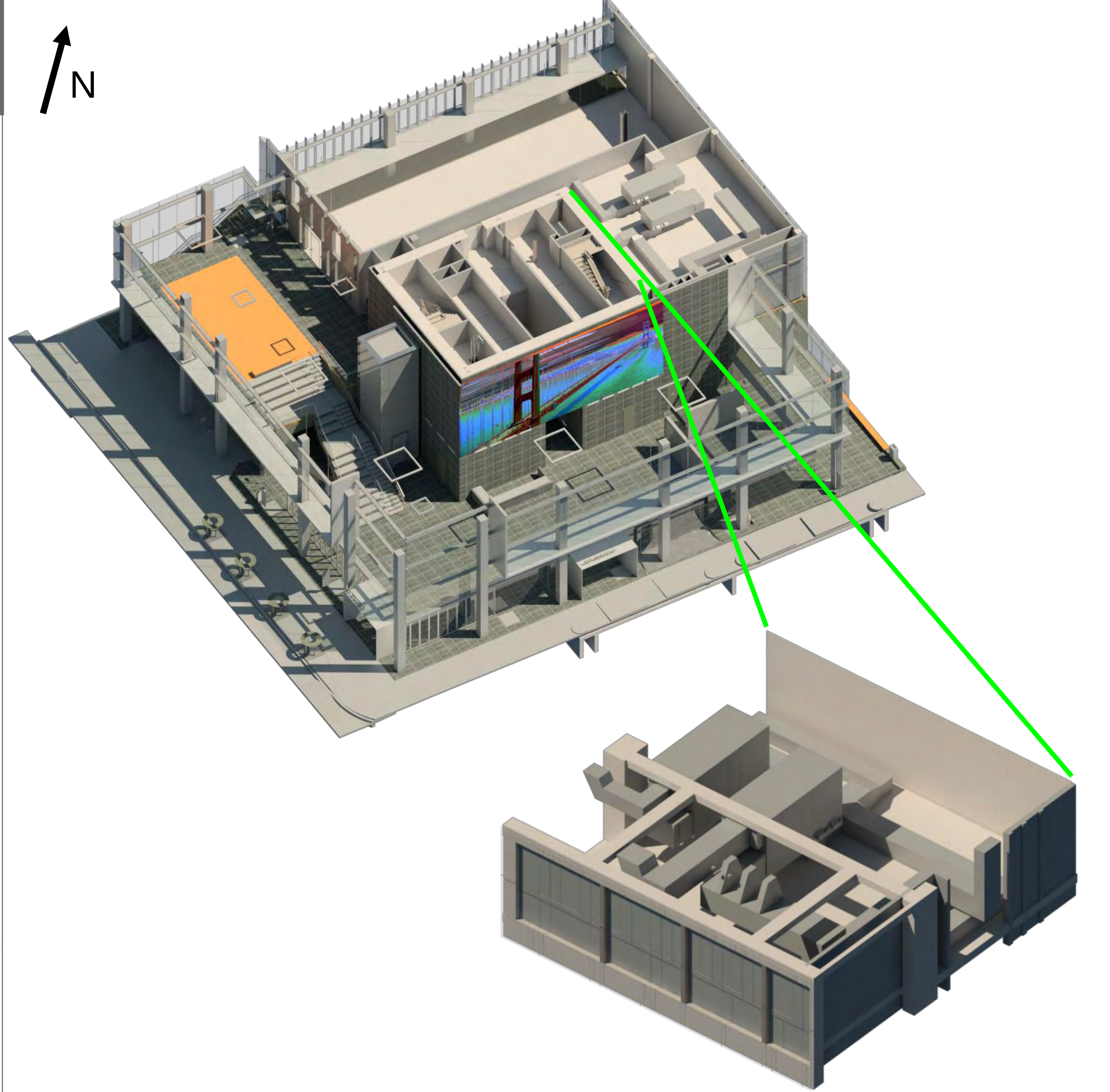
PUBLIC ART WALL: COORDINATION



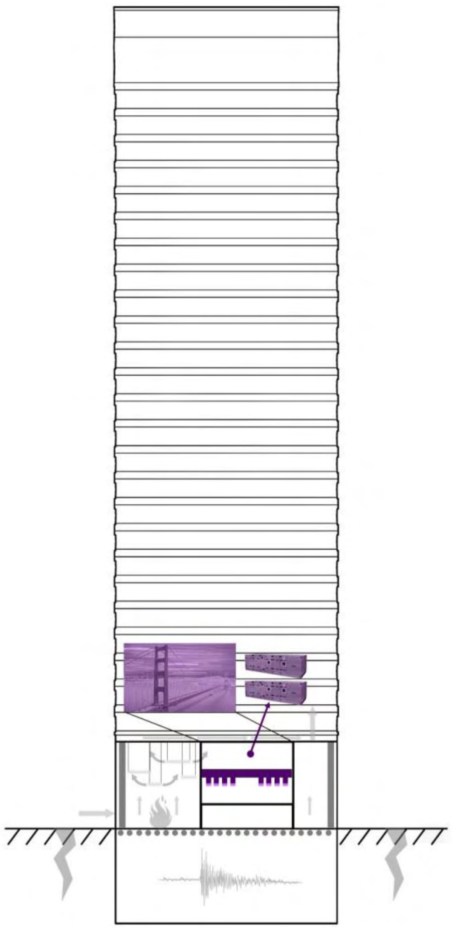


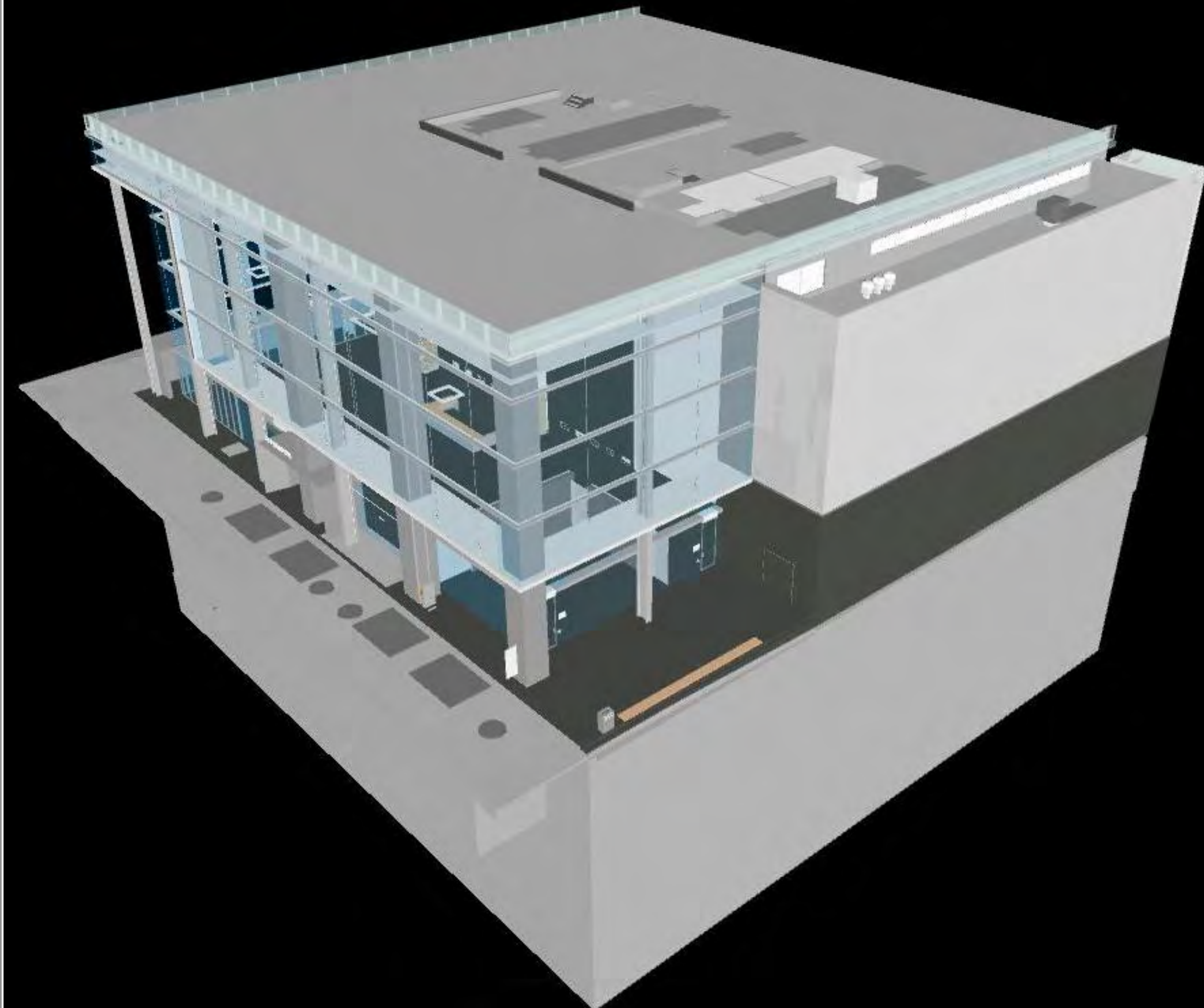
MECHANICAL DESIGN





CLASH DETECTION

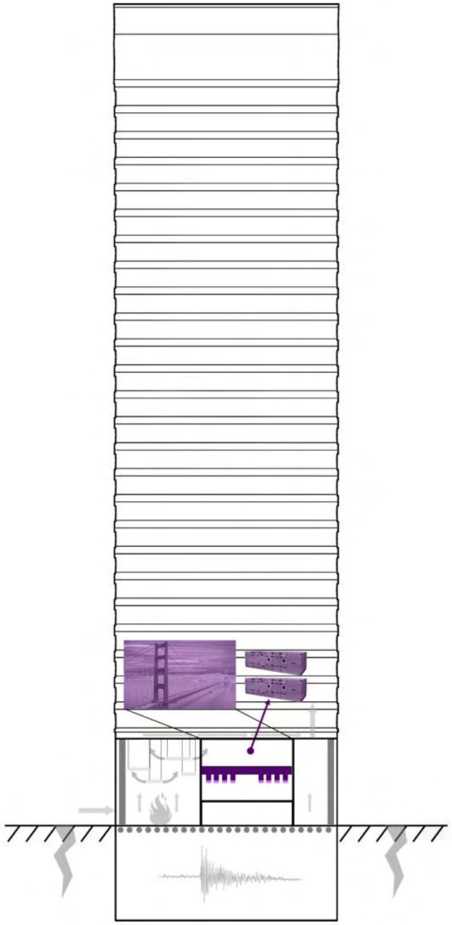


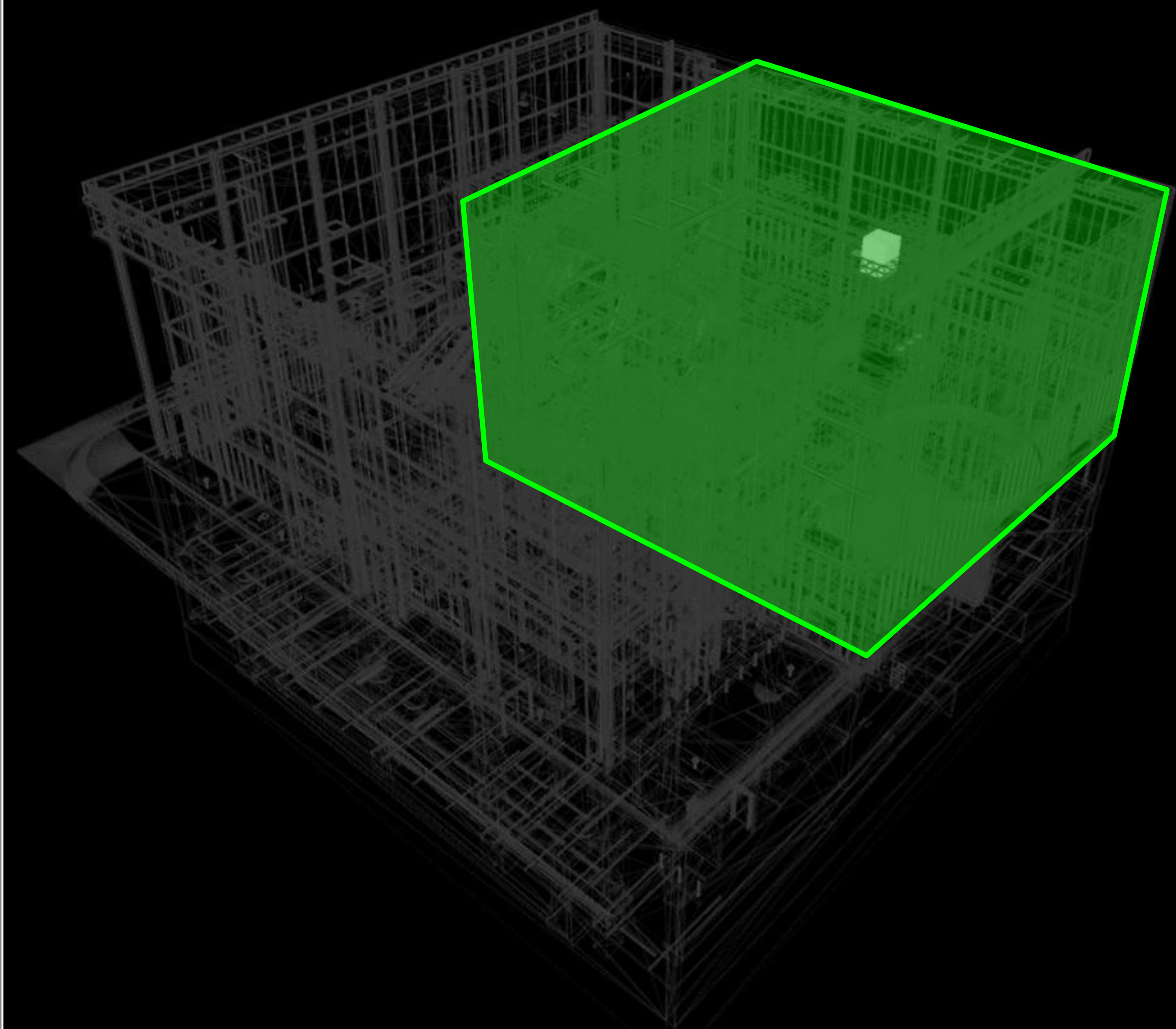


BUILDING SYSTEMS

ENERGY&POWER–SUBSTRUCTURE–SUPERSTRUCTURE–**LOBBY**–FAÇADE–OFFICE FLOOR

CLASH DETECTION

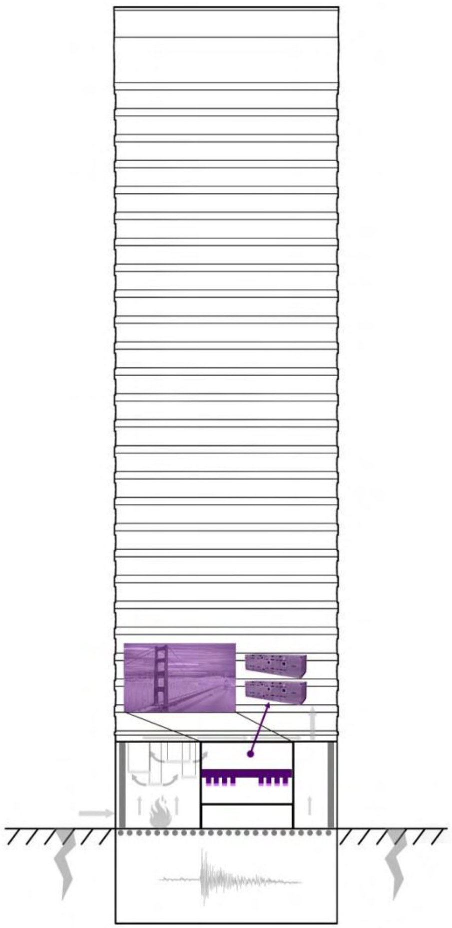


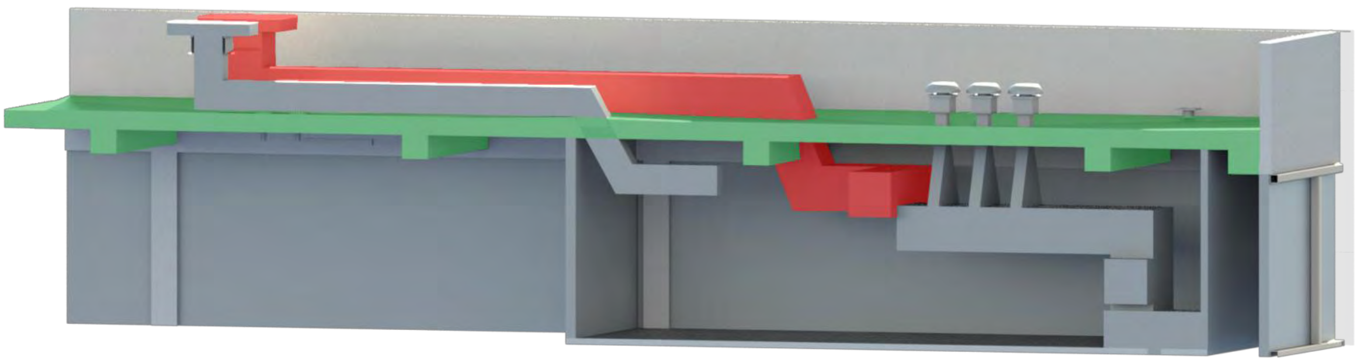


BUILDING SYSTEMS

ENERGY&POWER–SUBSTRUCTURE–SUPERSTRUCTURE–**LOBBY**–FAÇADE–OFFICE FLOOR

CLASH DETECTION





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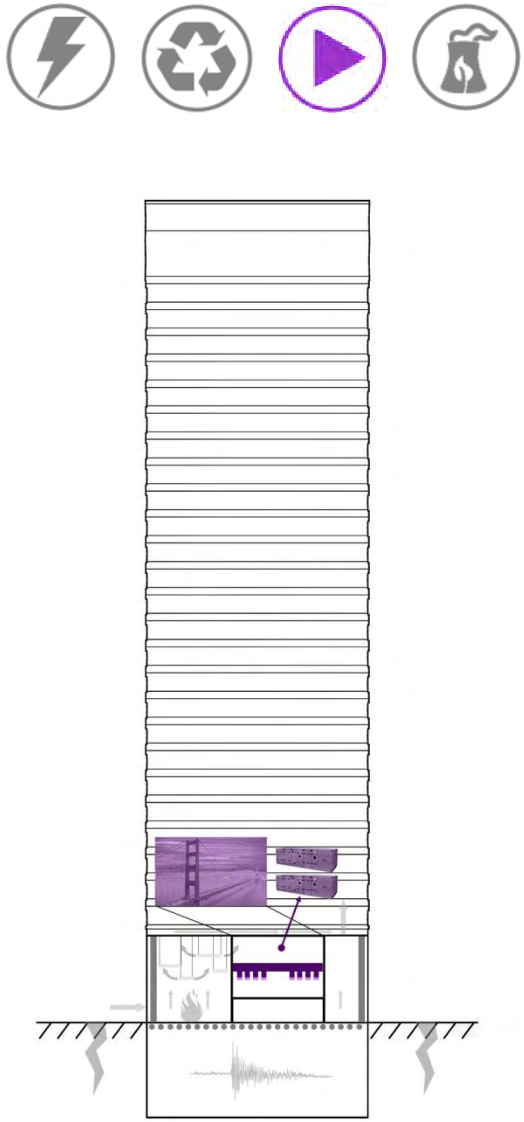

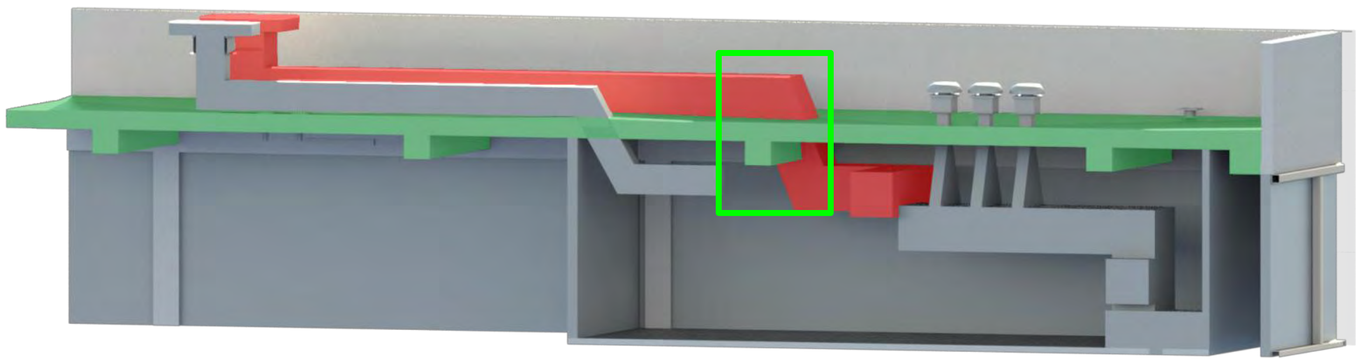

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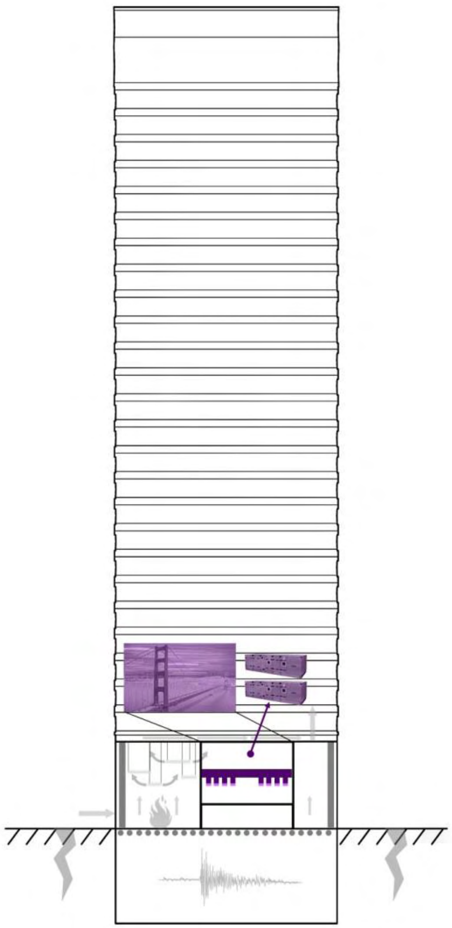
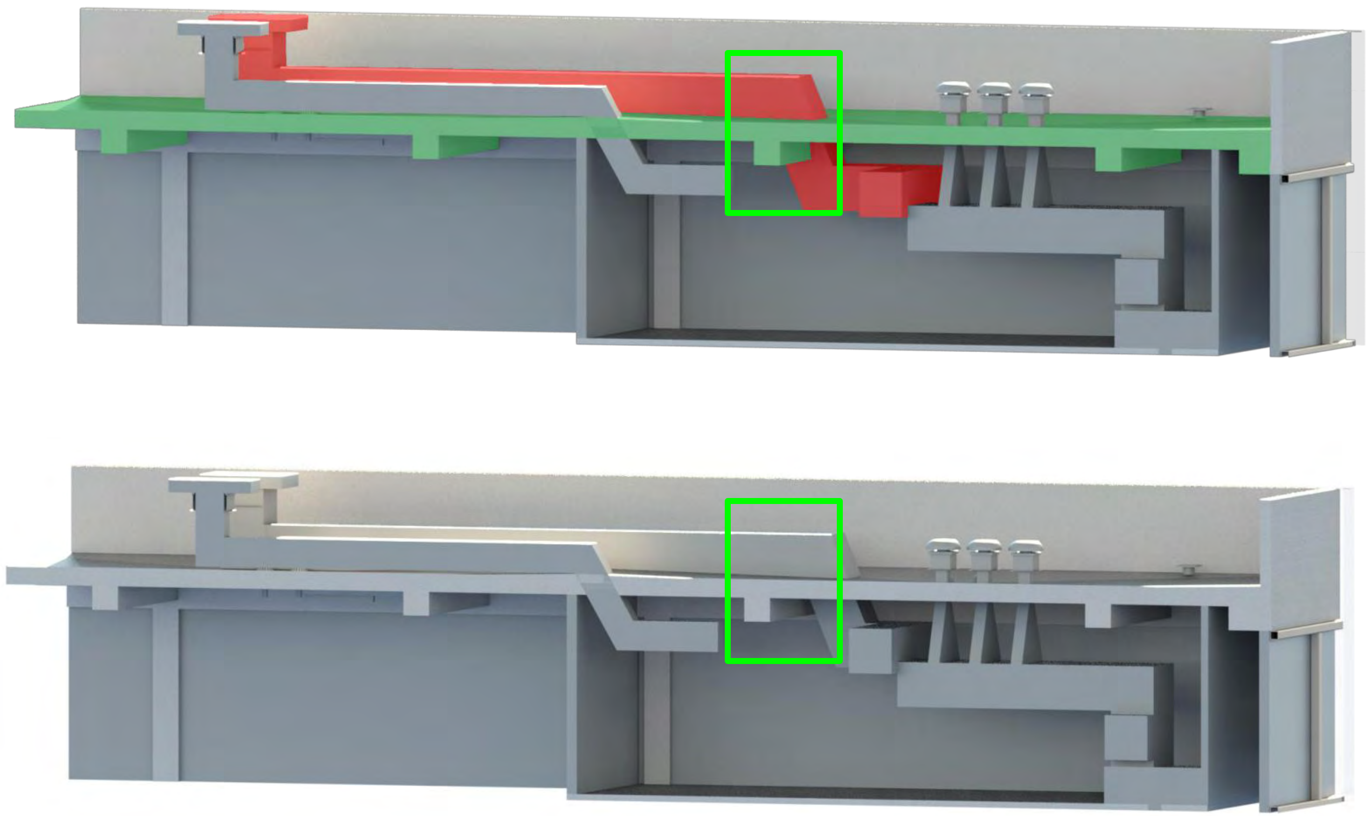
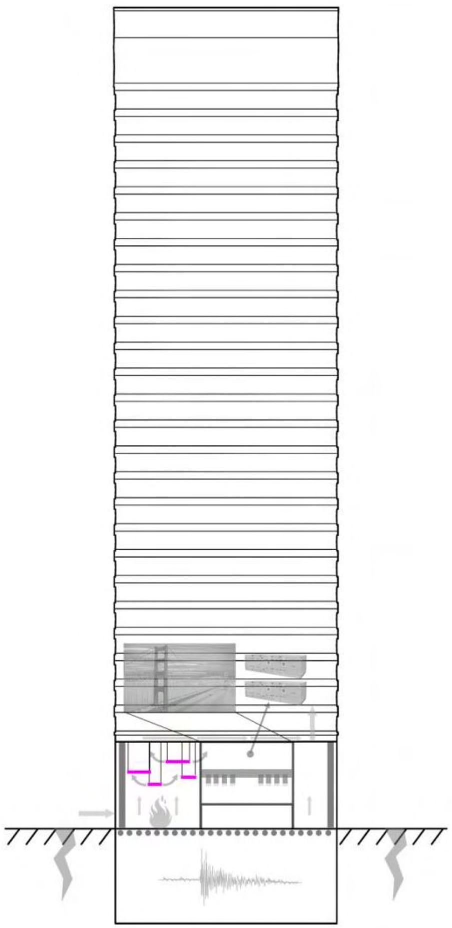




LIGHTING DESIGN



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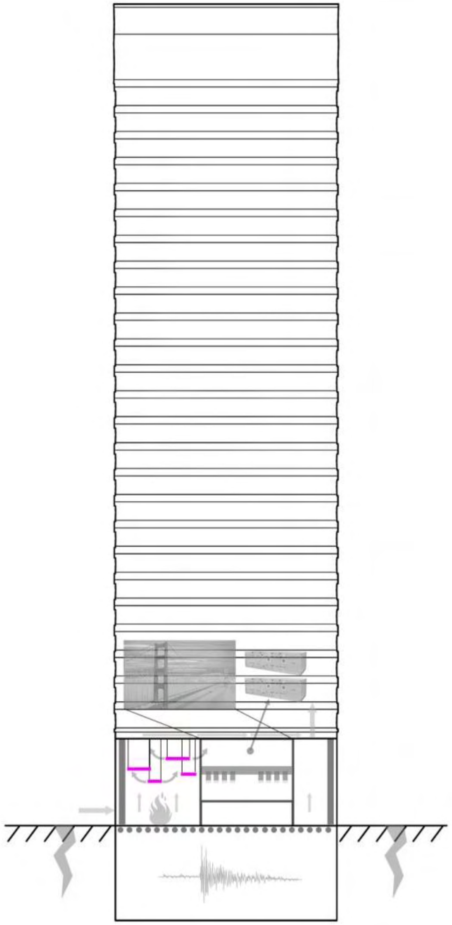

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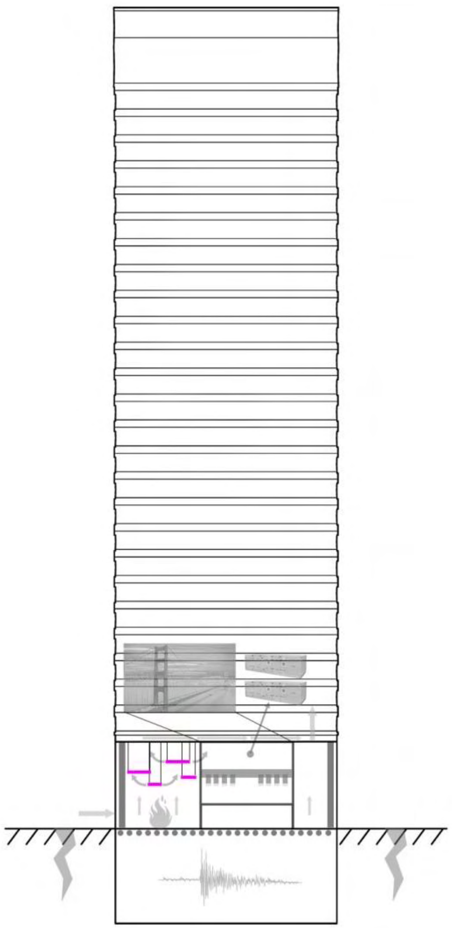

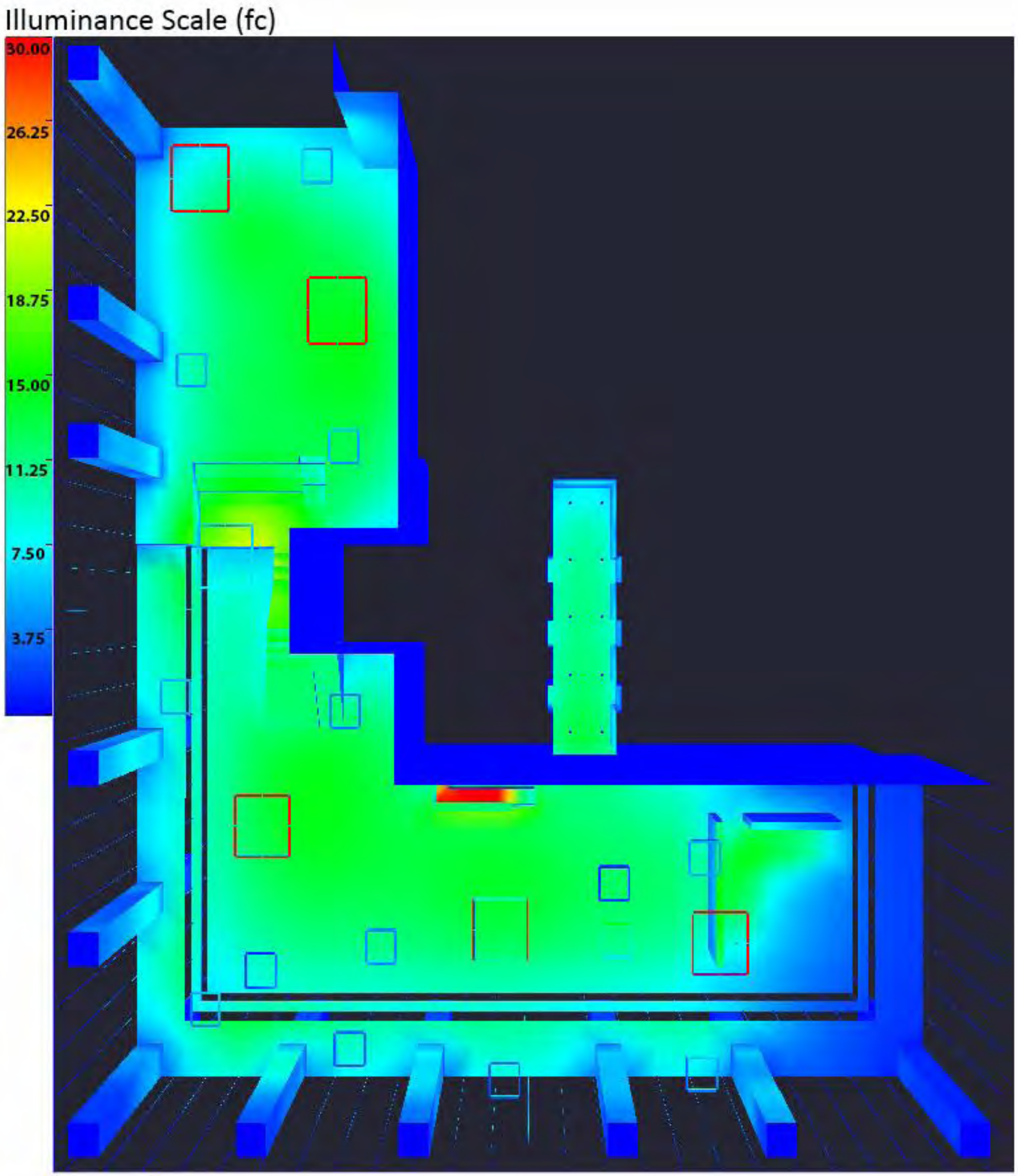

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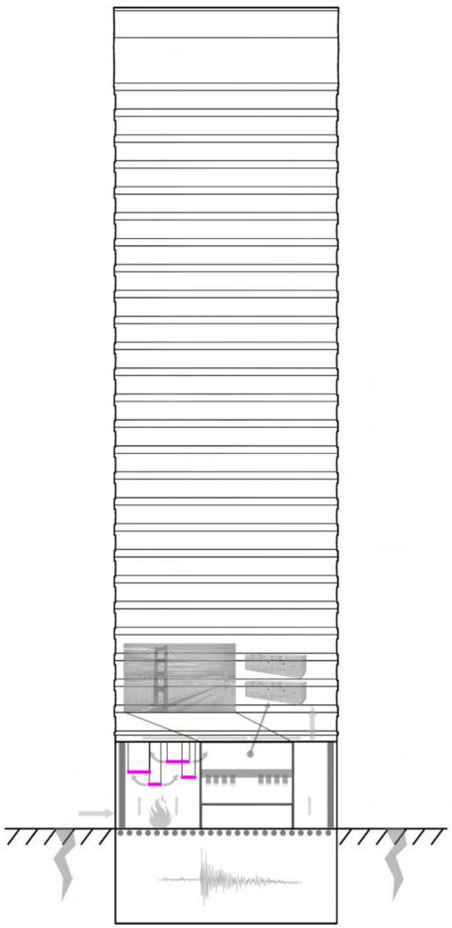

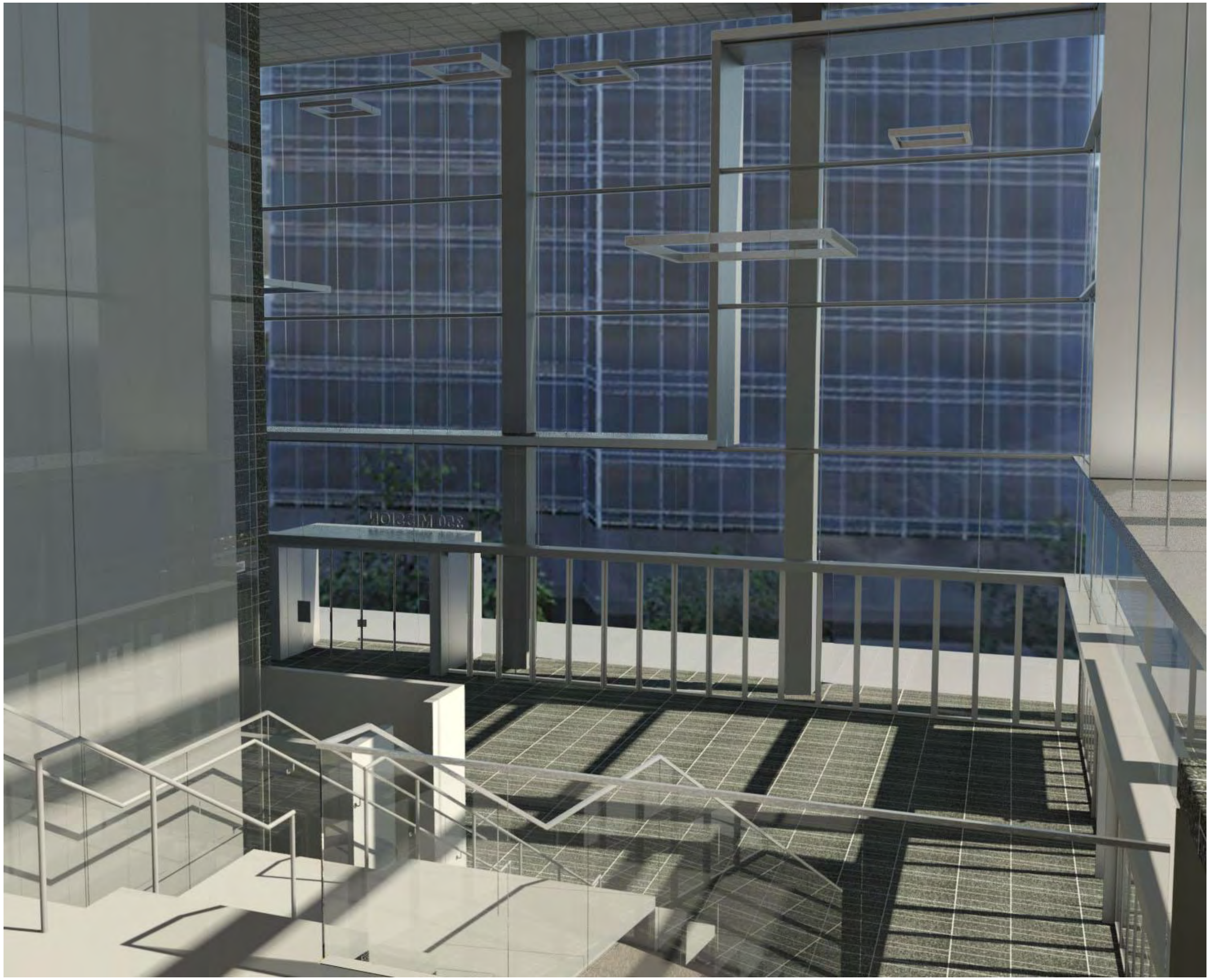

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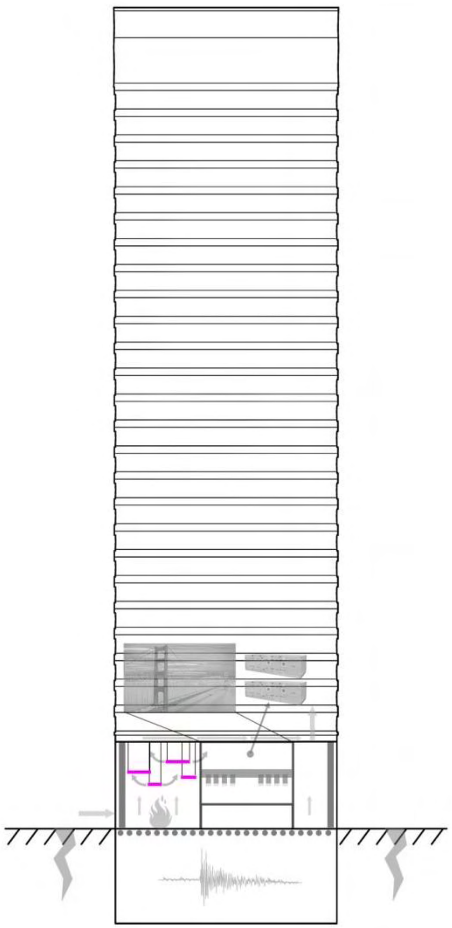
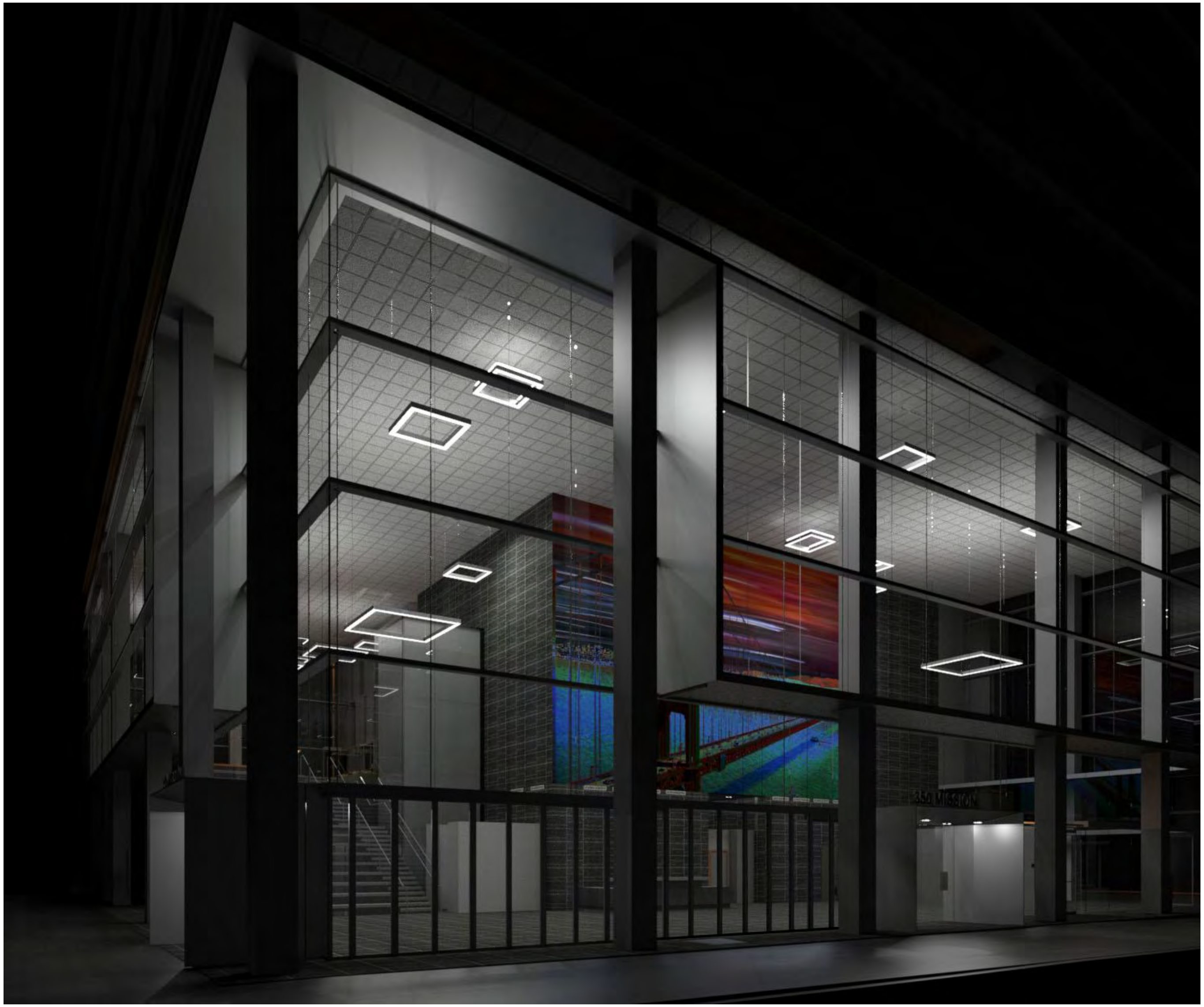
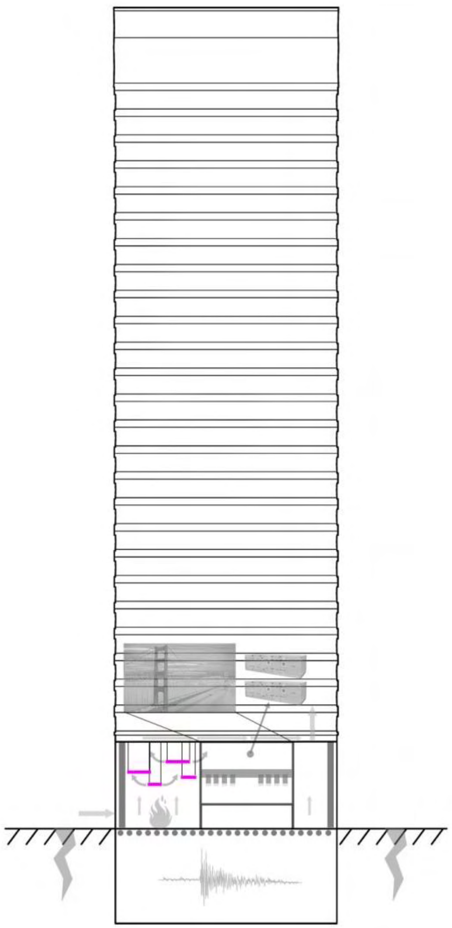
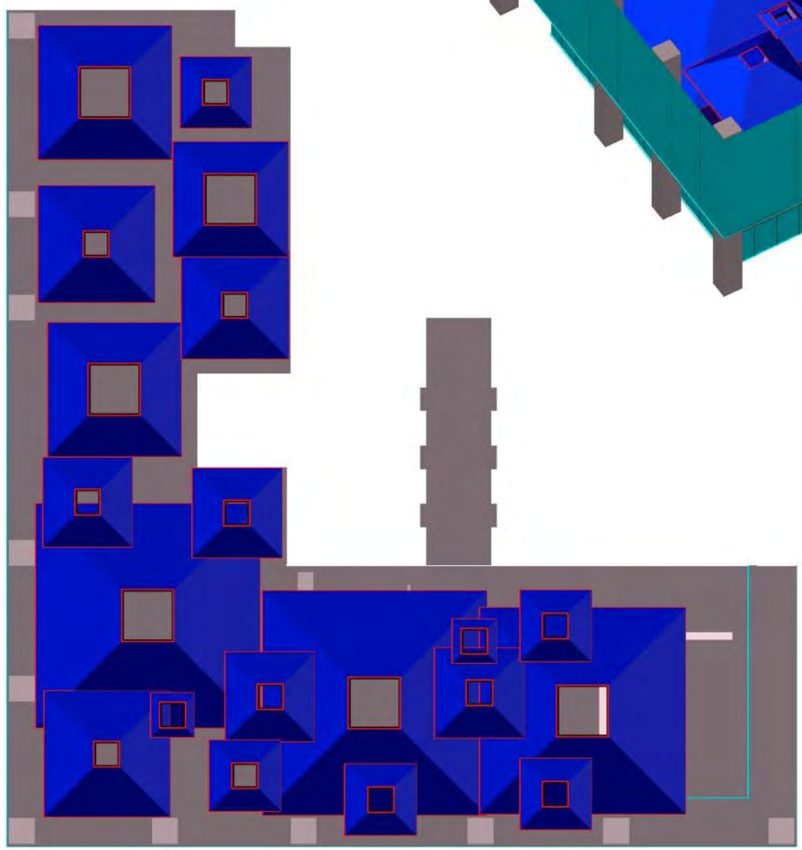
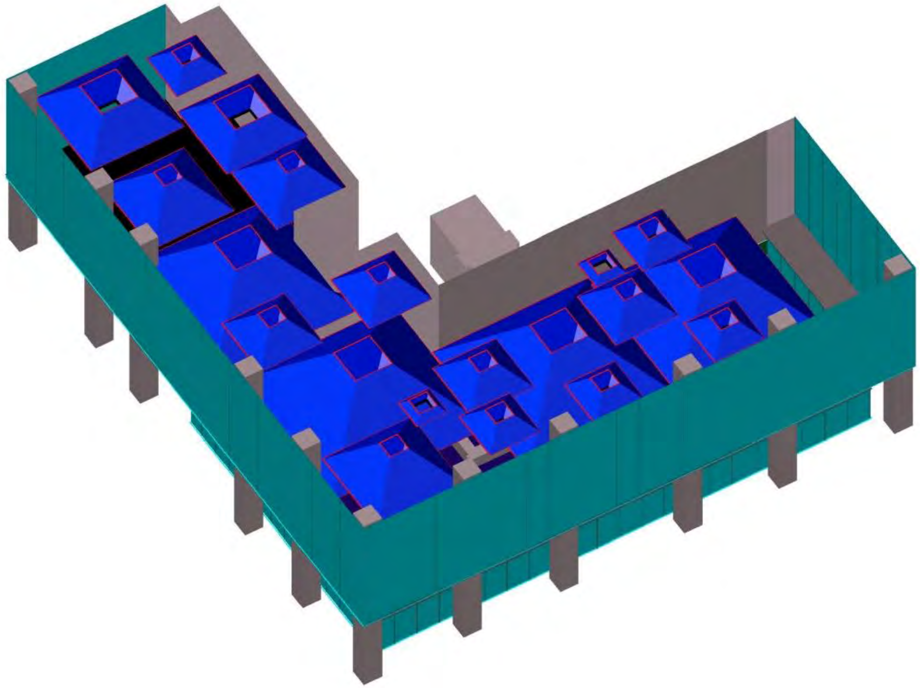




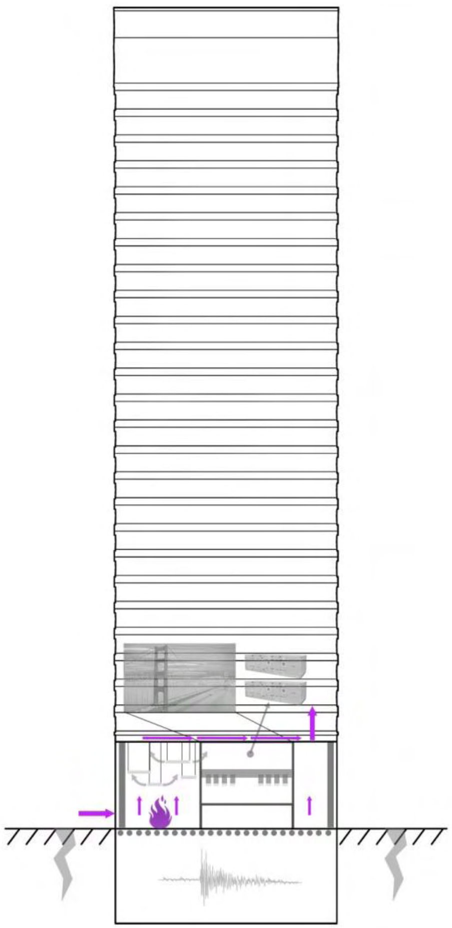
DISASTER MANAGEMENT

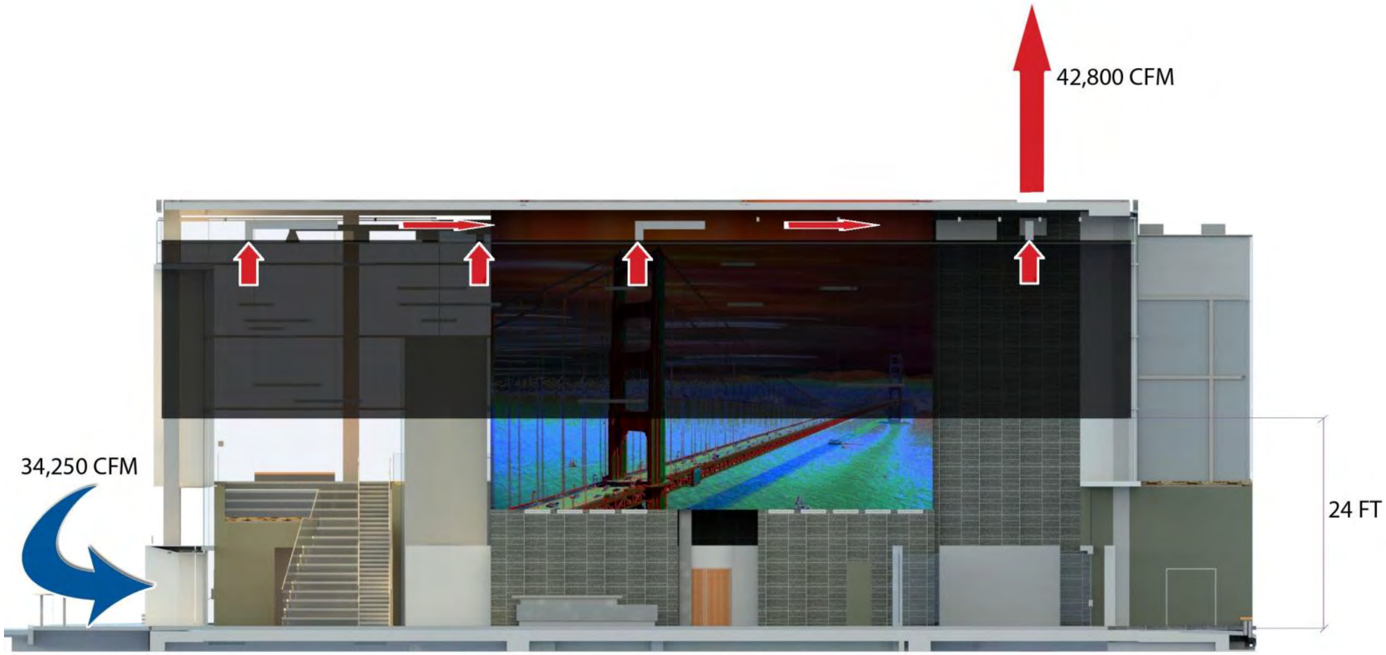


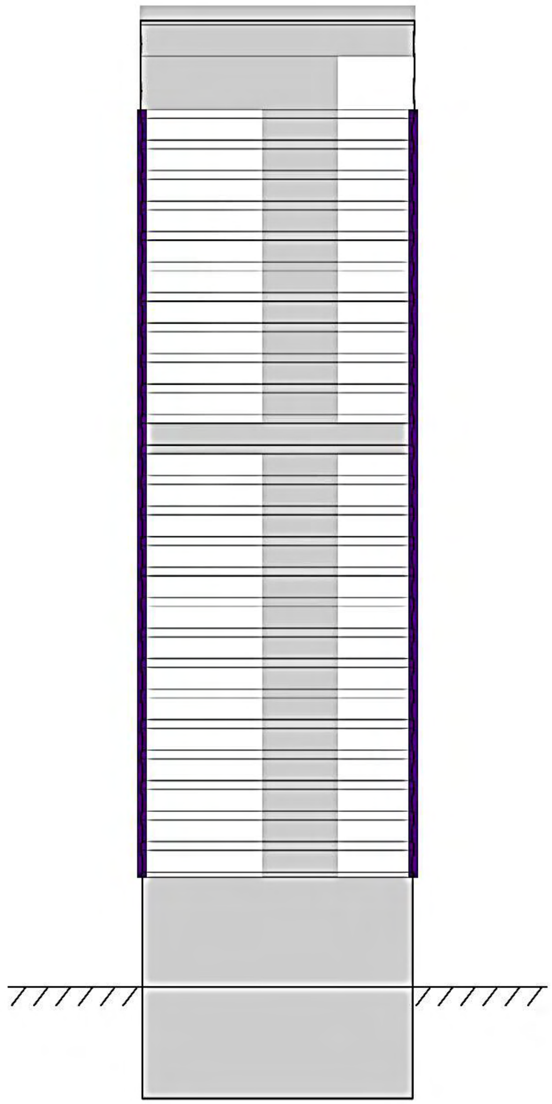




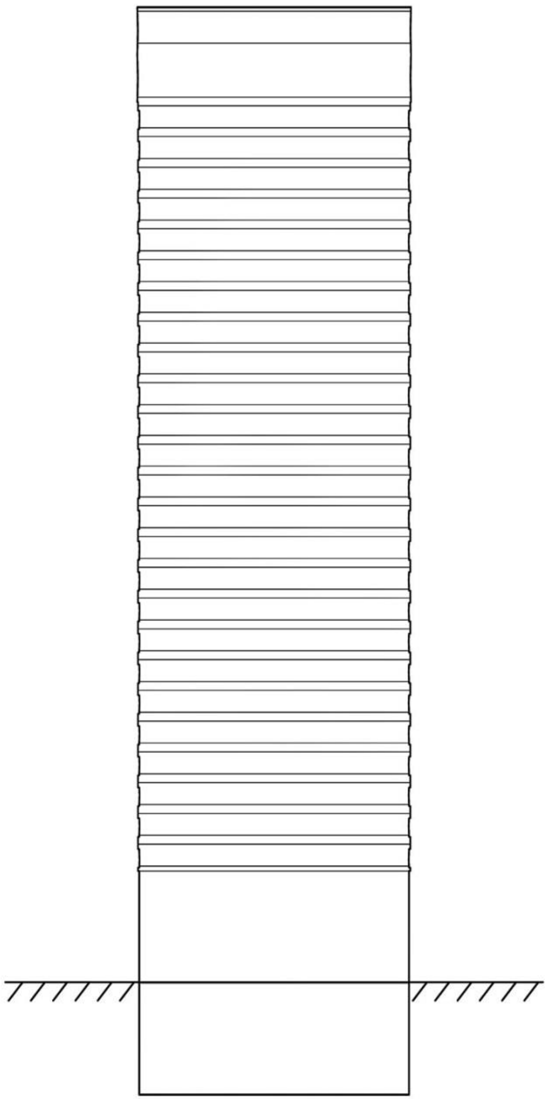
DISASTER MANAGEMENT

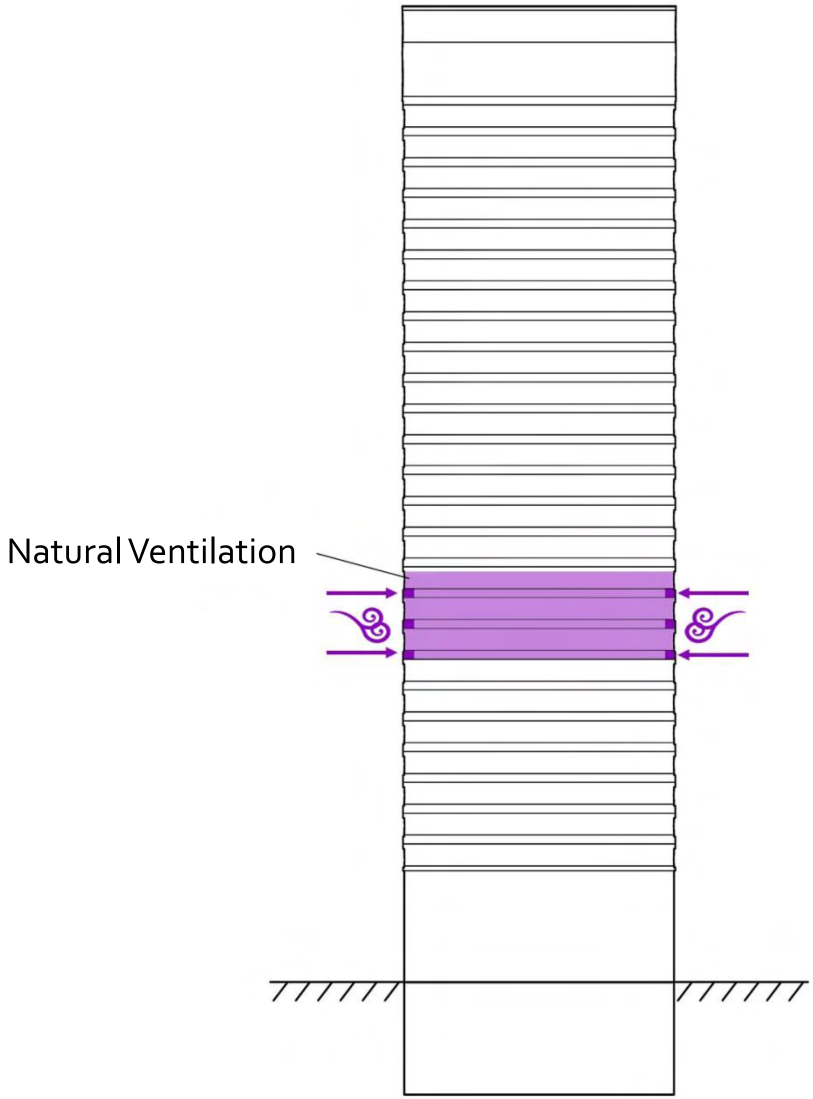




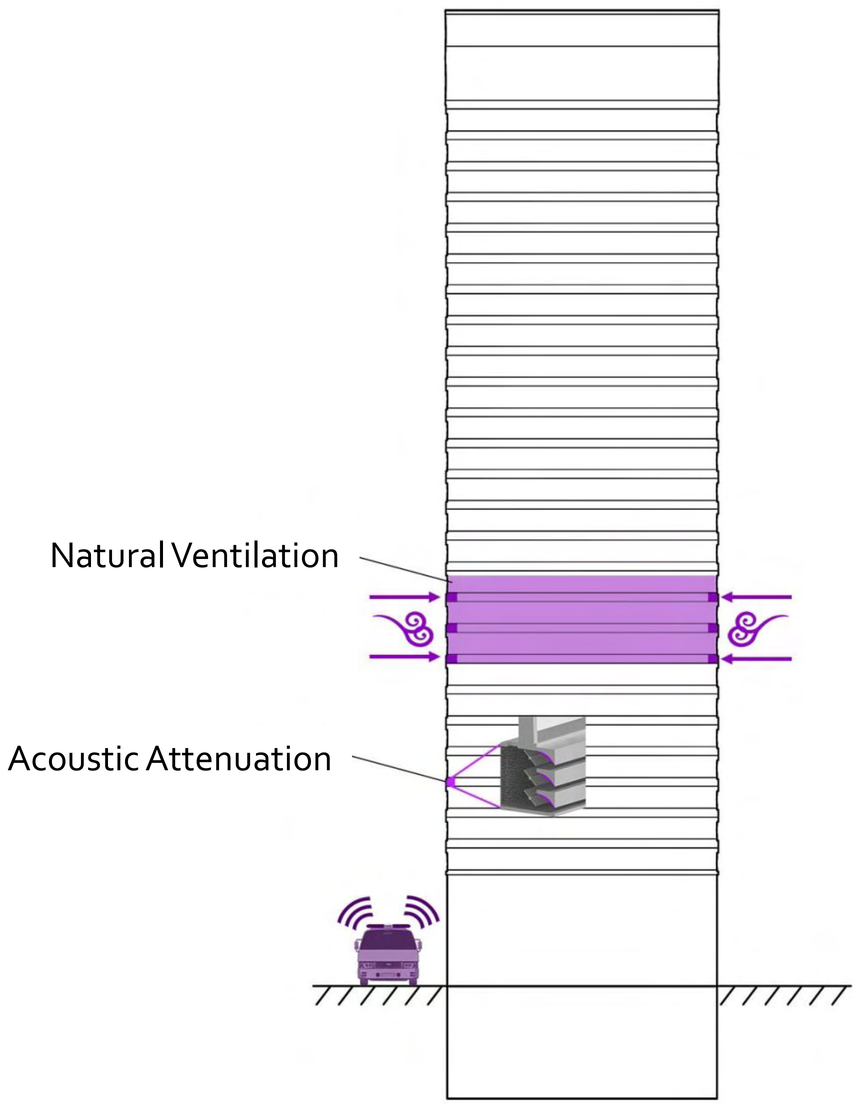


FAÇADE SCHEMATIC OVERVIEW

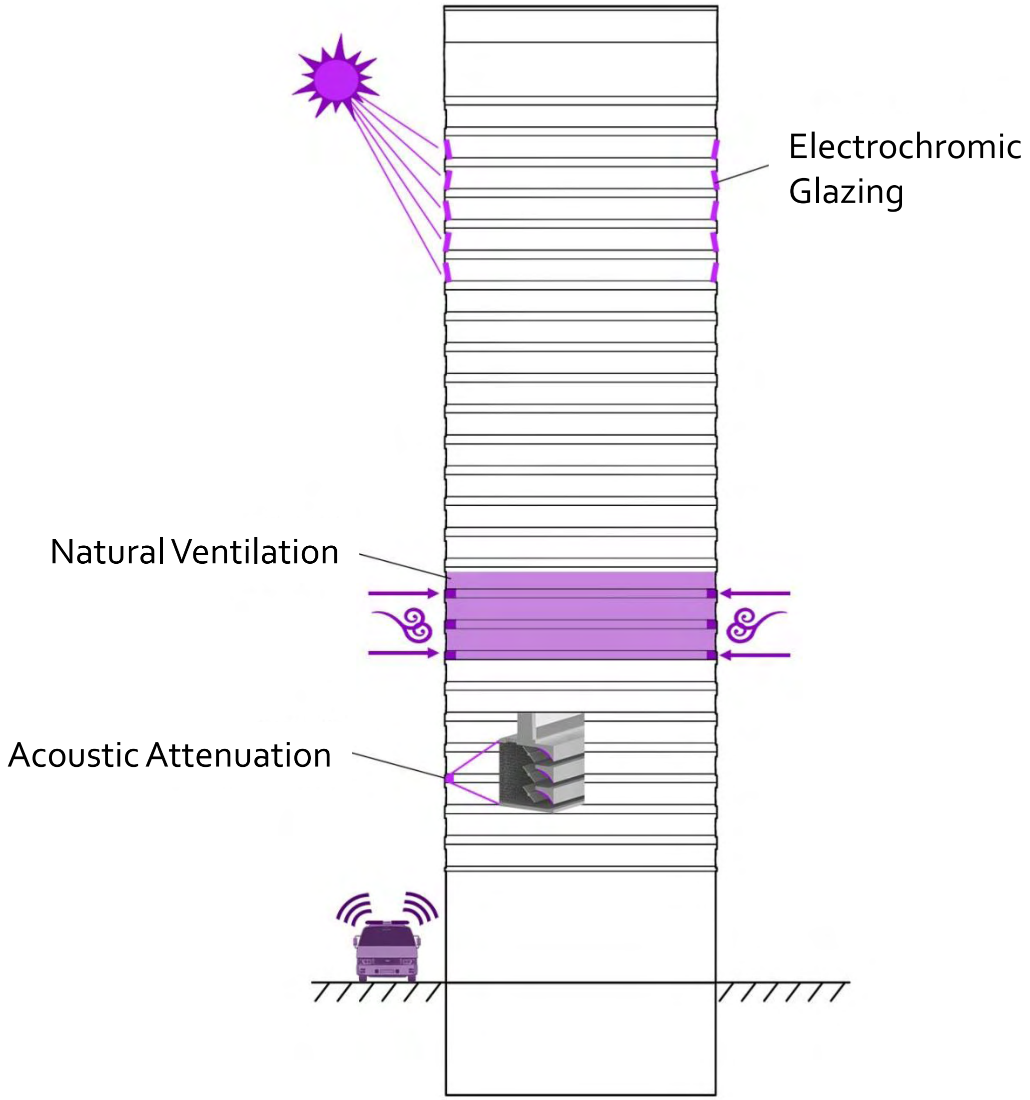



Natural Ventilation

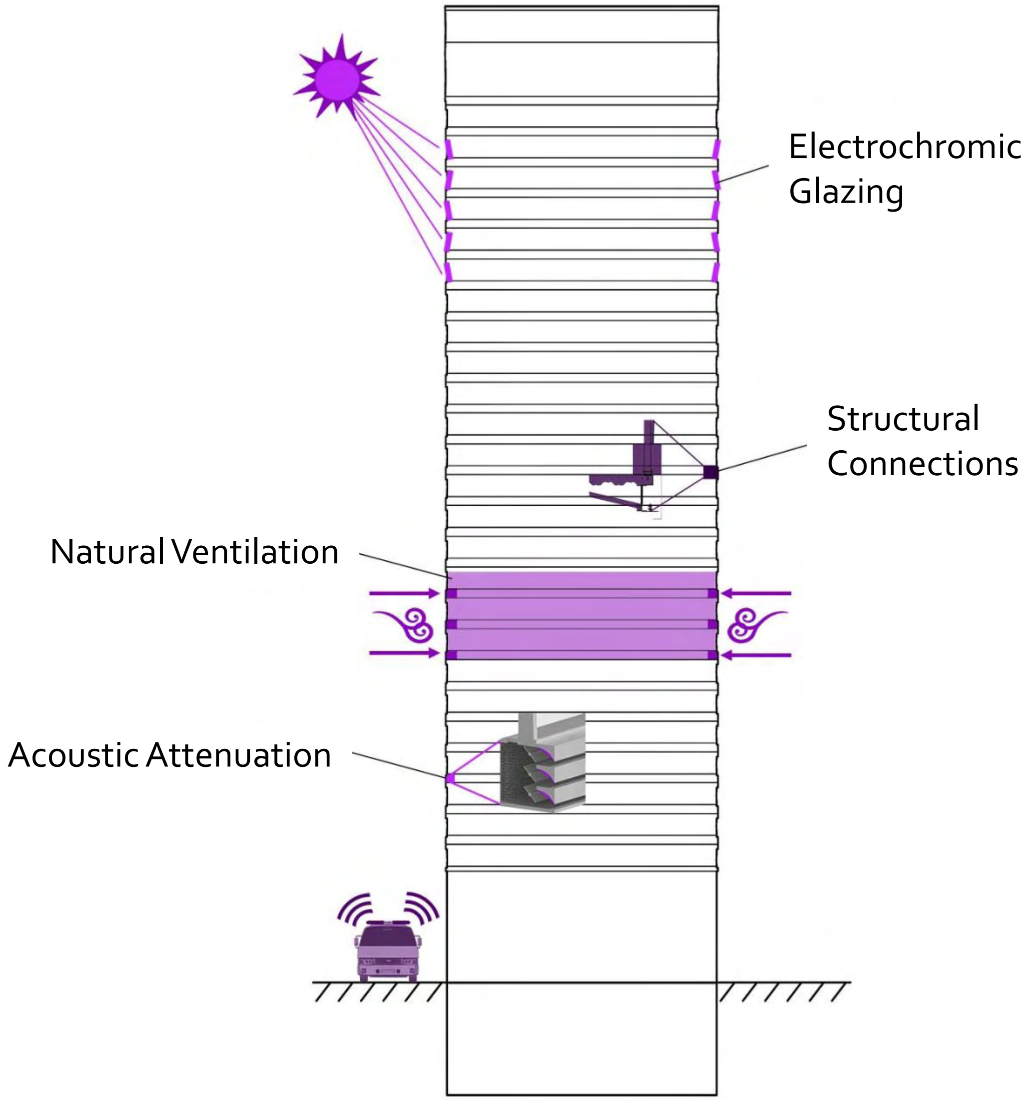
FAÇADE SCHEMATIC OVERVIEW



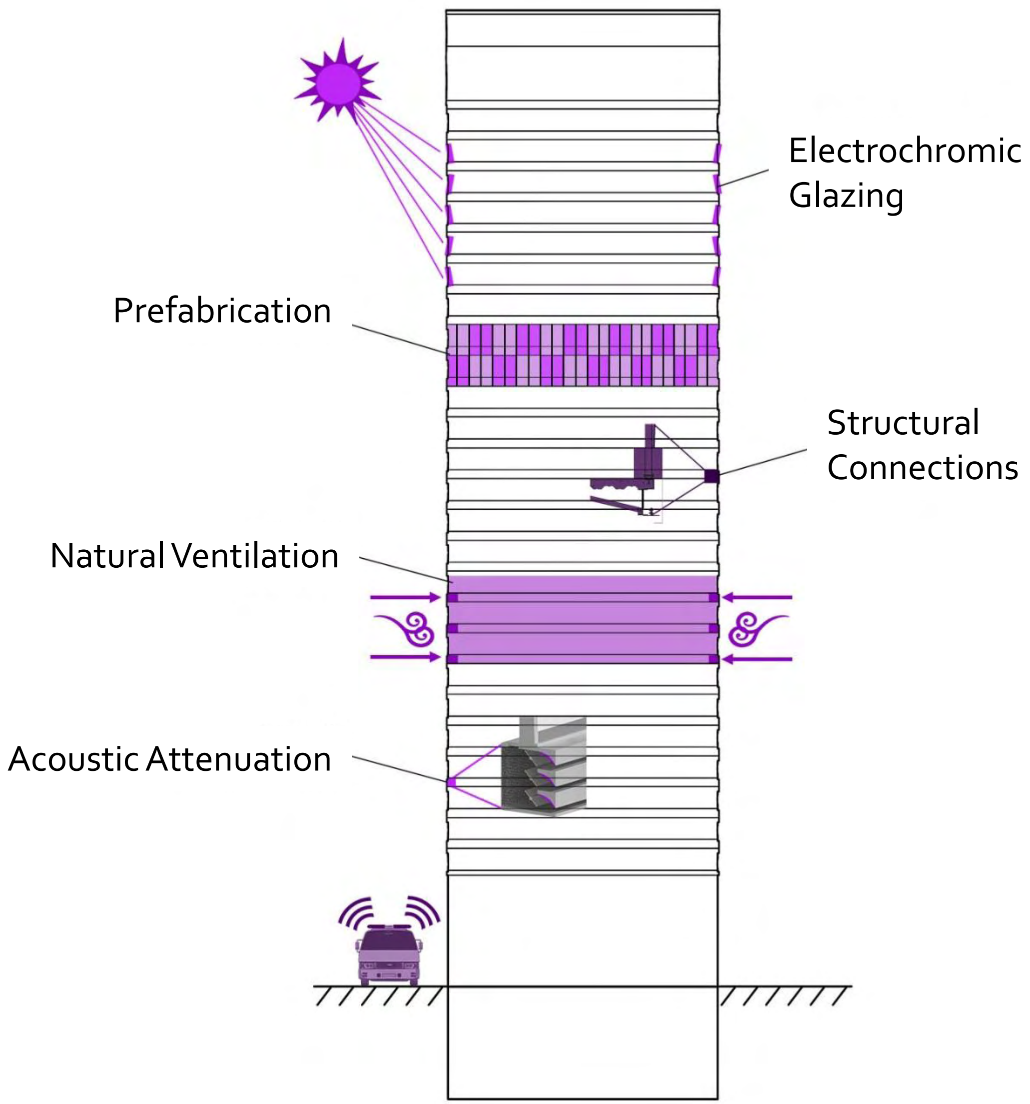
FAÇADE SCHEMATIC OVERVIEW



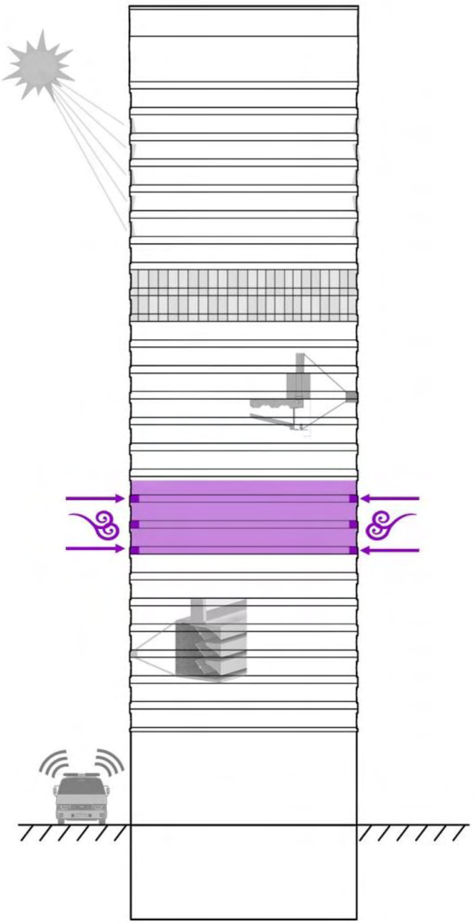
FAÇADE SCHEMATIC OVERVIEW



FAÇADE SCHEMATIC OVERVIEW



NATURAL VENTILATION



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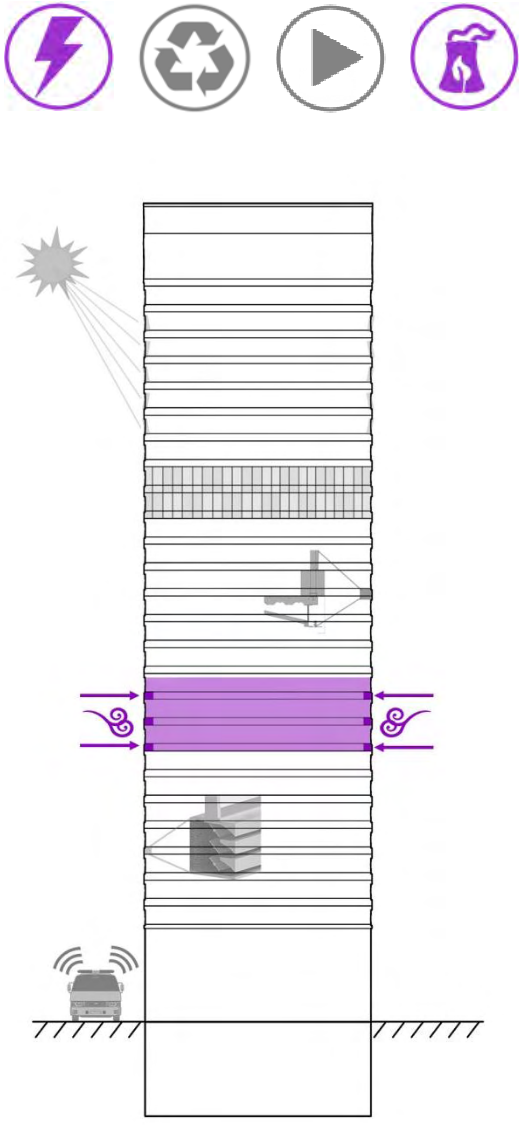

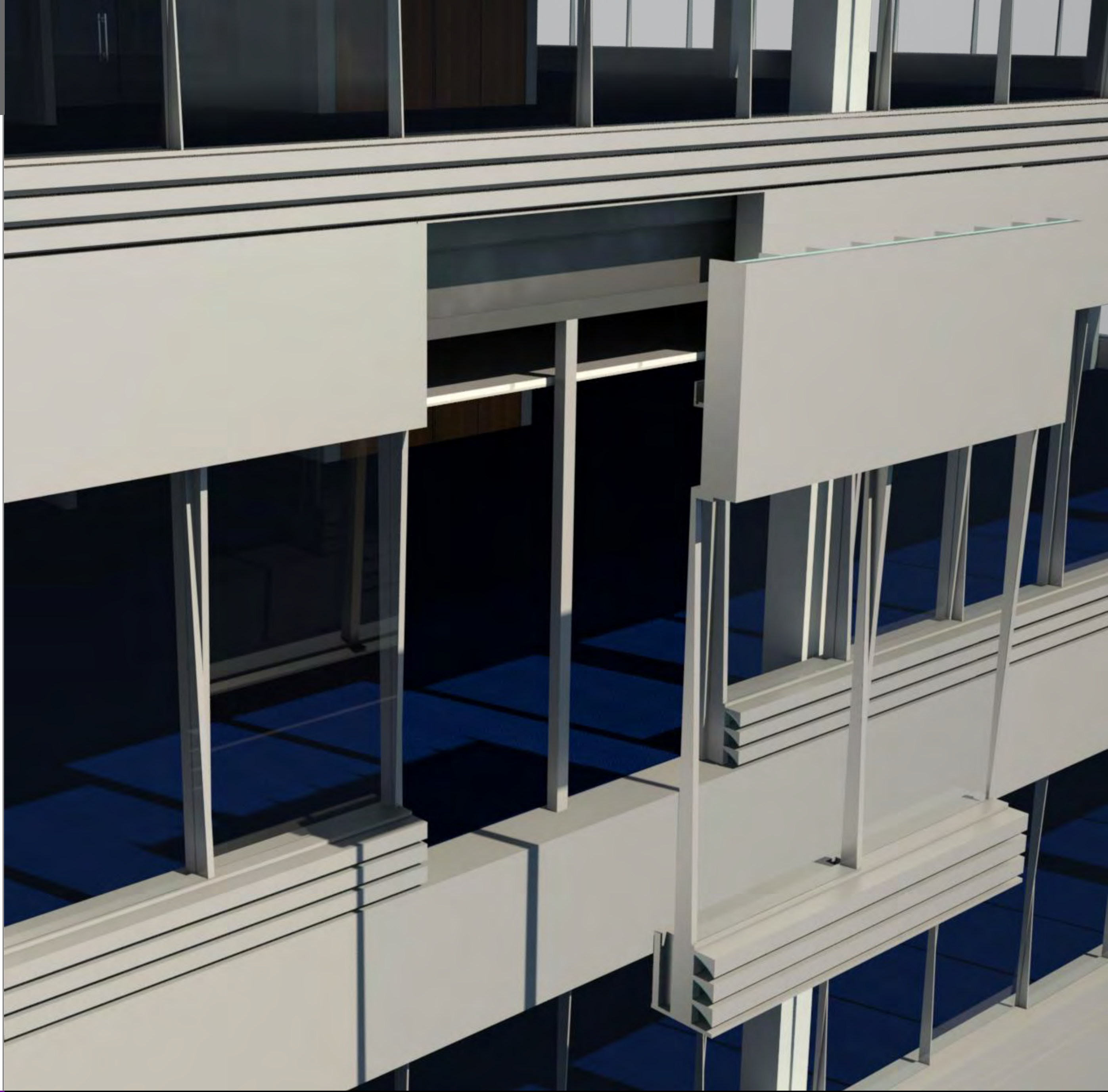

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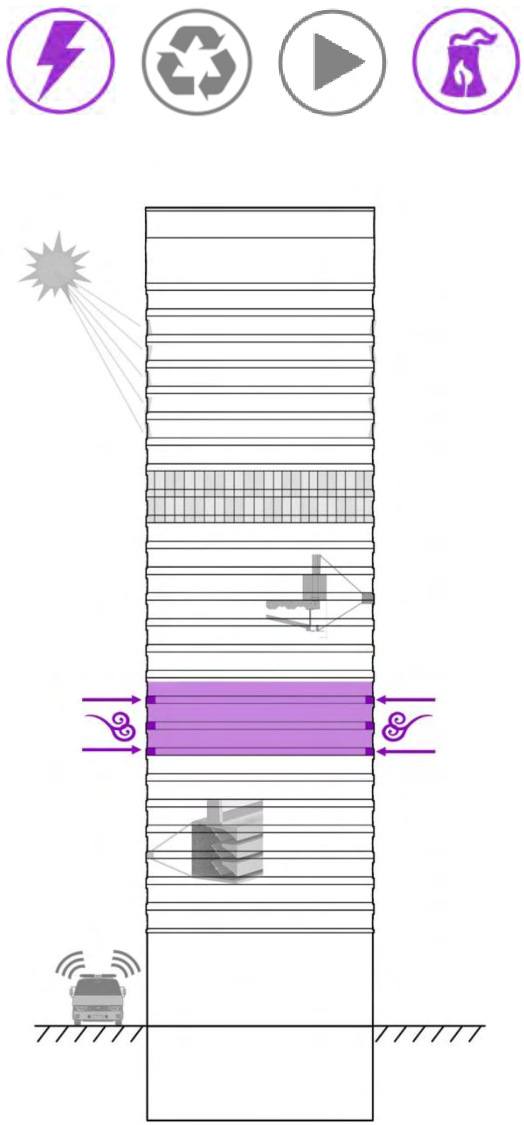

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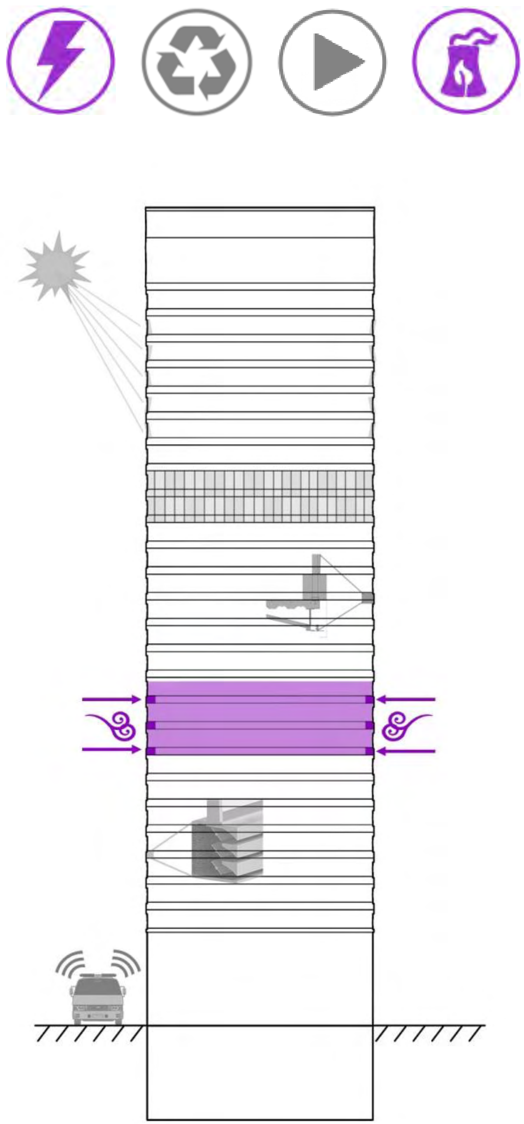

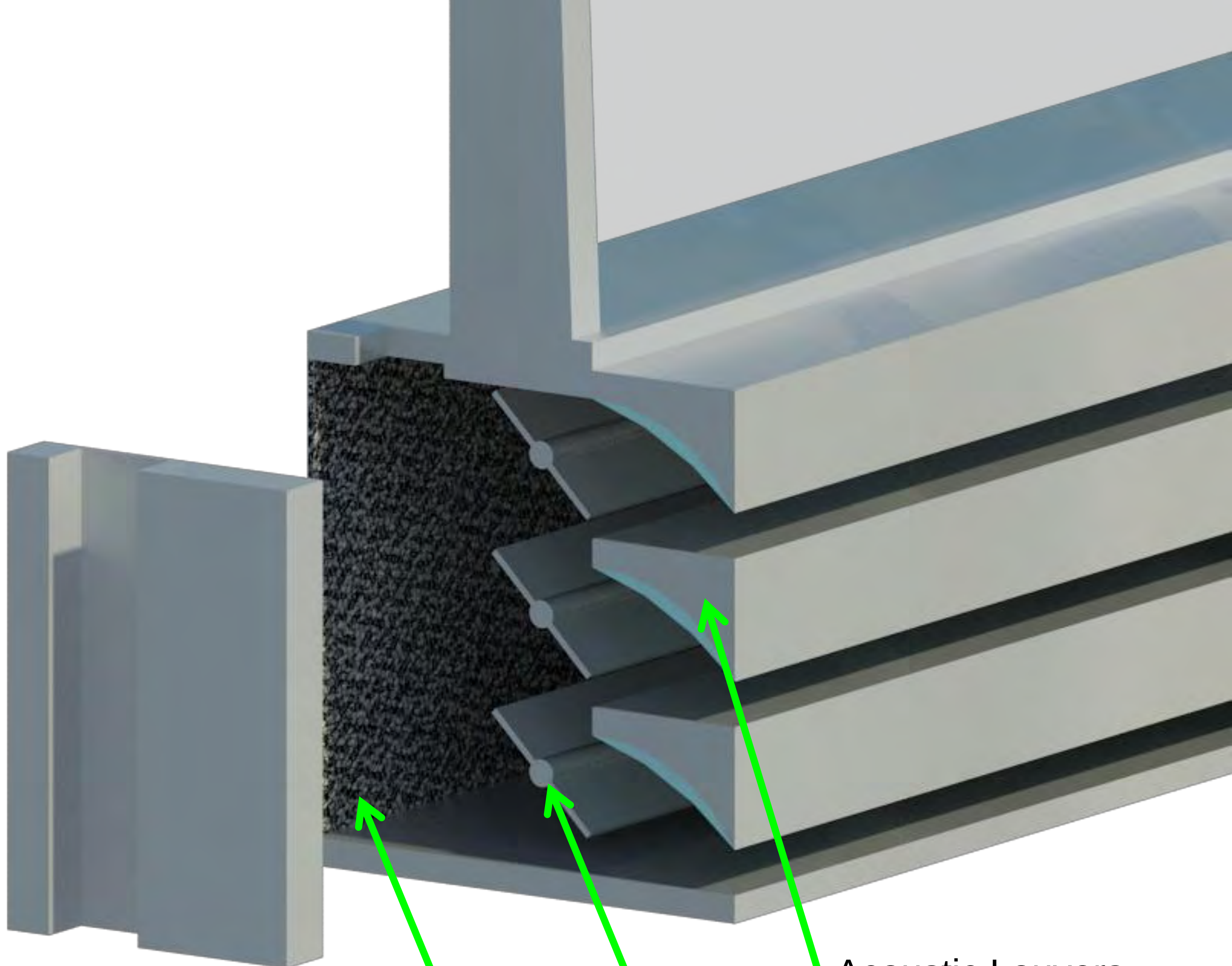

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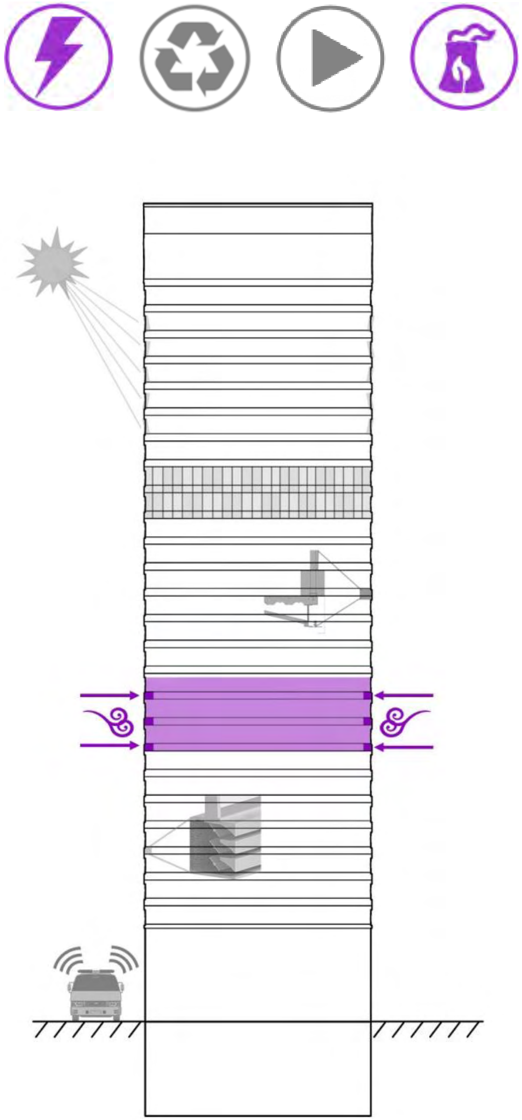
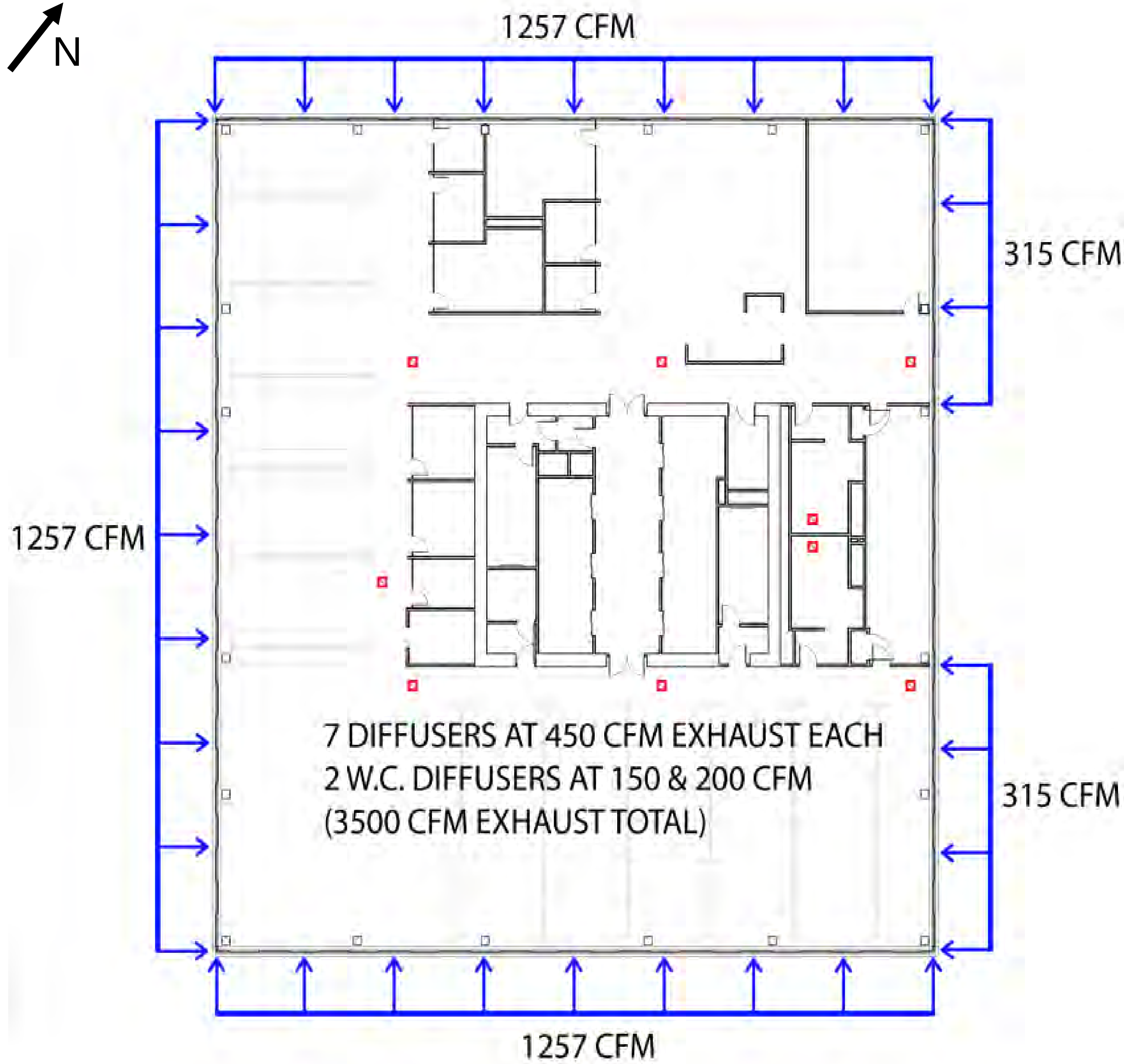
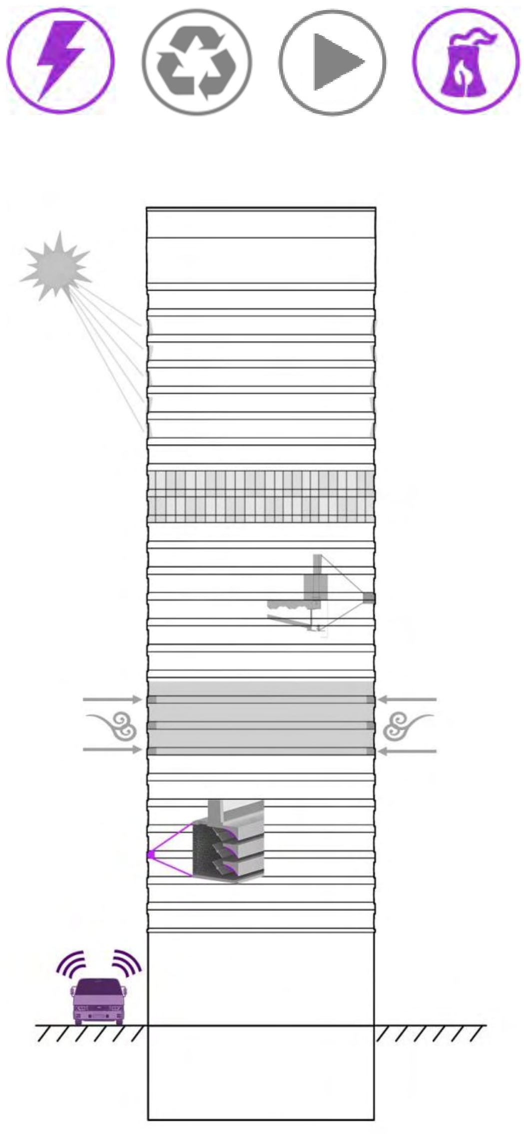
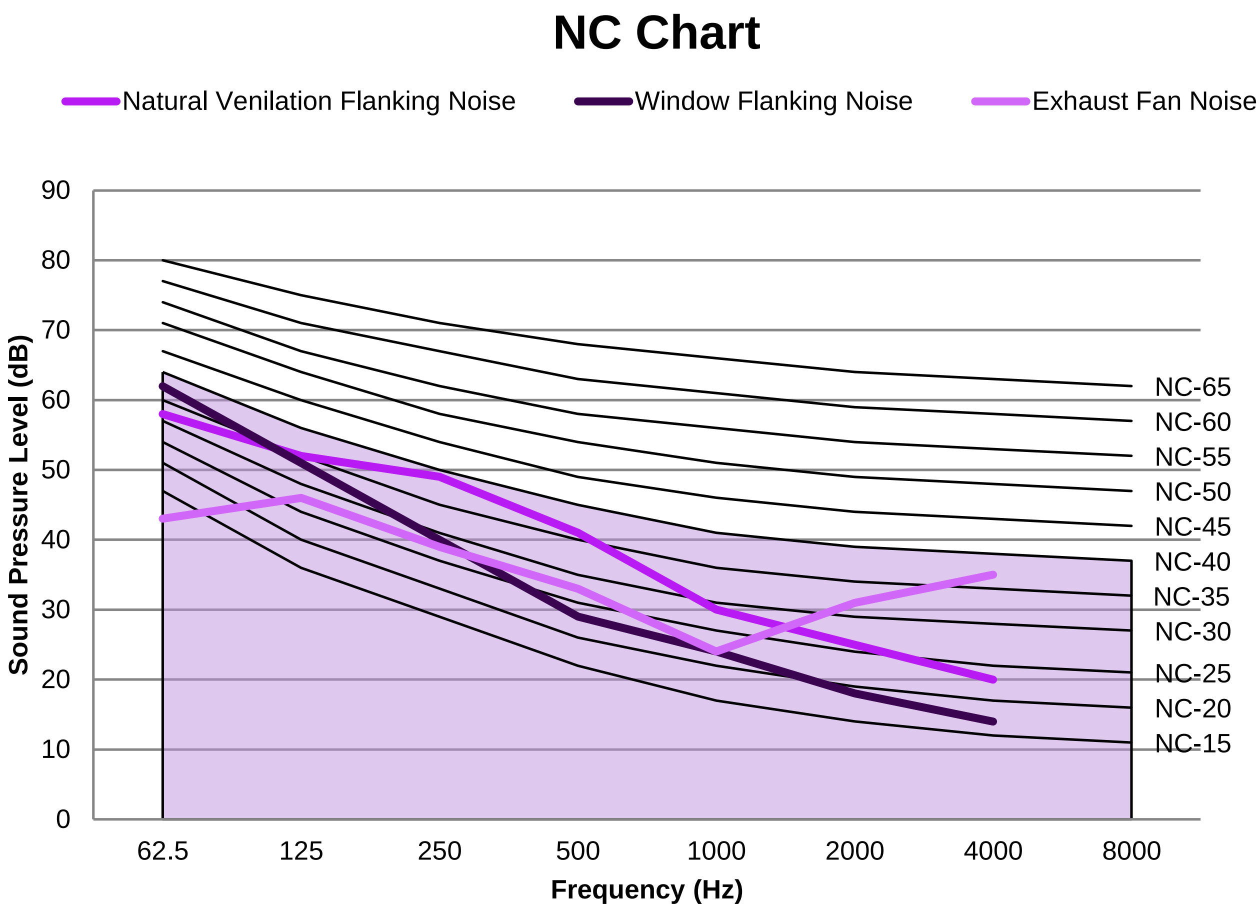


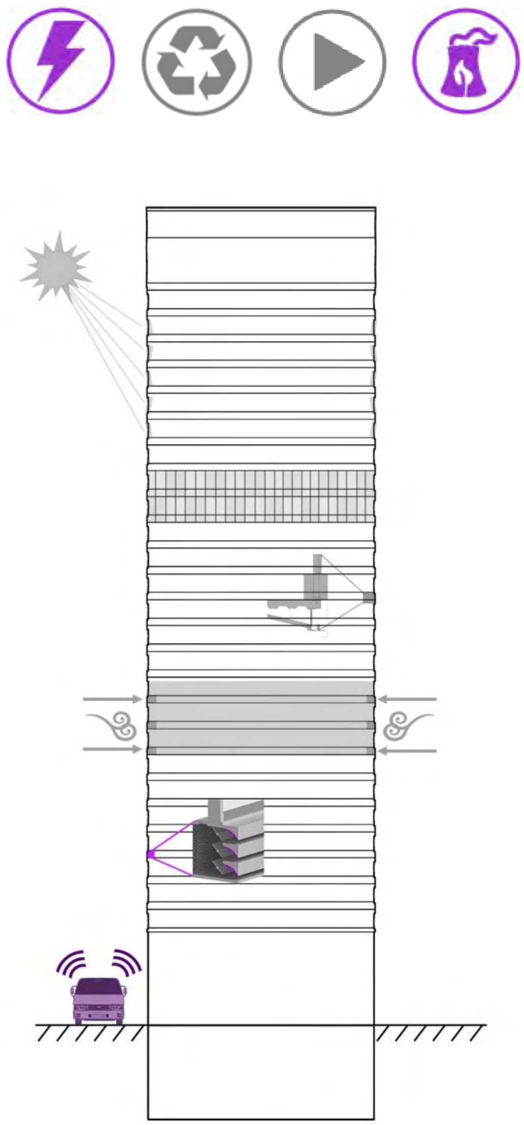


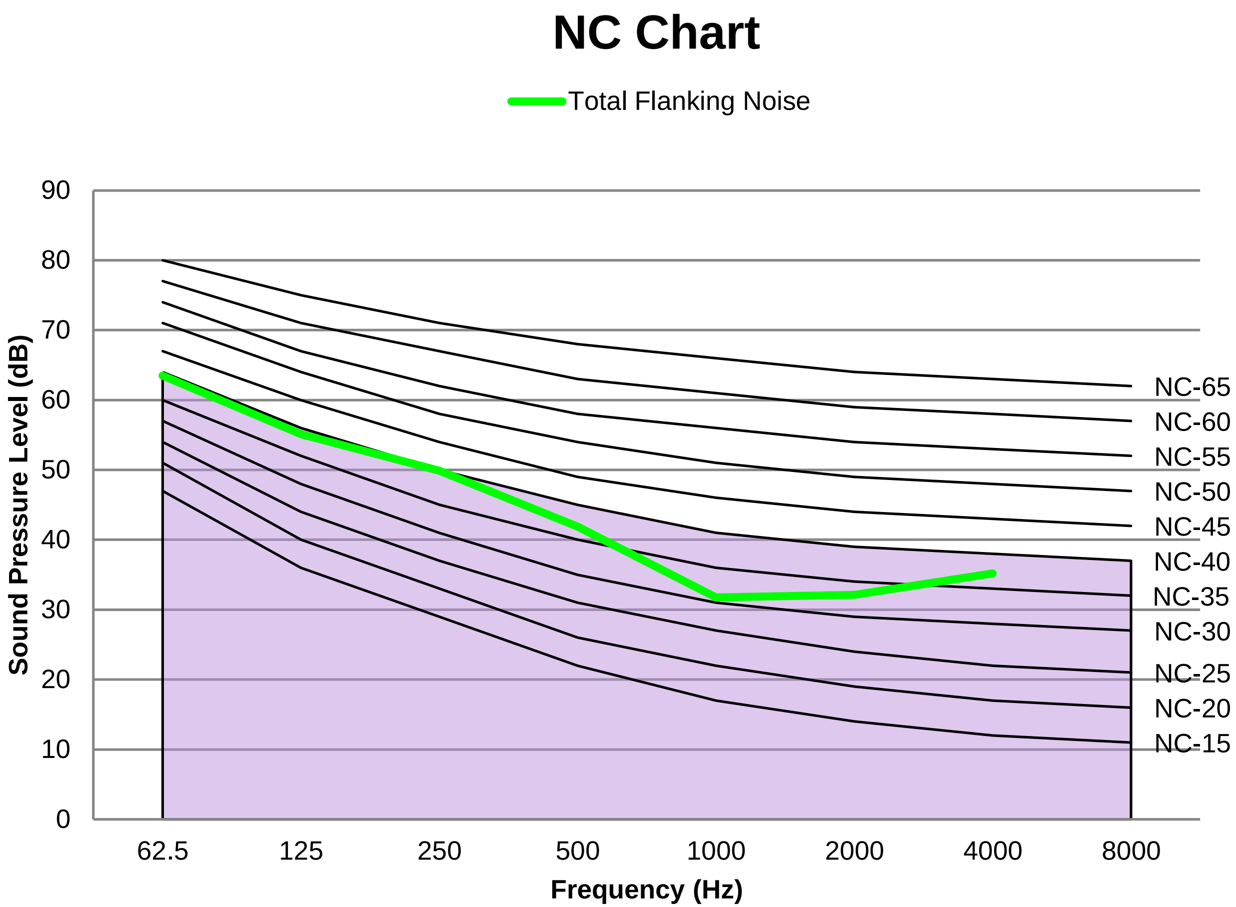
ACOUSTIC ATTENUATION



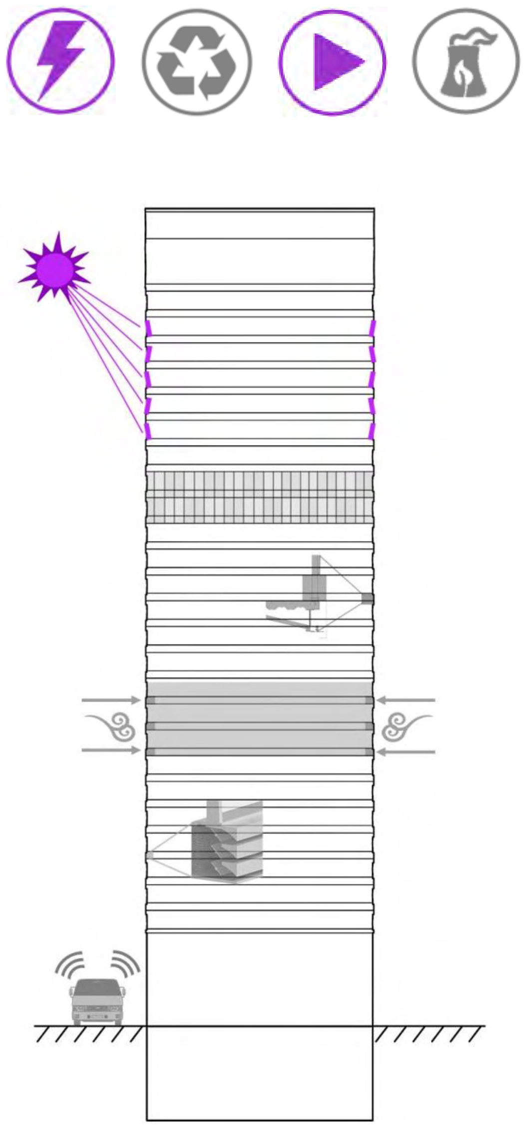


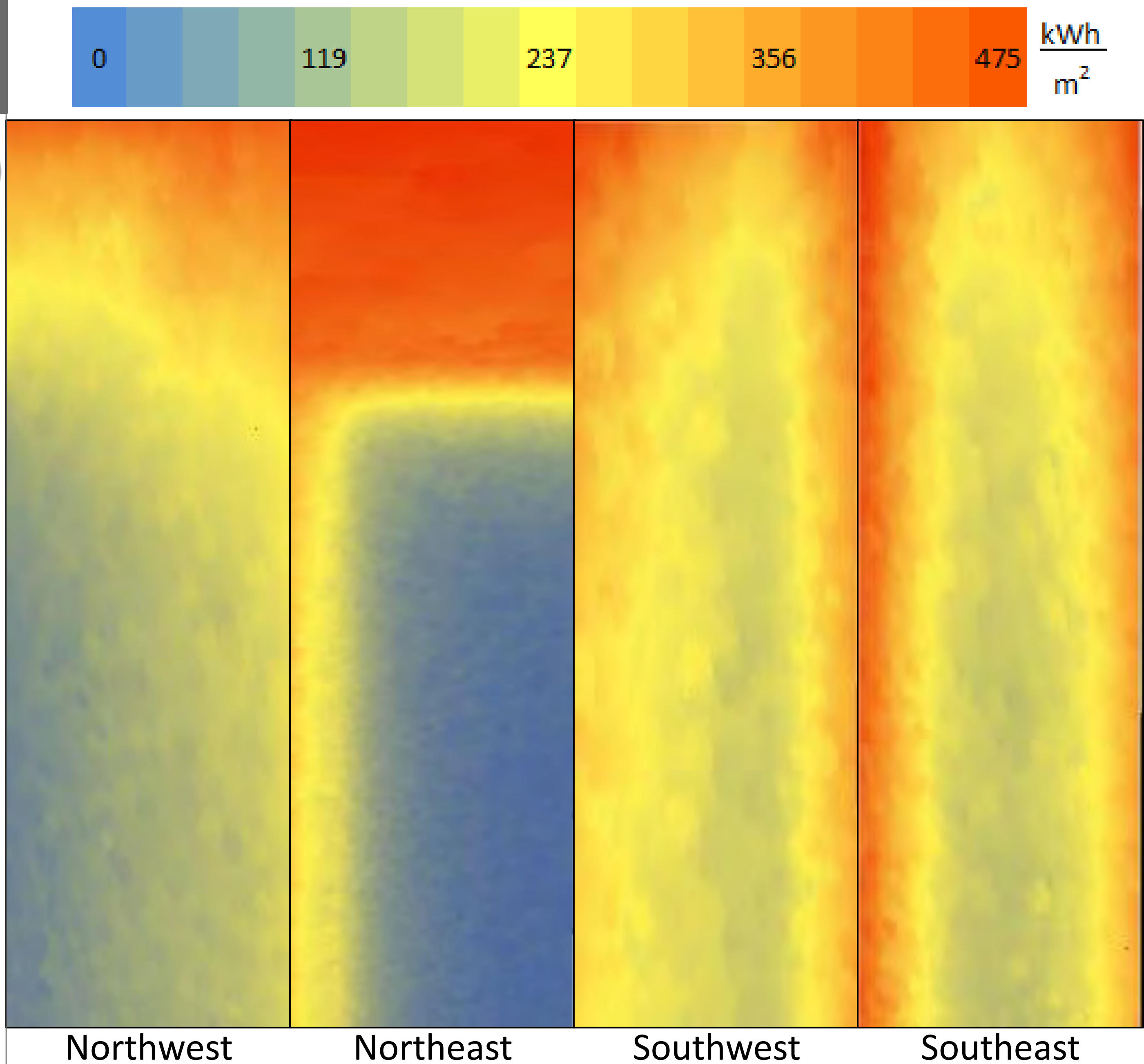
ACOUSTIC ATTENUATION





ELECTROCHROMIC GLASS





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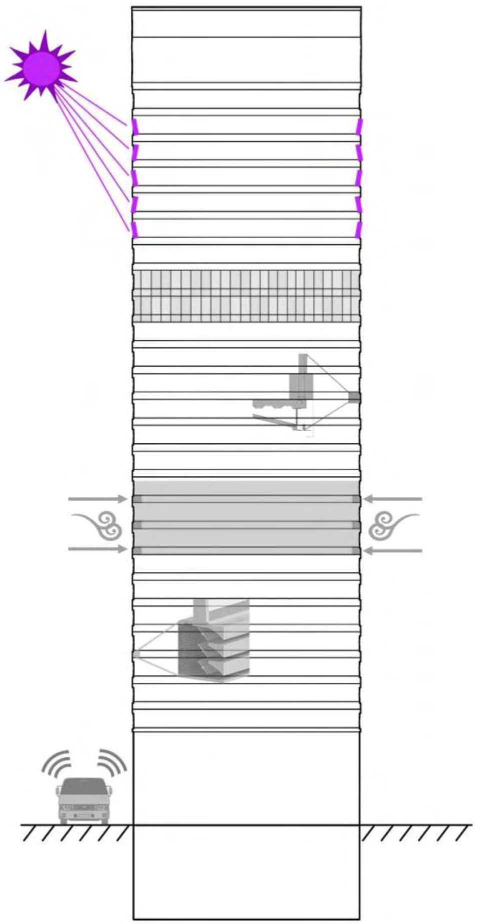
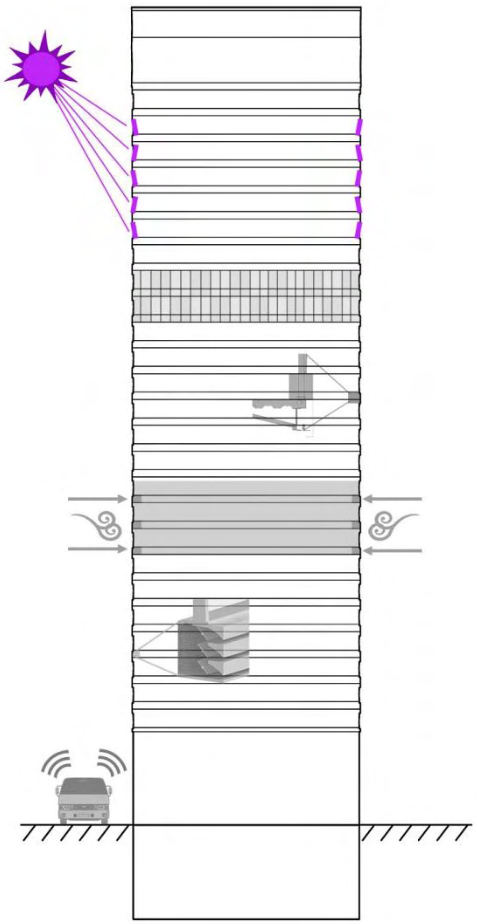


BUILDING SYSTEMS

ENERGY&POWER–SUBSTRUCTURE–SUPERSTRUCTURE–LOBBY –FAÇADE –OFFICE FLOOR

ELECTROCHROMIC GLASS



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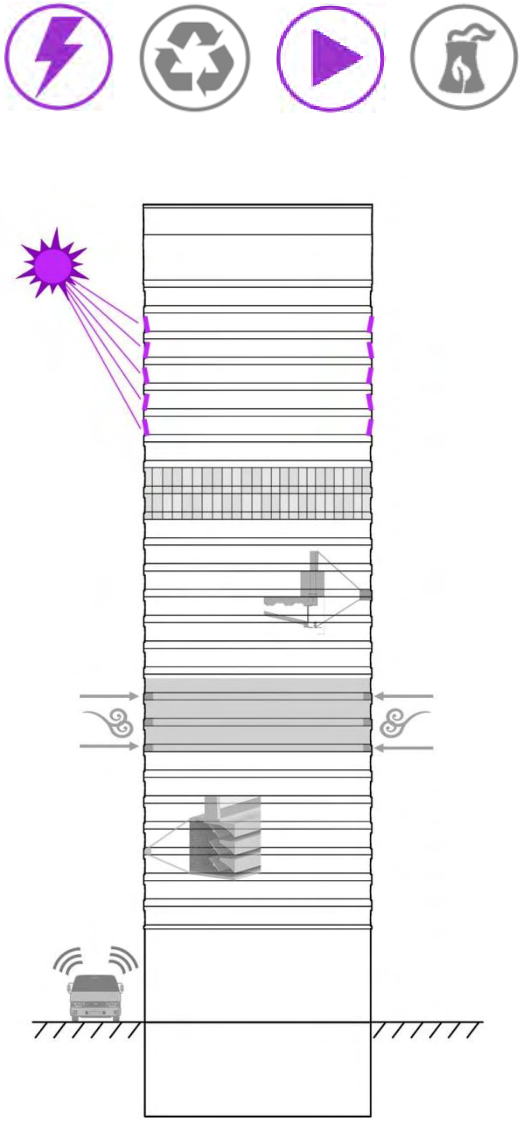
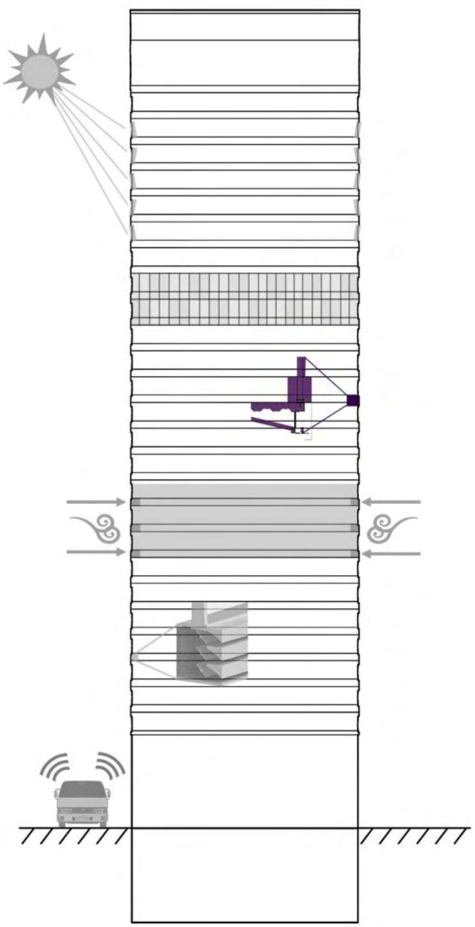
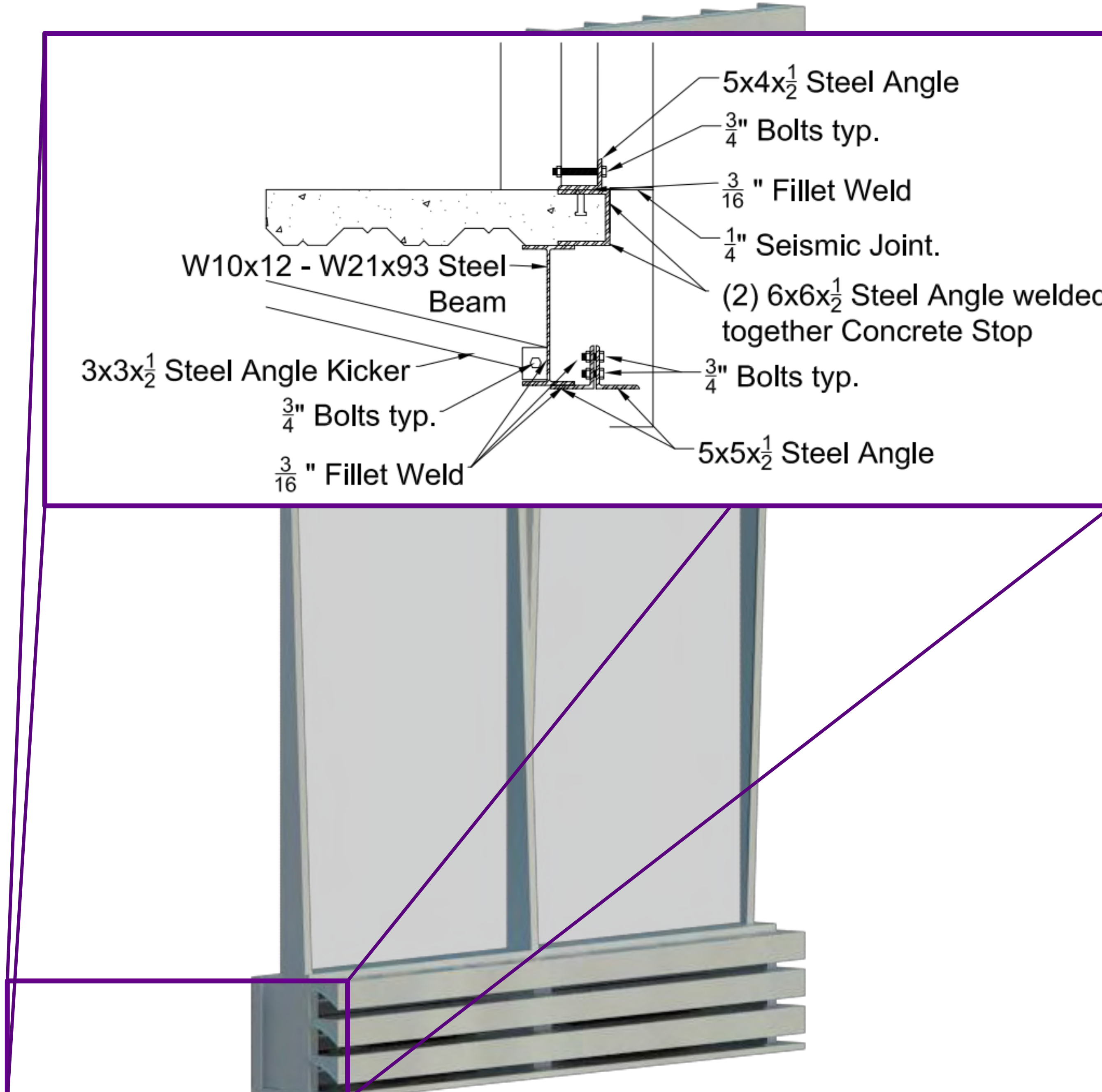


BUILDING SYSTEMS

STRUCTURAL CONNECTIONS





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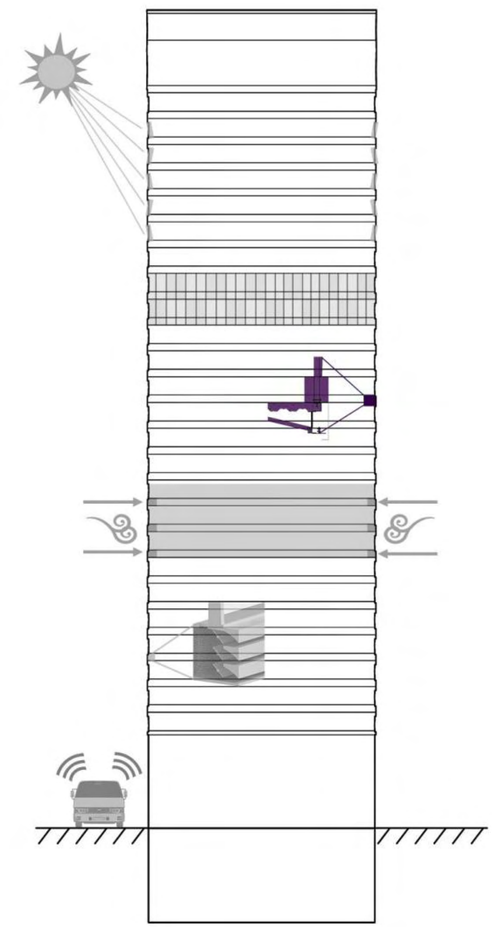

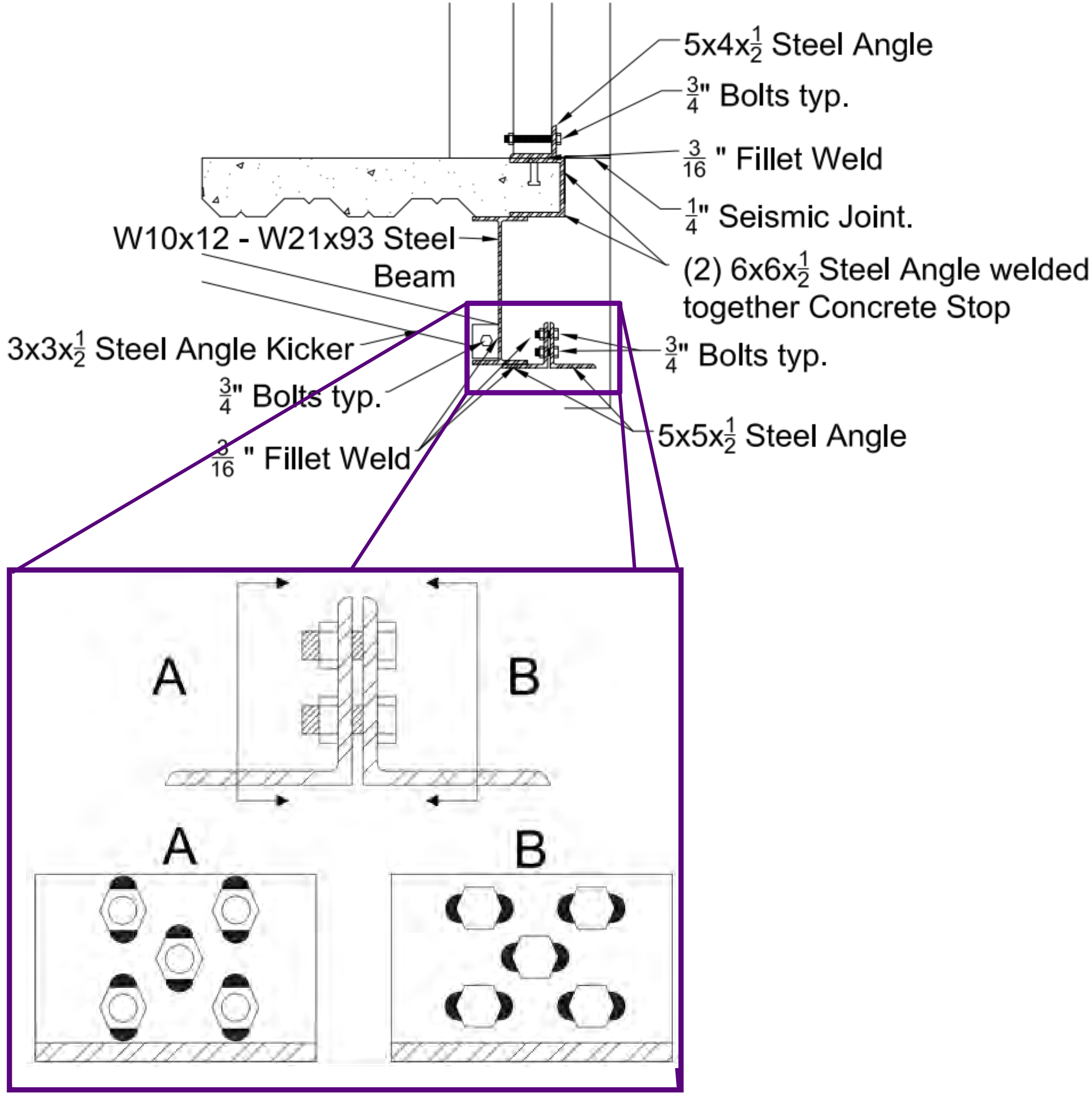

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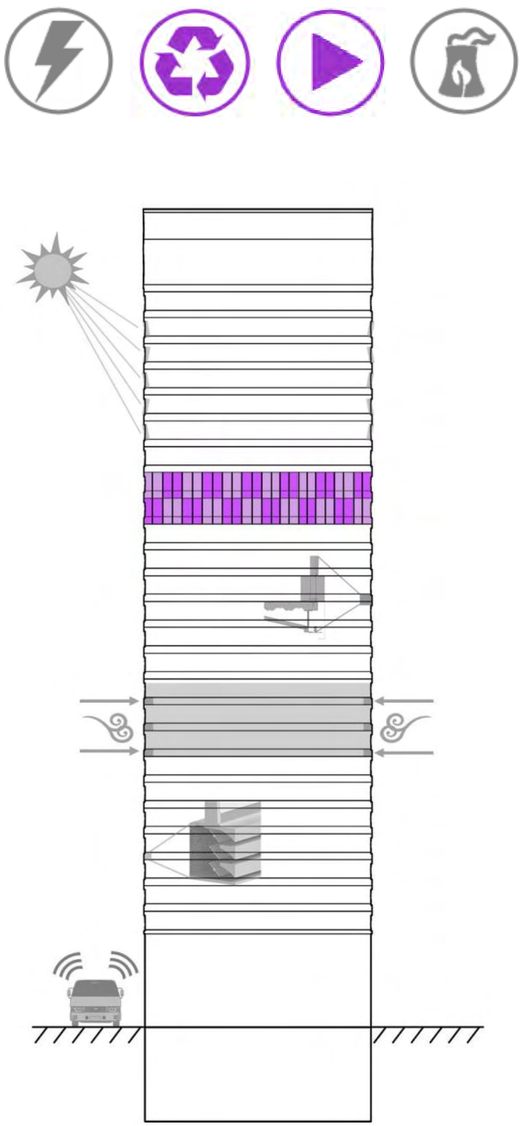

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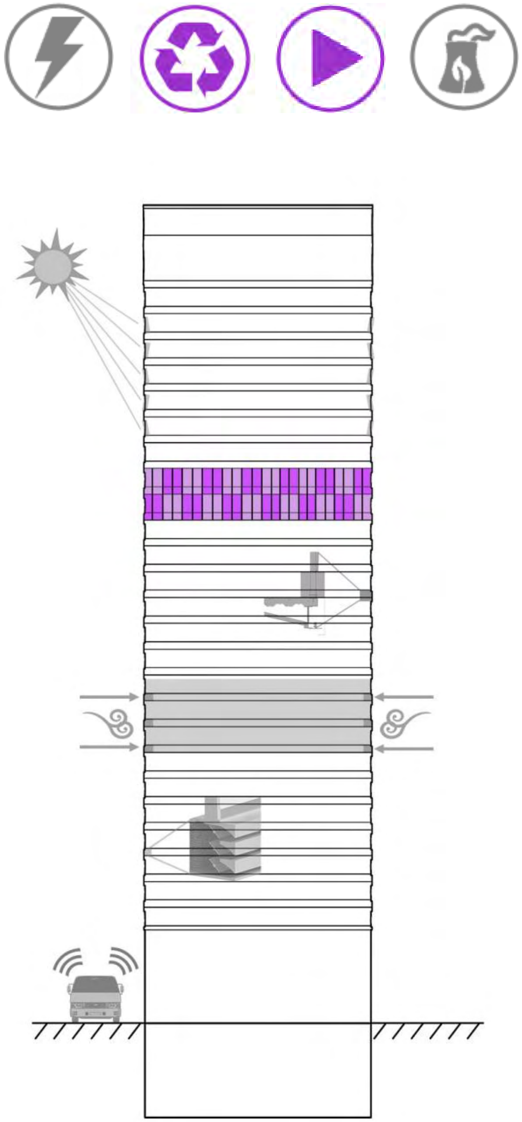
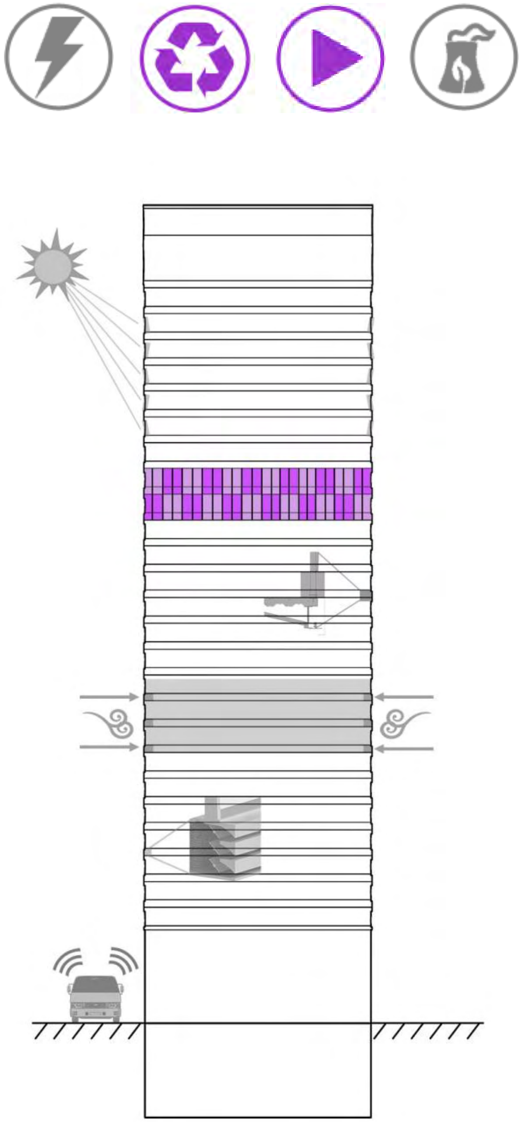


BUILDING SYSTEMS

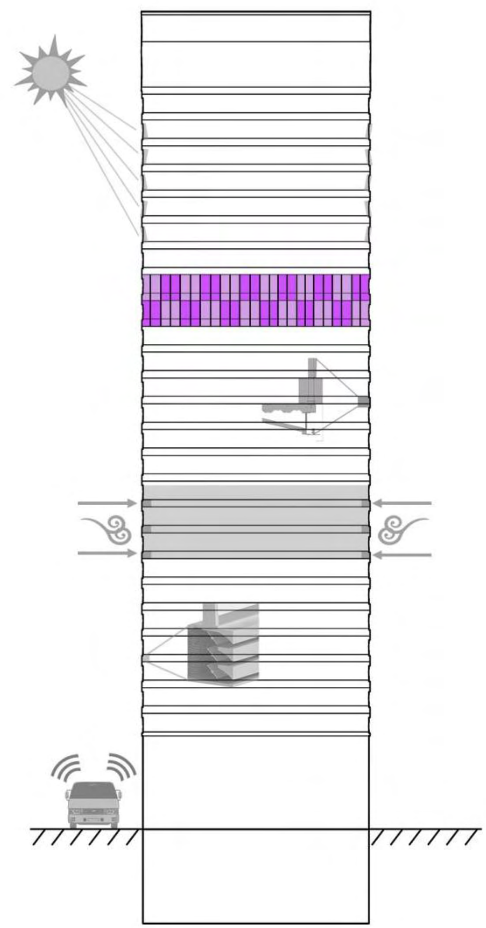
PREFABRICATION

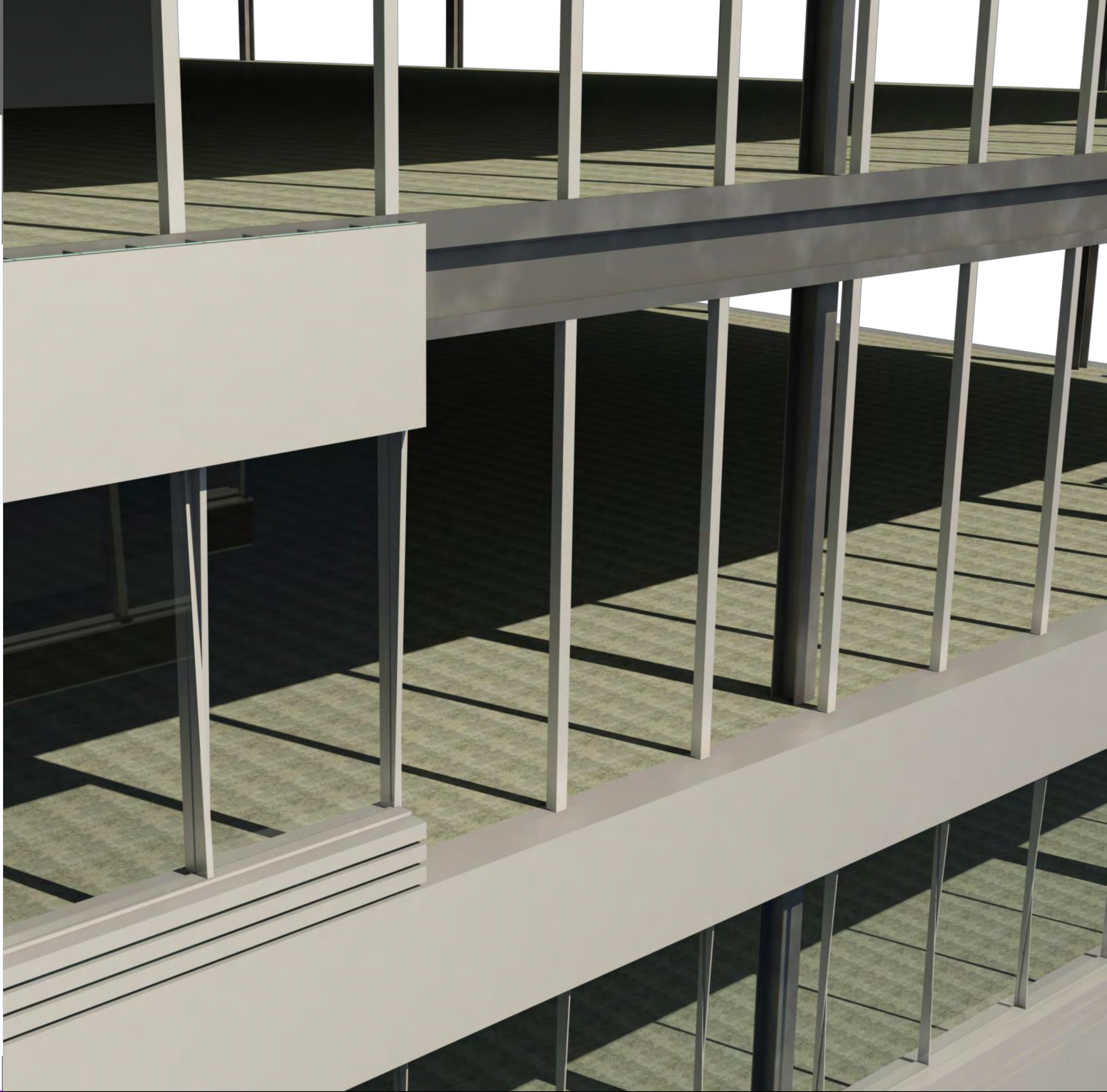


BUILDING SYSTEMS

ENERGY&POWER–SUBSTRUCTURE–SUPERSTRUCTURE–LOBBY –**FAÇADE** –OFFICE FLOOR

PREFABRICATION





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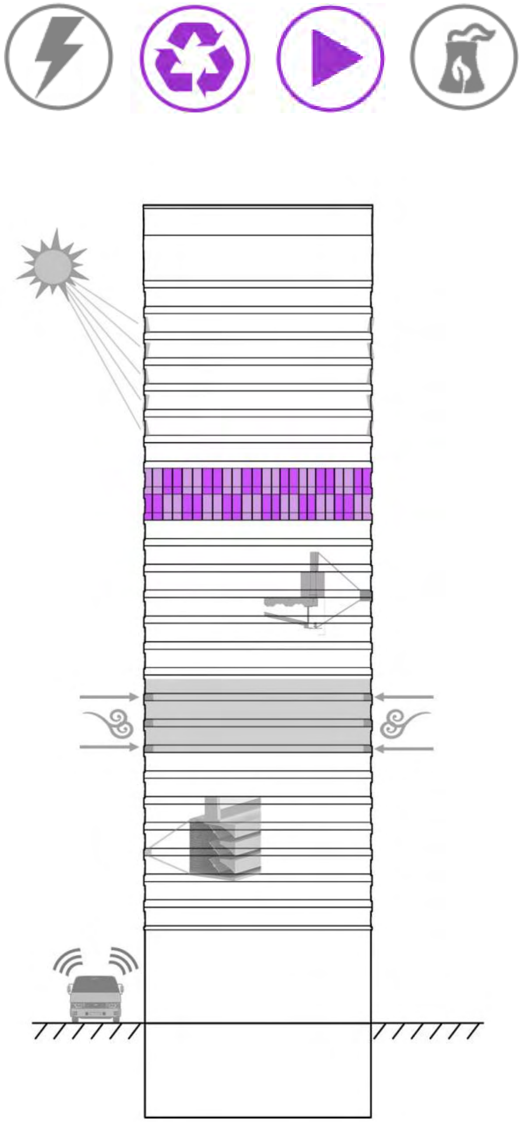
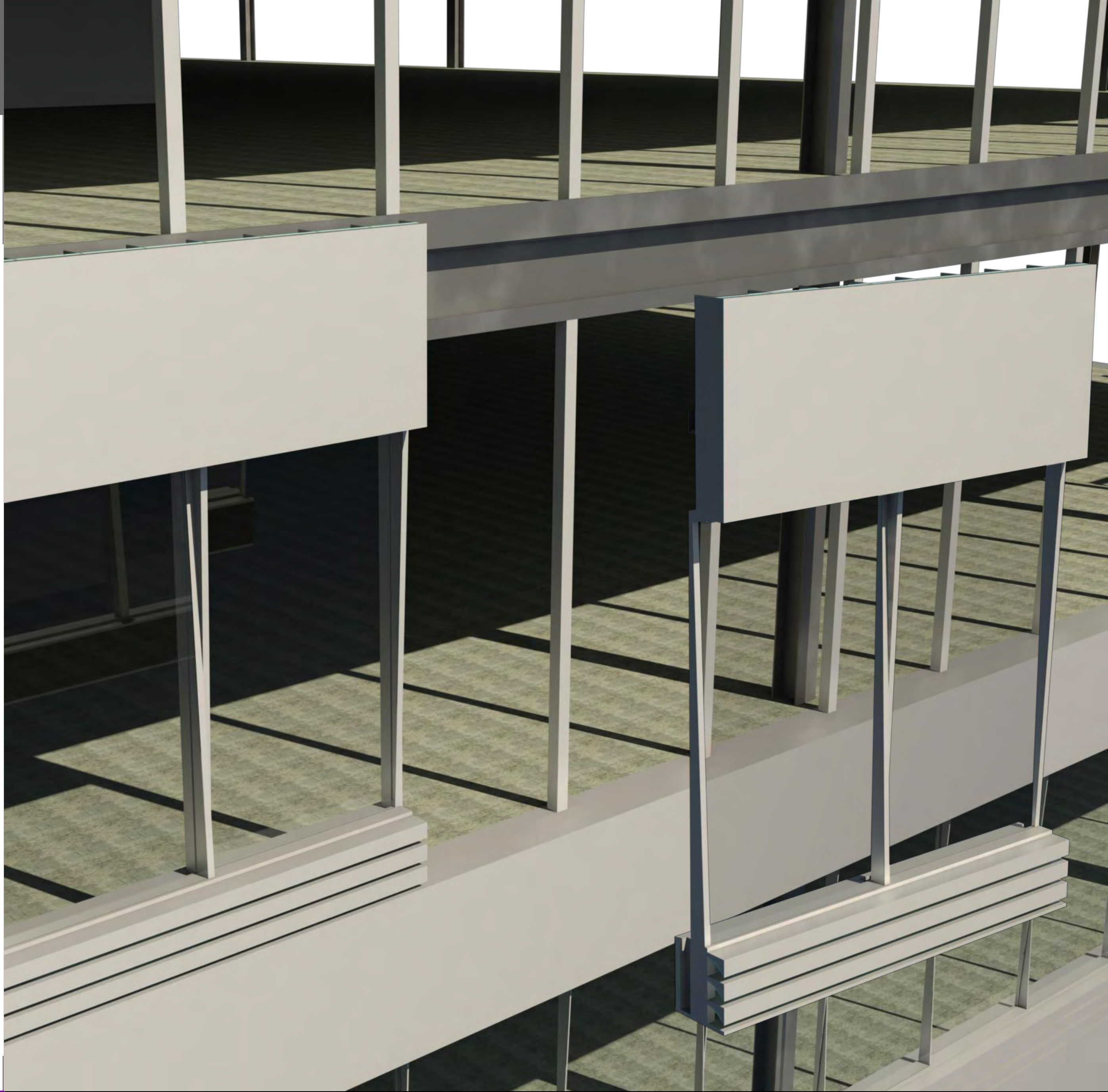
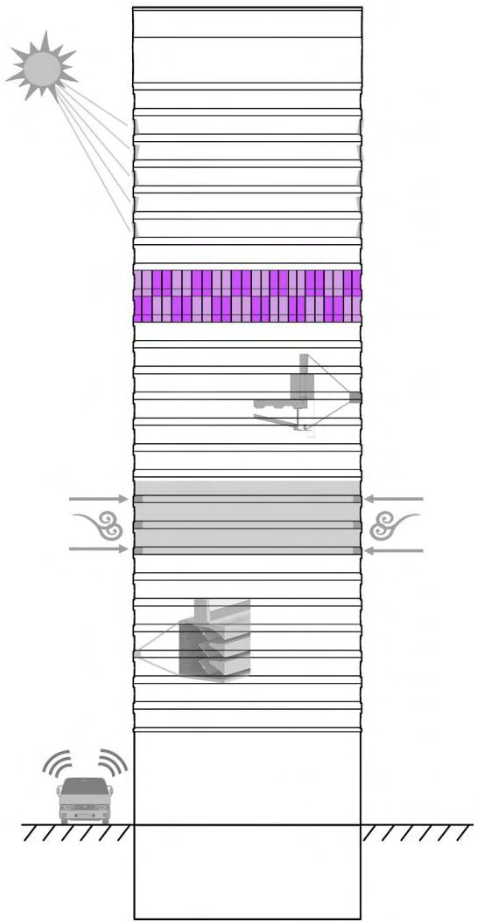




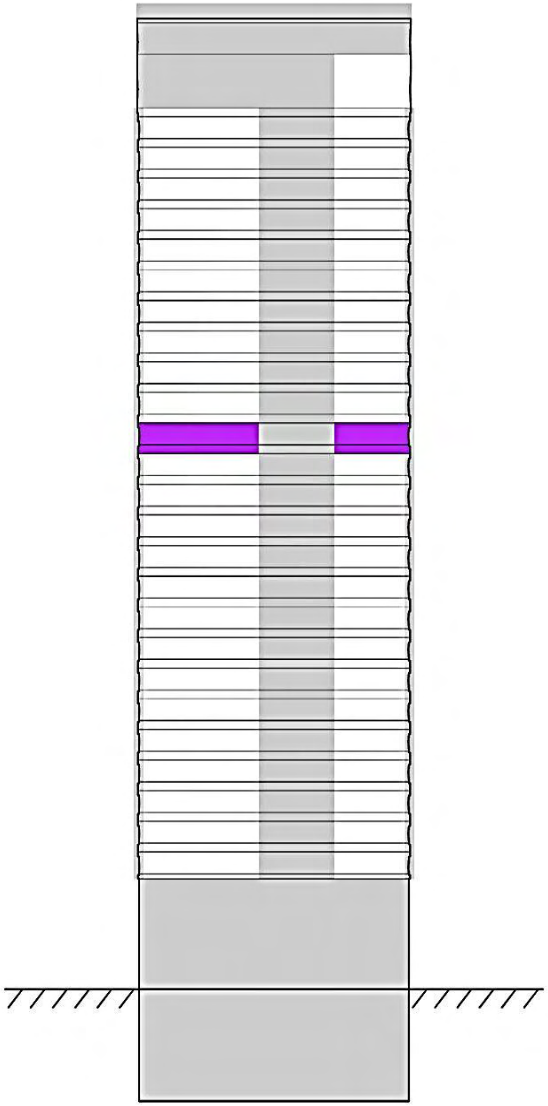
BUILDING SYSTEMS

ENERGY&POWER–SUBSTRUCTURE–SUPERSTRUCTURE–LOBBY –FAÇADE–OFFICE FLOOR

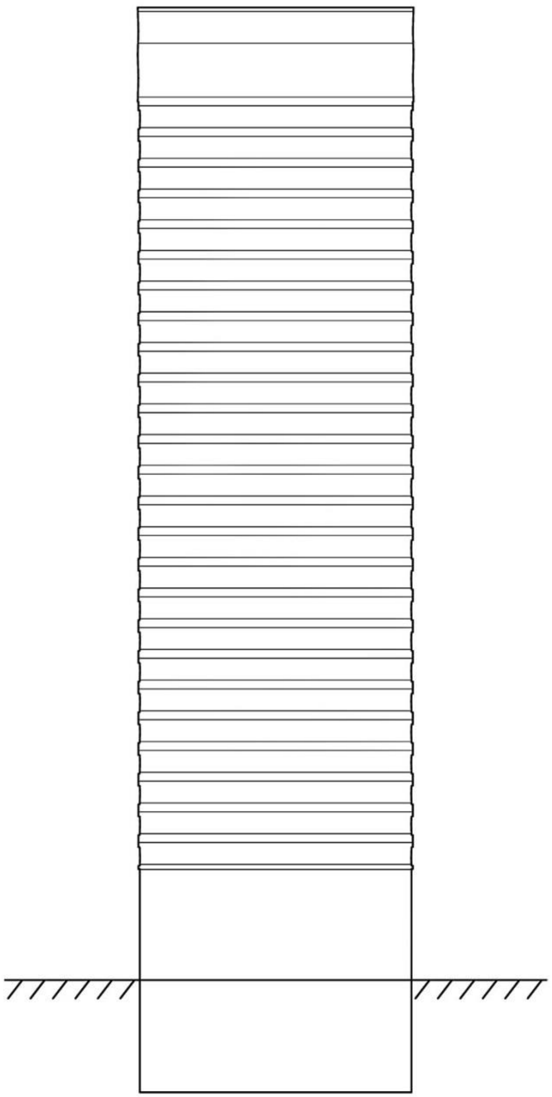
PREFABRICATION



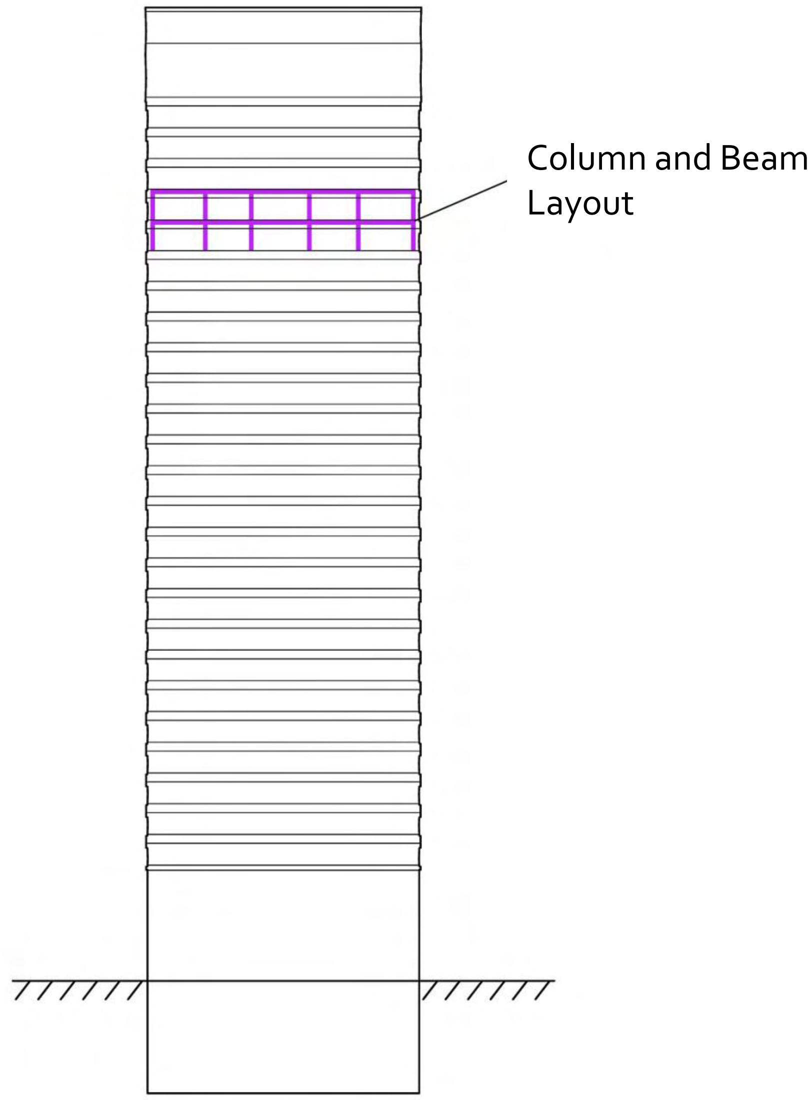
OFFICE FLOOR SCHEMATIC OVERVIEW

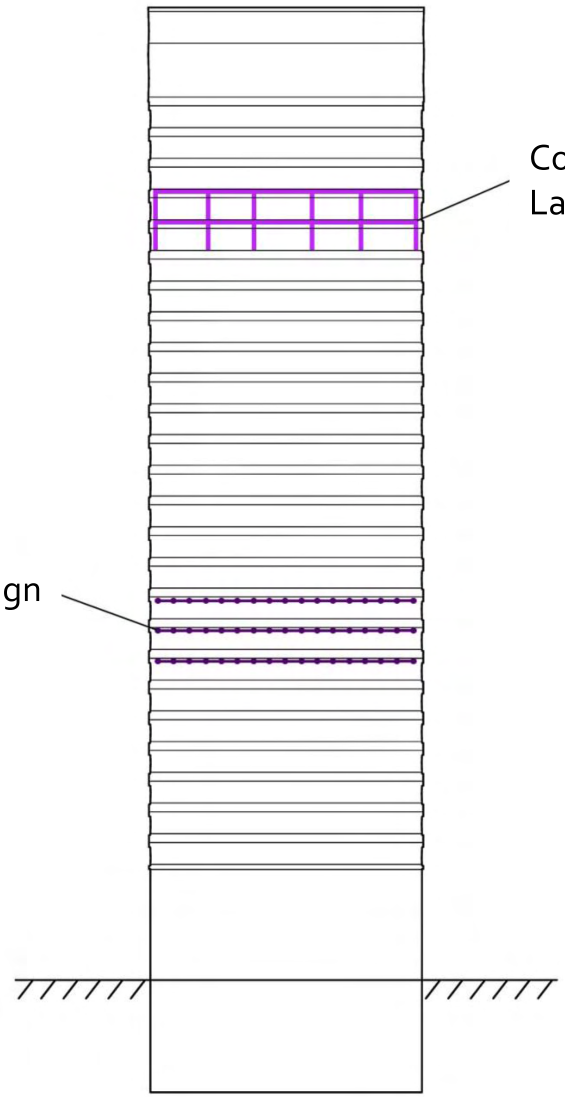


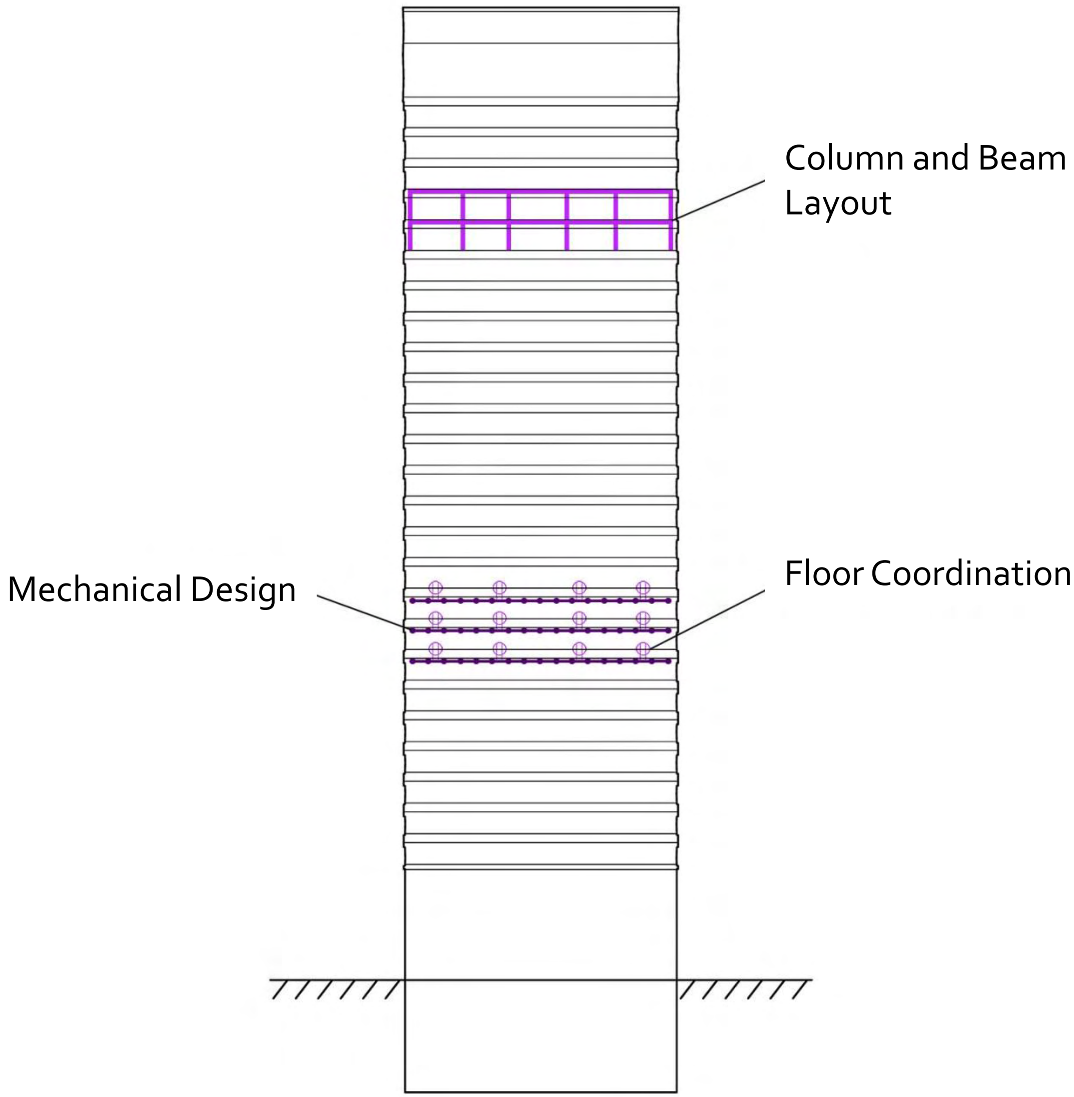
OFFICE FLOOR SCHEMATIC OVERVIEW



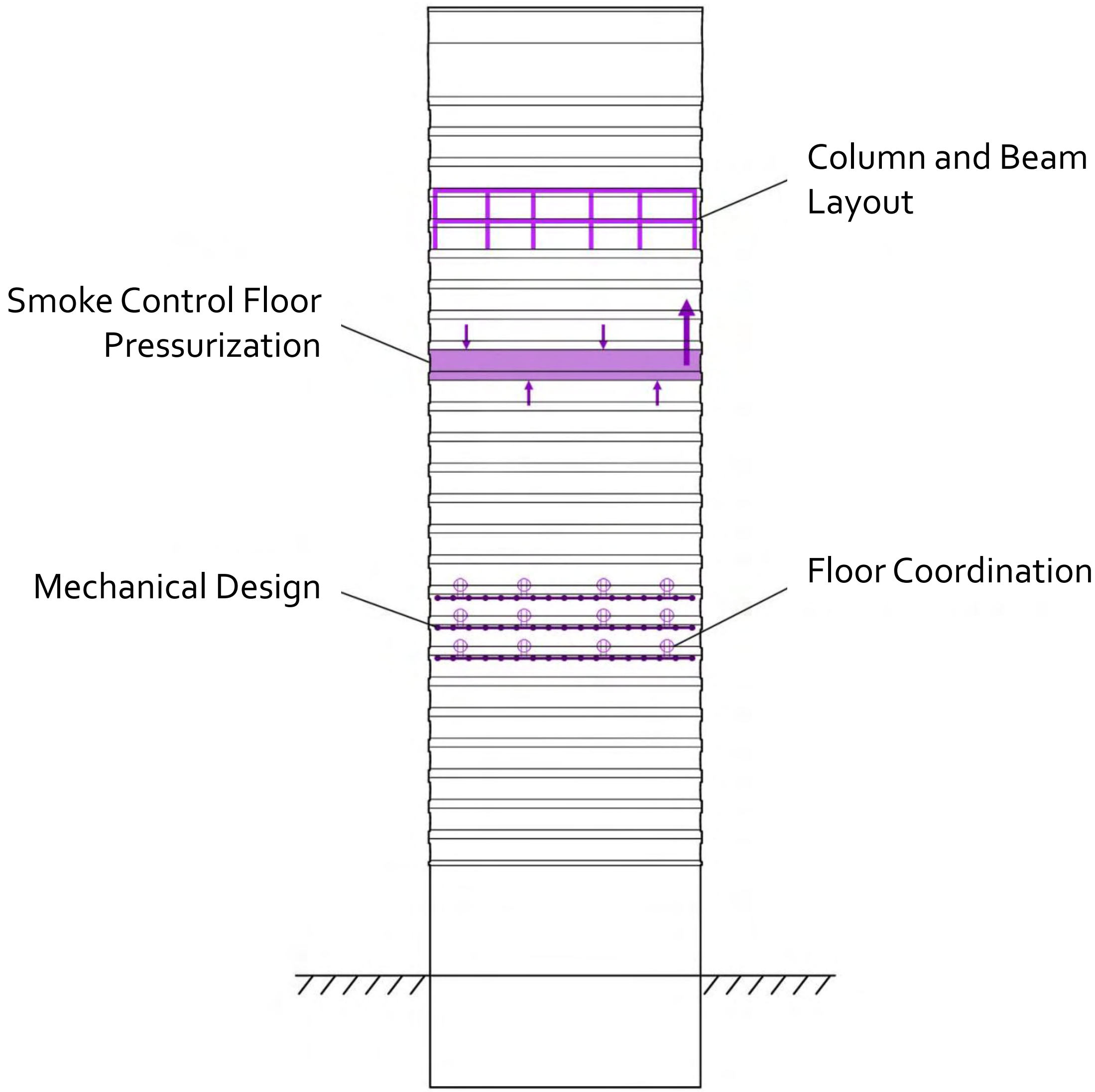
OFFICE FLOOR SCHEMATIC OVERVIEW



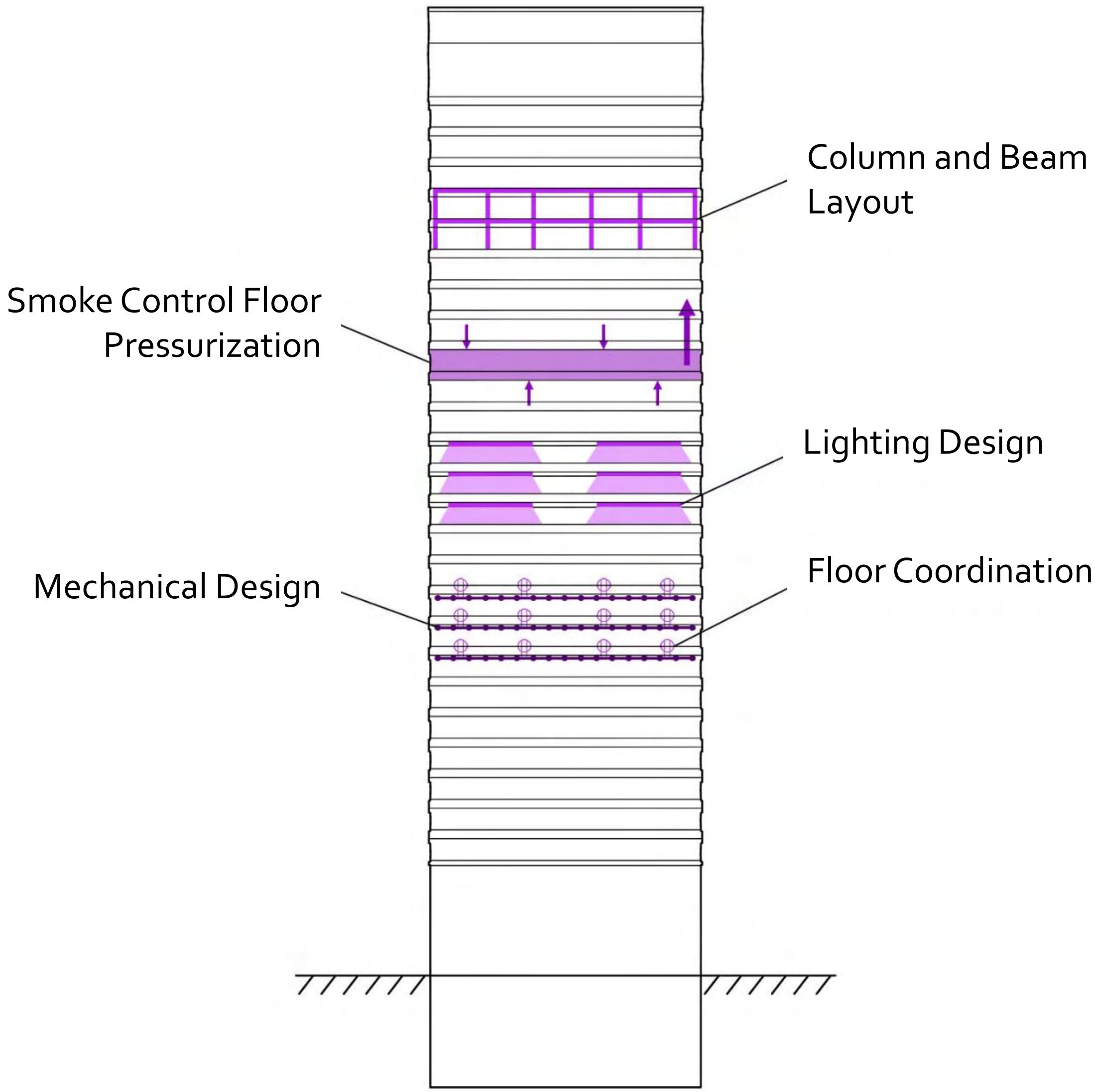

Column and Beam Layout
Mechanical Design

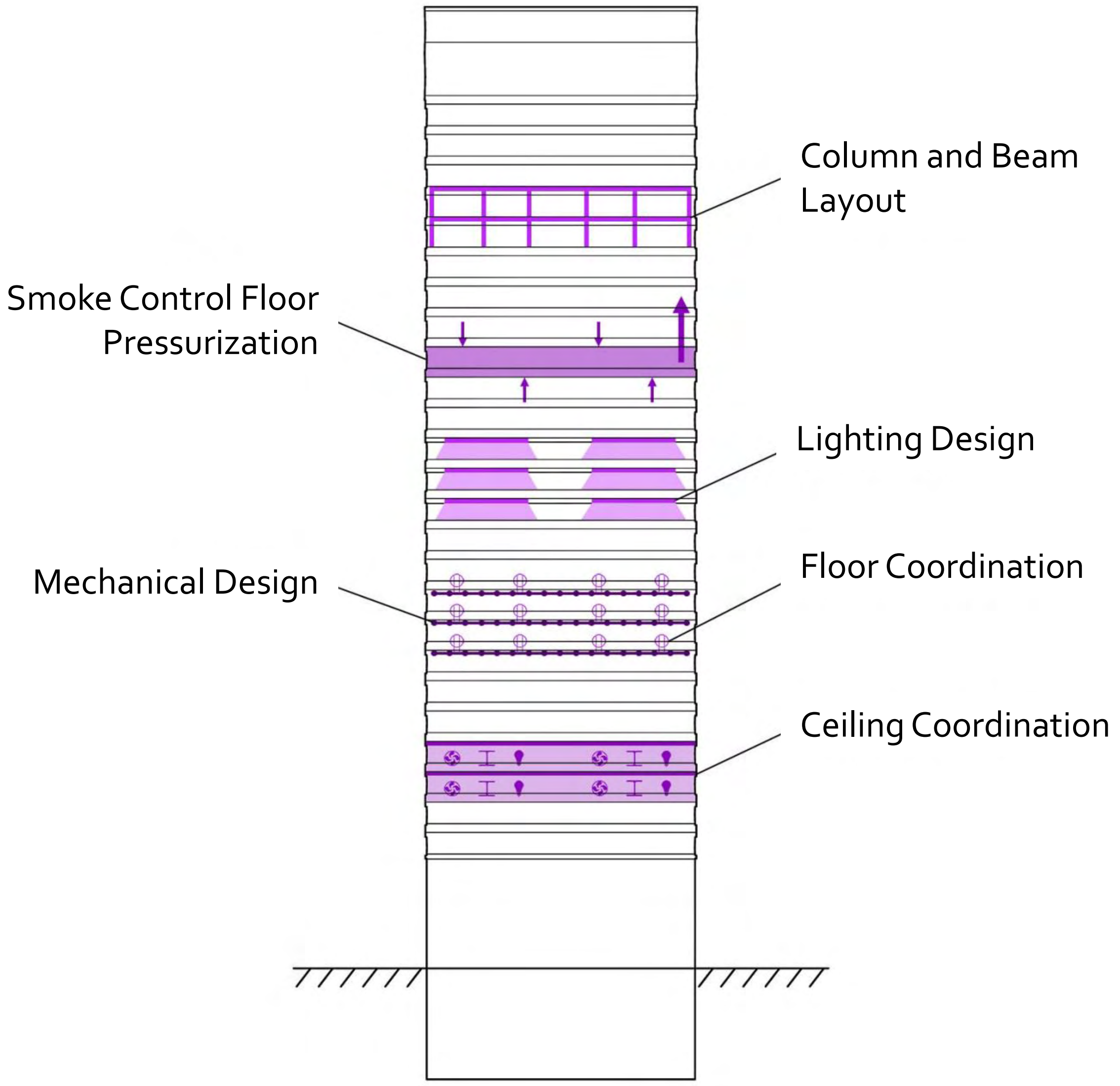

Column and Beam Layout
Mechanical Design
Floor Coordination

OFFICE FLOOR SCHEMATIC OVERVIEW

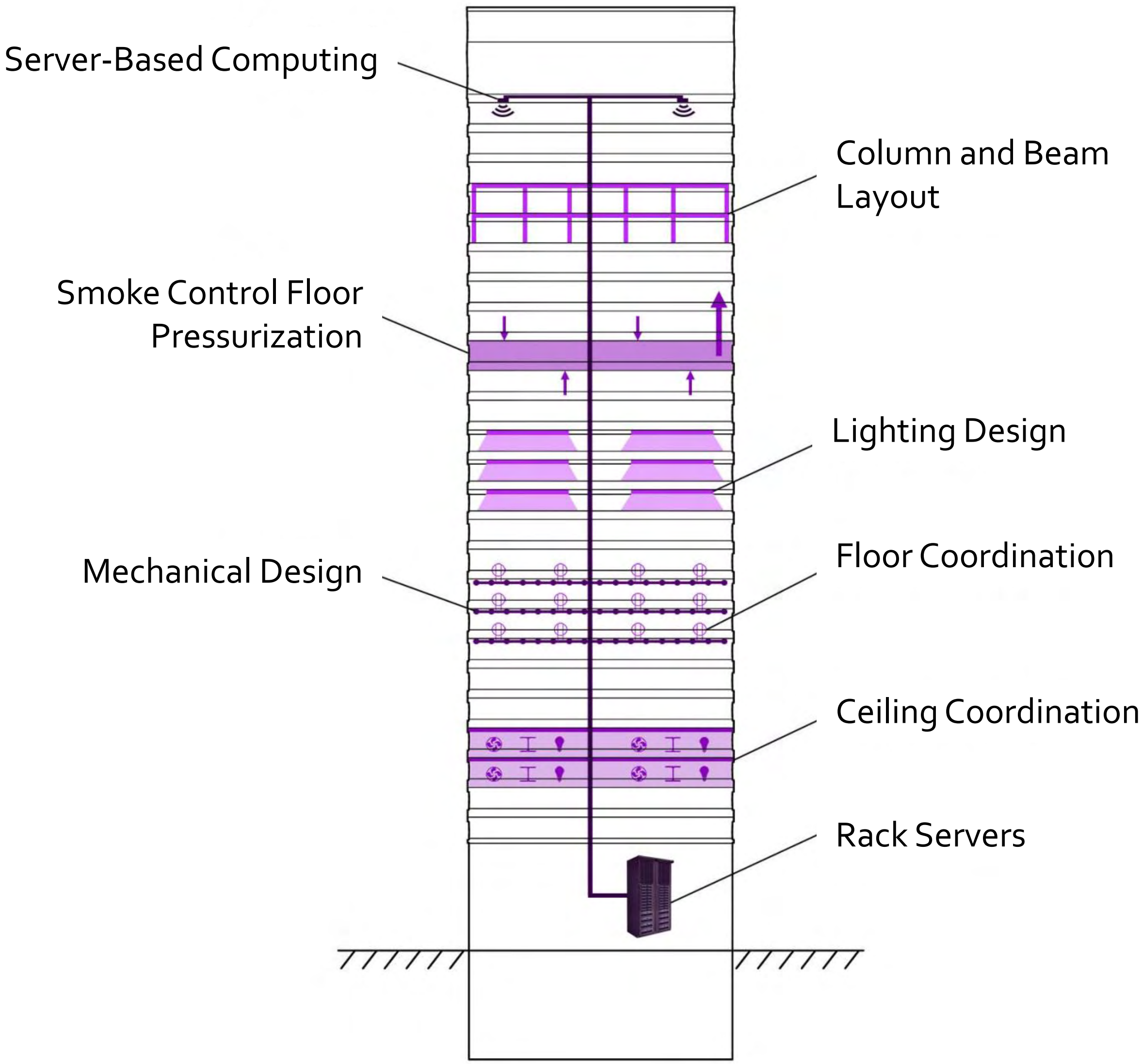


OFFICE FLOOR SCHEMATIC OVERVIEW

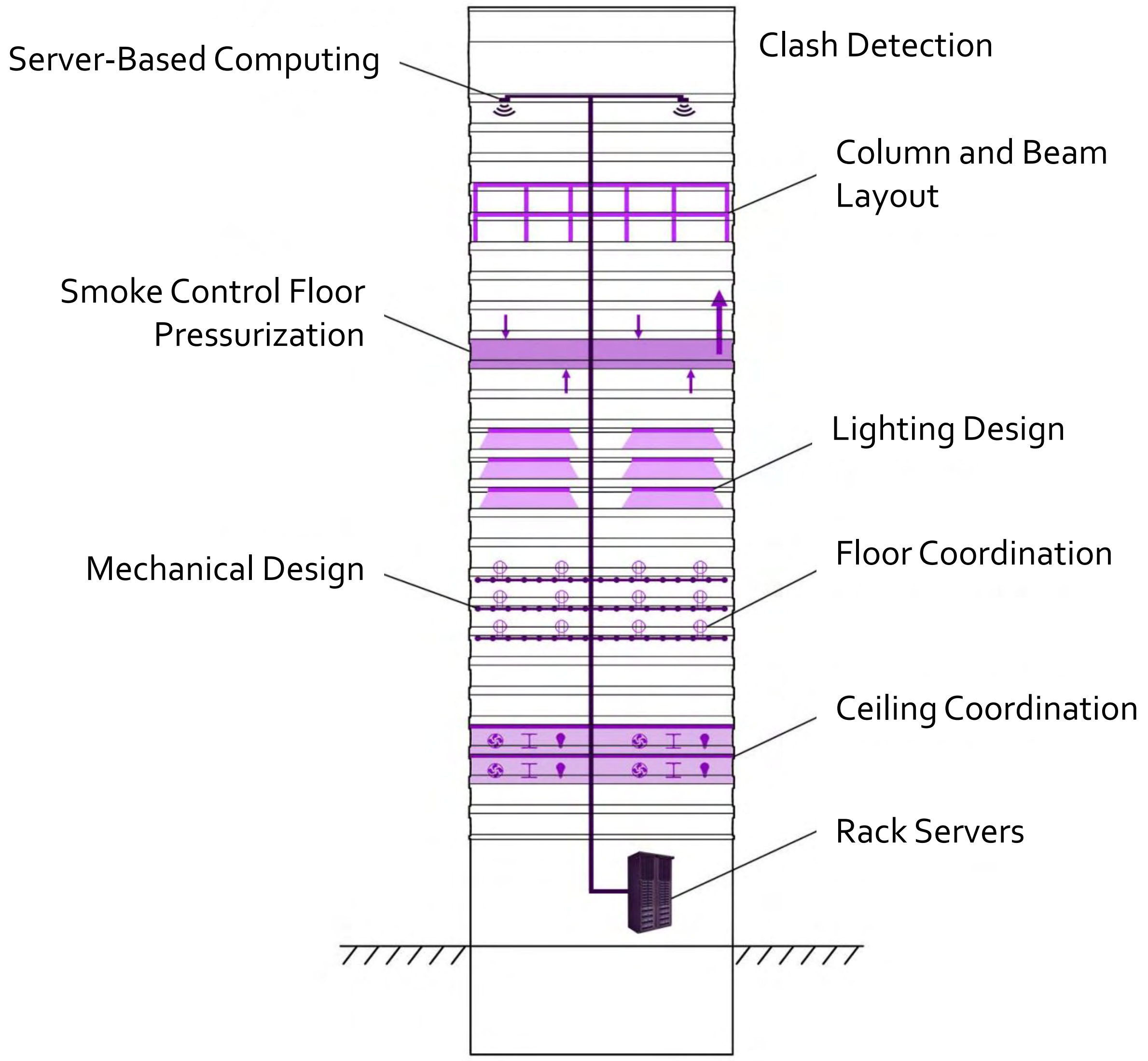



Column and Beam Layout
Smoke Control Floor Pressurization
Lighting Design
Mechanical Design
Floor Coordination
Ceiling Coordination

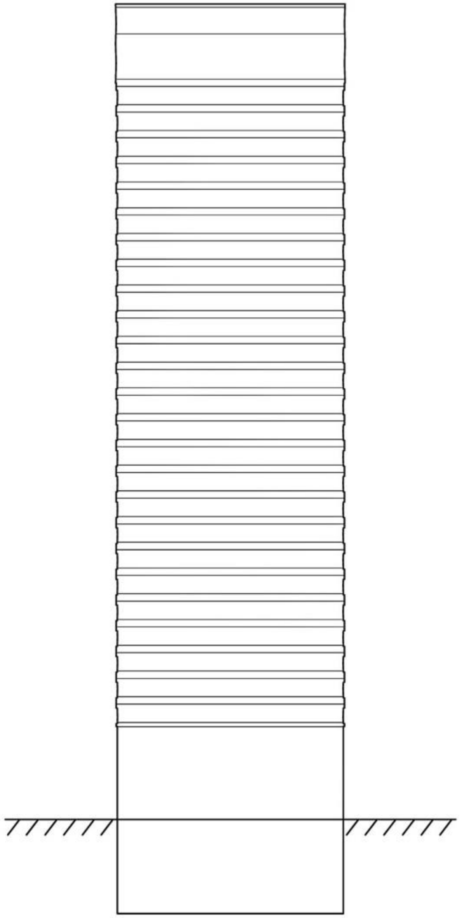
OFFICE FLOOR SCHEMATIC OVERVIEW

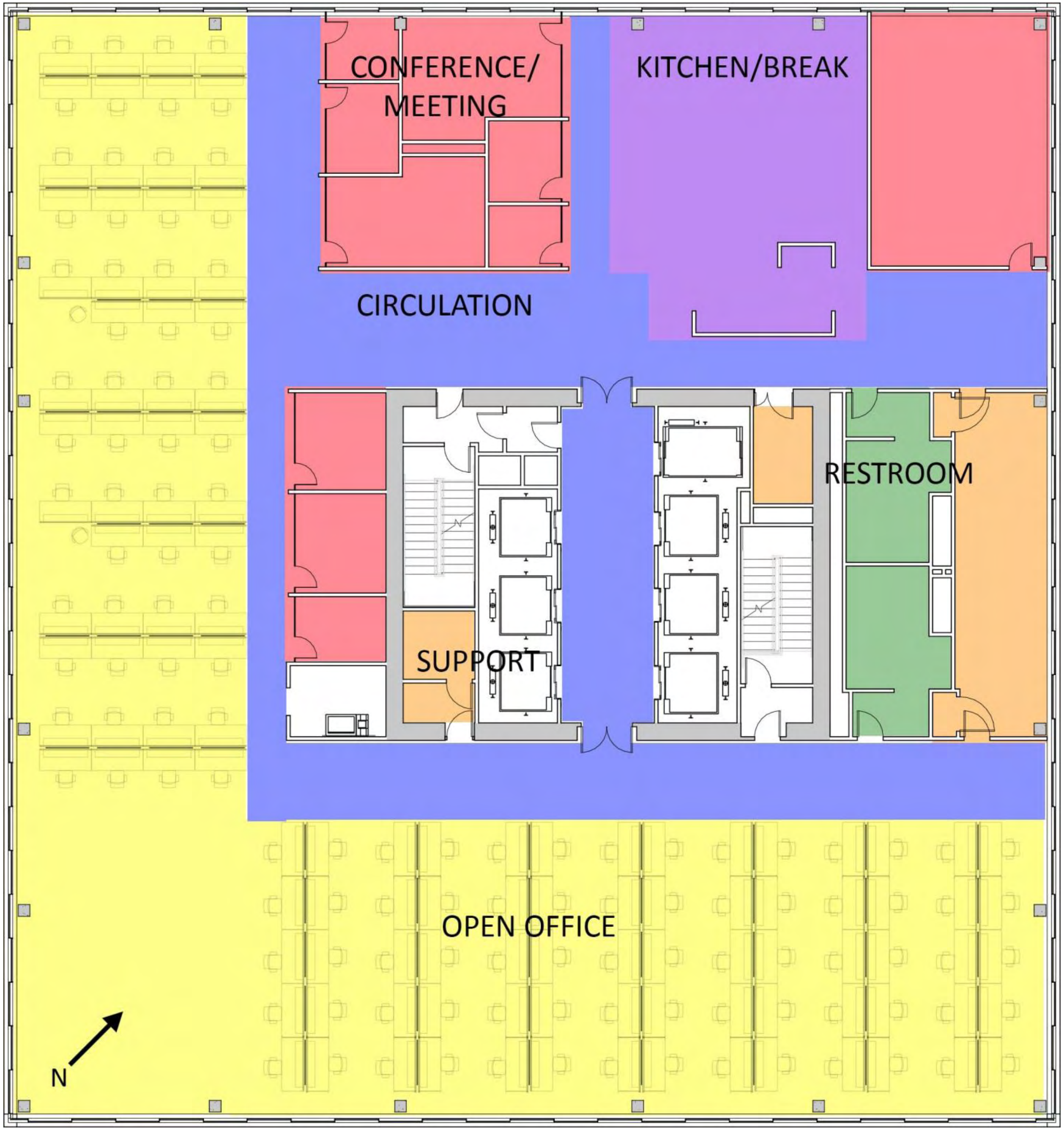


OFFICE FLOOR SCHEMATIC OVERVIEW

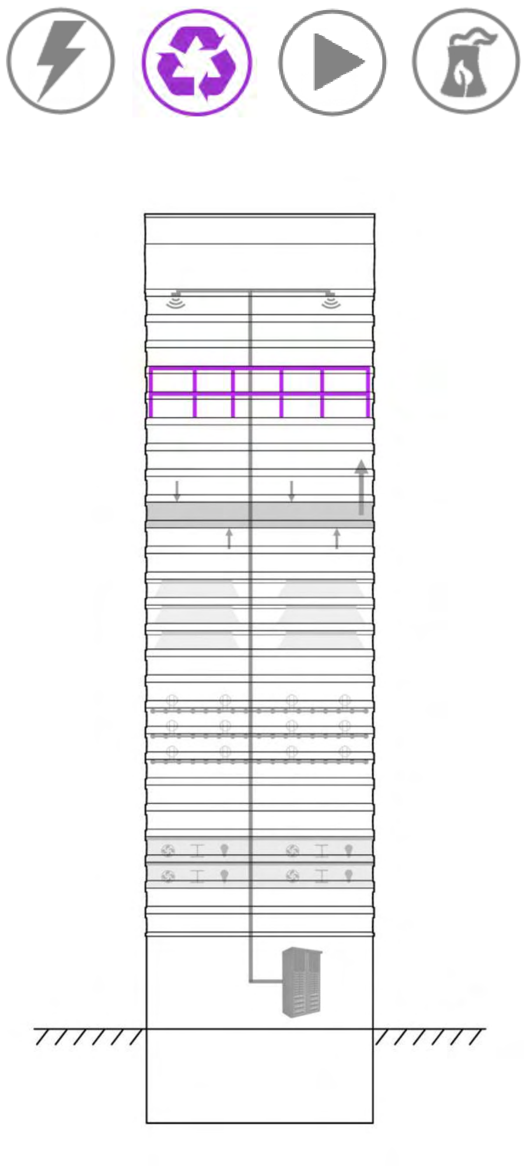


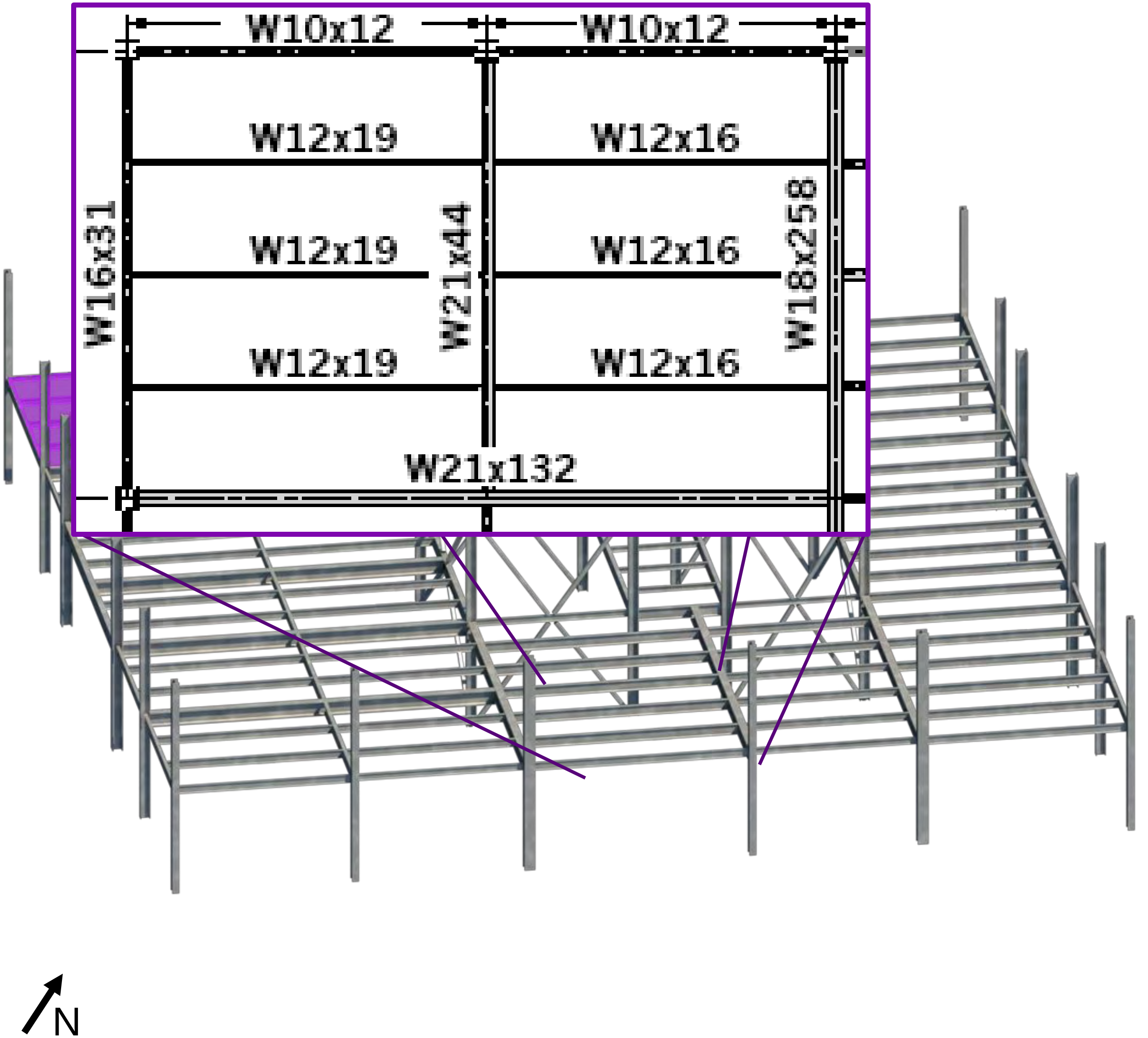
SPACE ALLOCATION





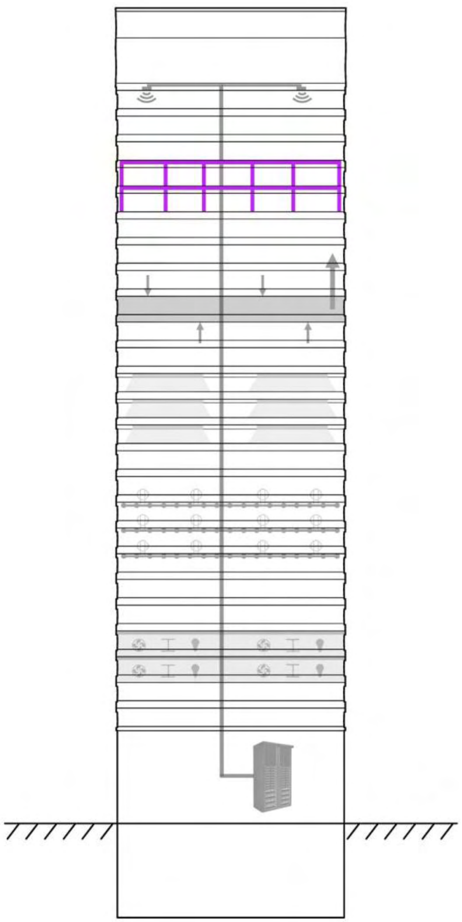
BEAM LAYOUT

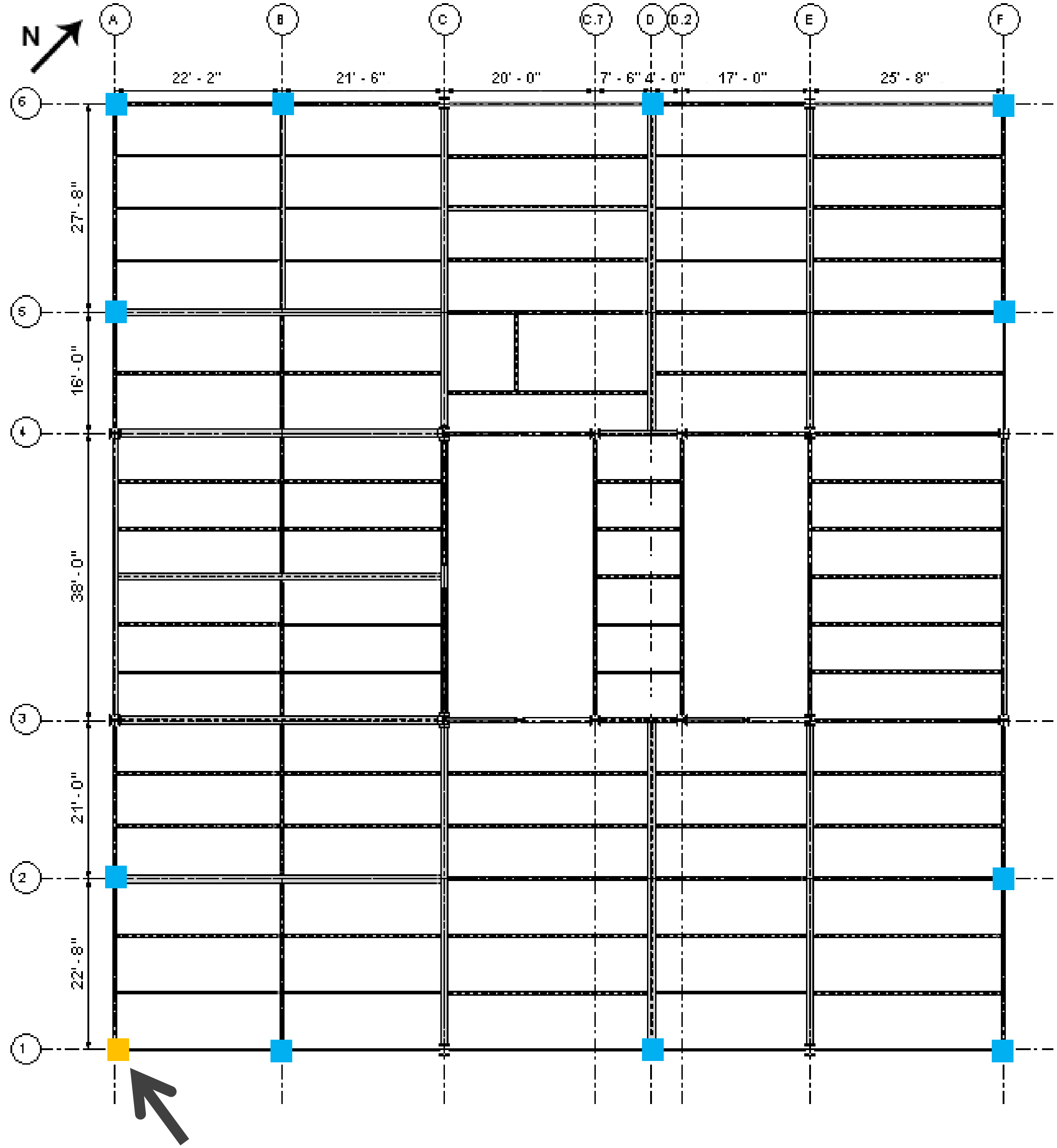




W10x12
W10x12
W12x19
W12x16
W12x19
W12x16
W12x19
W12x16
W16x31
W21x44
W18x258
W21x132
N

GRAVITY COLUMNS





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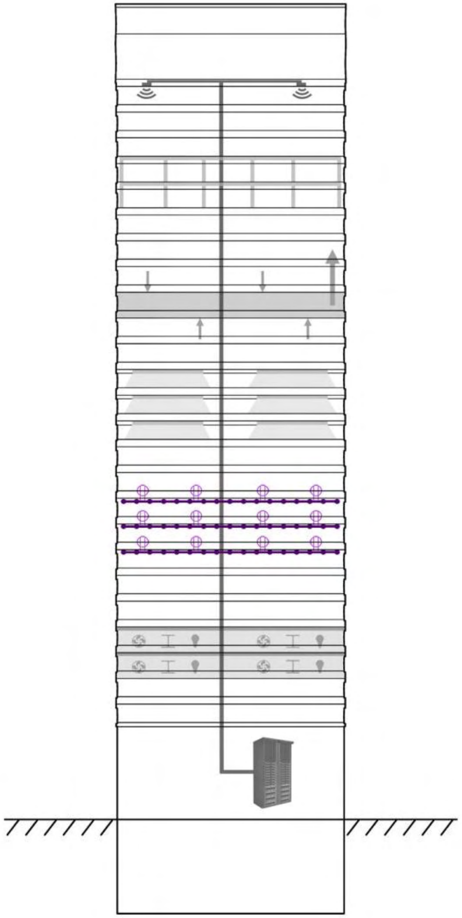

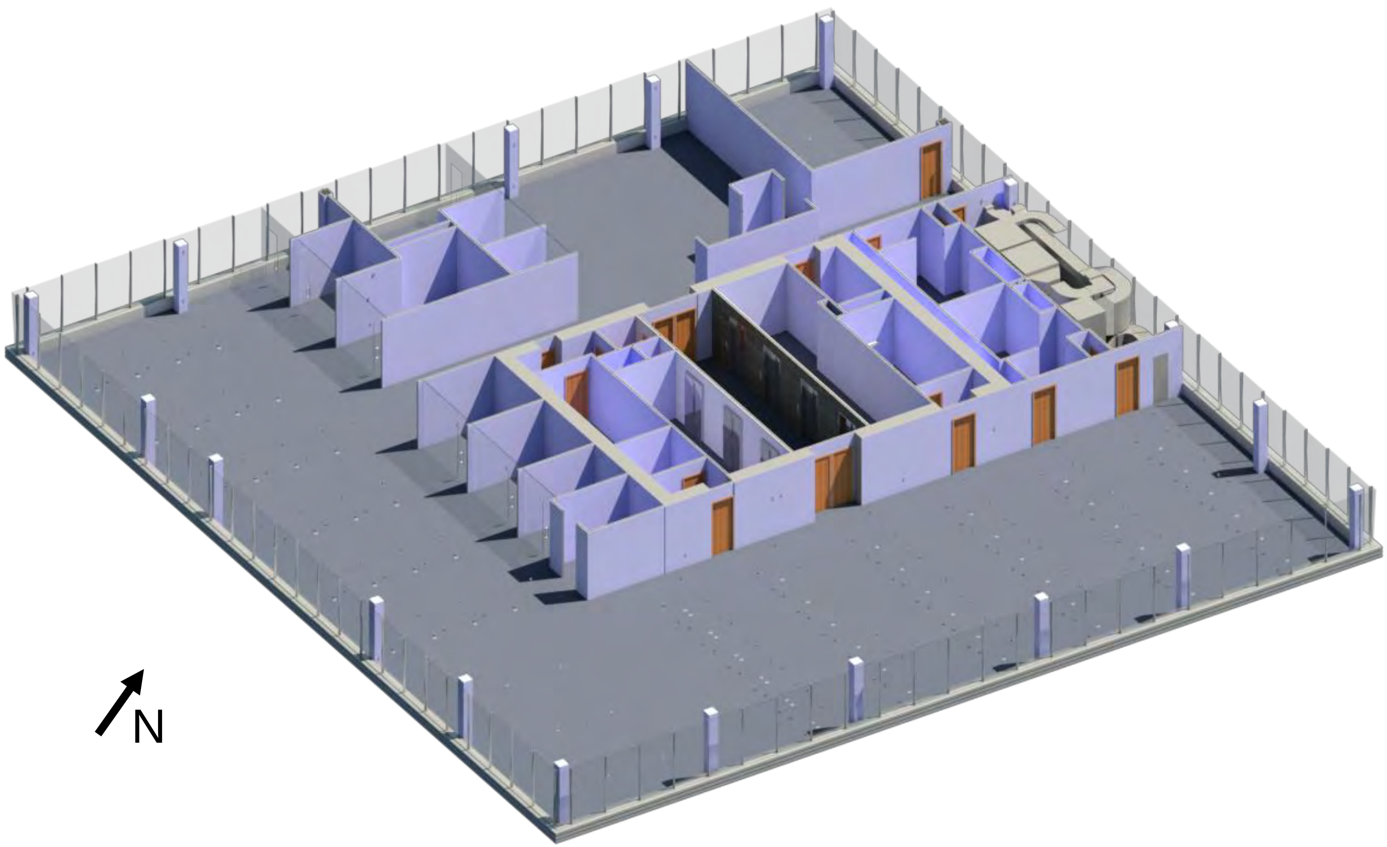

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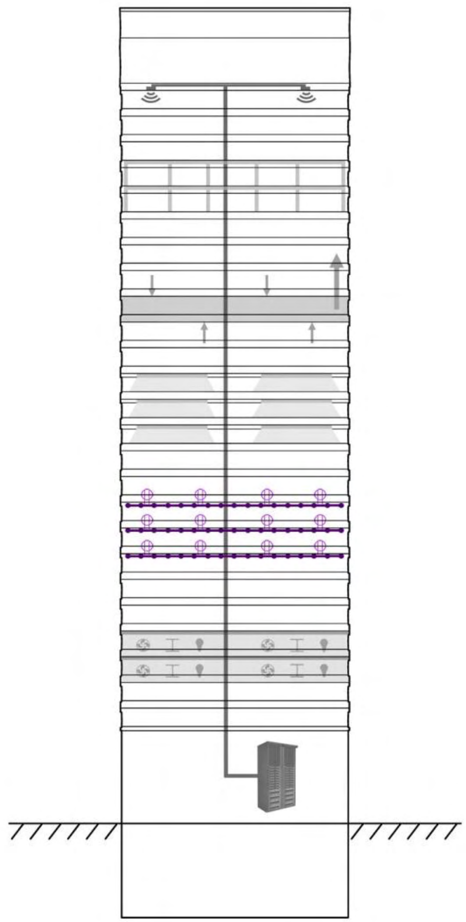

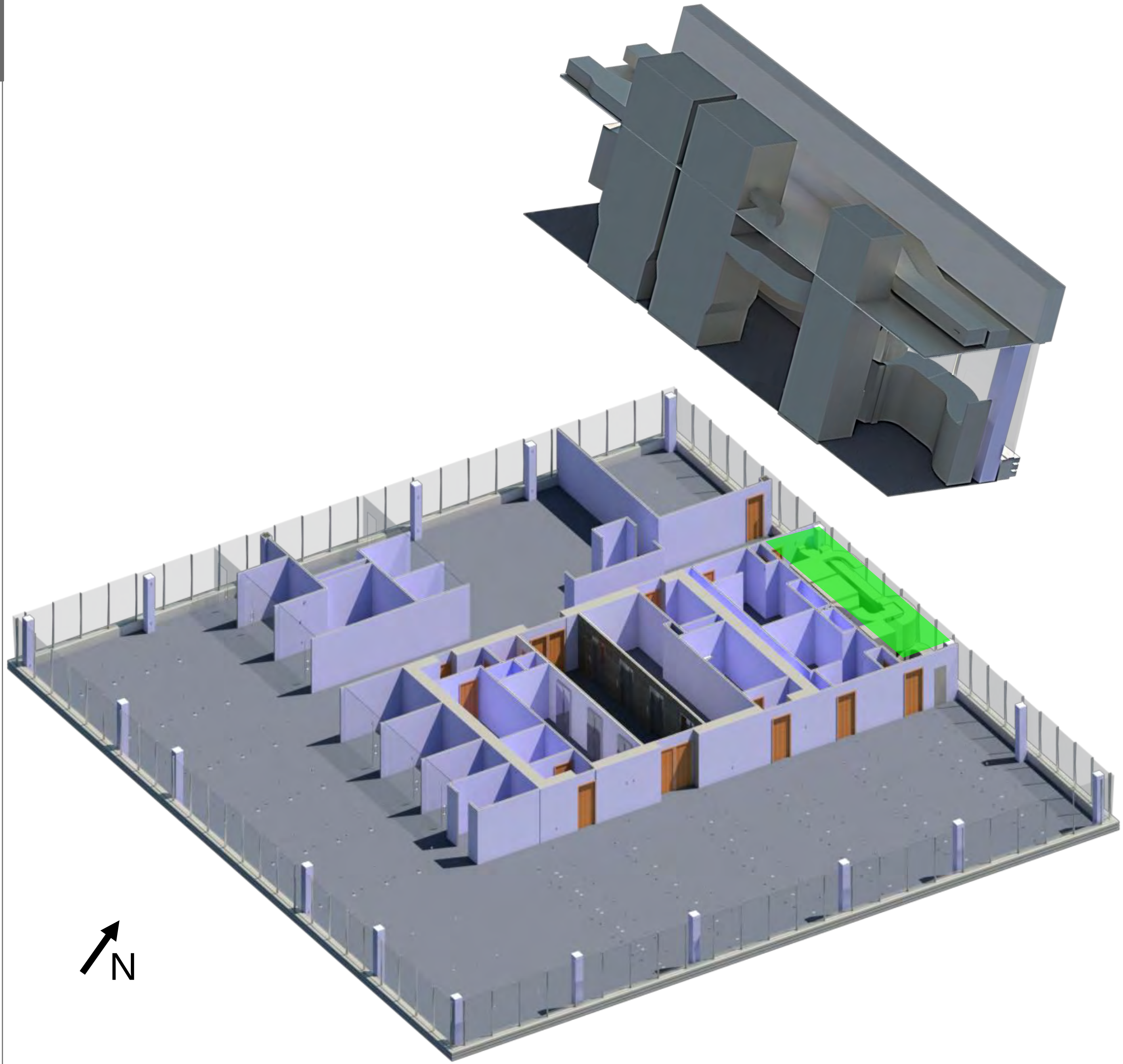

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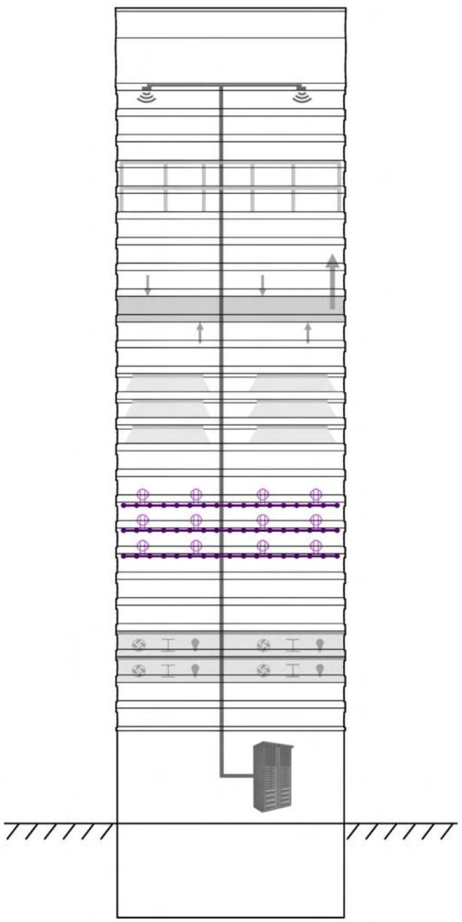
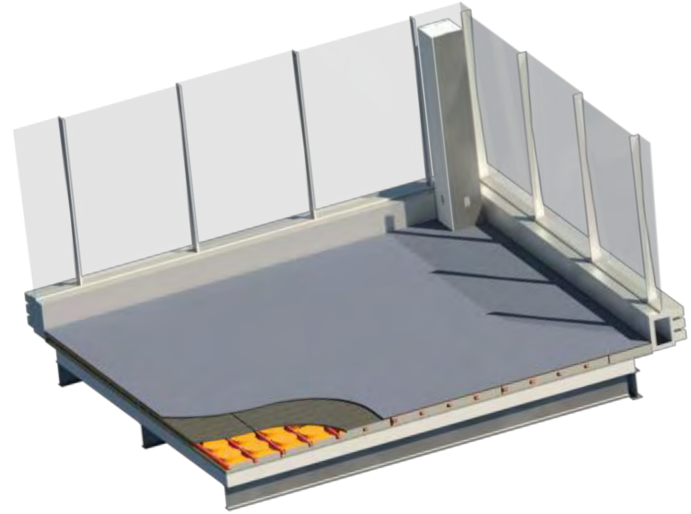
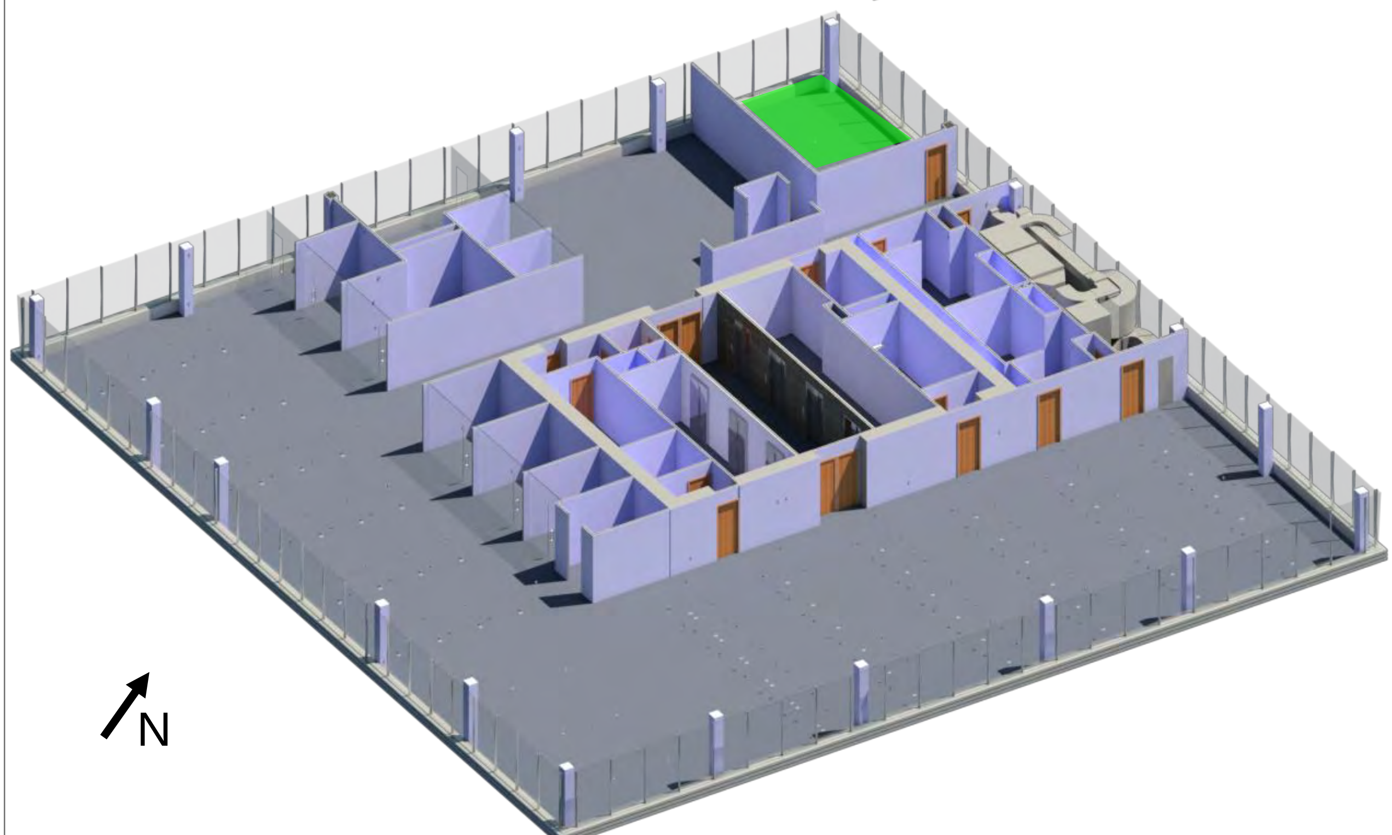
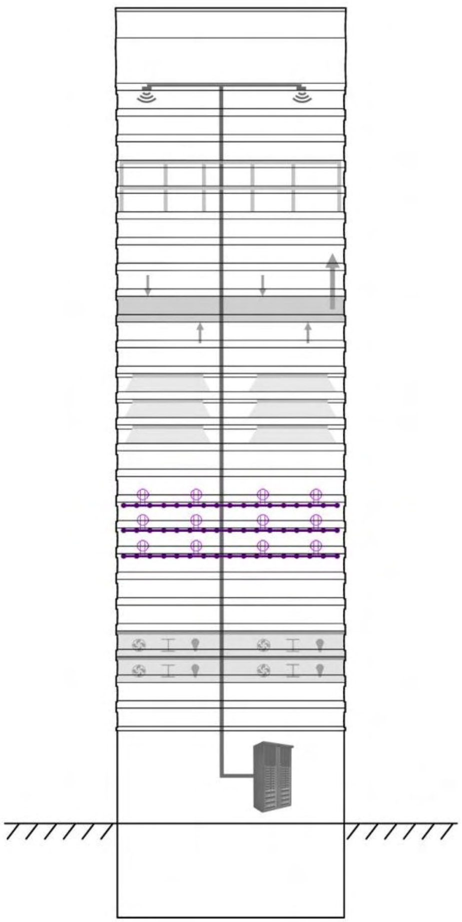
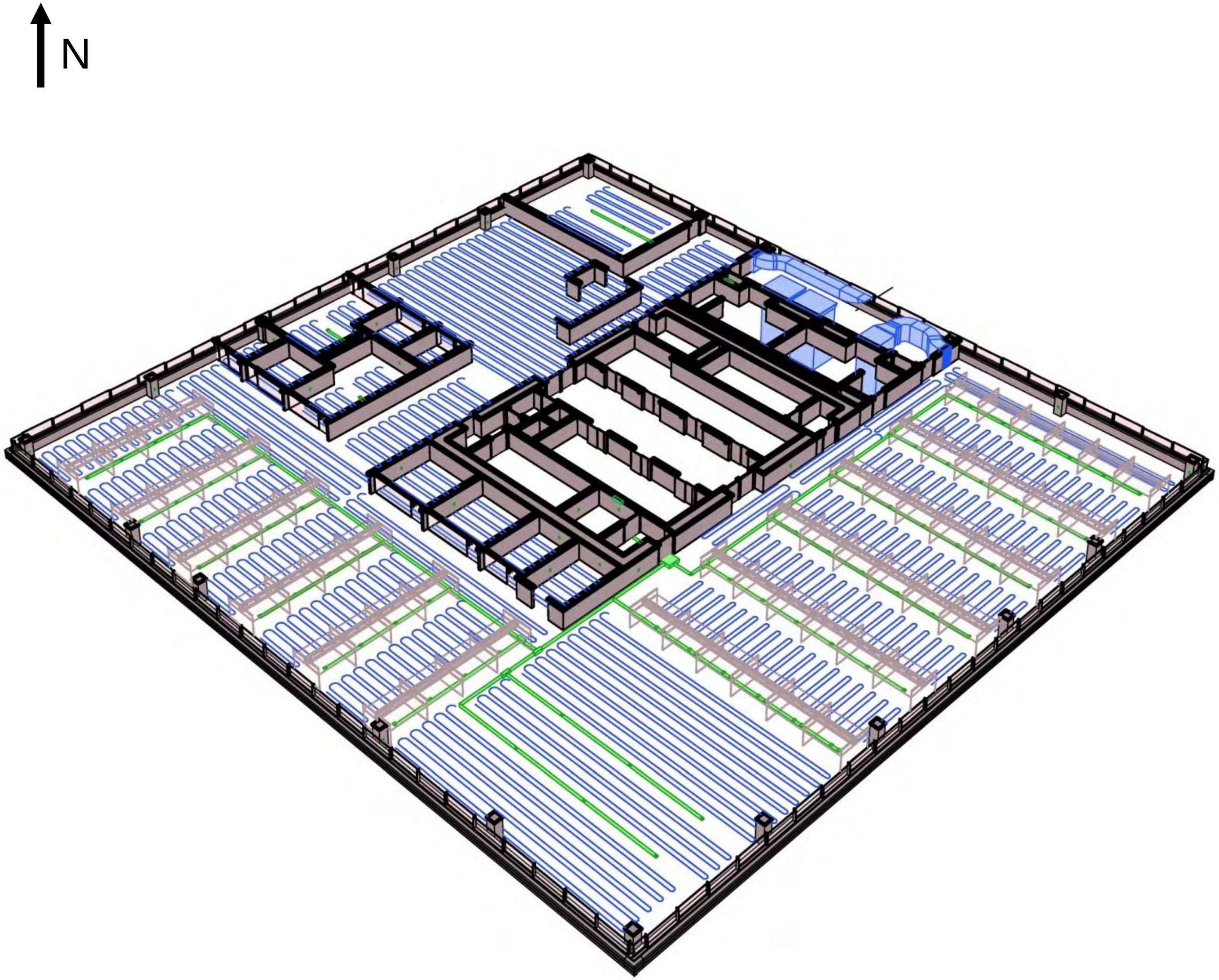




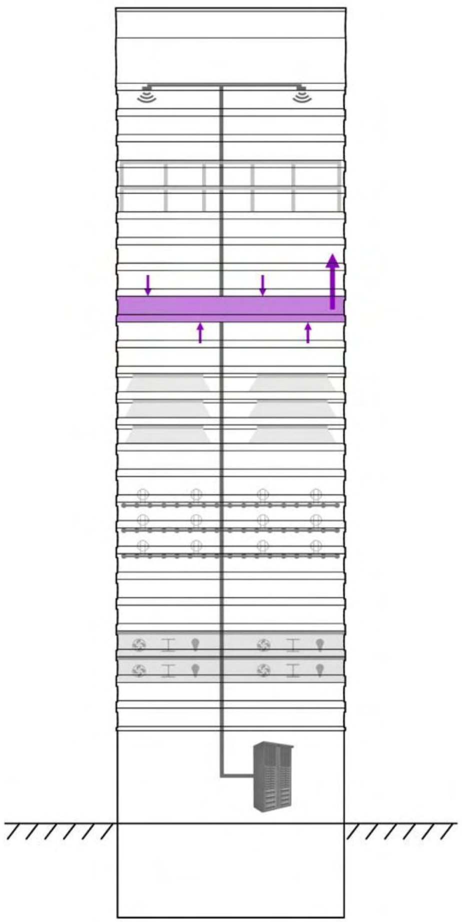


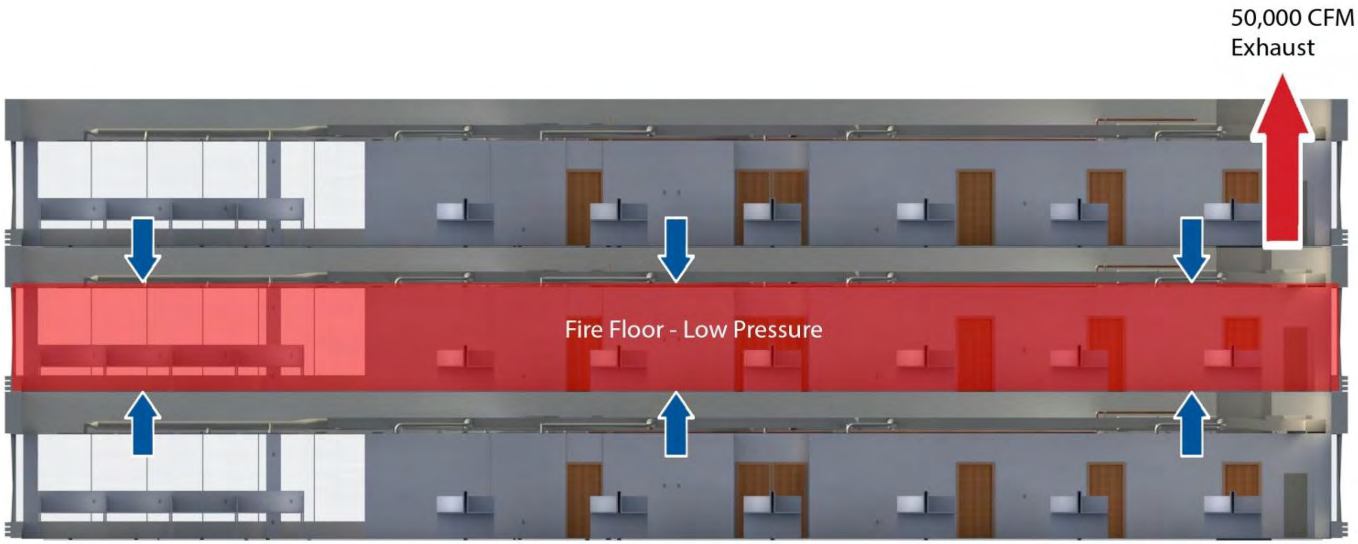
COORDINATION



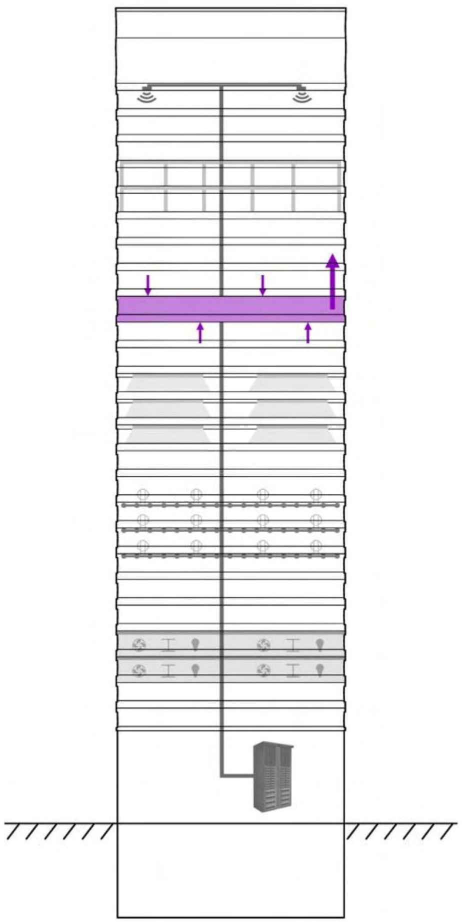


SMOKE CONTROL

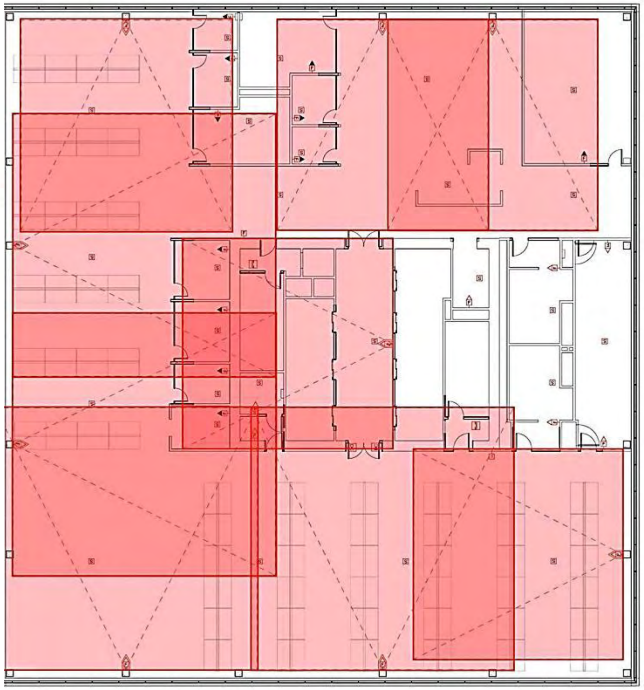




SMOKE CONTROL

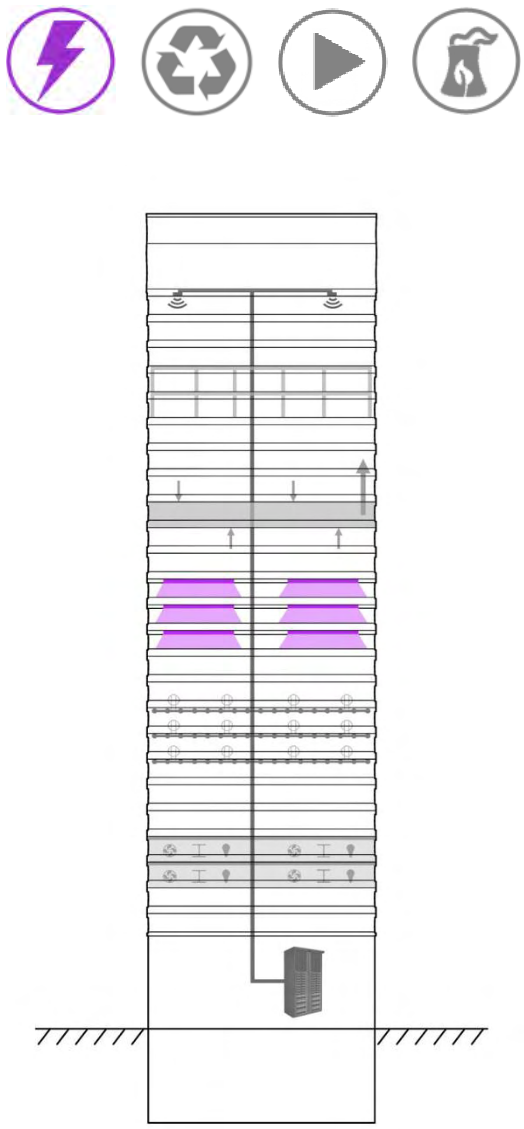


Corridor and Open Office
Smoke Detector Coverage



Corridor and Open Office
Fire Alarm Coverage

LIGHTING DESIGN



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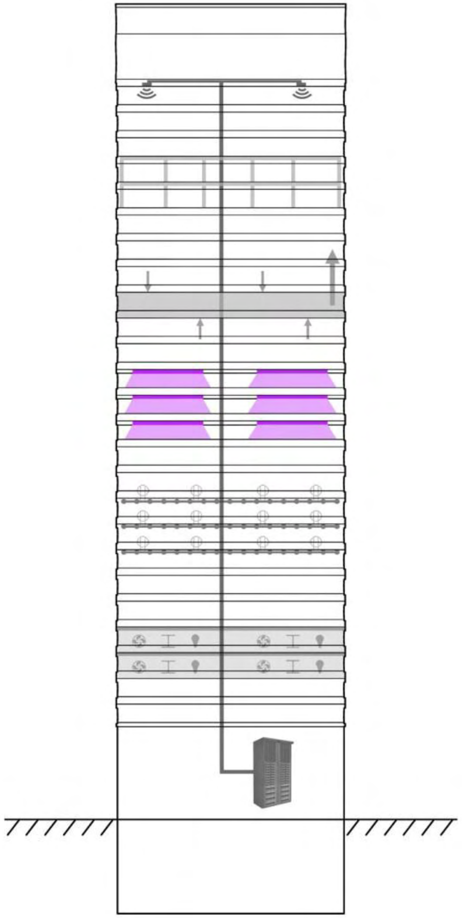

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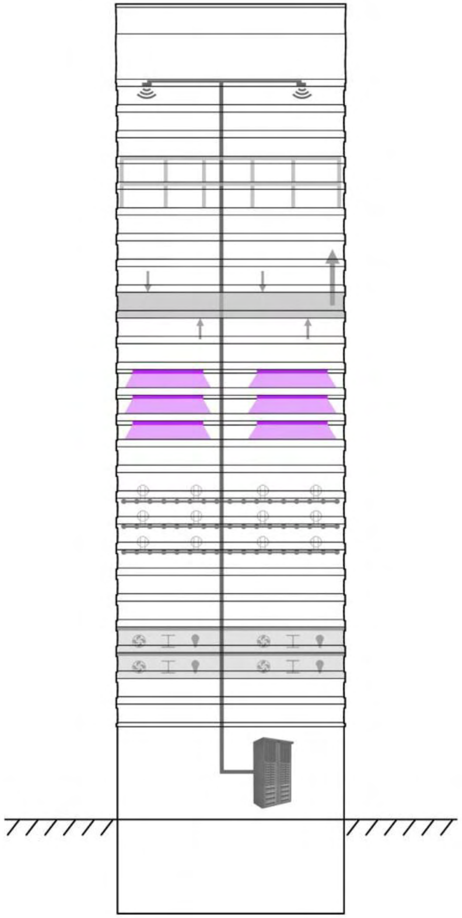

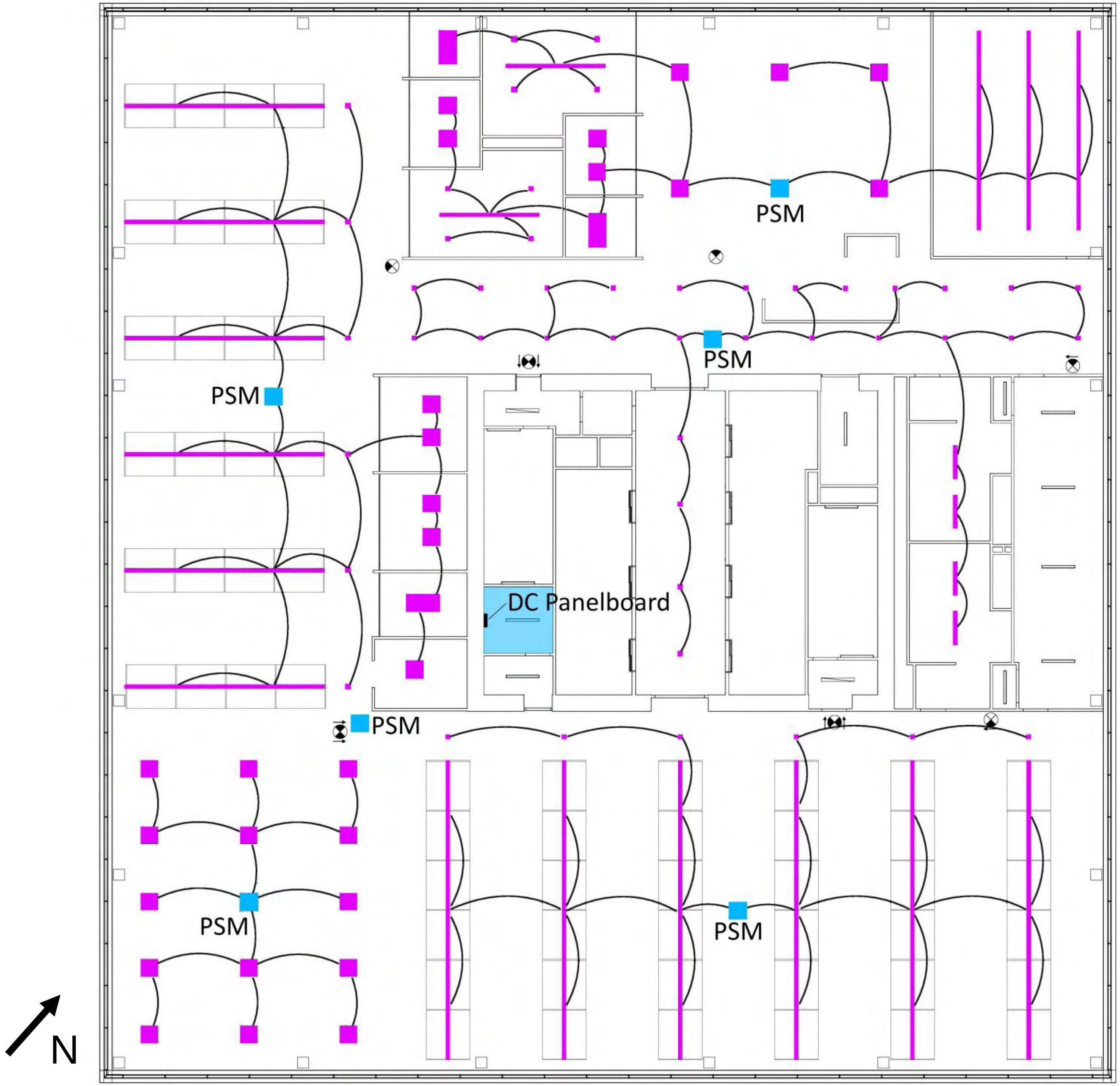

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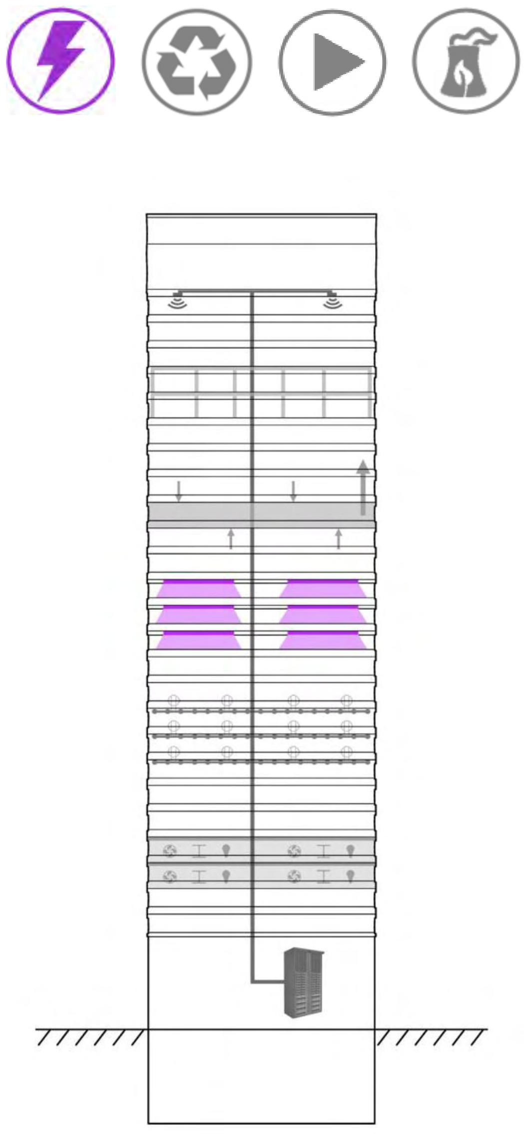

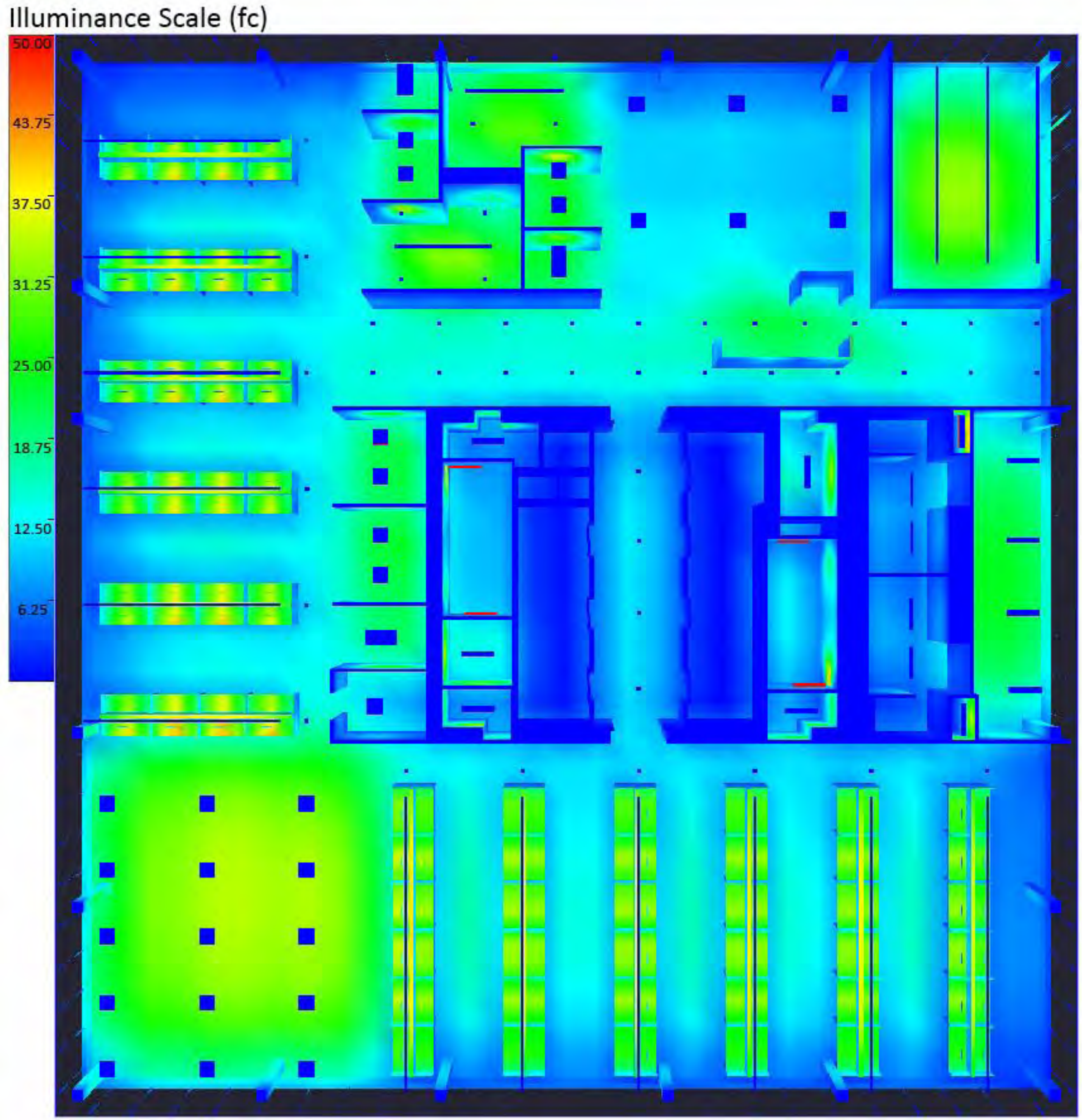

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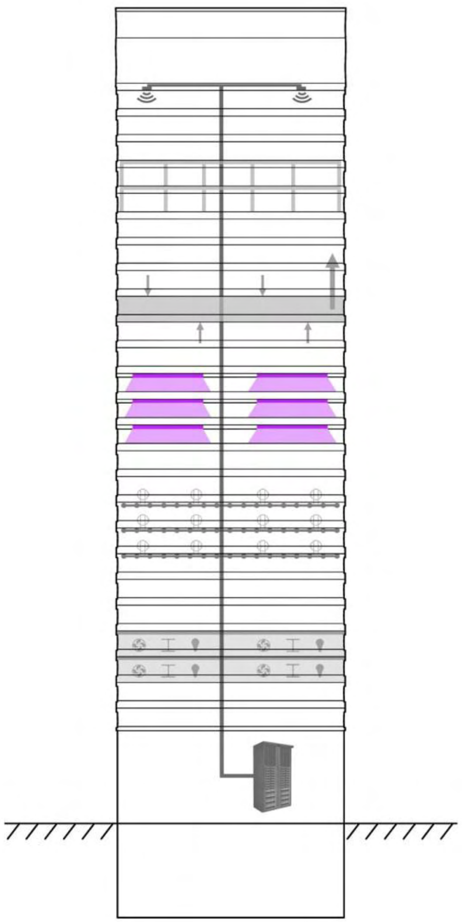
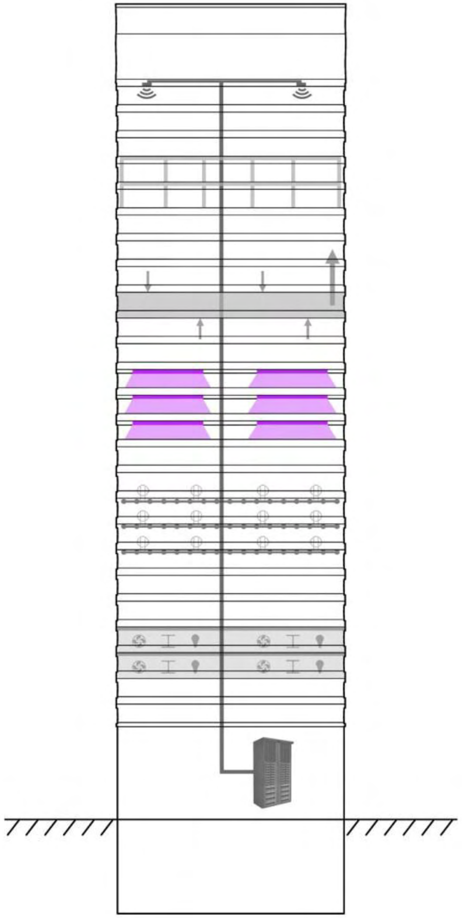


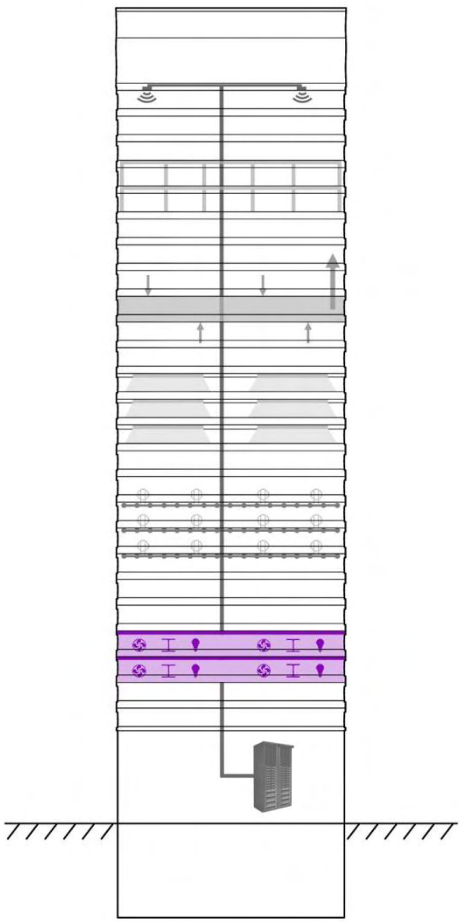
BUILDING SYSTEMS

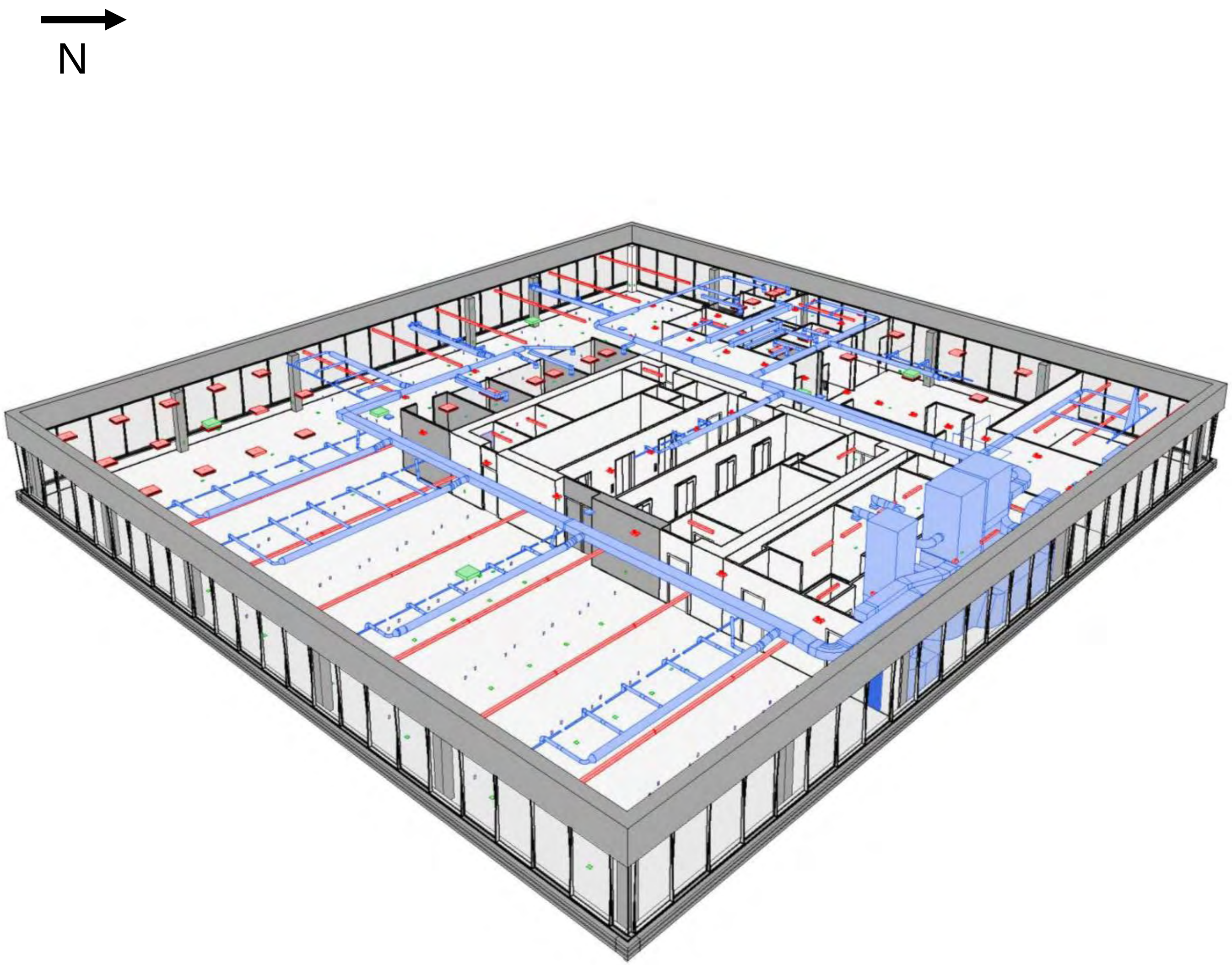
ENERGY&POWER–SUBSTRUCTURE–SUPERSTRUCTURE–LOBBY –FAÇADE –**OFFICE FLOOR**

LIGHTING DESIGN

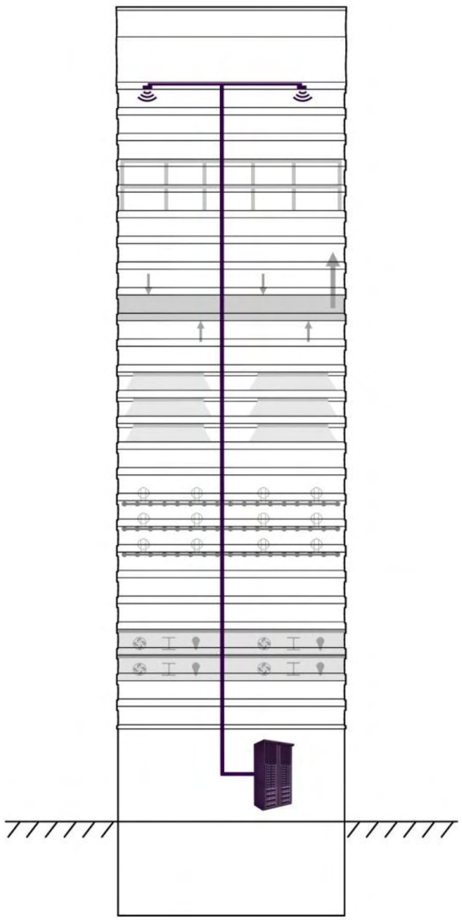


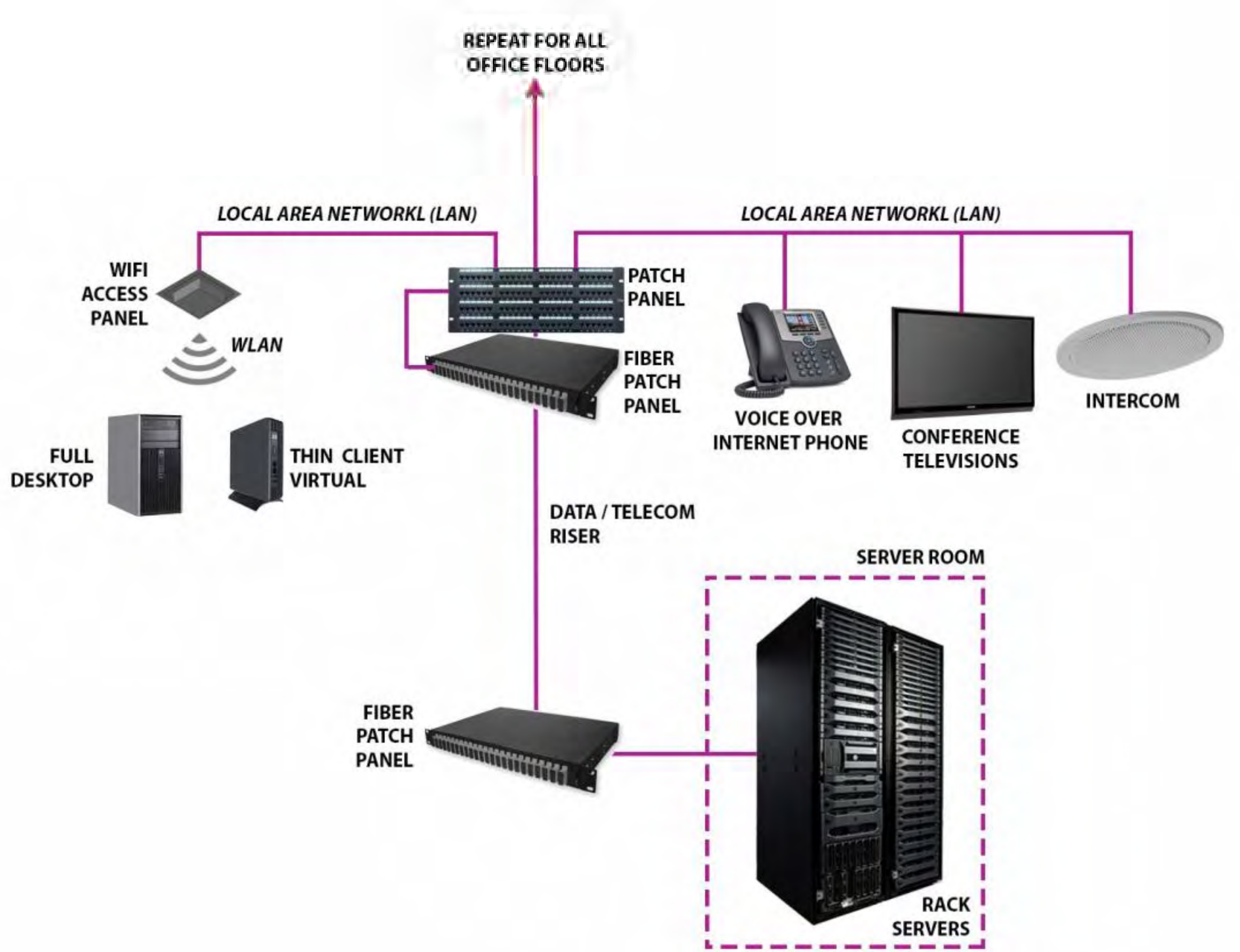
COORDINATION





SERVER ROOM




REPEAT FOR ALL
OFFICE FLOORS
LOCAL AREA NETWORKL (LAN)
LOCAL AREA NETWORKL (LAN)
WIFI
ACCESS
PANEL
WLAN
PATCH
PANEL
FIBER
PATCH
PANEL
VOICE OVER
INTERNET PHONE
CONFERENCE
TELEVISIONS
INTERCOM
FULL
DESKTOP
THIN CLIENT
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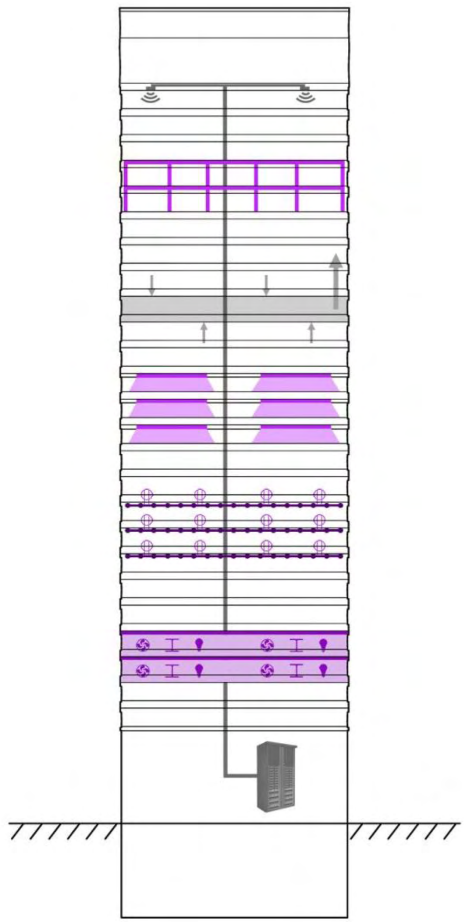
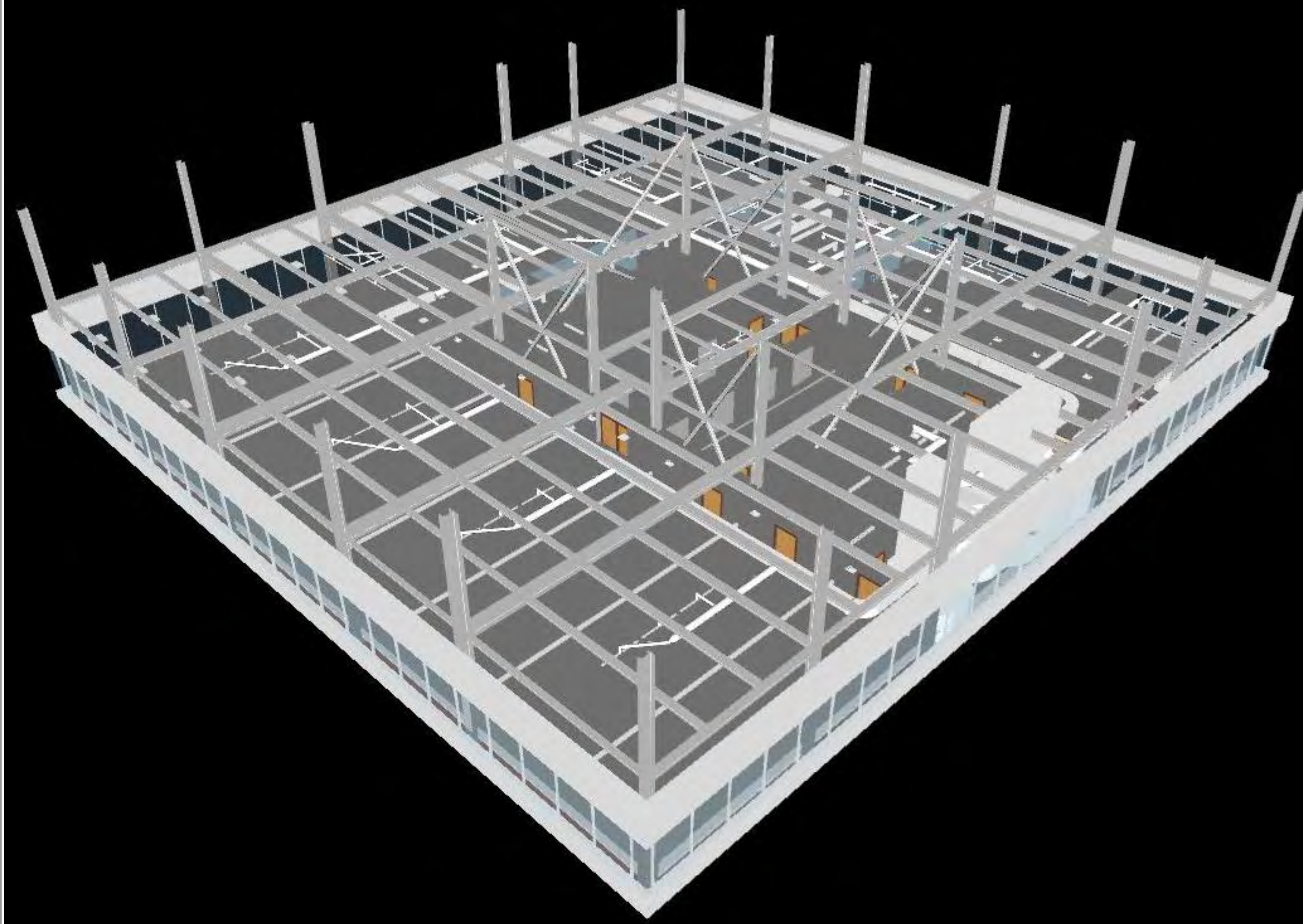
DATA / TELECOM
RISER
SERVER ROOM
FIBER
PATCH
PANEL
RACK
SERVERS

CLASH DETECTION

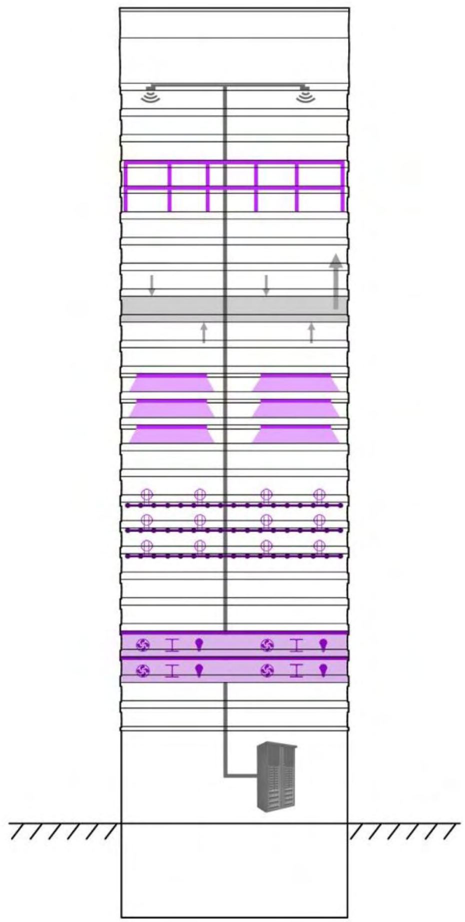


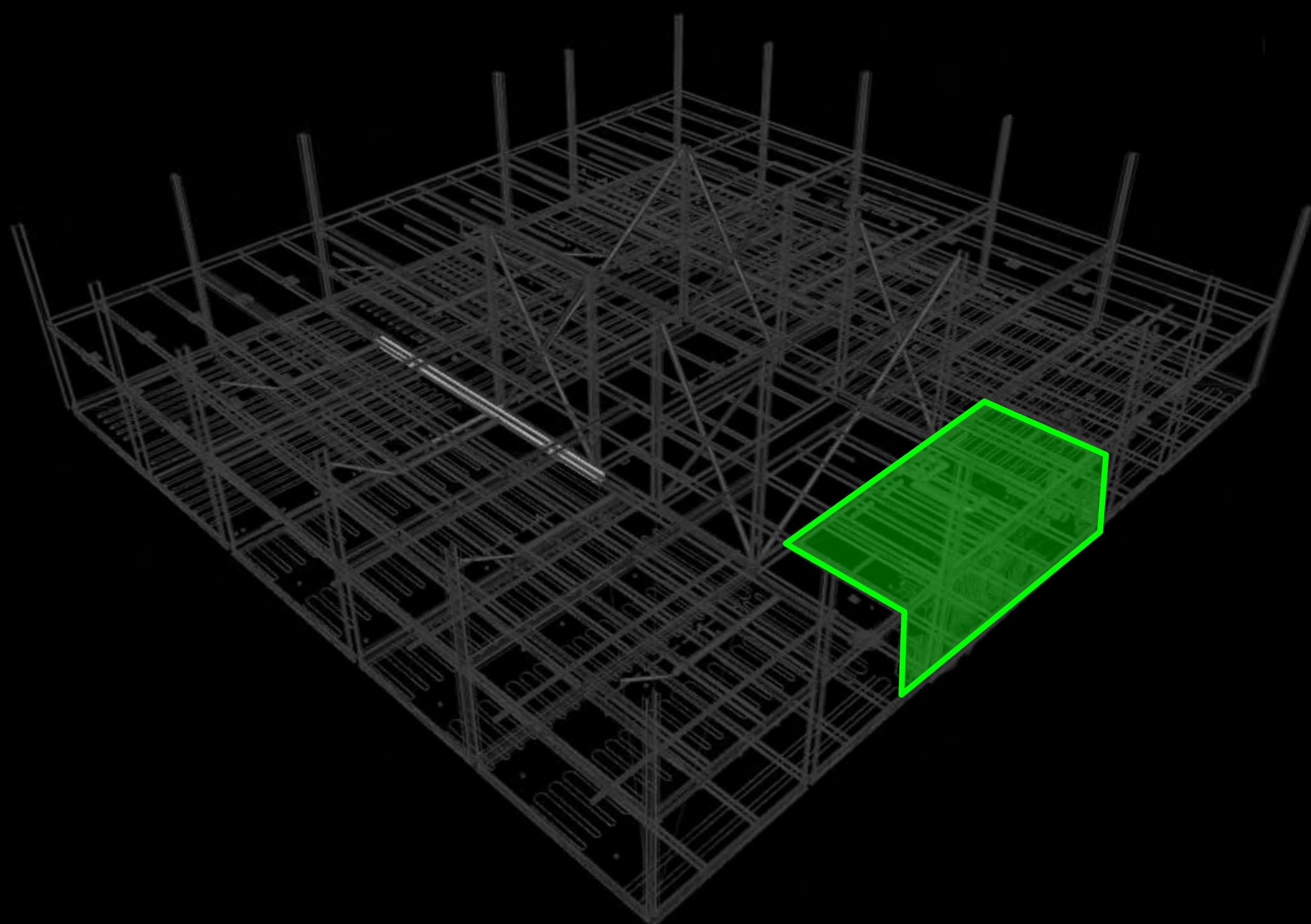


BUILDING SYSTEMS

ENERGY&POWER–SUBSTRUCTURE–SUPERSTRUCTURE–LOBBY –FAÇADE –**OFFICE FLOOR**

CLASH DETECTION

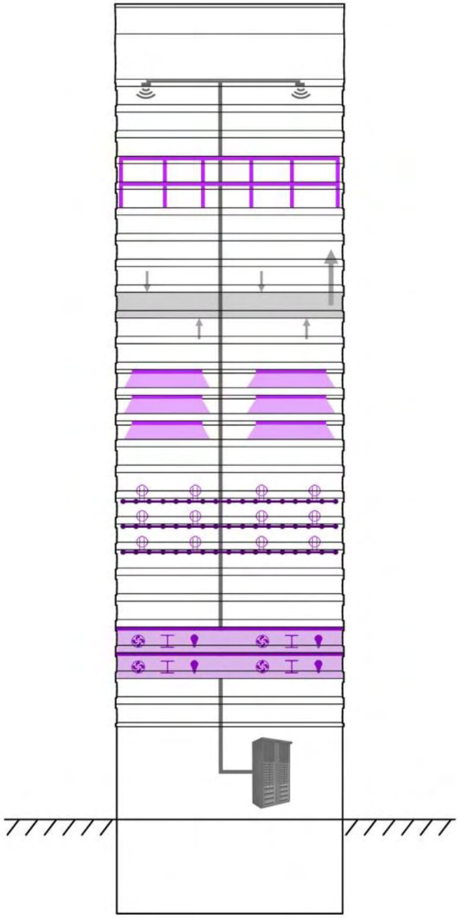




BUILDING SYSTEMS

ENERGY&POWER–SUBSTRUCTURE–SUPERSTRUCTURE–LOBBY –FAÇADE –**OFFICE FLOOR**

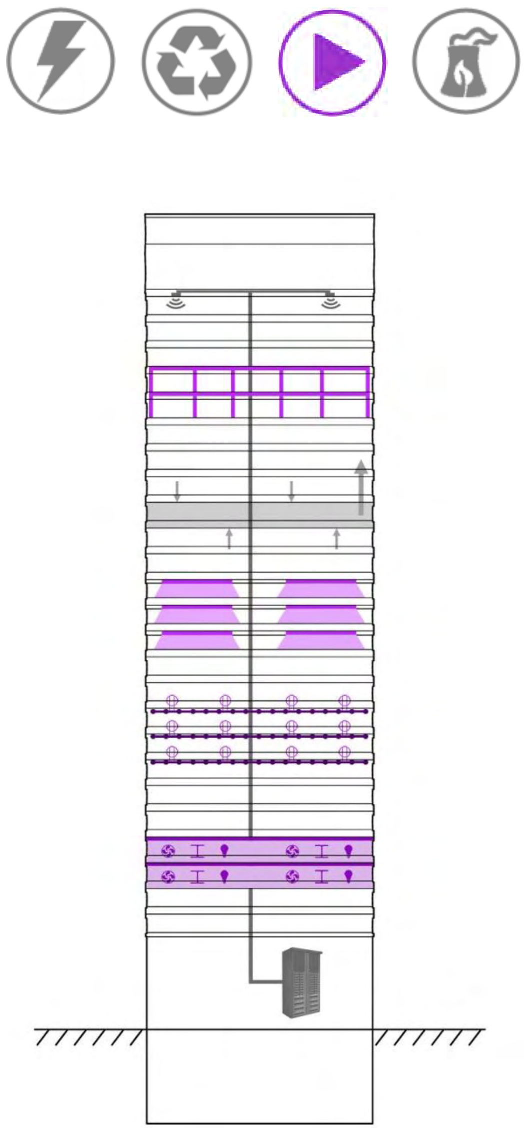
CLASH DETECTION



BUILDING SYSTEMS

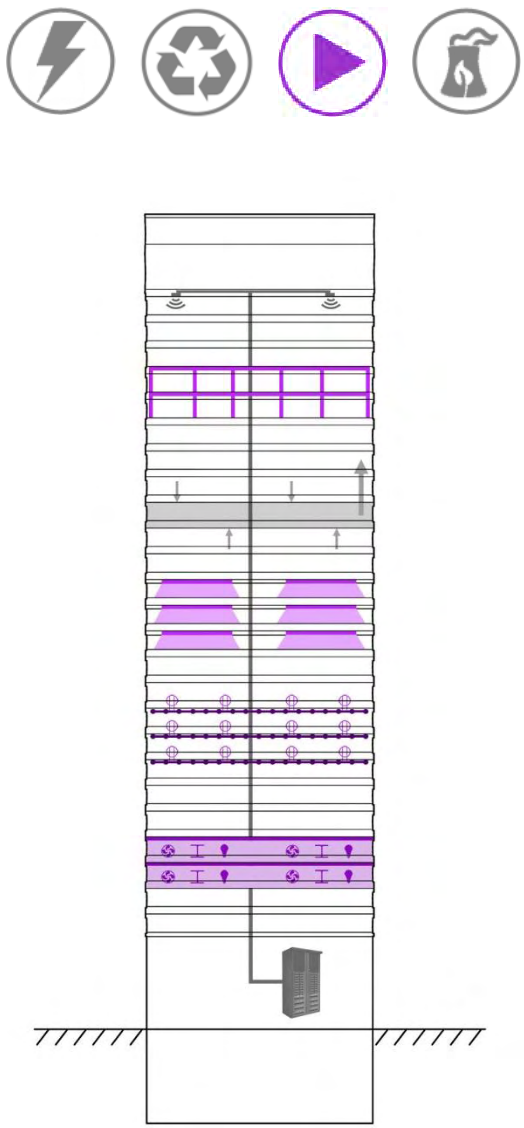
ENERGY&POWER–SUBSTRUCTURE–SUPERSTRUCTURE–LOBBY –FAÇADE –**OFFICE FLOOR**

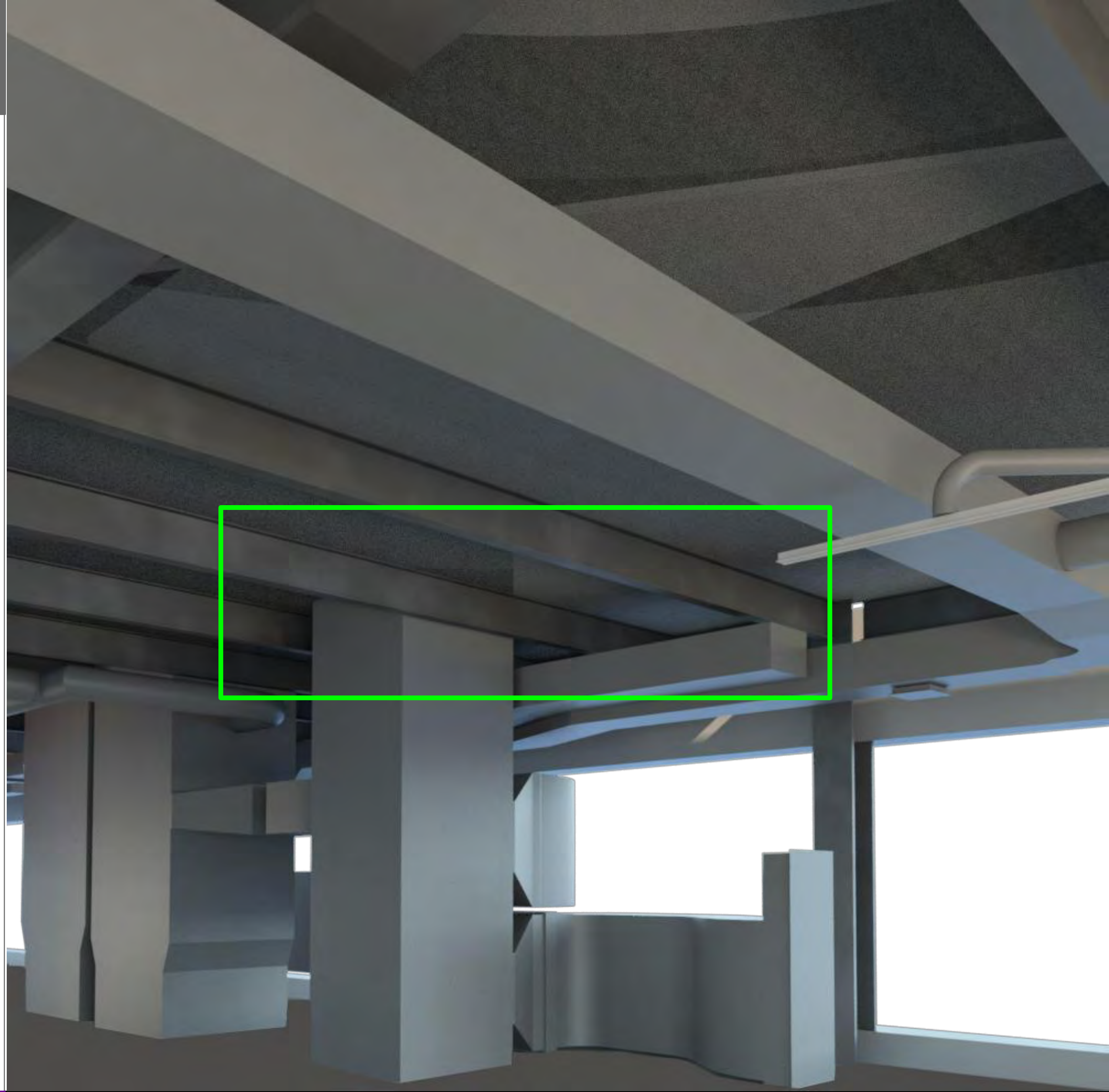
CLASH DETECTION



BUILDING SYSTEMS

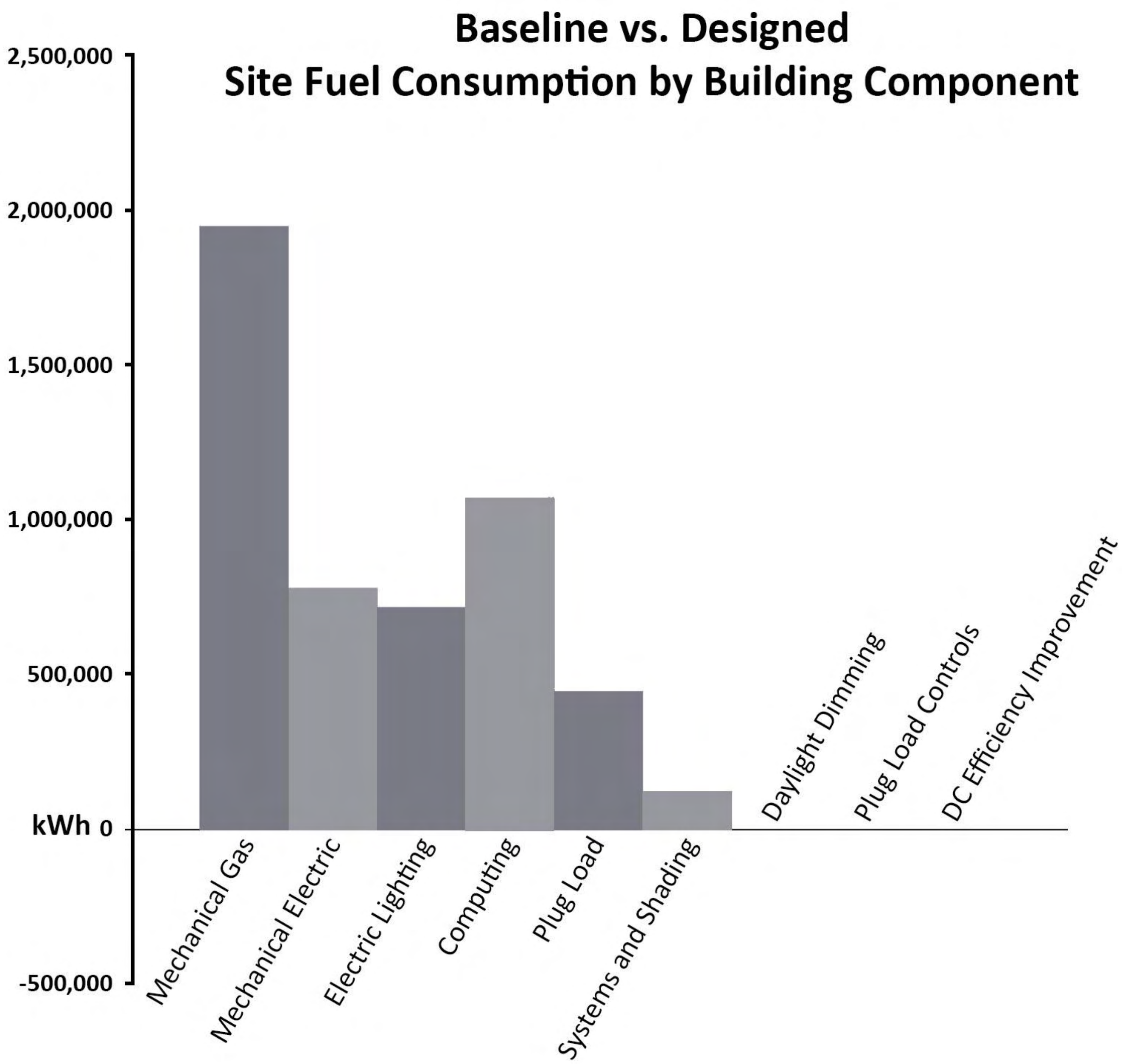
CLASH DETECTION

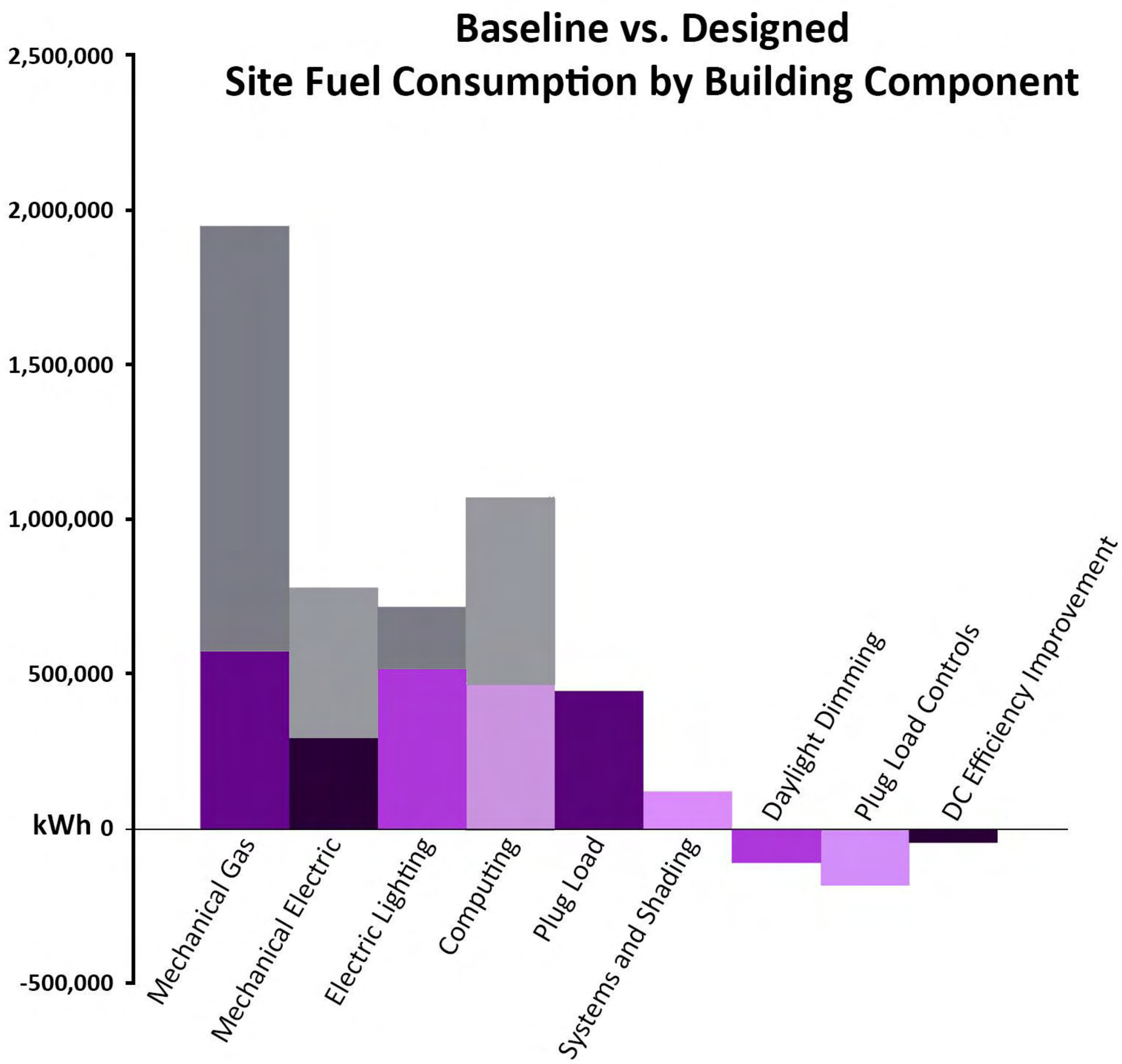


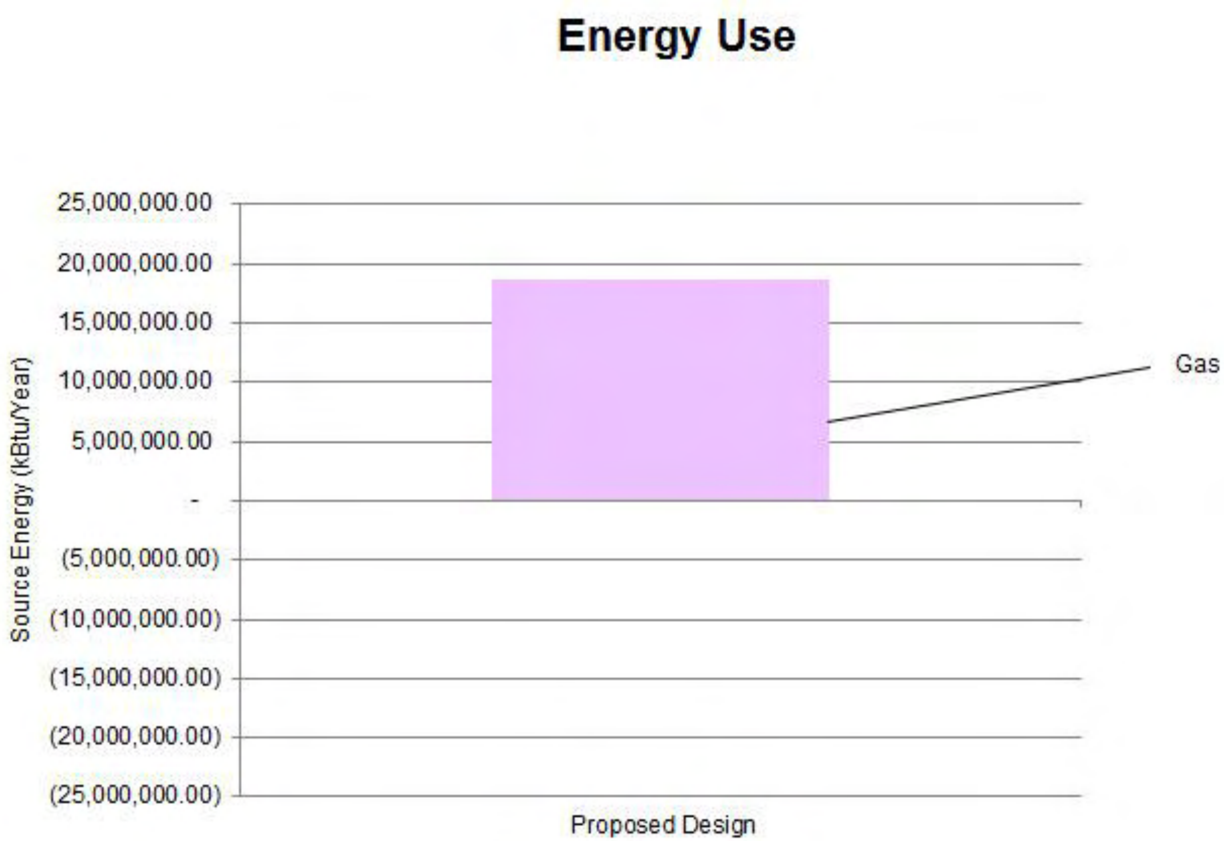


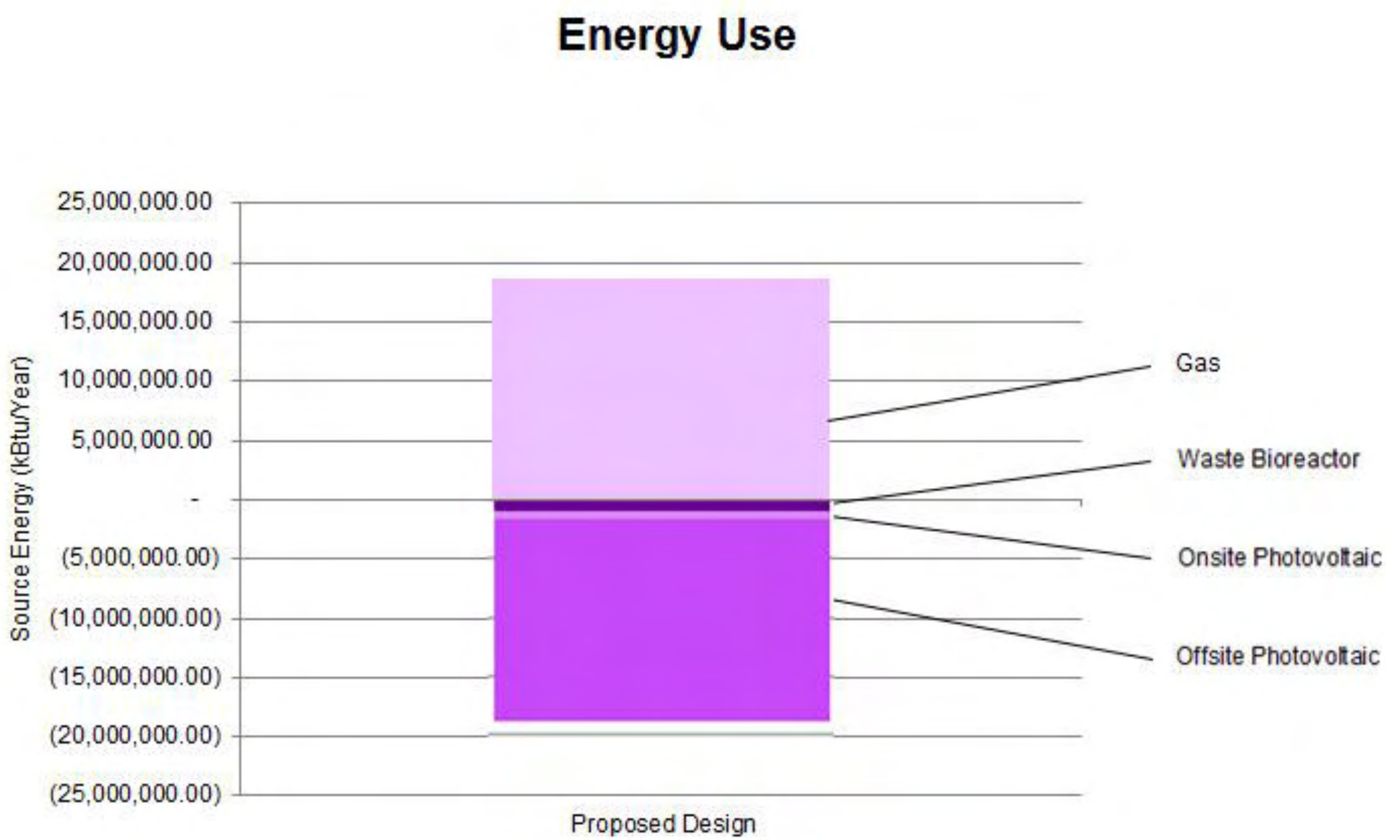
BUILDING SYSTEMS

ENERGY&POWER–SUBSTRUCTURE–SUPERSTRUCTURE–LOBBY –FAÇADE –**OFFICE FLOOR**

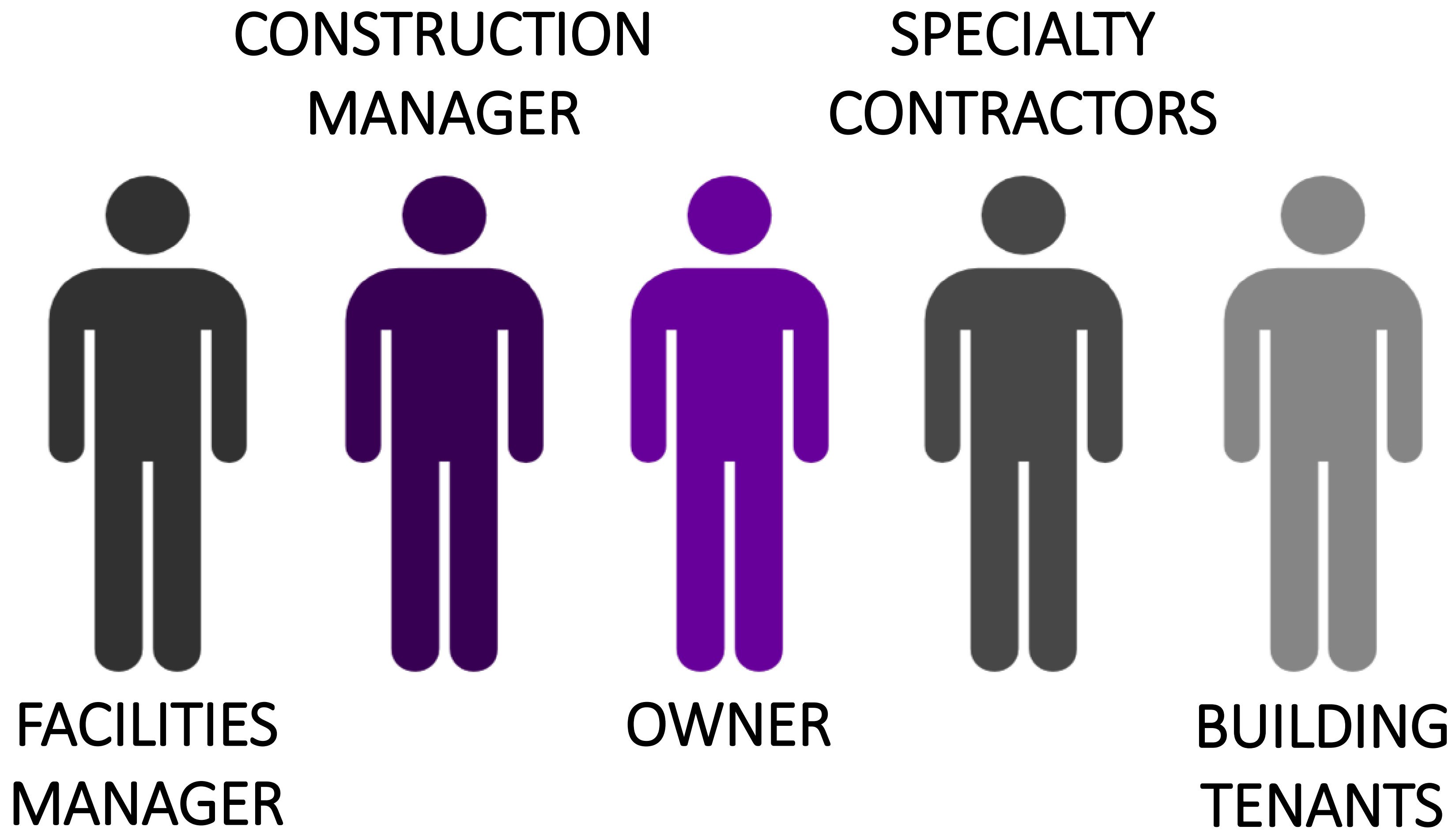

Baseline vs. Designed
Site Fuel Consumption by Building Component
2,500,000
2,000,000
1,500,000
1,000,000
500,000
kWh 0
-500,000
Mechanical Gas
Mechanical Electric
Electric Lighting
Computing
Plug Load
Systems and Shading
Daylight Dimming
Plug Load Controls
DC Efficiency Improvement

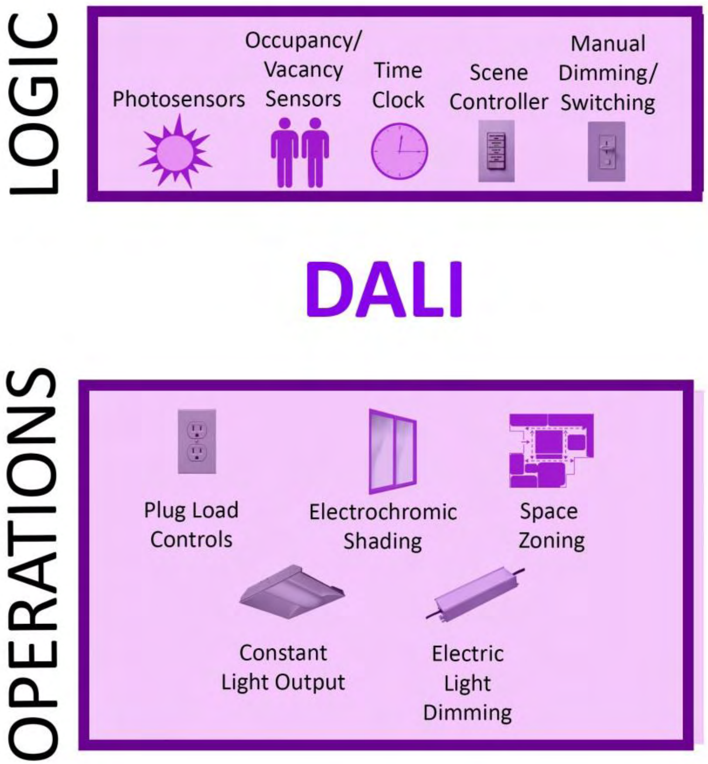

Baseline vs. Designed
Site Fuel Consumption by Building Component
2,500,000
2,000,000
1,500,000
1,000,000
500,000
kWh 0
-500,000
Mechanical Gas
Mechanical Electric
Electric Lighting
Computing
Plug Load
Systems and Shading
Daylight Dimming
Plug Load Controls
DC Efficiency Improvement

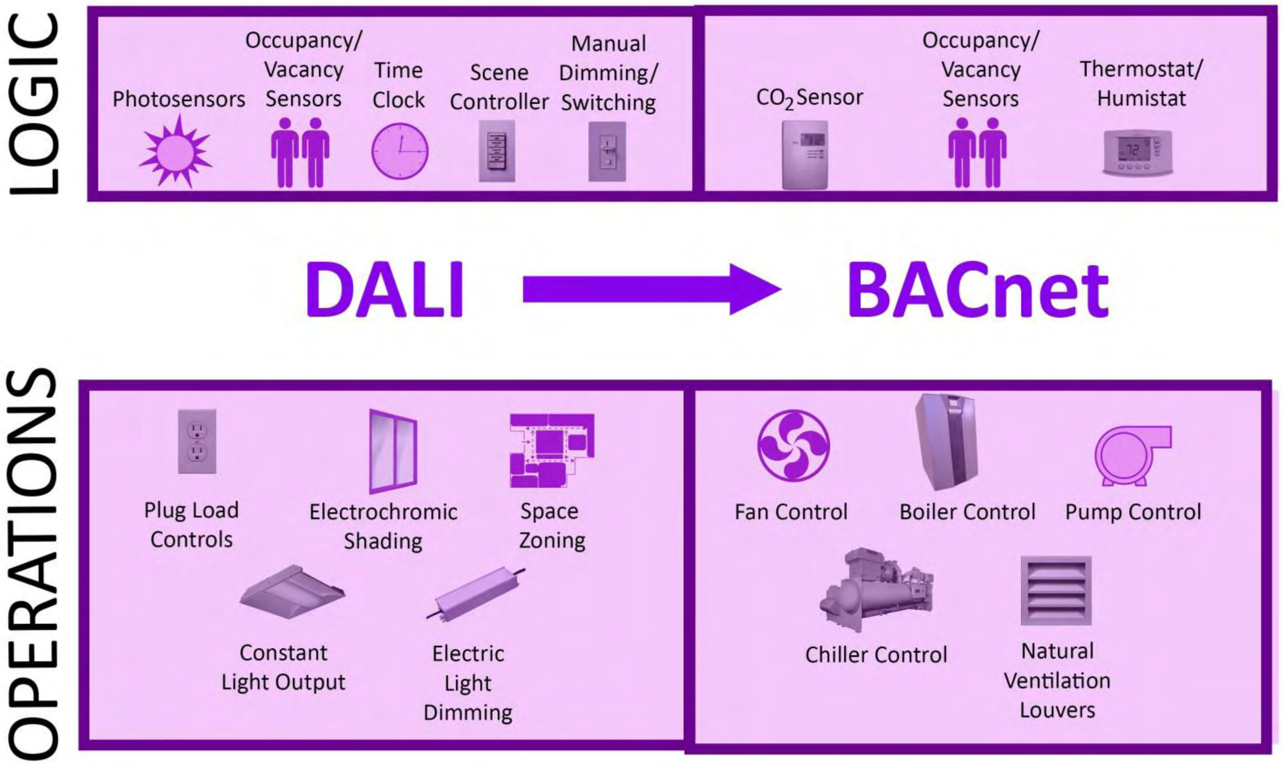

Energy Use
25,000,000.00
20,000,000.00
15,000,000.00
10,000,000.00
5,000,000.00
-
(5,000,000.00)
(10,000,000.00)
(15,000,000.00)
(20,000,000.00)
(25,000,000.00)
Source Energy (kBtu/Year)
Gas
Proposed Design

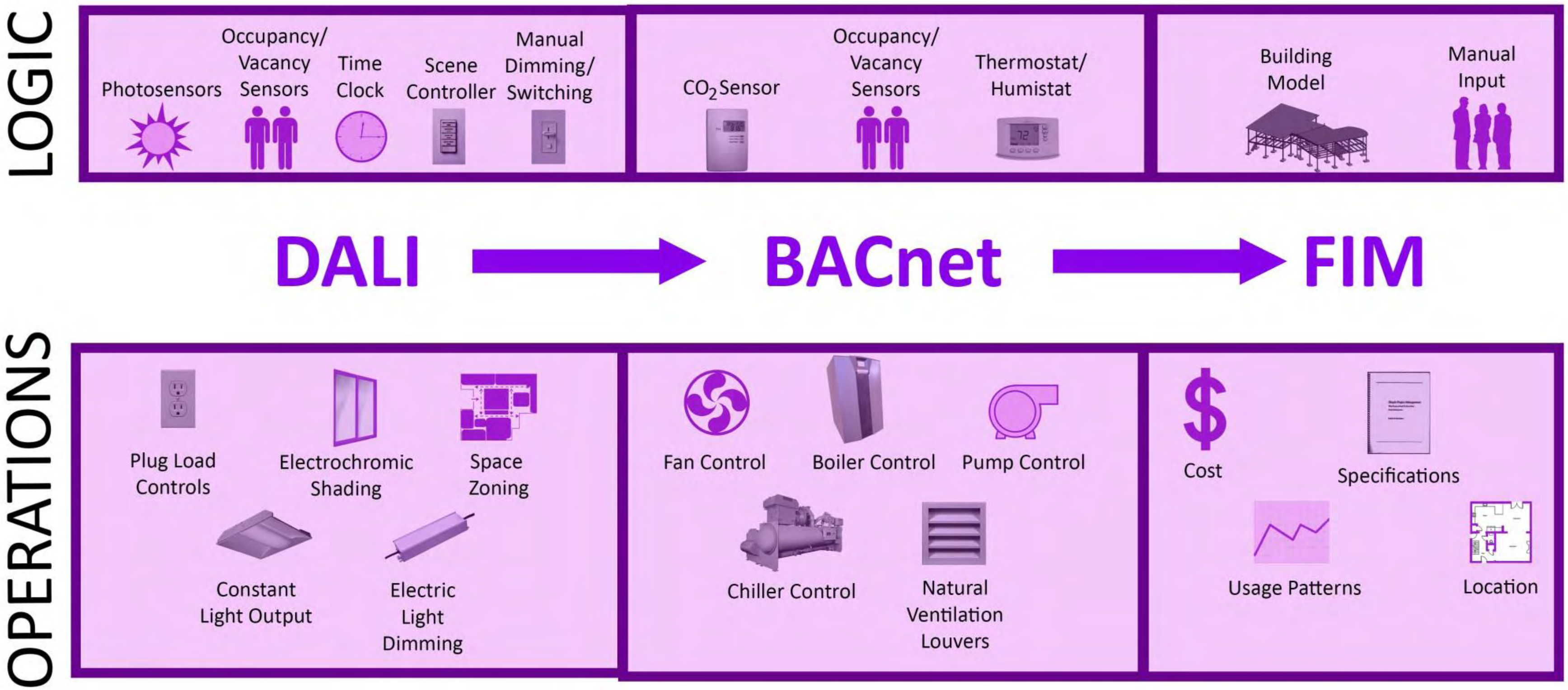

Energy Use
25,000,000.00
20,000,000.00
15,000,000.00
10,000,000.00
5,000,000.00
-
(5,000,000.00)
(10,000,000.00)
(15,000,000.00)
(20,000,000.00)
(25,000,000.00)
Source Energy (kBtu/Year)
Proposed Design
Gas
Waste Bioreactor
Onsite Photovoltaic
Offsite Photovoltaic

FACILITIES INTEGRATION MANAGEMENT STAKEHOLDERS

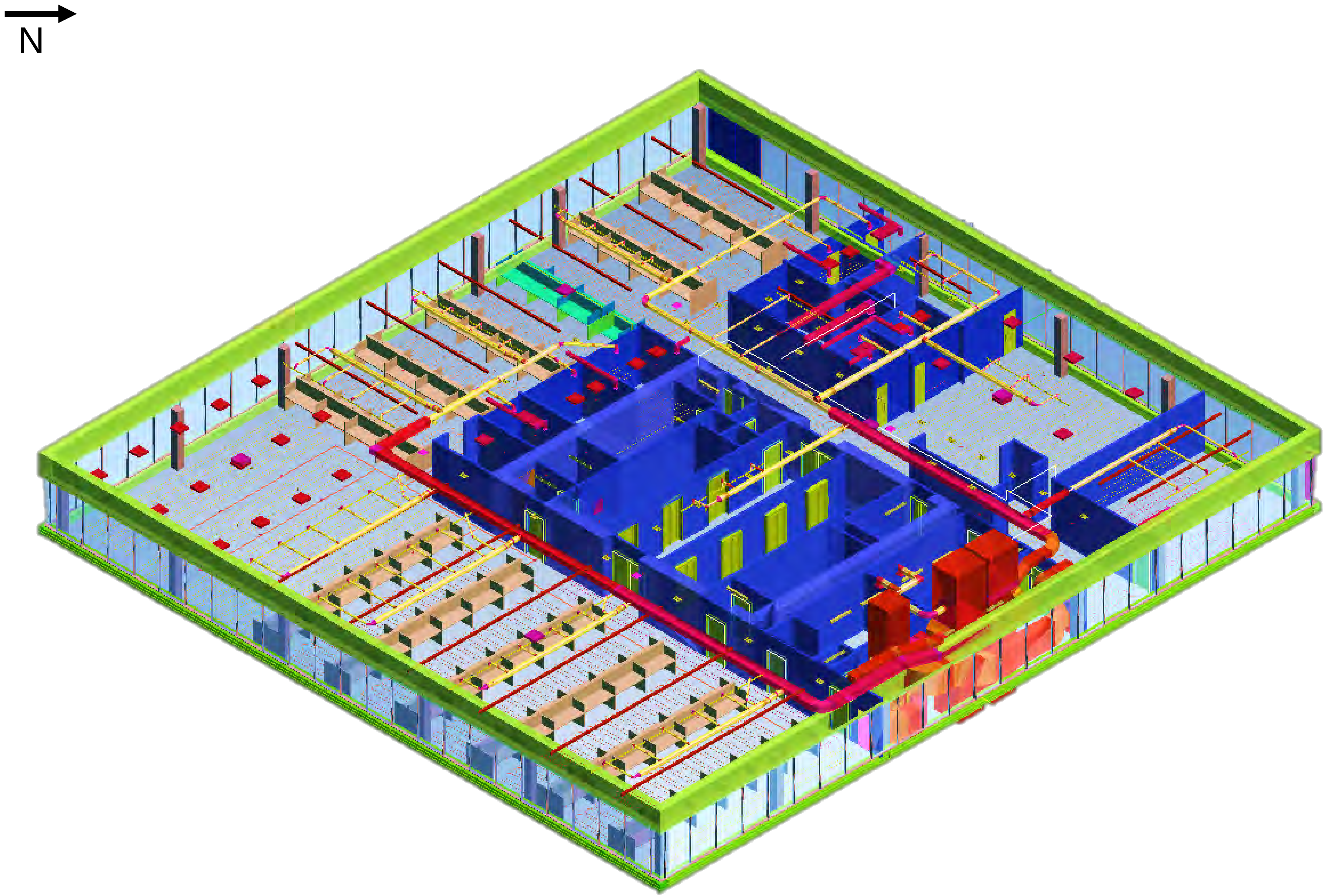



LOGIC
Photosensors
Occupancy/ Vacancy Sensors
Time Clock
Scene Controller
Manual Dimming/ Switching
DALI
OPERATIONS
Plug Load Controls
Electrochromic Shading
Space Zoning
Constant Light Output
Electric Light Dimming

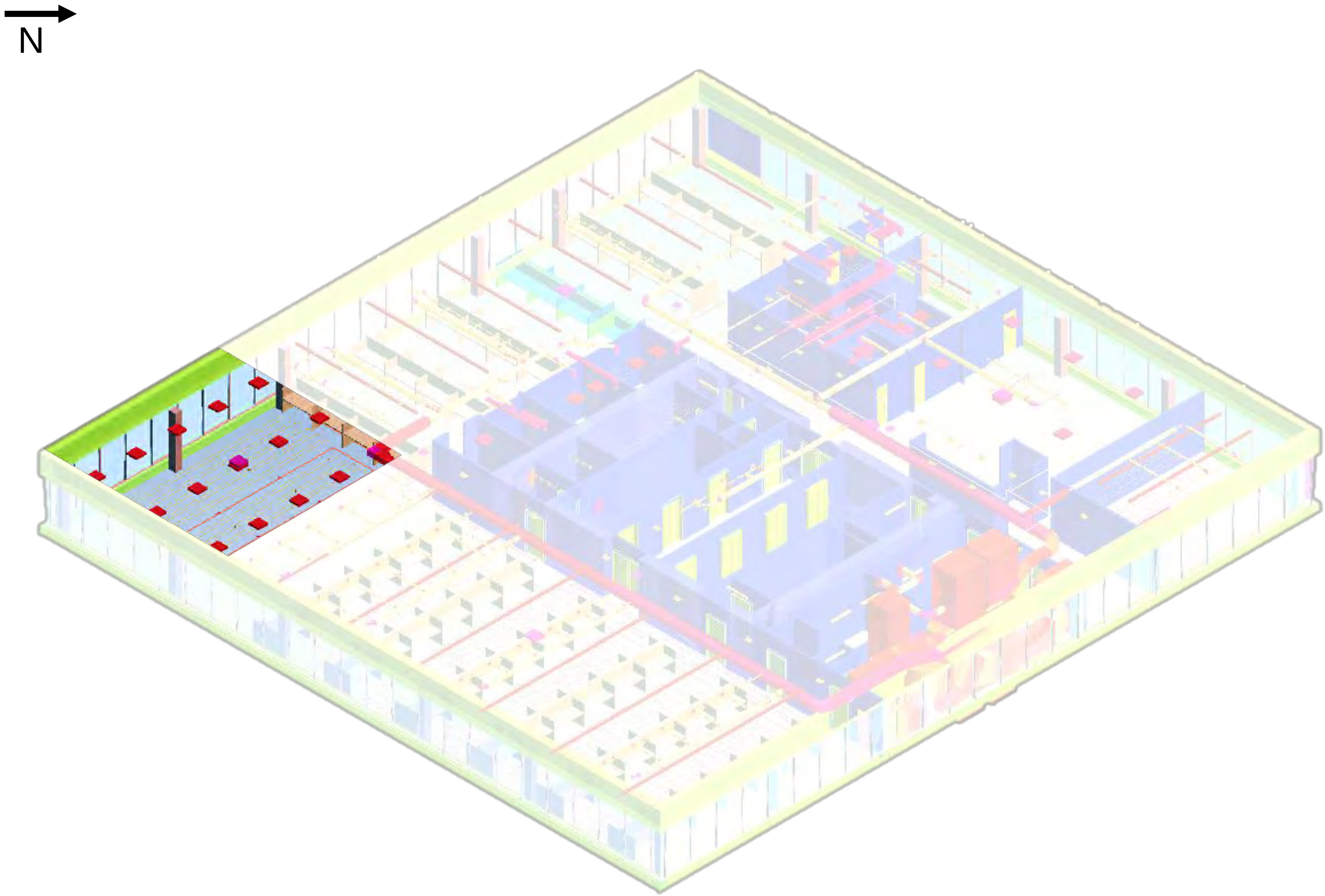

LOGIC
Photosensors
Occupancy/ Vacancy Sensors
Time Clock
Scene Controller
Manual Dimming/ Switching
CO_2 Sensor
Occupancy/ Vacancy Sensors
Thermostat/ Humistat
DALI
BACnet
OPERATIONS
Plug Load Controls
Electrochromic Shading
Space Zoning
Constant Light Output
Electric Light Dimming
Fan Control
Boiler Control
Pump Control
Chiller Control
Natural Ventilation Louvers

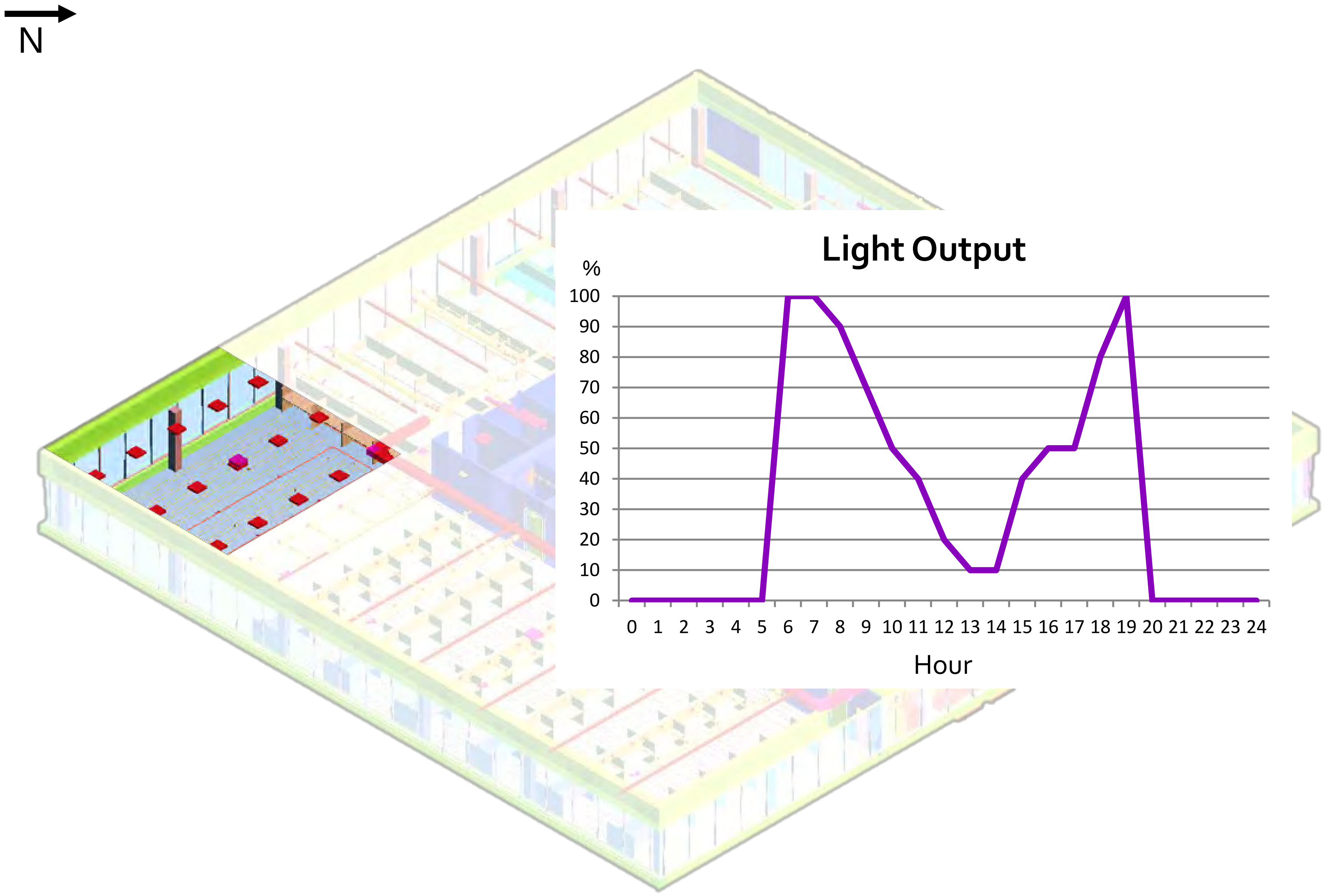

LOGIC
Photosensors
Occupancy/ Vacancy Sensors
Time Clock
Scene Controller
Manual Dimming/ Switching
CO_2 Sensor
Occupancy/ Vacancy Sensors
Thermostat/ Humistat
Building Model
Manual Input
DALI
BACnet
FIM
OPERATIONS
Plug Load Controls
Electrochromic Shading
Space Zoning
Constant Light Output
Electric Light Dimming
Fan Control
Boiler Control
Pump Control
Chiller Control
Natural Ventilation Louvers
Cost
Specifications
Usage Patterns
Location

FACILITIES INTEGRATION MANAGEMENT: MODEL

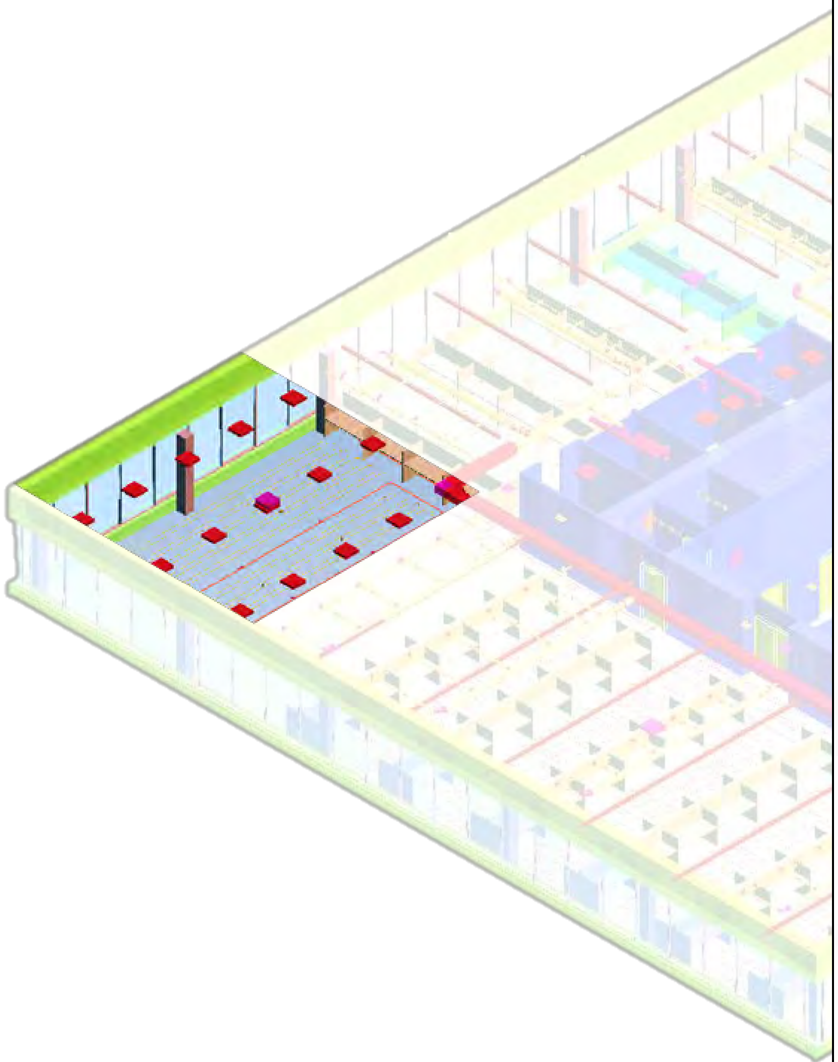


FACILITIES INTEGRATION MANAGEMENT: MODEL EXAMPLE




N
Light Output
%
100
90
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour

N



Day 2x2 LED RECESSED T-Bar & Drywall

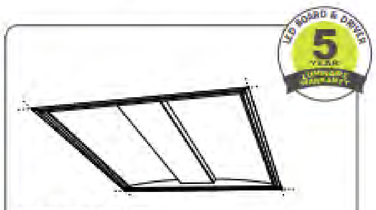
ECLAIRAGE axis LIGHTING
1.800.263.AXIS
[T] 514.948.6272
[F] 514.948.6271
www.axislighting.com

PROJECT INFORMATION

Project:

Type:

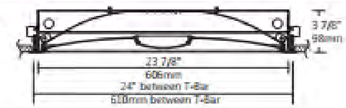
Notes:



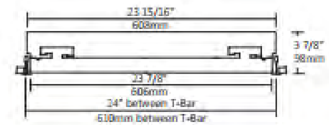
SHOWN WITH FLAT LENS

DIMENSIONS - SECTION VIEWS

SECTION VIEW



SIDE VIEW



Approved by: Date:

PERFORMANCE AT 4000K

NOMINAL LUMEN OUTPUT	INPUT WATTS*	EFFICACY
2500 lm	25.18w	99.3 lm/w
3000 lm	30.86w	97.2 lm/w
4000 lm	42.51w	94.1 lm/w
4400 lm	47.26w	93.1 lm/w

* Based on a 2'x2' luminaire using one driver
Please consult factory for customize lumen output and wattage.

ORDERING CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

PRODUCT SPECIFICATIONS

1	PRODUCT ID	2	SIZE	3	VERSION	4	NOMINAL LUMENS	5	COLOUR TEMP.	6	SHIELDING	7	FINISH
DAYFLED	day flat led	22	2'X2'	B2	B2 (factory preset)	2500	2500 lm	35	3500k	SO	spotless lens	W	white
DAYCLED	day curve led					3000	3000 lm	30	3000k(1)			C	custom
						4000	4000 lm	40	4000k(1)				
						4400	4400 lm						

(1) 6 Week lead time for 3000k and 4000k

8	VOLTAGE	9	DRIVER	10	CIRCUITS	11	MOUNTING/SUSPENSION	12	BATTERY	13	OTHER
120	120V	D	dimming(2)	1	1 circuit	TB9	t-bar 9/16"	B#	battery pack	F	fuse
277	277V	LT	lutron	2	2 circuits	TB15	t-bar 15/16"			AR	air return
UNV	universal	RD	redwood(3)	+E#	emergency section	ST	screw slot t-bar			FW#	flex whip (6' std)
				+NL#	night light section	TG9	tegular 9/16"			CP	chicago plenum
				+GTD#	generator transfer device	TG15	tegular 15/16"				
						DF	drywall flange				

(2) Standard with LED
(3) Please consult factory

Please consult factory

14	IC CONTROLS	15	CUSTOM
DS#	daylight sensor	C	custom
OS#	occupancy sensor		

See integrated controls guide for further details.

Please specify

SPECIFY DRIVER NAME (if needed)

SPECIFY BATTERY NAME (if needed)

Driver, Battery Pack and Integrated Control Details and Custom Description:

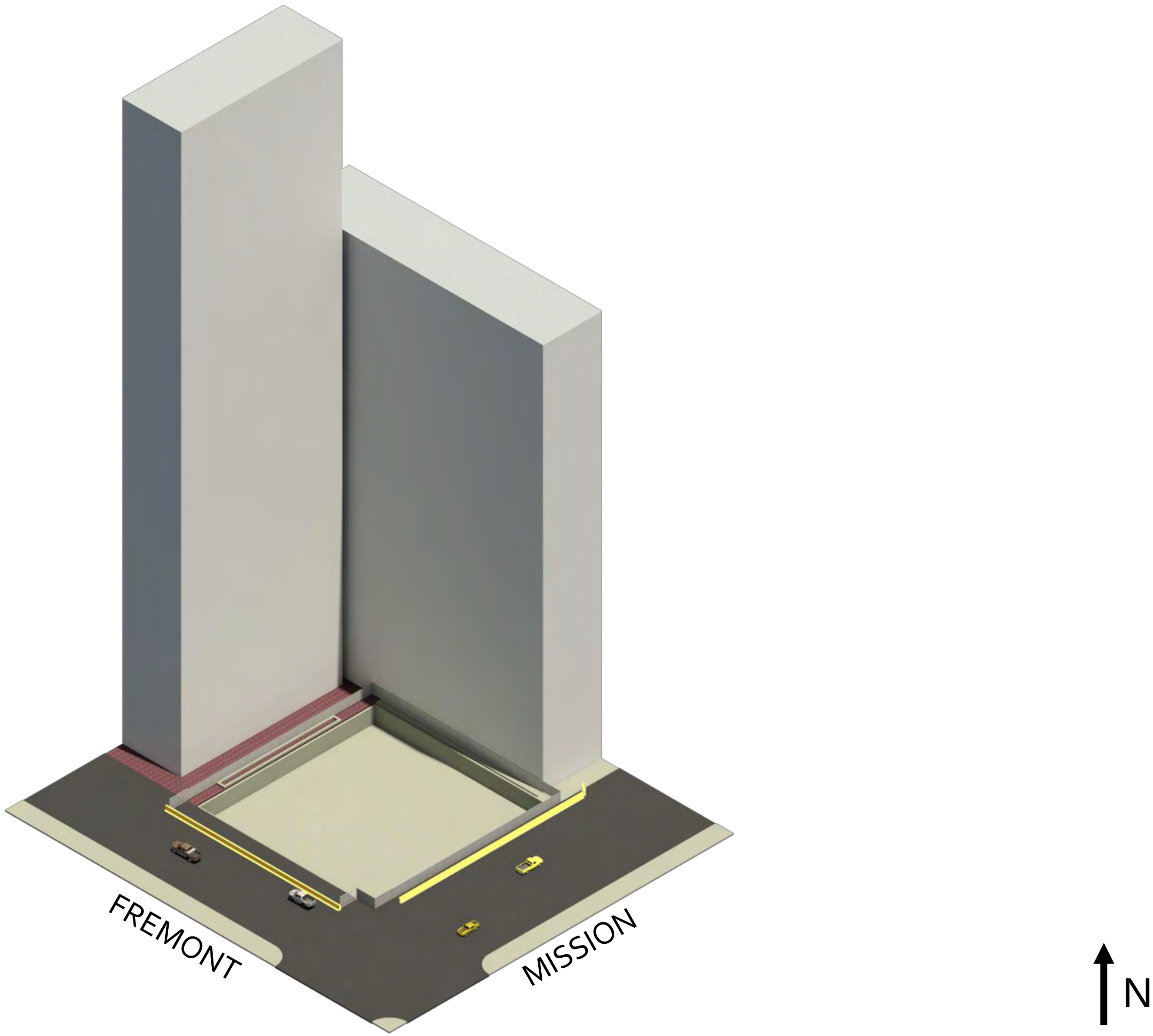
FILE NAME:DAY22-LED-B2.SPEC July 5, 2013

Product design and development is an ongoing process at Axis Lighting. We reserve the right to change specifications. Contact Axis for the latest product information.

POST DEMOLITION

START 4/7/14

COMPLETE 5/20/14

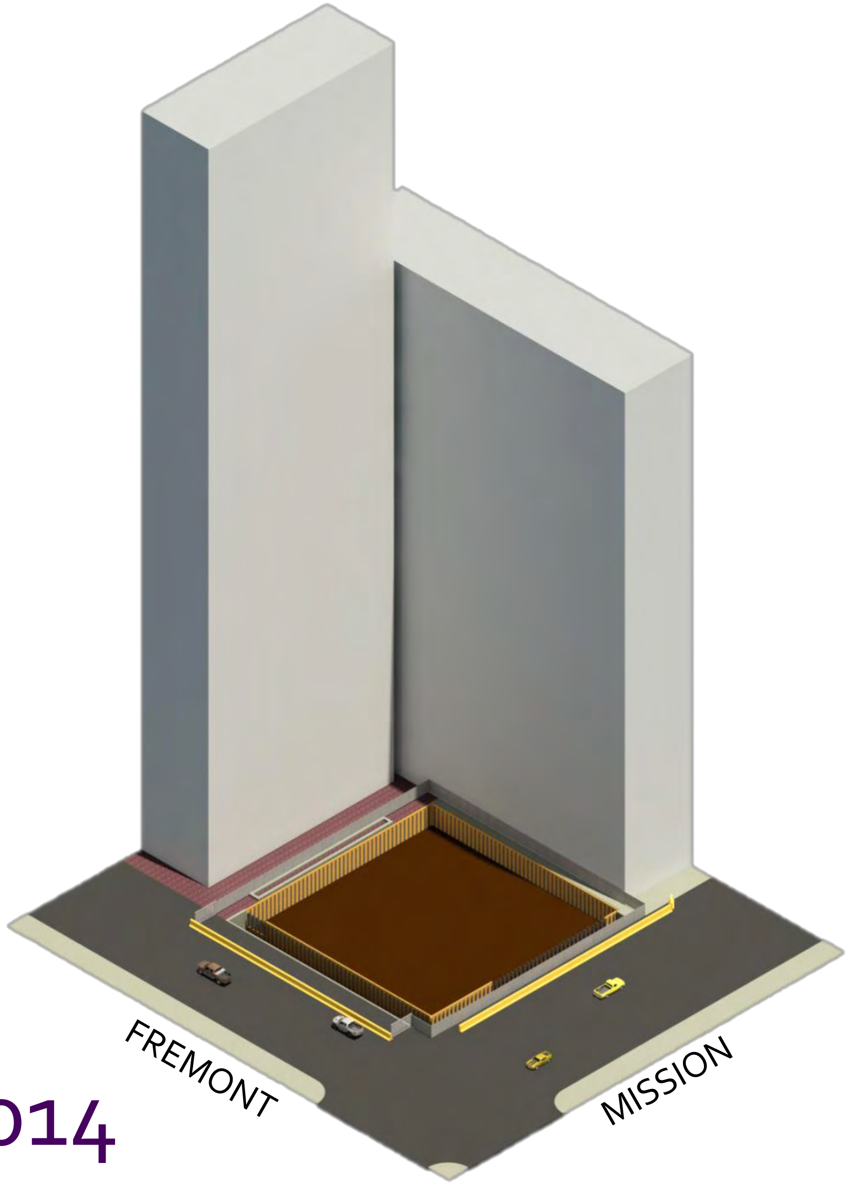


June 7, 2014

SLURRY WALL COMPLETE

COMPLETE 5/20/14

START 4/7/14



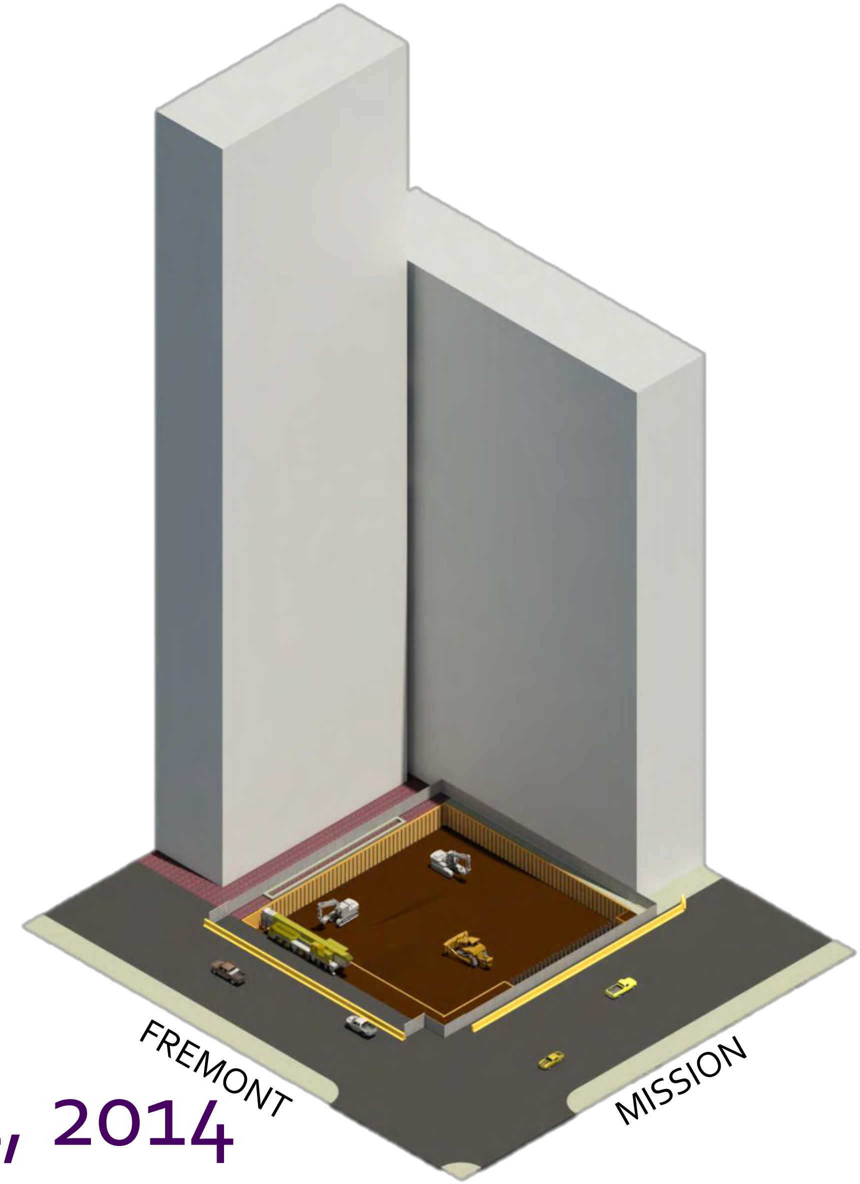
August 29, 2014

N

EXCAVATION

COMPLETE 5/20/14

START 4/7/14

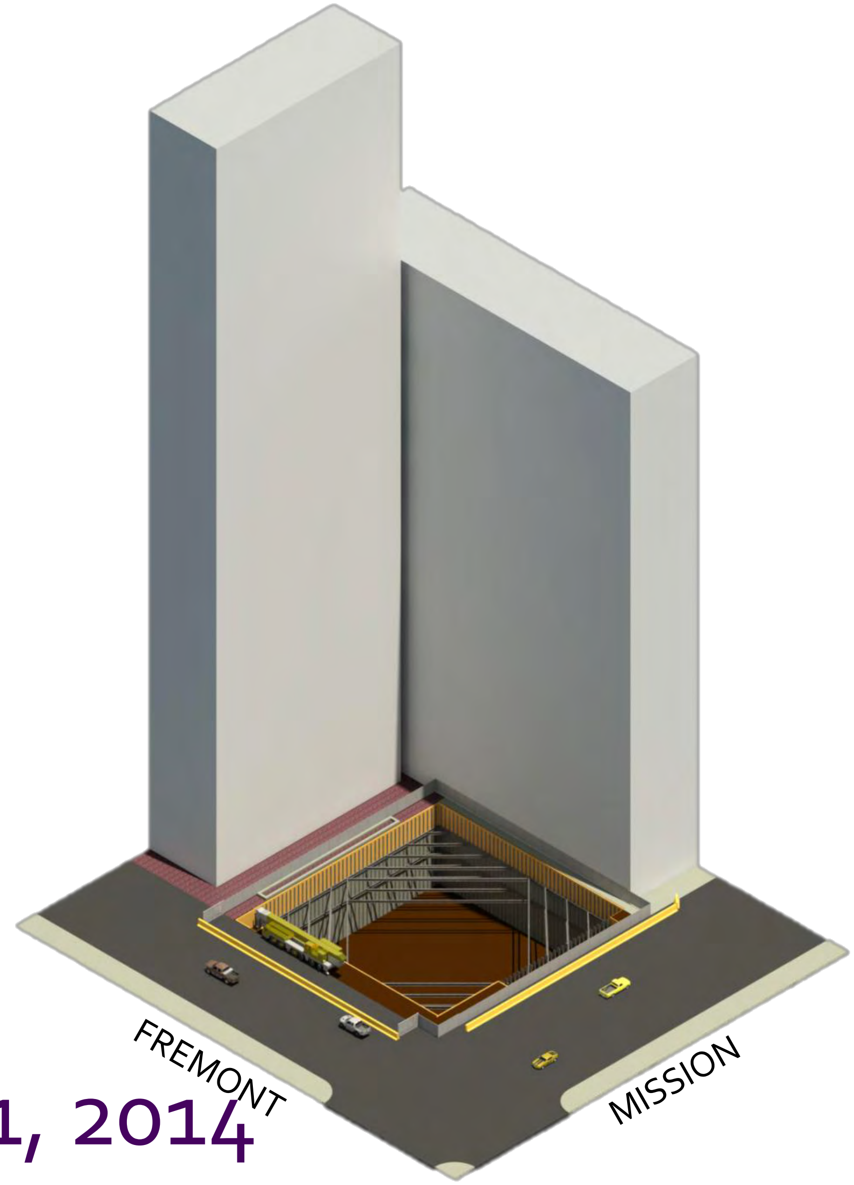


September 1, 2014

EXCAVATION COMPLETE

START 4/7/14

COMPLETE 5/20/14

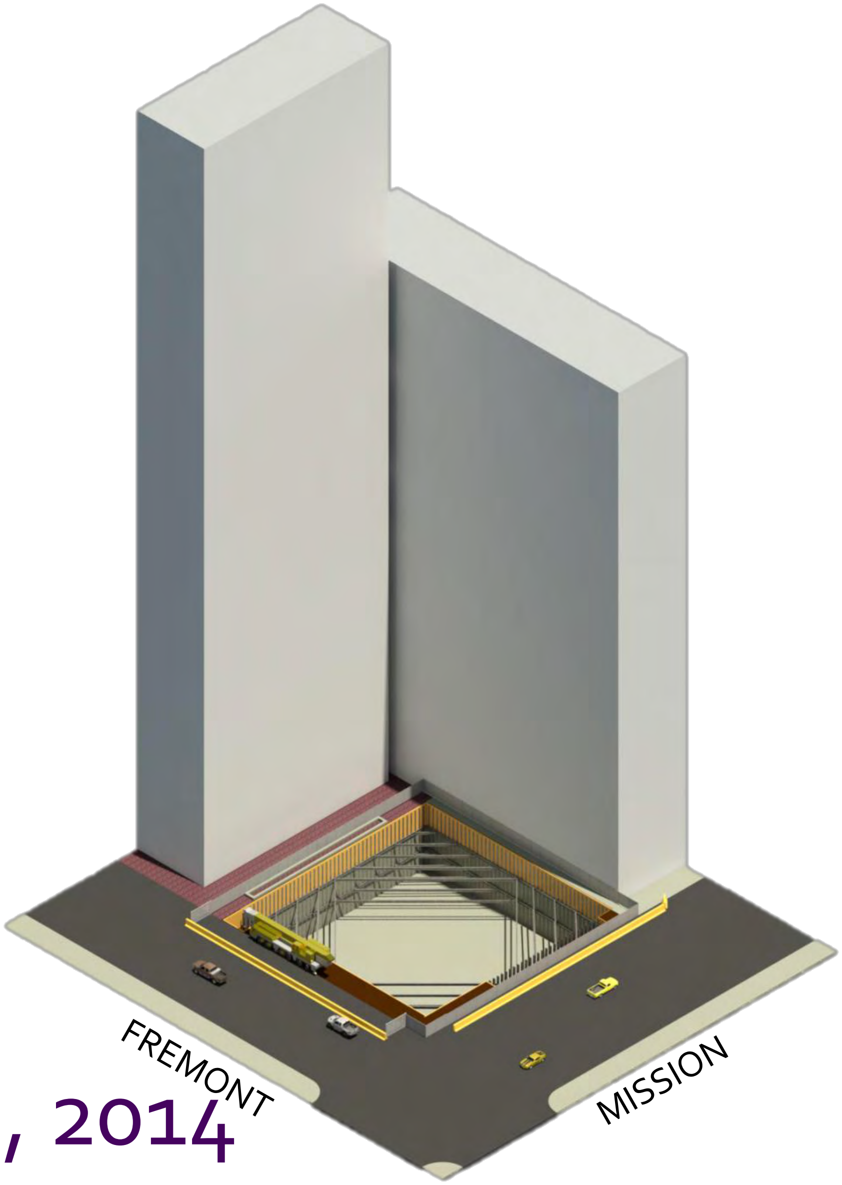


November 21, 2014

FOUNDATION

COMPLETE 5/20/14

START 4/7/14



December 19, 2014

N

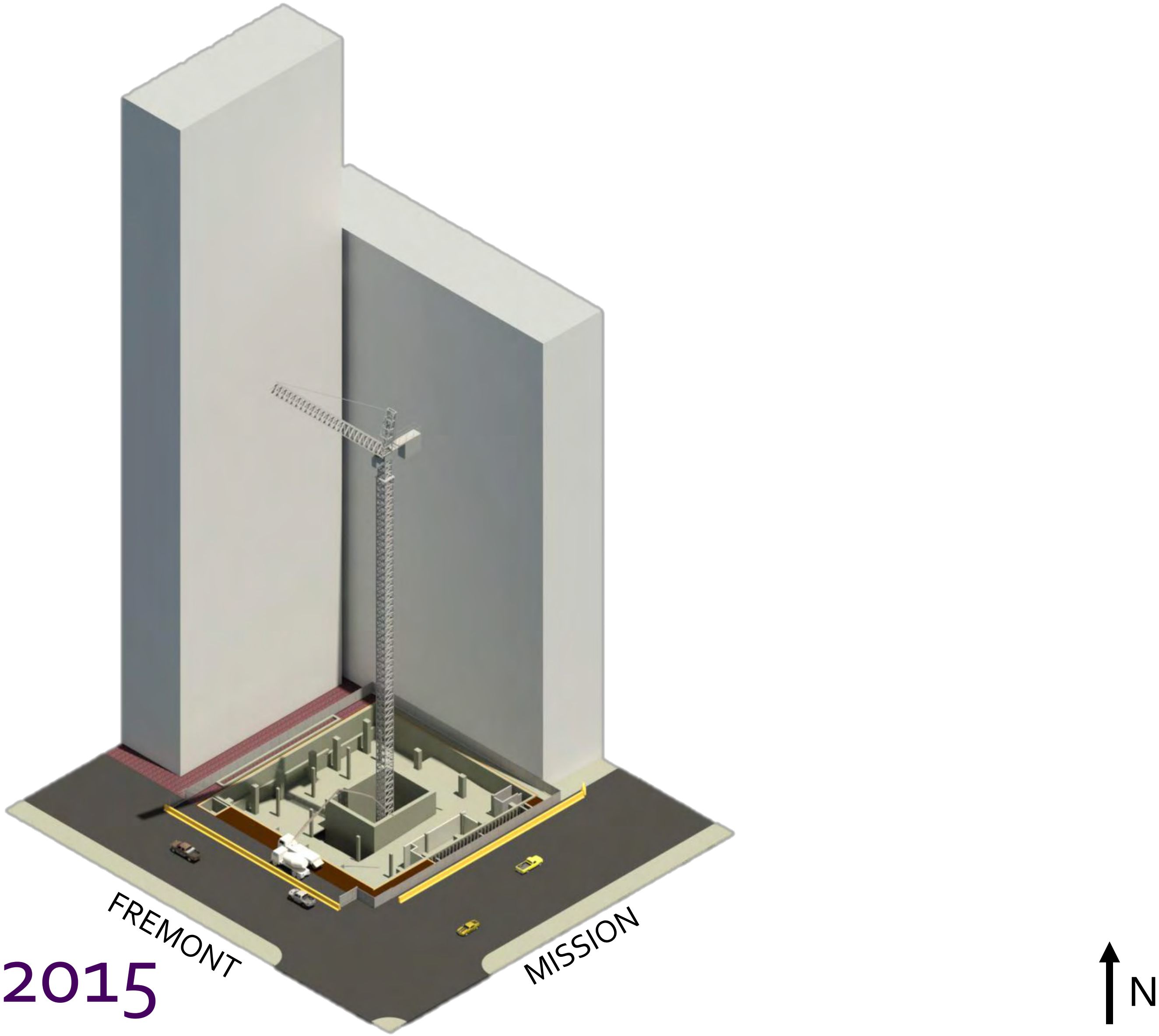
PERFORMANCE

FACILITIES MANAGEMENT – PHASING – SCHEDULE – ESTIMATE

SUBSTRUCTURE

COMPLETE 5/20/14

START 4/7/14

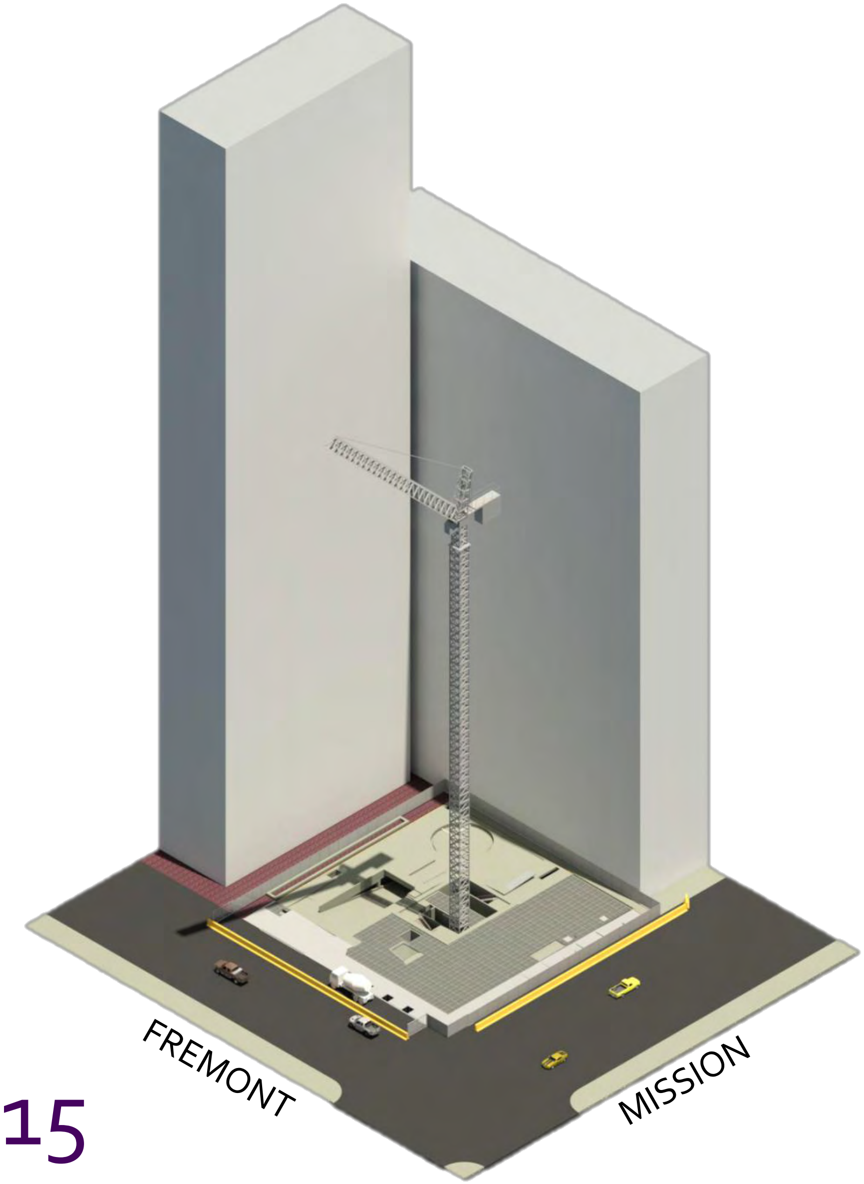


February 28, 2015

SUBSTRUCTURE COMPLETE

COMPLETE 5/20/14

START 4/7/14



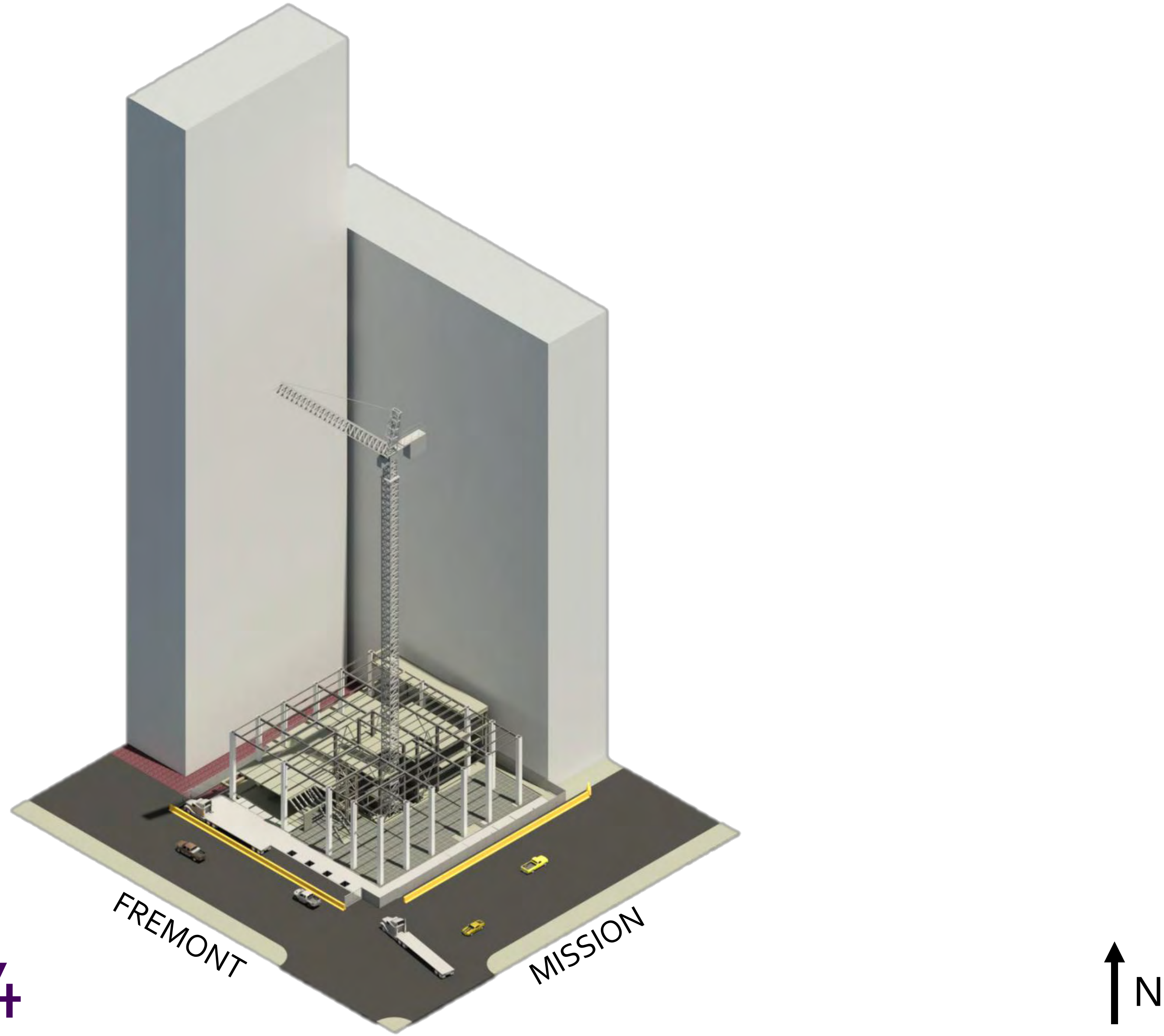
March 27, 2015

N

FIRST FIVE FLOORS

START 4/7/14

COMPLETE 5/20/14

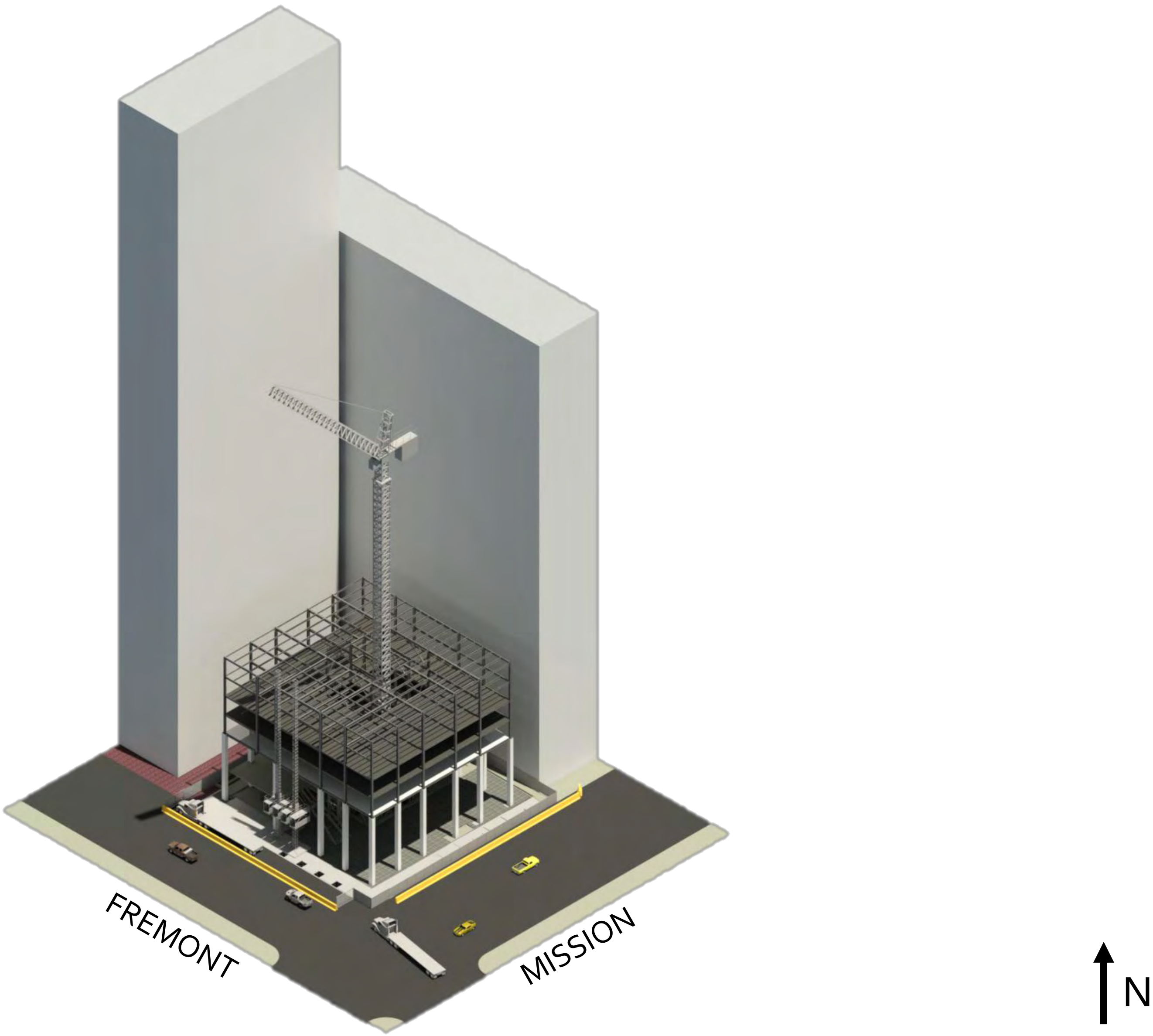


April 24, 2014

START SLABS

START 4/7/14

COMPLETE 5/20/14



May 25, 2015

START CURTAIN WALL

COMPLETE 5/20/14

START 4/7/14

June 15, 2015

CORE ROUGH-IN

COMPLETE 5/20/14

START 4/7/14

August 10, 2015

STEEL TOP-OUT

COMPLETE 5/20/14

START 4/7/14

October 26, 2015

PERFORMANCE

FACILITIES MANAGEMENT – PHASING – SCHEDULE – ESTIMATE

BUILDING WATERTIGHT

COMPLETE 5/20/14

START 4/7/14

December 14, 2015

SHORT INTERVAL PRODUCTION SCHEDULING : TYPICAL OFFICE FLOOR

AEVITAS (Typical Office Floor)

	Sep-15				Oct-15				Nov-15					Dec-15				Jan-16			
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14							
6		1	2	3	4	5	6	7	8	9	10	11	12	13	14						
7			1	2	3	4	5	6	7	8	9	10	11	12	13	14					
8				1	2	3	4	5	6	7	8	9	10	11	12	13	14				
9					1	2	3	4	5	6	7	8	9	10	11	12	13	14			
10						1	2	3	4	5	6	7	8	9	10	11	12	13	14		
11							1	2	3	4	5	6	7	8	9	10	11	12	13	14	
12								1	2	3	4	5	6	7	8	9	10	11	12	13	14
14									1	2	3	4	5	6	7	8	9	10	11	12	13
15										1	2	3	4	5	6	7	8	9	10	11	12
16											1	2	3	4	5	6	7	8	9	10	11
17												1	2	3	4	5	6	7	8	9	10
18													1	2	3	4	5	6	7	8	9
19														1	2	3	4	5	6	7	8
20															1	2	3	4	5	6	7
21																1	2	3	4	5	6
22																	1	2	3	4	5
23																		1	2	3	4
24																			1	2	3
25																				1	2
26																					1
27																					
28																					
29																					
30																					

AEVITAS (Typical Office Floor)

	Sep-15				Oct-15				Nov-15					Dec-15				Jan-16			
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14							
6		1	2	3	4	5	6	7	8	9	10	11	12	13	14						
7			1	2	3	4	5	6	7	8	9	10	11	12	13	14					
8				1	2	3	4	5	6	7	8	9	10	11	12	13	14				
9					1	2	3	4	5	6	7	8	9	10	11	12	13	14			
10						1	2	3	4	5	6	7	8	9	10	11	12	13	14		
11							1	2	3	4	5	6	7	8	9	10	11	12	13	14	
12								1	2	3	4	5	6	7	8	9	10	11	12	13	14
14									1	2	3	4	5	6	7	8	9	10	11	12	13
15										1	2	3	4	5	6	7	8	9	10	11	12
16											1	2	3	4	5	6	7	8	9	10	11
17												1	2	3	4	5	6	7	8	9	10
18													1	2	3	4	5	6	7	8	9
19														1	2	3	4	5	6	7	8
20															1	2	3	4	5	6	7
21																1	2	3	4	5	6
22																	1	2	3	4	5
23																		1	2	3	4
24																			1	2	3
25																				1	2
26																					1
27																					
28																					
29																					
30																					

AEVITAS (Typical Office Floor)

	Sep-15				Oct-15				Nov-15					Dec-15				Jan-16			
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14							
6		1	2	3	4	5	6	7	8	9	10	11	12	13	14						
7			1	2	3	4	5	6	7	8	9	10	11	12	13	14					
8				1	2	3	4	5	6	7	8	9	10	11	12	13	14				
9					1	2	3	4	5	6	7	8	9	10	11	12	13	14			
10						1	2	3	4	5	6	7	8	9	10	11	12	13	14		
11							1	2	3	4	5	6	7	8	9	10	11	12	13	14	
12								1	2	3	4	5	6	7	8	9	10	11	12	13	14
14									1	2	3	4	5	6	7	8	9	10	11	12	13
15										1	2	3	4	5	6	7	8	9	10	11	12
16											1	2	3	4	5	6	7	8	9	10	11
17												1	2	3	4	5	6	7	8	9	10
18													1	2	3	4	5	6	7	8	9
19														1	2	3	4	5	6	7	8
20															1	2	3	4	5	6	7
21																1	2	3	4	5	6
22																	1	2	3	4	5
23																		1	2	3	4
24																			1	2	3
25																				1	2
26																					1
27																					
28																					
29																					
30																					

SHORT INTERVAL PRODUCTION SCHEDULING : TYPICAL OFFICE FLOOR

AEVITAS (Typical Office Floor)

	Sep-15				Oct-15				Nov-15					Dec-15				Jan-16			
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14							
6		1	2	3	4	5	6	7	8	9	10	11	12	13	14						
7			1	2	3	4	5	6	7	8	9	10	11	12	13	14					
8				1	2	3	4	5	6	7	8	9	10	11	12	13	14				
9					1	2	3	4	5	6	7	8	9	10	11	12	13	14			
10						1	2	3	4	5	6	7	8	9	10	11	12	13	14		
11							1	2	3	4	5	6	7	8	9	10	11	12	13	14	
12								1	2	3	4	5	6	7	8	9	10	11	12	13	14
14									1	2	3	4	5	6	7	8	9	10	11	12	13
15										1	2	3	4	5	6	7	8	9	10	11	12
16											1	2	3	4	5	6	7	8	9	10	11
17												1	2	3	4	5	6	7	8	9	10
18													1	2	3	4	5	6	7	8	9
19														1	2	3	4	5	6	7	8
20															1	2	3	4	5	6	7
21																1	2	3	4	5	6
22																	1	2	3	4	5
23																		1	2	3	4
24																			1	2	3
25																				1	2
26																					1
27																					
28																					
29																					
30																					

	Sep-15				Oct-15				Nov-15					
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14
6		1	2	3	4	5	6	7	8	9	10	11	12	13
7			1	2	3	4	5	6	7	8	9	10	11	12
8				1	2	3	4	5	6	7	8	9	10	11
9					1	2	3	4	5	6	7	8	9	10
10						1	2	3	4	5	6	7	8	9
11							1	2	3	4	5	6	7	8
12								1	2	3	4	5	6	7
14									1	2	3	4	5	6
15										1	2	3	4	5
16											1	2	3	4
17												1	2	3
18													1	2
19														1
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14
6		1	2	3	4	5	6	7	8	9	10	11	12	13
7			1	2	3	4	5	6	7	8	9	10	11	12
8				1	2	3	4	5	6	7	8	9	10	11
9					1	2	3	4	5	6	7	8	9	10
10						1	2	3	4	5	6	7	8	9
11							1	2	3	4	5	6	7	8
12								1	2	3	4	5	6	7
14									1	2	3	4	5	6
15										1	2	3	4	5
16											1	2	3	4
17												1	2	3
18													1	2
19														1
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14
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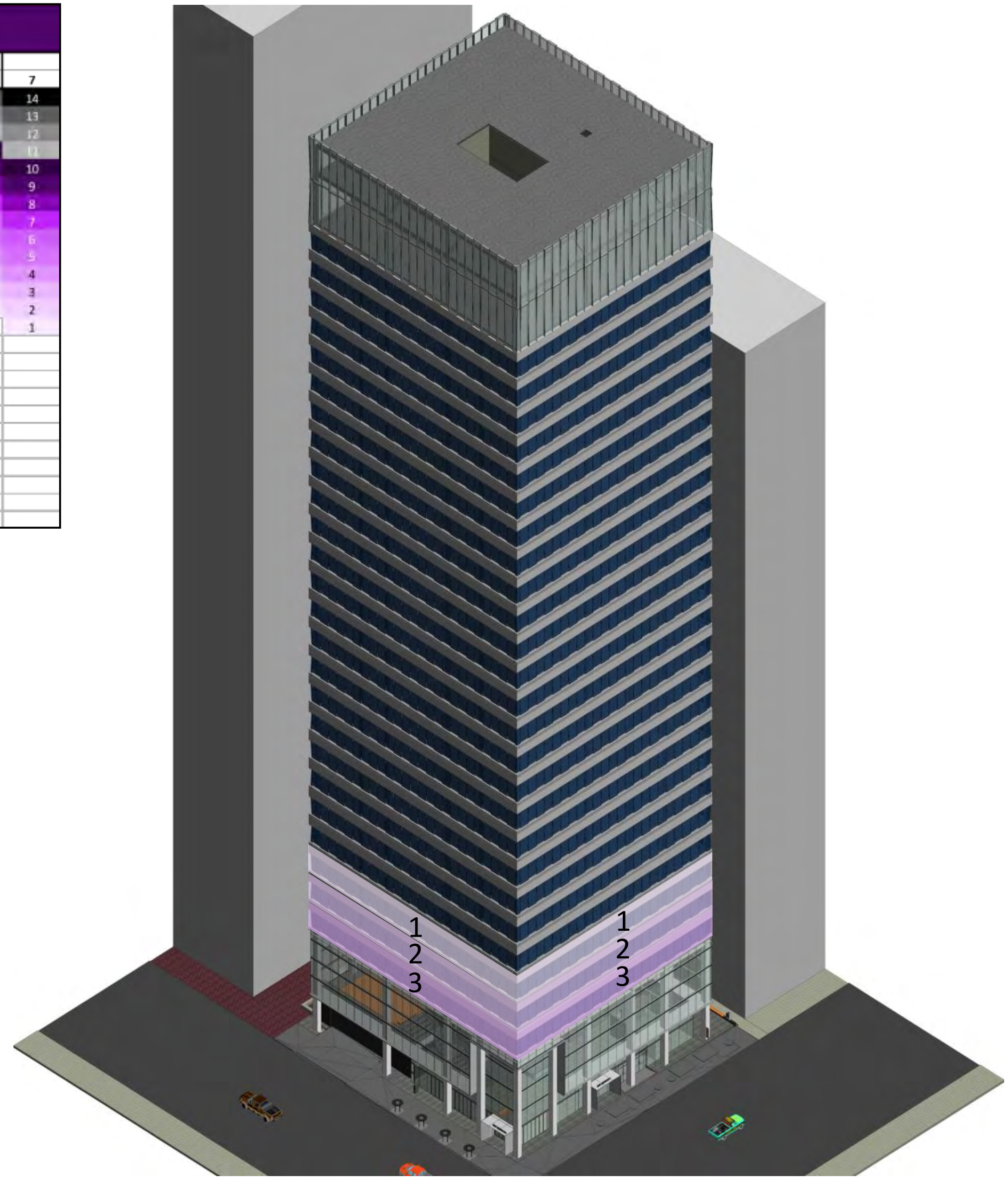

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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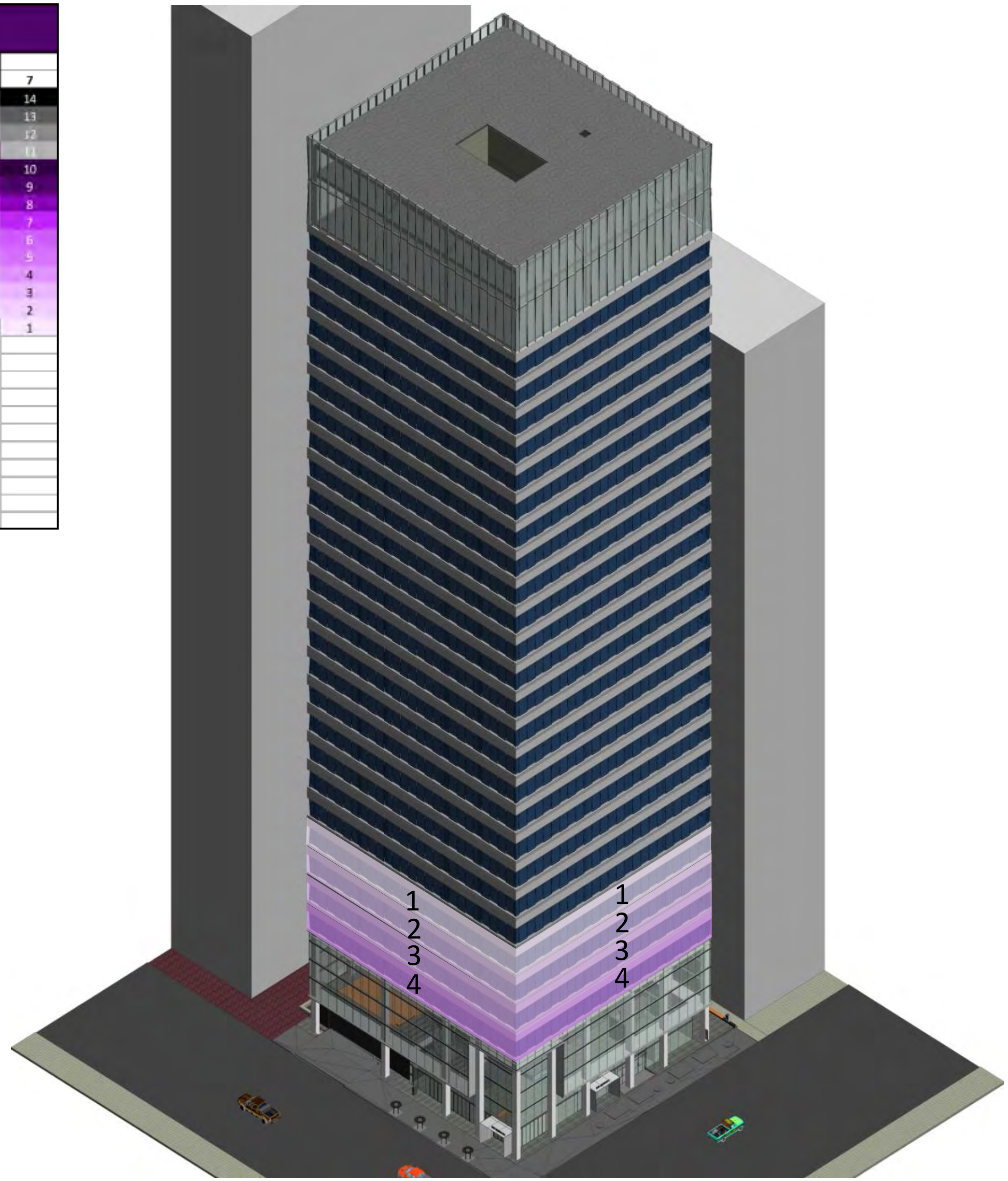

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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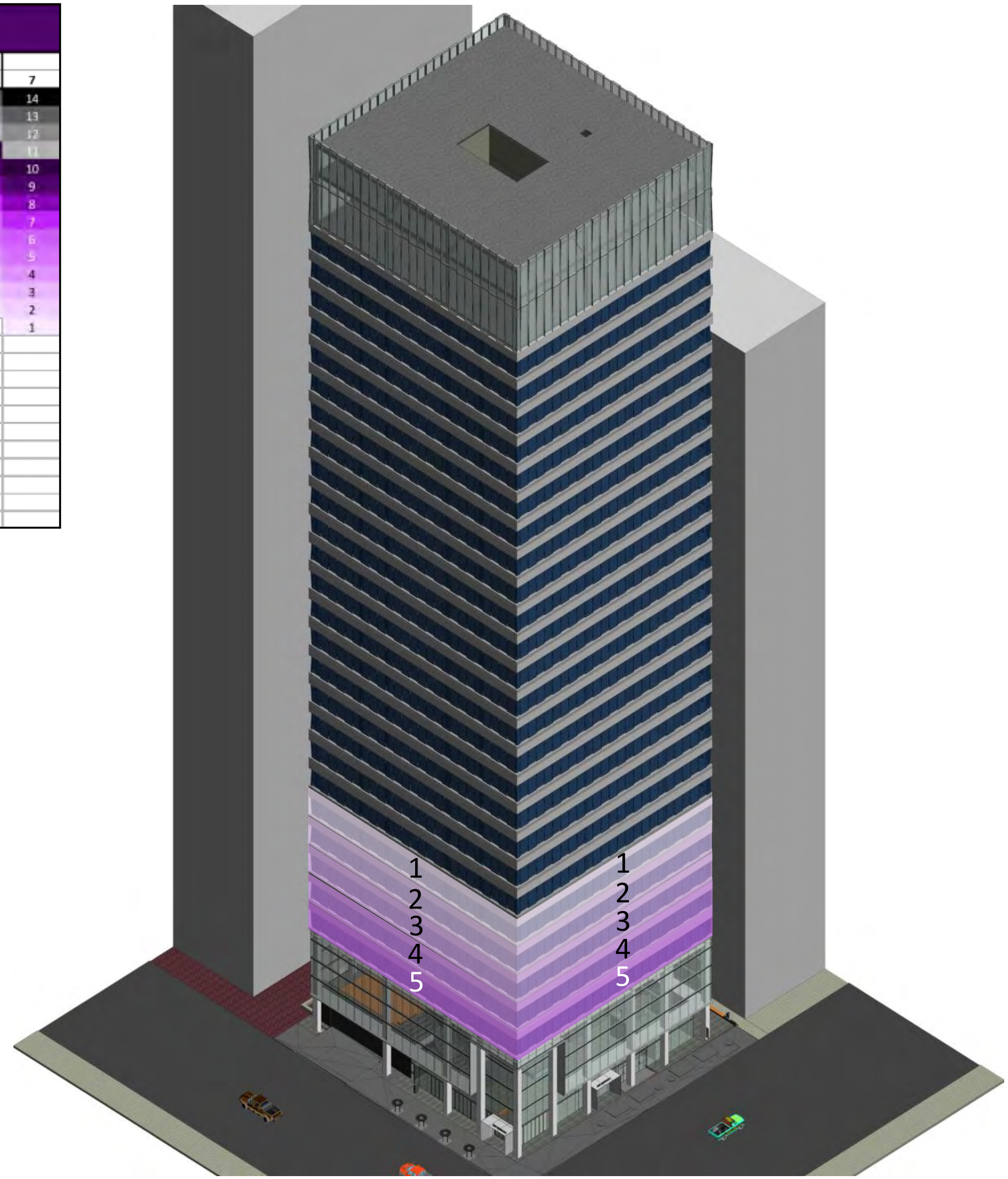

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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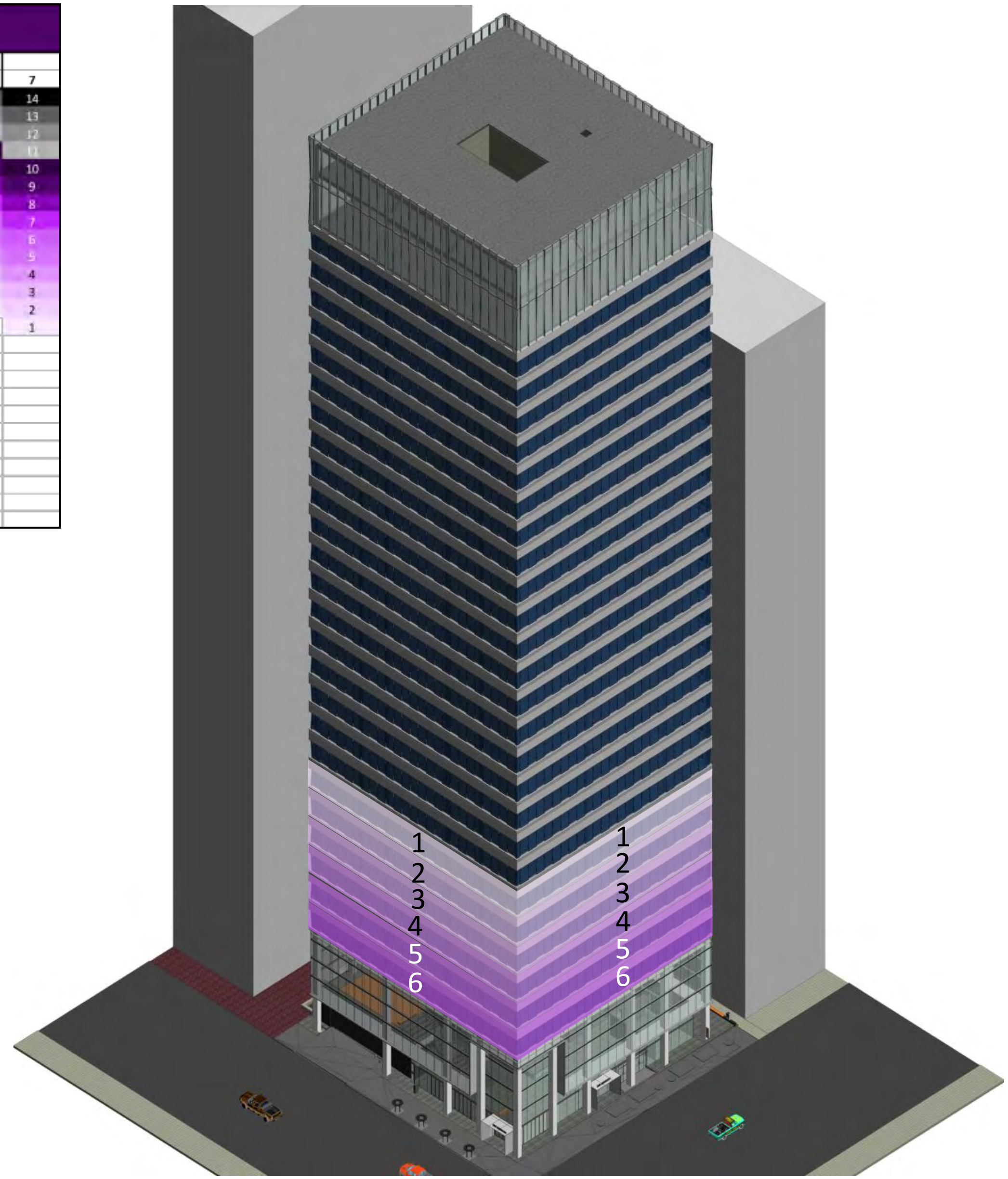

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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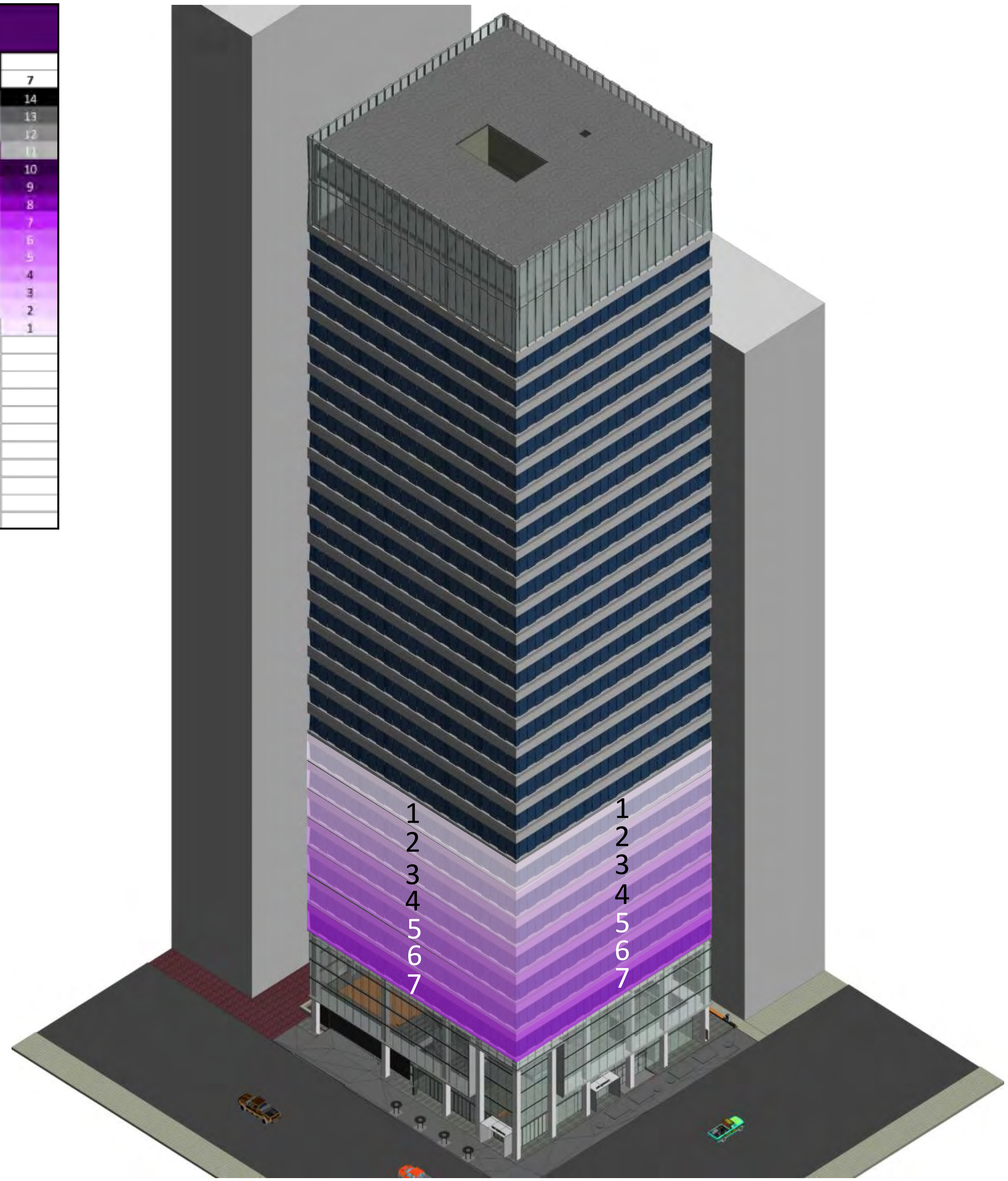

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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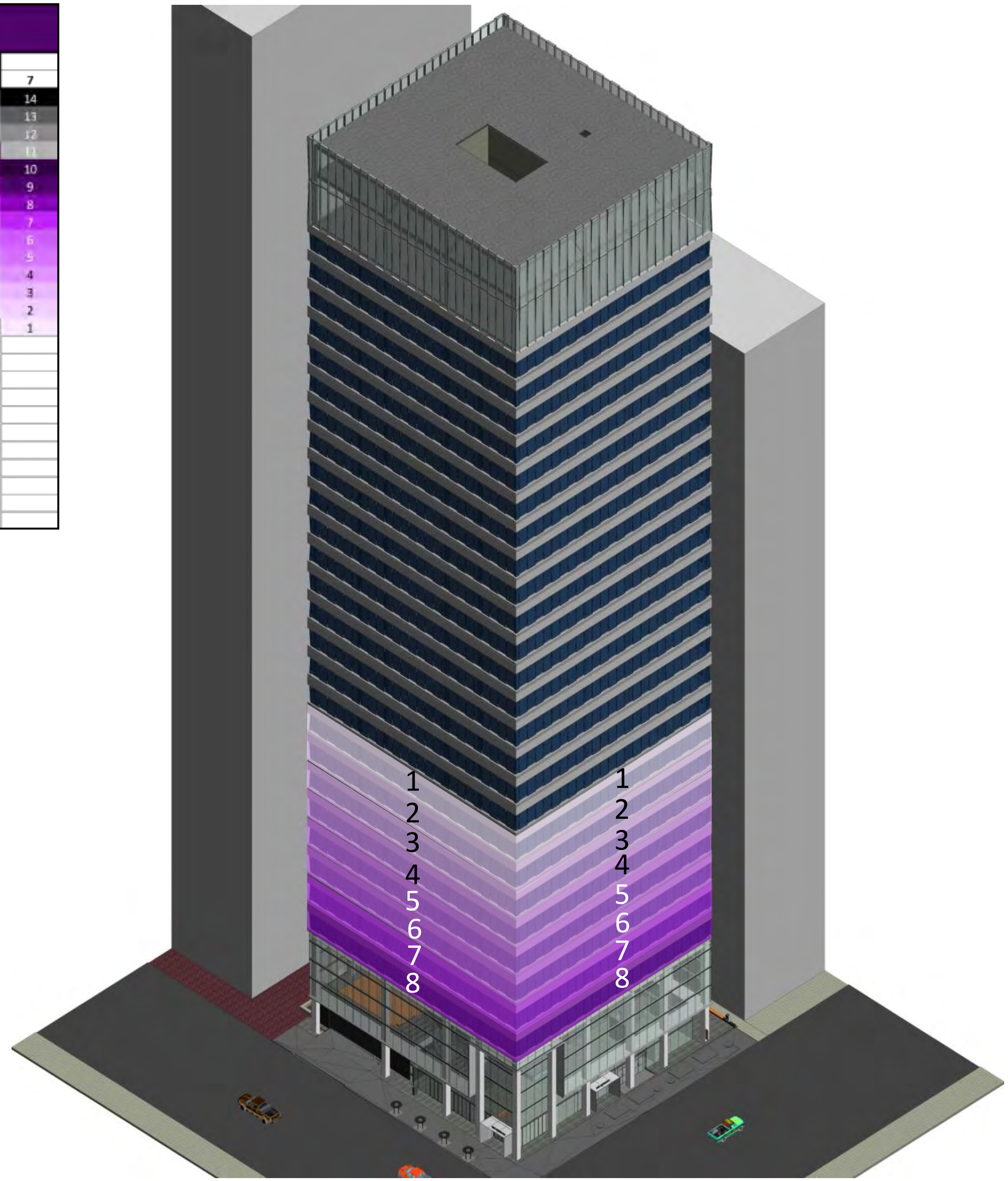

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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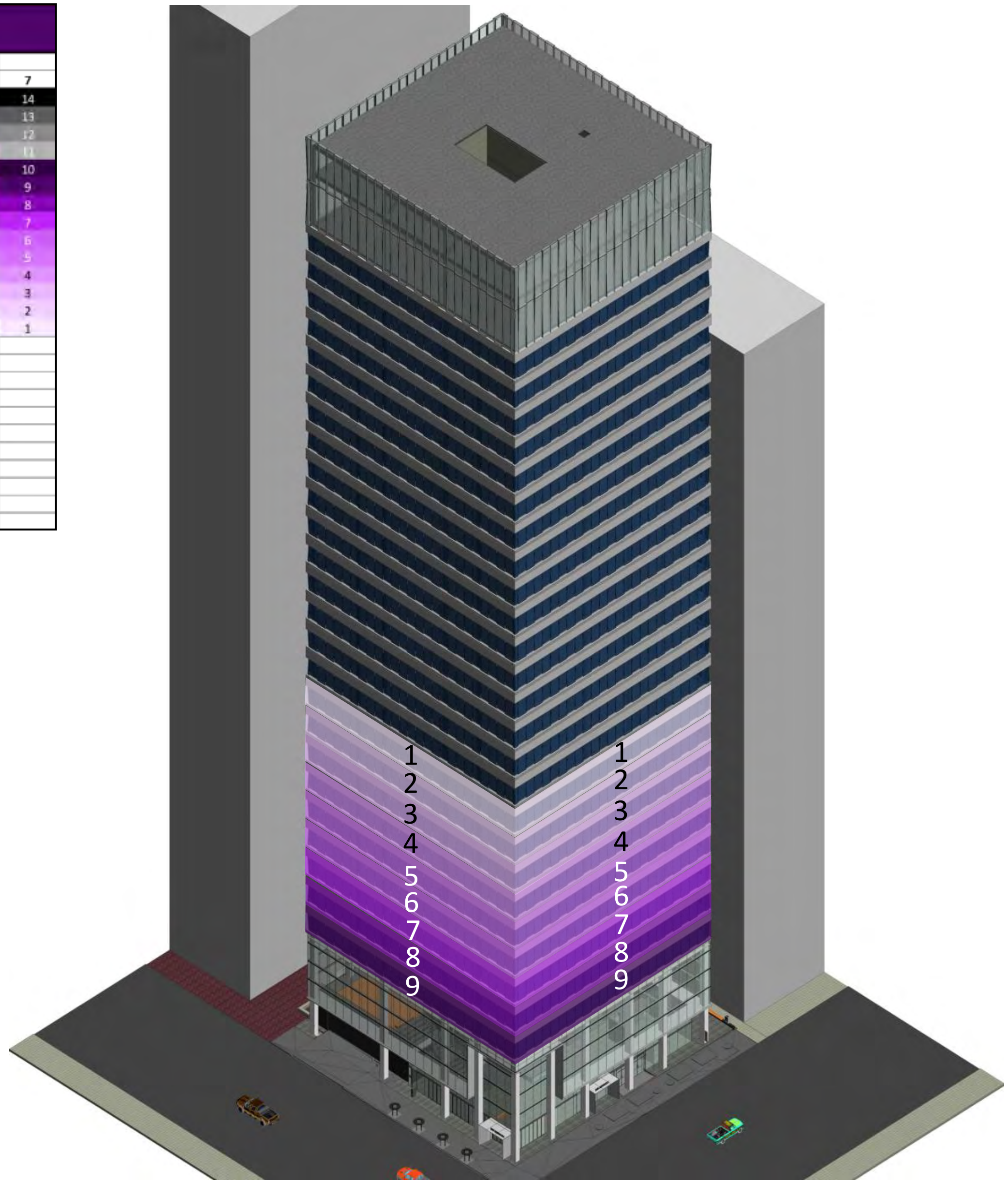

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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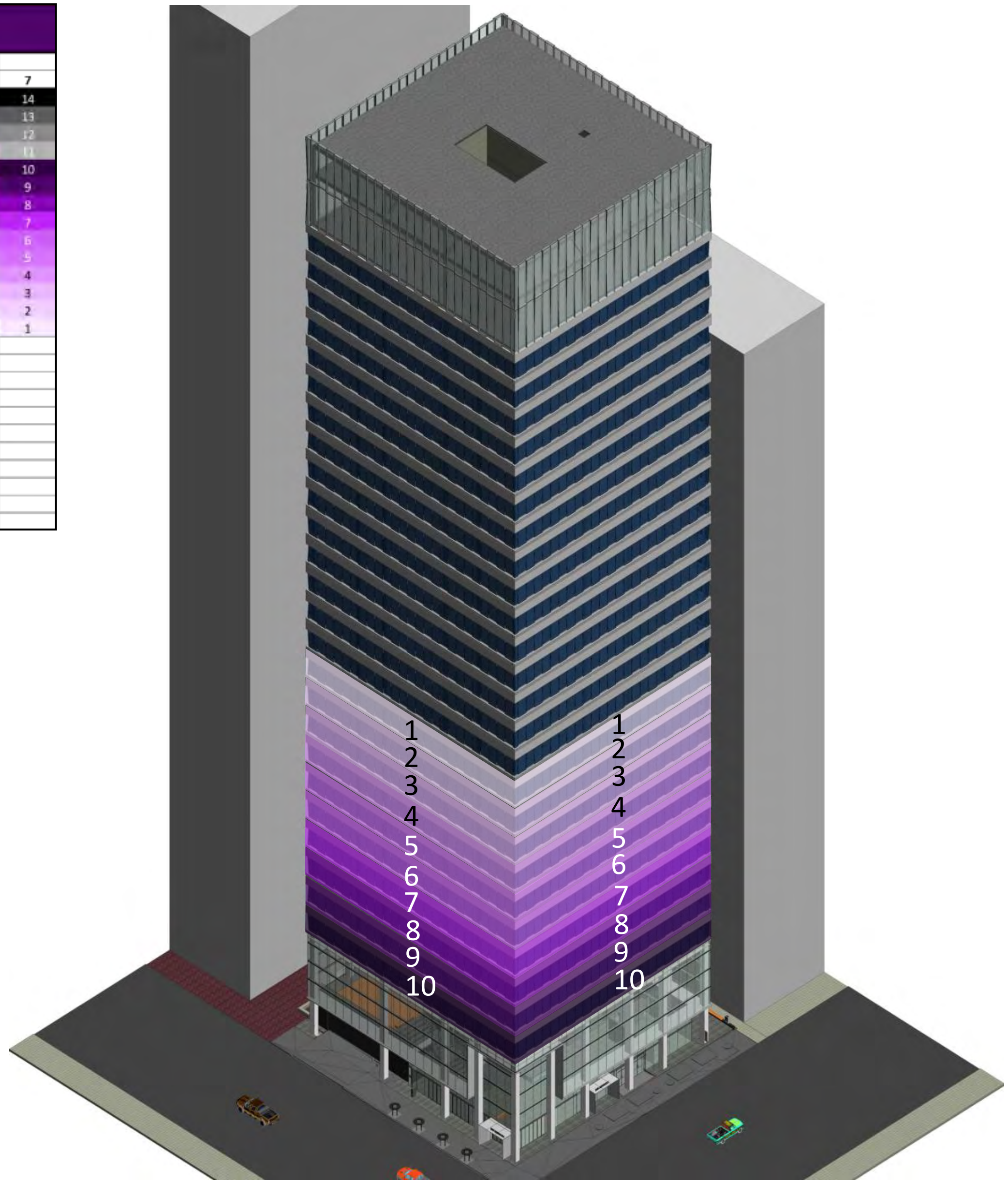

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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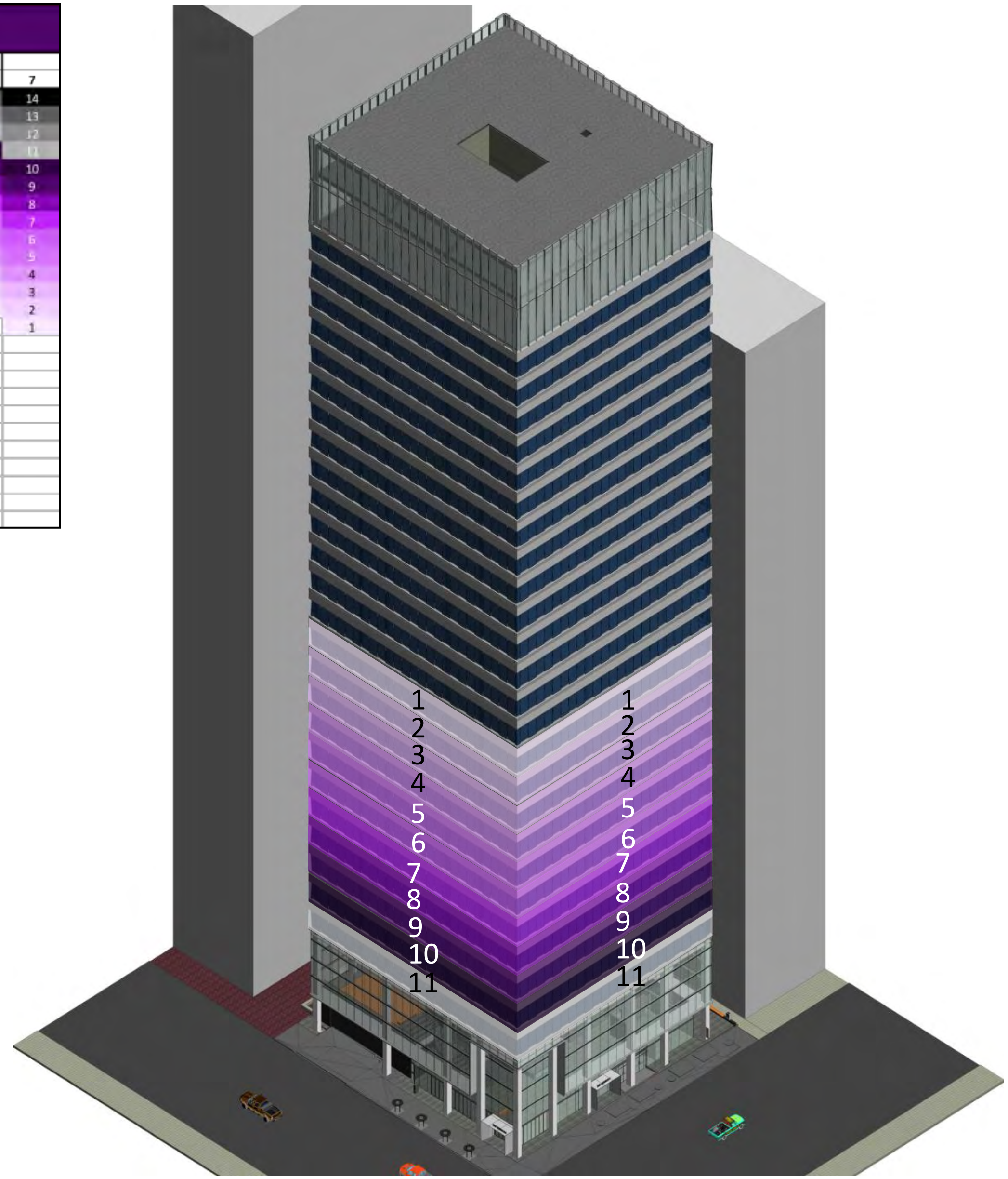

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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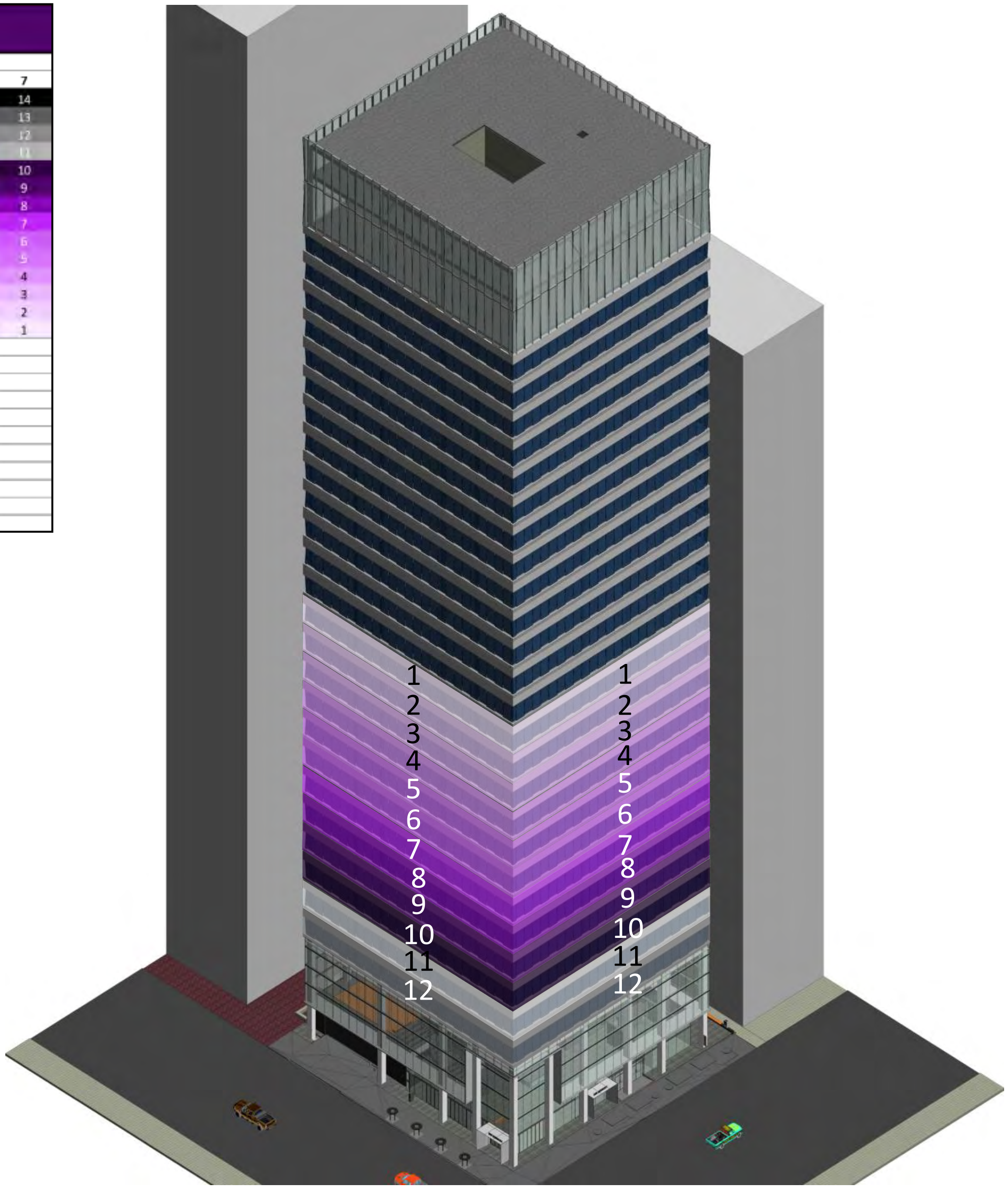

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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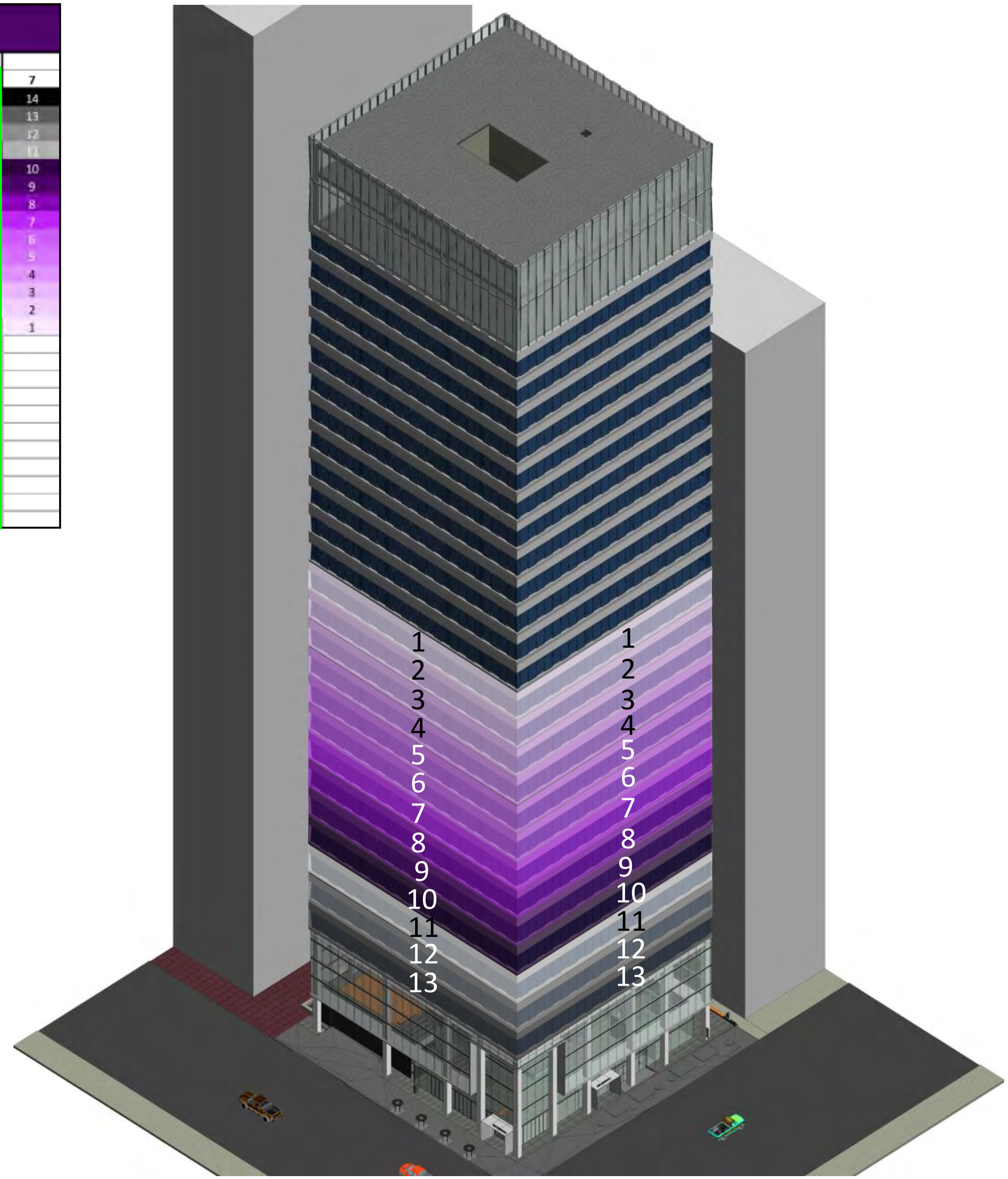

SHORT INTERVAL PRODUCTION SCHEDULING: FLOOR BY FLOOR PHASING

	Sep-15				Oct-15				Nov-15					
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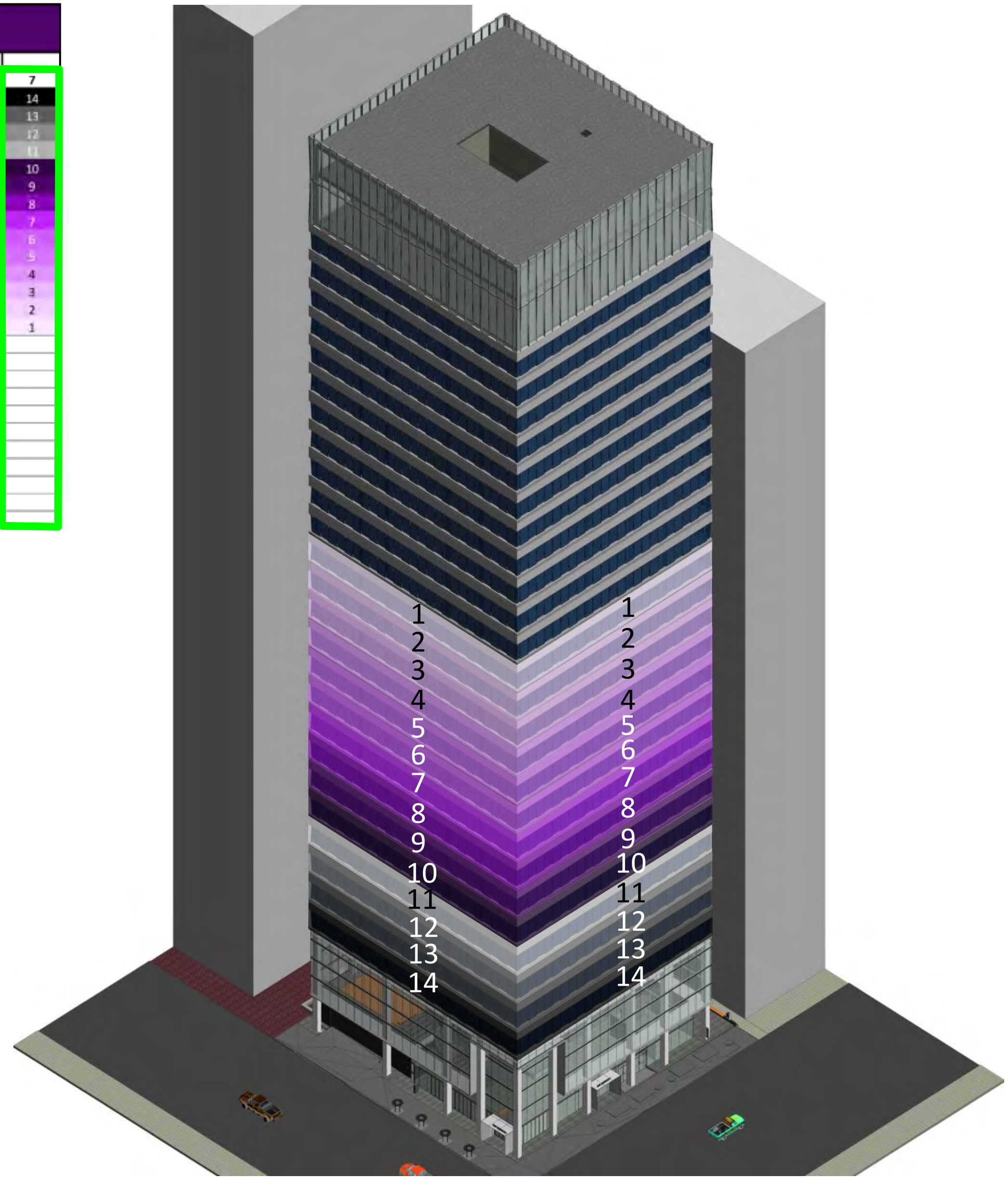

SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

	Sep-15				Oct-15				Nov-15					
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7
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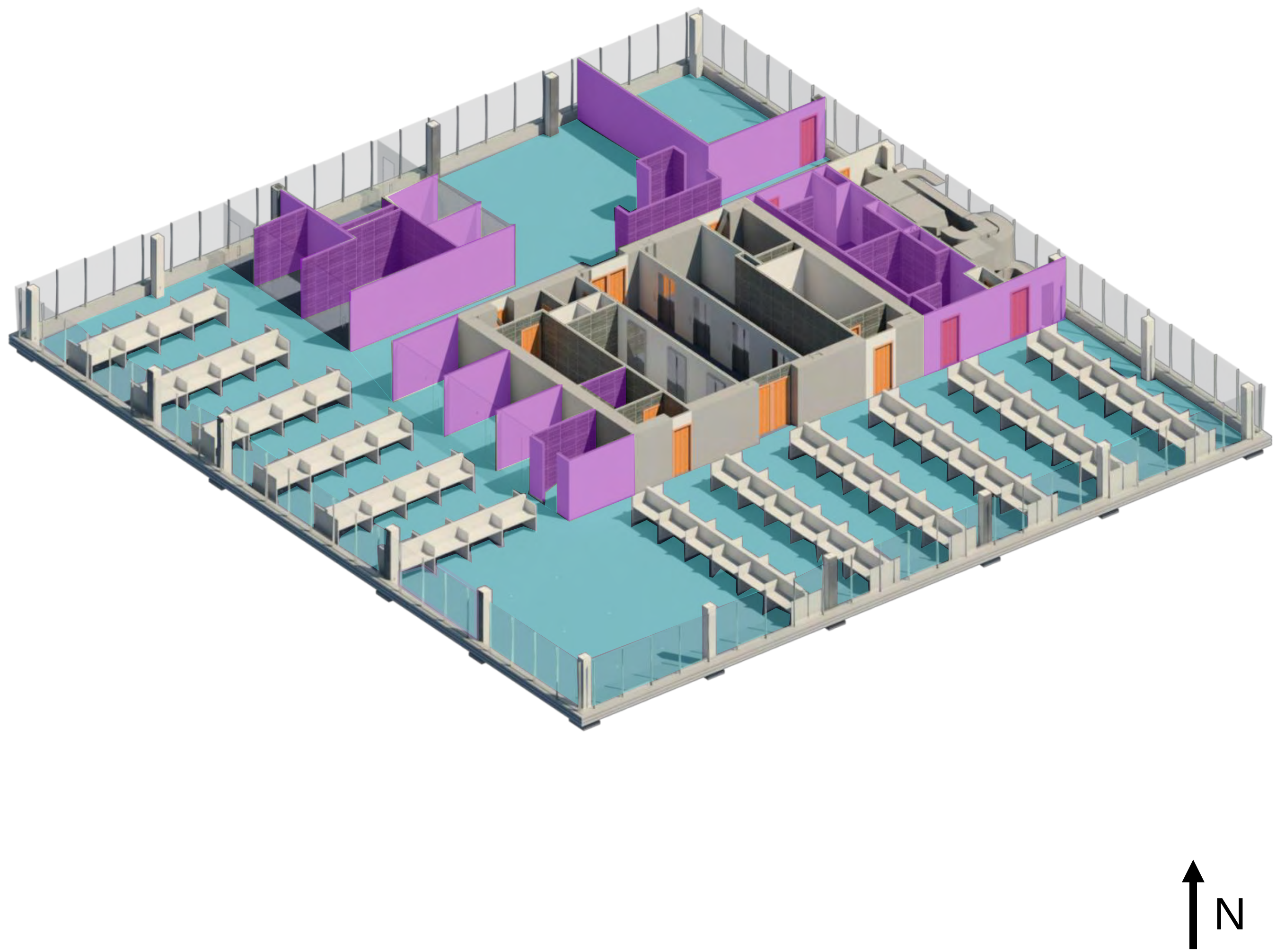

SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

	Sep-15				Oct-15				Nov-15					
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7
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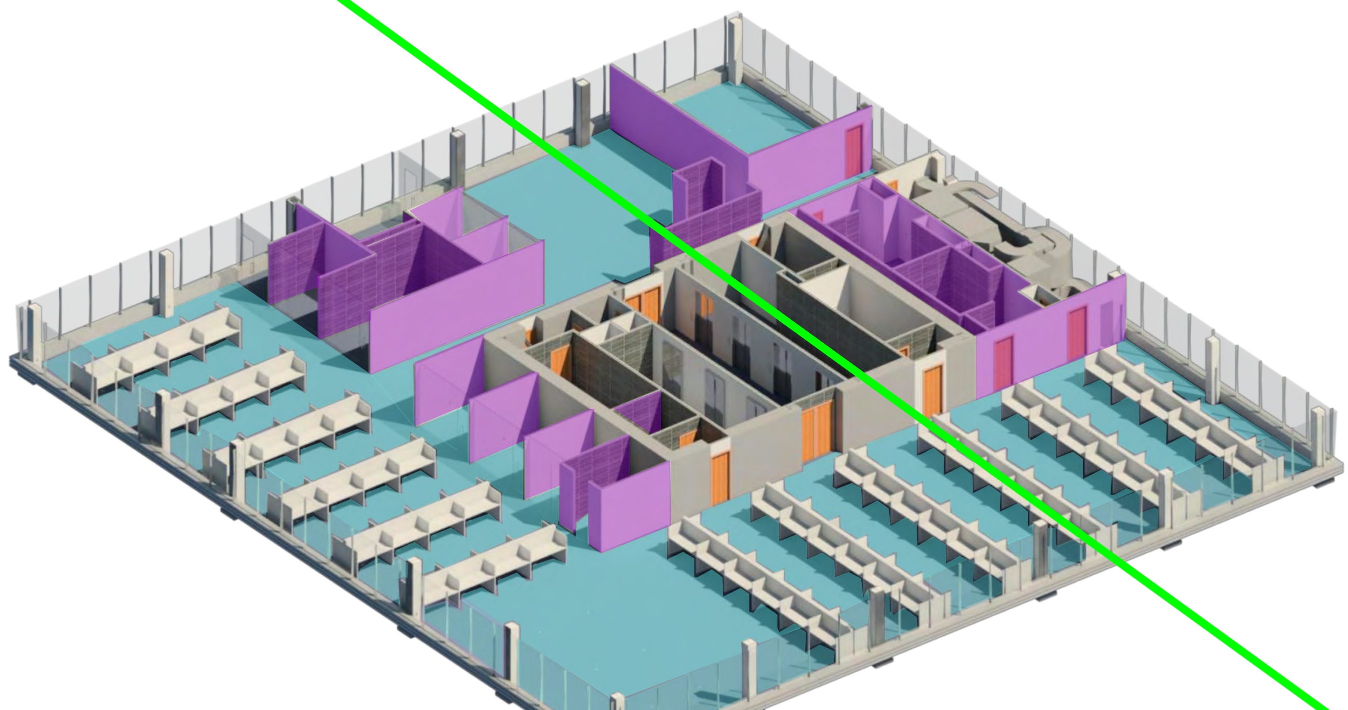

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors

SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

	Sep-15				Oct-15				Nov-15					
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7
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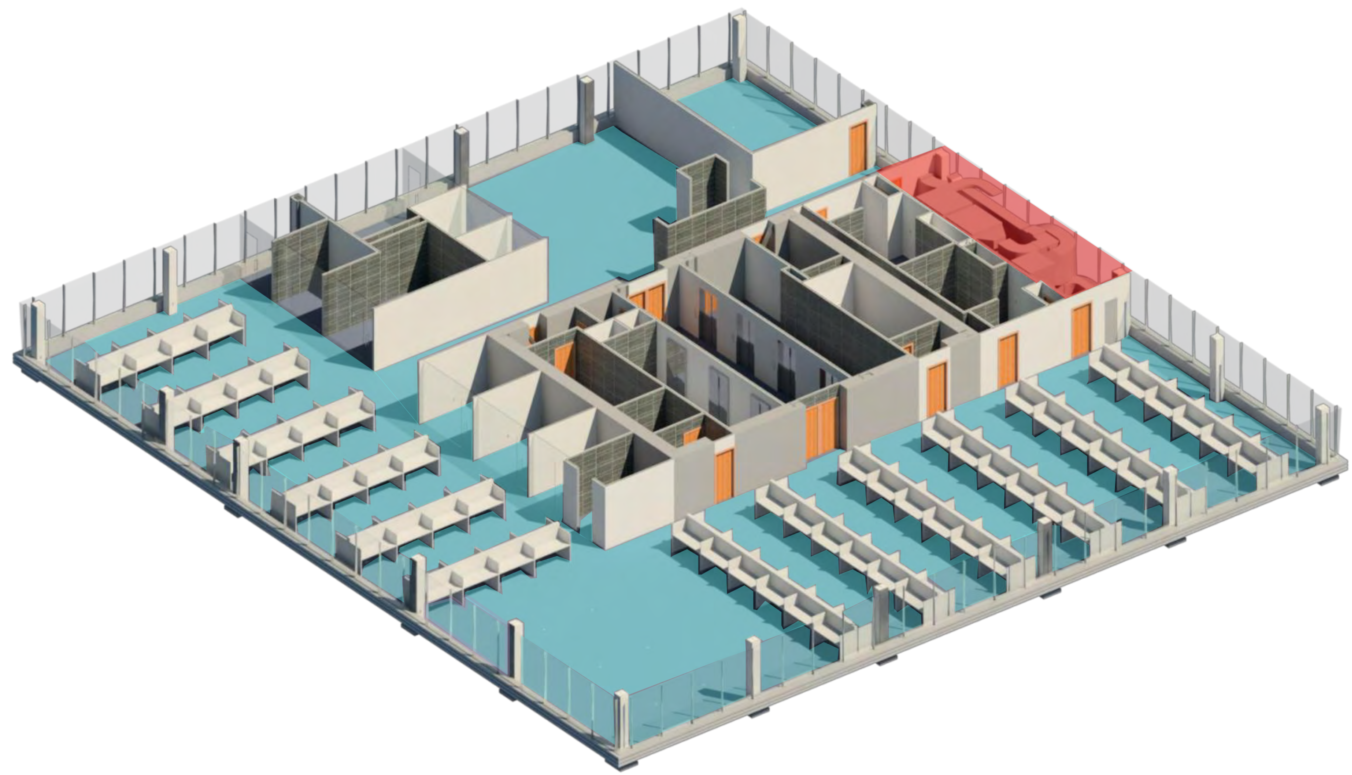

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SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

	Sep-15				Oct-15				Nov-15					
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PERFORMANCE

FACILITIES MANAGEMENT – PHASING – SCHEDULE – ESTIMATE

SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

	Sep-15				Oct-15				Nov-15					
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7
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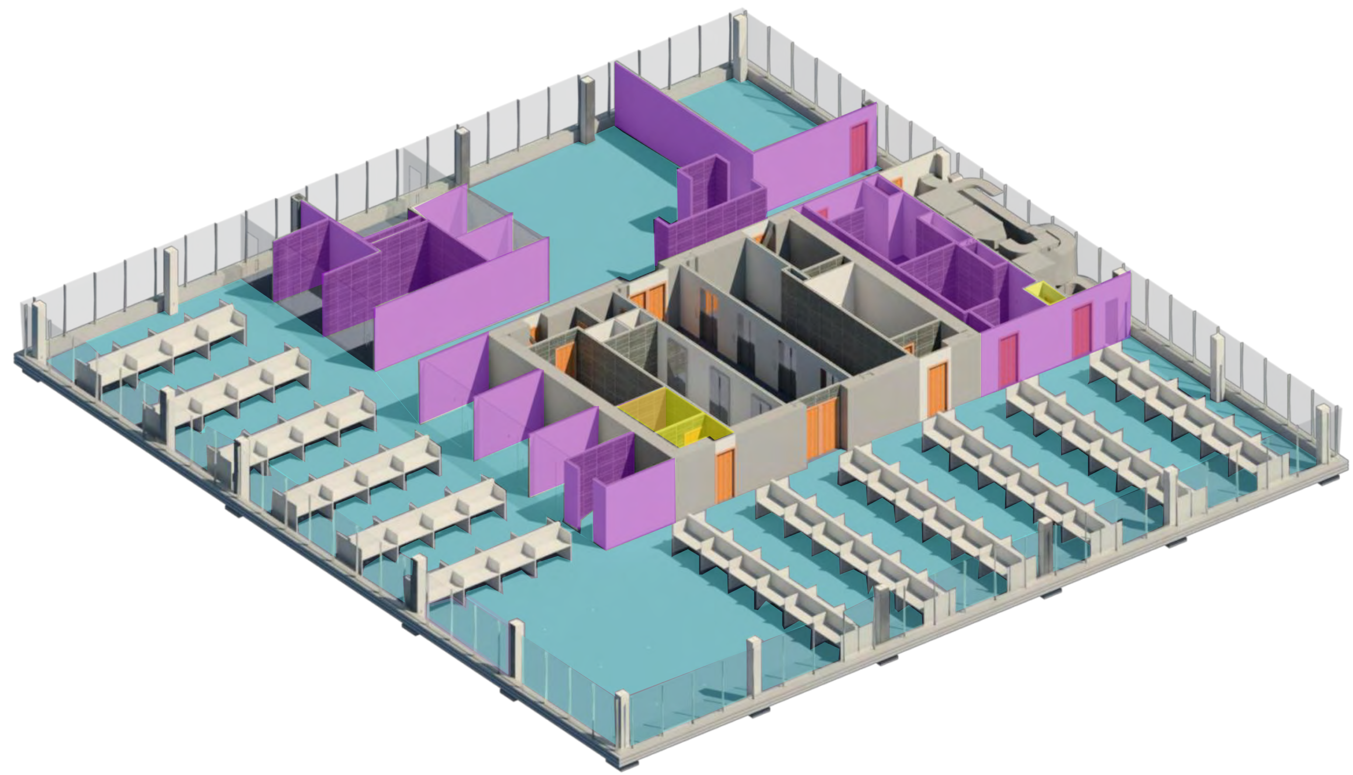

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PERFORMANCE

FACILITIES MANAGEMENT – PHASING – SCHEDULE – ESTIMATE

SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

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SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

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PERFORMANCE

FACILITIES MANAGEMENT – PHASING – SCHEDULE – ESTIMATE

SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

	Sep-15				Oct-15				Nov-15					
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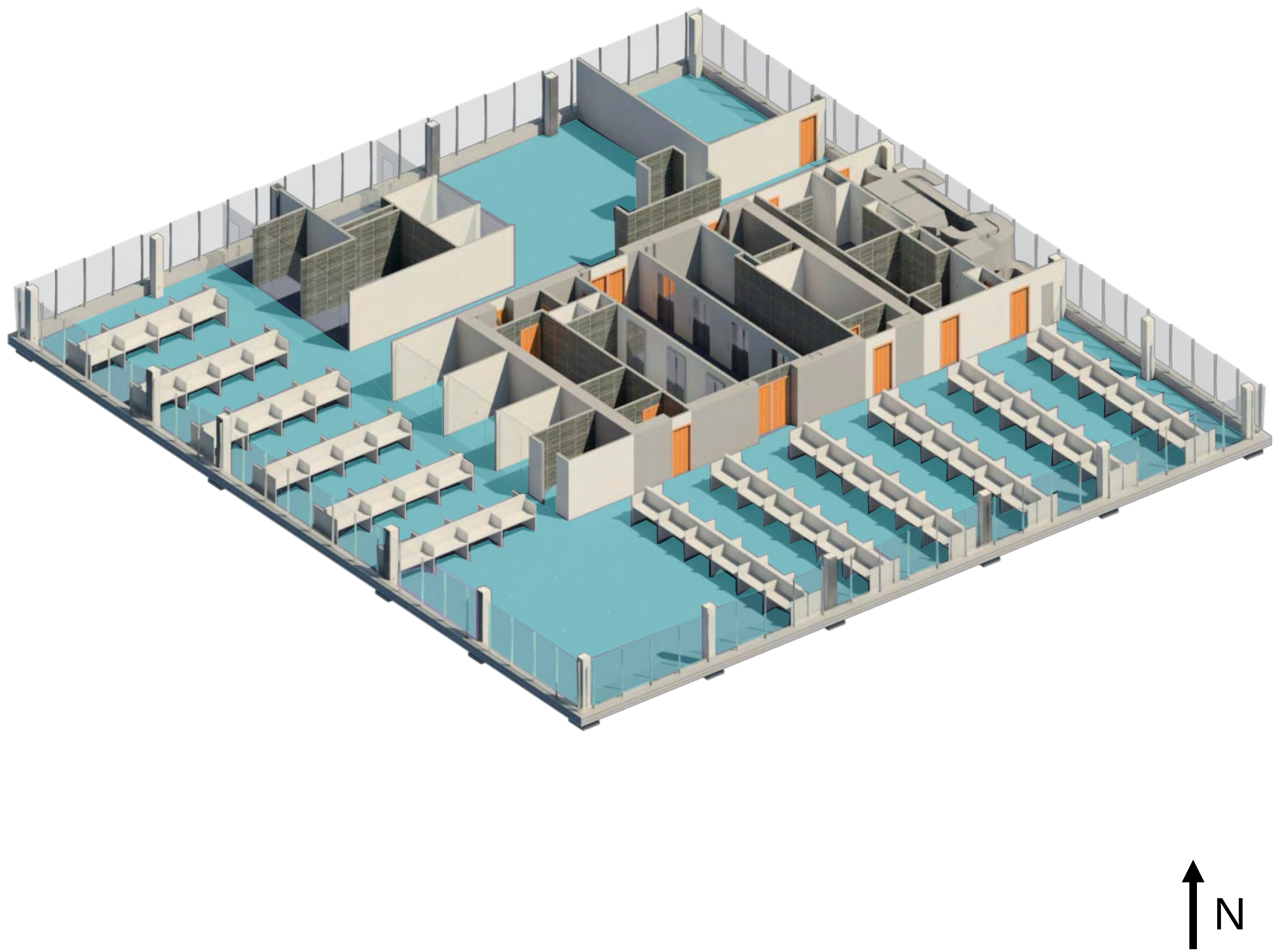

SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

	Sep-15				Oct-15				Nov-15					
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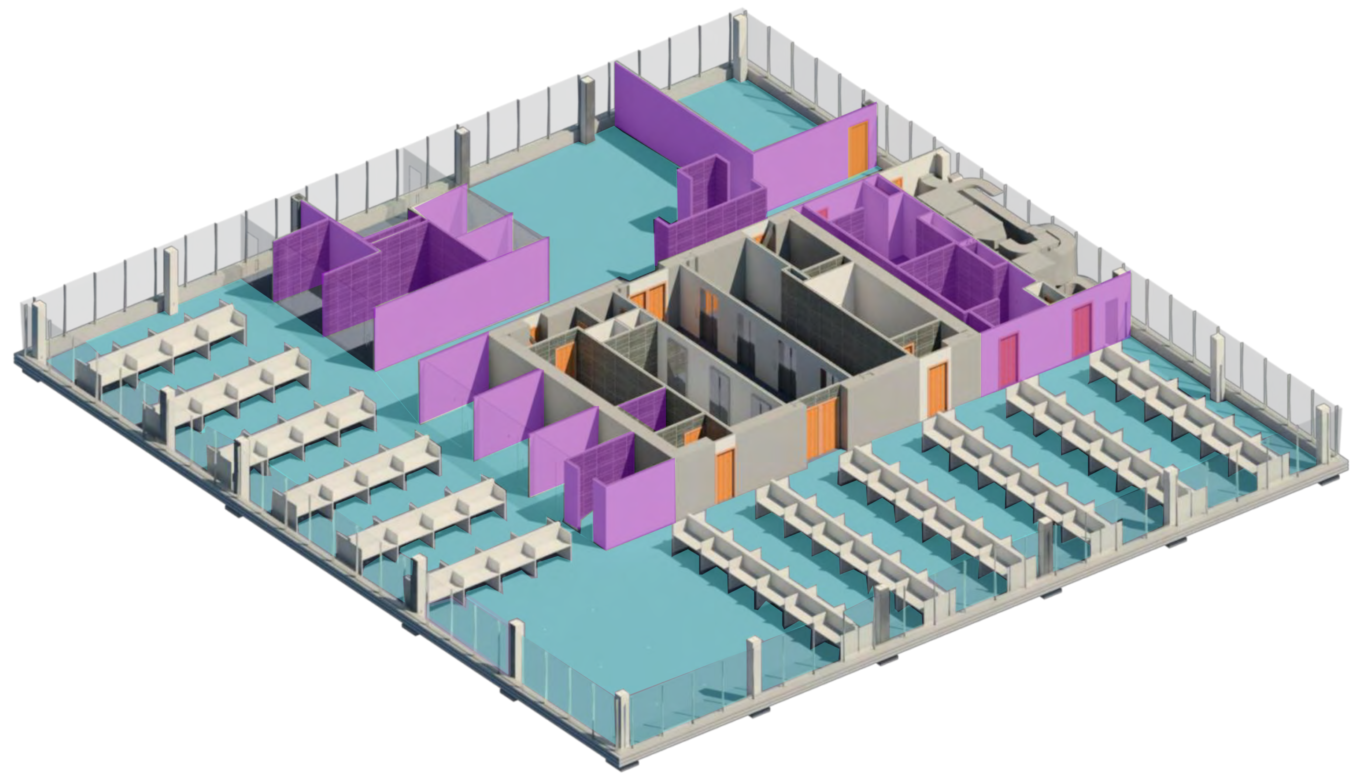

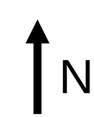

SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

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SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

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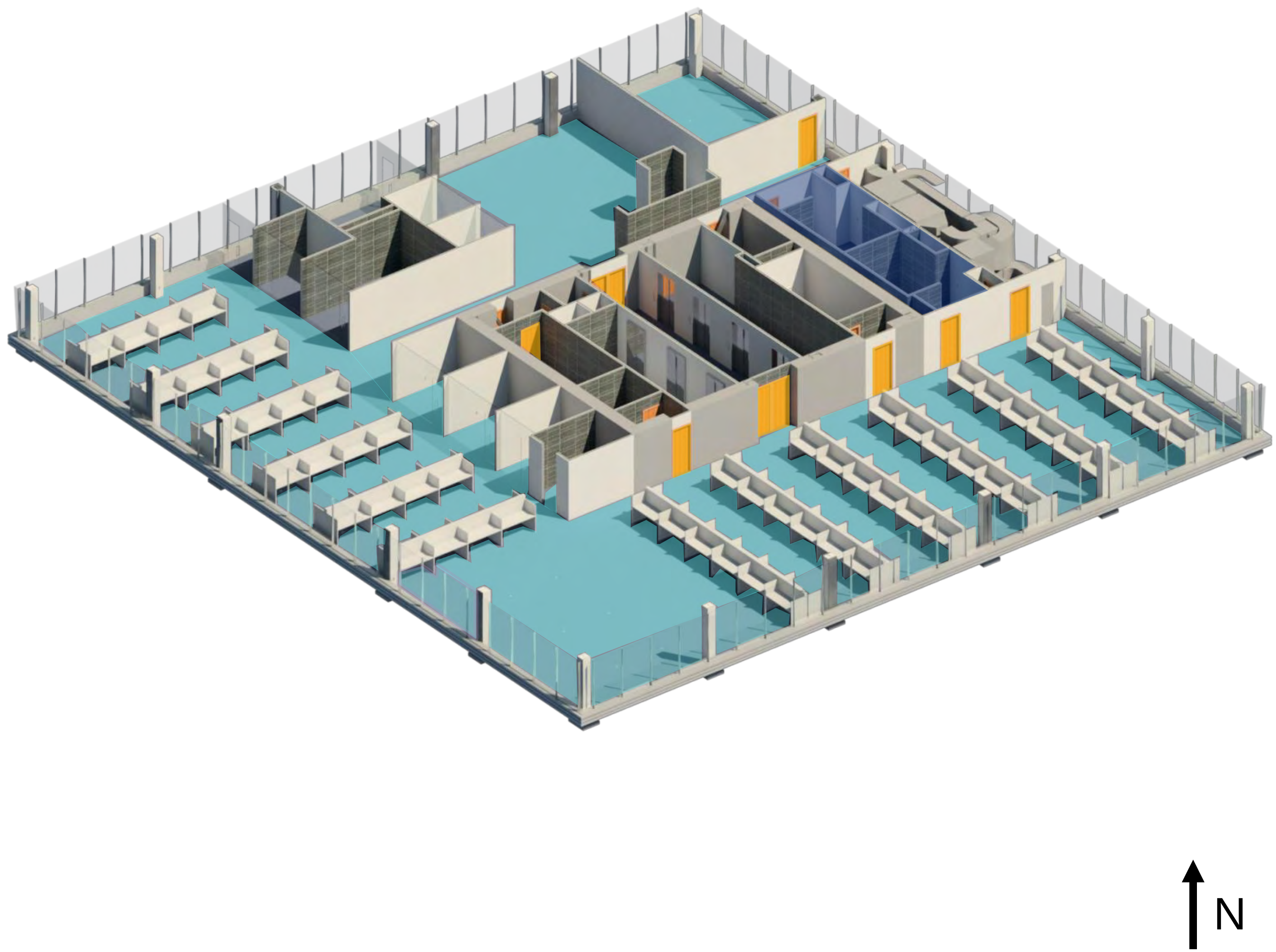


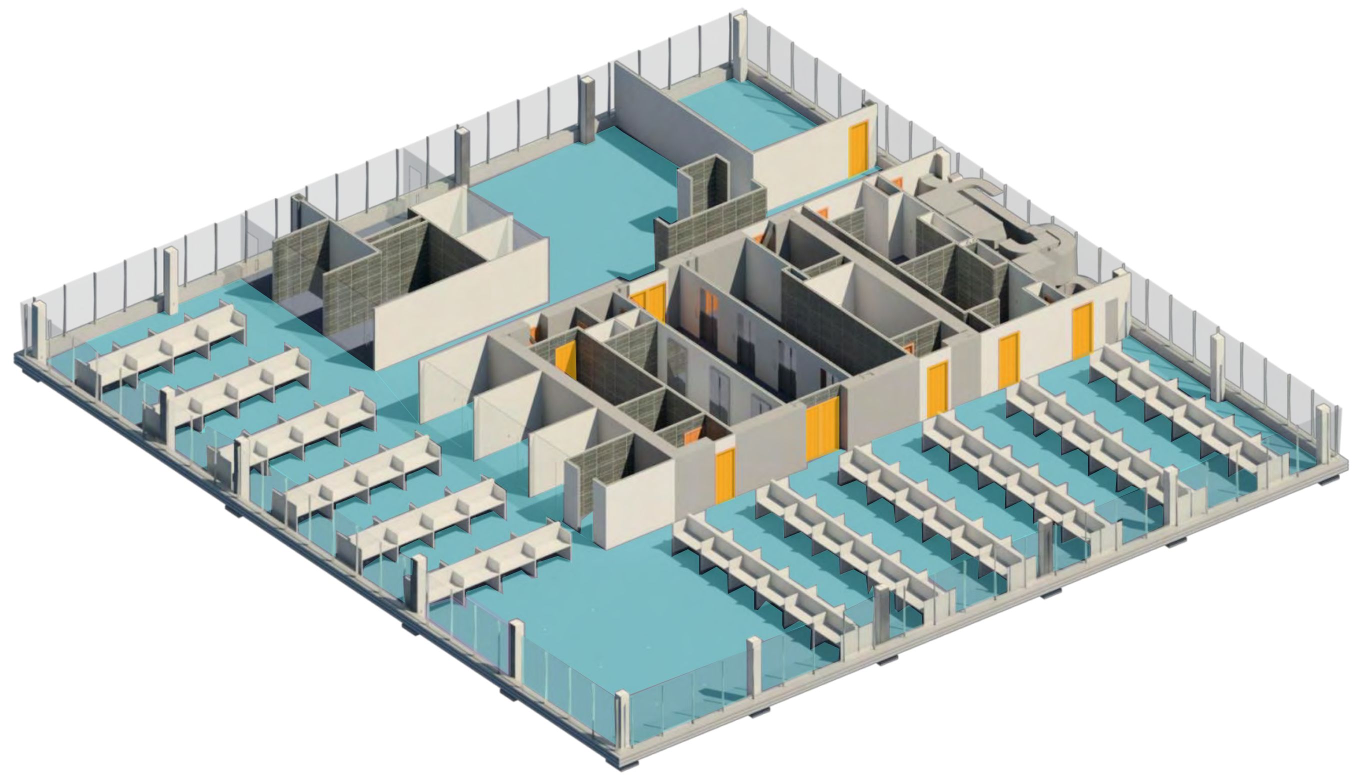
PERFORMANCE

FACILITIES MANAGEMENT – PHASING – SCHEDULE – ESTIMATE

SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

Phase	Activity	Trade
1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
9	Install Electrical Trim/Wall Controls	Elec
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

	Sep-15				Oct-15				Nov-15				
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14



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SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
3	Domestic Water Branches	Plum
	Sanitary/Prefab Toilet Rack Install	Plum
	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
8	Prime and Paint Walls	Painter
	Install Carpet Tile/Ceramic Tile	Flooring
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	Install Light Fixtures	Elec
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	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
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	Install Doors/Locks/Closers	Interiors
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	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

	Sep-15				Oct-15				Nov-15					
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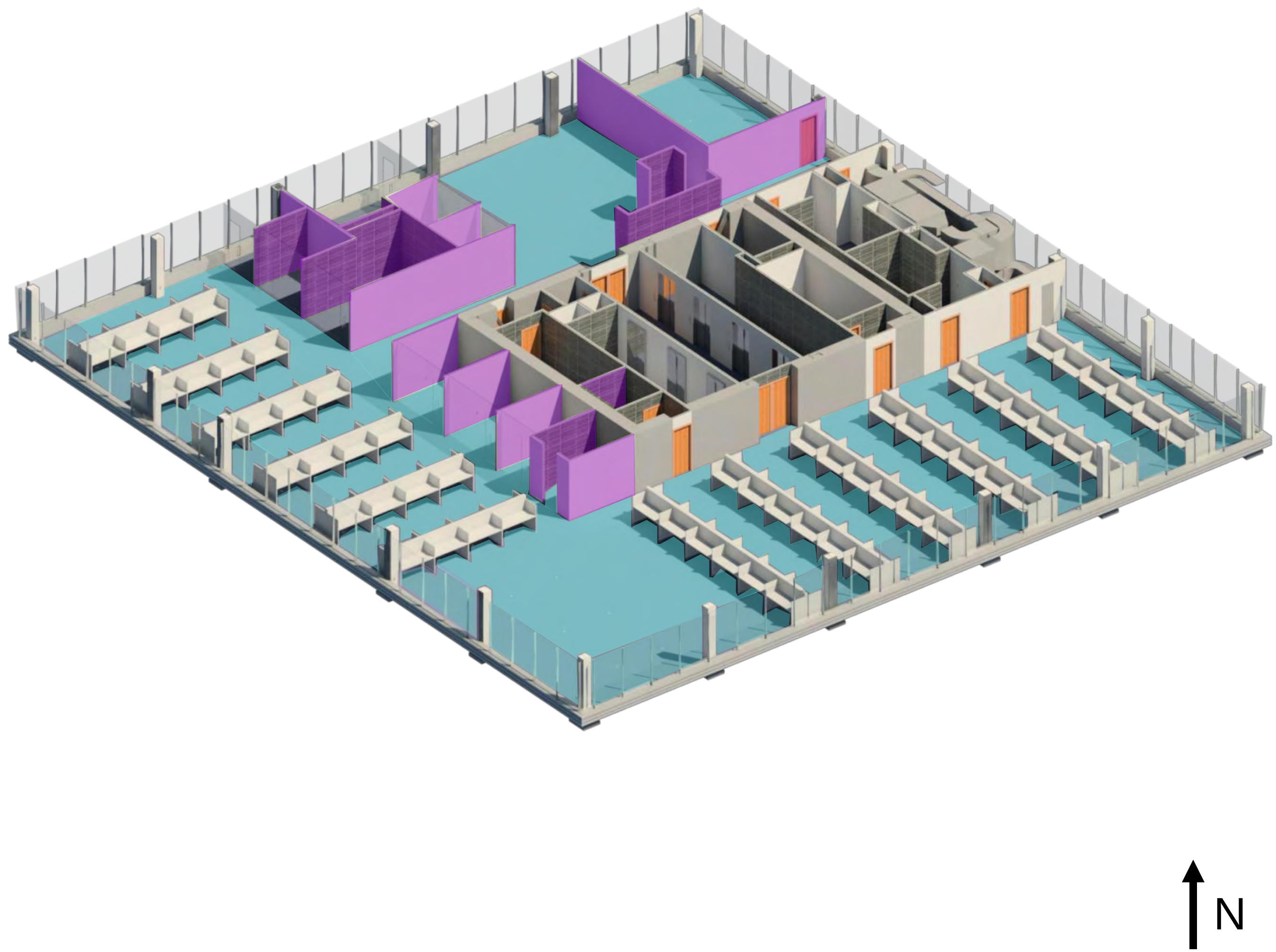
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14



SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

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	Install Raised Floor Warmboard System	Interiors
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	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
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	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
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	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
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	Sprinkler Hydrotest	FP
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	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
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	Final Clean	AEVITAS
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13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
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	Punchout and Signoff	AEVITAS/KR
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	Sep-15				Oct-15				Nov-15					
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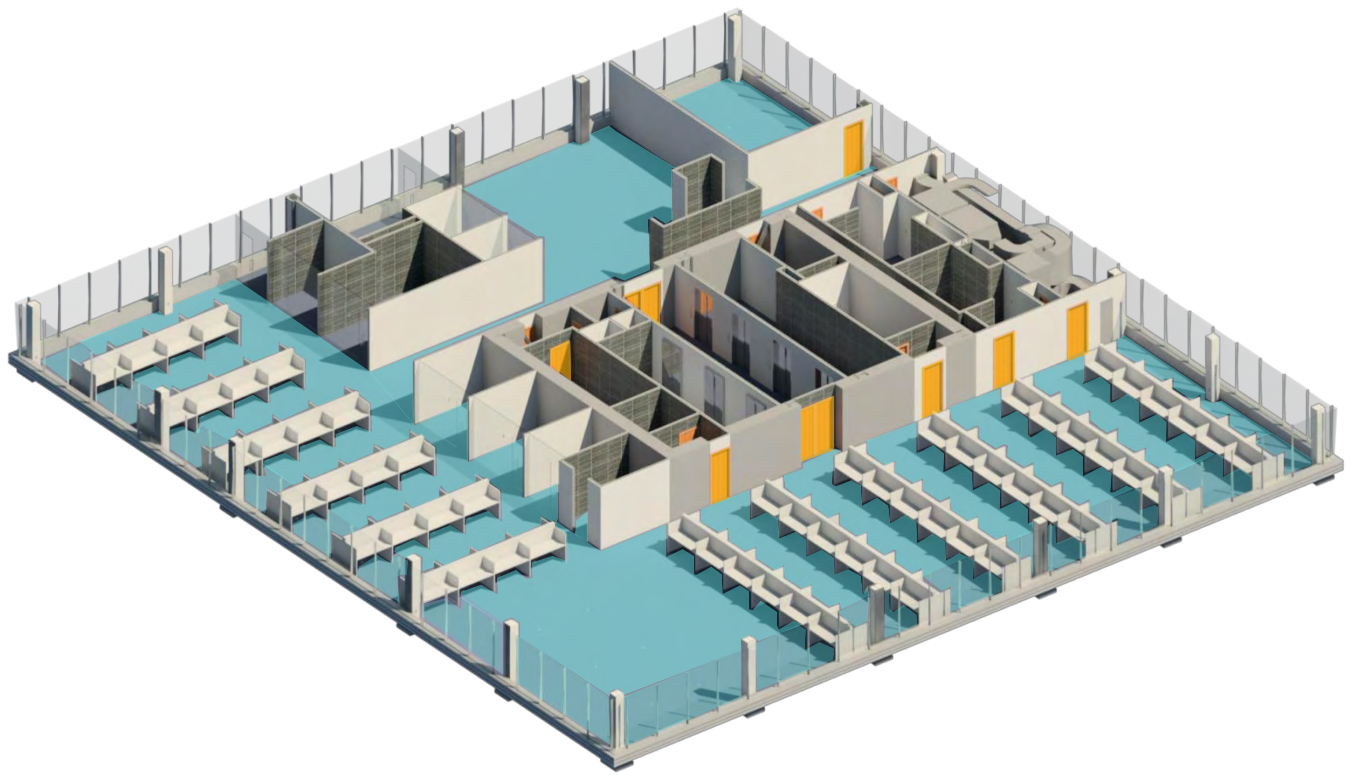
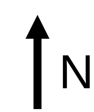
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14





PERFORMANCE

FACILITIES MANAGEMENT – PHASING – **SCHEDULE** – ESTIMATE

SHORT INTERVAL PRODUCTION SCHEDULING: ACTIVITY PHASING PER FLOOR

1	Layout Floor Install Top Track	Interiors
	Install Raised Floor Warmboard System	Interiors
	Layout/Install Radiant Tubing	Mech
	Layout Duct Openings in Int. Walls	Mech
	Metal Stud Walls/Openings	Interiors
2	HVAC Duct Mains/Dampers	Mech
	HVAC Duct Branches	Mech
	Install Duct Insulation	Mech
	Radiant Slab Tie In	Mech
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	Pipe Testing	Plum
	Pipe Insulation	Plum
	Sprinkler Mains	FP
	Sprinkler Branches	FP
4	Install Large Conduit	Elec
	Firestop and Caulk Penetrations	All
	Install Interior Partitions	Interiors
	One Side Drywall	Interiors
5	In Wall Electrical/Comm	Elec/Comm
	In Wall Controls	Controls
	In Wall Electrical Testing/QC	Mech/Plum
6	Close In Inspection	All
	Finish Drywall	Interiors
	Install Door Frames	Interiors
	Install Interior Glass Partitions	Glazer
	Frame/Install Ceiling Grid	Interiors
7	Pull Electrical Wire	Elec
	Pull Data Cable	Elec/Comm
	Pull Fire Alarm Cable	Elec/Comm
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	Install Carpet Tile/Ceramic Tile	Flooring
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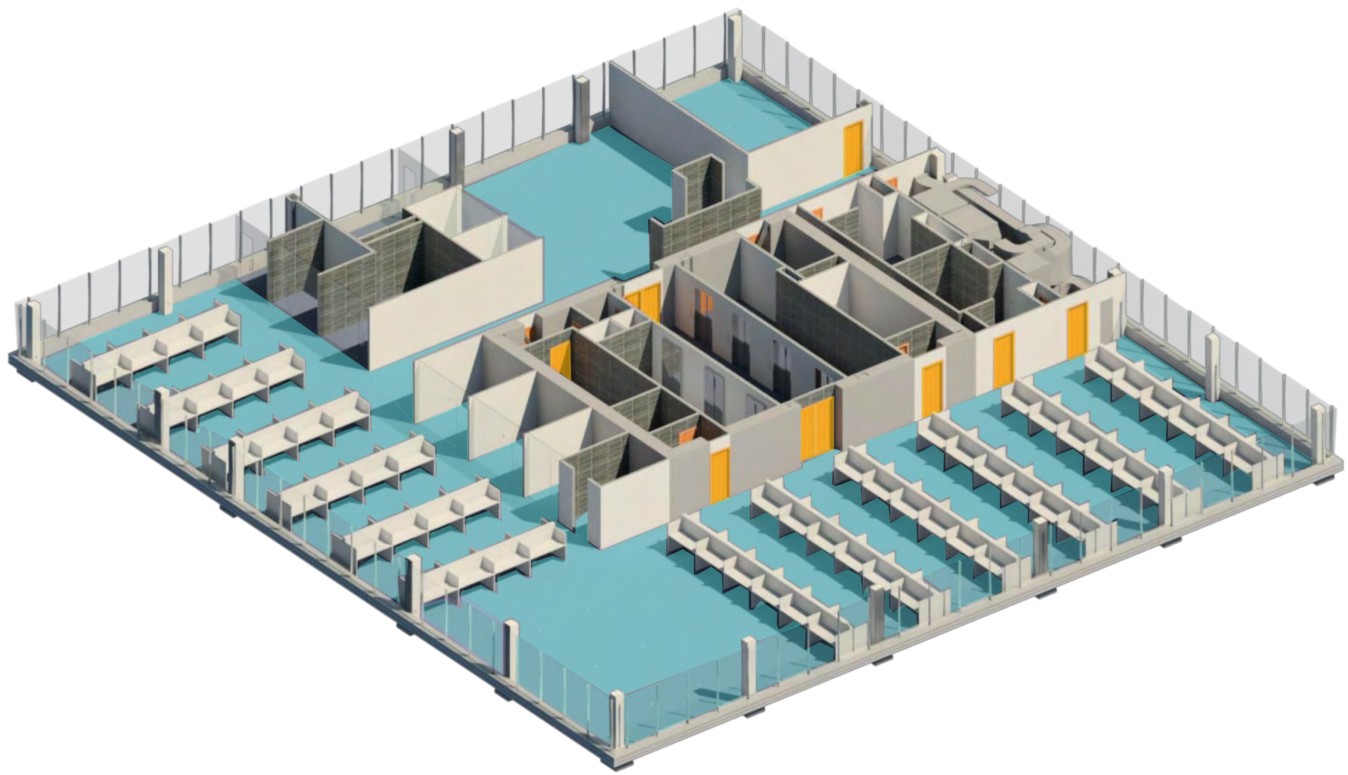
	Install Light Fixtures	Elec
	Set and Hookup Plumbing Fixtures	Mech/Plum
	Caulk Plumbing Fixtures	Mech/Plum
10	Install Sprinkler Drops	FP
	Sprinkler Hydrotest	FP
	Install Bathroom Trim and Partitions	Interiors
	Install Doors/Locks/Closers	Interiors
11	Overhead Close In Inspection	All
	Install Ceiling Tile	Interiors
	HVAC Ceiling Trim	Mech/Plum
	Electrical Ceiling Trim	Elec
	Sprinkler Ceiling Trim	FP
	Misc Trim	Interiors
12	Final Paint	Painter
	Final Clean	AEVITAS
	Air and Water Balancing	Mech/Plum
	Fire Alarm Testing	Elec/Comm
13	Performance Tests - TAB	Mech/Plum
	Performance Tests - Controls	Elec/Controls
	Performance Tests - Lighting	Elec
	Performance Tests - Radiant	Mech/Plum
14	Final Inspection/Punchout	AEVITAS/KR
	Punchout and Signoff	AEVITAS/KR
	Final Acceptance/Floor Completion	AEVITAS/KR

	Sep-15				Oct-15				Nov-15					
Floor	7	14	21	28	5	12	19	26	2	9	16	23	30	7
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14



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PERFORMANCE

FACILITIES MANAGEMENT – PHASING – SCHEDULE – ESTIMATE

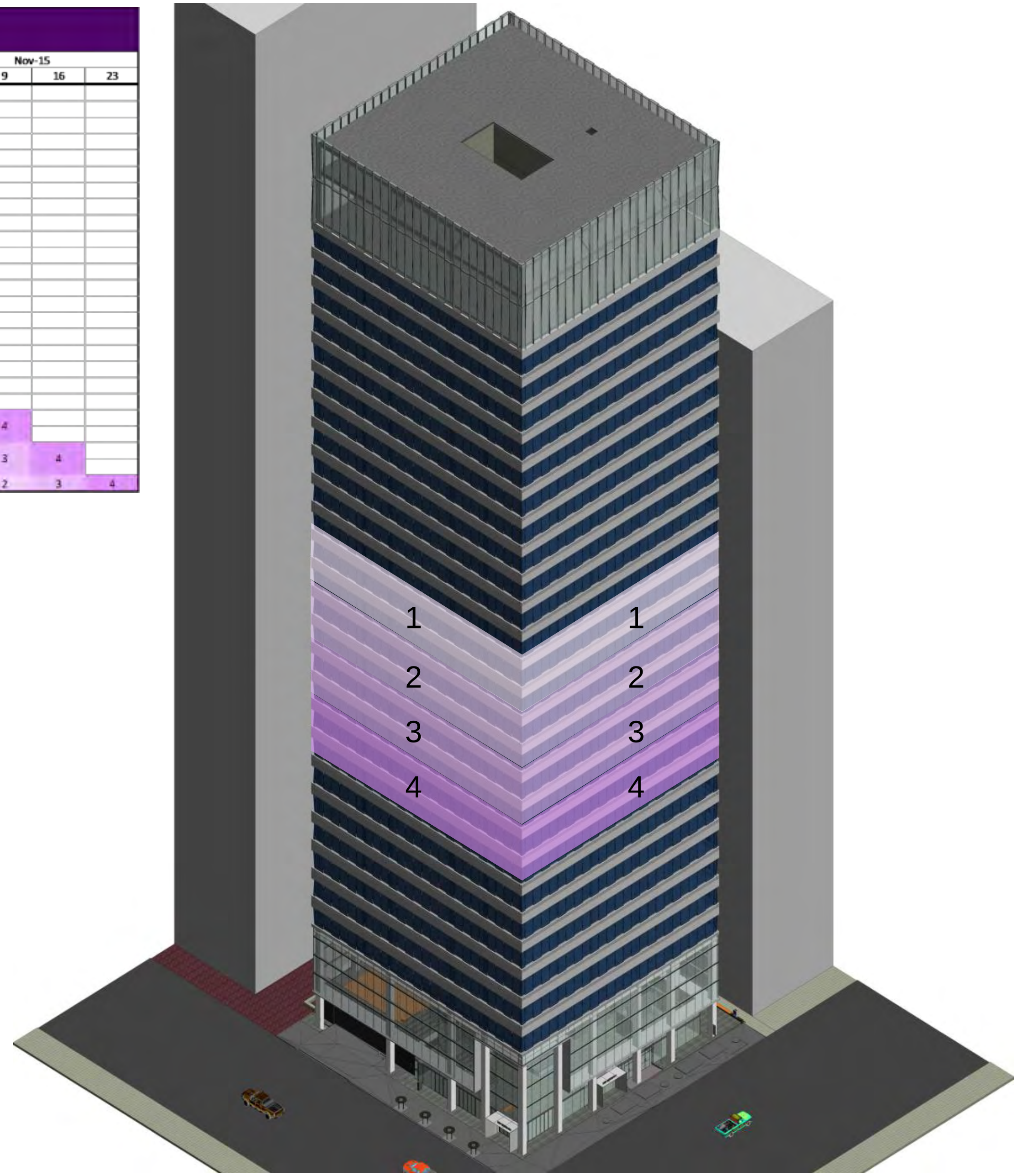
SHORT INTERVAL PRODUCTION SCHEDULING ANALYSIS: TYPICAL OFFICE FLOOR CORE

AEVITAS (Building Core/Risers)																
	Aug-15	Sept-15				Oct-15				Nov-15					Dec-15	
Floor	31	7	14	21	28	5	12	19	26	2	9	16	23	30	7	14
5 6	1	2	3	4												
7 8		1	2	3	4											
9 10			1	2	3	4										
11 12				1	2	3	4									
14 15					1	2	3	4								
16 17						1	2	3	4							
18 19							1	2	3	4						
20 21								1	2	3	4					
22 23									1	2	3	4				
24 25										1	2	3	4			
26 27											1	2	3	4		
28 29												1	2	3	4	
30													1	2	3	4

SHORT INTERVAL PRODUCTION SCHEDULING: CORE PHASING

AEVITAS (Building Core/Risers)

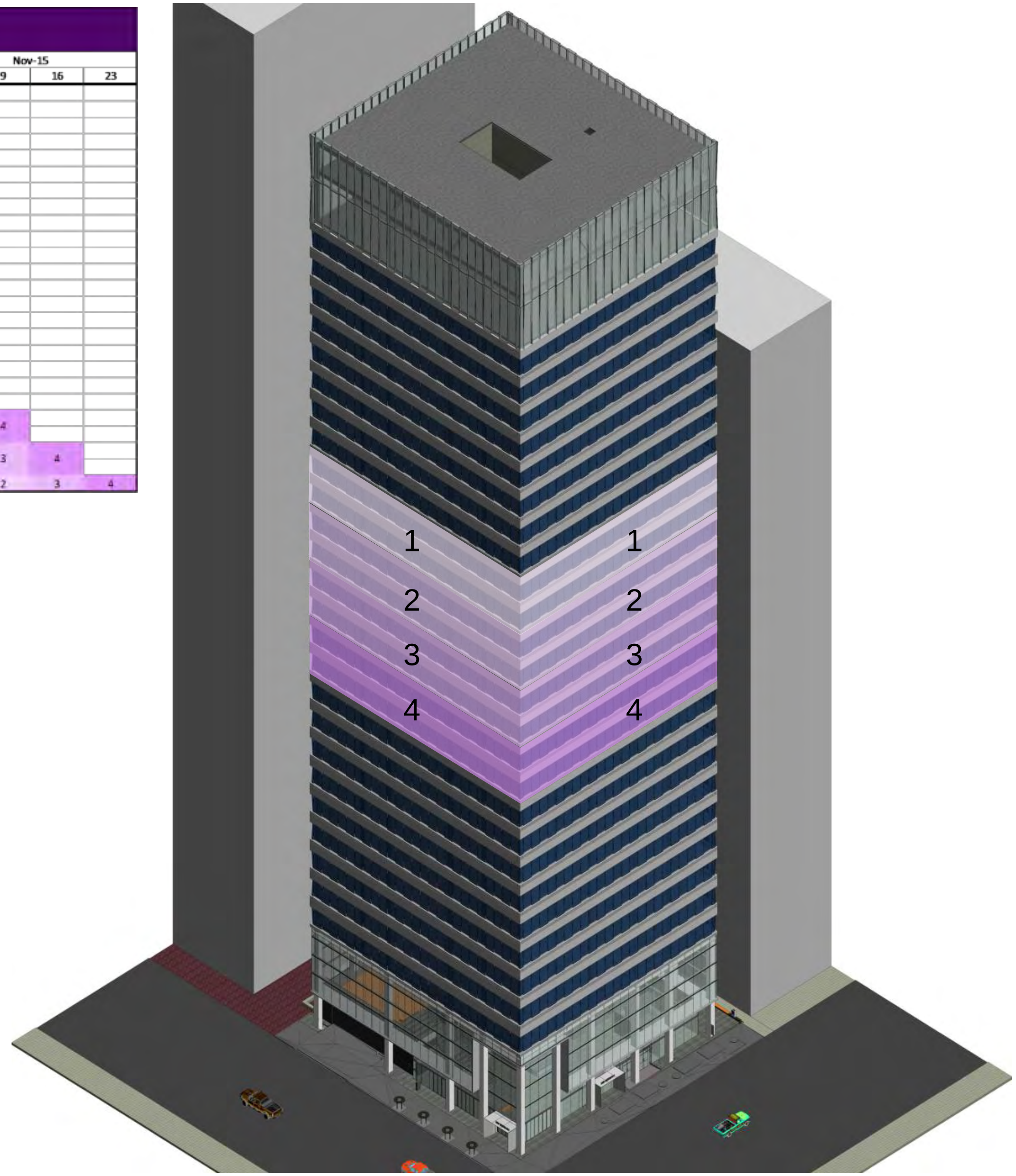
	Aug-15				Sept-15				Oct-15				Nov-15			
Floor	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23
5 6	1	2	3	4												
7 8		1	2	3	4											
9 10			1	2	3	4										
11 12				1	2	3	4									
14 15					1	2	3	4								
16 17						1	2	3	4							
18 19							1	2	3	4						
20 21								1	2	3	4					
22 23									1	2	3	4				
24 25										1	2	3	4			
26 27											1	2	3	4		
28 29												1	2	3	4	
30													1	2	3	4



SHORT INTERVAL PRODUCTION SCHEDULING: CORE PHASING

AEVITAS (Building Core/Risers)

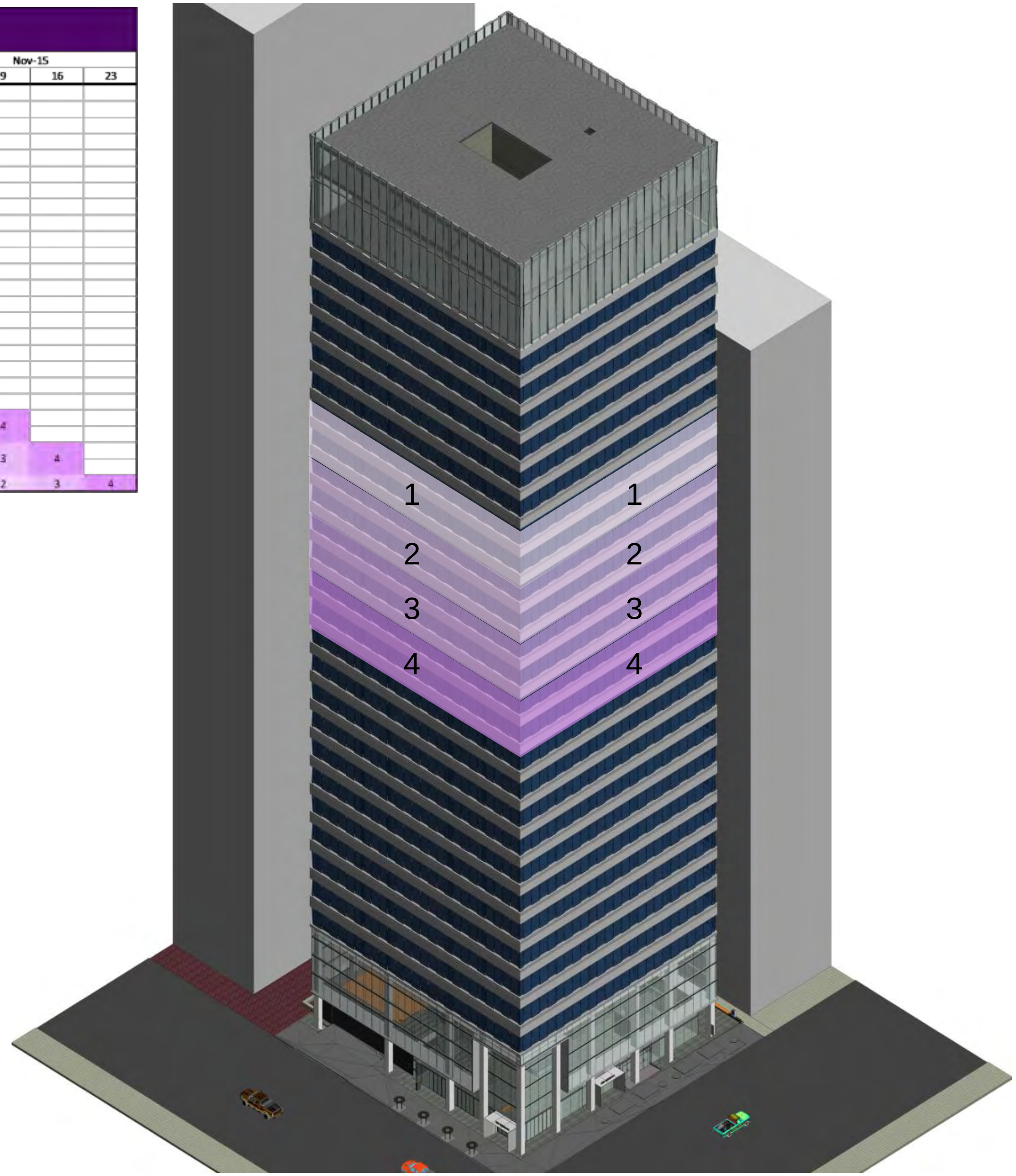
	Aug-15				Sept-15				Oct-15				Nov-15			
Floor	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23
5	1	2	3	4												
6																
7		1	2	3	4											
8																
9			1	2	3	4										
10																
11				1	2	3	4									
12																
14					1	2	3	4								
15																
16						1	2	3	4							
17																
18							1	2	3	4						
19																
20								1	2	3	4					
21																
22									1	2	3	4				
23																
24										1	2	3	4			
25																
26											1	2	3	4		
27																
28												1	2	3	4	
29																
30													1	2	3	4



SHORT INTERVAL PRODUCTION SCHEDULING: CORE PHASING

AEVITAS (Building Core/Risers)

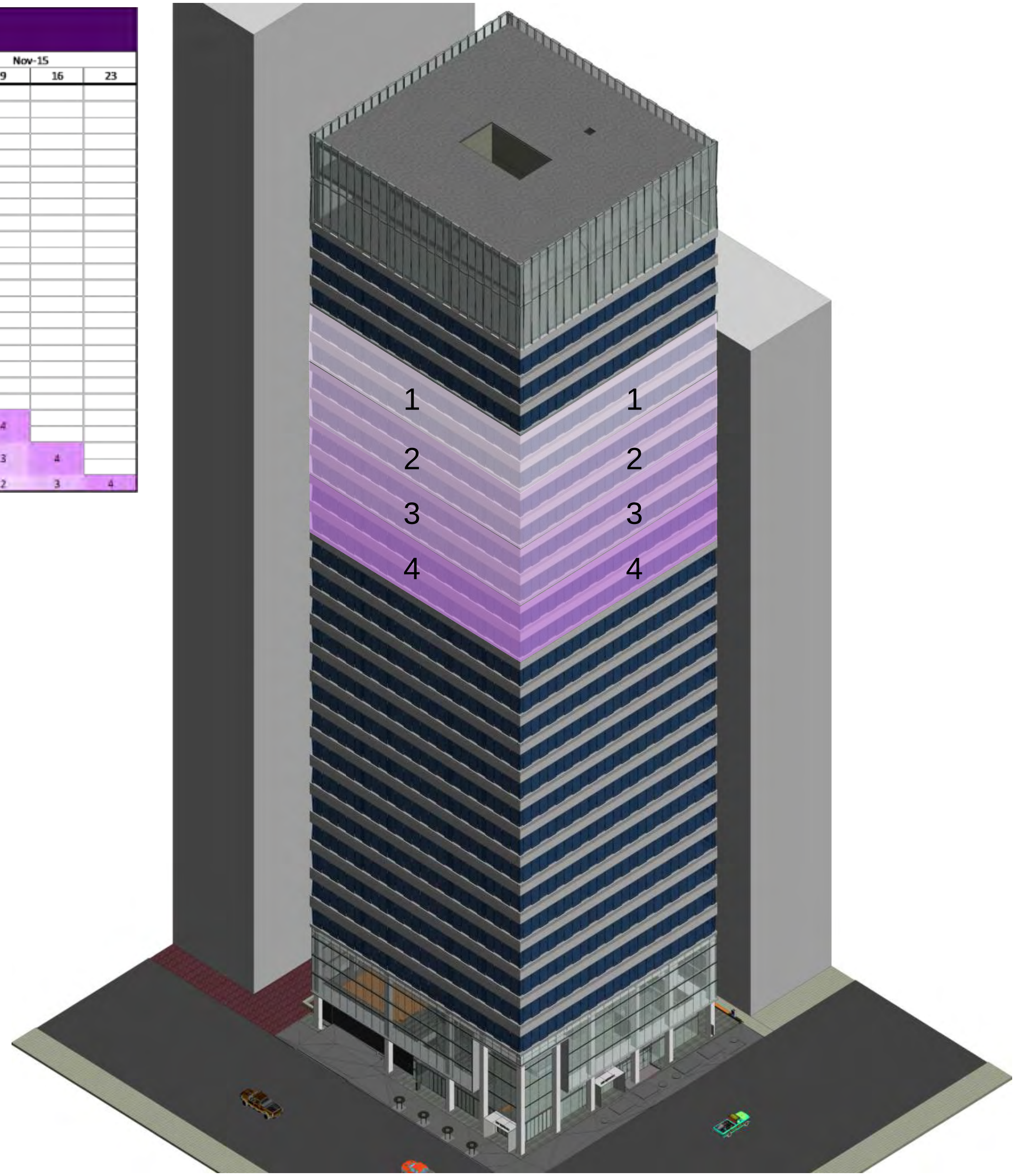
	Aug-15				Sept-15				Oct-15				Nov-15			
Floor	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23
5	1	2	3	4												
6																
7		1	2	3	4											
8																
9			1	2	3	4										
10																
11				1	2	3	4									
12																
14					1	2	3	4								
15																
16						1	2	3	4							
17																
18							1	2	3	4						
19																
20								1	2	3	4					
21																
22									1	2	3	4				
23																
24										1	2	3	4			
25																
26											1	2	3	4		
27																
28												1	2	3	4	
29																
30													1	2	3	4



SHORT INTERVAL PRODUCTION SCHEDULING: CORE PHASING

AEVITAS (Building Core/Risers)

	Aug-15				Sept-15				Oct-15				Nov-15			
Floor	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23
5	1	2	3	4												
6																
7		1	2	3	4											
8																
9			1	2	3	4										
10																
11				1	2	3	4									
12																
14					1	2	3	4								
15																
16						1	2	3	4							
17																
18							1	2	3	4						
19																
20								1	2	3	4					
21																
22									1	2	3	4				
23																
24										1	2	3	4			
25																
26											1	2	3	4		
27																
28												1	2	3	4	
29																
30													1	2	3	4

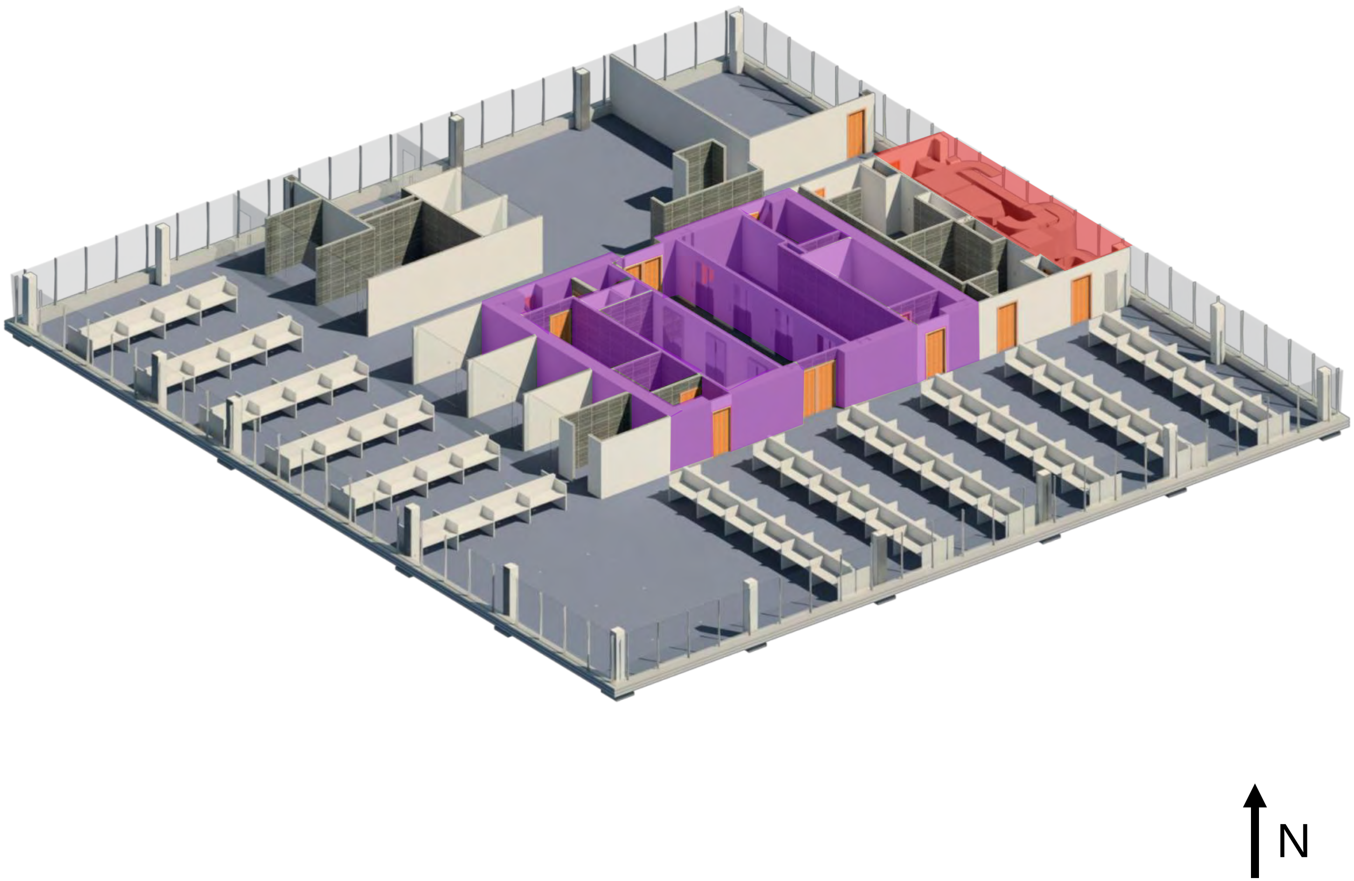


SHORT INTERVAL PRODUCTION SCHEDULING: CORE PHASING PER FLOOR

1	Fall Protection at Core	Interiors
	Install Top Track Around Shaft	Interiors
	Install Duct Risers	Mech
	Install Fire Damper in Duct Risers	Mech
2	Install HVAC Piping Risers	Mech/Plum
	Install Plumbing Risers	Plum
	Install Elec/Comm Risers	Elec/Comm
3	Test HVAC Piping Risers	Mech/Plum
	Test Plumbing Risers	Plum
	Insulate HVAC Piping Risers	Mech/Plum
	Insulate HVAC Duct Risers	Mech
4	Close In Inspection	All
	Install Fire Rated Shaft Walls	Interiors

AEVITAS (Building Core/Risers)

	Aug-15				Sept-15				Oct-15			
Floor	10	17	24	31	7	14	21	28	5	12	19	26
5	1	2	3	4								
6												



PERFORMANCE

FACILITIES MANAGEMENT – PHASING – SCHEDULE – ESTIMATE

SHORT INTERVAL PRODUCTION SCHEDULING: CORE PHASING PER FLOOR

1	Fall Protection at Core	Interiors
	Install Top Track Around Shaft	Interiors
	Install Duct Risers	Mech
	Install Fire Damper in Duct Risers	Mech
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	Test Plumbing Risers	Plum
	Insulate HVAC Piping Risers	Mech/Plum
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4	Close In Inspection	All
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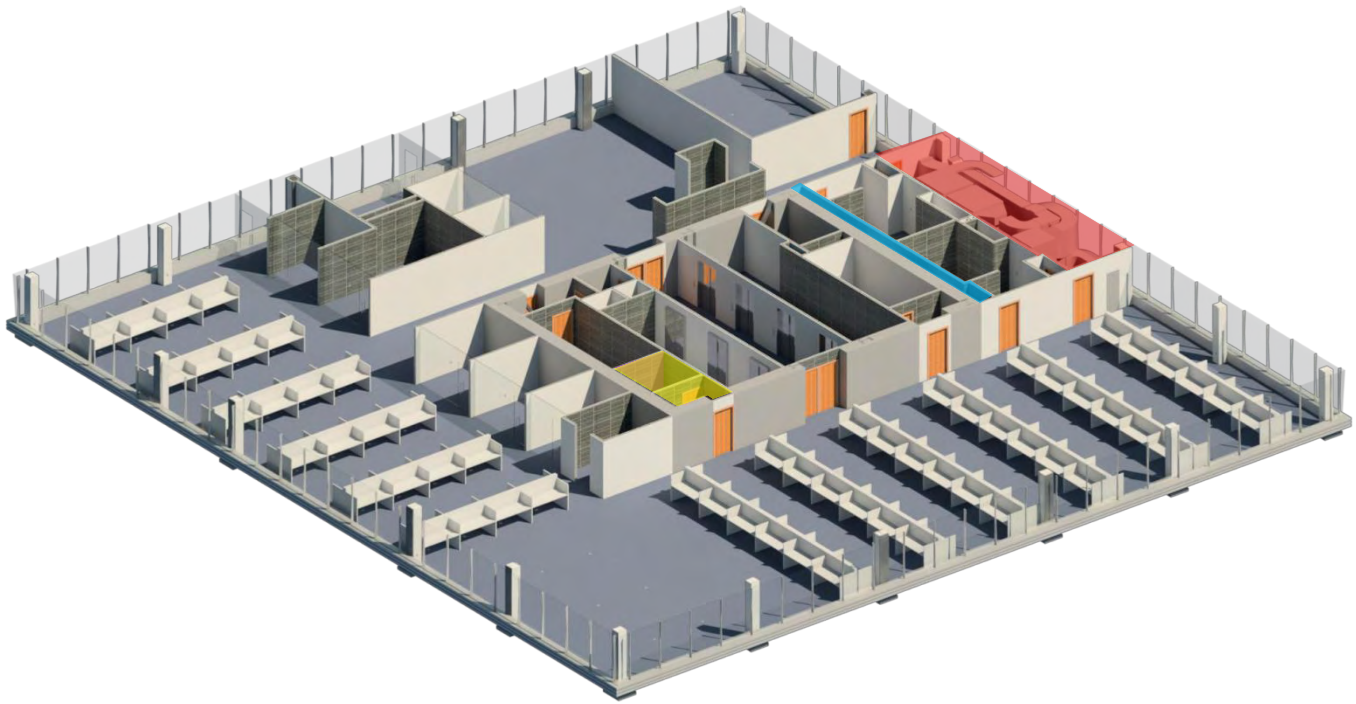
AEVITAS (Building Core/Risers)

	Aug-15				Sept-15				Oct-15			
Floor	10	17	24	31	7	14	21	28	5	12	19	26
5	1	2	3	4								
6												



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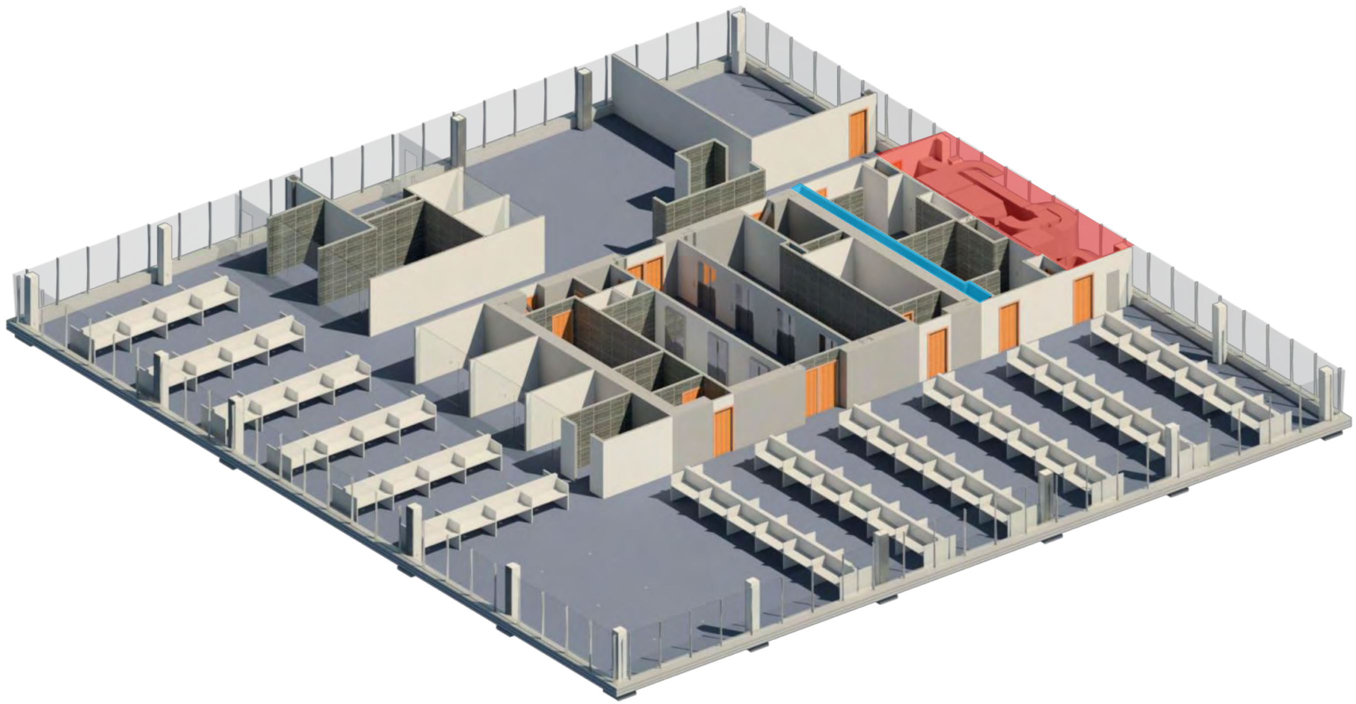
PERFORMANCE FACILITIES MANAGEMENT – PHASING – SCHEDULE – ESTIMATE

SHORT INTERVAL PRODUCTION SCHEDULING: CORE PHASING PER FLOOR

1	Fall Protection at Core	Interiors
	Install Top Track Around Shaft	Interiors
	Install Duct Risers	Mech
	Install Fire Damper in Duct Risers	Mech
2	Install HVAC Piping Risers	Mech/Plum
	Install Plumbing Risers	Plum
	Install Elec/Comm Risers	Elec/Comm
3	Test HVAC Piping Risers	Mech/Plum
	Test Plumbing Risers	Plum
	Insulate HVAC Piping Risers	Mech/Plum
	Insulate HVAC Duct Risers	Mech
4	Close In Inspection	All
	Install Fire Rated Shaft Walls	Interiors

AEVITAS (Building Core/Risers)

	Aug-15				Sept-15				Oct-15			
Floor	10	17	24	31	7	14	21	28	5	12	19	26
5	1	2	3	4								
6												



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AEVITAS (Building Core/Risers)

	Aug-15				Sept-15				Oct-15			
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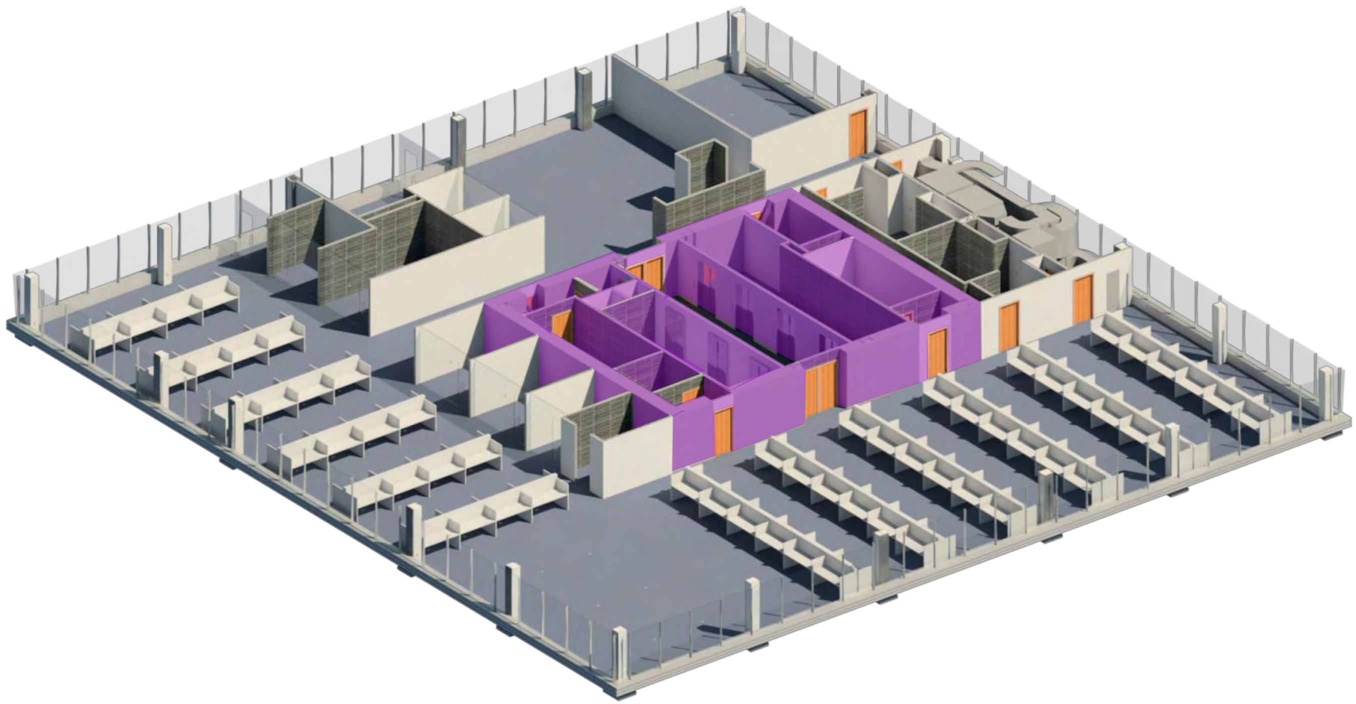
5	1	2	3	4								
6												



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FULL PROJECT SCHEDULE

PROJECT BEGINS
4/7/14

5/20/16
END OF PROJECT

PROJECT BEGINS
4/7/14

TOTAL PROJECT DURATION: 26 MONTHS

5/20/16
END OF PROJECT

FULL PROJECT SCHEDULE

PROJECT BEGINS
4/7/14

5/20/16
END OF PROJECT

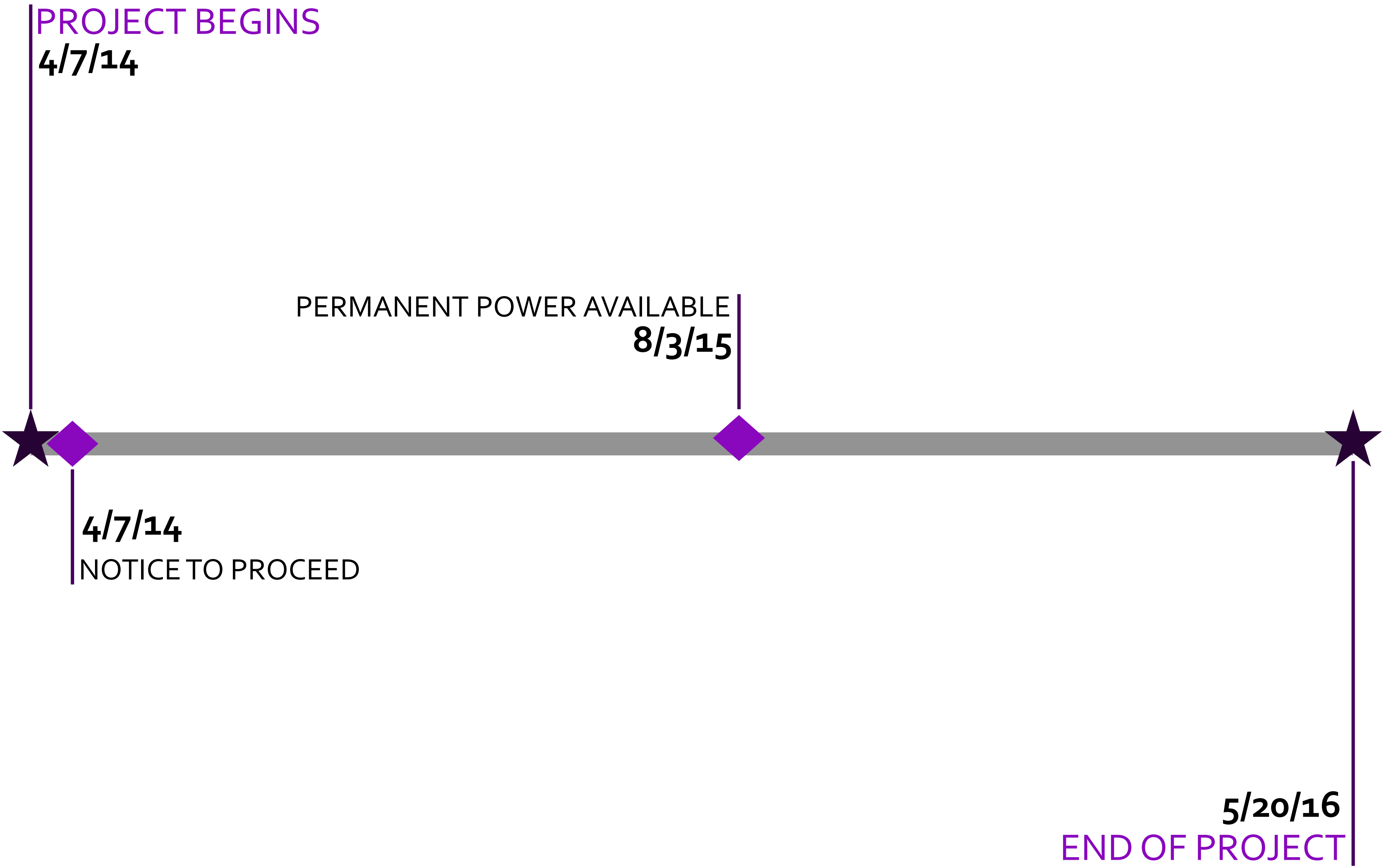
FULL PROJECT SCHEDULE

PROJECT BEGINS
4/7/14

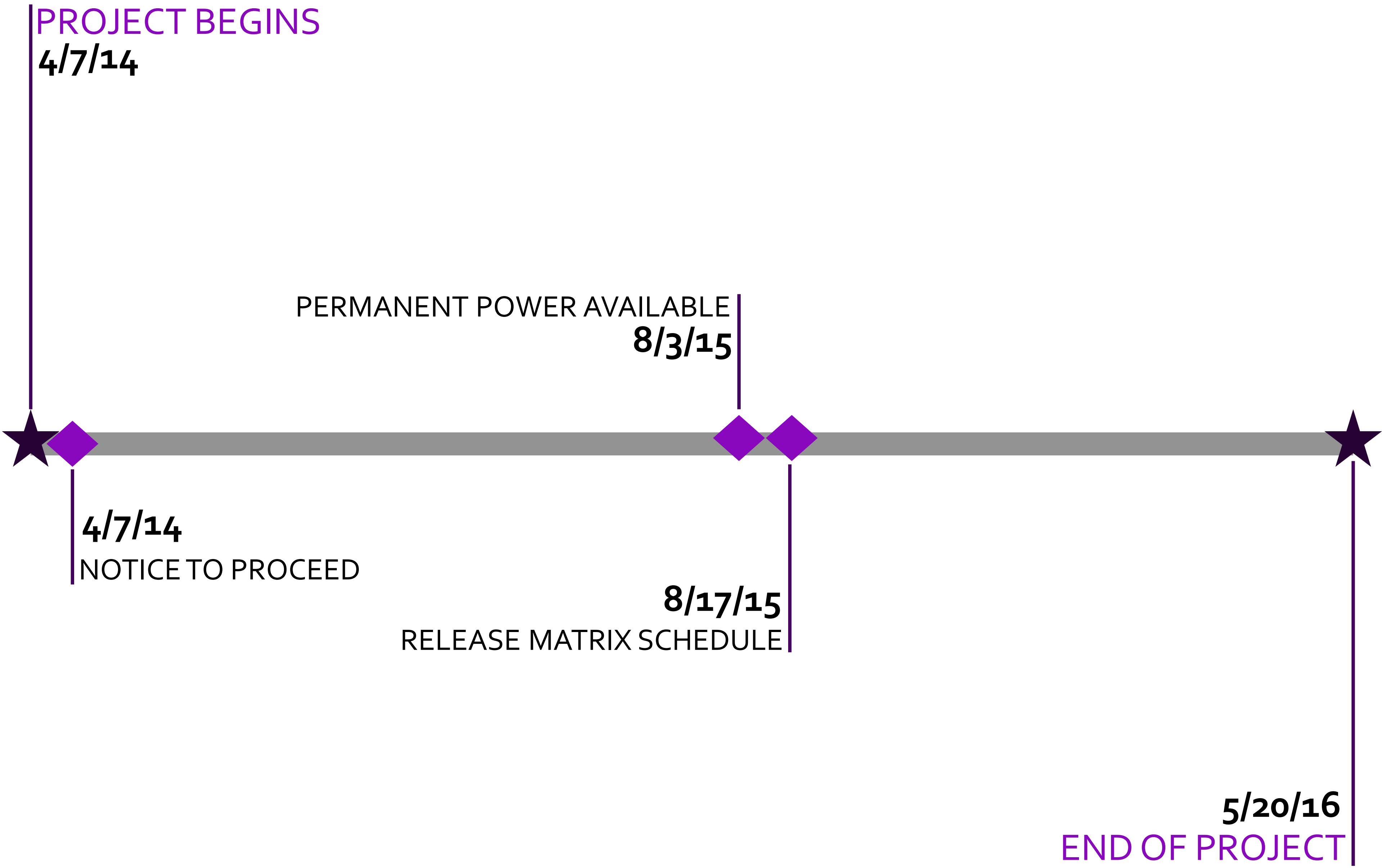
4/7/14
NOTICE TO PROCEED

5/20/16
END OF PROJECT

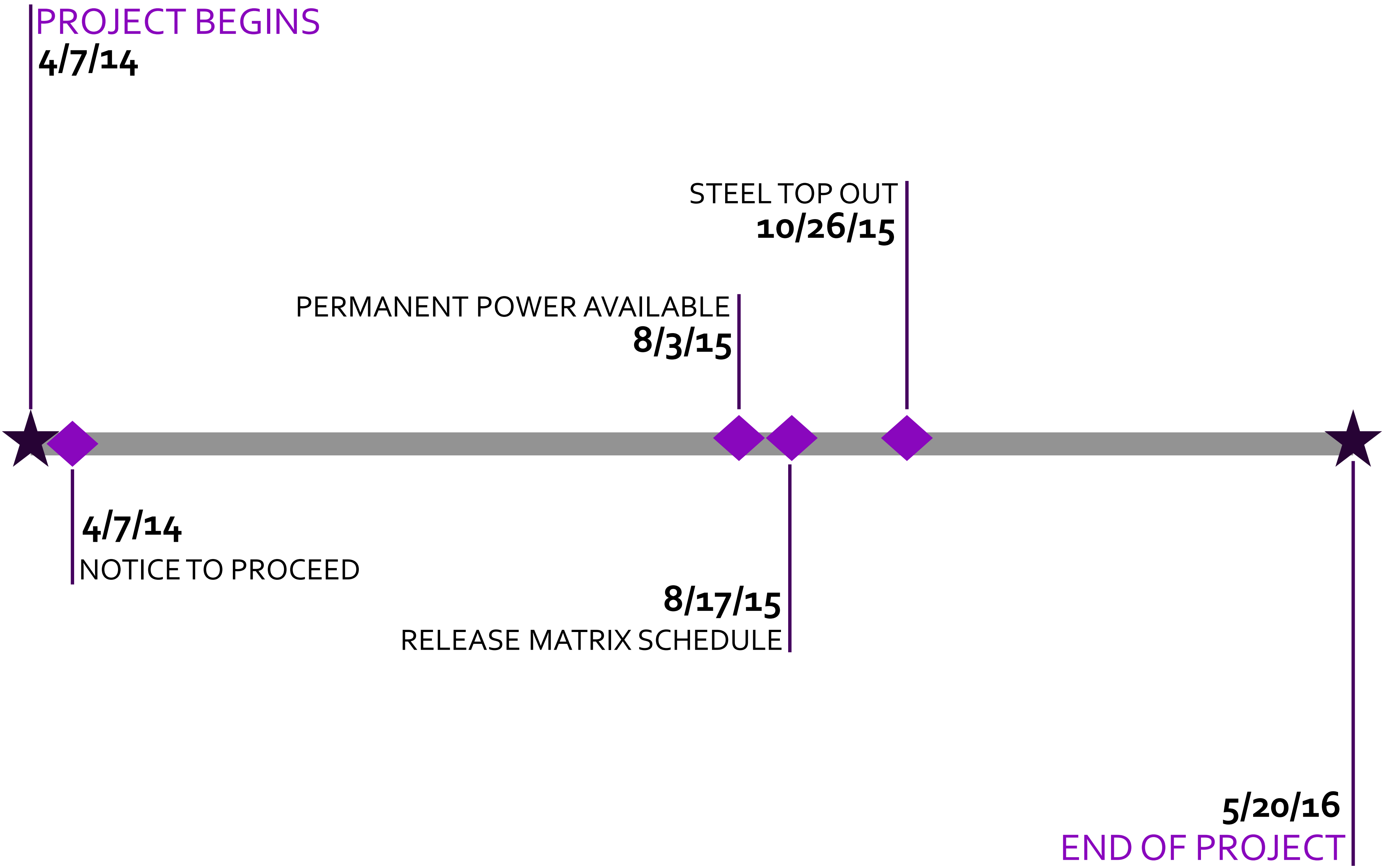
FULL PROJECT SCHEDULE



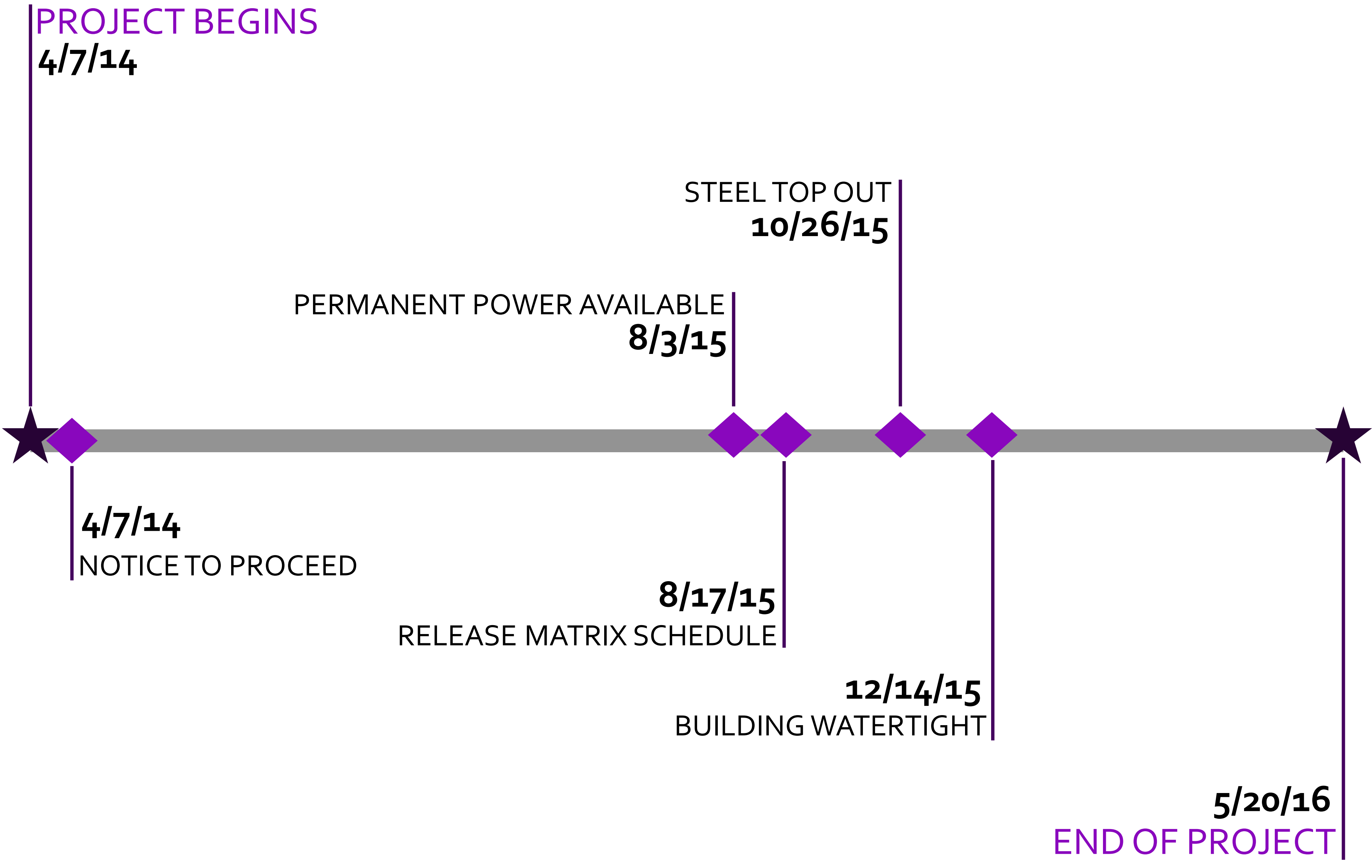
FULL PROJECT SCHEDULE



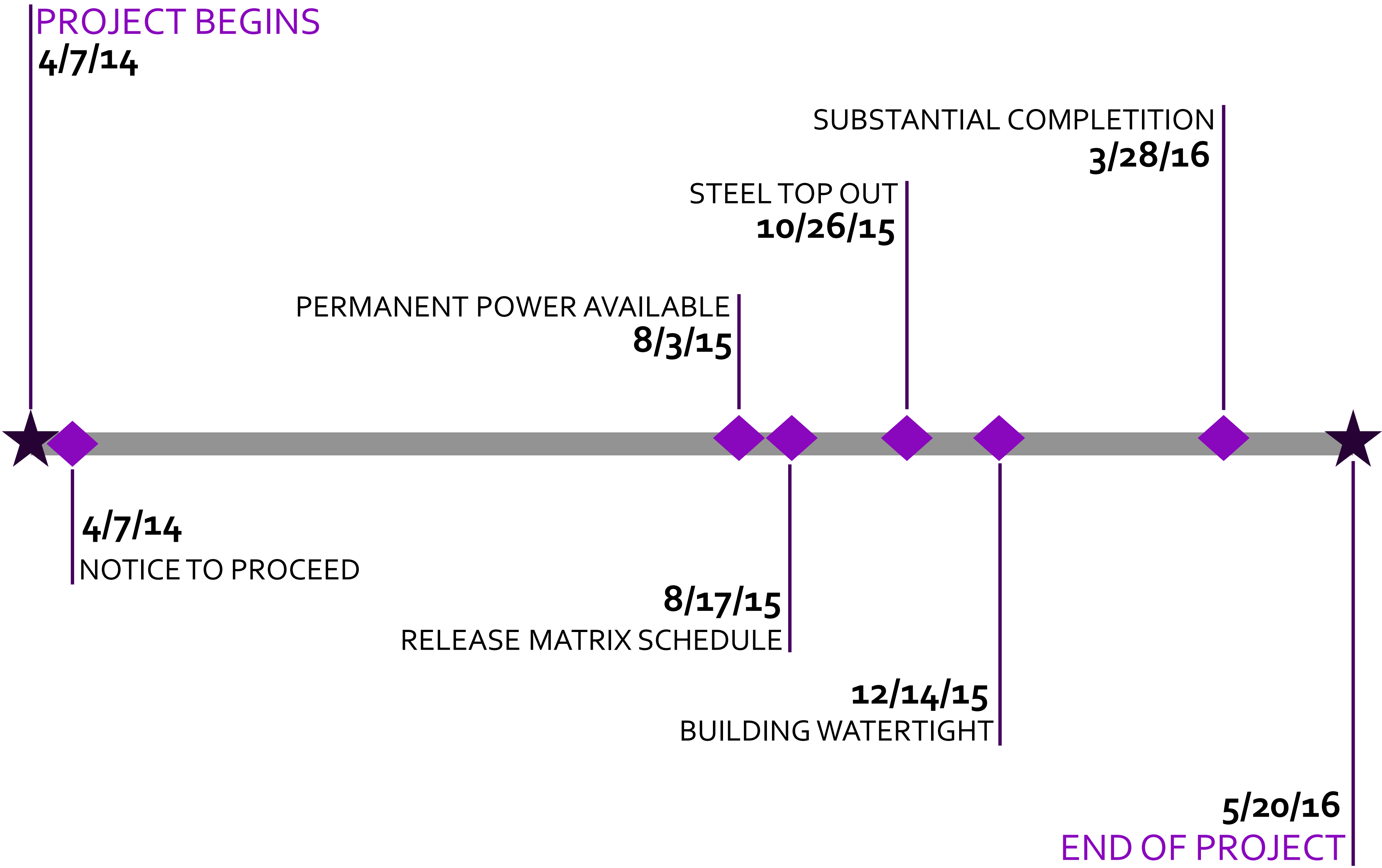
FULL PROJECT SCHEDULE



FULL PROJECT SCHEDULE

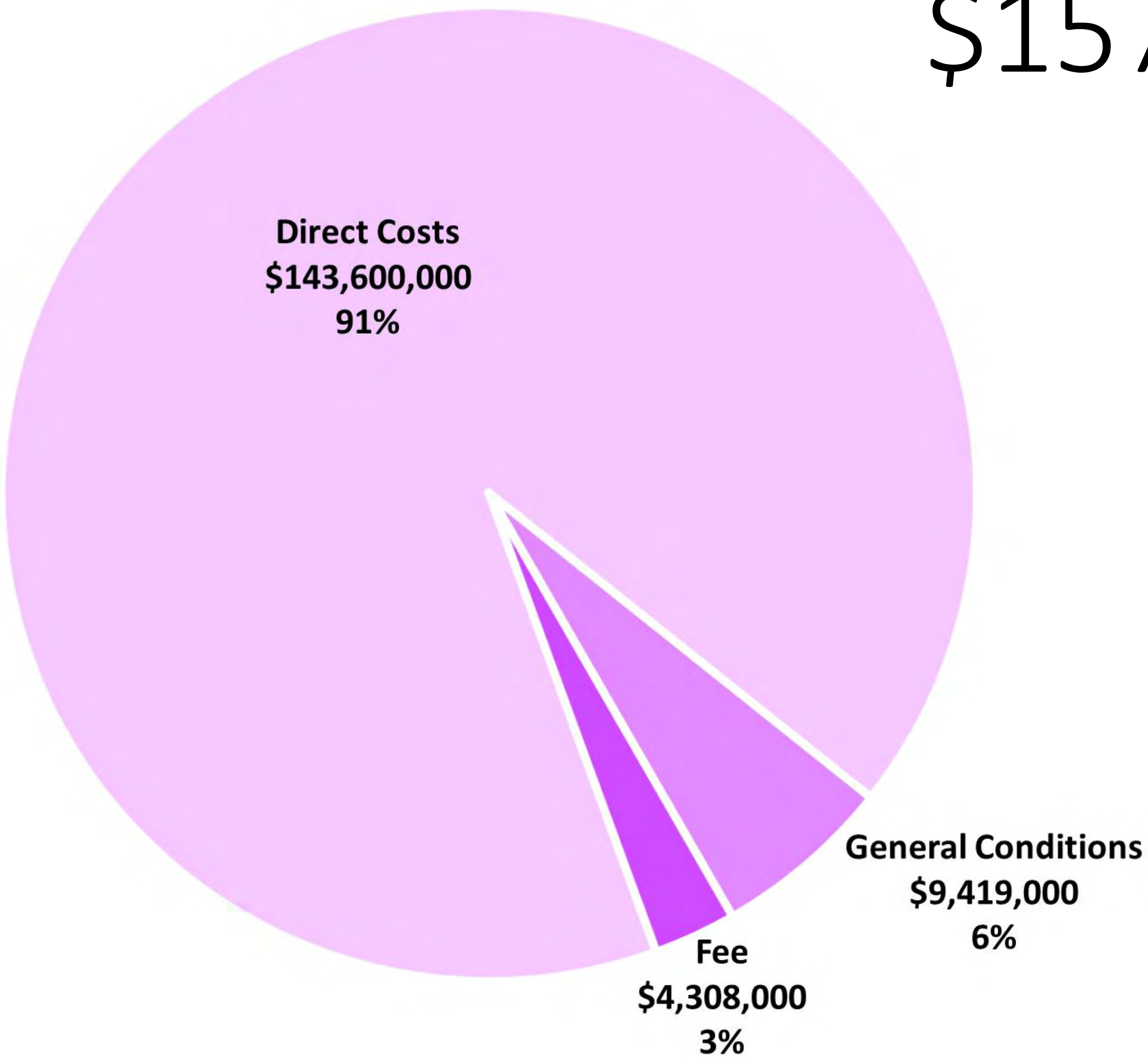


FULL PROJECT SCHEDULE

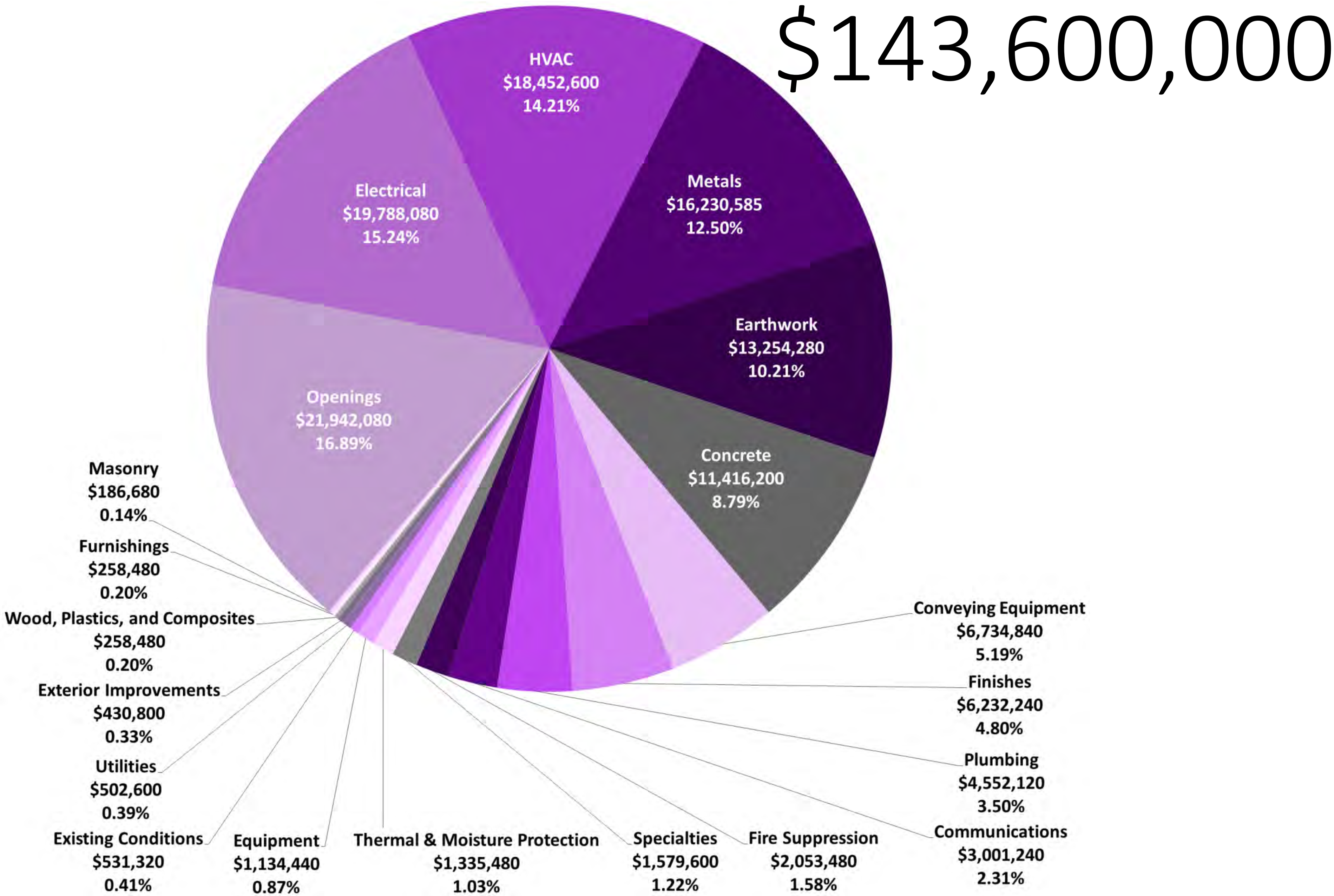


TOTAL CONSTRUCTION COST AND BREAKDOWN

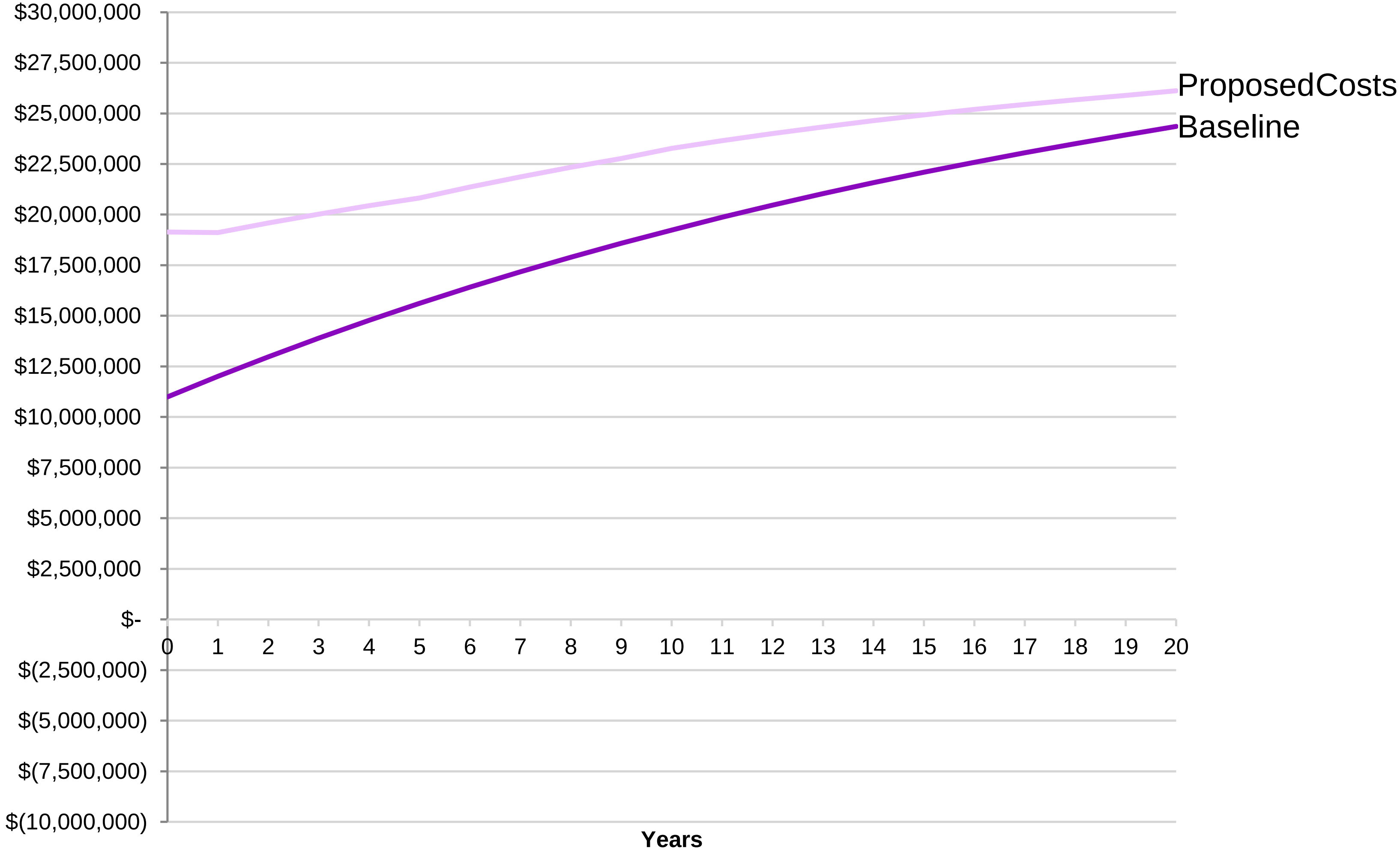
$157,327,000

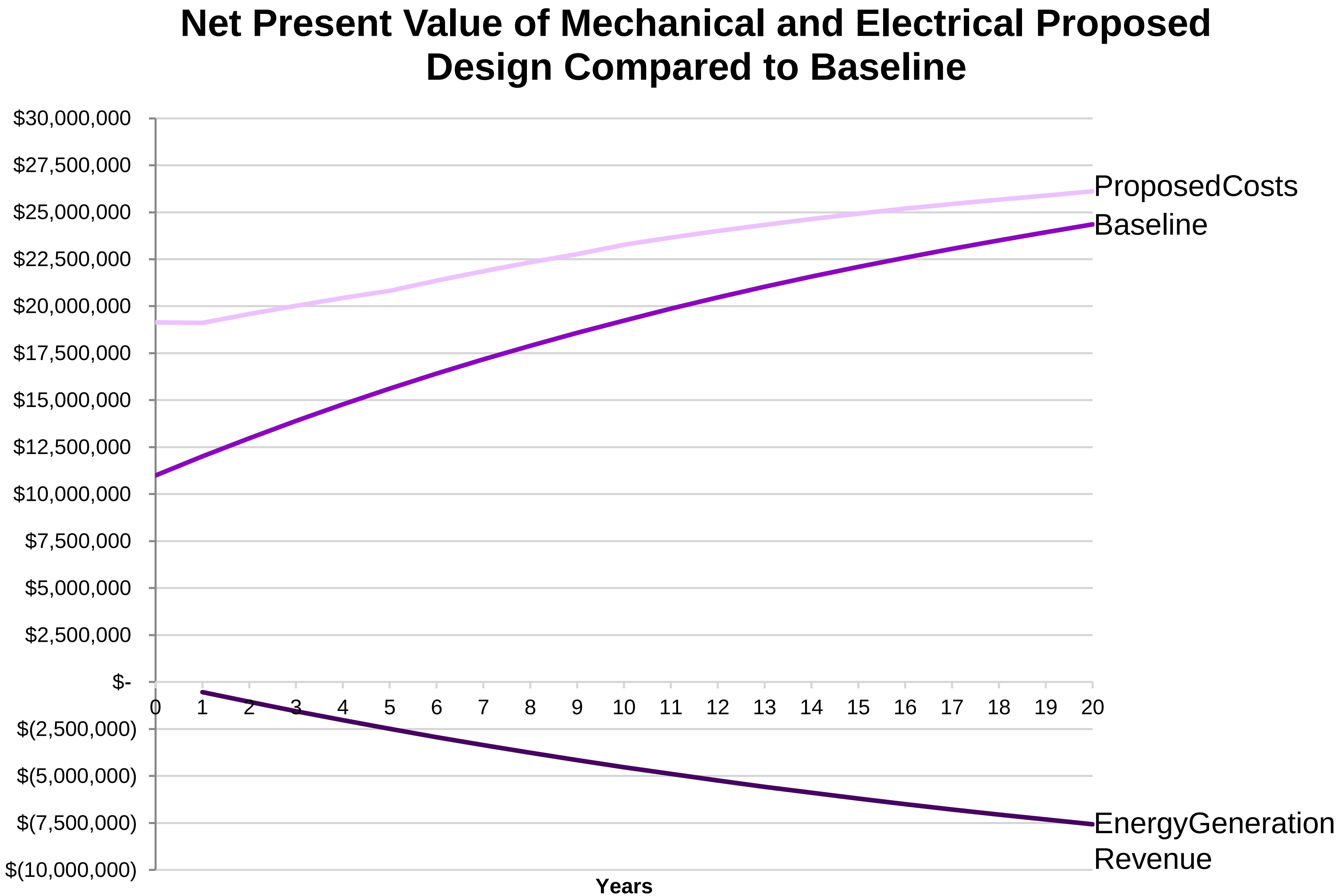


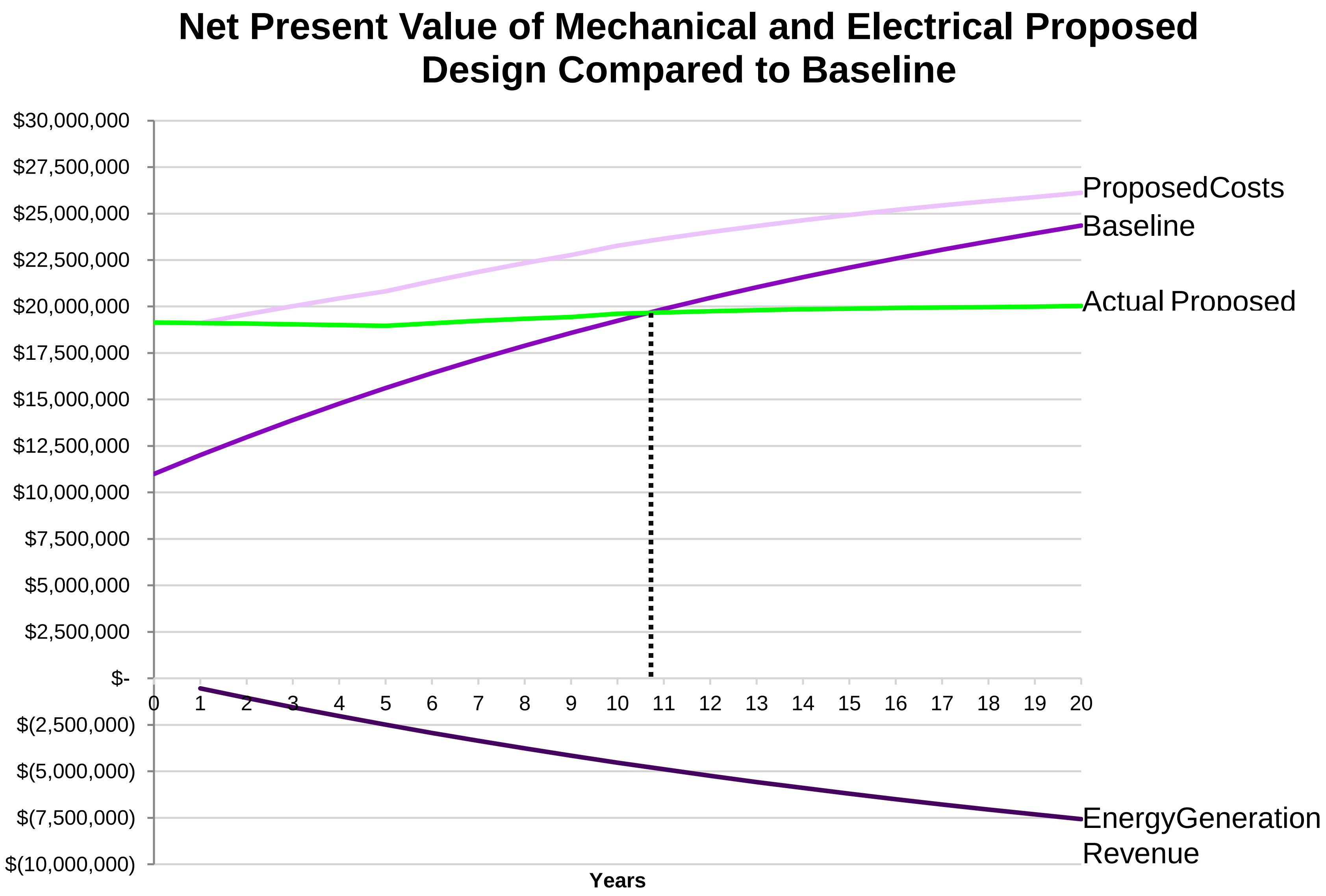
DIRECT COST BREAKDOWN WITHOUT FEE OR GENERAL CONDITIONS



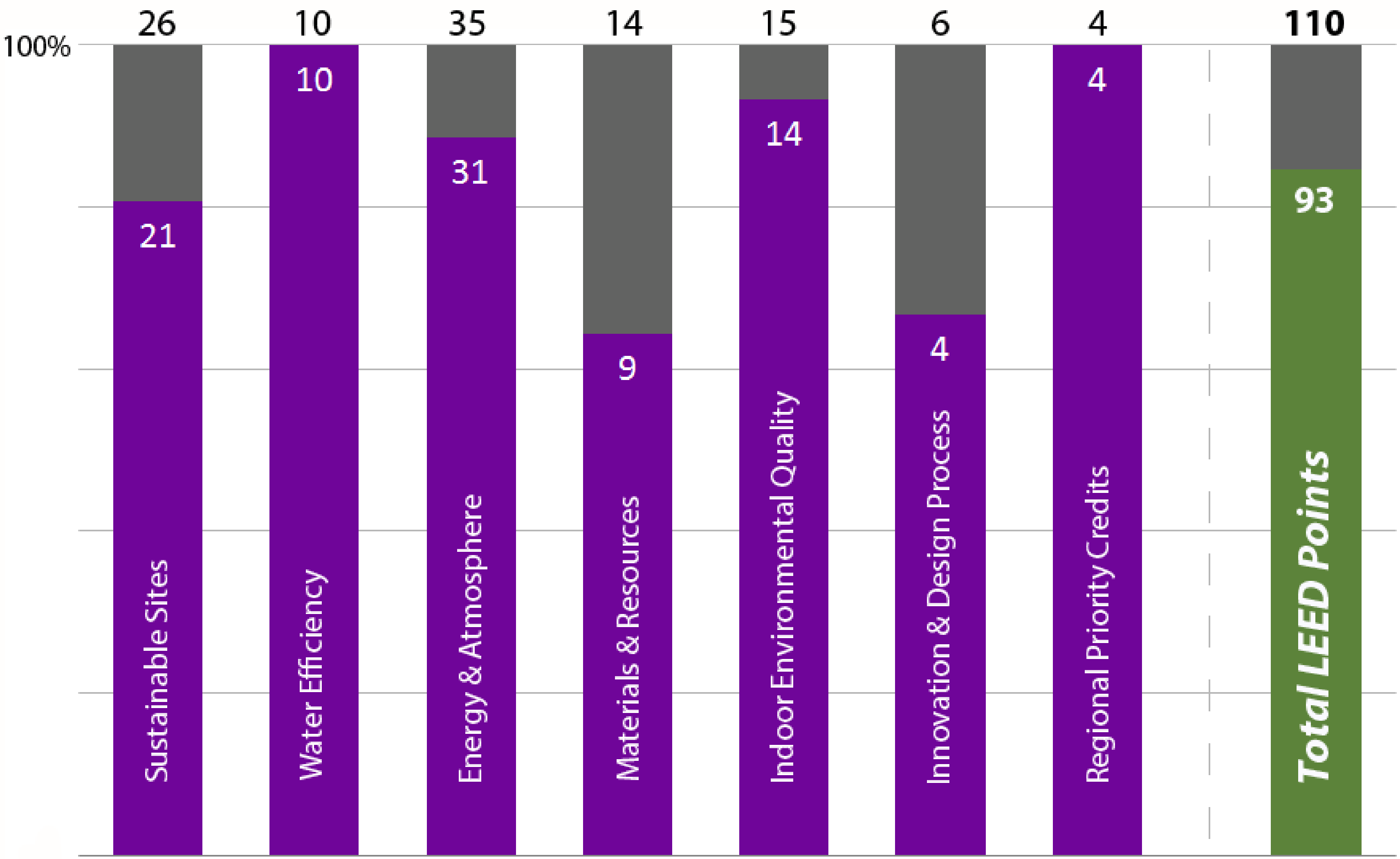
Net Present Value of Mechanical and Electrical Proposed Design Compared to Baseline




Net Present Value of Mechanical and Electrical Proposed Design Compared to Baseline
$30,000,000
$27,500,000
$25,000,000
$22,500,000
$20,000,000
$17,500,000
$15,000,000
$12,500,000
$10,000,000
$7,500,000
$5,000,000
$2,500,000
$-
$(2,500,000)
$(5,000,000)
$(7,500,000)
$(10,000,000)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Years
ProposedCosts
Baseline
EnergyGeneration Revenue

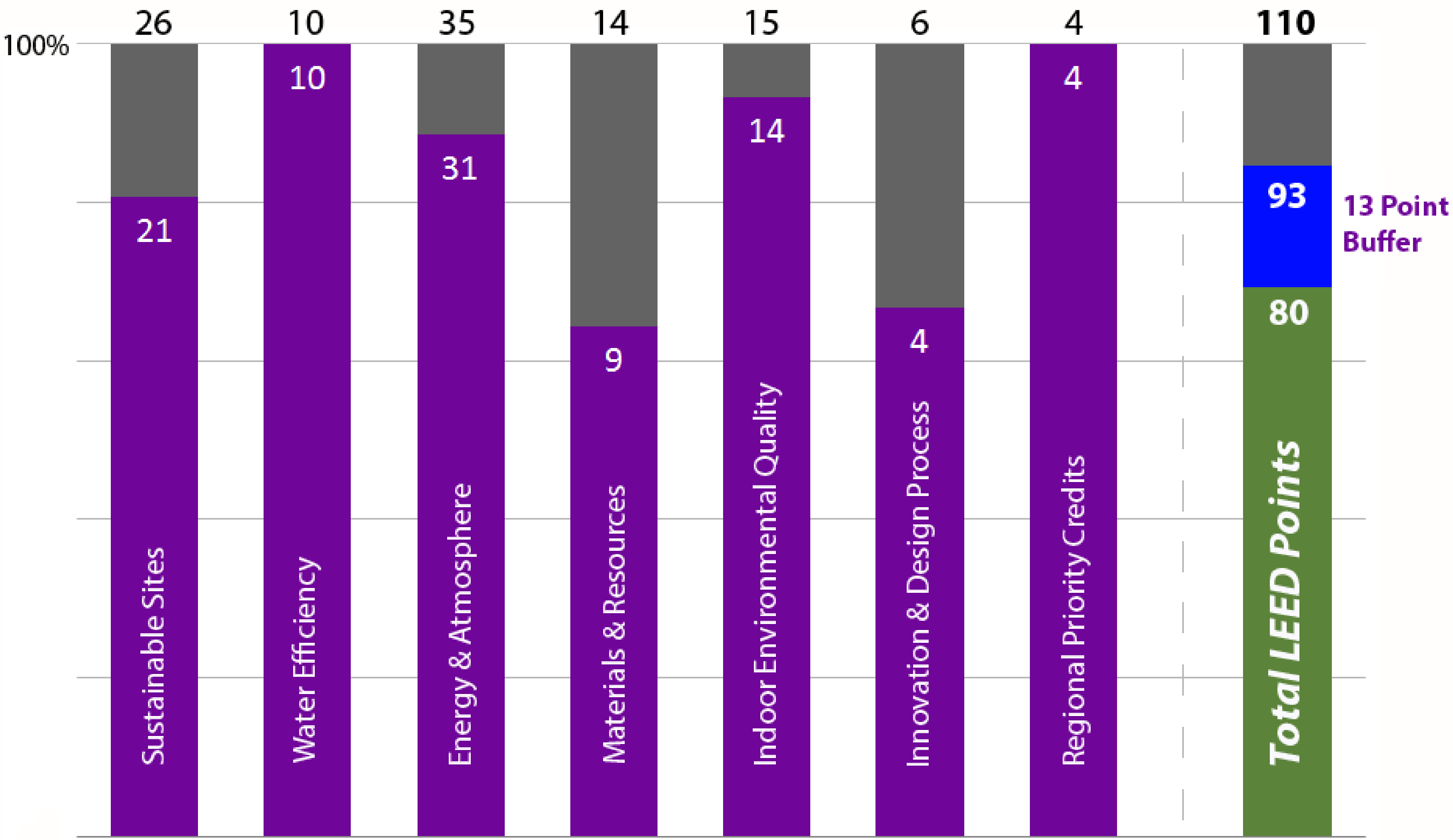

Net Present Value of Mechanical and Electrical Proposed Design Compared to Baseline
$30,000,000
$27,500,000
$25,000,000
$22,500,000
$20,000,000
$17,500,000
$15,000,000
$12,500,000
$10,000,000
$7,500,000
$5,000,000
$2,500,000
$-
$(2,500,000)
$(5,000,000)
$(7,500,000)
$(10,000,000)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Years
ProposedCosts
Baseline
Actual Proposed
EnergyGeneration Revenue

LEED ANALYSIS

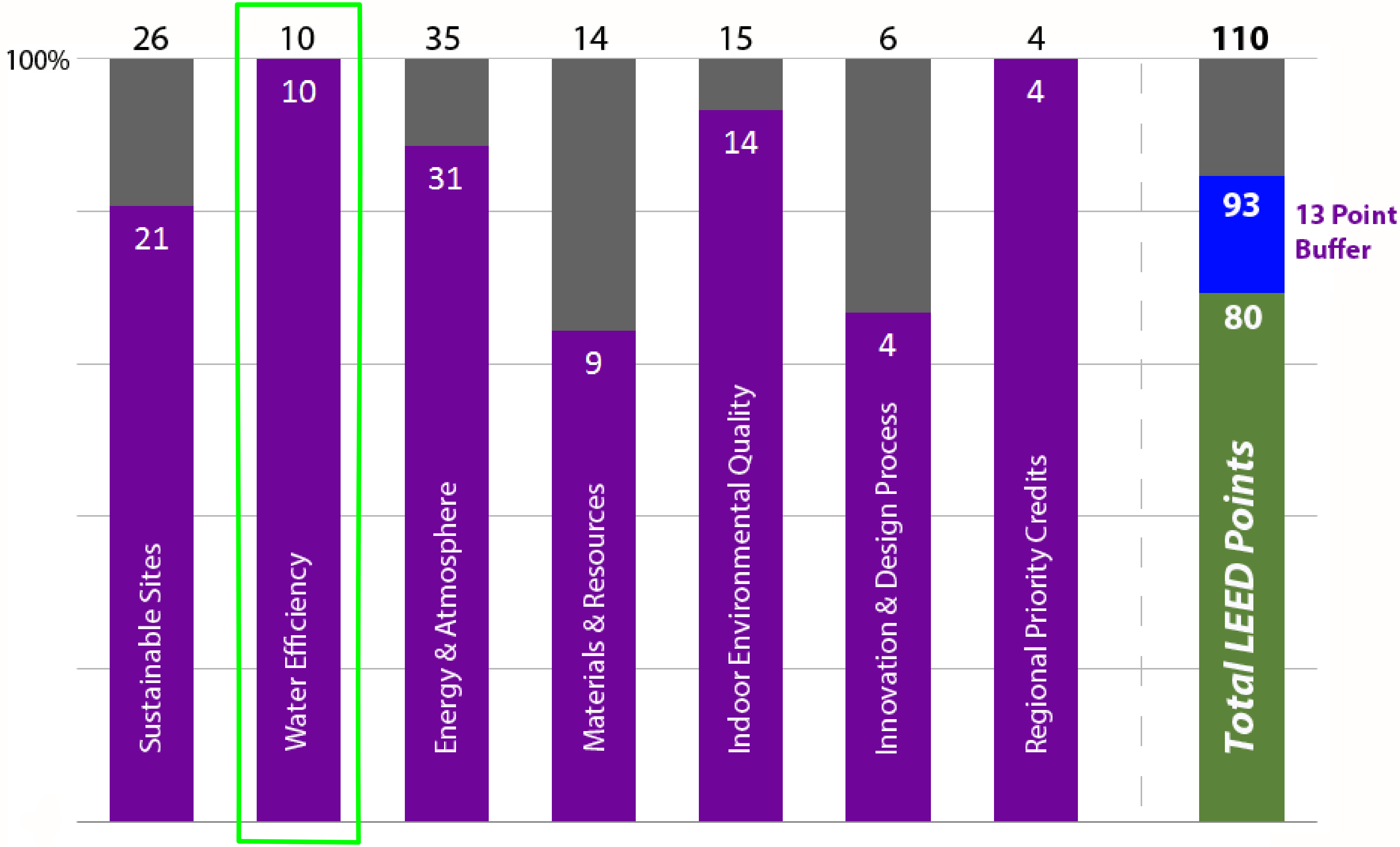


93 of 110 possible points | LEED Platinum Accreditation Achievable

LEED ANALYSIS

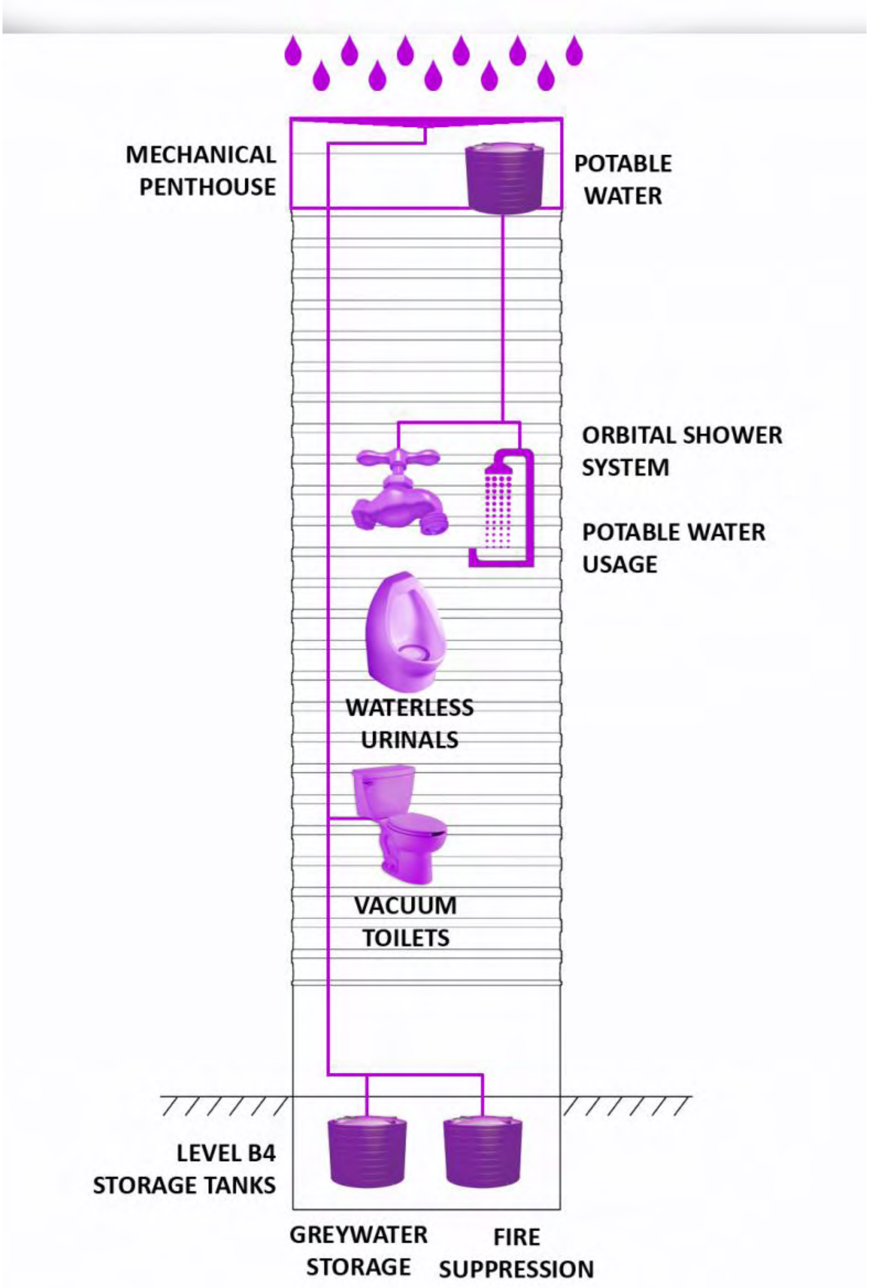


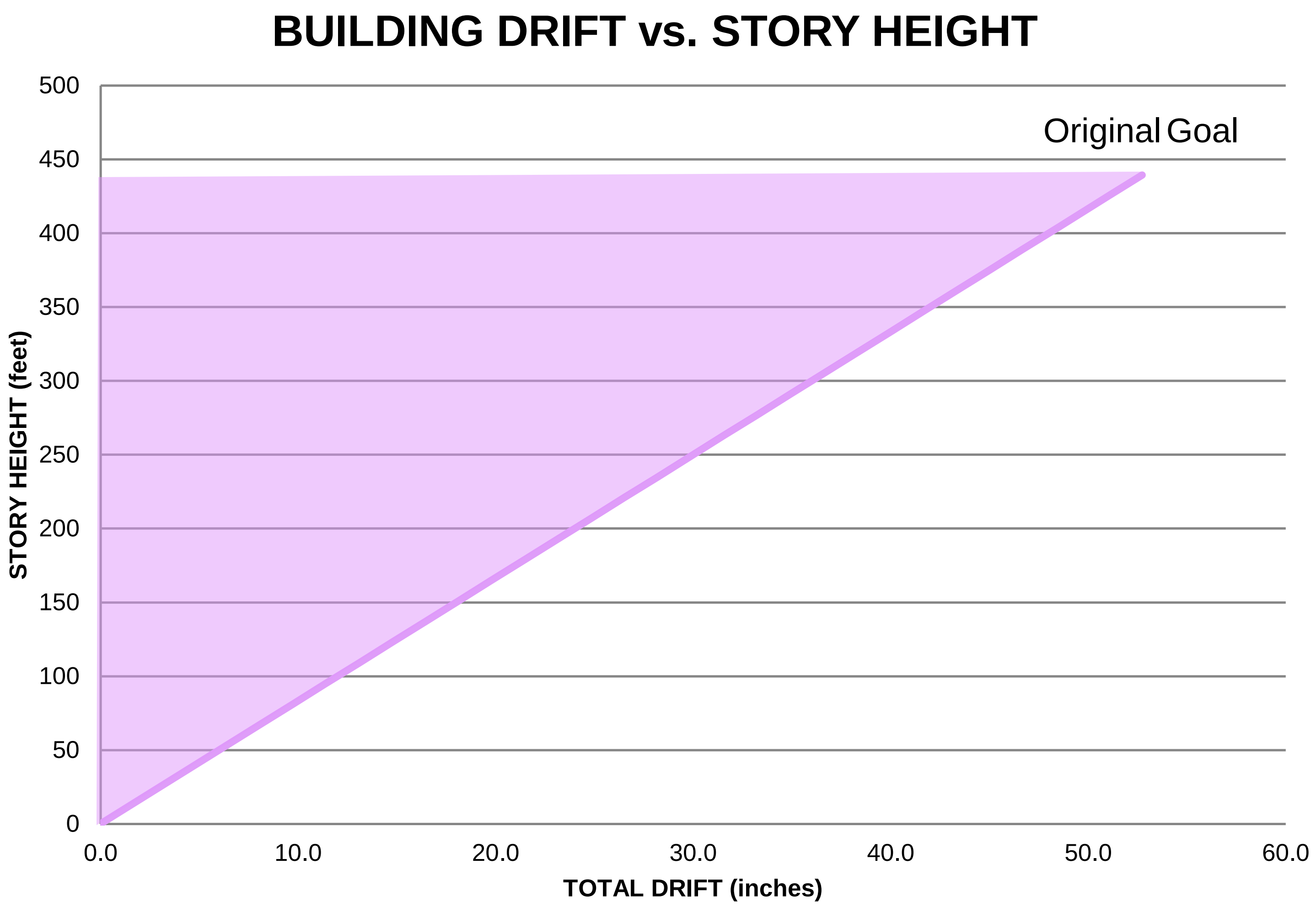
93 of 110 possible points | LEED Platinum Accreditation Achievable

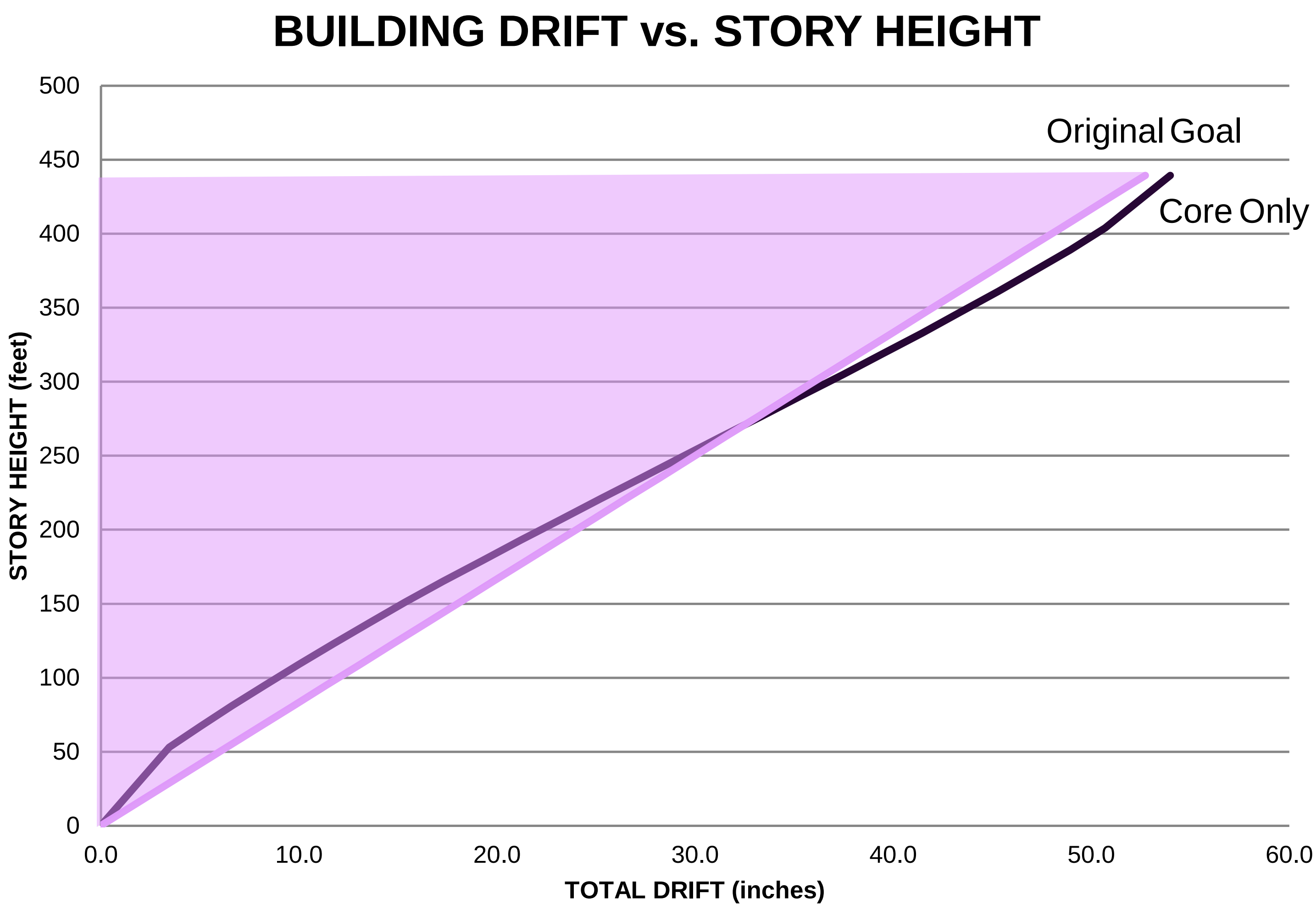


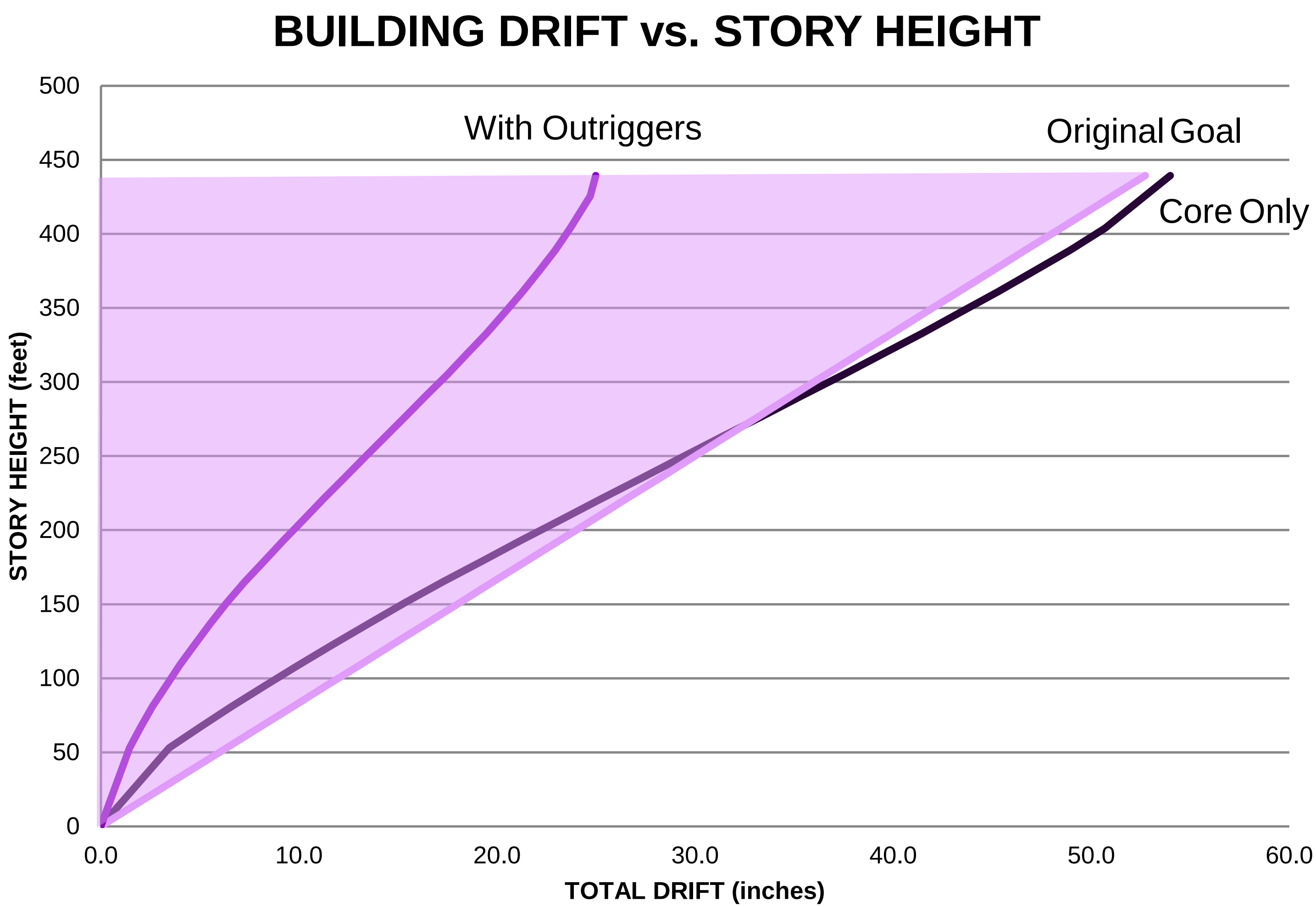
93 of 110 possible points | LEED Platinum Accreditation Achievable

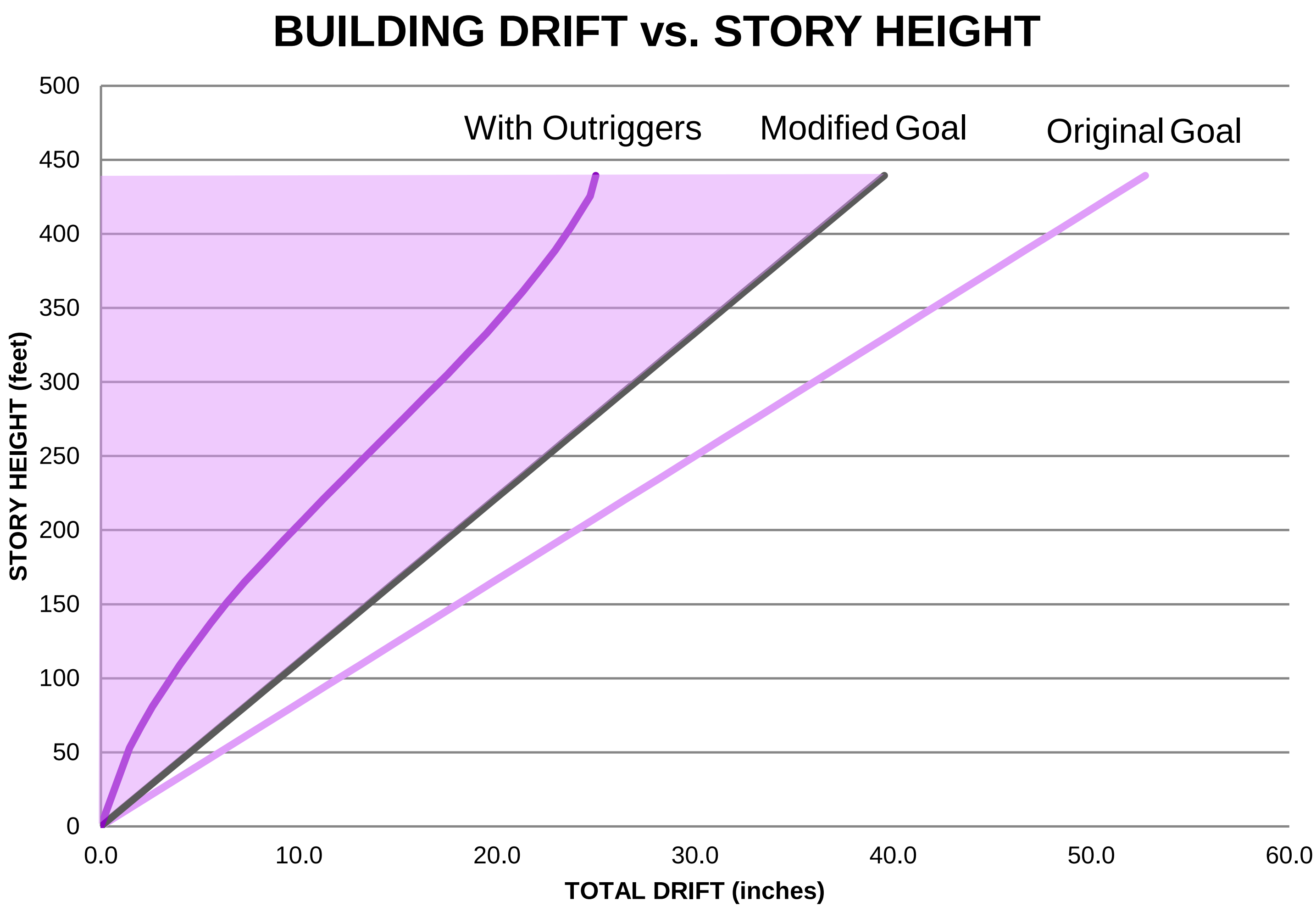
WATER CONSERVATION MEASURES

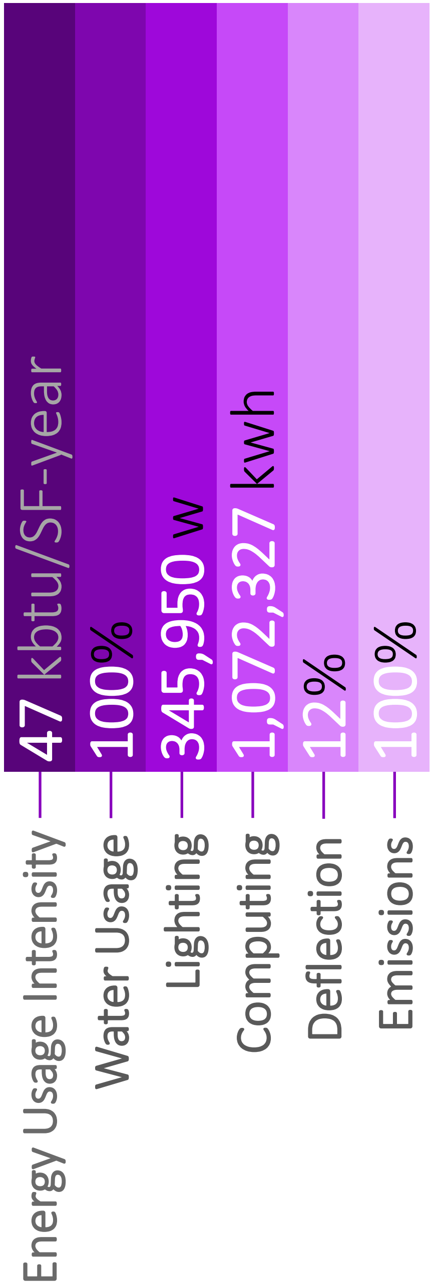



BUILDING DRIFT vs. STORY HEIGHT
Original Goal
STORY HEIGHT (feet)
0
50
100
150
200
250
300
350
400
450
500
0.0
10.0
20.0
30.0
40.0
50.0
60.0
TOTAL DRIFT (inches)

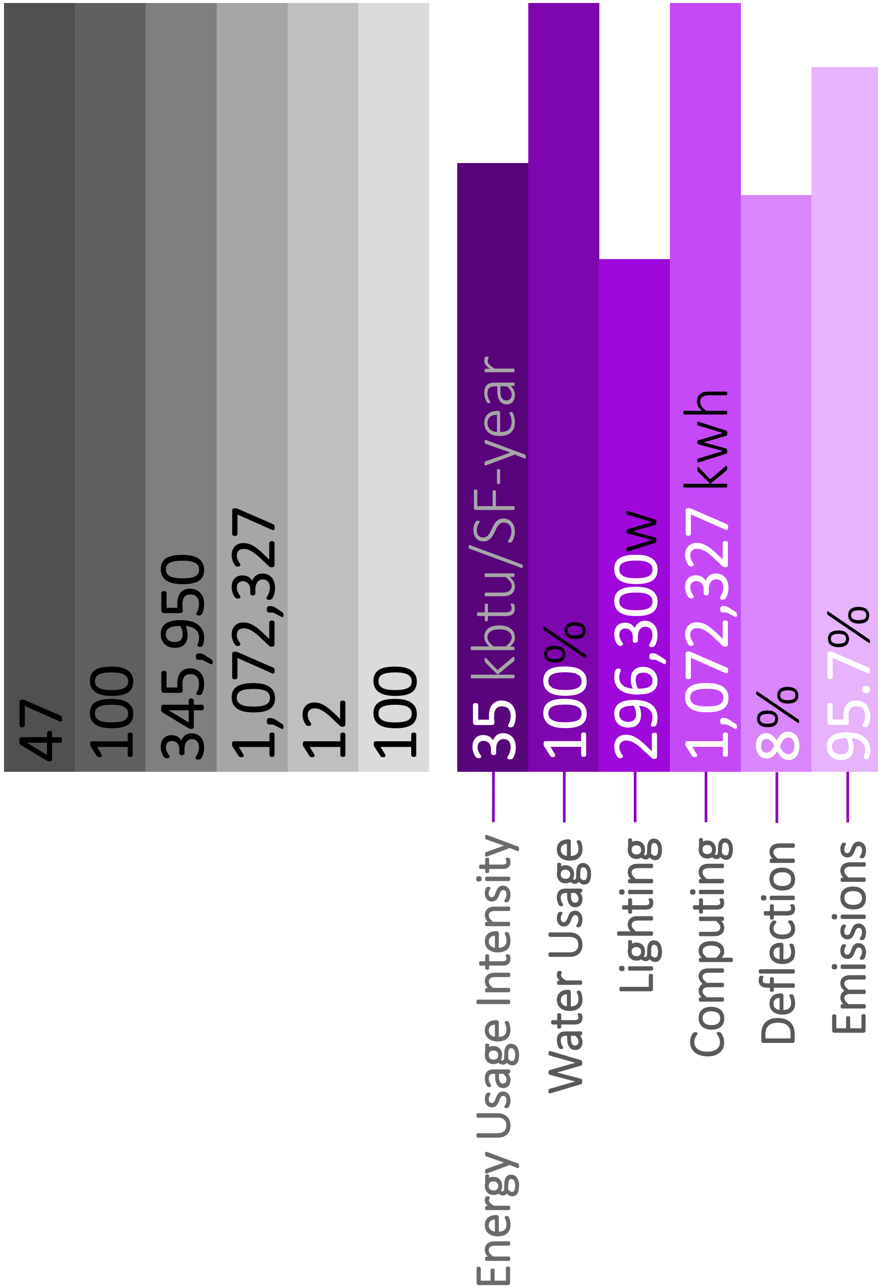

BUILDING DRIFT vs. STORY HEIGHT
STORY HEIGHT (feet)
TOTAL DRIFT (inches)
Original Goal
Core Only
0
50
100
150
200
250
300
350
400
450
500
0.0
10.0
20.0
30.0
40.0
50.0
60.0


BUILDING DRIFT vs. STORY HEIGHT
With Outriggers
Original Goal
Core Only
STORY HEIGHT (feet)
0
50
100
150
200
250
300
350
400
450
500
0.0
10.0
20.0
30.0
40.0
50.0
60.0
TOTAL DRIFT (inches)

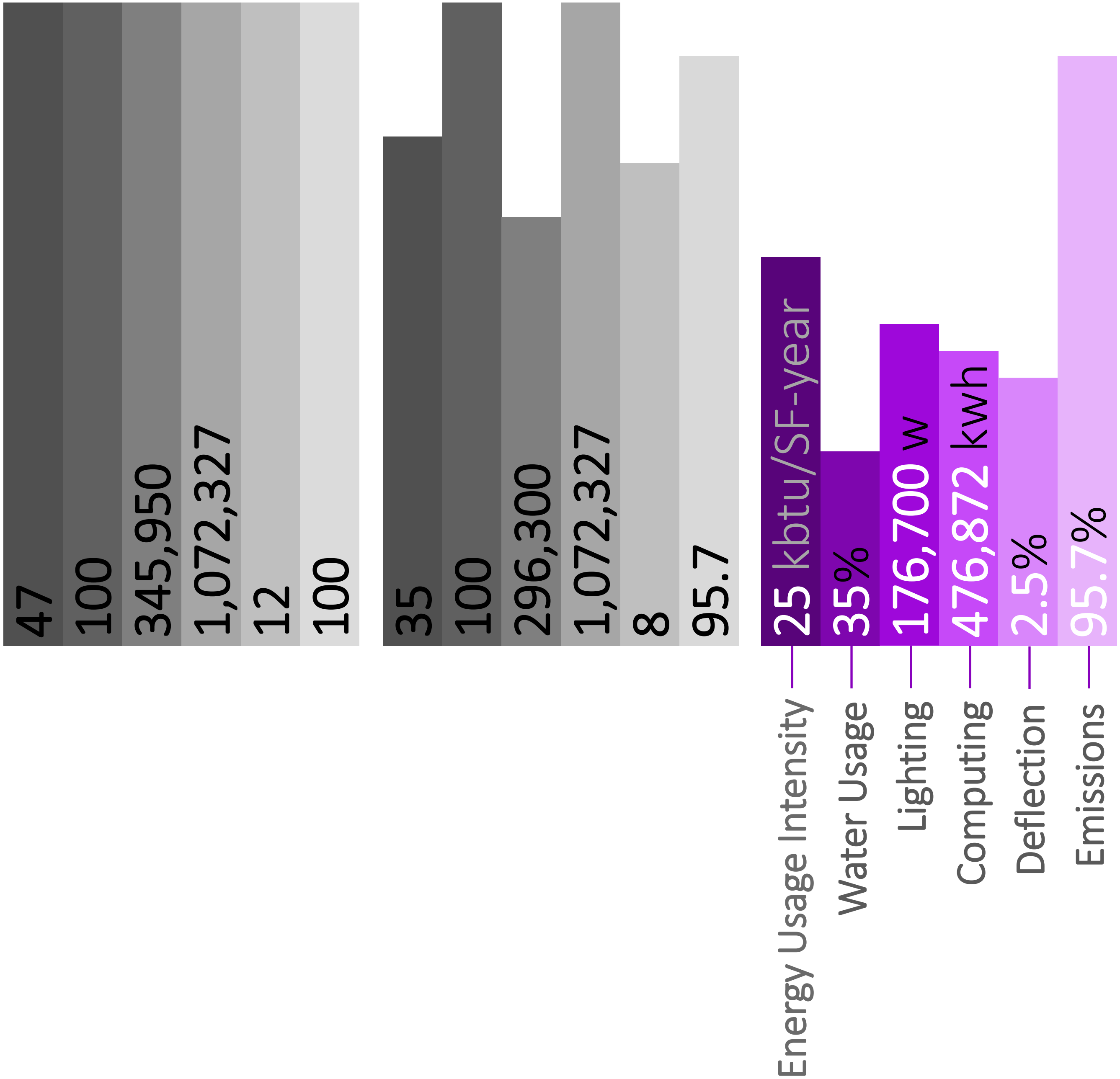

BUILDING DRIFT vs. STORY HEIGHT
With Outriggers
Modified Goal
Original Goal
500
450
400
350
300
250
200
150
100
50
0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
STORY HEIGHT (feet)
TOTAL DRIFT (inches)


47 kbtu/SF-year
100%
345,950 w
1,072,327 kwh
12%
100%
Energy Usage Intensity
Water Usage
Lighting
Computing
Deflection
Emissions

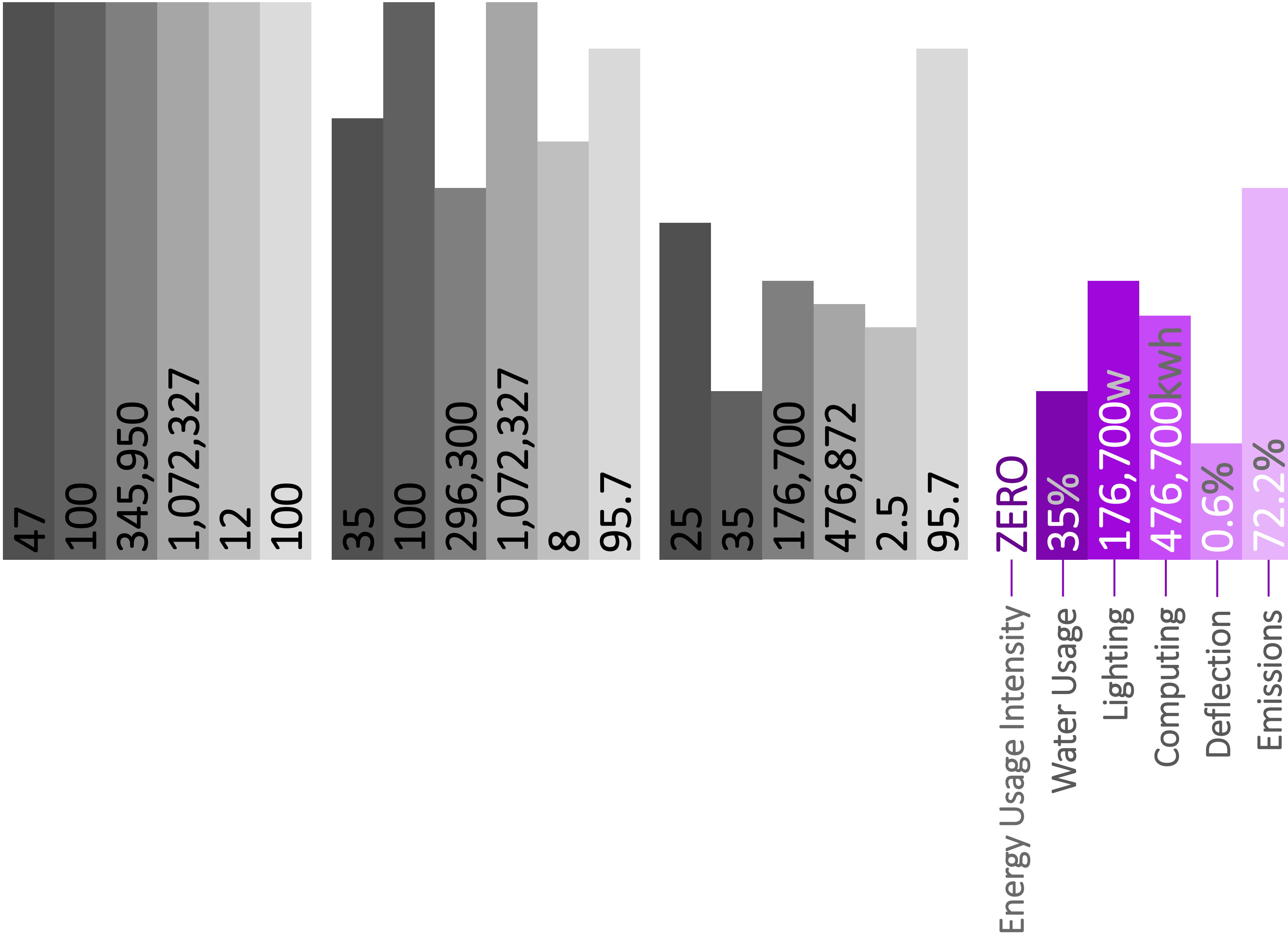
QUANTITATIVE SUCCESSES



QUANTITATIVE SUCCESSES

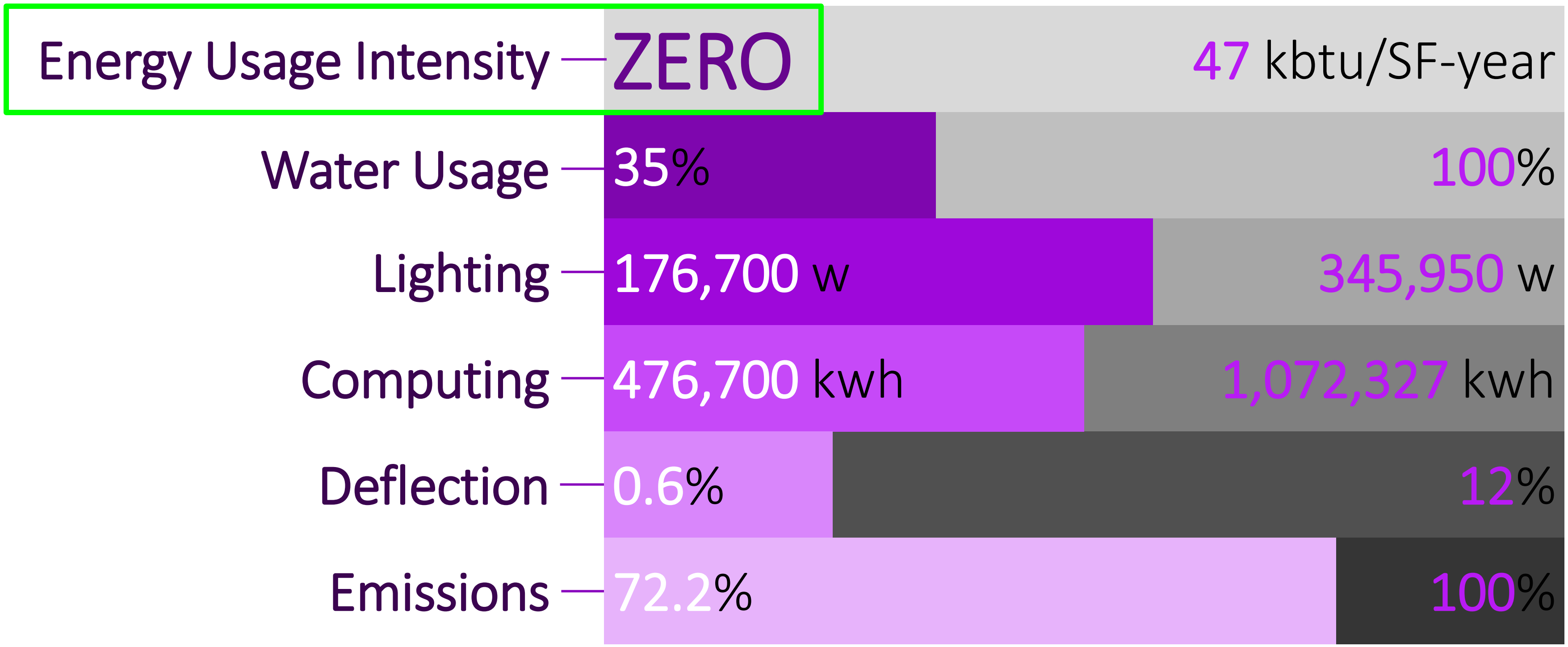


QUANTITATIVE SUCCESSES



Energy Usage Intensity	47 kbtu/SF-year
Water Usage	100%
Lighting	345,950 w
Computing	1,072,327 kwh
Deflection	12%
Emissions	100%

QUANTITATIVE SUCCESSES: BEGINNING TO END COMPARISON



INTEGRATION OF GOALS

Charles Pankow Foundation
Architectural Engineering Institute
Penn State AE Faculty
Southland Industries
Skidmore, Owings, & Merrill LLP
Pankow
HGA Architects and Engineers
EwingCole
JBA Consulting
AECOM
Barton Malow
Bob McNamara
Bob Holland
Friends & Family

AEVITAS

DECISION POINT MATRIX

		ZERO IMPACT GOALS				OWNER DRIVEN EVALUATION CRITERIA														
	SYSTEM DESCRIPTION	ENERGY	INTERRUPTION	WASTE	EMISSIONS	ENERGY QUANTITY	COST	SUSTAINABILITY	PHASEABILITY	INNOVATION	COMPLEXITY	SPACE NEEDED	MAINTENANCE	INTEGRATION	SITE ISSUES	TEACHING	PRACTICALITY	LIFECYCLE	EFFECTIVENESS	RECOMMENDED?
Production Tracking	SIPS Scheduling	0	0	+	0	0	+	0	++	+	-	+	+	++	++	+	++	0	++	Yes
	Last Planner	0	0	+	0	0	++	0	++	+	-	0	-	++	+	+	+	0	+	Maybe
	CPM Schedule	0	0	+	0	0	-	0	+	-	++	0	-	0	0	0	+	0	-	No
Reduce Reuse Recycle	WM Bagster	0	0	+	0	0	-	+	+	+	+	+	+	0	-	0	--	--	--	No
	WM DART	0	0	++	++	0	-	+	0	+	-	0	-	0	-	+	+	+	+	Yes
	Recycled Matl.	0	0	++	++	0	-	++	0	+	+	0	0	0	0	0	+	0	+	Yes
Prefabrication	Toilet Racks	0	0	+	0	0	+	0	+	++	+	+	0	+	+	0	++	0	++	Yes
	Façade Panels	0	+	+	0	0	+	0	+	-	-	-	0	+	-	0	+	0	++	Maybe
	Overhead Racks	0	0	+	0	0	-	0	+	+	--	--	0	+	--	0	-	0	-	No
Virtual Construction	Augmented Reality	0	0	-	0	0	--	0	0	+	--	0	--	+	+	+	-	+	-	No
	FIM	++	0	++	+	0	-	++	0	++	--	0	--	++	+	++	++	+	+	Yes
	Virtual Mockups	0	0	+	0	0	+	0	0	+	+	0	0	+	0	+	+	0	+	Maybe
	4D Model	0	0	+	0	0	-	0	++	+	+	0	+	+	++	++	++	0	++	Yes
Project Delivery	Bridging D-B-O-M	++	0	+	+	0	--	0	0	++	-	0	0	++	0	0	++	++	++	Yes
	IPD	0	0	+	0	0	-	0	0	++	--	0	0	++	0	0	-	0	+	No
	CM Agency	0	0	+	0	0	+	0	0	+	+	0	0	+	0	0	+	0	+	No

1.2.4 How do I apply for an STP?
Use the **Special Traffic Permit** application form found on Page 102, Appendix H; or download the application from www.sfmta.com/bluebook. Complete the form and fax it to 415.701.4217 or email to trafficpermits@sfmta.com. Use SFMTA striping drawings to clearly show the planned work. The Contractor will be notified by fax or email if the permit request is approved or denied. If approved, the Contractor will be faxed or emailed an unofficial copy of the permit indicating that the official copy is ready to be paid for and picked up at SFMTA. Payment may also be made by setting up a draw-down account with SFMTA (see Section 1.2.9).

1.1.1 Excavation Permit
An excavation permit is required for any excavation work within the public right-of-way.

1.1.4 Additional Street Space
Additional Street Space (ADS) for buildings allows the contractor to extend the boundaries of a Street Space Agreement. ADS is used for long term occupancies (over 1 month).

1.1.5 Night Noise Permit
Any work done between the hours of 8 p.m. and 7 a.m. in the roadway or sidewalk area requires a night noise permit as specified in Section 2908 of the Police Code.

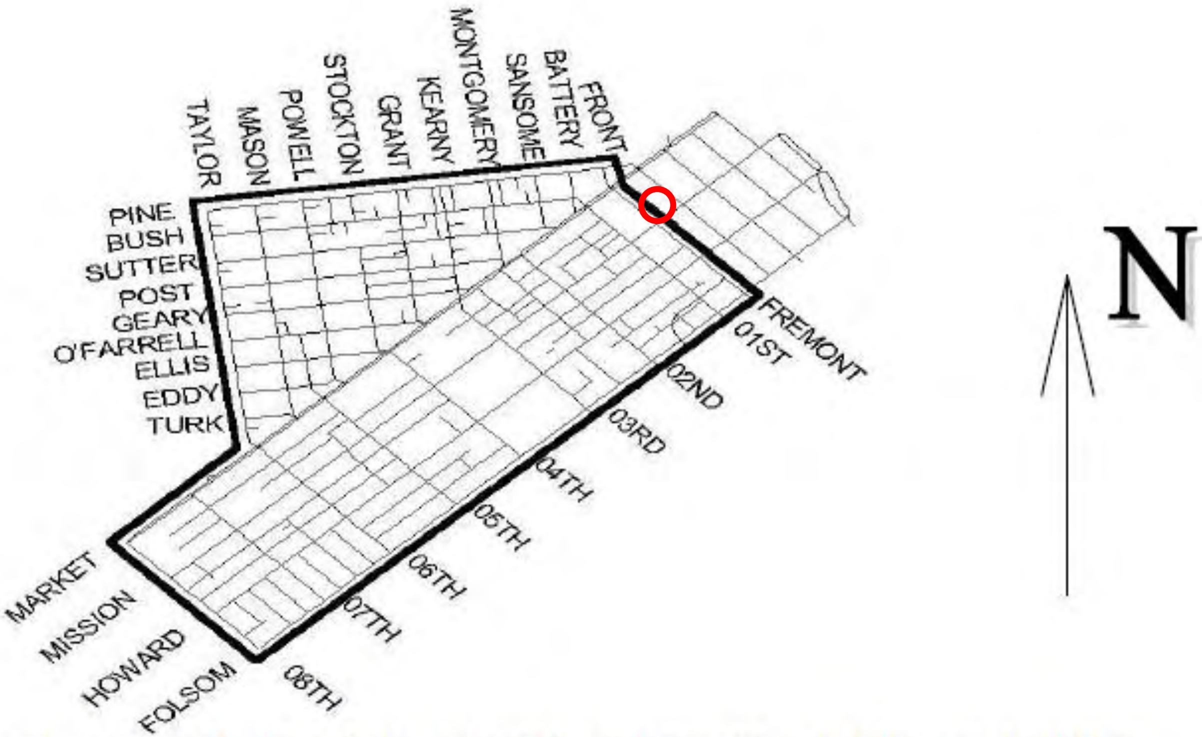


Figure 1: Streets where special construction hours are applied

Figure 1: Streets where special construction hours are applied

Any Business Block in the City: A business block is any City block where at least 50 percent of the frontage is devoted to business. Establishments in this category are retail stores, bars, restaurants, banks, service type businesses, non-residence type hotels, wholesale businesses or others as determined by the SFMTA.

The SFMTA will determine if a block is under moratorium on a case by case basis using data provided by the Contractor (or applicant). Data may be submitted to the SFMTA by completing the form "Holiday Moratorium – Business Block Map" found on Page 94, Appendix H. Please note that this form must be filled out completely, and include both sides of any block for

4.1 Register with the Tow-Desk- PARKING REMOVAL

To clear the parking lane of parked cars for any construction work, the Contractor is required to post "Tow-Away No Stopping" signs. These signs must first be registered with the SFMTA Tow-Desk through 311, by calling 415.701.2311, at least 72 hours in advance of the effective date and time. Once registered, the signs shall be posted at least 72 hours in advance of the effective date and time in order to give the public sufficient notice. Construction tow-away zones can be registered for a maximum of one month at a time. If additional time is needed to complete construction, the Contractor may request a time extension by calling the Tow-Desk at 415.554.9928. Approval of a time extension must be obtained and new signs must be posted at least 72 hours prior to the expiration of the previously registered period.

Parking must not be prohibited where there is no construction activity. Construction tow-away zones are for construction activities only, such as loading, unloading, storage of materials, special equipment occupancy, etc. These zones do **NOT** apply to vehicles not actively involved in construction, including all private vehicles and any other company vehicle.

5.1 Clear Path of Travel

A 6-foot wide clear path of travel is desirable. At a minimum, Contractor **shall** provide a **4-foot wide** clear path of travel on any sidewalk at all times. More width may be required by DPW or the SFMTA in areas where heavier pedestrian volumes are expected.

Any sidewalk closure, walkway closure or any other work that does not provide a continuous 4-foot wide clear path of travel on the same side of the street shall require a Special Traffic Permit (STP).

9.4 Closure of Bike Routes

A Special Traffic Permit is required for any street closure or the closure of one direction of a street. The STP may require that a Bicycle Route Detour be provided and that
additional bike signs such as "Bicyclists Allowed Use of Full Lane" or "Bicycle Route Detour" signs be posted as a permit condition (see signs in Appendix E)

TABLE 1
STREETS OF MAJOR IMPORTANCE

NO WORK IS ALLOWED ON THE FOLLOWING STREETS DURING THE SPECIFIED HOURS.
CONTRACTOR IS NOT ALLOWED TO LEAVE ANY HOLE, DEBRIS, ANY MATERIAL/EQUIPMENT IN THE TRAFFIC LANES, INCLUDING TOW-AWAY LANES, DURING THESE HOURS.

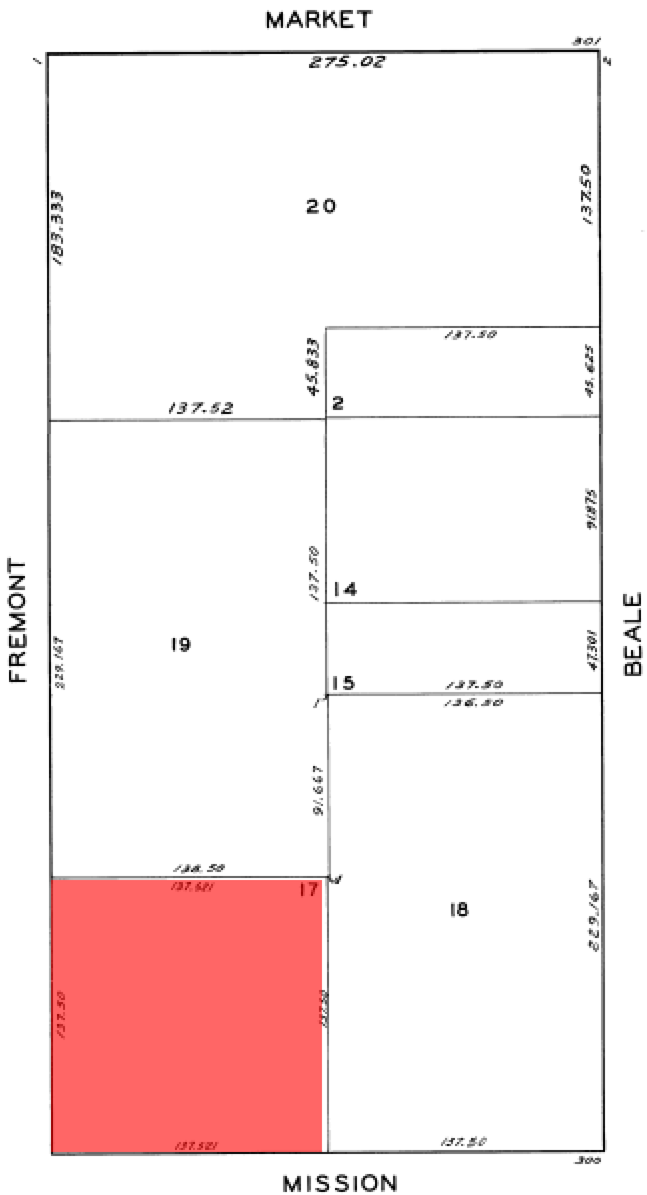
STREETS (Limits)	NORTHSIDE	SOUTHSIDE	EASTSIDE	WESTSIDE	ADDITIONAL RESTRICTIONS SEE APPENDIX C MAPS
Main St. (Market - Bryant)	--	--	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	Map 1
Marina Blvd. (Buchanan - Doyle Drive)	3p.m. - 7p.m.	7a.m. - 9a.m.	--	--	
Market St. (Steuart - 1st St.)	6a.m. - 7p.m.	6a.m. - 7p.m.	--	--	Map 1
Market St. (1st St. - 8th St.)	6a.m. - 7p.m.	6a.m. - 7p.m.	--	--	Maps 1, 2, & 4
Market St. (8th St. - Duboce)	6a.m. - 7p.m.	6a.m. - 7p.m.	--	--	Map 1
Market St. (Duboce - 14th St.)	4p.m. - 6p.m.	7a.m. - 9a.m.	--	--	
Market St. (14th St. - Corbett)	4p.m. - 6p.m.	7a.m. - 9a.m.	--	--	
Mason St. (Market - Sutter)	--	--	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	Map 1
Masonic Ave. (Waller - Page)	--	--	7a.m. - 9a.m.	4p.m. - 6p.m.	
Masonic Ave. (Page - Hayes)	--	--	7a.m. - 9a.m.; 4p.m. - 6p.m.	7a.m. - 9a.m.; 4p.m. - 6p.m.	
Masonic Ave. (Hayes - Presidio)	--	--	7a.m. - 9a.m.	4p.m. - 6p.m.	
McAllister St. (Market - Gough)	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	--	--	Map 1
McAllister St. (Gough - Octavia)	4p.m. - 6p.m.	--	--	--	
Mission St. (Embarcadero - Beale)	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	--	--	Map 1
Mission St. (Beale - 1st. St.)	7a.m. - 7p.m.	7a.m. - 7p.m.	--	--	Map 1
Mission St. (1st St. - 11th St.)	7a.m. - 7p,m, Everyday	7a.m. - 7p,m, Everyday	--	--	Maps 1 & 2
Mission St. (11th St. - So. Van Ness)	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	--	--	Map 1
Mission St. (So. Van Ness - 13th St.)	Caltrans	Caltrans	Caltrans	Caltrans	Caltrans Jurisdiction
Mission St. (13th St. - Rolph)	--	--	7a.m. - 9a.m.; 4p.m. - 6p.m.	4p.m. - 6p.m.	

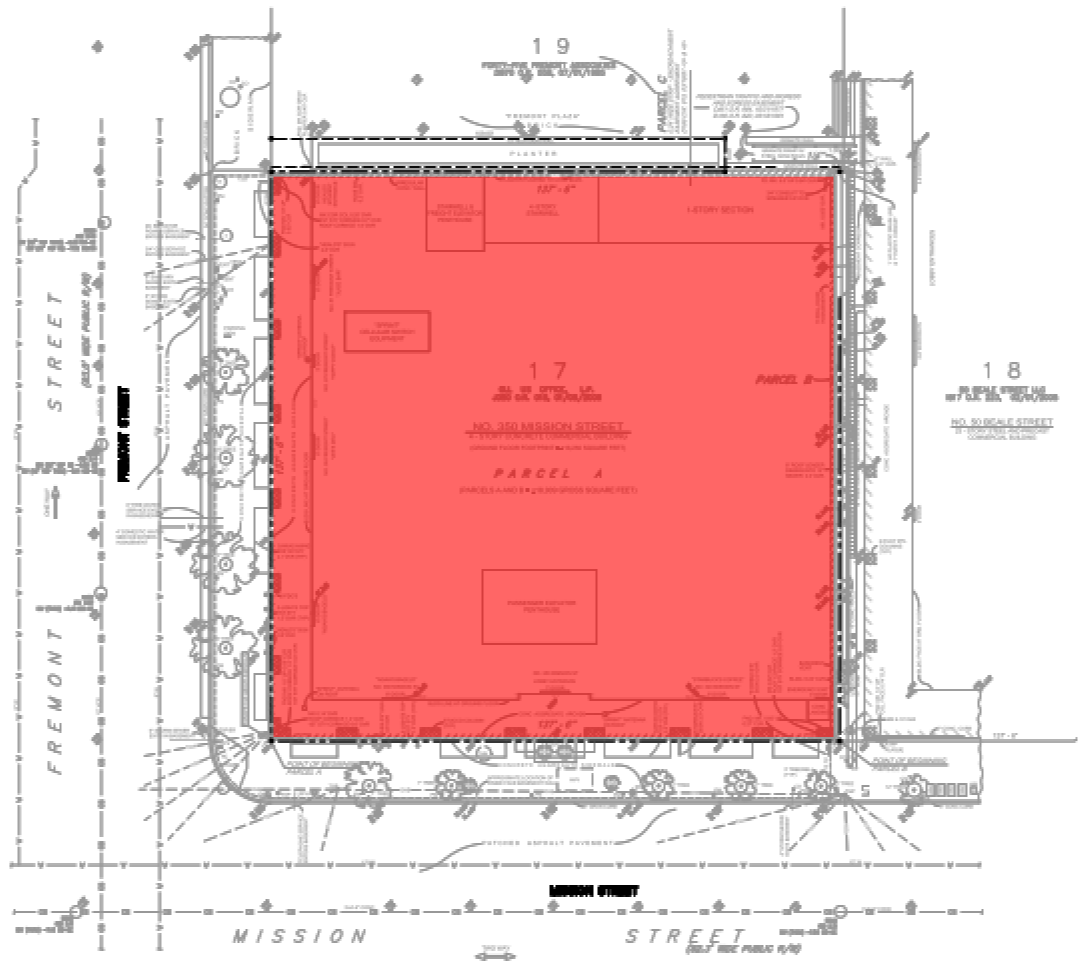
TABLE 1
STREETS OF MAJOR IMPORTANCE

NO WORK IS ALLOWED ON THE FOLLOWING STREETS DURING THE SPECIFIED HOURS.
CONTRACTOR IS NOT ALLOWED TO LEAVE ANY HOLE, DEBRIS, ANY MATERIAL/EQUIPMENT IN THE TRAFFIC LANES, INCLUDING TOW-AWAY LANES, DURING THESE HOURS.

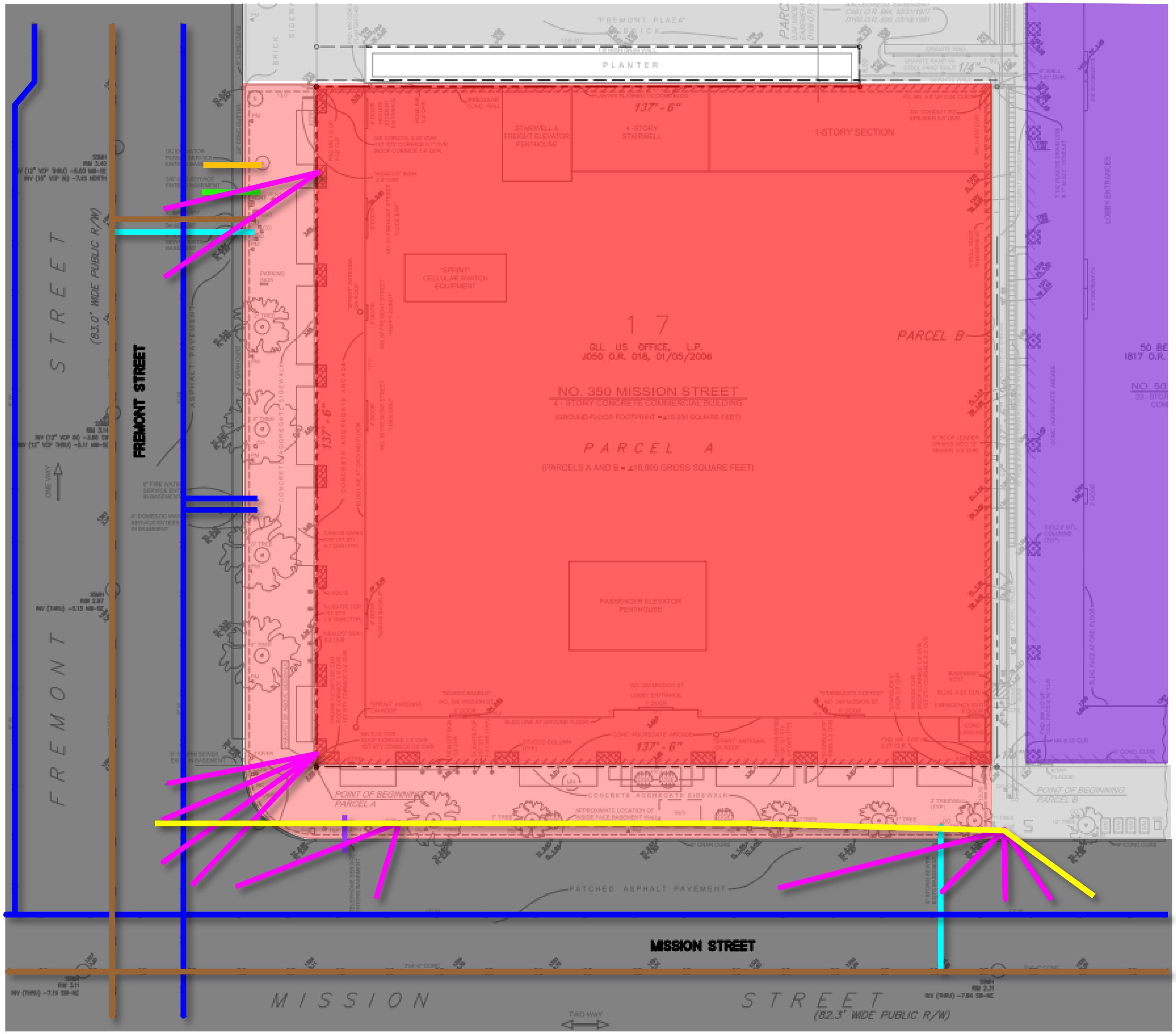
STREETS (Limits)	NORTHSIDE	SOUTHSIDE	EASTSIDE	WESTSIDE	ADDITIONAL RESTRICTIONS SEE APPENDIX C MAPS
Euclid Ave. (Presidio - Masonic)	--	7a.m. - 9a.m.	--	--	
Fell St. (Polk - Baker)	7a.m. - 7p.m. Everyday	7a.m. - 7p.m. Everyday	--	--	Map 1
Fell St. (Baker - Stanyan)	3 p.m. -7p.m.	3 p.m. -7p.m.	--	--	
Fillmore St. (Chestnut - Lombard)	--	--	4p.m. - 6p.m.	4p.m. - 6p.m.	
Folsom St. (Embarcadero - 3rd St.)	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	+	--	Map 1
Folsom St. (3rd St. - 5th St.)	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	--	--	Maps 1 & 2
Folsom St. (5th St. - 13th St.)	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	--	--	Map 1
Folsom St. (13th St. - Cesar Chavez)	--	--	7a.m. - 9a.m.	4p.m. - 6p.m.	
Franklin St. (Market - California)	--	--	7a.m. - 7p.m. Everyday	7a.m. - 7p.m. Everyday	Map 1
Franklin St. (California - Lombard)	--	--	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	Map 1
Fremont St. (Market - Harrison)	--	--	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	Map 1
Front St. (Market - Broadway)	--	--	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	Map 1
Fulton St. (Hyde - Gough)	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	--	--	Map 1
Fulton St. (Gough - Park Presidio)	4PM - 6PM	7AM - 9AM	--	--	
Geary St. (Market - Taylor)	7AM - 7PM Everyday	7AM - 7PM Everyday	--	--	Map 1
Geary St. (Taylor - Gough)	7a.m. - 9a.m.; 3p.m. - 7p.m.	7a.m. - 9a.m.; 3p.m. - 7p.m.	--	--	Map 1
Geary Blvd. (Gough - Presidio)	3p.m. - 7p.m.	7a.m. - 9a.m.	--	--	
Geary Blvd. (Presidio - 25th Ave.)	7a.m. - 6p.m.	7a.m. - 6p.m.			
Geary Blvd. (25th Ave. - 36th Ave.)	4p.m. - 7p.m.	4p.m. - 7p.m.			

PROPERTY LINE DEFINED

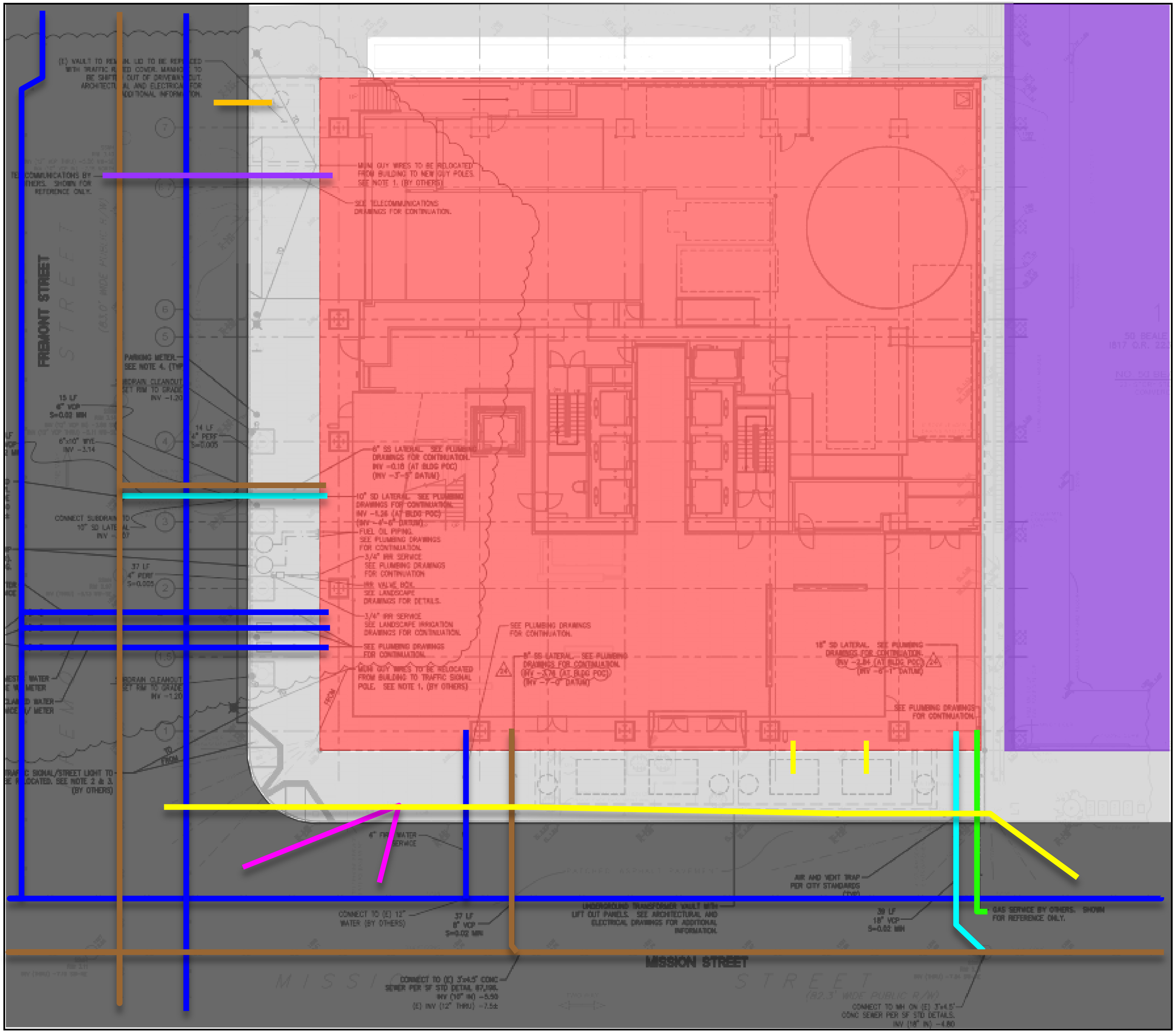




UTILITY PLAN : BEFORE



UTILITY PLAN : AFTER



WASTE MANAGEMENT PLAN

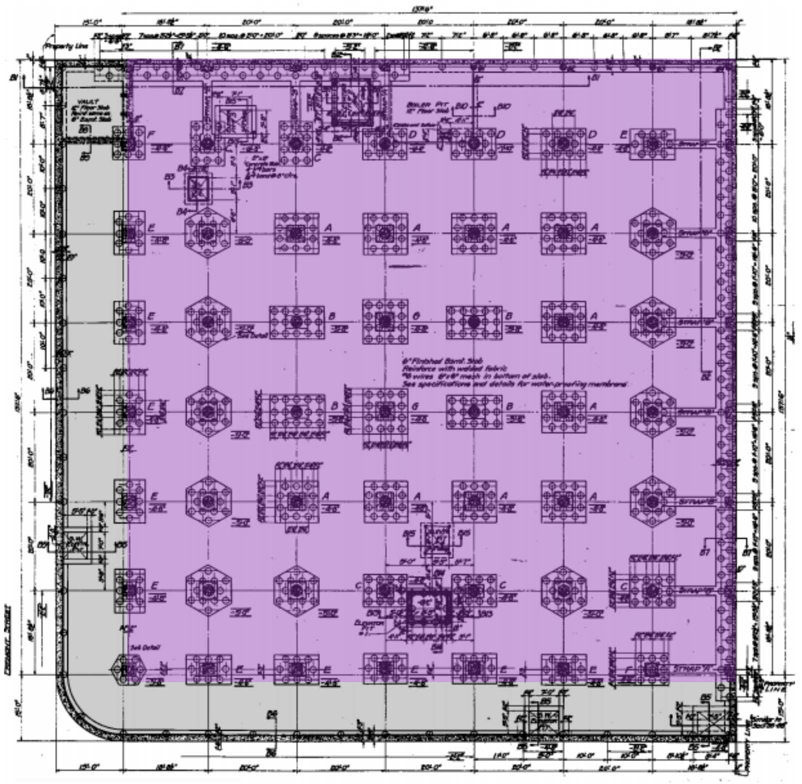
WASTE MANAGEMENT TRACKING LOG

1) AEVITAS strives to divert a minimum of 80% by weight of waste during construction of the 350 Mission building from landfills. As a collective team all parties involved with the construction of the 350 Mission building will contribute to the waste management effort and use the same waste management entity for consistent waste diversion tracking. The Waste Management for the project will utilize the Diversion and Recycling Tracking Tool (DART) created by Waste Management Company, or equivalent tool by another waste management entity.
2) The targeted materials to be recycled include the following:
    - Scrap Metals
    - Concrete
    - Masonry
    - Gypsum Board
    - Carpet
    - Material Packaging
    - Wood
3) The aforementioned materials will be recycled in a Co-Mingled manner, meaning that all materials will be disposed of in the same dumpster and sorted at the waste management subcontractor's facility. The following table is a sample of how the material will be tracked. An AEVITAS superintendent will be responsible for this tracking log and coordinating with the waste management subcontractor for dumpster delivery and pick-up.

Date	Destination	Destination Ticket No.	Trash	Concrete	Metal	Wood	Plastics	Cardboard	Drywall	Other	Total Weight
			Unrecycled Weight	Recycled Weight							
5/1/2014											
5/2/2014											
5/3/2014											
5/4/2014											
5/5/2014											
5/6/2014											
5/7/2014											
MONTH TOTALS											

4) The implementation of this plan will require multiple preconstruction meetings with the specialty contractors that are contracted to be part of the AEVITAS team. In the meetings the procedures to be followed for the duration of the project will be discussed and the specialty contractors will be able to provide feedback to establish the most efficient processes for the waste management efforts. The specialty contractors will also be able to provide feedback on any additional materials that are eligible to be recycled.

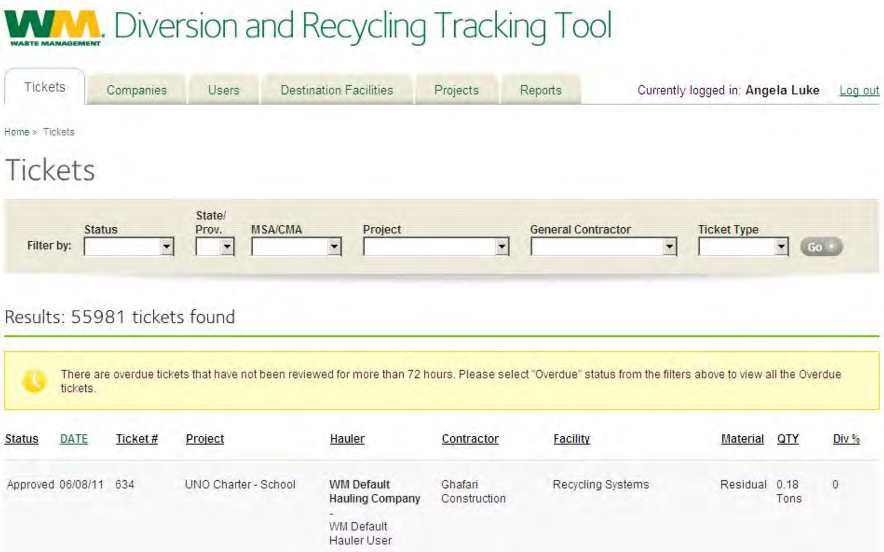
5) During construction the results of the tracking efforts will be posted around the construction site and in the new structure to remind workers of the significance of the plan and encourage increased participation in the recycling efforts. The "green facts" generated by the DART tool mentioned earlier will be a good representation of the efforts as they provide easily understood representations of the results. Upon completion a project summary will be created and turned over to the owner for their own marketing purposes.



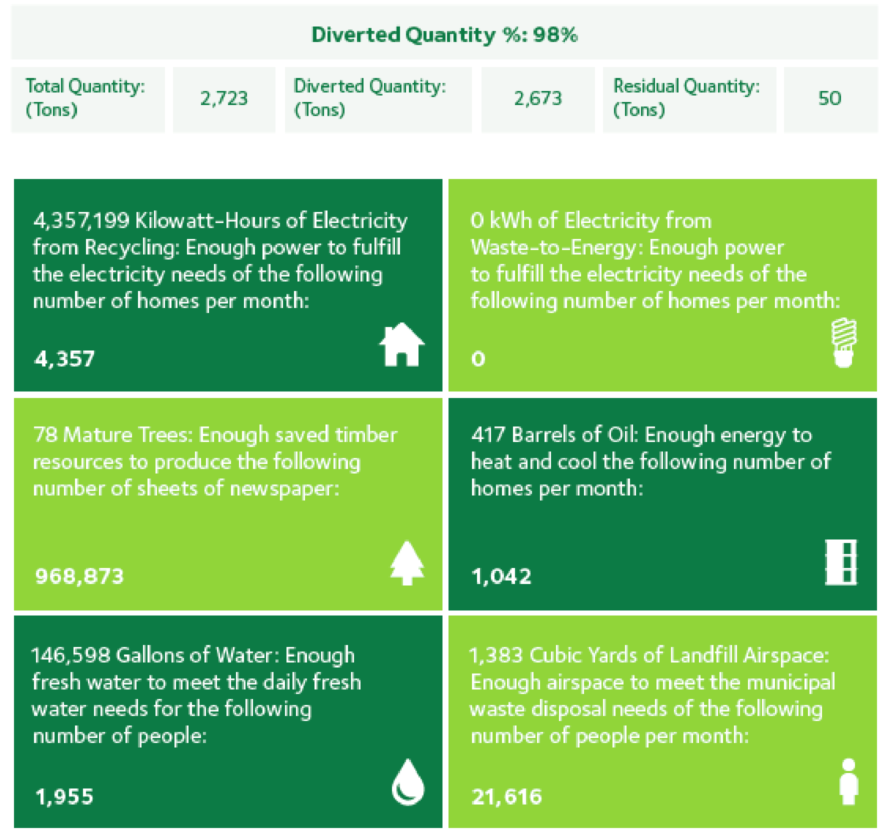
Existing Building Materials

Material Type	Quantity
Concrete (Structure)	3181 CuYd
Columns	109 CuYd
Slabs	3072 CuYd
Wood (Piles)	756 Each
Glass (Windows)	5616 SF
Carpet	56718 SF

WASTE MANAGEMENT: DART TOOL



http://www.wm.com/documents/ticket-tracking.JPG



https://www.wm.com/documents/Green-Facts.pdf

Crusher
- Up to 45 tons per hour
- Tier 3 engine- CARB compliant
- 7' 5" wide x 8' 6" high x 22' long
- Weight- 24,000 Lbs
- Adjustable finish product size - 3/4" - 3 1/2"
- Dust control system
- Magnet Conveyor for removing metal

PROJECT SCHEDULE

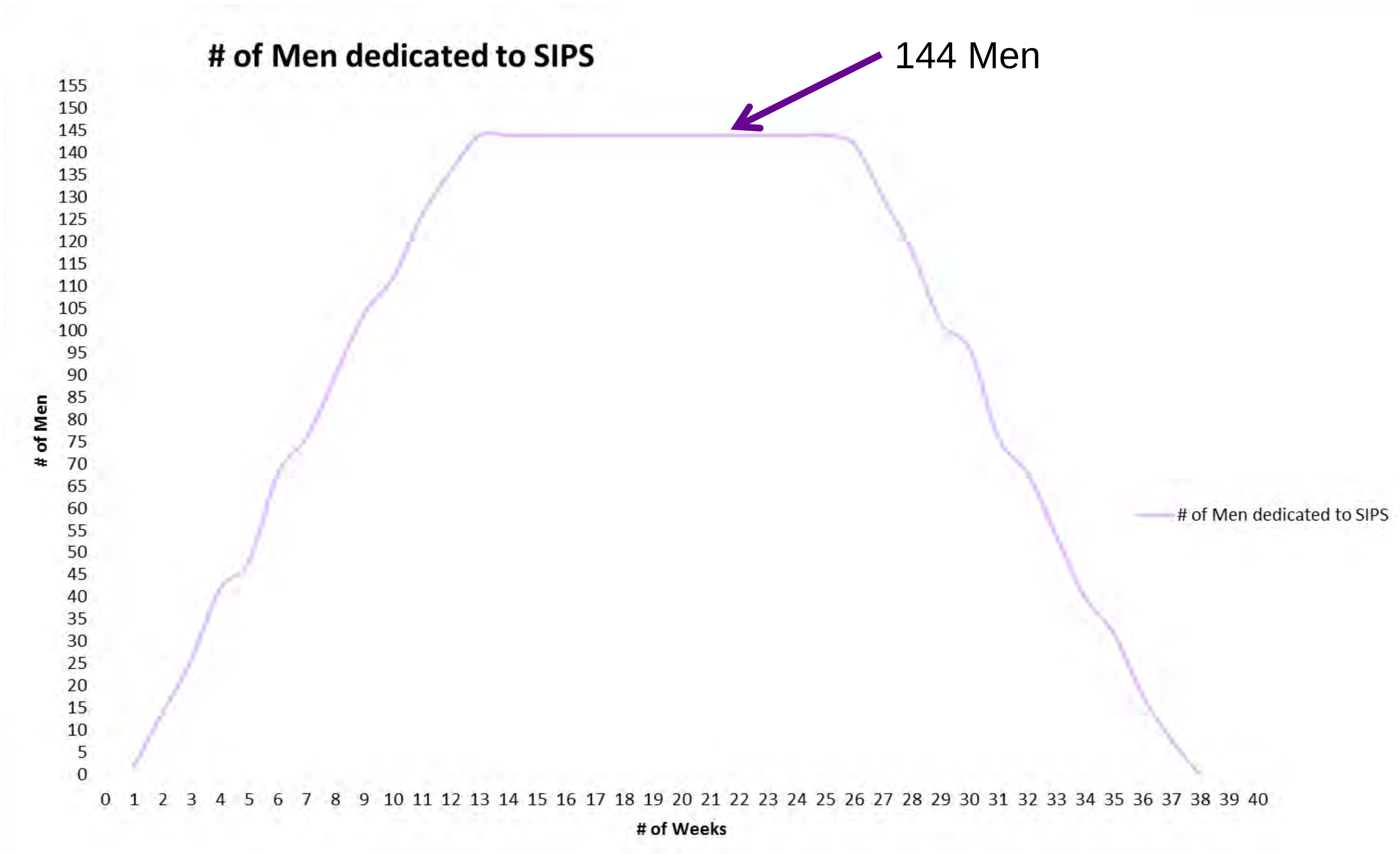
	Task Name	Duration	Start	Finish	Free Slack	Total Slack
1	Notice to Proceed	0 days	Mon 4/7/14	Mon 4/7/14	0 days	145 days
2	Existing Building Demo	65 days	Mon 4/7/14	Fri 7/4/14	0 days	145 days
3	Mobilization	10 days	Mon 7/7/14	Fri 7/18/14	0 days	145 days
4	Slurry Wall Excavation and Installation	30 days	Mon 7/21/14	Fri 8/29/14	0 days	145 days
5	Bulk Excavation	55 days	Mon 9/1/14	Fri 11/14/14	0 days	145 days
6	Diagonal Cross Lot Shoring	30 days	Mon 9/29/14	Fri 11/7/14	0 days	145 days
7	Mat Foundation Excavation	10 days	Mon 11/10/14	Fri 11/21/14	0 days	145 days
8	Foundation Waterproofing	60 days	Mon 11/24/14	Fri 2/13/15	0 days	145 days
9	FRP Mat Foundation Footing	15 days	Mon 12/1/14	Fri 12/19/14	0 days	330 days
10	FRP Foundation Core	40 days	Mon 12/22/14	Fri 2/13/15	0 days	330 days
11	FRP Substructure Floors, Columns, Walls	55 days	Mon 1/12/15	Fri 3/27/15	0 days	115 days
12	Set Structural steel to 5th floor	20 days	Mon 3/30/15	Fri 4/24/15	0 days	115 days
13	Set Structural steel to Mech 1	80 days	Mon 4/27/15	Fri 8/14/15	0 days	135 days
14	Lift Major Equipment within building	10 days	Mon 8/17/15	Fri 8/28/15	20 days	135 days
15	Pour Concrete floors to Equip Plat	10 days	Mon 5/11/15	Fri 5/22/15	0 days	115 days
16	Place Concrete Slabs to Mech 1	80 days	Mon 5/25/15	Fri 9/11/15	0 days	115 days
17	Lift and Set rooftop equipment	10 days	Mon 9/14/15	Fri 9/25/15	0 days	115 days
18	Set Structural Steel to Parapet	20 days	Mon 9/28/15	Fri 10/23/15	0 days	115 days
19	Steel Top Out	0 days	Mon 10/26/15	Mon 10/26/15	10 days	125 days
20	Permanent Roof	25 days	Mon 11/9/15	Fri 12/11/15	0 days	115 days
21	Building Watertight	0 days	Mon 12/14/15	Mon 12/14/15	115 days	115 days
22	Start Curtain Wall at 5th floor	10 days	Mon 6/15/15	Fri 6/26/15	0 days	115 days
23	Curtain wall to Parapet floor	100 days	Mon 6/29/15	Fri 11/13/15	0 days	115 days
24	Curtain wall G to 5th Floor	35 days	Mon 10/26/15	Fri 12/11/15	0 days	115 days
25	Set basement Equipment	10 days	Mon 5/11/15	Fri 5/22/15	0 days	160 days
26	Permanent Power Startup	10 days	Mon 7/20/15	Fri 7/31/15	0 days	205 days
27	Permanent Power Available	0 days	Mon 8/3/15	Mon 8/3/15	50 days	205 days
28	Substructure Rough In	40 days	Mon 5/25/15	Fri 7/17/15	0 days	220 days
29	Substructure Interiors	40 days	Mon 6/8/15	Fri 7/31/15	45 days	70 days
30	Elevator shaft work	80 days	Mon 6/22/15	Fri 10/9/15	0 days	155 days
31	Energize elev machines	5 days	Mon 10/12/15	Fri 10/16/15	115 days	155 days
32	Building Core Riser Rough In (Matrix Sched)	80 days	Mon 8/10/15	Fri 11/27/15	0 days	125 days
33	Lobby work	100 days	Mon 8/24/15	Fri 1/8/16	0 days	25 days
34	Sitework/Hardscaping	30 days	Mon 12/28/15	Fri 2/5/16	35 days	75 days
35	Release of Matrix Schedule	0 days	Mon 8/17/15	Mon 8/17/15	15 days	15 days
36	Typ Floor Construction (Matrix Schedule)	185 days	Mon 9/7/15	Fri 5/20/16	0 days	0 days
37	Commissioning & Start ups	60 days	Mon 2/29/16	Fri 5/20/16	0 days	0 days
38	Substantial Completion	0 days	Mon 3/28/16	Mon 3/28/16	0 days	40 days
39	Allow Tenant work to begin	0 days	Tue 3/29/16	Tue 3/29/16	39 days	39 days

TRADE SEQUENCING: MANPOWER CALCULATIONS

Electrical/Communications			Electrical								
Takeoff Totals			Productivity						Labor Durations		
Item	Quantity		Crew	Men/ Crew	# Crews	# Men	Daily Output	Total Output	Hours	Days	Weeks
Branch Circuits			Branch Circuits								
EMT Conduit (3/4")	3000	LF	1 Elec	1.0	8.0	8.0	253.0	2024.0	11.9	1.5	0.3
#12 Wire	120	CLF	1 Elec	1.0	8.0	8.0	11.0	88.0	10.9	1.4	0.3
#12 Wire Terminations	300	Ea	1 Elec	1.0	8.0	8.0	50.0	400.0	6.0	0.8	0.2
#10 Wire	40	CLF	1 Elec	1.0	8.0	8.0	10.0	80.0	4.0	0.5	0.1
#10 Wire Terminations	150	Ea	1 Elec	1.0	8.0	8.0	45.0	360.0	3.3	0.4	0.1
Armored Cable (3) #12	7.5	CLF	1 Elec	1.0	8.0	8.0	2.0	16.0	3.8	0.5	0.1
Junction Boxes	80	Ea	1 Elec	1.0	8.0	8.0	8.0	64.0	10.0	1.3	0.3
Outlet Boxes	156	Ea	1 Elec	1.0	8.0	8.0	20.0	160.0	7.8	1.0	0.2
Receptacles	156	Ea	1 Elec	1.0	8.0	8.0	32.0	256.0	4.9	0.6	0.1
Fixtures			Fixtures								
4' Linear Recessed	118	Ea	1 Elec	1.0	10.0	10.0	8.0	80.0	11.8	1.5	0.3
2X2 Troffer	34	Ea	1 Elec	1.0	10.0	10.0	5.7	57.0	4.8	0.6	0.1
Down Light	47	Ea	1 Elec	1.0	10.0	10.0	8.0	80.0	4.7	0.6	0.1
Linear Fluorescent Fixt	14	Ea	1 Elec	1.0	10.0	10.0	8.0	80.0	1.4	0.2	0.0
Task Lighting	120	Ea	1 Elec	1.0	10.0	10.0	10.0	100.0	9.6	1.2	0.2
Emergency Lighting	12	Ea	1 Elec	1.0	10.0	10.0	4.0	40.0	2.4	0.3	0.1
Exit Signs	6	Ea	1 Elec	1.0	10.0	10.0	4.0	40.0	1.2	0.2	0.0
Equipment			Equipment								
DC Conversion Module	5	Ea	1 Elec	1.0	10.0	10.0	5.0	50.0	0.8	0.1	0.0
Grounding Rod	1	Ea	1 Elec	1.0	10.0	10.0	5.3	53.0	0.2	0.0	0.0
Occupancy Sensors	6	Ea	1 Elec	1.0	10.0	10.0	6.5	65.0	0.7	0.1	0.0
Daylighting Sensors	4	Ea	1 Elec	1.0	10.0	10.0	6.5	65.0	0.5	0.1	0.0
Life Safety			Life Safety								
Fiber Optic Cable	10	CLF	1 Elec	1.0	4.0	4.0	6.7	26.7	3.0	0.4	0.1
Heat Detectors	4	Ea	1 Elec	1.0	10.0	10.0	8.0	80.0	0.4	0.1	0.0
Smoke Detectors	6	Ea	1 Elec	1.0	10.0	10.0	6.0	60.0	0.8	0.1	0.0
Carbon Monoxide Detect	2	Ea	1 Elec	1.0	10.0	10.0	8.0	80.0	0.2	0.0	0.0
Visual Alarms	6	Ea	1 Elec	1.0	10.0	10.0	5.3	53.0	0.9	0.1	0.0
Audible Alarms	2	Ea	1 Elec	1.0	10.0	10.0	6.7	67.0	0.2	0.0	0.0
Data			Data								
24 Port Patch Panel	1	Ea	2 Elec	2.0	1.0	2.0	6.0	6.0	1.3	0.2	0.0
Cat 6 Cable	25	CLF	1 Elec	1.0	4.0	4.0	7.0	28.0	7.1	0.9	0.2
Network Hub Router	6	Ea	3 Elec	3.0	2.0	6.0	1.5	3.0	16.0	2.0	0.4

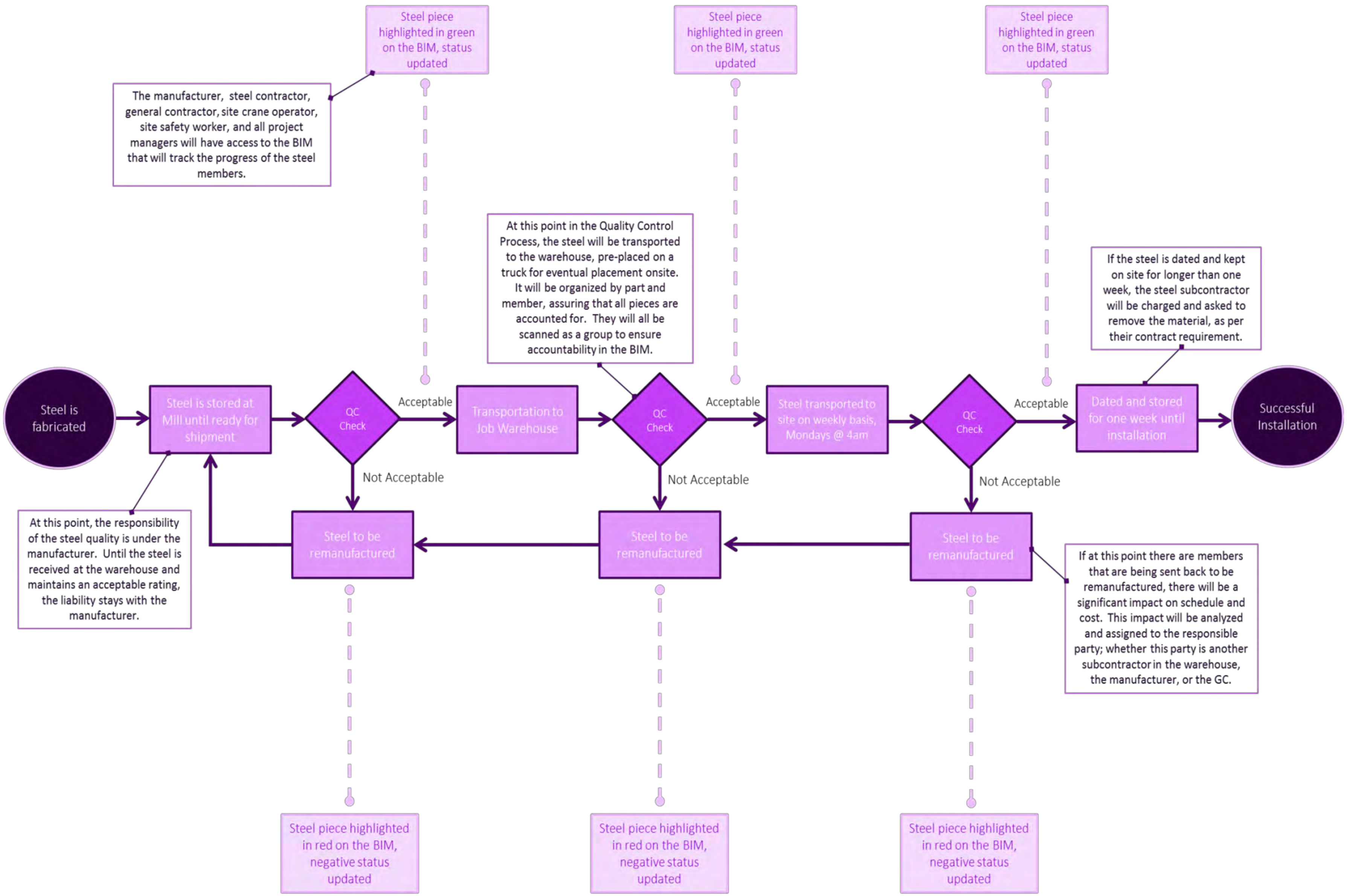
TRADE SEQUENCING: MANPOWER LOADING

Seq #	Task	Desired Duration	Trade	# Men Req'd To Meet Desired Duration	Total # of Men
1	Layout Install Top Track Layout Duct Openings in Wall Metal Stud Wall/Openings	5	Interiors	2	**2**
2	HVAC Duct Mains/Dampers HVAC Duct Branches Install Duct Insulation Radiant Slab Tie In	5	Mech	12	**12**
3	Domestic Water Branches Sanitary/Prefab Toilet Rack Install Pipe Testing Pipe Insulation Sprinkler Mains Sprinkler Branches	5	Plum FP	6 6	**12**
4	Install Large Conduit Firestop and Caulk Penetrations Install Interior Partitions One Side Drywall	5	Elec All Interiors	6 2 8	**16**
5	In-Wall Electrical/Comm In Wall Controls In Wall Testing/QC	5	Elec	6	**6**
6	Close In Inspection Finish Drywall Install Door Frames Frame and Install Ceiling Grid	5	All Interiors	4 16	**20**
7	Pull Electrical Wire Pull Data Cable Pull Fire Alarm Cable	5	Elec	8	**8**
8	Prime and Paint Walls Install Carpet Tile/Ceramic Tile	5	Painter Flooring	4 10	**14**
9	Install Electrical Trim/Wall Controls Install Light Fixtures Set and Hookup Plumbing Fixtures Caulk Plumbing Fixtures	5	Elec Plum	10 4	**14**
10	Install Sprinkler Drops Sprinkler Hydrotest Install Bathroom Trim/Partitions Install Doors/Locks/Closers	5	FP Interiors	4 4	**8**
11	Overhead Close In Inspection Install Ceiling Tile HVAC Ceiling Trim Electrical Ceiling Trim Sprinkler Ceiling Trim Misc Ceiling Trim	5	All Interiors Mech Elec FP Interiors	4 6 1 1 1 1	**14**
12	Final Paint Final Clean Air and Water Balancing Fire Alarm Testing	5	Painter AEVITAS Plum/Mech Elec/Comm	4 2 2 2	**10**
13	Performance Tests - TAB Performance Tests - Controls Performance Tests - Lighting Performance Tests - Radiant	5	Mech/Plum Elec/Controls Elec Mech/Plum	2 2 2 2	**8**
14	Final Inspection/Punchout Punchout and Signoff Final Acceptance/Floor Completion	5	AEVITAS/KR	-- -- --	**0**



# of Men dedicated to SIPS
144 Men
155
150
145
140
135
130
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
# of Men
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
# of Weeks
# of Men dedicated to SIPS

Long Lead Items	Lead Times
Loading Dock Turntable	12 Weeks
Fuel Cell	30 Weeks
Switchgears	6 Weeks
UPS's	8 Weeks
Solar Panels	6 Weeks
Cooling Tower	24 Weeks
Generator	16 Weeks
Façade Panels	12 Weeks
Heat Pumps	8 Weeks
Chillers	6 Weeks
Boilers	6 Weeks
Steel	40 Weeks
Air Handling Units	12 Weeks


Steel is fabricated
Steel is stored at Mill until ready for shipment
QC Check
Acceptable
Not Acceptable
Transportation to Job Warehouse
QC Check
Acceptable
Not Acceptable
Steel transported to site on weekly basis, Mondays @ 4am
QC Check
Acceptable
Not Acceptable
Dated and stored for one week until installation
Successful Installation
Steel to be remanufactured
Steel to be remanufactured
Steel to be remanufactured
Steel piece highlighted in green on the BIM, status updated
Steel piece highlighted in green on the BIM, status updated
Steel piece highlighted in green on the BIM, status updated
Steel piece highlighted in red on the BIM, negative status updated
Steel piece highlighted in red on the BIM, negative status updated
Steel piece highlighted in red on the BIM, negative status updated
The manufacturer, steel contractor, general contractor, site crane operator, site safety worker, and all project managers will have access to the BIM that will track the progress of the steel members.
At this point in the Quality Control Process, the steel will be transported to the warehouse, pre-placed on a truck for eventual placement onsite. It will be organized by part and member, assuring that all pieces are accounted for. They will all be scanned as a group to ensure accountability in the BIM.
If the steel is dated and kept on site for longer than one week, the steel subcontractor will be charged and asked to remove the material, as per their contract requirement.
At this point, the responsibility of the steel quality is under the manufacturer. Until the steel is received at the warehouse and maintains an acceptable rating, the liability stays with the manufacturer.
If at this point there are members that are being sent back to be remanufactured, there will be a significant impact on schedule and cost. This impact will be analyzed and assigned to the responsible party; whether this party is another subcontractor in the warehouse, the manufacturer, or the GC.

California Legal Truck Tractor - Semitrailer

Semitrailer length : no limit
KPRA* : 40 feet maximum for two or more axles, 38 feet maximum for single-axle trailers
Overall length : 65 feet maximum *(KPRA = kingpin-to-rear-axle)

Interstate "STAA" Truck Tractor - Semitrailer

Semitrailer length : 48 feet maximum
KPRA* : no limit
Overall length : no limit *(KPRA = kingpin-to-rear-axle)

Semitrailer length : over 48 feet up to 53 feet maximum
KPRA : 40 feet maximum for two or more axles, 38 feet maximum for single-axle trailers
Overall length : no limit

GENERAL RULE

35100. (a) The total outside width of any vehicle or its load shall not exceed **102 inches**.

MEASUREMENT

35100.1. (a) The **metric** equivalent of 102 inches is **2.6 meters**.

(b) The width measurement of any vehicle with **side walls** shall be made from the outside wall of the two opposite sides of the vehicle.

RTE	COUNTY	POST-MILE	DIR	NAME	VERT CLEARANCE
5	San Diego	15.420	NB	Pershing Dr.	13'-10"
33	Ventura	18.231	NB	South Matilija Tunnel	13'-4"
33	Ventura	18.811	NB	Middle Matilija Tunnel	13'-4"
33	Ventura	18.846	NB	North Matilija Tunnel	13'-4"
33	Ventura	18.846	SB	North Matilija Tunnel	13'-4"
33	Ventura	18.811	SB	Middle Matilija Tunnel	13'-4"
33	Ventura	18.231	SB	South Matilija Tunnel	13'-4"
110	Los Angeles	24.160	NB	College St.	13'-6"
110	Los Angeles	24.548	NB	Hill St.	13'-5"
151	Shasta	5.508	EB	Coram Railroad Crossing	13'-9"
151	Shasta	5.508	WB	Coram Railroad Crossing	13'-9"
238	Alameda	2.190	SB	Edenvale Railroad Crossing	14'-0"

GENERAL RULE

35550. (a) The **gross weight** on any one axle shall not exceed **20,000 pounds**, and the gross weight upon any one **wheel, or wheels**, supporting one end of an axle, shall not exceed **10,500 pounds**.

(b) The **gross weight** limit for any one **wheel, or wheels**, shall not apply to vehicles with loads of **livestock**.

(c) The **maximum wheel load** is the **lesser** of the following:
(1) The load limit established by the **tire manufacturer**, on the tire sidewall.
(2) A load of **620 pounds per lateral inch of tire width**, as determined by the manufacturer's rated tire width on the tire sidewall. The **steering axle**, however, must go by the load limit by the **tire manufacturer**.

CSI DIVISION	RS Means 30 Story High Rise (420,000 GSF)	Budget for Anonymous NYC High Rise (432,305 GSF)	AEVITAS 350 Mission NZE High Rise (420,000 GSF)
Division 2 - Existing Conditions	N/A	N/A	$531,320.00
Division 3 - Concrete	$4,631,000.00	$19,457,000	$11,416,200.00
Division 4 - Masonry	N/A	$5,602,600	$186,680.00
Division 5 - Metals	$15,798,277.78	$18,663,000	$16,230,585.00
Division 6 - Wood, Plastics, Comp	N/A	$392,000	$258,480.00
Division 7 - Thermal and Moisture Prot	$104,000.00	$2,696,000	$1,335,480.00
Division 8 - Openings	$21,536,055.56	$28,796,000.00	$21,942,080.00
Division 9 - Finishes	$12,533,222.22	$8,478,330	$6,232,240.00
Division 10 - Specialties	N/A	$4,147,000	$1,579,600.00
Division 11 - Equipment	N/A	$1,355,000	$1,134,440.00
Division 12 - Furnishings	N/A	N/A	$258,480.00
Division 14 - Conveying Equipment	$7,281,717.80	$7,647,000	$6,734,840.00
Division 21 - Fire Suppression	$2,314,333.33	$1,641,000	$2,053,480.00
Division 22 - Plumbing	$2,924,500.00	$4,833,000	$4,552,120.00
Division 23 - HVAC	$12,305,166.67	$21,009,090	$18,452,600.00
Division 26 - Electrical	$12,684,000.00	$22,276,380	$19,788,080.00
Division 27 - Communications	Included in Div 26	Included in Div 26	$3,001,240.00
Division 31 - Earthwork	$4,040,000.00	$12,292,510	$13,254,280.00
Division 32 - Exterior Improvements	Included in Div 31	$964,195	$430,800.00
Division 33 - Utilities	Included in Div 31	$225,000	$502,600.00
Direct Costs	$111,310,273.36	$152,828,105	$143,600,000.00
General Conditions	$9,077,568.34	$9,169,686.30	$9,419,000.00
Fee	$6,019,392.08	$4,584,843.15	$4,308,000.00
Total Building Cost	$126,407,233.78	$166,582,634	$157,327,000.00

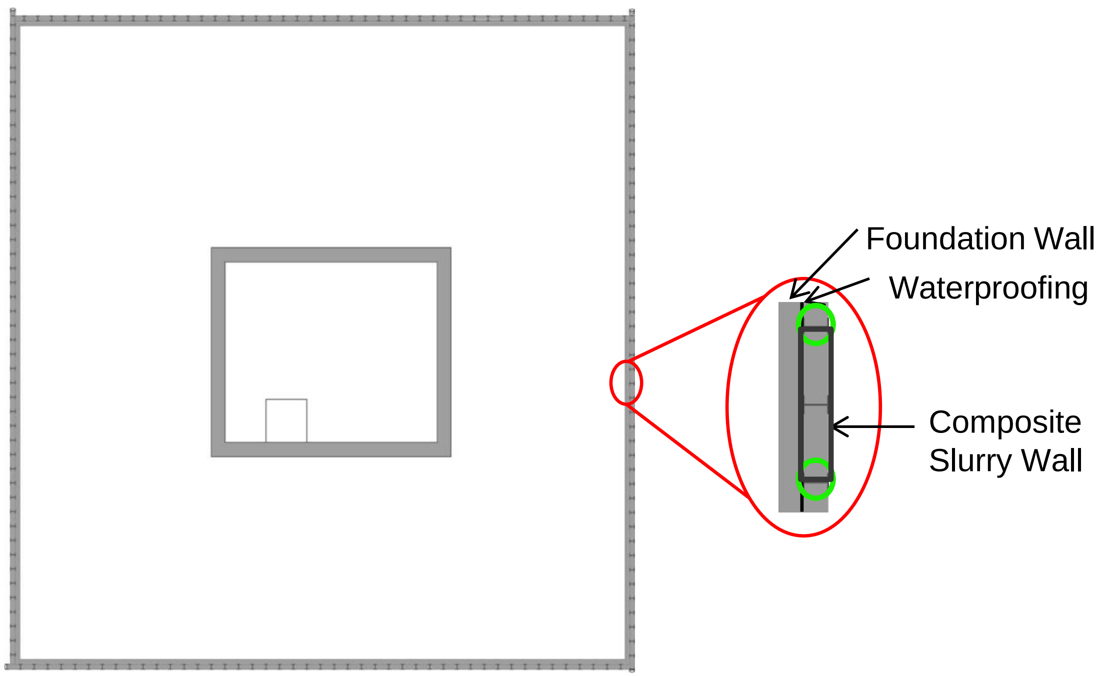
PRELIMINARY BUDGET: DETAILED

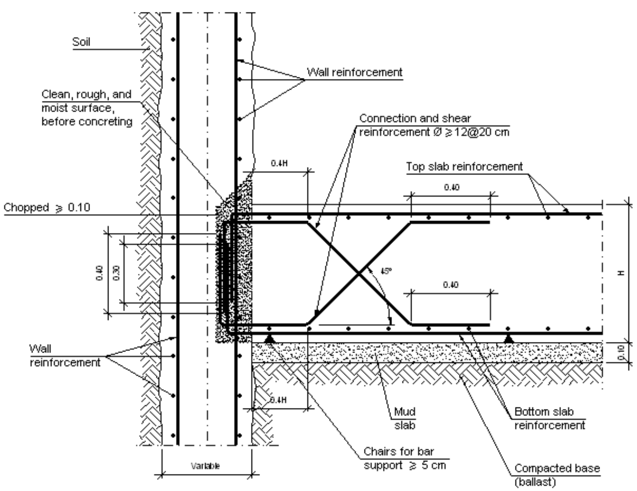
CSI DIVISION	TOTALS	$/SF	% OF TOTAL
Division 2 - Existing Conditions	**$531,320**	**$1.25**	**0.37%**
02 40 00 Demolition/Remediation	$531,320	$1.25	0.37%
Division 3 - Concrete	**$11,416,200**	**$26.86**	**7.95%**
03 10 00 Concrete Forming	$1,694,480	$3.99	1.18%
03 20 00 Concrete Reinforcing	$2,469,920	$5.81	1.72%
03 30 00 Cast In Place Concrete	$7,251,800	$17.06	5.05%
Division 4 - Masonry	**$186,680**	**$0.44**	**0.13%**
04 00 00 Masonry	$186,680	$0.44	0.13%
Division 5 - Metals	**$16,230,585**	**$38.19**	**11.30%**
05 10 00 Structural Steel	$12,525,705	$29.47	8.72%
05 30 00 Metal Decking	$1,694,480	$3.99	1.18%
05 50 00 Miscellaneous Metals	$2,010,400	$4.73	1.40%
Division 6 - Wood, Plastics, Comp	**$258,480**	**$0.61**	**0.18%**
06 20 00 Millwork	$258,480	$0.61	0.18%
Division 7 - Thermal and Moisture Prot	**$1,335,480**	**$3.14**	**0.93%**
07 10 00 Water Proofing	$904,680	$2.13	0.63%
07 50 00 Membrane Roofing	$430,800	$1.01	0.30%
Division 8 - Openings	**$21,942,080**	**$51.63**	**15.28%**
08 10 00 Doors and Frames	$560,040	$1.32	0.39%
08 30 00 Overhead Doors	$100,520	$0.24	0.07%
08 80 00 Glazing/Curtain Walls	$19,457,800	$45.78	13.55%
08 90 00 Louvers and Vents	$1,823,720	$4.29	1.27%
Division 9 - Finishes	**$6,232,240**	**$14.66**	**4.34%**
09 20 00 Drywall/Partitions	$2,125,280	$5.00	1.48%
09 30 00 Tiling	$229,760	$0.54	0.16%
09 50 00 Ceilings	$2,584,800	$6.08	1.80%
09 60 00 Carpet Tile	$718,000	$1.69	0.50%
09 90 00 Painting	$574,400	$1.35	0.40%
Division 10 - Specialties	**$1,579,600**	**$3.72**	**1.10%**
10 00 00 Specialties/Signage	$1,579,600	$3.72	1.10%
Division 11 - Equipment	**$1,134,440**	**$2.67**	**0.79%**
11 00 00 Equipment	$1,134,440	$2.67	0.79%
Division 12 - Furnishings	**$258,480**	**$0.61**	**0.18%**
12 40 00 Furnishings and Accessories	$258,480	$0.61	0.18%
Division 14 - Conveying Equipment	**$6,734,840**	**$15.85**	**4.69%**
14 20 00 Elevators	$6,734,840	$15.85	4.69%
Division 21 - Fire Suppression	**$2,053,480**	**$4.83**	**1.43%**
21 00 00 Fire Suppression	$2,053,480	$4.83	1.43%
Division 22 - Plumbing	**$4,552,120**	**$10.71**	**3.17%**
22 00 00 Plumbing	$4,552,120	$10.71	3.17%
Division 23 - HVAC	**$18,452,600**	**$43.42**	**12.85%**
23 00 00 HVAC	$18,452,600	$43.42	12.85%
Division 26 - Electrical	**$19,788,080**	**$46.56**	**13.78%**
26 00 00 Electrical	$19,788,080	$46.56	13.78%
Division 27 - Communications	**$3,001,240**	**$7.06**	**2.09%**
27 00 00 Communications	$3,001,240	$7.06	2.09%
Division 31 - Earthwork	**$13,254,280**	**$31.19**	**9.23%**
31 00 00 Earthwork	$11,172,080	$26.29	7.78%
31 40 00 Shoring and Underpinning	$574,400	$1.35	0.40%
31 50 00 Excavation Support and Prot	$1,507,800	$3.55	1.05%
Division 32 - Exterior Improvements	**$430,800**	**$1.01**	**0.30%**
32 00 00 Hardscaping/Site Work	$430,800	$1.01	0.30%
Division 33 - Utilities	**$502,600**	**$1.18**	**0.35%**
33 00 00 Utilities	$502,600	$1.18	0.35%
Direct Costs	$143,600,000	$337.88	90.44%
General Conditions	$9,419,000	$22.16	6.56%
Fee	$4,308,000	$10.14	3.00%
Total Building Cost	**$157,327,000**	**$370.18**	**100.00%**

CSI CODE	TITLE	QUANTITY	UNITS	$/UNIT	TOTALS
01 30 00	**Administrative Reqs**				
	Project Staff				
	Project Executive	65	Weeks	$10,000	$650,000
	Senior Project Manager	85	Weeks	$5,000	$425,000
	Project Manager	100	Weeks	$4,000	$400,000
	Assistant Project Manager	100	Weeks	$3,000	$300,000
	Project Engineer	100	Weeks	$2,250	$225,000
	Project Engineer	92	Weeks	$2,250	$207,000
	Project Engineer	88	Weeks	$2,250	$198,000
	Senior Superintendent	85	Weeks	$4,200	$357,000
	Superintendent	100	Weeks	$3,000	$300,000
	Superintendent	85	Weeks	$3,000	$255,000
	Assistant Superintendent	100	Weeks	$2,500	$250,000
	Assistant Superintendent	88	Weeks	$2,500	$220,000
	Assistant Superintendent	75	Weeks	$2,500	$187,500
	Assistant Superintendent	75	Weeks	$2,500	$187,500
	Quality Control Manager	85	Weeks	$2,050	$174,250
	Safety Manager	85	Weeks	$2,050	$174,250
	Project Management/Coordination				
	Office Supplies/Equip/Furniture	1	LS	$100,000	$100,000
	Computers/Fax/Printers/Software	1	LS	$100,000	$100,000
	Printing Charges	1	LS	$50,000	$50,000
	Safety Equipment	1	LS	$125,000	$125,000
	Postage/Packaging	1	LS	$12,000	$12,000
	Permitting	1	LS	$250,000	$250,000
	Progress Photos	1	LS	$12,000	$12,000
01 40 00	**Quality Requirements**				
	Quality Control	1	LS	$20,000	$20,000
	Testing and Inspection	1	LS	$300,000	$300,000
	Testing Laboratory Services	1	LS	$25,000	$25,000
01 50 00	**Temporary Facilities and Controls**				
	Temporary Utilities Consumption				
	Temporary Utilities	1	LS	$100,000	$100,000
	Waste Management				
	Waste Management Fees	1	LS	$500,000	$500,000
	Construction Facilities				
	Job Office Trailer	1	LS	$8,000	$8,000
	Job Warehouse	25	Months	$7,100	$177,500
	Warehouse Set Up	1	LS	$5,000	$5,000
	Drinking Water/Ice	1	LS	$12,000	$12,000
	Radios/Phones	1	LS	$15,000	$15,000
	Construction Aids				
	Personal Protection Equipment (PPE)	1	LS	$15,000	$15,000
	Temporary Hoists	1	LS	$300,000	$300,000
	Temporary Cranes	9	Months	$75,000	$675,000
	Crane Set Up & Demobilization	1	LS	$600,000	$600,000
	Temporary Scaffolding and Platforms	1	LS	$100,000	$100,000
	Temporary Shoring and Bracing	1	LS	$400,000	$400,000
	Temporary Dewatering Pumps	1	LS	$200,000	$200,000
	Temporary Barriers and Enclosures				
	Temporary Fencing (Plastic Jersey Barriers)	1	LS	$10,000	$10,000
	Temporary Protection of Adjacent Structures	1	LS	$10,000	$10,000
01 70 00	**Execution and Closeout Requirements**				
	Execution				
	Signage	1	LS	$12,000	$12,000
	Topping Out	1	LS	$50,000	$50,000
	Business Promotions	1	LS	$15,000	$15,000
	Vehicle Mileage	1	LS	$25,000	$25,000
	Auto Allowances	1	LS	$100,000	$100,000
	Job Site Travel	1	LS	$100,000	$100,000
	Cleaning and Waste Management				
	Progress Cleaning	1	LS	$80,000	$80,000
	Final Cleaning	1	LS	$405,000	$405,000
	TOTAL AMOUNT				**$9,419,000**

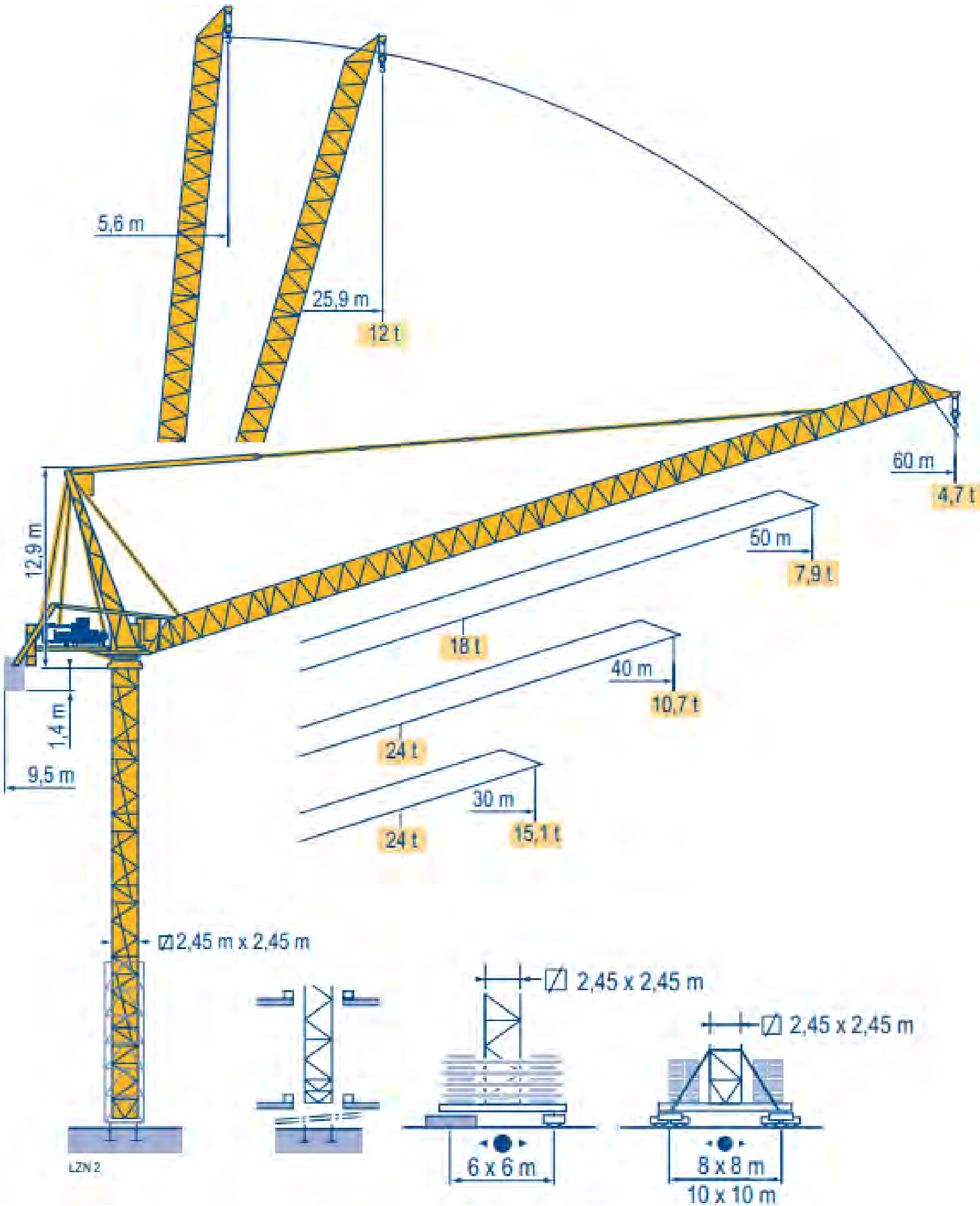
EQUIPMENT SCHEDULE

OPTION	EQUIPMENT	QUANTITY	DIMENSIONS (LWH)	LOCATION	CUT SHEET AND SPECIFICATION INFO
MECHANICAL	Boiler	3	5'2" - 3'1" - 6'3"	Penthouse	Boiler
	Chiller	3	14'2" - 6'6" - 7'5"	Penthouse	Chiller
	DOAS Fans	2	5' - 5' - 7'	Rooftop	DOAS Fans
	DOAS 1 AHU	1	11'7" - 4'5" - 9'5"	Penthouse	DOAS 1 AHU
	DOAS 2 AHU	1	11'7" - 4'5" - 9'5"	Mech. Platform M206	DOAS 2 AHU
	Smoke Exhaust Fan	1	6' - 6' - 7'	Rooftop	Smoke Exhaust Fan
	Kitchen Exhaust Fan	1	4' - 4' -6'	Mech. Platform M206	Kitchen Exhaust Fan
	Bathroom Fan + VFD 1	1	4' - 4' -6'	Rooftop	Bathroom Fan + VFD 1
	Bathroom Fan + VFD 2	1	4' - 4' -6'	Mech. Platform M206	Bathroom Fan + VFD 2
	Garage Exhaust Fan	1	5' - 5' - 7'	Near truck turnstyle	Garage Exhaust Fan
	HVAC Primary Pumps + VFD	6	1' - 1' - 1'6"	Penthouse	HVAC Primary Pumps + VFD
	HVAC Secondary Pumps + VFD	2	1' - 1' - 1'6"	Penthouse	HVAC Secondary Pumps + VFD
	Tertiary Pumps + VFD	26 (1 per fl.)	1' - 1' - 1'6"	Mech. Space per floor	Tertiary Pumps + VFD
	Dom. Water Booster Pumps + VFD	2	1' - 1' - 1'6"	Pump RM (Level B4)	Dom. Water Booster Pumps + VFD
	Fire Pump + VFD	1	1' - 1' - 1'6"	Fire Pump RM (Level B4)	Fire Pump + VFD
	Cooling Tower	1	13'11" - 22'5" - 22'7"	Penthouse	Cooling Tower
	Greywater Storage Tank	1	See room size	RM B422B (Level B4)	Greywater Storage Tank
	Robust Potable Storage Tank	1	12'D - 10'H	Penthouse	Robust Potable Storage Tank
	Fire Suppression Tank	1	See room size	RM B422A (Level B4)	Fire Suppression Tank
LIGHTING/ELECTRICAL	Fuel Cell	3	27'4" - 8'4" - 10'	Penthouse Electrical Room (2) and Main Electrical Room (1)	Fuel Cell
	Human Waste to Energy	1		Storage B420 (Level B4)	Human Waste to Energy
	Onsite Solar	200 kW	15,000 ft.^{2}	Rooftop	Onsite Solar
	Paralleling Switchgear	2	24' - 3'6" - 8'	Penthouse Electrical Room (1) and Main Electrical Room (1)	Paralleling Switchgear
	Battery Pack	2		Penthouse Electrical Room, Server Room	Battery Pack
	Rectifier	1		Penthouse Electrical Room	Rectifier
	Inverter	1		Penthouse Electrical Room	Inverter
	Primary Transformers	2	Provided by Utility	Service Entrance (PG&E vault)	Primary Transformers
	Secondary Transformers	27		Electrical Room every floor	Secondary Transformers
	Rack Servers	50		Server Room	Rack Servers
	Equipment Distribution Panelboards	4		Penthouse Electrical Room (2) and Main Electrical Room (2)	Equipment Distribution Panelboards
	Branch Panelboards	75		Electrical Room per floor	Branch Panelboards
	Primary ATS	1		Penthouse Electrical Room	Primary ATS
	Secondary ATS	26 (1 per fl.)		Electrical Room per floor	Secondary ATS

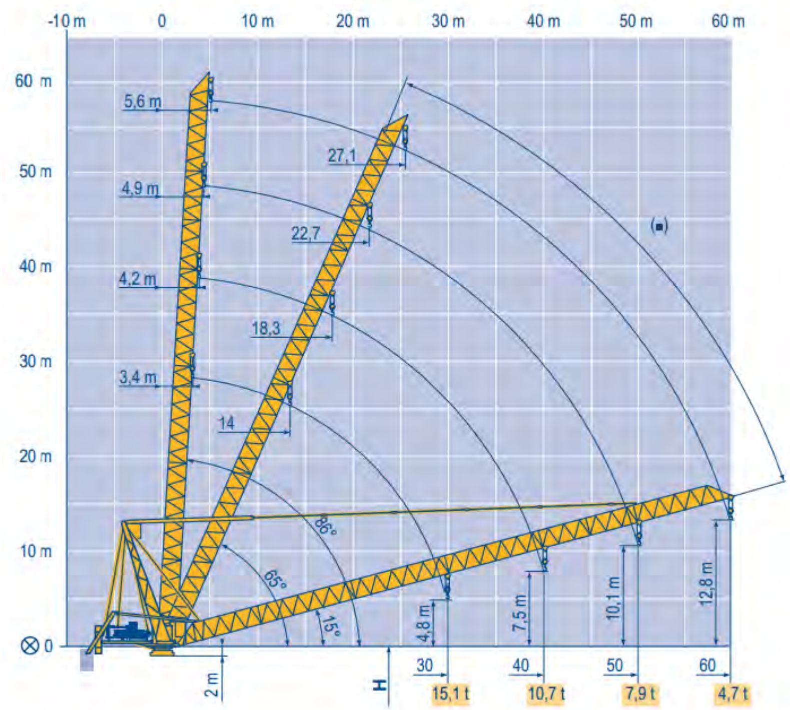

Foundation Wall
Waterproofing
Composite
Slurry Wall


Soil
Wall reinforcement
Clean, rough, and moist surface, before concreting
Connection and shear reinforcement Ø ≥ 12@20 cm
Top slab reinforcement
0.4H
0.40
Chopped ≥ 0.10
0.40
0.30
45°
H
0.10
Wall reinforcement
0.4H
Mud slab
Bottom slab reinforcement
Chairs for bar support ≥ 5 cm
Compacted base (ballast)
Variable

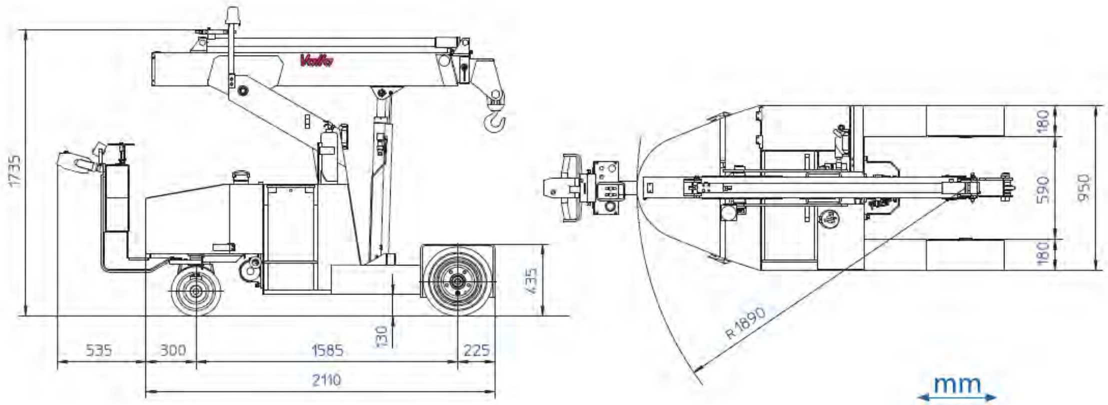
CONSTRUCTABILITY: CRANE SELECTION SPECS



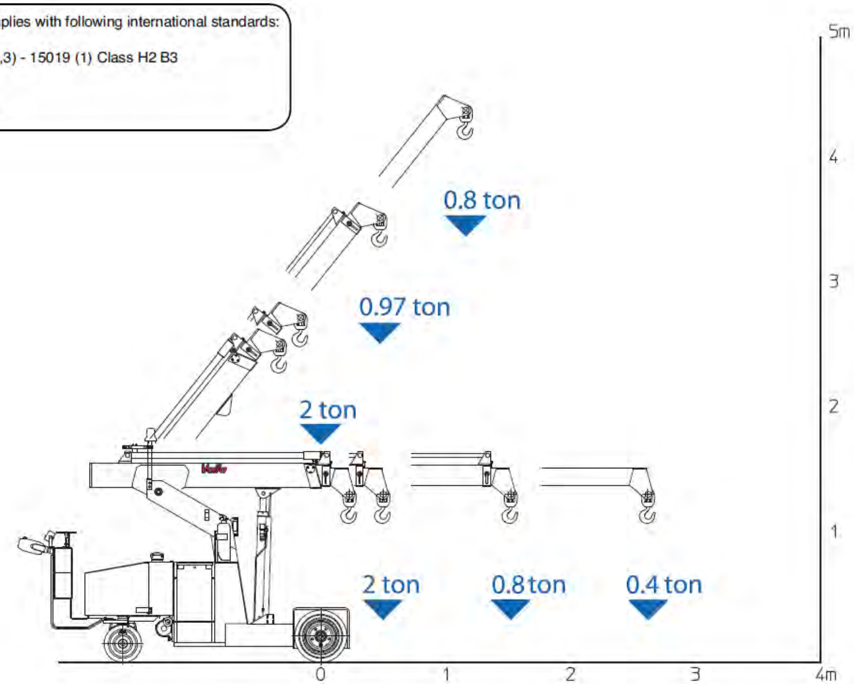
40 m	4,2 ►	18,6	20	22	25	27	30	32	35	36	40	m
		24	22,3	20,2	17,6	16,3	14,6	13,6	12,4	12	10,7	t
										12	10,7	t



CONSTRUCTABILITY: FLOOR CRANE SELECTION SPECS

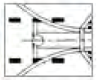


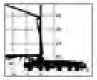
The crane complies with following international standards:
- I.S.P.E.S.L.
- DIN 15018 (1,3) - 15019 (1) Class H2 B3
- ANSI - 1994
- 98/37/CE
- 89/336/CEE



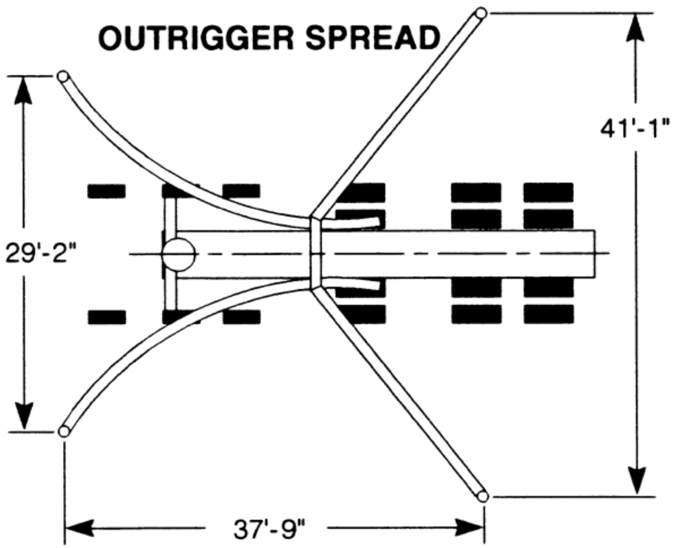
S 58 SX: The 58 Meter with a 187 Foot Boom

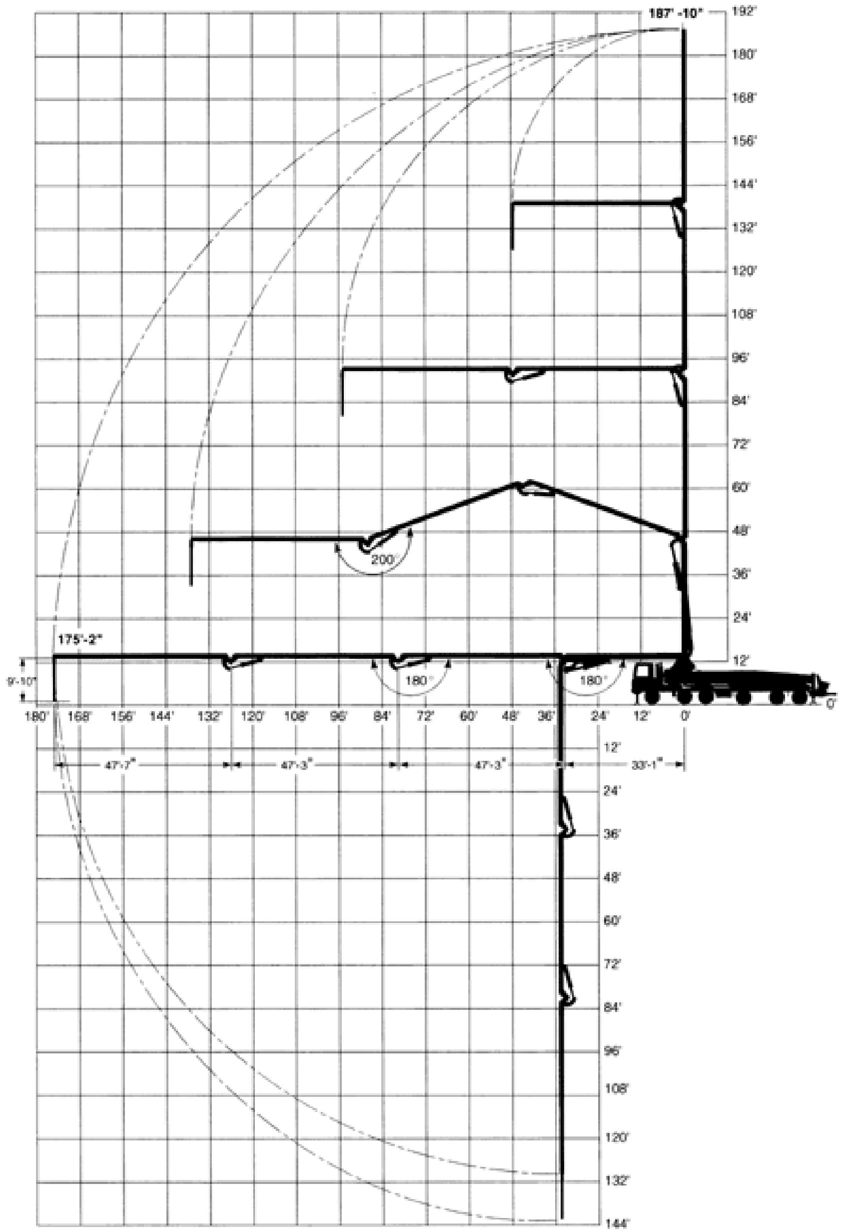
When you think the reach is too far, call in the big dog. The bohemouth S58SX will reach out and make your pour easier. Nobody wants to drag a hose.





Boom Specifications		58 U.S.	61 U.S.	58 Metric	61 Metric
Pipeline Diameter		5"	4.5"	125 mm	112 mm
Vertical Reach		187'-10"	197'-2"	57.24 m	61 m
Net Horizontal Reach		162'-9"	172'-9"	49.6 m	52.7 m
Horizontal Reach		175'-2"	184'-6"	53.4 m	56.4 m
Unfolding height		48'-6"	52'-3"	14.8 m	15.9 m
Section Length	1st Section	33'-1"	34'	10 m	10.4 m
	2nd Section	47'-3"	49'	14.4 m	14.9 m
	3rd Section	47'-3"	50'-8"	14.4 m	15.4 m
	4th Section	47'-3"	51'	14.5 m	15.5 m
Slewing Range		370º	370º	370º	370º
End hose length		10'	10'	3 m	3 m
Reach from front of truck is 163' | Overall truck height to top of boom is 13' | Overall truck length is 51' 6"					

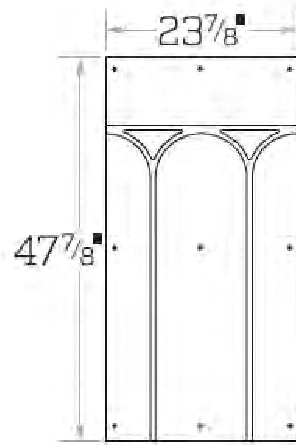


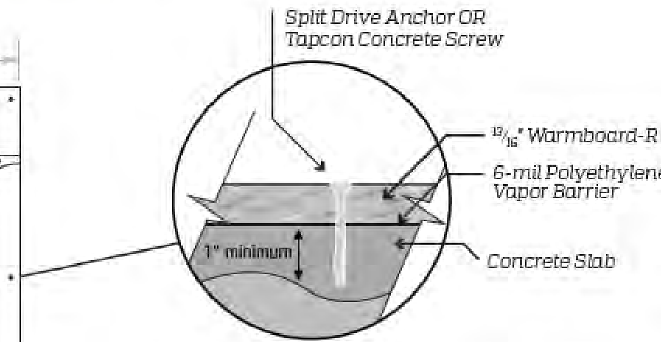


Specifications	
Panel thickness	$\frac{13}{16}$"
Panel size	2' x 4'
Tubing spacing	12"
Tubing size	$\frac{1}{2}$"
Panel types	Straight, Turn
Conductive surface	.025" thick 1060 aluminum

Left: *Warmboard-R panels are installed over existing subfloor.*
Right: *Detail of Warmboard-R showing the $\frac{13}{16}$" OSB and thick aluminum*

Fastening pattern for Warmboard–R over concrete

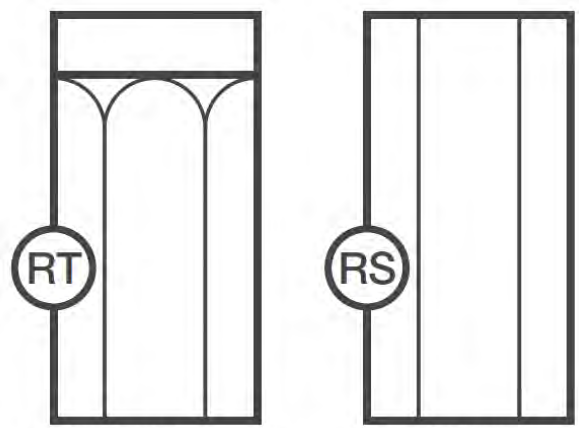




Concrete Screw Detail
Note: Predrill with Warmboard-R in place using a high-quality masonry bit. Drilling depth should be $\frac{1}{2}$" deeper than the required specification without drilling through the slab. All concrete drilling should be done with a heavy duty rotary hammer drill.

Panel Types

There 2 panel types of Warmboard–R panels. Each panel measures $23\frac{7}{8}$"W x $47\frac{7}{8}$"L x $\frac{13}{16}$"H. Panels are made from OSB and are square-edged. Filler panels are also available.

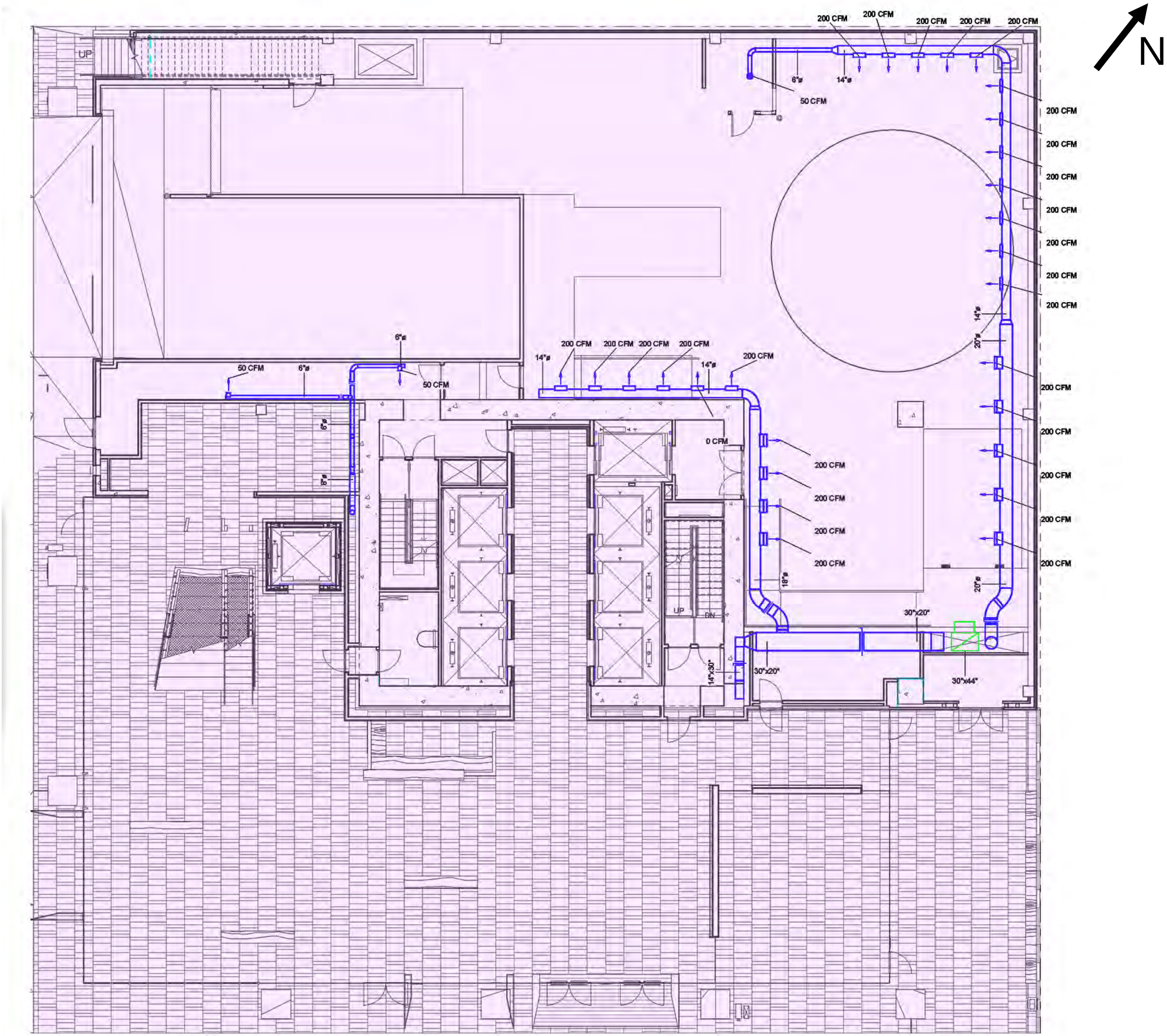


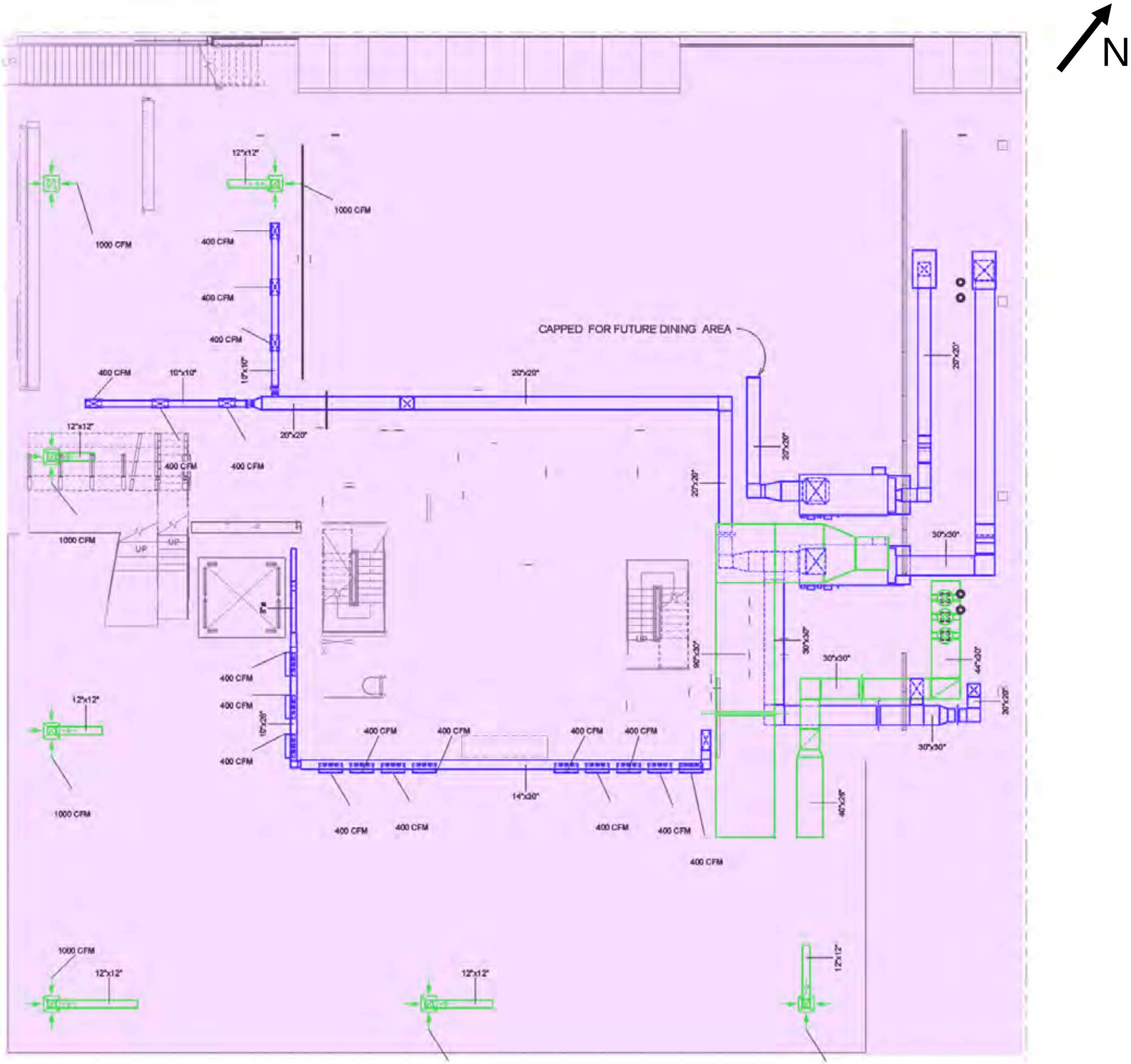
Turn Panel *Straight Panel*

DECISION POINT MATRIX

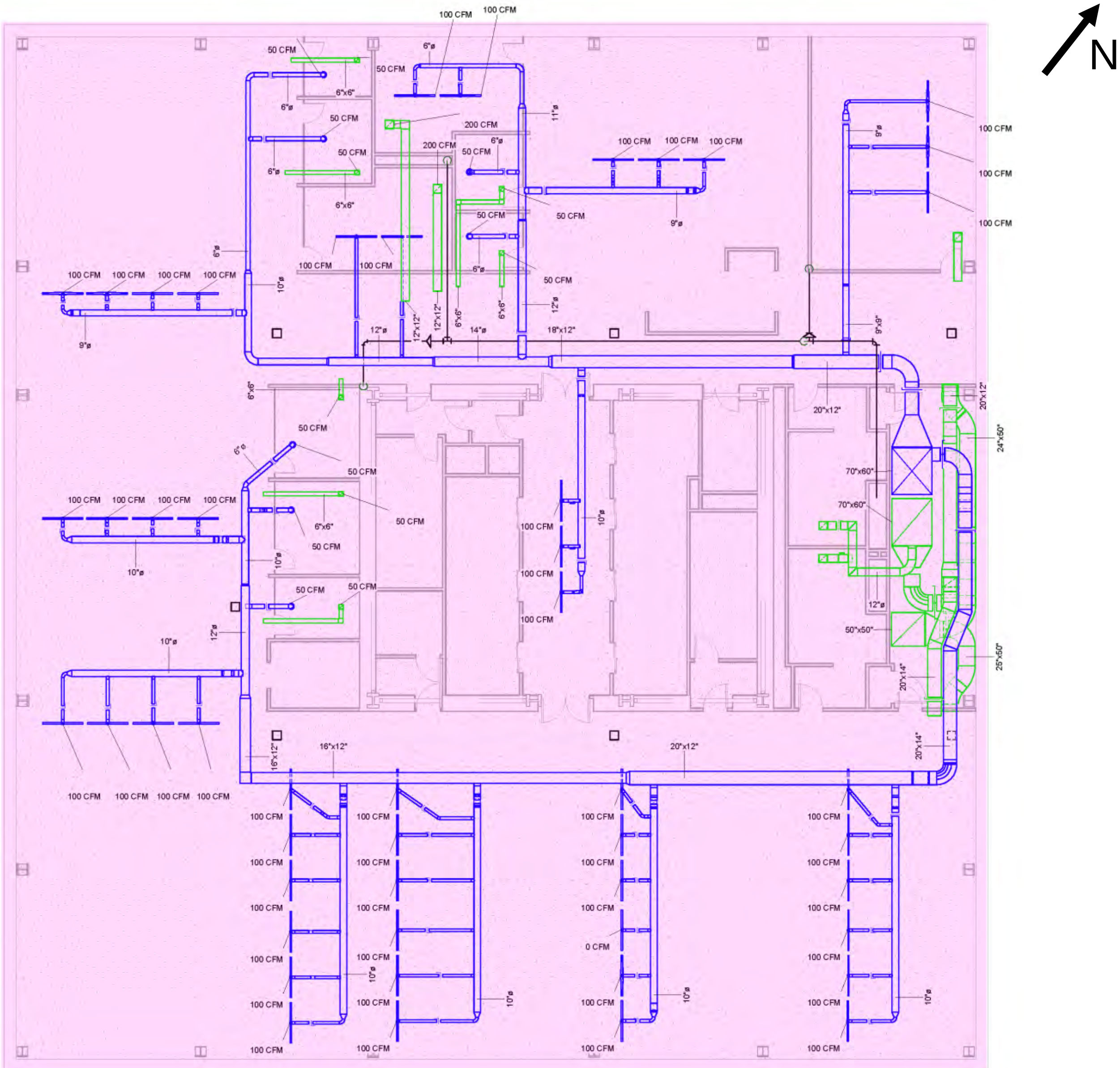
		ZERO IMPACT GOALS				OWNER DRIVEN EVALUATION CRITERIA														
	SYSTEM DESCRIPTION	ENERGY	INTERRUPTION	WASTE	EMISSIONS	ENERGY QUANTITY	COST	SUSTAINABILITY	PHASEABILITY	INNOVATION	COMPLEXITY	SPACE NEEDED	MAINTENANCE	INTEGRATION	SITE/CLIMATE ISSUES	TEACHING	PRACTICALITY	LIFECYCLE	EFFECTIVENESS	RECOMMENDED?
Heating and Cooling	Radiant Slabs - Heating/Cooling Plant Located on Roof	++	+	0	+	0	+	+	+	+	--	0	-	+	-	0	++	+	++	Yes
	Under Floor Air Distribution	+	0	0	+	0	-	+	+	+	-	-	0	0	0	0	+	+	+	No
Ventilation	Natural Ventilation	++	+	++	++	0	-	++	+	0	-	0	-	+	-	+	++	+	++	Yes
	Dedicated Outdoor Air System	+	0	0	+	0	+	+	+	0	+	+	0	0	0	0	++	+	+	Yes
Energy	Trigeneration	-	0	++	0	++	--	+	--	+	--	-	--	+	--	+	--	--	--	No
	Cogeneration	-	0	+	0	++	--	+	--	+	--	-	--	+	--	+	--	--	--	No
Misc.	Improved Façade	+	0	0	+	0	--	+	0	+	0	0	0	++	-	0	+	0	+	Yes
	Modular Equipment	0	0	0	0	0	++	0	++	-	+	+	++	+	0	0	+	+	0	Yes
	Rain-Water Collection, Gavity Fed Graywater	0	+	++	+	0	0	++	+	-	+	--	0	+	+	+	+	+	+	Yes

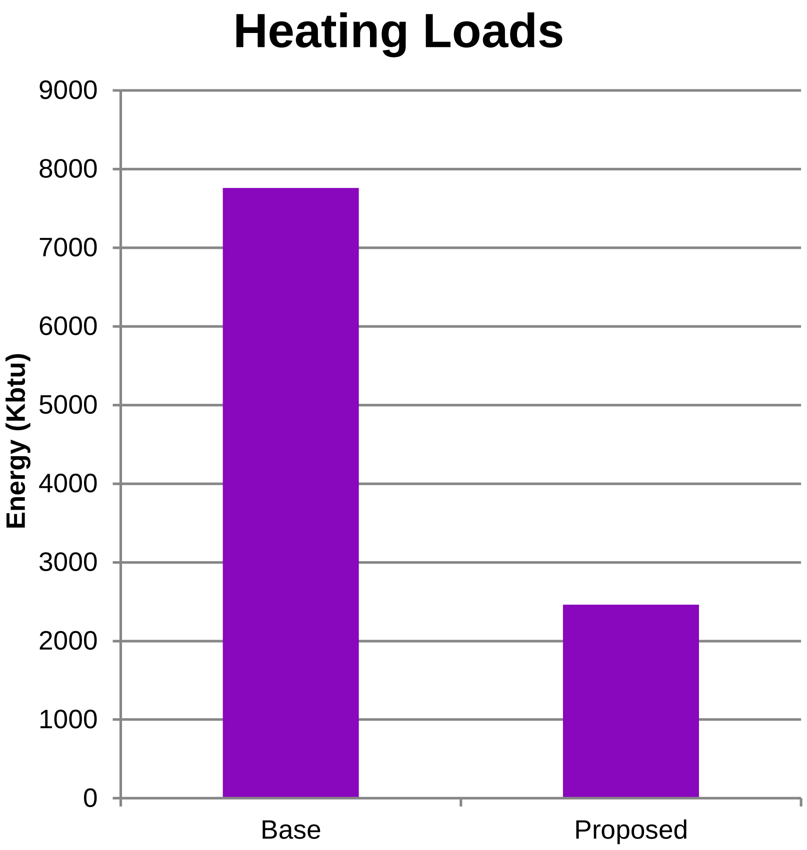
TYPICAL LOBBY PLAN - LOWER

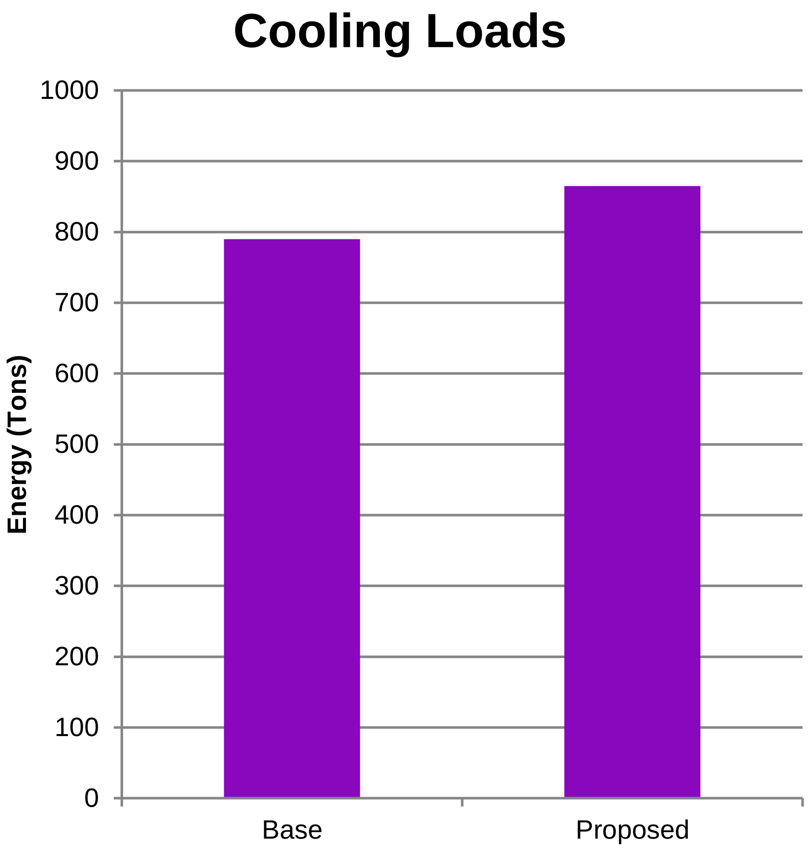



N
CAPPED FOR FUTURE DINING AREA
1000 CFM
12"x12"
400 CFM
10"x10"
20"x20"
14"x30"
30"x30"
40"x20"
400 CFM

TYPICAL OFFICE PLAN



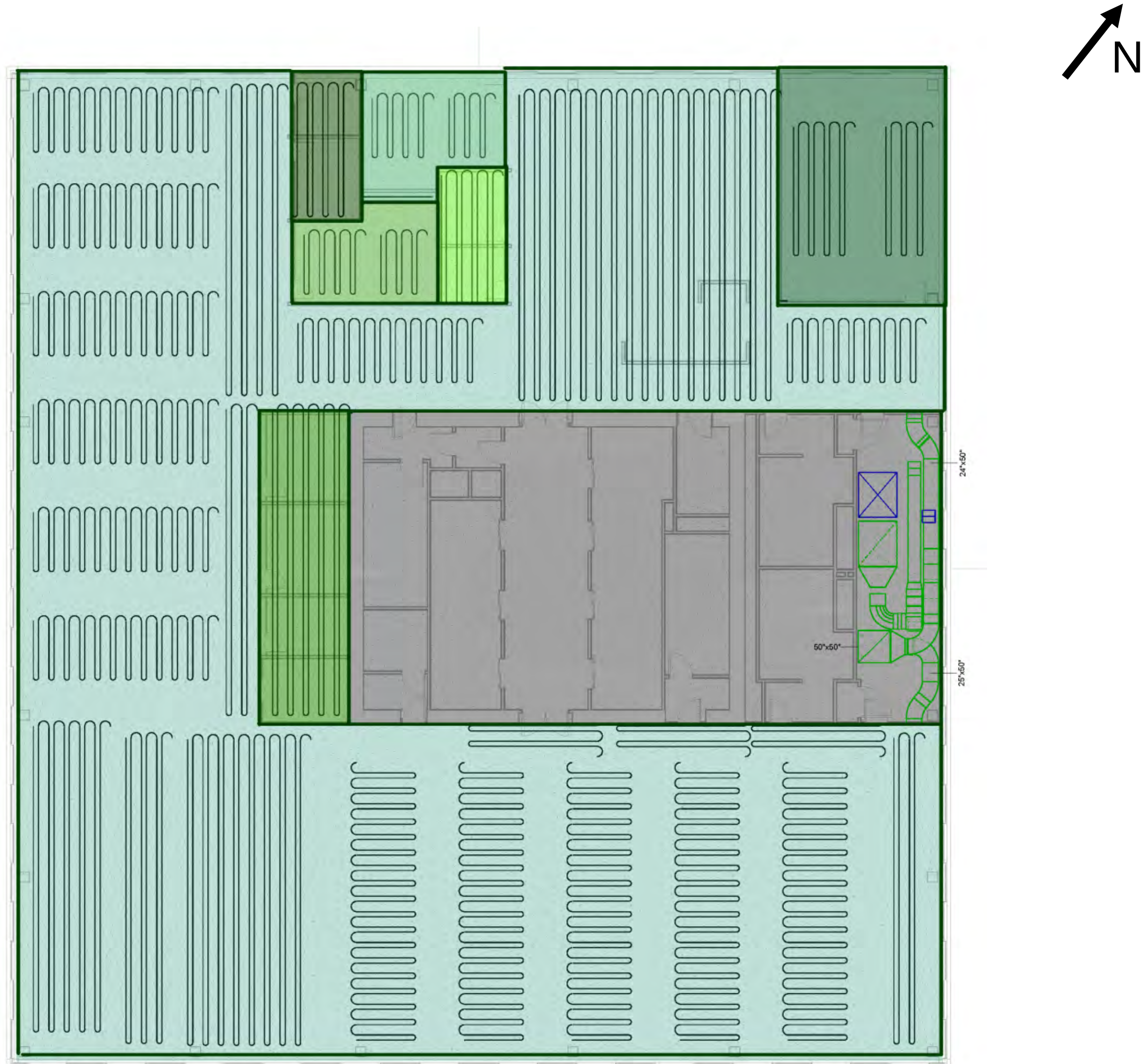

Heating Loads
Energy (Kbtu)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Base
Proposed


Cooling Loads
Energy (Tons)
1000
900
800
700
600
500
400
300
200
100
0
Base
Proposed

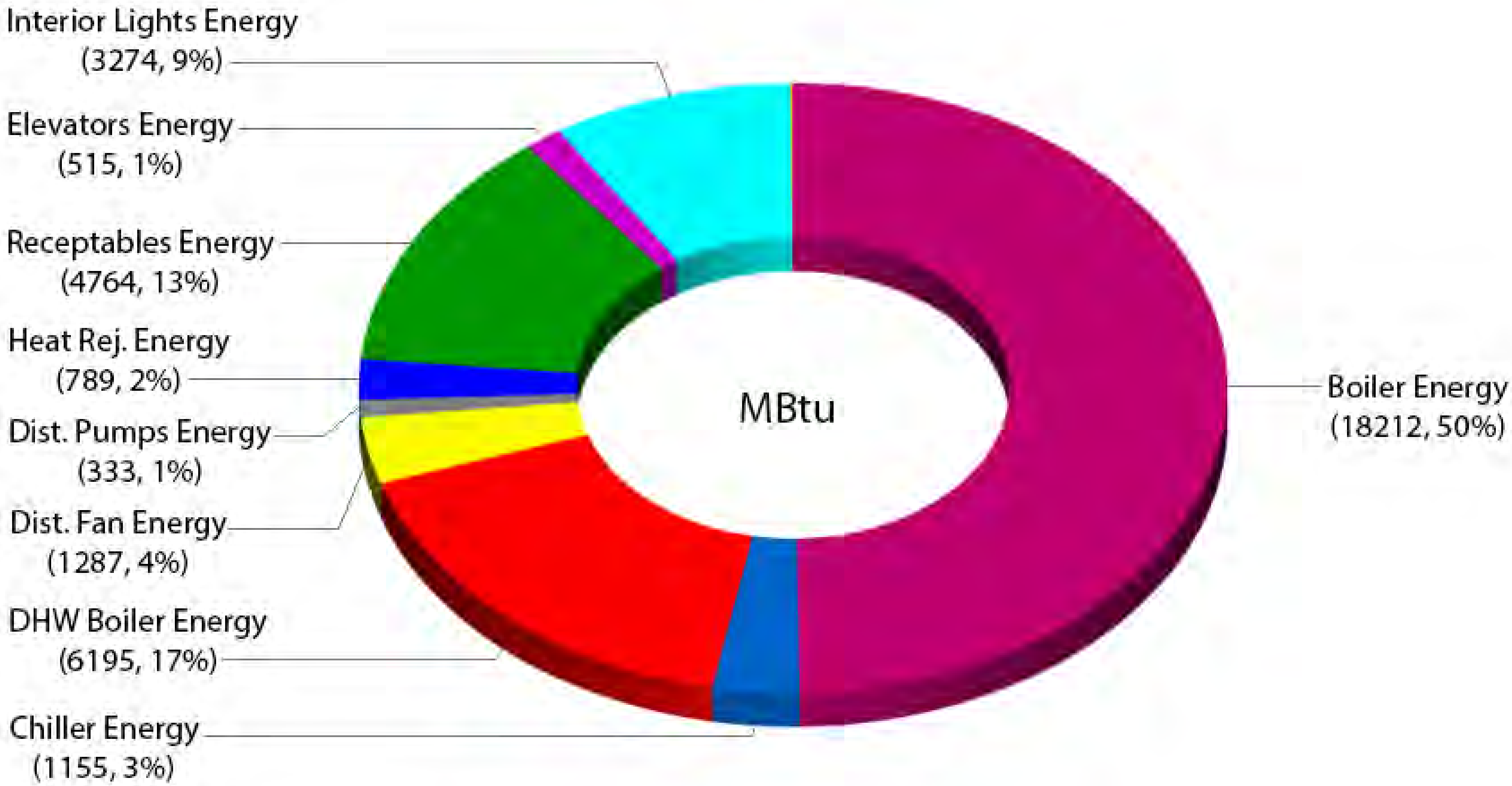
RADIANT SLAB AREA ANALYSIS

	Room Name	Floor Area (ft2)	Cooling Sensible Load with Oversizing factor* (Btu/h)	Heating Sensible Load with Oversizing factor* (Btu/h)	Radiant Ceiling (BTU/hr/SF)	Cooling Radiant Floor (%Area)	Heating Radiant Floor (%Area)	Cooling and Heating Floor Covering (%)	Does this meet load?
Typical Office Floor	Large Conference	604	17,579	2,734	38	77%	12%	77%	**Yes**
	Office 1	60	1,746	272	38	77%	12%	77%	**Yes**
	Video Conference	88	1,825	280	38	55%	8%	55%	**Yes**
	Office 2	121	1,770	266	38	38%	6%	38%	**Yes**
	Office 3	135	1,442	202	38	28%	4%	28%	**Yes**
	Interview Room	60	1,909	279	38	84%	12%	84%	**Yes**
	Office 4	88	1,420	197	38	42%	6%	42%	**Yes**
	Office 5	62	1,643	228	38	70%	10%	70%	**Yes**
	Open Office	10,326	308,129	62,605	38	79%	16%	79%	**Yes**
	Small Conference 1	214	7,360	717	38	91%	9%	91%	**Yes**
	Small Conference 2	214	7,360	693	38	91%	9%	91%	**Yes**
Lobby	Lower Lobby	5,351	186,000	125,000	38	91%	61%	91%	**Yes**
	Loading Dock Office	83	700	800	38	22%	25%	25%	**Yes**
	Retail Space	655	24,000	22,000	38	96%	88%	96%	**Yes**
	Upper Lobby	2,108	71,600	48,000	38	89%	60%	89%	**Yes**
	Restaurant	4,224	127,500	88,500	38	79%	55%	79%	**Yes**

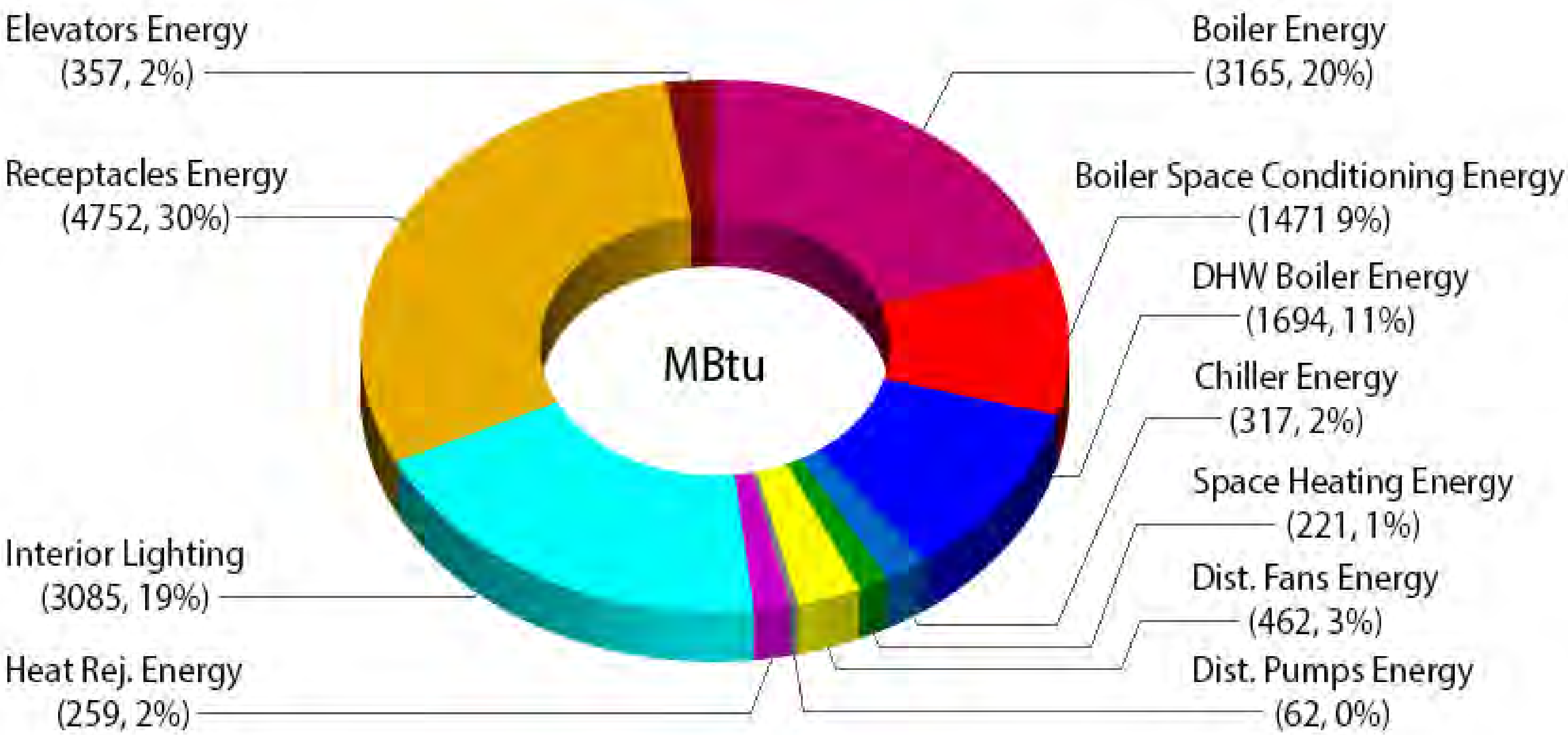
RADIANT FLOOR ZONING



BASELINE ENERGY PER YEAR BY ENDUSE



PROPOSED ENERGY PER YEAR BY ENDUSE



ENERGY USE ECONOMICS AND EUI CALCULATION

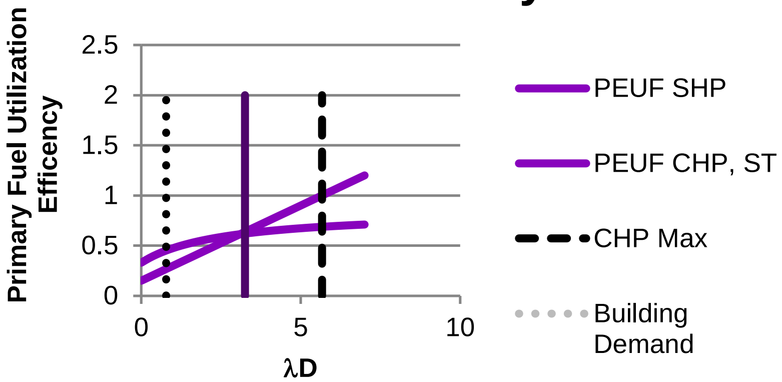
Source EUI Calculation	Baseline	Proposed
Electric Used (kbtu/ year)	11,956,470/.334	0
Gas Used (kbtu/ year)	8,343,218*1.1	16,895,173*1.1
Electric Produced (kbtu/ year)	0	(18,915,977)
Subtotal (kbtu/year)	44,975,353	(331,288)
Gross SQFT	÷ 420000	÷ 420000
Source EUI (kbtu/SQFT-year)	107.08	(0.79)

		Baseline		Proposed	
		Energy (kbtu)	cost ($)	Energy (kbtu)	cost ($)
Energy Used Onsite					
	Electric	11,956,470	$ 588,389.96	-	$ -
	Gas	8,343,218	$ 79,260.57	16,895,173	$ 146,297.23
Electric Produced Onsite					
	Photovoltaic Panels			(662,423)	$ (20,402.70)
	Waste Bioreactor			(991,613)	$ (30,541.78)
Total Energy Used From Grid		20,299,688	$ 667,650.53	15,241,137	$ 95,352.75
Electric Produced Offsite				(17,261,943)	$ (531,669.86)
Energy Use Deficit		20,299,688	$ 667,650.53	(2,020,805)	$ (436,317.11)
Site EUI		48.33		40.23	
Source EUI		107.08		(0.789)	

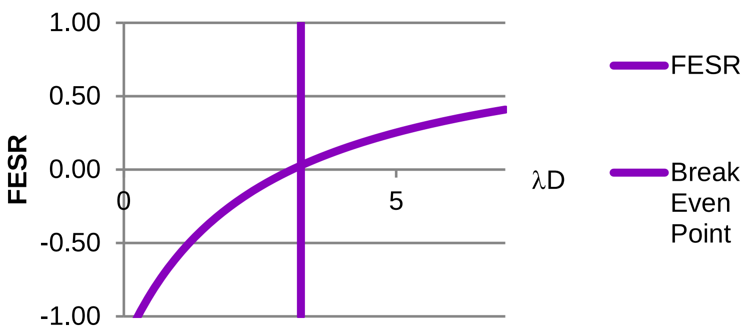
CHP Alternatives Analyses

STEAM TURBINE

Steam Turbine Analysis

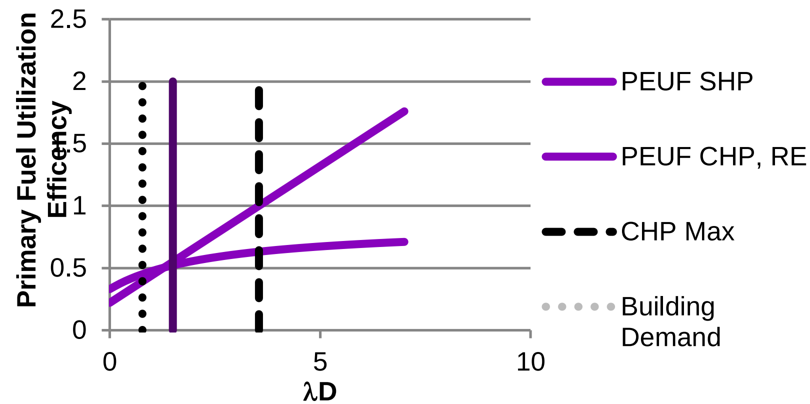


Fuel Energy Savings Ratio

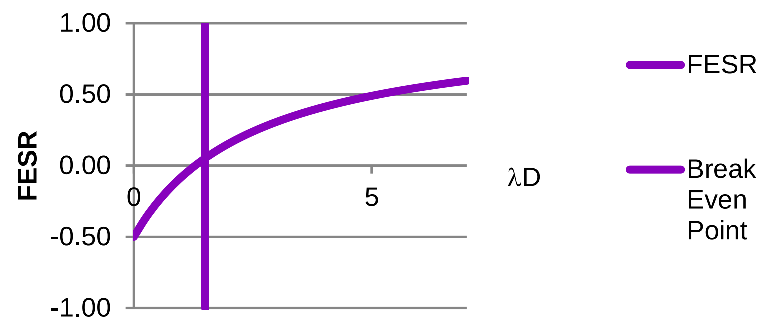


RECIPROCATING ENGINE

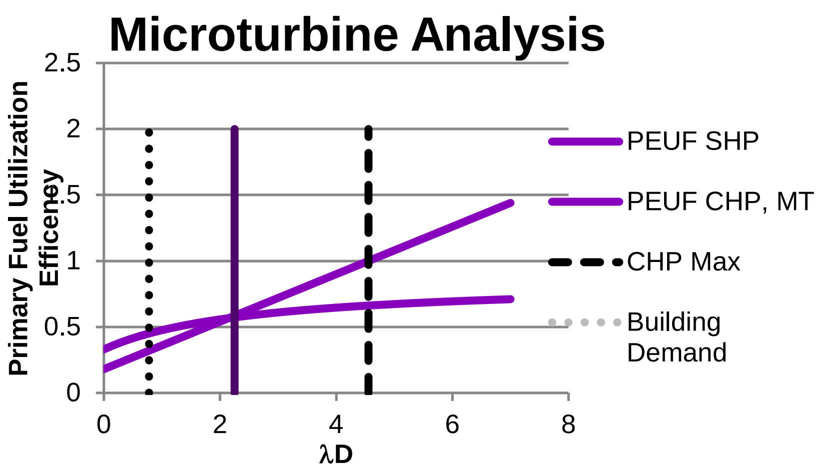
Recip. Engine Analysis

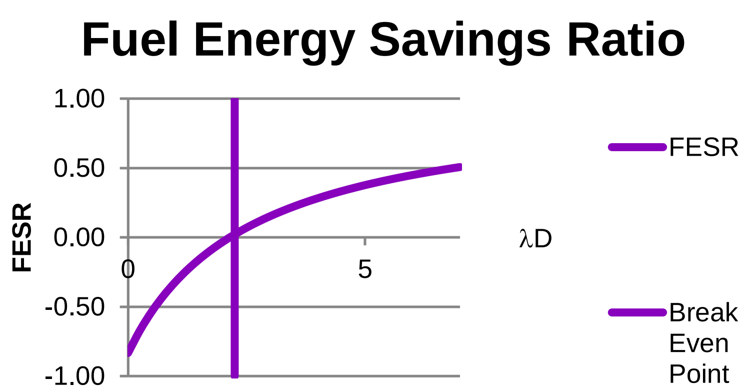


Fuel Energy Savings Ratio

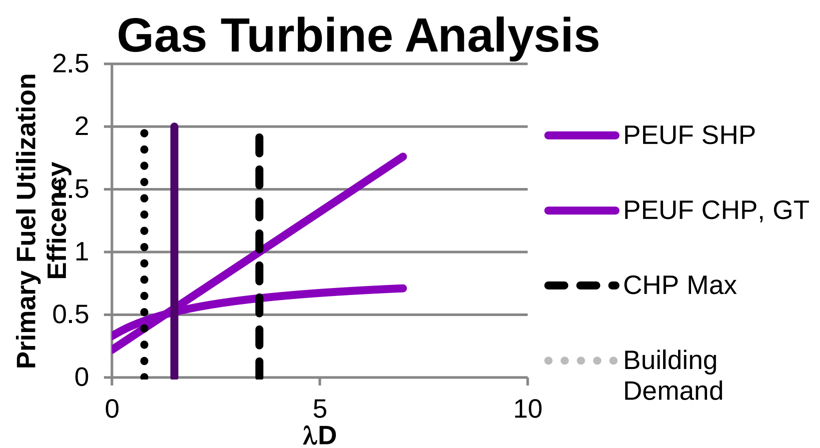


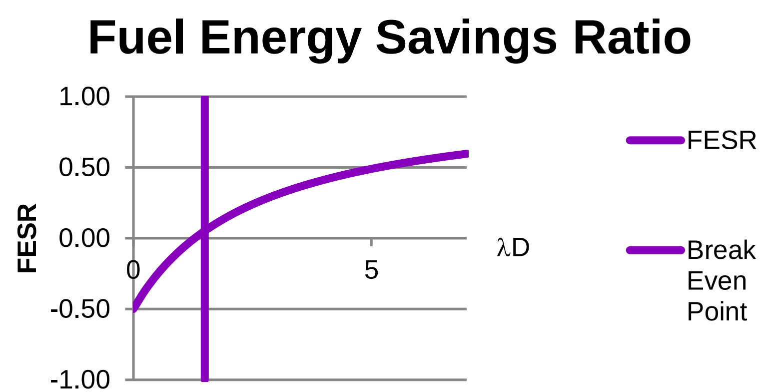
MICROTURBINE





GAS TURBINE





Item	Cost	Source
Baseline Maintenance Cost	$0.446/sf	ASHRAE Maintenance Cost Data
Proposed Maintenance Cost	$0.74/sf	Allowance
Building Maintenance Cost	$0.512/sf	ASHRAE Maintenance Cost Data
Fuel Cell Maintenance Cost	$0.032/kWh	U.S. EPA Combined Heat and Power Partnership: Catalog of CHP Technologies
Photovoltaic batteries	$0.239/kWh-10 year	Solarbuzz.com
Baseline Mechanical System		
Boiler	$90789.00 ea.	RS Means Assembly
Cooling Tower	$262408.00 ea.	RS Means Assembly
Chiller	$225014.40 ea.	RS Means Assembly
VAV AHU	$145141.40 ea.	RS Means Assembly
VAV Terminal W/ Reheat 2000 CFM	$20690.30 ea.	RS Means Assembly
VAV Terminal W/ Reheat 400 CFM	$ 7100.80 ea.	RS Means Assembly
Proposed Mechanical System		
Boiler	$48048.40 ea.	RS Means Assembly
Cooling Tower	$262408.00 ea.	RS Means Assembly
Chiller	$225014.4 ea.	RS Means Assembly
CAV AHU	$111679.80 ea.	RS Means Assembly
Radiant System	$12000000.00	Allowance
Fuel Cell	$7000000.00 (6mil. Incentive)	See Electrical Report
Photovoltaic	$5,475,000.00 (30% Incentive)	See Electrical Report
Human Waste To Power Converter	$1000000.00	Allowance

Rate	Percent (%)	Source
Discount	8.00	NISTIR 85
Electricity	3.75	NISTIR 85
Natural Gas	5.00	NISTIR 85
Maint. And Labor	1.73	NISTIR 85
Materials	1.73	NISTIR 85

Baseline						
Fixture Type	Flow Rate	Duration	Daily Uses	Occupants	Total	
Showerheads	2.5 gpm	8 min.	1	300	6000	gallon/day
Lavatory Faucets	0.5 gpm	0.25 min.	3	2000	750	gallon/day
Kitchen Faucets	2.2 gpm	4 min.	1	500	4400	gallon/day
Flushometer Tank Water Closets	1.6 gpm	1 flush	1 male + 3 female	2000	6400	gallon/day
Urinals	1.0 gpm	1 flush	2 male	1000	2000	gallon/day
Total					19550	gallon/day

Proposed						
Fixture Type	Flow Rate	Duration	Daily Uses	Occupants	Total	
Showerheads*	0 gpm	8 min.	1	300	0	gallon/day
Lavatory Faucets	0.4 gpm	0.25 min.	3	2000	600	gallon/day
Kitchen Faucets	1.8 gpm	4 min.	1	500	3600	gallon/day
Vacuum Toilets	0.5 gpm	1 flush	1 male + 3 female	2000	2000	gallon/day
Waterless Urinals	0.0 gpm	1 flush	2 male	1000	0	gallon/day
Total					6800	gallon/day
Grey Water Total					2000	gallon/day
Potable Water Total					4800	gallon/day

Water Tank Sizing

Potable Water Storage Tank	Size		Dimensions	Weight (lbs.)
1 Day Storage	4800 gallon/day		8.5'D x 13'H	39978
2 Day Storage	9600 gallon/day		12'D x 10'H	79955

Greywater Storage Tank	Cubic Feet	Length (10' D)	Length (8' D)	Weight (lbs.)
10 Year Storm	3534	45	70	220144
1 Year Storm	2240	29	45	139563

Rainwater Collection

Month	Monthly Rainfall	Rainy Days
Jan.	4.5	11.7
Feb.	4.45	11.1
Mar.	3.25	11
Apr.	1.46	6.5
May	0.7	3.8
June	0.16	1.5
Jul.	0	0.3
Aug.	0.06	1
Sept.	0.21	1.7
Oct.	1.12	3.9
Nov.	3.16	8.9
Dec.	4.56	11.6
Total	23.63	73

San Francisco Rainfall	23.63	inches/year
Roof Area	16000	square feet
Total Yearly Rainwater Collection	235685	US gal/year
	646	US gal/day

Percent Greywater Use	32%

12 Hour - 10 Year Storm	2.65	inches/12 hours
Roof Area	16000	square feet
Total Rainfall	26431	US gal/12 hours

12 Hour - 1 Year Storm	1.68	inches/12 hours
Green Roof Area	16000	square feet
Total Rainfall	16756	US gal/12 hours

SMOKE CONTROL CALCULATIONS

Floor Area	=	**15258.00**	**ft^2**		**(Area of floor calculated.)**
Roof Area	=	15258.00	ft^2		(Area of roof calculated.)
Wall Area	=	6930.00	ft^2		(Area of wall calculated - Perimeter area.)
Exit Enclosure Area	=	300.00	ft^2		(Area of exits or stair walls calculated.)
Other Shaft Area	=	644.00	ft^2		(Area of other shafts calculated.)
Other Openings	=	0.00	ft^2		(Area of any other opening.)
Number of Doors:(1)					
36" doors	=	2	0.42	ft^2	
42" doors	=	0	0	ft^2	
48" doors	=	0	0	ft^2	
Pressure Difference	=	0.05	w.c.		(Minimum pressure difference required.)
Total Leakage Area	=	85.36			Calculated with IBC Equation 9-2
Exhaust Rate	=	49814.93			

Z	**=**	**24.0**	**ft**		**(Height of the smoke layer above fire.)**
Q	=	1,500	Btu/s		(Steady state heat release rate.)
Qc	=	1,050	Btu/s		(Convective portion of heat release rate, estimated as 0.7 X Q.)
zl	=	8.6	ft		(Limiting elevation.)
T_0	=	72.0	^{0}F		(Ambient temperature.)
T_p	=	161.2	^{0}F		(Average Plume Temperature)
T_s	=	116.6	^{0}F		(Temperature of smoke)
p_{atm}	=	14.69	psi		(Density of smoke/air at 68 ^{0}F.)
r	=	0.069	lb/ft^3		(Density of smoke.)
$m_{,\ Z>zl}$	=	49.1	lb/s		(Mass flow rate of smoke production above the limiting elevation.)
V	=	42,788.6	ft^3/min		(Volumetric rate of smoke production. Exhaust CFM required)

	Frequency Bands (Hz)							
	62.0	*125.0*	*250.0*	*500.0*	*1000.0*	*2000.0*	*4000.0*	*8000.0*
Typical Traffic Noise (db)	79.0	74.0	69.0	64.0	59.0	55.0	51.0	49.0
Attenuation Due to Distance (10 ft. to 50 ft.)	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9
Noise at opening W/out louver (dB)	75.1	70.1	65.1	60.1	55.1	51.1	47.1	45.1
Transmission Loss Due to Louvers*	-6.0	-7.0	-5.0	-8.0	-14.0	-15.0	-16.0	-17.0
Noise at opening with louver (dB)	69.1	63.1	60.1	52.1	41.1	36.1	31.1	28.1

Acoustic Information

	63	125	250	500	1k	2k	4k	8k	Total	dBA@3m
Inlet	99	106	102	101	99	96	93	90	110	84
Outlet	99	106	102	101	99	96	93	90	110	84
Breakout	-	-	-	-	-	-	-	-	-	-

Sound Power Level Spectra dB (re 10^{-12} Watts) shown @ free air.

Octave Band Frequency (Hz)	Free Field Noise Reduction (db)
1/63	12
2/125	13
3/250	11
4/500	14
5/1000	20
6/2000	21
7/4000	22
8/8000	23

Note: The TL for the louvers is 6 dB less than the noise reduction

Office NV
Calculation Summary

	Element	Properties	NC	63	125	250	500	1K	2K	4K	dB(A)
				Octave Midband Frequency, Hz							
1	**Office NV**	**Criteria: NC-40**	**39**	**58**	**52**	**49**	**41**	**30**	**25**	**20**	**44**
2	**Wall/Floor Transmission (1)**	**Criteria: NC-40**									
3	NV Louvers			69	63	60	52	41	36	31	
4	End Reflection Loss	1,608"x36" (Flush)		0	0	0	0	0	0	0	
5	Room Correction (Line Source)	134'x134'x12'		-11	-11	-11	-11	-11	-11	-11	
6	**SUM**		**39**	**58**	**52**	**49**	**41**	**30**	**25**	**20**	**44**

Office Window

Calculation Summary

Element		Properties	NC	63	125	250	500	1K	2K	4K	dB(A)
				Octave Midband Frequency, Hz							
7	**Office Window**	**Criteria: NC-40**	**38**	**62**	**51**	**40**	**29**	**24**	**18**	**14**	**40**
8	**Wall/Floor Transmission (1)**	**Criteria: NC-40**									
9	Ambiant Noise			75	70	65	60	55	51	47	
10	Window			-13	-19	-25	-31	-31	-33	-33	
11	**SUM**		**38**	**62**	**51**	**40**	**29**	**24**	**18**	**14**	**40**

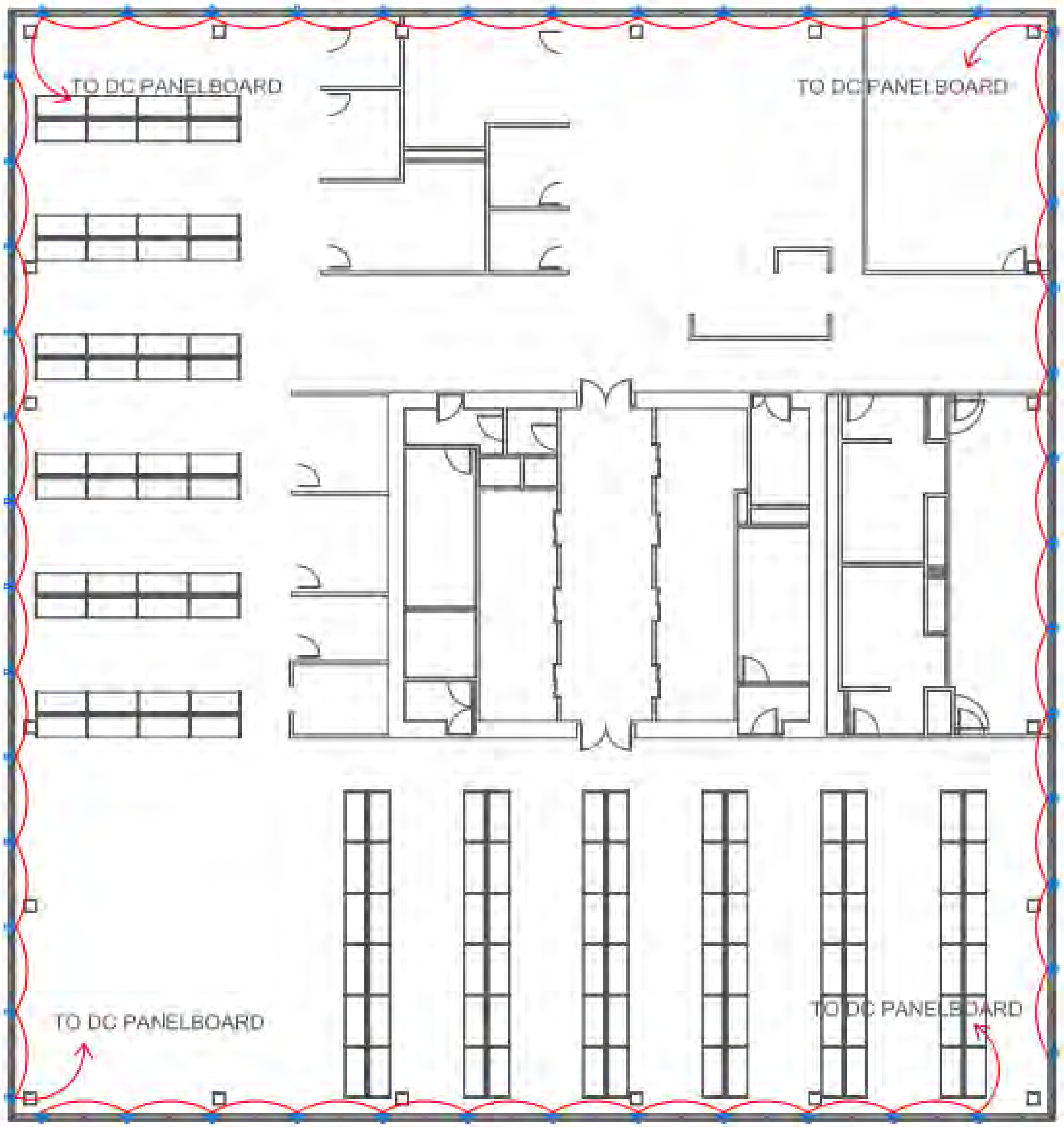
Office Fan

Calculation Summary

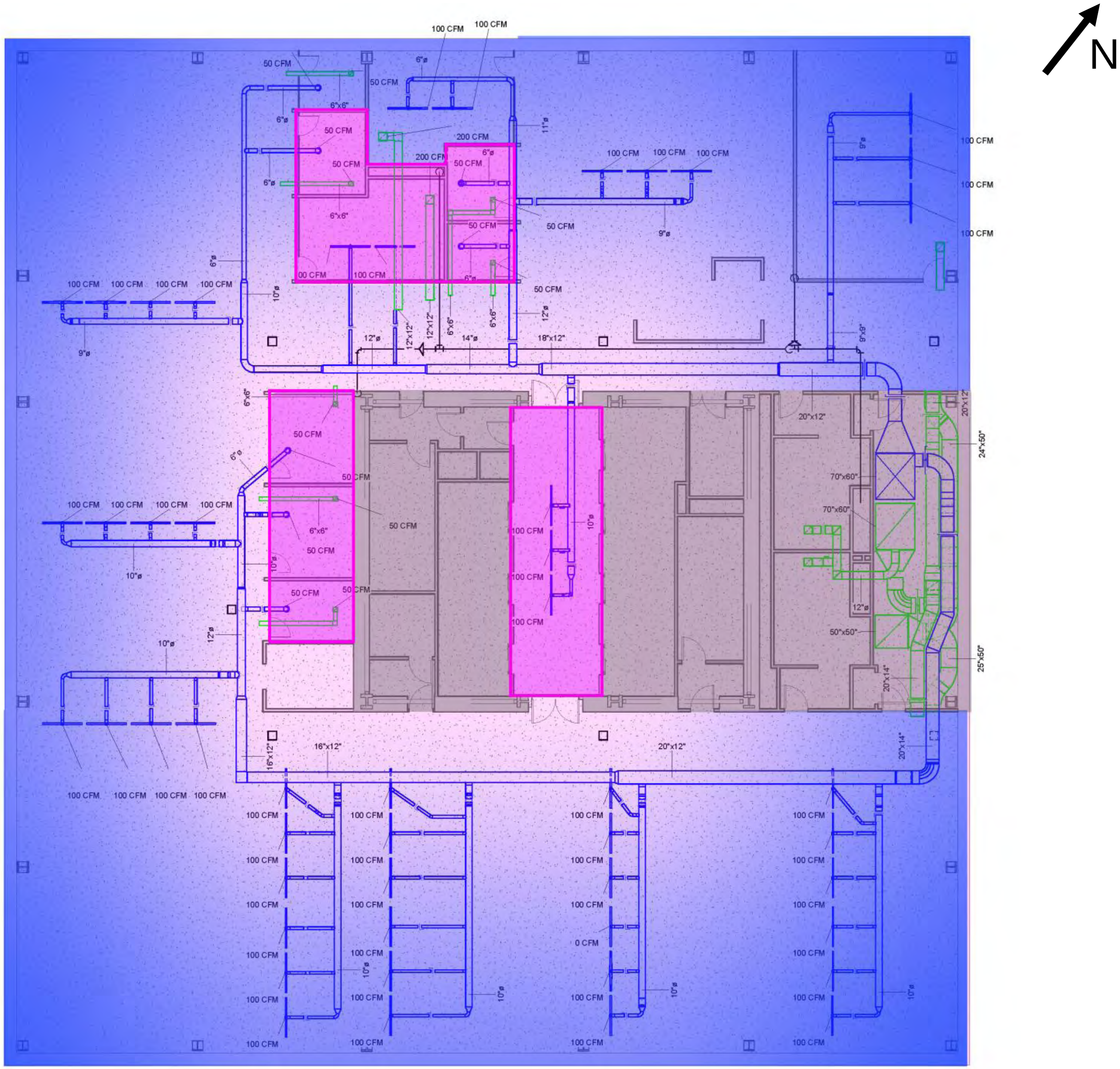
Element		Properties	NC	63	125	250	500	1K	2K	4K	dB(A)
				Octave Midband Frequency, Hz							
1	**Office Fan**	**Criteria: NC-40**	**38**	**43**	**46**	**39**	**33**	**24**	**31**	**35**	**40**
2	**Exhaust Path (1)**	**Criteria: NC-40**									
3	Exhaust Fan			99	106	102	101	99	96	93	
4	LF55	24"x24"x96"		-8	-12	-21	-27	-35	-24	-17	
	Generated Noise			79	70	63	60	58	61	67	
5	Rectangular Duct	70"x60"x5' (0")		-1	0	0	0	0	0	0	
6	Rectangular Elbow Turning Vanes	70"x60" (0")		-4	-6	-4	-4	-4	-4	-4	
				53	49	41	30	16	0	0	
7	Rectangular Duct	70"x60"x10' (0")		-1	-1	-1	0	0	0	0	
8	Rectangular Elbow Turning Vanes	70"x60" (0")		-4	-6	-4	-4	-4	-4	-4	
				53	49	41	30	16	0	0	
9	Rectangular Duct	70"x60"x10' (0")		-1	-1	-1	0	0	0	0	
10	Cross (Branch Power Split)	70"x60" / 24"x20"		-10	-10	-10	-10	-10	-10	-10	
				54	50	45	39	32	25	17	
11	Circular Elbow Radius	25" (0")		0	-1	-2	-3	-3	-3	-3	
				20	16	11	5	0	0	0	
12	Rectangular Duct	22"x22"x5' (0")		-1	-1	-1	0	0	0	0	
13	End Reflection Loss	22"x22" (Flush)		-7	-3	-1	0	0	0	0	
14	Plenum	134'x2'x134'		0	0	0	0	0	0	0	
15	Room Correction (Classic Diffuse)	134'x134'x10'		-19	-19	-19	-19	-19	-19	-19	
16	**SUM**		**38**	**43**	**46**	**39**	**33**	**24**	**31**	**35**	**40**

	Frequency Bands (Hz)						
	62.0	*125.0*	*250.0*	*500.0*	*1000.0*	*2000.0*	*4000.0*
Natural Ventilation Flanking Path Noise Level (dB)^*	58.0	52.0	49.0	41.0	30.0	25.0	20.0
Window Flanking Path Noise Level (dB)^*	62.0	51.0	40.0	29.0	24.0	18.0	14.0
Exhaust Fan Noise Level (dB)^*	43.0	46.0	39.0	33.0	24.0	31.0	35.0
Total experienced interior noise level (dB)	**63.5**	**55.1**	**49.9**	**41.9**	**31.8**	**32.1**	**35.2**

NATURAL VENTILATION WIRING



NATURAL VENTILATION ZONING



Building:	VAV - Lobby Area
System Tag/Name:	AHU-1
Operating Condition Description:	100% Open
Units (select from pull-down list)	IP

Inputs for System	**Name**	**Units**	w/o diversity **System**		**Diversity**	w/ diversity **System**
Floor area served by system	As	sf	13730			
Population of area served by system	Ps	P	935	D	100%	935
Design primary supply fan airflow rate	Vpsd	cfm	7,455	D	100%	7,455
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf	0.10			
OA req'd per person for system area (Weighted average)	Rps	cfm/p	5.8			
Outdoor air intake provided for system	OA	cfm				

Inputs for Potentially Critical zones

Zone title turns purple italic for critical zone(s)

Potentially Critical Zones

	Name	Units												
Zone Name				Electical Room	Exit Passageway	Service Lobby	Lobby	Retail	Office	Corridor	Mechanical Room	Lobby	*Restaurant*
Zone Tag				105	107	103	101	113	110	208	206	215	209
Occupancy Category		Select from pull-down list		Electrical equipment rooms	Corridors	Lobbies	Lobbies	Sales	Office space	Corridors	Electrical equipment rooms	Lobbies	Restaurant dining rooms
Floor Area of zone	Az	sf		109	428	89	5,361	666	85	457	225	2,107	4,224
Design population of zone	Pz	P (default value listed, may be overridden)		0	0	13.35	300	9.825	0.425	0	0	316.05	295.68
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		6	33	200	1,518	127	50	50	325	1,423	3,723
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A											
Frac. of local recirc. air that is representative of system RA	Er												
Inputs for Operating Condition Analyzed													
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		FSCR LV	CSCRH	CSCRH	FSCR LV	FSCR LV	CSCRH	FSCR LV	CSCRH	FSCR LV	CSCRH
Zone air distribution effectiveness at conditioned analyzed	Ez			1.20	0.80	0.80	1.20	1.20	0.80	1.20	0.80	1.20	0.80
Primary air fraction of supply air at conditioned analyzed	Ep												

Results of Minimum ASHRAE 62.1 Ventilation Rate Procedure (EQp1)			
System Ventilation Efficiency	Ev		0.91
Outdoor air intake required for system (EQp1)	Vot	cfm	7,454
Outdoor air per unit floor area	Vot/As	cfm/sf	0.54
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	8.0
Outdoor air as a % of design primary supply air	Ypd	%	100%

Results of 30% Increase beyond ASHRAE 62.1 Ventilation Rate Procedure (EQc2)				
System Ventilation Efficiency with 30% increase (EQc2)	Evz30		0.89	Critical zone needs more ventilation
Outdoor air intake required for system with 30% increase (EQc2)	Vot30	cfm	>100%	**More than 100% outside air is required based on conditions provided**
Outdoor air per unit floor area for system with 30% increase (EQc2)	Vot30/As	cfm/sf		
Outdoor air per person served by system (including diversity) (EQc2)	Vot30/Ps	cfm/p		
Outdoor air as a % of design primary supply air (EQc2)	Ypd30	%		

Building:	OGMS for Typical Office Floor
System Tag/Name:	AHU-B1 to 30
Operating Condition Description:	100%
Units (select from pull-down list)	IP

Inputs for System

	Name	Units	System		Diversity	System
Floor area served by system	As	sf	10,240			
Population of area served by system	Ps	P	233	D	100%	233
Design primary supply fan airflow rate	Vpsd	cfm	3,425	D	100%	3,425
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf	0.06			
OA req'd per person for system area (Weighted average)	Rps	cfm/p	5.0			
Outdoor air intake provided for system	OA	cfm	3,360			

Inputs for Potentially Critical zones

Potentially Critical Zones

	Name	Units	Stair 1 Vestibule	Storage Room	Electrical Room	Lobby	Service Lobby	Stair 2 Vestibule	Mechanical Room	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Break Room	Conference Room	Conference Room	Office	Office
Zone Name	Zone title turns purple italic for critical zone(s)		Stair 1 Vestibule	Storage Room	Electrical Room	Lobby	Service Lobby	Stair 2 Vestibule	Mechanical Room	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Break Room	Conference Room	Conference Room	Office	Office
Zone Tag																											
Occupancy Category		Select from pull down list	Corridors	Storage rooms	Electrical equipment rooms	Lobbies	Lobbies	Corridors	Electrical equipment rooms	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Break rooms	Conference/meeting	Conference/meeting	Office space	Office space
Floor Area of zone	Az	sf	90	47	69	412	97	46	618	823	67	72	87	80	113	77	133	128	192	98	9,652	88	246	287	100	98
Design population of zone	Pz	P (default value listed; may be overridden)	0	0	0	12.4	2.9	0	0	3.115	1	1	1	1	1	1	1	1	1	1	175	2.2	12.25	12.35	1	1
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	10	10	10	118	30	10	50	75	26	26	26	26	26	26	26	26	26	26	2,600	26	180	150	26	26
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull down list or leave blank if N/A																								
Frac. of local recirc. air that is representative of system RA	Er																									

Inputs for Operating Condition Analyzed

	Name	Units	System	Stair 1 Vestibule	Storage Room	Electrical Room	Lobby	Service Lobby	Stair 2 Vestibule	Mechanical Room	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Office	Break Room	Conference Room	Conference Room	Office	Office
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull down list		FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR	FSCR
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Inputs for Systems with Outdoor Air Economizers

	Name	Units
Outdoor air Temperature	Toa	Deg F
Supply Air Temperature	Ts	Deg F
Return Air Temperature	Tr	Deg F
Supply Fan Heat Gain	dTsf	Deg F
Return Fan Heat Gain	dTrf	Deg F

Results of Minimum ASHRAE 62.1 Ventilation Rate Procedure (EQp1)

System Ventilation Efficiency	Ev		0.82
Outdoor air intake required for system (EQp1)	Vot	cfm	2,403
Outdoor air per unit floor area	Vot/As	cfm/sf	0.19
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	10.3
Outdoor air as a % of design primary supply air	Ypd	%	70%

Results of 30% Increase beyond ASHRAE 62.1 Ventilation Rate Procedure (EQc2)

System Ventilation Efficiency with 30% increase (EQc2)	Ev30		0.76
Outdoor air intake required for system with 30% increase (EQc2)	Vot30	cfm	3,349
Outdoor air per unit floor area for system with 30% increase (EQc2)	Vot30/As	cfm/sf	0.25
Outdoor air per person served by system (including diversity) (EQc2)	Vot30/Ps	cfm/p	14.4
Outdoor air as a % of design primary supply air (EQc2)	Ypd30	%	98%

Sustainable Sites (21/26 Points)		
Prereq 1	Construction Activity Pollution Prevention	
Credit 1	Site Selection	1 Point
Credit 2	Development Density and Community Connectivity	5 Points
Credit 4.1	Alternative Transportation – Public Transportation Access	6 Points
Credit 4.2	Alternative Transportation – Bicycle Storage and Changing Rooms	1 Point
Credit 4.3	Alternative Transportation – Low-Emitting and Fuel-Efficient Vehicles	3 Points
Credit 4.4	Alternative Transportation – Parking Capacity	2 Points
Credit 6.1	Stormwater Design – Quantity Control	1 Point
Credit 7.1	Heat Island Effect – Non-roof	1 Point
Credit 8	Light Pollution Reduction	1 Point
Water Efficiency (10/10 Points)		
Prereq 1	Water Use Reduction – 20% Reduction	
Credit 1	Water Efficient Landscaping | No Potable Water Use or Irrigation	4 Points
Credit 2	Innovative Wastewater Technologies	2 Points
Credit 3	Water Use Reduction | Reduce by 40%	4 Points
Energy and Atmosphere (31/35 Points)		
Prereq 1	Fundamental Commissioning of Building Energy Systems	
Prereq 2	Minimum Energy Performance	
Prereq 3	Fundamental Refrigerant Management	
Credit 1	Optimize Energy Performance| Improve by 48%+ for New Buildings	19 Points
Credit 2	On-Site Renewable Energy | 7% Renewable Energy	7 Points
Credit 3	Enhanced Commissioning	2 Points
Credit 5	Measurement and Verification	3 Points
Materials and Resources (9/14 Points)		
Prereq 1	Storage and Collection of Recyclables	
Credit 2	Construction Waste Management | 75% Recycled or Salvaged	2 Points
Credit 3	Materials Reuse| Reuse 10%	2 Points
Credit 4	Recycled Content | 20% of Materials	2 Points
Credit 5	Regional Materials	2 Points
Credit 7	Certified Wood	1 Point

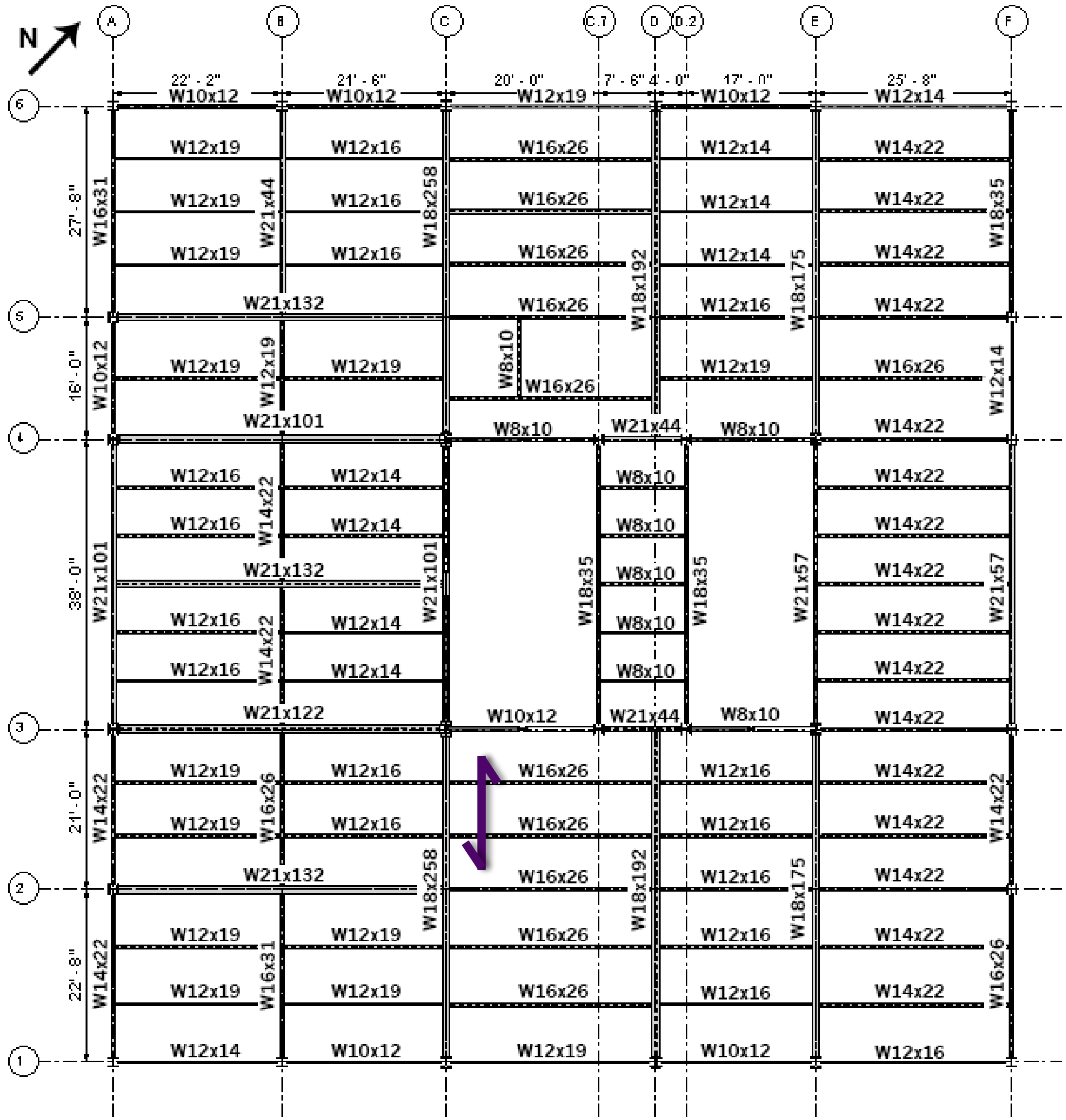
LEED POINT BREAKDOWN (CONT.)

Indoor Environmental Quality (14/15 Points)		
Prereq 1	Minimum Indoor Air Quality Performance	1 Point
Prereq 2	Environmental Tobacco Smoke (ETS) Control	1 Point
Credit 1	Outdoor Air Delivery Monitoring	1 Point
Credit 2	Increased Ventilation	1 Point
Credit 3.1	Construction IAQ Management Plan – During Construction	1 Point
Credit 3.2	Construction IAQ Management Plan – Before Occupancy	1 Point
Credit 4.1	Low-Emitting Materials – Adhesives and Sealants	1 Point
Credit 4.2	Low-Emitting Materials – Paints and Coatings	1 Point
Credit 4.3	Low-Emitting Materials – Flooring Systems	1 Point
Credit 4.4	Low-Emitting Materials – Composite Wood and Agrifiber Products	1 Point
Credit 5	Indoor Chemical and Pollutant Source Control	1 Point
Credit 6.1	Controllability of Systems – Lighting	1 Point
Credit 6.2	Controllability of Systems – Thermal Comfort	1 Point
Credit 7.1	Thermal Comfort – Design	1 Point
Credit 7.2	Thermal Comfort – Verification	1 Point
Credit 8.2	Daylight and Views - Views	1 Point
Innovation and Design Process (4/6 Points)		
Credit 1.1	Innovation in Design: Acoustics Pilot Credit	1 Point
Credit 1.2	Innovation in Design: Interior Lighting – Quality Pilot Credit	1 Point
Credit 1.3	Innovation in Design: Sustainable Wastewater Management Pilot Credit	1 Point
Credit 2	LEED Accredited Professional	1 Point
Regional Priority Credits (4/4 Points)		
Credit 1.1	Regional Priority: On-site Renewable Energy	1 Point
Credit 1.2	Regional Priority: Daylight & Views - Daylight	1 Point
Credit 1.3	Regional Priority: Innovative wastewater technologies	1 Point
Credit 1.4	Regional Priority: Water use reduction	1 Point
Total LEED Points 93/110		

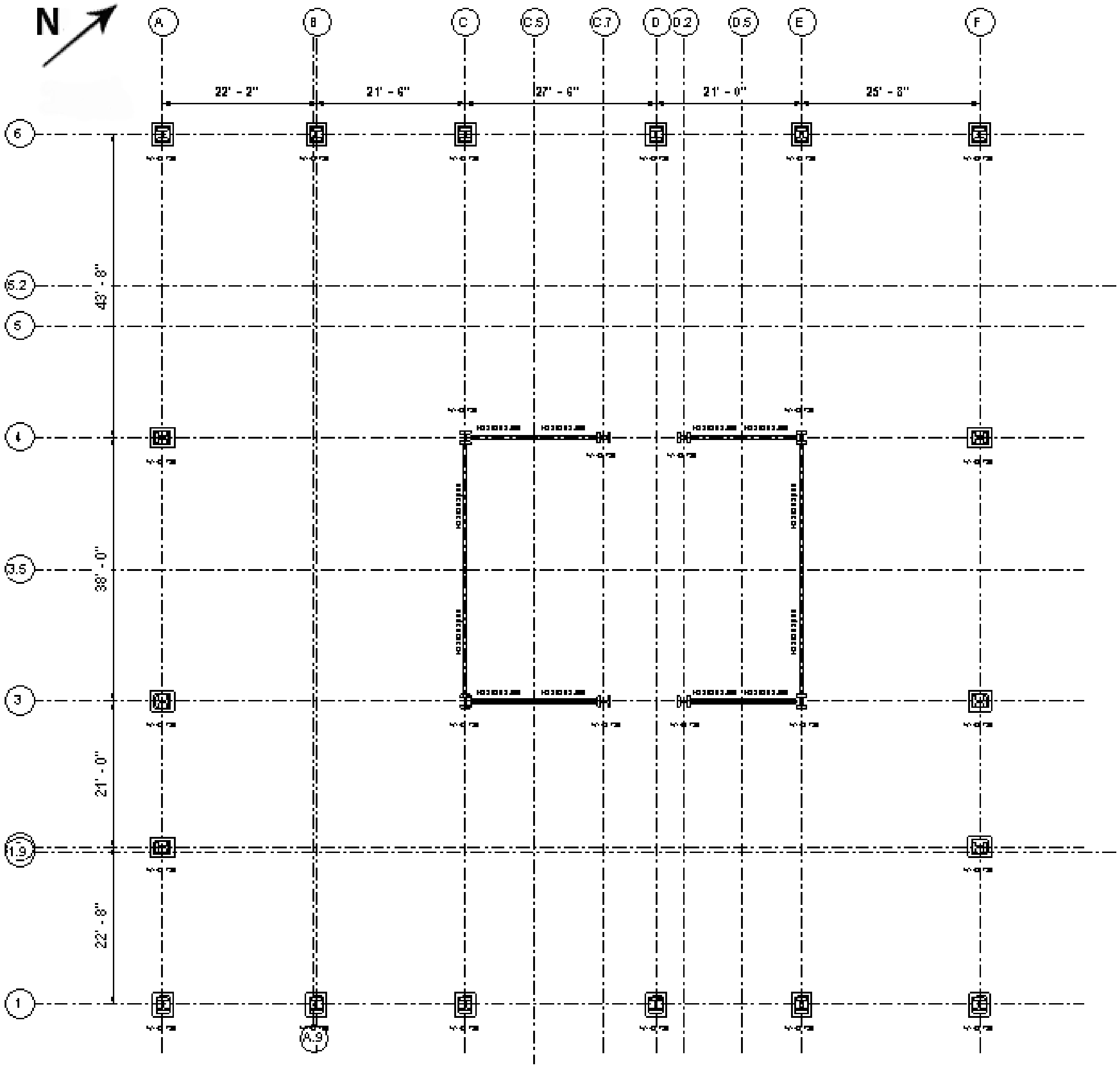
DECISION POINT MATRIX

		ZERO IMPACT GOALS				OWNER DRIVEN EVALUATION CRITERIA														
	SYSTEM DESCRIPTION	ENERGY	INTERRUPTION	WASTE	EMISSIONS	ENERGY QUANTITY	COST	SUSTAINABILITY	PHASEABILITY	INNOVATION	COMPLEXITY	SPACE NEEDED	MAINTENANCE	INTEGRATION	SITE/CLIMATE ISSUES	TEACHING	PRACTICALITY	LIFECYCLE	EFFECTIVENESS	RECOMMENDED?
GRAVITY SYSTEM	Composite Beams and Deck	0	0	+	-	0	0	+	+	0	0	-	0	+	-	0	+	+	++	Yes
	Wood Floor	+	0	++	++	0	+	++	+	++	-	-	-	0	--	++	--	--	-	No
	Non-Composite Beams and Deck	0	0	-	-	0	-	0	+	0	0	--	0	-	-	0	-	0	-	No
LATERAL SYSTEM	Steel Braced Frame Core	0	+	+	0	0	-	+	++	0	-	+	0	++	+	+	++	+	++	Yes
	Concrete Core	0	+	-	--	0	+	0	-	0	-	0	-	-	-	0	0	-	+	No
	Steel Shear Walls	0	0	+	0	0	-	+	+	+	0	+	0	-	+	+	+	0	+	No
SPECIAL SEISMIC DESIGN	Outriggers	0	+	+	0	0	-	+	-	+	--	-	0	-	+	+	-	+	++	Yes
	Outrigger and Dampers	+	++	+	0	0	--	+	-	++	--	-	--	-	0	+	-	-	++	Maybe
	Base Isolation System	+	++	0	0	0	--	--	--	++	--	--	--	--	0	++	-	0	++	No

TYPICAL OFFICE FLOOR PLAN

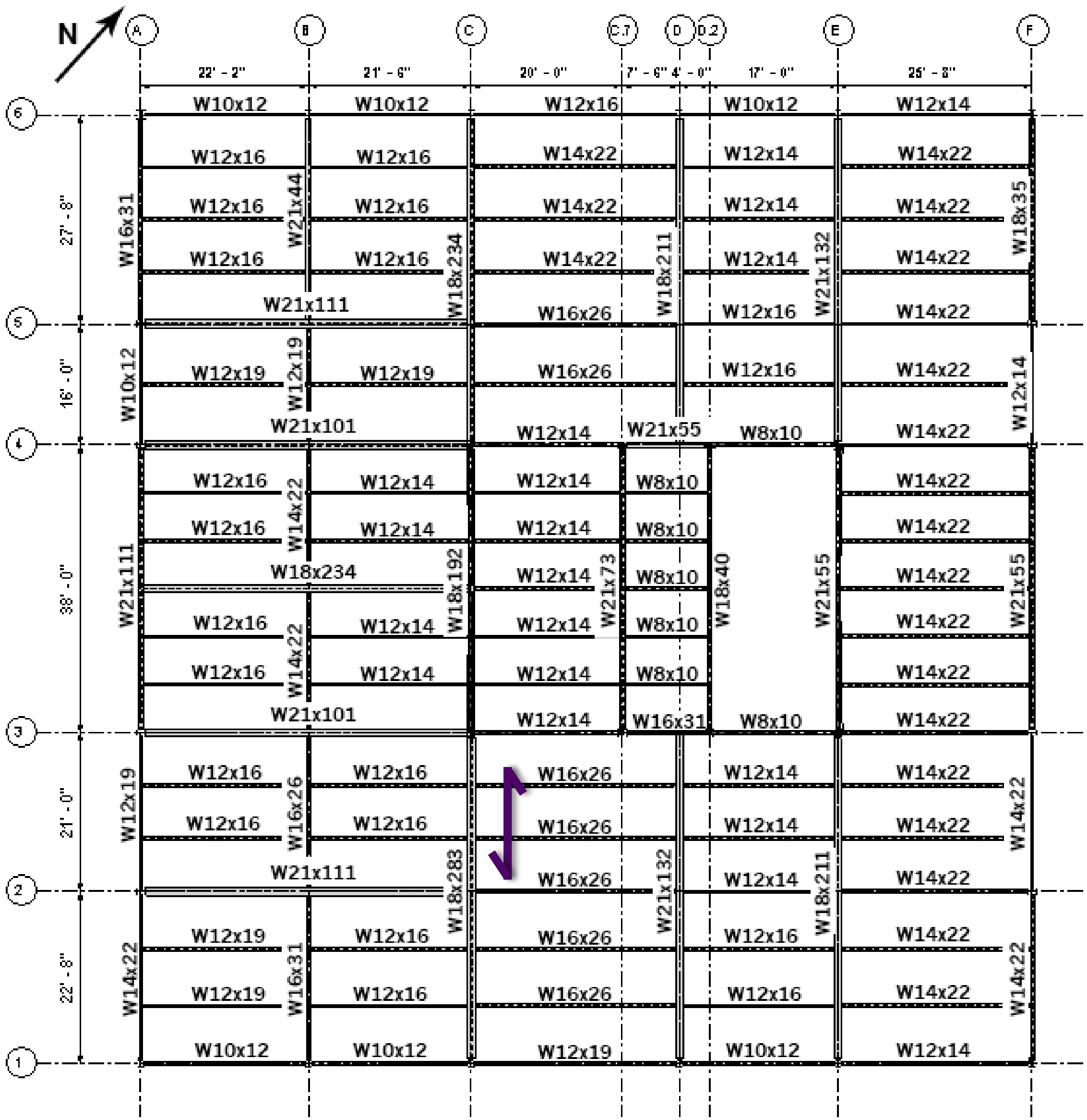


LOBBY FLOOR PLAN

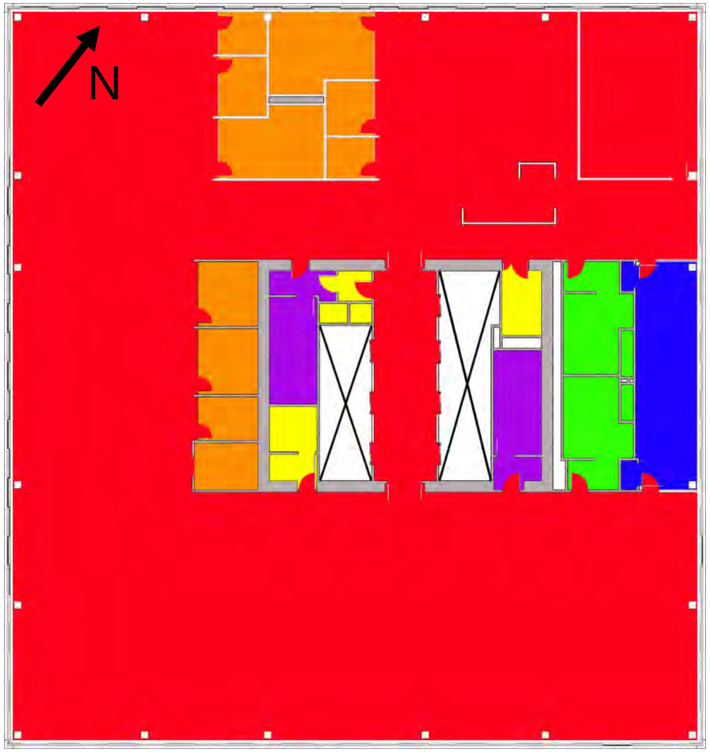


APPENDIX STRUCTURAL

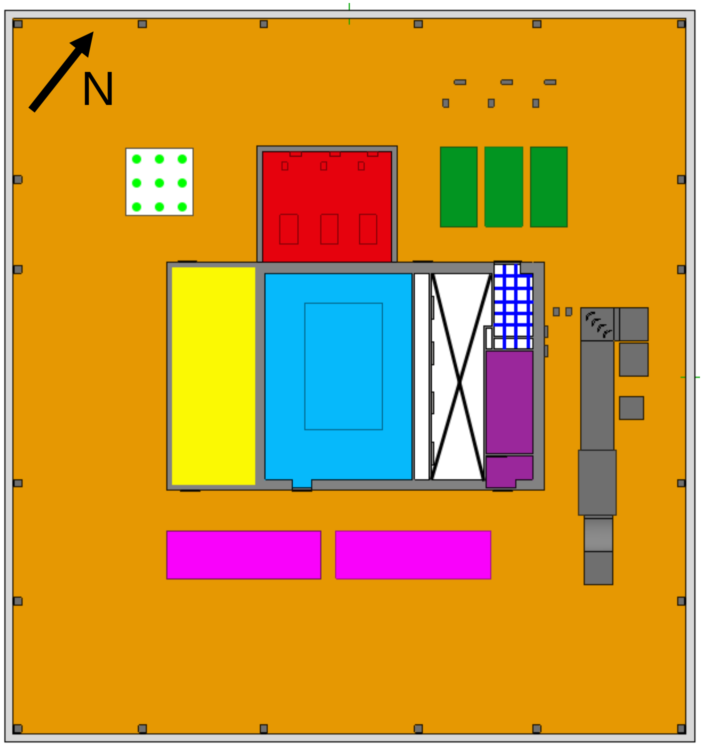
PENTHOUSE FLOOR PLAN



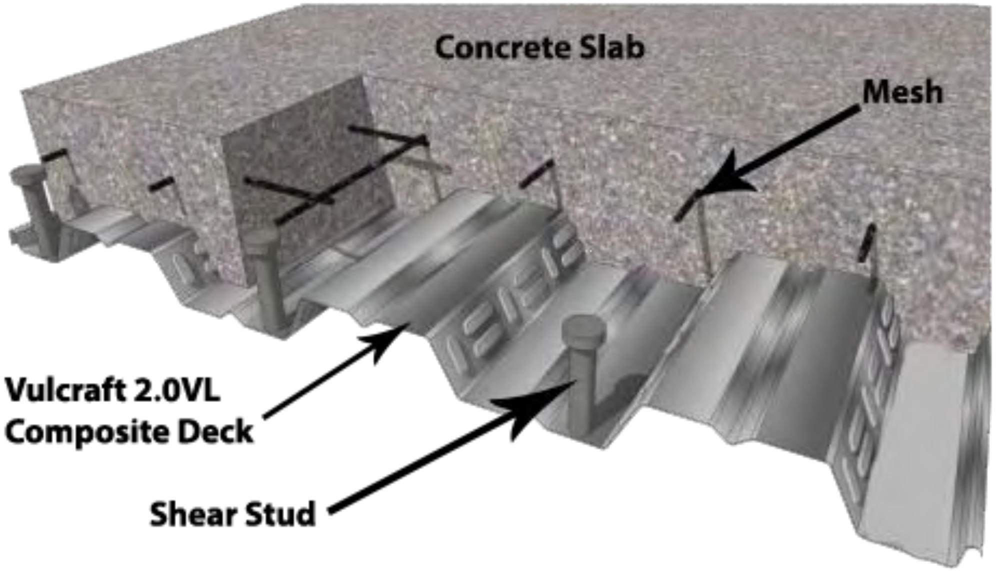
LOADING DIAGRAMS

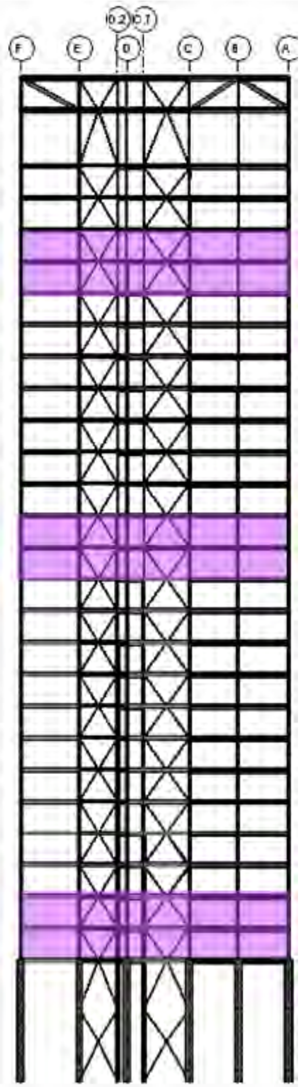


- 80 psf Open Office
- 80 psf Closed Office
- 70 psf Mechanical
- 100 psf Stairs
- 50 psf Storage
- 100 psf Bathrooms
- Opening



- 40 psf Open Floor
- 23 kips Cooling Tower
- 22 kips Chillers
- 100 psf Stairs
- 35 psf Electrical Room
- 80 kips Potable Water
- 60 kips Fuel Cell
- .7 kips Boilers
- 50 psf Service Elevator
- Opening


Concrete Slab
Mesh
Vulcraft 2.0VL
Composite Deck
Shear Stud

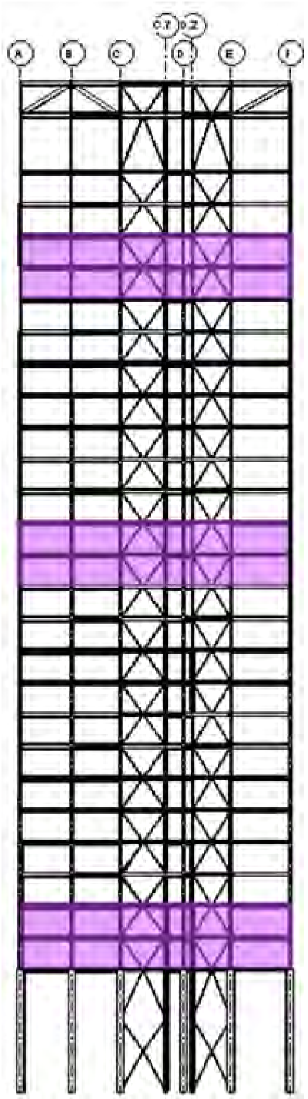


Column Line A - W14x82
Column Line B - W14x82
Column Line C -W14x193
Column Line D - W14x82
Column Line E - W14x193
Column Line F - W14x82

Column Line A - W14x74
Column Line B- W14x120
Column Line C - W14x211
Column Line D - W14x176
Column Line E - W14x211
Column Line F - W14x120

Column Line A - W14x120
Column Line B -W14x211
Column Line C -W14x426
Column Line D -W14x370
Column Line E -W14x370
Column Line F - W14x132

North



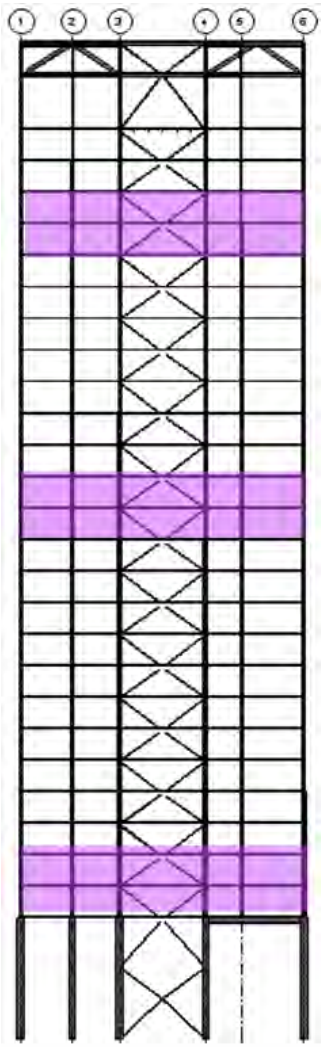
Column Line A – W14x82
Column Line B–W14x82
Column Line C -W14x193
Column Line D -W14x48
Column Line E -W14x193
Column Line F - W14x82

Column Line A -W14x99
Column Line B–W14x99
Column Line C -W14x257
Column Line D -W14x211
Column Line E -W14x193
Column Line F - W14x68

Column Line A -W14x176
Column Line B–W14x176
Column Line C -W14x455
Column Line D -W14x370
Column Line E -W14x370
Column Line F - W14x109

South

BUILDING ELEVATIONS – EAST/WEST

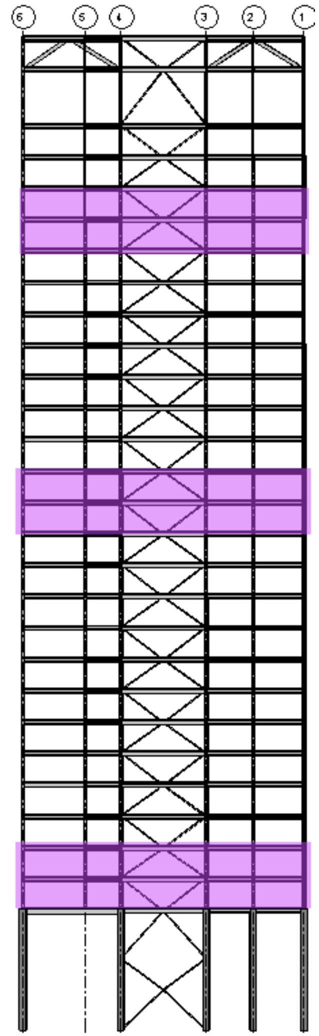


Column Line 1 – W14x82
Column Line 2–W14x82
Column Line 3 -W14x193
Column Line 4 -W14x193
Column Line 5 -W14x82
Column Line 6 - W14x82

Column Line 1 -W14x68
Column Line 2–W14x109
Column Line 3 -W14x145
Column Line 4 -W14x120
Column Line 5 -W14x120
Column Line 6 - W14x90

Column Line 1 -W14x109
Column Line 2–W14x193
Column Line 3 -W14x283
Column Line 4 -W14x257
Column Line 5 -W14x211
Column Line 6 - W14x132

East

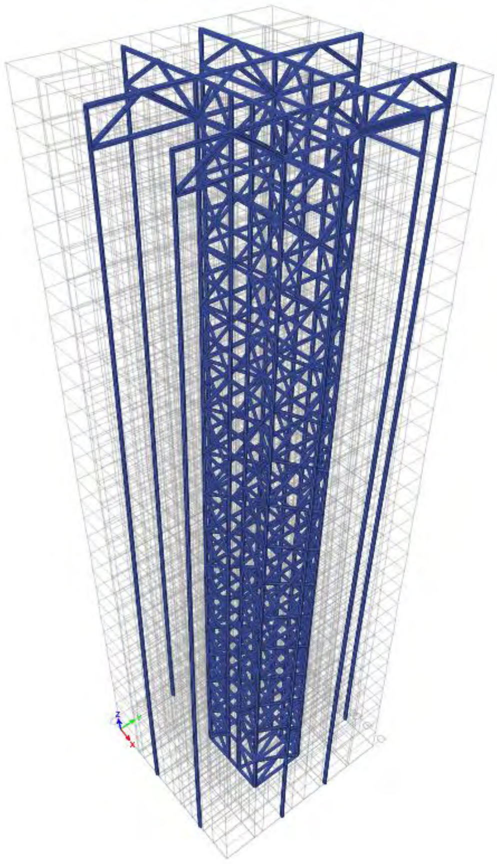


Column Line 1 – W14x82
Column Line 2–W14x82
Column Line 3 -W14x193
Column Line 4 -W14x193
Column Line 5 -W14x82
Column Line 6 - W14x82

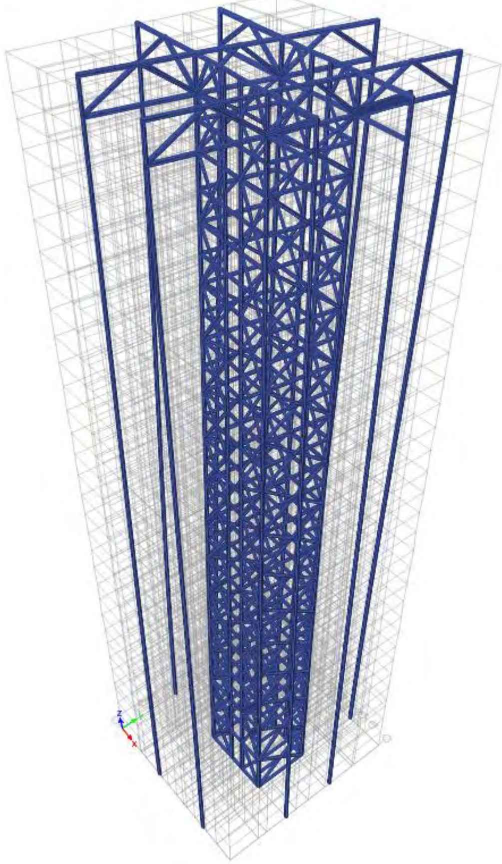
Column Line 1 -W14x99
Column Line 2–W14x193
Column Line 3 -W14x283
Column Line 4 -W14x233
Column Line 5 -W14x176
Column Line 6 - W14x74

Column Line 1 -W14x176
Column Line 2–W14x342
Column Line 3 -W14x500
Column Line 4 -W14x455
Column Line 5 -W14x342
Column Line 6 - W14x120

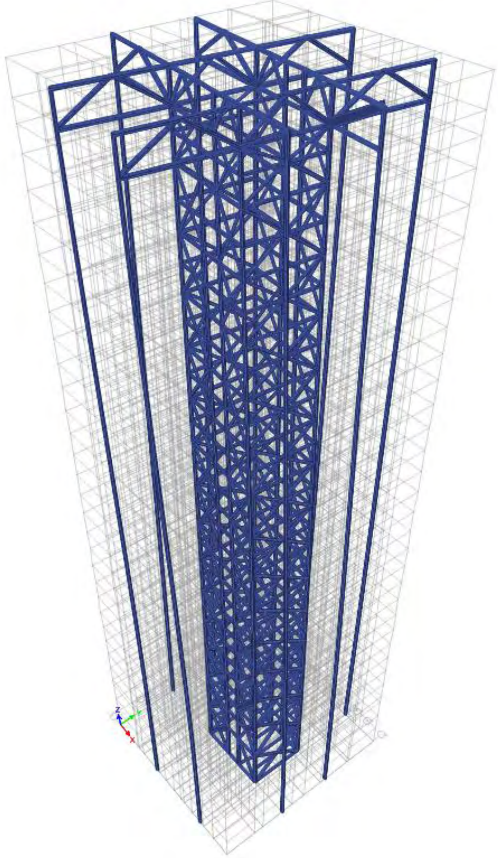
West



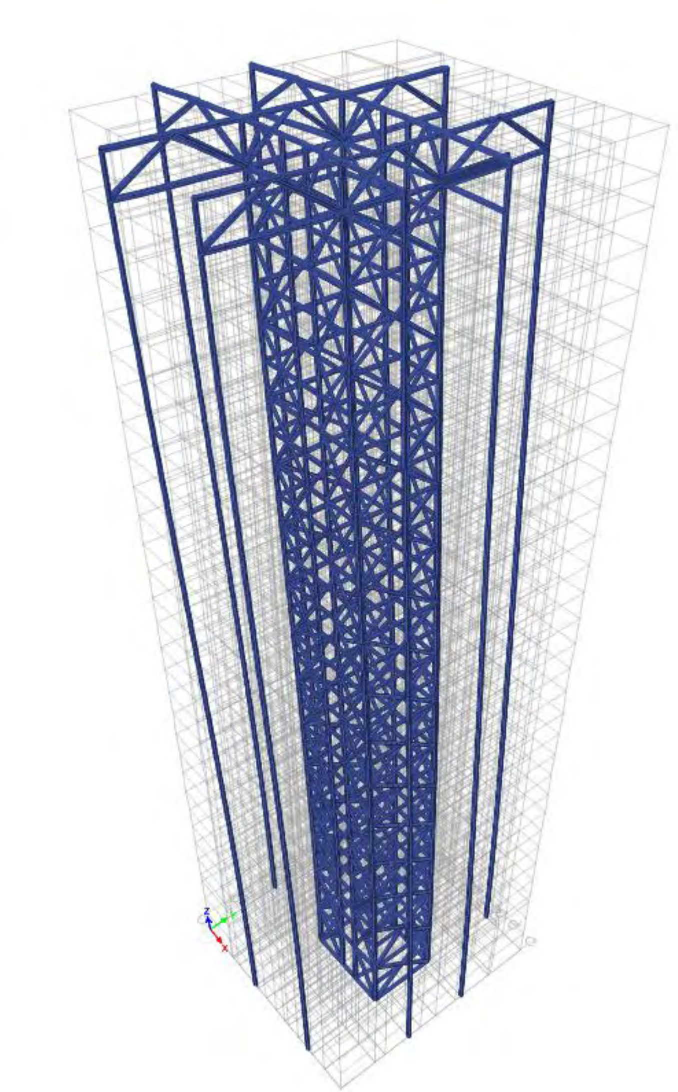
Mode 1: 2.003 seconds
Y-Translation



Mode 2: 1.673 seconds
Z-Rotation



Mode 3: 1.487 seconds
X-Translation

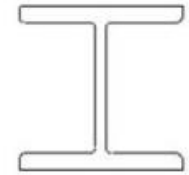


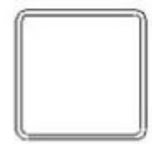
30 inch displacement

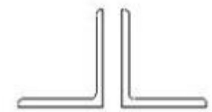
MATERIALS

Material	Type	Specific Usage	Size Range	
Steel	Wide-Flange	Beams	W8x10	W21x132
		Girders	W18x35	W30x90
		Columns	W14x43	W14x730
	HSS Shapes	Bracing	HSS3x3x3/16	HSS10x10x5/8
	Steel Plates	Gusset Plates	1/2"	1"
		Stiffener Plates	1/2"	
		Connection Plates	1/2"	
	Angles	Connections	⅃ L 5x5x1/2	
		Torsional Kickers	⅃ 3x3x1/2	
		Concrete Stops	⅃ 6x6x1/2	
	Bolts		3/4" ø A325-N	
	Shear Studs		5"	
	Reinforcement	Longitudinal	#7	#8
		Ties	#4	#6
		Mesh	#3	
	Decking		19 Gage	
Concrete	Below-Grade		11" thick	7' thick
	Above-Grade Slab		6 1/2"	
	Columns		4' square	

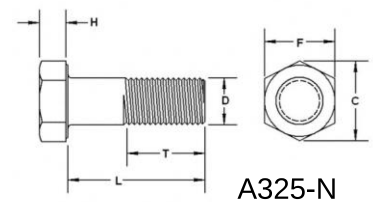

Wide Flange Beams and Girders


Wide Flange Columns

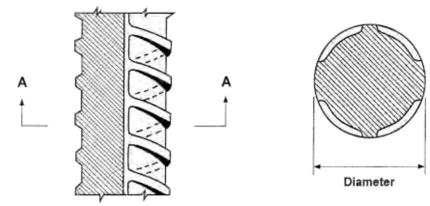

Square HSS Bracing


Double Angles Connections

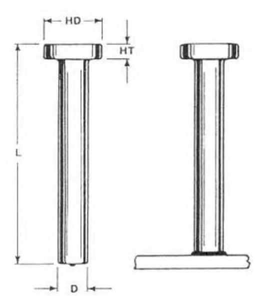

Single Angle Kickers and Stops



A325-N Structural Bolts



Rebar

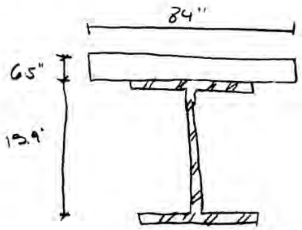


Shear Studs

LOAD

W16x31

LOAD = 274 psf



$f'_c = 4000$ psi

$A_s = 9.13\ in^2$

$b_{eff} = \min \left| \begin{array}{l} 28(12)/8 = 42 \\ 9.5(12)/2 = 57 \end{array} \right. \times 2 = 84"$

$V_{cmax} = .85(4)(84)(6.5) = 1856.4^k$

$V_{smax} = (9.13)\,50 = 456.5^k$

∴ NA IS IN CONCRETE

$456.5 = .85(4)(84)(a) \Rightarrow a = 1.6"$

$$M_n = \frac{(456.5)\left[\frac{15.9}{2} + 6.5 - \frac{1.6}{2}\right]}{12} = 518.7'^k$$

$Y2 = t - a/2 = 6.5 - 1.6/2 = 5.7"$

$(274)(10) = 2.74$ klf

$$M_u = \frac{2.74(28)^2}{8} = 268.5 \text{ ft-k}$$

$M_u < \phi M_n$ OK

DEFLECTION

CHECK WET CONC:

$w_{wc} = 69(10) + 31 = .721$ klf

$$\Delta_{wc} = \frac{5(.72)(28)^4(1728)}{384(29000)(375)} = .916"$$

$$\Delta_{wc} = \frac{(28)(12)}{240} = 1.4" \quad \text{OK}$$

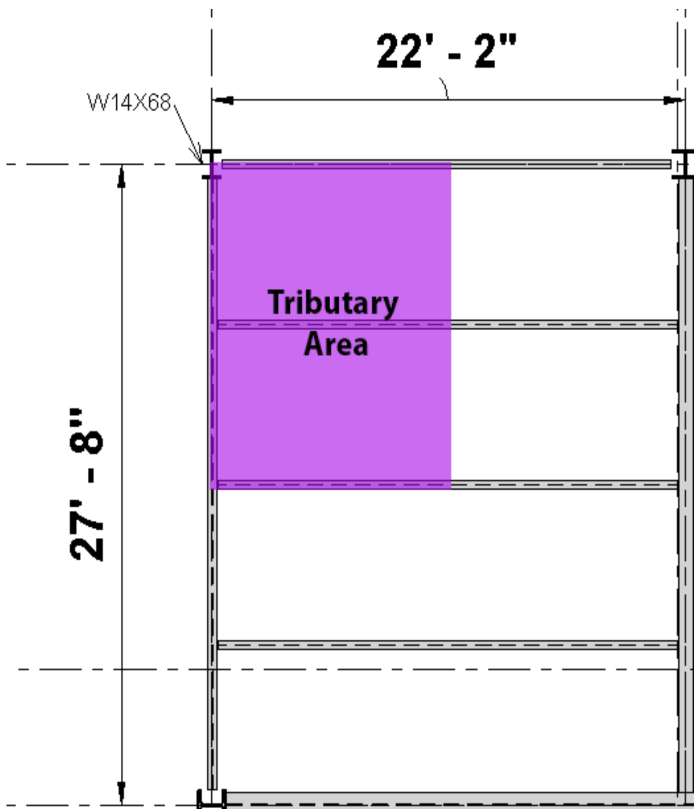
CHECK L.L. DEF:

$w_{LL} = 80(10) = .8$ klf

$I_{LB} = 1230\ in^4$ @ $Y2 = 5.7$

$$\Delta_{LL} = \frac{5(.8)(28^4)(1728)}{384(29000)(1230)} = .31"$$

$$\Delta_{LL\,max} = \frac{28(12)}{360} = .933" \quad \text{OK}$$



Roof Loads		
Dead Load (psf)	Live Load (psf)	Total Load (psf)
15	20	50
Mechanical Loads		
Dead Load (psf)	Live Load (psf)	Total Load (psf)
20	50	104
Typical Floor Load		
Dead Load (psf)	Live Load (psf)	Total Load (psf)
18	80	149.6

Corner Column (A6-Level 20) W14X68		
Length	11.1	ft
Width	13.8	ft
Tributary Area	153.4	ft^2
P_u	230.1	kips

Checks		
K	1	
L_x	28	ft
r_x	2.41	in
F_y	60	ksi
F_e	26.7	ksi
E	29000	ksi
KL_x/r_x	139.4	
$4.71\sqrt{(E/F_y)}$	103.5	
KL_x/r_x >	$4.71\sqrt{(E/F_y)}$	OK

Allowable Load for W14x68		
F_{cr}	23.4	ksi
A_g	20	in^2
ϕ	0.9	
$\phi P_n = F_{cr} A_g$	421.6	kips
$\phi P_n > P_u$		OK

Typical Brace Calculation

Axial Load → 83.4 kips (both tension & compression)

Unbraced Length → 23.5′ pinned - pinned → K = 1.0

Effective length KL = 24′

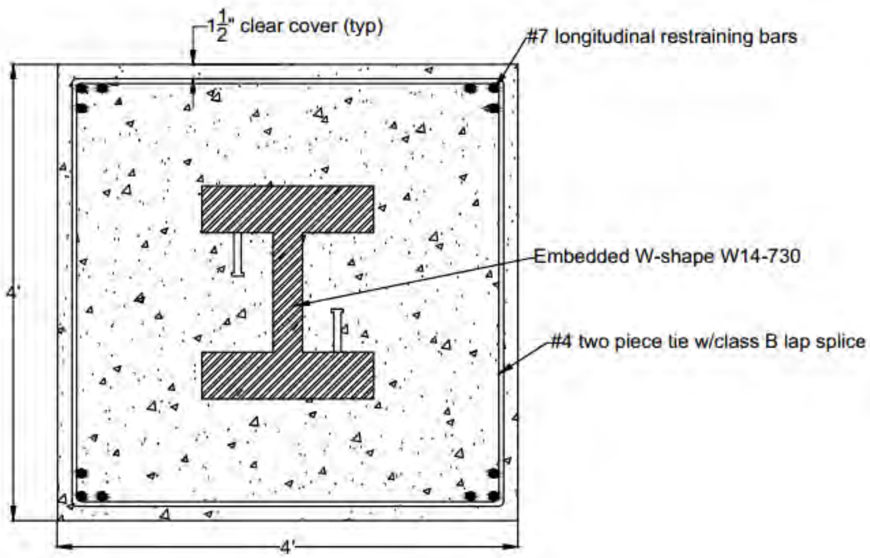
For Axial Compression

KL = 24′ HSS 7×7×3/16 $\phi P_n = 93.4 > P_u = 83.4$ works ✓ok

For Axial Tension

Yielding $\phi P_n = 193$ kips $> P_u = 83.4$ kips ✓ok

Rupture $\phi P_n = 182$ kips $> P_u = 83.4$ kips ✓ok



Design of Composite Columns for the Lobby - Typical					
P_u =	$\phi_c P_n$	(required axial strength)			
P_n =	$A_s F_{cr}$	(nominal axial strenth)			
λ_c =	$(Kl/r_m\pi)\sqrt{(F_{my}/E_m)}$			c_1	0.7
F_{my} =	$F_y + c_1 F_{yr}(A_r/A_s) + c_2 f'c(A_c/A_s)$			c_2	0.6
E_m =	$E + c_3 E_c(A_c/A_s)$			c_3	0.2
ϕ_c	0.85		A_r	5.28	sq. in
F_y	50	ksi	A_s	215	sq. in
F_{yr}	60	ksi	A_c	2084	sq. in
f'c	5	ksi	E	29000	ksi
4'x4' Column W14x730 (12) #6's longitudinal reinforcement					
F_{my}	80.11	ksi			
E_m	36813	ksi			
λ_c	0.825	≤ 1.5	ok		
F_{cr}	35.86				
ϕP_n	6553	kips	>6210 kips	ok	
Use 4'x4' Concrete Columns with W14x730, (12) #7's and f'c = 5ksi, Shear studs and ties spaced every 12"					

MAT FOUNDATION AND SLURRY WALL CALCULATIONS

Mat Foundation Area		
Total Area	14,765	SF
Column Weights	2,915,319	lb
Beam Weights	3,760,290	lb
Floor Weight	59,178,931	lb
Bracing Weight	255,860	lb
Total Weight	66,110,400	lb
Bearing Pressure	8,000	psf
Mat Foundation Area	8,264	sf

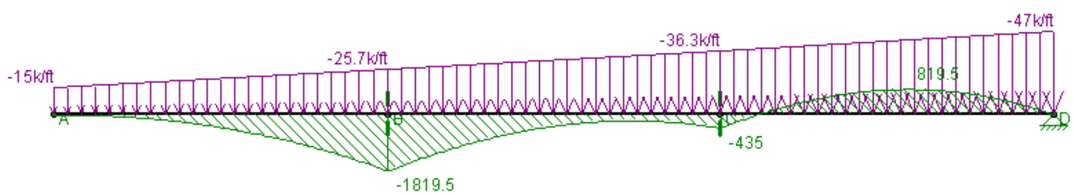
Calculations		
q	5.8	ksf
L	50	ft
M_u	7363.0	ft-k
$M_u \leq$	$\phi M_n =$	$\phi\ 5 \sqrt{f'c}\ S$
h	72	in
h	6	ft
Check Shear		
ϕV_n	3,339,365	lb
V_u	292,327	lb

Loads and Factors					
P_D	37,761	kip	ϕ	0.55	
P_L	28,349	kip	q_u	8	ksf
P_U	90,672	kip	f'c	4000	psi
Foundation Dimensions			**Core Dimensions**		
Length	125	ft	Length	48.5	ft
Width	125	ft	Width	48.5	ft

Given:		
Surcharge =	20H + 100	
	1080	psf
Soil Pressure =	110	pcf
Height =	42	ft

Assumptions:	
ϕ =	30°

Loads:		
Ka	0.33	
$W_{surcharge}$ =	14969	plf
W_{soil} =	32017	plf



DECISION POINT MATRIX

	SYSTEM DESCRIPTION	ZERO IMPACT GOALS				OWNER DRIVEN EVALUATION CRITERIA														
		ENERGY	INTERRUPTION	WASTE	EMISSIONS	ENERGY QUANTITY	COST	SUSTAINABILITY	PHASEABILITY	INNOVATION	COMPLEXITY	SPACE NEEDED	MAINTENANCE	INTEGRATION	SITE/CLIMATE ISSUES	TEACHING	PRACTICALITY	LIFECYCLE	EFFECTIVENESS	RECOMMENDED?
ONSITE ENERGY	Solar Power	++	0	0	+	+	-	++	0	0	0	++	+	0	-	+	++	-	-	Yes
	Wind Power	++	0	0	+	0	-	++	0	0	0	+	0	0	--	++	++	-	--	No
	Geothermal Power	++	0	0	+	+	--	++	0	+	--	--	--	--	--	+	--	--	--	No
	Fuel Cells	++	0	-	+	+	-	+	0	+	-	-	-	+	-	++	+	++	+	Yes
	Human Waste to Power	++	0	++	++	+	-	++	0	++	-	+	-	+	0	++	+	+	+	Yes
	Municipal Waste to Power	++	0	++	++	+	-	++	0	++	-	+	-	0	0	++	0	0	0	No
	Algae Biomass	++	0	0	+	+	--	++	0	+	--	-	-	0	-	++	-	-	-	No
	PaveGen Tiles	++	0	+	+	+	--	++	0	++	0	++	-	+	+	++	+	-	0	Yes
OFFSITE ENERGY	Tidal Power	++	0	0	+	0	--	++	0	++	--	-	--	0	-	+	-	-	+	No
	Solar Power	++	0	0	+	++	-	++	0	0	-	-	0	0	0	+	++	+	++	Yes
	Geothermal Power	++	0	0	+	++	--	++	0	+	--	--	--	0	-	+	--	--	+	No
	Wind Power	++	0	0	+	++	--	++	0	0	--	--	-	0	-	+	-	-	+	No
ELECTRICAL SYSTEM	AC/DC Distribution	+	+	++	0	+	-	+	0	++	-	-	-	0	0	+	+	+	++	Yes
	Dual Risers	0	++	-	0	0	--	0	0	+	-	-	-	-	-	0	+	0	+	Yes
	Paralleling Switchgear	-	++	-	0	0	--	0	0	0	-	0	-	0	0	0	0	-	0	Yes
	Double Ended Substation	-	++	-	0	0	--	0	0	0	-	0	-	0	0	0	-	--	++	No
DAYLIGHTING	Shades	++	0	+	0	0	-	+	0	0	-	-	-	0	0	0	+	+	+	No
	Electrochromic Glass	++	0	+	0	0	-	+	0	++	0	+	+	++	0	++	0	+	+	Yes
ELECTRIC LIGHTING	LED Lighting	++	0	++	0	+	-	++	0	0	0	0	0	0	0	0	++	++	++	Yes
	DALI Control System	++	+	++	0	+	-	++	0	0	+	0	+	+	0	++	++	++	++	Yes
	Task Lighting	++	+	++	0	+	-	++	0	+	-	-	0	0	0	0	++	++	++	Yes

Costs

	Cost
Solar Panels	$360,000

Income/Incentives

	Amount
Incentives	$108,000
Annual energy generation	194,144 kWh
Annual Income	$20,400

Onsite Solar Potential Analysis									
Area represented by each point			3.861225	ft^2	=	0.358719	m^2		
Sensor Point			Sensor Orientation			Annual	Daily	Annual	Daily
x	y	z	x	y	z	kwh/m2	kwh/m2	kwh	kwh
-92.9875	-0.27729	440.1	0	0	1	663.74	1.82	238.10	0.65
-92.9875	1.687739	440.1	0	0	1	789.08	2.16	283.06	0.78
-91.0225	-2.24232	440.1	0	0	1	713.62	1.96	255.99	0.70
-91.0225	-0.27729	440.1	0	0	1	946.03	2.59	339.36	0.93
87.79528	3.652769	440.1	0	0	1	1078.48	2.95	386.87	1.06
89.76031	-0.27729	440.1	0	0	1	1058.49	2.90	379.70	1.04
89.76031	1.687739	440.1	0	0	1	1065.26	2.92	382.13	1.05
#	#	nodegroup00					Sum	1769374	
#	0	0	1				Efficiency	265406.03	
#	-0.7071	0.7071	0				Derate	204362.65	
#	-0.7071	-0.7071	0				Walkways	194144.51	
#	1.965								
#	1.965								
#	-1								
#									
#	4278								

10 dry tons generates 18,868 kWh → 1 pound generates 0.93 kWh

The average person will generate about 0.25 dry pounds per day.

$$0.25\,\frac{dry\ pounds}{person} * 5000\ people = 1250\ dry\ pounds$$

$$1250\ dry\ lbs * 0.93\ kWh = 1163\,\frac{kWh}{day}$$

$$1163\,\frac{kWh}{day} * 250\,\frac{working\ days}{year} = 290{,}625\,\frac{kWh}{year}$$

Costs

	Cost
Land	$13,000
Solar Panels	$5,115,000

Income/Incentives

	Amount
Incentives	$1,534,500
Annual energy generation	5,059,186 kWh
Annual Income	$531,670

Station Identification	
Cell ID:	0176359
State:	California
Latitude:	34.9 ° N
Longitude:	118.1 ° W
PV System Specifications	
DC Rating:	3000.0 kW
DC to AC Derate Factor:	0.750
AC Rating:	2250.0 kW
Array Type:	Fixed Tilt
Array Tilt:	34.9 °
Array Azimuth:	180.0 °
Energy Specifications	
Cost of Electricity:	14.4 ¢/kWh

Results

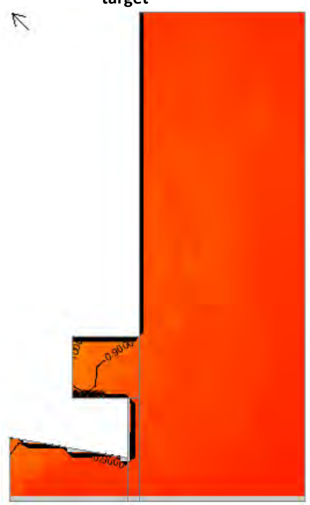
Month	Solar Radiation ($kWh/m^2/day$)	AC Energy (kWh)	Energy Value ($)
1	5.27	348266	50031.89
2	5.98	358230	51463.32
3	6.78	440047	63217.15
4	7.24	450080	64658.49
5	7.52	468484	67302.41
6	7.71	452164	64957.88
7	7.62	454446	65285.71
8	7.88	471687	67762.56
9	7.56	447211	64246.33
10	7.09	448603	64446.31
11	6.12	386421	55513.24
12	5.13	333546	47917.22
Year	6.83	5059186	726802.67

1st Floor Circulation

E_{target} = 10 fc

% of points above 50% = **100**

E_{target} = 30 fc

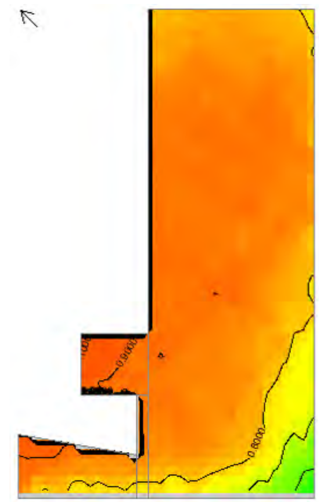


% of points above 50% = **100**

E_{target} = 50 fc

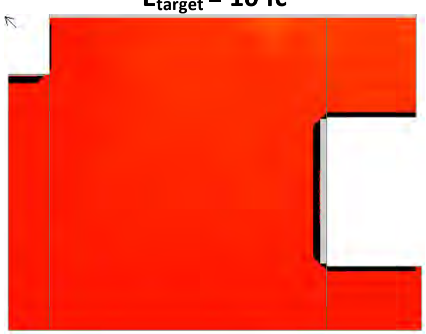
% of points above 50% = **100**

UDI 10 fc – 500 fc



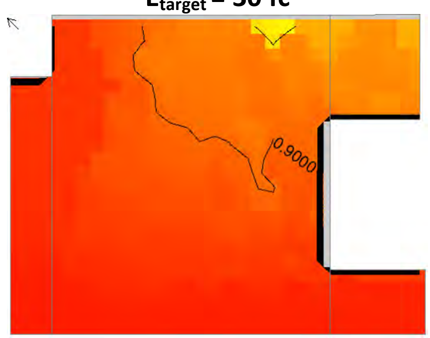
2nd Floor Circulation

E_{target} = 10 fc



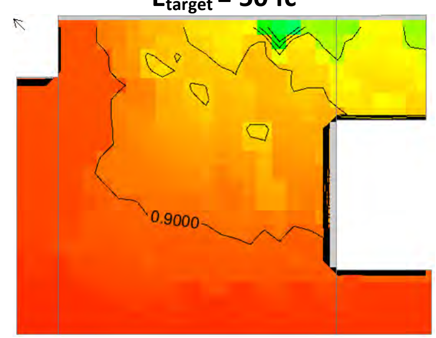
% of points above 50% = **100**

E_{target} = 30 fc



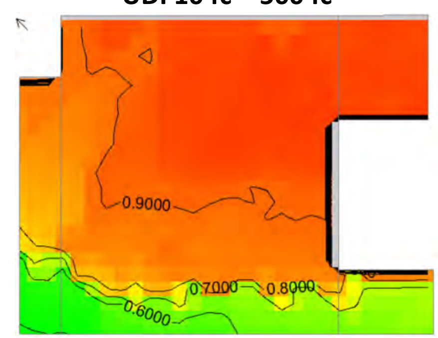
% of points above 50% = **100**

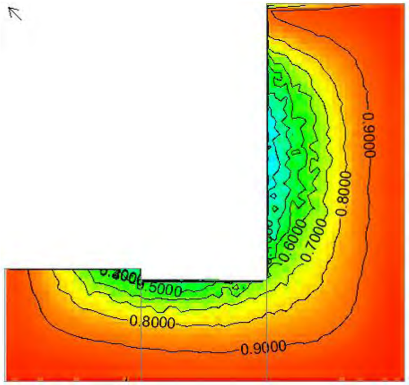
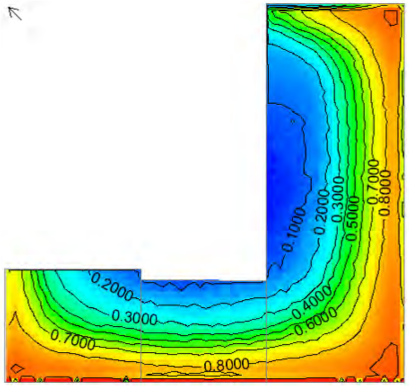
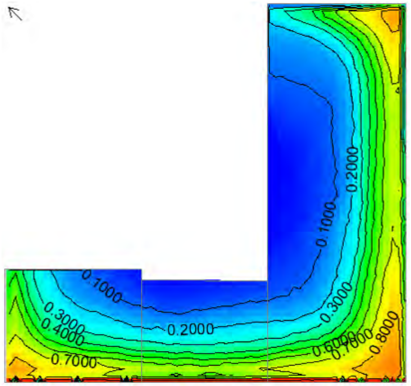
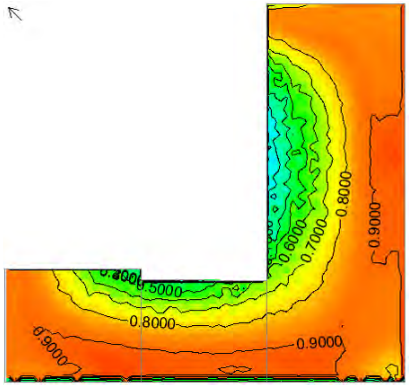
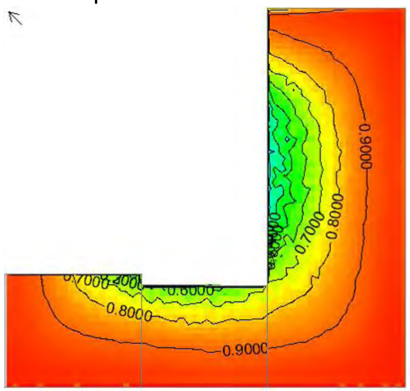
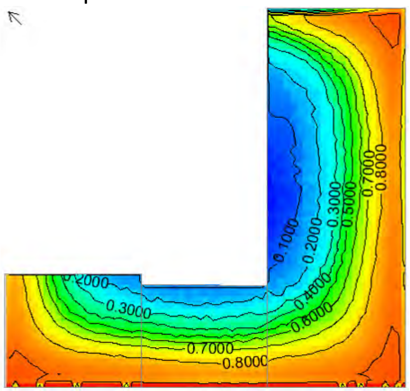
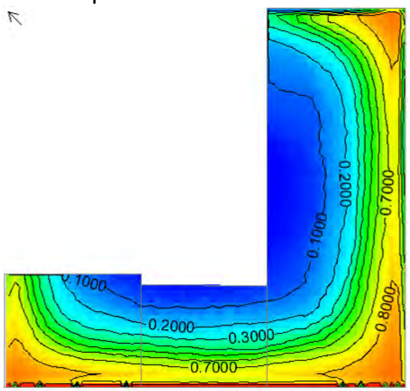
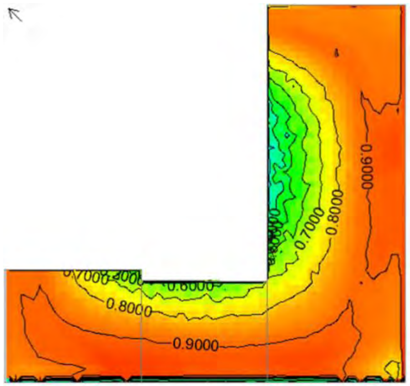
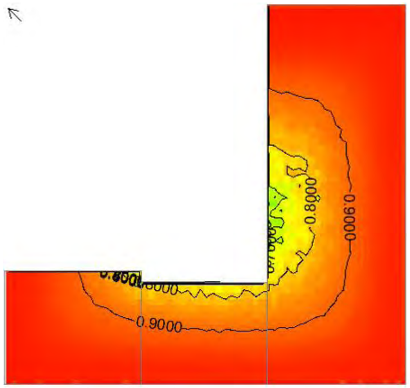
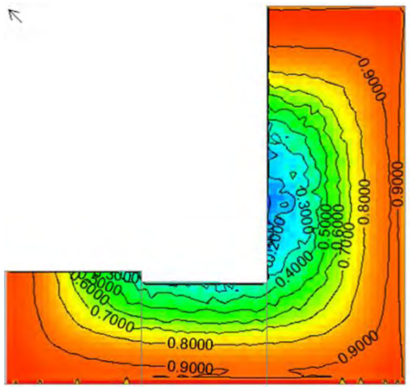
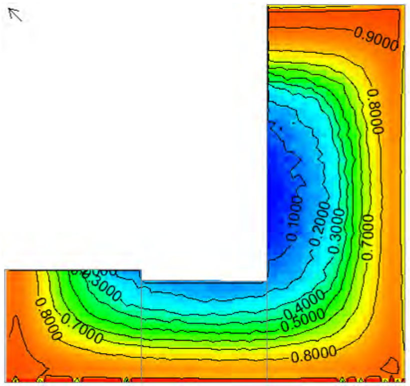
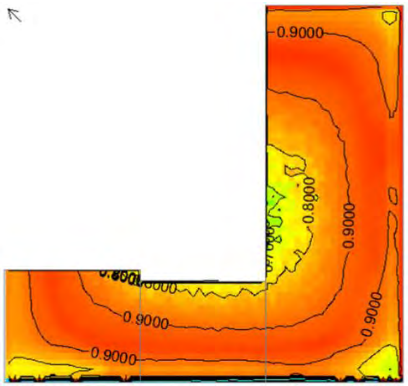
E_{target} = 50 fc



% of points above 50% = **99.46**

UDI 10 fc – 500 fc



	E_{target} = 10 fc	E_{target} = 30 fc	E_{target} = 50 fc	UDI 10 fc – 500 fc
Floor 5	 % of points above 50% = **91.9**	 % of points above 50% = **53.34**	 % of points above 50% = **33.2**	
Floor 18	 % of points above 50% = **96.34**	 % of points above 50% = **61.17**	 % of points above 50% = **42.08**	
Floor 30	 % of points above 50% = **100**	 % of points above 50% = **82.19**	 % of points above 50% = **64.33**	

ELECTROCHROMIC GLASS COST ANALYSIS

Traditional Windows/Shades	Price	SF value (5'x8' windows)
Low e, double pane glass	$40-55/sf	$40
Shade fabric	$28/sf	$28
Automatic shade motor	$370 per unit	$2.50
Total		**$70.50**

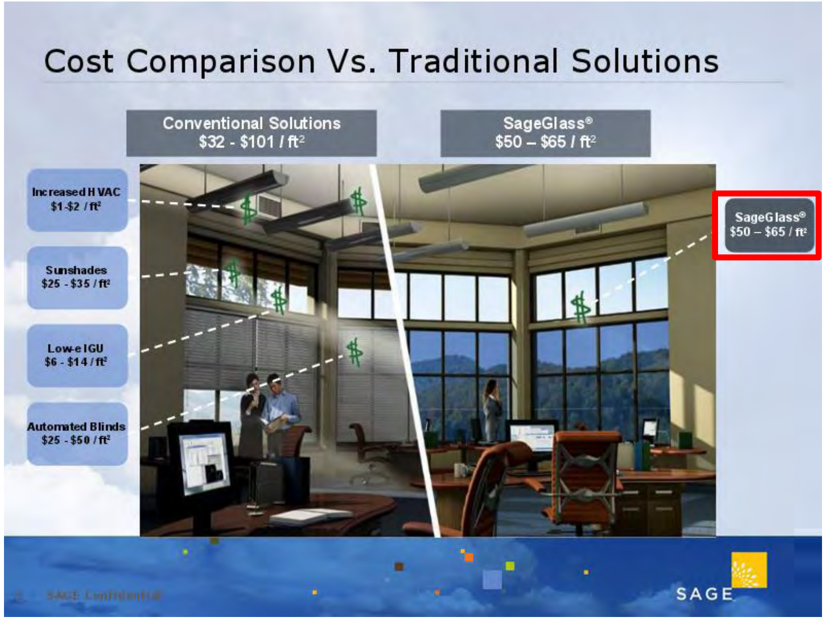
Electrochromic Glass		
Glass	$50-65/sf	$65
Total		**$65**

Lutron Cost Comparison Study – line voltage AC system

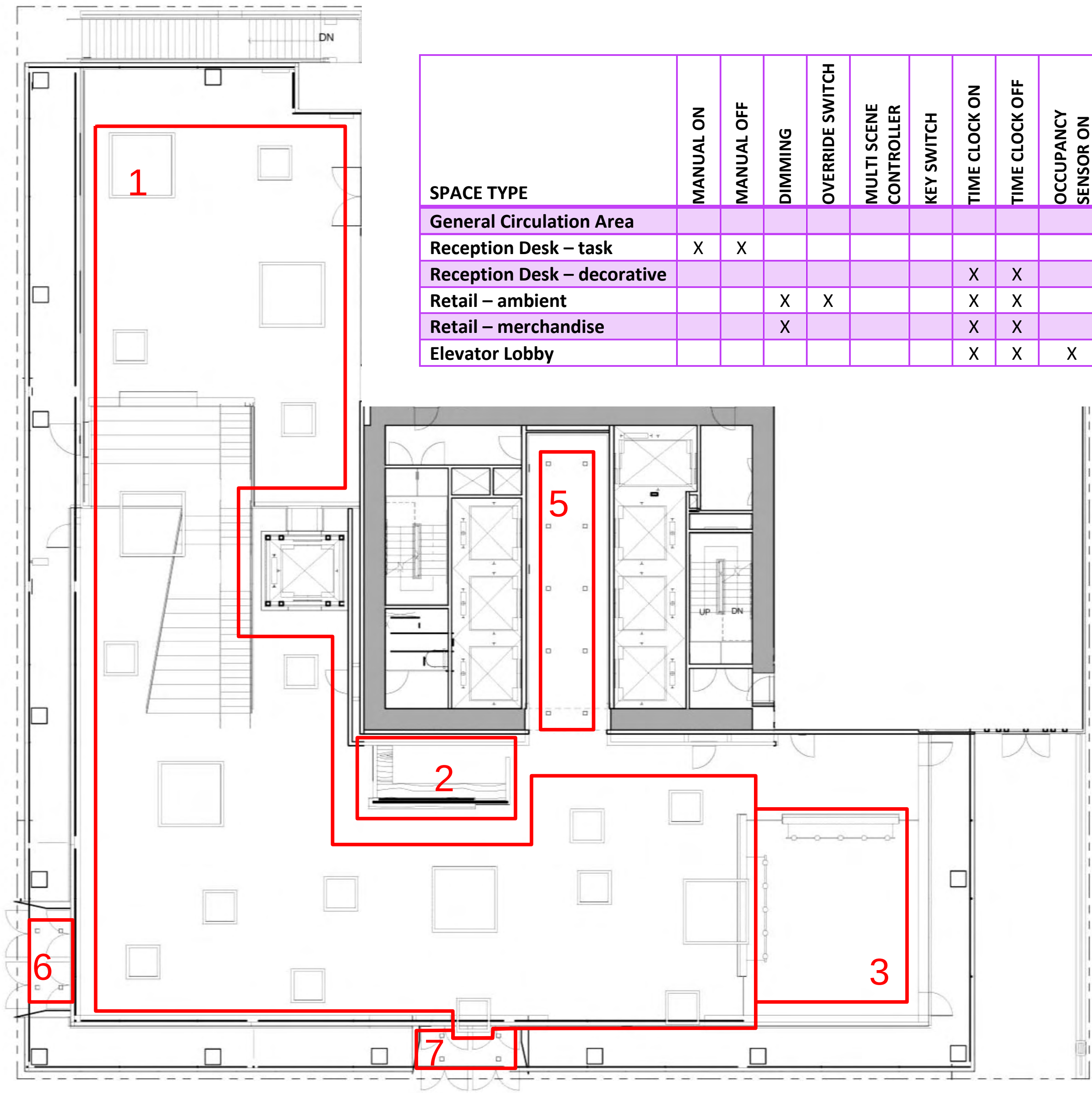
			Qty	Total Price (USD)
Labor	Window Treatment Contractor	Administrative Charges	-	$1,950.00
		Keypad Cable Labor	-	$400.00
		Shades Installation and Programming	-	$11,518.00
	Electricical Contractor	Line voltage wiring and circuit installation	-	$10,172.19
	Total Labor			$24,040.19
Wiring	Breakers & Electrical Materials	20 A Breakers	6	$157.15
		Miscellaneous Materials	-	$2,099.59
	Cable (Qty. in feet)	#12/3 MC Cable (Shades Wiring)	2300	$3,878.69
		#12/2 MC Cable (Breaker Wiring)	300	$301.34
		Low Voltage 4 Conductor Keypad Cable	400	$193.60
	Total Wiring			$6,630.37
Components	Shades, Brackets and Lineals	Open Office Sheer Shade Pairs	17	$18,464.15
		Conference Rooms & Executive Office Dual Shade Pairs	6	$6,950.94
	Keypads	Group A, B, A+B Keypads	4	$369.81
	Power and Control	Group Controllers	6	$2,207.55
	Total Components			$27,992.45
Total Installed Cost				**$58,663.01**

Shades are 5' x 8'
Controllers are for a group of 4 shades

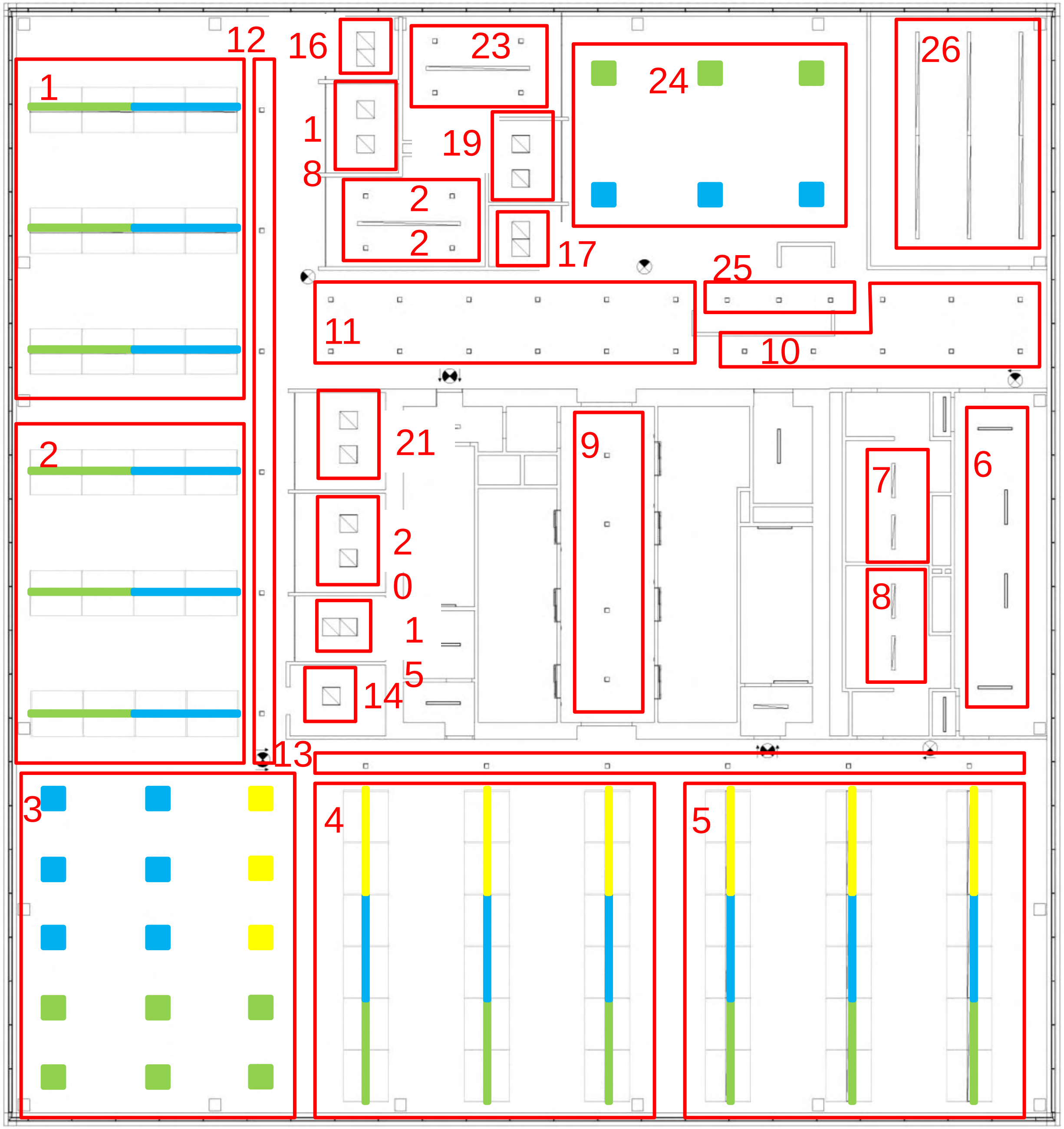
SageGlass Information Sheet



SPACE TYPE	MANUAL ON	MANUAL OFF	DIMMING	OVERRIDE SWITCH	MULTI SCENE CONTROLLER	KEY SWITCH	TIME CLOCK ON	TIME CLOCK OFF	OCCUPANCY SENSOR ON	OCCUPANCY SENSOR OFF	PHOTOCONTROL DIMMING
General Circulation Area											X
Reception Desk – task	X	X								X	
Reception Desk – decorative							X	X			
Retail – ambient			X	X			X	X			X
Retail – merchandise			X				X	X			
Elevator Lobby							X	X	X	X	

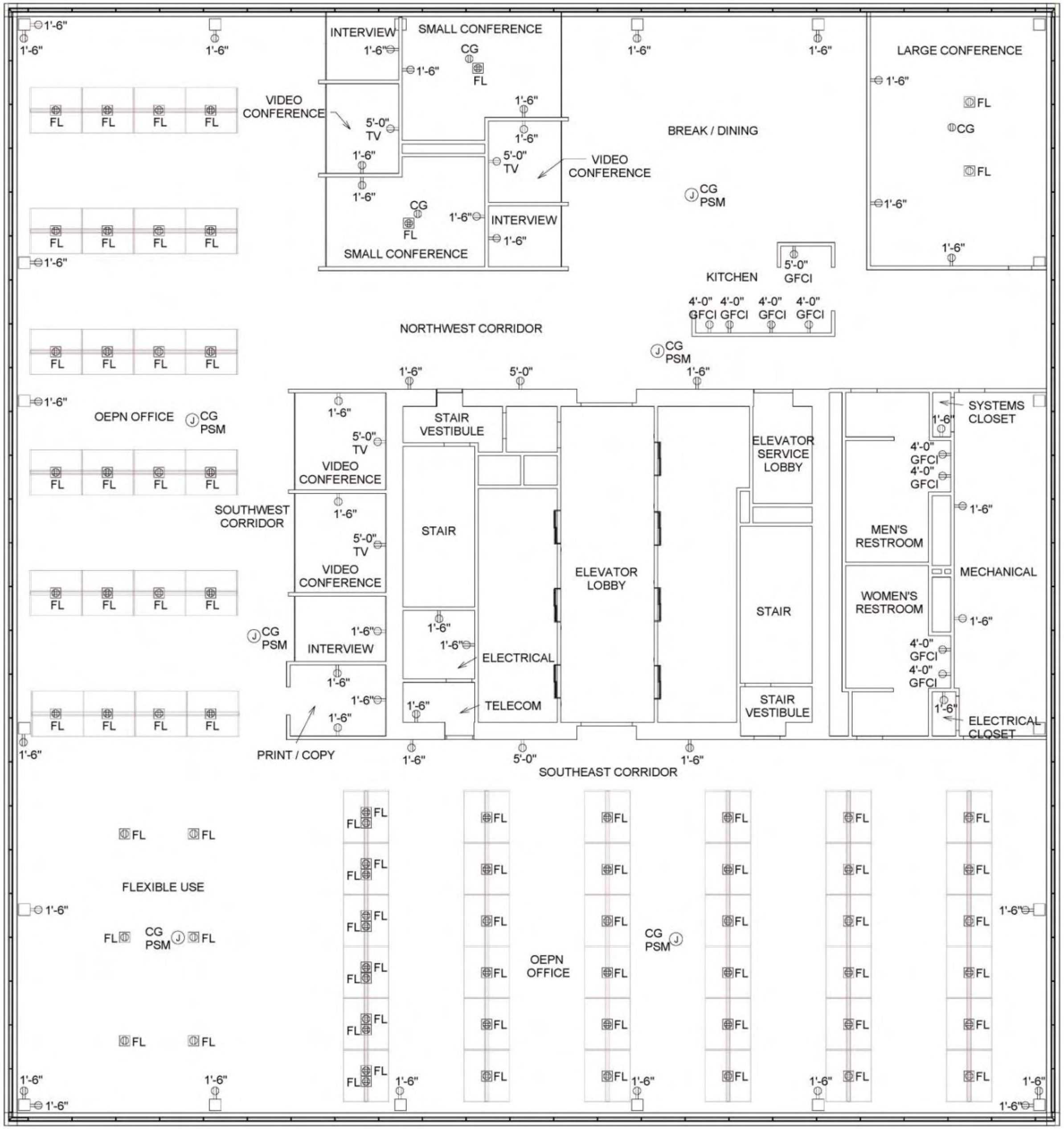


OFFICE LIGHTING CONTROLS



OFFICE LIGHTING CONTROLS

SPACE TYPE	MANUAL ON	MANUAL OFF	DIMMING	OVERRIDE SWITCH	MULTI SCENE CONTROLLER	KEY SWITCH	TIME CLOCK ON	TIME CLOCK OFF	OCCUPANCY SENSOR ON	OCCUPANCY SENSOR OFF	PHOTOCONTROL DIMMING
Open Office – overhead	X			X				X			X
Open Office – task lighting	X	X								X	
Flex Space	X			X				X			X
Electrical/Mechanical Rooms	X	X								X	
Restrooms									X	X	
Elevator Lobby							X	X	X	X	
Corridors							X	X	X	X	
Copy Room									X	X	
Interview Rooms	X	X								X	
Teleconference Rooms	X	X	X							X	
Conference Rooms	X	X	X		X					X	
Dining/Break Area									X	X	X
Kitchen									X	X	


INTERVIEW
SMALL CONFERENCE
VIDEO CONFERENCE
LARGE CONFERENCE
BREAK / DINING
KITCHEN
NORTHWEST CORRIDOR
OEPN OFFICE
SOUTHWEST CORRIDOR
STAIR VESTIBULE
STAIR
ELEVATOR LOBBY
ELEVATOR SERVICE LOBBY
MEN'S RESTROOM
WOMEN'S RESTROOM
SYSTEMS CLOSET
MECHANICAL
ELECTRICAL CLOSET
ELECTRICAL
TELECOM
PRINT / COPY
SOUTHEAST CORRIDOR
FLEXIBLE USE
CG PSM
GFCI
FL
TV

Type	Location	Purpose	Quantity	Maximum Power per		Connected Power per floor		Connected Power for Building		Demand Power for Building		Expected Demand Power for		Notes and Assumptions about Expected Demand Power
General Use Receptacles														
Duplex	Column covers	General use	18	180	VA	3.24	kVA	81	kVA	45.5	kVA	4.55	kV	Assume 10% are in use at any given time
Open Office														
Quadruplex	Open office floor, under desk partitions	Thin client desktops, computer monitors	66	360	VA	23.8	kVA	594	kVA	594	kVA	222	kVA	Thin client desktop = 30W, LED backlit monitor = 30W, full desktop = 175W (Max power) Assume 10% full desktop
Hard-wired	At each open office desk	Task light	120	6.5	VA	0.78	kVA	19.5	kVA	19.5	kVA	12.19	kVA	Assume that 50% of task lights will be at full output and 25% at half output simultaneously
Flexible Space														
Duplex	Floor	Thin client desktops, computer monitors	6	180	VA	1.1	kVA	27	kVA	27	kVA	10.5	kVA	Thin client desktop = 40W, LED backlit monitor = 30W (Max power)
Large Conference Room														
Duplex	Walls	General use of additional electronics	3	180	VA	0.5	kVA	13.5	kVA	11.8	kVA	5.88	kVA	Assume that 50% of conference rooms are simultaneously in use
Duplex	Ceiling	Video projector	1	180	VA	0.2	kVA	4.5	kVA	7.25	kVA	3.63	kVA	Assume that 50% of conference rooms are simultaneously in use
Duplex	Floor	For use at central conference table	2	180	VA	0.4	kVA	9	kVA	9	kVA	4.50	kVA	Assume that 50% of conference rooms are simultaneously in use
Small Conference Rooms														
Duplex	Walls	General use of additional electronics	4	180	VA	0.7	kVA	18	kVA	14	kVA	7	kVA	Assume that 50% of conference rooms are simultaneously in use
Duplex	Ceiling	Video projector	2	180	VA	0.4	kVA	9	kVA	9.5	kVA	4.75	kVA	Assume that 50% of conference rooms are simultaneously in use
Quadruplex	Floor	For use at central conference table	2	360	VA	0.7	kVA	18	kVA	18	kVA	9	kVA	Assume that 50% of conference rooms are simultaneously in use
Video Conference Rooms														
Duplex	Near TV screen	Operation of TV and video conference equipment	4	180	VA	0.7	kVA	18	kVA	18	kVA	2.23	kVA	TV, LCD = 60W, speakers = 30W Assume that 33% of video conference rooms are simultaneously in use
Duplex	Adjoining wall	General use of additional electronics	4	180	VA	0.7	kVA	18	kVA	14	kVA	4.62	kVA	Assume that 33% of video conference rooms are simultaneously in use
Interview Rooms														
Duplex	Wall	General use of electronics	3	180	VA	0.5	kVA	13.5	kVA	11.8	kVA	2.35	kVA	Assume that 20% of interview rooms are simultaneously in use
Printer/Copier Room														
Duplex	At equipment locations	(1) laser printer, (1) inkjet multifunction printer	1	180	VA	0.2	kVA	4.5	kVA	4.5	kVA	2.34	kVA	Laser printer = 130W, Inkjet MFD = 26W Assume 60% of units are in use simultaneously
Duplex	Opposite walls of current equipment	General purpose recetacles for growth	2	180	VA	0.4	kVA	9	kVA	9	kVA	0.9	kVA	Assume 10% are simultaneously in use
Northwest and Southeast Corridors														
Duplex	around building core	General use	4	180	VA	0.7	kVA	18	kVA	14	kVA	1.4	kVA	Assume 10% are simultaneously in use
Duplex	Entrance to elevator corridor	TV's showing energy use on office floor	2	180	VA	0.4	kVA	9	kVA	9.5	kVA	3	kVA	TV, LCD = 60W
Kitchen														
Duplex (special purpose) GFI	At equipment locations	Coffee maker	1	464	VA	0.5	kVA	11.6	kVA	11.6	kVA	5.59	kVA	Equipment on standby = 2W Assume 50% of coffee makers are on standby, 50% active
Duplex (special purpose) GFI	At equipment locations	Microwave oven	1	1620	VA	1.6	kVA	40.5	kVA	40.5	kVA	11.39	kVA	Equipment on standby = 3W Assume 75% of microwaves are on standby, 25% active
Duplex GFI	At equipment locations	Water dispenser	1	180	VA	0.2	kVA	4.5	kVA	4.5	kVA	0.65	kVA	Water dispenser = 90W, standby = 1W Assume 75% of dispenser are on standby, 25% active
Duplex (special purpose) GFI	At equipment locations	Hot beverage dispenser	1	1650	VA	1.7	kVA	41.3	kVA	41.3	kVA	12.90	kVA	Equipment on standby = 75W Assume 75% of dispensers are on standby, 25% active
Duplex (special purpose) GFI	At equipment locations	Refrigerator	1	650	VA	0.7	kVA	16.3	kVA	16.3	kVA	16.25	kVA	Always in use
Restrooms														
Duplex GFI	Above sinks	Miscellaneous use	4	180	VA	0.7	kVA	18	kVA	14	kVA	0.70	A	Assume 5% are simultaneously in use
Utility Spaces (Electrical, Mechanical, Telecom)														
Duplex	Walls	Miscellaneous use	7	180	VA	1.3	kVA	31.5	kVA	20.8	kVA	1.04	kV	Assume 5% are simultaneously in use
OFFICE FLOORS TOTAL								**Connected**		**Demand**		**Expected**		
								1034	kVA	968	kVA	341	kV	

Location	DC Loads: Connected Load		DC Loads: Demand Load		DC Loads: Expected Load		AC Loads: Connected Load		AC Loads: Demand Load		AC Loads: Expected Load	
Interior Lighting												
Office	123.0	kW	123.0	kW	112.6	kW	19.5	kW	19.5	kW	19.5	kW
Lobby	2.0	kW	2.0	kW	2.0	kW	1.0	kW	1.0	kW	1.0	kW
Undesigned Spaces	31.3	kW	31.3	kW	22.4	kW	-	kW	-	kW	-	kW
Total	156.2	kW	156.2	kW	137.0	kW	20.5	kW	20.5	kW	20.5	kW

	DC Energy Use		AC Energy Use		Savings Source	Reference or Assumptions
Total Energy	454,273	kwh	62,282	kwh		See LPD analysis
Energy Savings	95,825	kwh	10,647	kwh	Daylight harvesting	See DA analysis
Energy Savings	17,922	kwh	-	kwh	5% efficiency increase for DC	
Expected Energy	340,525	kwh	51,634	kwh		

Location	DC Loads: Connected Load		DC Loads: Demand Load		DC Loads: Expected Load		AC Loads: Connected Load		AC Loads: Demand Load		AC Loads: Expected Load	
Receptacles (Plug load - not including desktops and monitors or lighting)												
Office	-	kW	-	kW	-	kW	393	kW	328	kW	105	kW
Lobby	-	kW	-	kW	-	kW	20	kW	17	kW	6	kW
Undesigned Spaces	-	kW	-	kW	-	kW	19	kW	14	kW	11	kW
Total	-	kW	-	kW	-	kW	432	kW	359	kW	121	kW

	DC Energy Use		AC Energy Use		Savings Source	Reference or Assumptions
Total Energy	-	kwh	447,275	kwh		See office power plan
Energy Savings	-	kwh	183,000	kwh	Plug load controls	See plug load in support
Expected Energy	-	kwh	264,275	kwh		

Location	DC Loads: Connected Load		DC Loads: Demand Load		DC Loads: Expected Load		AC Loads: Connected Load		AC Loads: Demand Load		AC Loads: Expected Load	
Computing Loads (Desktops and monitors on receptacles)												
Rack Servers	35	kW	35	kW	35	kW	-	kW	-	kW	-	kW
Desktops & Monitors	-	kW	-	kW	-	kW	621	kW	621	kW	242	kW
Total	35	kW	35	kW	35	kW	621	kW	621	kW	242	kW

	DC Energy Use		AC Energy Use		Savings Source	Reference or Assumptions
Total Energy	64,983	kwh	403,764	kwh		See computing power
Energy Savings	3,249	kwh	-	kwh	5% efficiency increase for DC	
Expected Energy	61,734	kwh	403,764	kwh		

Location	DC Loads: Connected Load		DC Loads: Demand Load		DC Loads: Expected Load		AC Loads: Connected Load		AC Loads: Demand Load		AC Loads: Expected Load	
Mechanical Equipment												
Office	15	kW	15	kW	15	kW	-	kW	-	kW	-	kW
Below Grade	36.5	kW	36.5	kW	36.5	kW	-	kW	-	kW	-	kW
Mechanical Platform	37.4	kW	37.4	kW	37.4	kW	-	kW	-	kW	-	kW
Penthouse	68.3	kW	45.3	kW	45.3	kW	-	kW	-	kW	-	kW
Rooftop	95	kW	95	kW	95	kW	-	kW	-	kW	-	kW
Total	252.2	kW	229.2	kW	229.2	kW		kW		kW		kW

	DC Energy Use		AC Energy Use		Savings Source	Reference or Assumptions
Total Energy	295,769	kwh	-	kwh		See mechanical loads
Energy Savings	14,788	kwh	-	kwh	5% efficiency increase	
Expected Energy	280,980	kwh	-	kwh		

Systems												
Fire Alarm	-	kW	-	kW	-	kW	37	kW	37	kW	9	kW
Telecom/Data	130	kW	130	kW	130	kW	-	kW	-	kW	-	kW
Total	130	kW	130	kW	130	kW	37	kW	37	kW	9	kW

	DC Energy Use		AC Energy Use		Savings Source	Reference or Assumptions
Total Energy	39,000	kwh	78,840	kwh		
Energy Savings	1,950	kwh	-	kwh	5% efficiency increase	
Expected Energy	37,050	kwh	78,840	kwh		

Miscellaneous												
Electrochromic glass	3	kW	3	kW	3	kW	-	kW	-	kW	-	kW
Total	3	kW	3	kW	3	kW		kW		kW		kW

	DC Energy Use		AC Energy Use		Savings Source	Reference or Assumptions
Total Energy	3,000	kwh	-	kwh		
Energy Savings	150	kwh	-	kwh	5% efficiency increase	
Expected Energy	2,850	kwh	-	kwh		

Electric Power Demand Summary											
DC Loads						AC Loads					
Connected Load		Demand Load		Expected Load		Connected Load		Demand Load		Expected Load	
576.4	kW	553.4	kW	534.2	kW	1,110.1	kW	1,037.5	kW	392.4	kW

Expected Energy Use					
DC Energy			AC Energy		
Before Savings	857,024	kwh	Before Savings	992,161	kwh
After Savings	723,139	kwh	After Savings	798,514	kwh

Conservative Energy Estimate					
DC Energy			AC Energy		
1,000,000	annual	kwh	800,000	annual	kwh
Fuel cell analysis conducted assuming additional DC load as a conservative estimate in the event that projected DC energy savings are lower than expected. Server or mechanical expansion may result in larger DC energy use.					

FUEL CELL ANALYSIS

Fuel Cell	Max Output		Output Voltage		Electrical Efficiency	Natural Gas Consumption		Heat for Recovery			CO_2 Emissions			Space Required (Dimen. & Area)
ClearEdge Model 400 PureCell	400	kW	480	VAC	42%	3,630,000	Btu/h	1,550,000	Btu/h	at 140°F	1059	lb/MWh	no recovery	27'4" x 8'4" x 10'
			380	VDC	47%						497	lb/MWh	w/ recovery	

Expected AC Energy	800,000	kwh	Annually
Expected DC Energy	1,000,000	kwh	Annually

Natural Gas Fuel Usage

Fuel Cell	Electrical Energy Use		Hours of Use		Total Energy Consumption [using electrical efficiency]		Cas Consumption in kBtu		Gas Consumption in Therms		Monthly Therms	
ClearEdge AC	800000	kwh	2000	hr	1904762	kwh	6499048	kBtu	64990	therms	5416	therms
ClearEdge DC1	500000	kwh	1250	hr	1063830	kwh	3629787	kBtu	36298	therms	3025	therms
ClearEdge DC2	500000	kwh	1250	hr	1063830	kwh	3629787	kBtu	36298	therms	3025	therms
Total	1800000	kwh	4500	hr	4032421	kwh	13,758,622	kBtu	137586	therms	11466	therms

Heat for Recovery

	Heat Recovery from Fuel Cell		Actual Heat to Mechanical Equ.		Annual Energy Used in Recovery Heat	
ClearEdge Model 400	6975000	kBtu	4185000	kBtu	1226553	kwh

Carbon Footprint (CO_2)

ClearEdge Model 400	1906200	lb	864637	kg	Annually, no recovery
	894600	lb	405783	kg	Annually, with recovery

Cost Analysis

Summer $/Month	Winter $/Month	Flat $	Total $	
Cost using natural gas				
$9,239.83	$9,815.10	$1,808.64	$116,138.22	Annually
Cost using grid electricity				
$35,259.50	$22,458.50	-	$346,308.00	Annually
Monetary Savings from using Fuel Cells			$230,169.78	Annually

Primary Fuel Comparison

Energy Source	Annual Primary Fuel Energy Consumption		Assumptions
Grid Natural Gas with Fuel Cells	4,480,468	kwh	Natural gas tranmission results in 10% losses from source to site
Grid Electric	5,806,452	kwh	Electric grid is 33% efficient from source to site after generation and tranmission
Savings	1,325,983	kwh	

Primary Fuel Utilization Comparison

Energy Source	Energy Use	Energy Consumption	
Fuel Cell	Total Required	4,480,468	kwh
	Electricity	1,800,000	kwh
	Recovery Heat	343,563	kwh
	Percent of total	48%	kwh
Electric Grid	Total Required	5,806,452	kwh
	Electricity	1,800,000	kwh
	Percent of Total	31%	kwh

TRADITIONAL VS. VIRTUAL COMPUTING ANALYSIS

COMPUTING POWER DEMAND

Average rack server	Max Power [W]	700	Avg. Power [W]	600	Idle Power [W]	420	Sleep Power [W]	200	Off Power [W]	5
Average thin client	Max Power [W]	30	Avg. Power [W]	15	Idle Power [W]	10	Sleep Power [W]	4	Off Power [W]	2
Average full-capacity desktop	Max Power [W]	175	Avg. Power [W]	120	Idle Power [W]	85	Sleep Power [W]	5	Off Power [W]	3
Average LED or LCD monitor	Max Power [W]	30	Avg. Power [W]	30	Idle Power [W]	20	Sleep Power [W]	2	Off Power [W]	1

Maximum Power Per Office Floor

Computing Method	Rack Servers	DC Power [kW]	Thin Client Desktops	AC Power [kW]	Full-Capacity Desktops	AC Power [kW]	Monitors (Backlit LED)	AC Power [kW]	Total Maximum Power	
Virtual Computing	2	1.4	120	3.6	12	2.1	132	4.0	11.1	kW
Traditional Computing	-	-	-	-	132	23.1	132	4.0	27.1	kW
Maximum Power for the Entire Building										
Virtual Computing	50	35	3000	90	300	52.5	3300	99	276.5	kW
Traditional Computing	-	-	-	-	3300	577.5	3300	99	676.5	kW

Computing Maximum Power Demand Summary		
Virtual Computing Connected Power	276.5	kW
Traditional Computing Connected Power	676.5	kW
Connected Power Reduction	400	kW
Connected Power Reduction	59%	-

Note about Computing Power Demand Analysis

The AC computer loads (every load except the servers) is supplied by receptacles and are included in the receptacle table and load summaries. This analysis was completed for two reasons, the first being a method of quantifying estimated energy savings over traditional computing methods. The second was to evaluate whether the computing loads could be met by the fuel cells when using actual loads, and not receptacles loads that conservatively overestimate power demand.

Estimated Energy Usage					Energy Assumptions
Virtual Computing Connected Power	1865.4	kwh per workday	476,872	kwh annually	Assume an average of 7 hours of active use, 1.5 hours of idle use, 1 hours of sleep use, and 14.5 hours of off use per workday. 'Off' status on weekends and holidays. Assume 255 annual workdays.
Traditional Computing Connected Power	4199.3	kwh per workday	1,072,327	kwh annually	Assume an average of 7 hours of active use, 1.5 hours of idle use, 1 hours of sleep use, and 14.5 hours of off use per workday. 'Off' status on weekends and holidays. Assume 255 annual workdays.
Connected Power Reduction	2333.9	kwh per workday	595,454	kwh annually	-
Connected Power Reduction	56%	kwh per workday	56%	kwh annually	-

$$V_{drop} = \frac{K(I)(L)(2)}{cmils}$$

K = resistance (ohms/cmil-ft)
- 11 for copper loaded to less than 50% ampacity
- 12 for copper loaded to greater than 50% ampacity

I = load in amps

L = one-way distance

380VDC Distribution							24VDC Distribution								
Circuit	Load Type	Max Load [A]	Actual Load [A]	Breaker on Panel [A]	Max Distance	V_{drop} Panel - PSM	PSM	Load [VA]	Load [A]	Channel	Load [VA]	Load [A]	Max Dist.	V_{drop} PSM - Luminaire	Max Total Branch Circuit V_{drop}
1	Lighting, controls	4.00	1.87	15	64	0.2%	1 (Flex)	662.2	27.6	1	94.6	3.9	24	1.4%	1.6%
										2	94.6	3.9	24	1.4%	
										3	94.6	3.9	16	0.7%	
										4	47.3	2.0	12	0.3%	
										5	47.3	2.0	12	0.3%	
										6	94.6	3.9	16	0.7%	
										7	94.6	3.9	24	1.4%	
										8	94.6	3.9	24	1.4%	
								47.3	2.0	9 E	47.3	2.0	<1	0.0%	
2	Lighting, controls	4.00	2.50	15	60	0.2%	2 (Open Office)	819.2	34.1	1	40	1.7	56	1.3%	2.8%
										2	40	1.7	56	1.3%	
										3	92.4	3.9	47	2.6%	
										4	92.4	3.9	47	2.6%	
										5	92.4	3.9	47	2.6%	
										6	92.4	3.9	47	2.6%	
										7	92.4	3.9	33	1.8%	
										8	92.4	3.9	33	1.8%	
										9	92.4	3.9	18	1.0%	
										10	92.4	3.9	18	1.0%	
								132.4	5.5	11 E	66.2	2.8	40	1.6%	
										12 E	66.2	2.8	40	1.6%	
3	Lighting, controls	4.00	2.47	15	54	0.2%	3 (Open Office)	806.8	33.6	1	40	1.7	41	1.0%	2.8%
										2	40	1.7	41	1.0%	
										3	92.4	3.9	47	2.6%	
										4	92.4	3.9	47	2.6%	
										5	92.4	3.9	18	1.0%	
										6	92.4	3.9	18	1.0%	
										7	46.2	1.9	18	0.5%	
										8	46.2	1.9	18	0.5%	
										9	94.6	3.9	31	1.7%	
										10	94.6	3.9	39	2.1%	
										11	75.6	3.2	57	2.6%	
								132.4	5.5	12 E	66.2	2.8	50	2.0%	
										13 E	66.2	2.8	50	2.0%	
4	Lighting, controls	4.00	2.84	15	114	0.4%	4 (Dining/ Break)	941	39.2	1	50.4	2.1	57	1.7%	2.8%
										2	94.6	3.9	43	2.3%	
										3	79.8	3.3	46	2.1%	
										4	67.2	2.8	56	2.2%	
										5	50.4	2.1	30	0.9%	
										6	94.6	3.9	32	1.8%	
										7	79.8	3.3	46	2.1%	
										8	67.2	2.8	56	2.2%	
										9	50.4	2.1	26	0.8%	
										10	75.6	3.2	38	1.7%	
										11	92.4	3.9	36	2.0%	
										12	46.2	1.9	42	1.1%	
										13	92.4	3.9	45	2.4%	
								138.6	5.8	14 E	71.4	3.0	30	1.3%	
										15 E	67.2	2.8	58	2.3%	
5	Lighting, controls, systems	4.00	1.79	15	98	0.3%	5 (Corridor)	576.8	24.0	1	60	2.5	49	1.7%	3.0%
										2	80	3.3	34	1.6%	
										3	60	2.5	18	0.6%	
										4	87.2	3.6	26	1.3%	
										5	73.6	3.1	35	1.5%	
										6	80	3.3	58	2.7%	
										7	52.6	2.2	24	0.7%	
										8	52.6	2.2	42	1.3%	
										9	30.8	1.3	56	1.0%	
								101.7	4.2	10 E	66.3	2.8	62	2.4%	
										11 E	35.4	1.5	78	1.5%	
6	Telecom devices, controls	4.00	-	15	-	-	6	Location and loads based on low voltage device placement and wiring.							

Plug Load Savings			
Large Offices	0.61	kwh / year / $ft.^2$	Based on "large" (175,000 $ft.^2$ office)
350 Mission Area	300,000	$ft.^2$	Usable office space on 25 office floors
Estimated Energy Savings	183,000	kwh / year	See plug load control section for description of control strategy

Plug Load	Control Strategy
Computer monitors Open office task lighting Audio/visual equipment General use receptacles	These devices operate on both time clock controls and occupancy sensors. There is no threat of losing data if the device shuts off due to inactivity in the space. With 120 open office work stations per floor, under-desk occupancy sensors have the potential to save task lighting and computer monitor energy. AV equipment in conference rooms may go unused for long periods of time when the rooms are empty.
Printing, copying, and scanning equipment Kitchen Appliances	Receptacles serving these loads operate solely on a time clock. Most kitchen appliances require operation throughout the work day, even when the kitchen is not occupied, and copy room devices often receive signals when the room is empty.

RISER DIAGRAM