

# Building Technology III

## New York City College of Technology

Course Day 22  
*Revit Day 13 (Project Day 11)*

*The New Academic Building –  
Cores*



Professor Paul C. King, RA, AIA, ARA  
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<http://professorpaulking.wordpress.com/>  
<http://students.autodesk.com/>

# Lab Programming : Program Spaces & Sizes

Space Type	Description	Size Required
Research Labs	Single (1) Bay	215 sq ft
	Double (2) Bay	430 sq ft
	Triple (3) Bay	650 sq ft
Teaching Labs	(2) Bay – 16 Students	430 sq ft
	(4) Bay – 32 Students	860 sq ft
	(6) Bay – 32 Students	1290 sq ft
Classrooms	For 16 and 32 students	
Faculty Offices	1 for each research lab	120 sq ft
Lecture Halls	Fixed Seating	60 Seats
	Fixed Seating	120 Seats
Bathrooms	Men's & Women's	each floor

# Lab Programming : Program by Department

**Space Planning** Work with these numbers as a start. For each research lab you will need 1 faculty office. On the basement level or the lab or atrium you should include the large lecture halls. The lower two floors should be teaching labs & classrooms.

Department	Research Labs			
	1-Bay	2-Bay	3-Bay	Classrooms
Biology	8	6	2	4
Chemistry	8	4	2	4
Physics	7	6	2	4
Dental Hygiene	6	3	1	3
Nursing	8	3	2	3
Total by Type	37	22	9	
Total Bays	37	44	27	108

Project Day 11

Programming  
Spaces

- Spaces & Sizes
- By Department
- Color Layout

▪ Core Layout  
Examples

- Elevator Layouts
- Mechanical Shaft  
Layouts
- Stair Layouts

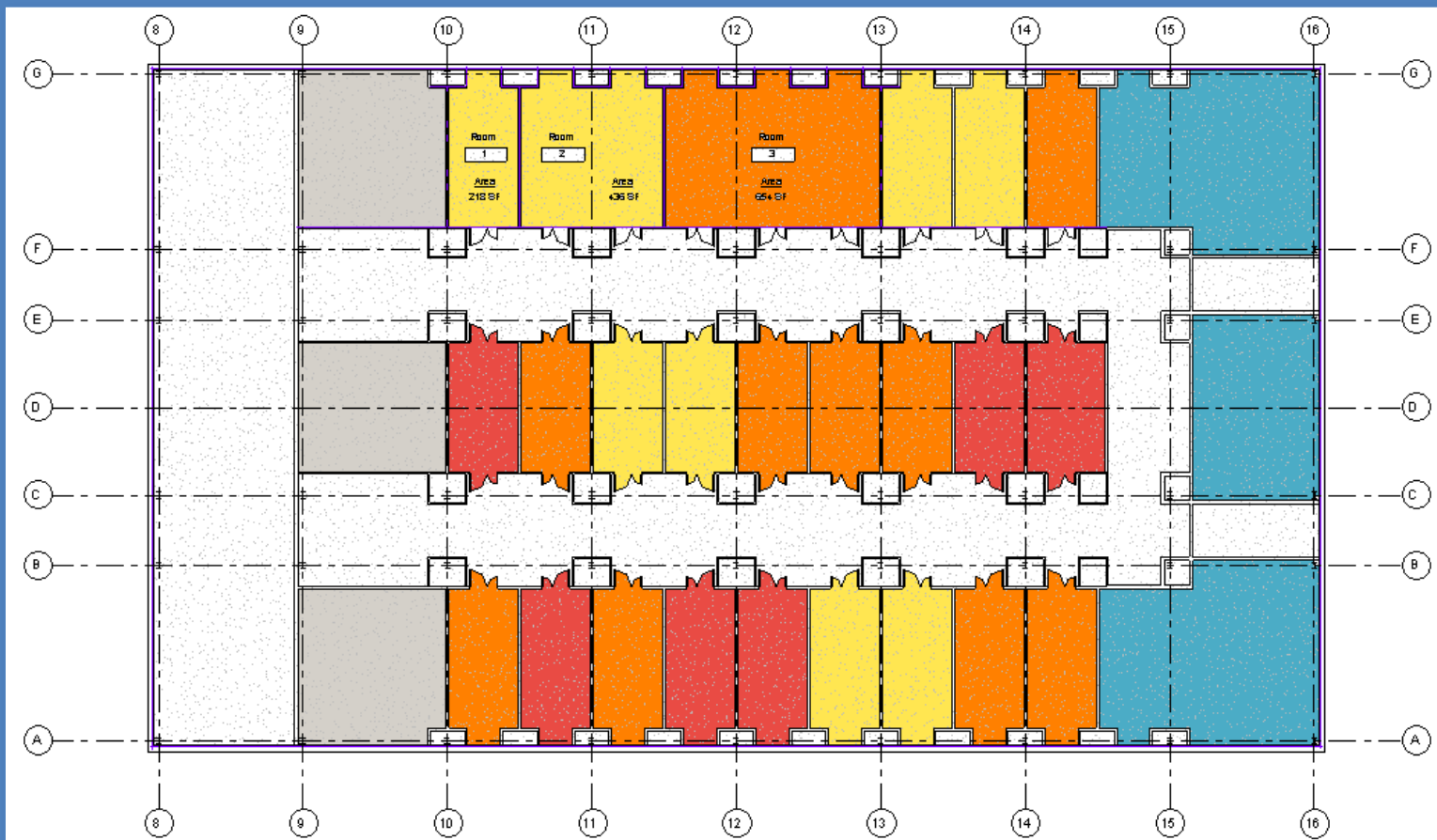
- Core Construction
- Shaft Walls

▪ Work Session

Wrap-Up

# Lab Programming : Layout by Department

**Patchwork:** A programmed floor plan may include a combination of spaces by department as well as some shared spaces. Programming is a compromise.



## Project Day 11

- Spaces & Sizes
- By Department
- Color Layout

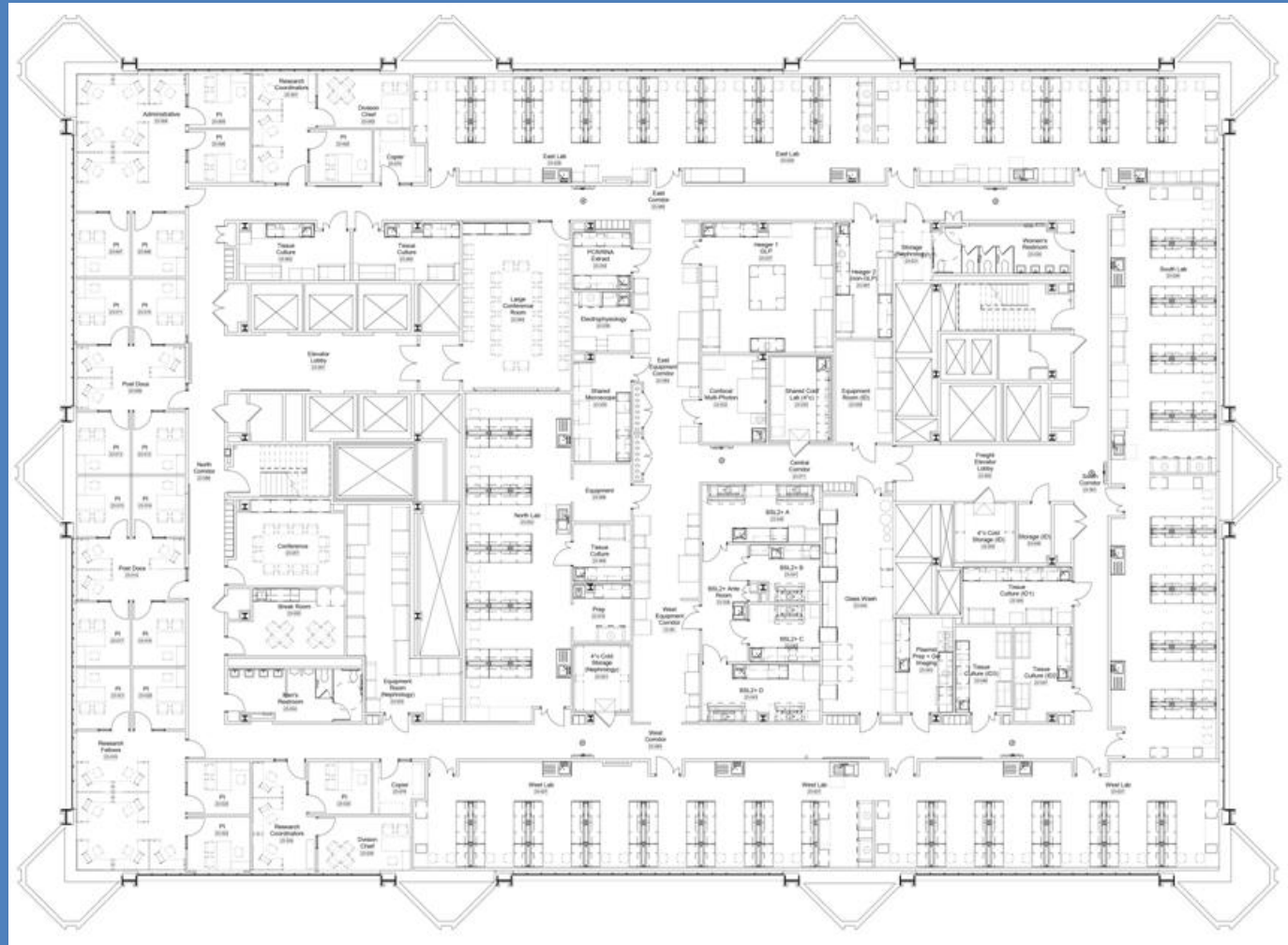
- Elevator Layouts
- Mechanical Shaft Layouts

## ▪ Stair Layouts

- Core Construction
- Shaft Walls

## ■ Work Session

## Wrap-Up





# Core Layout Examples

## Project Day 11

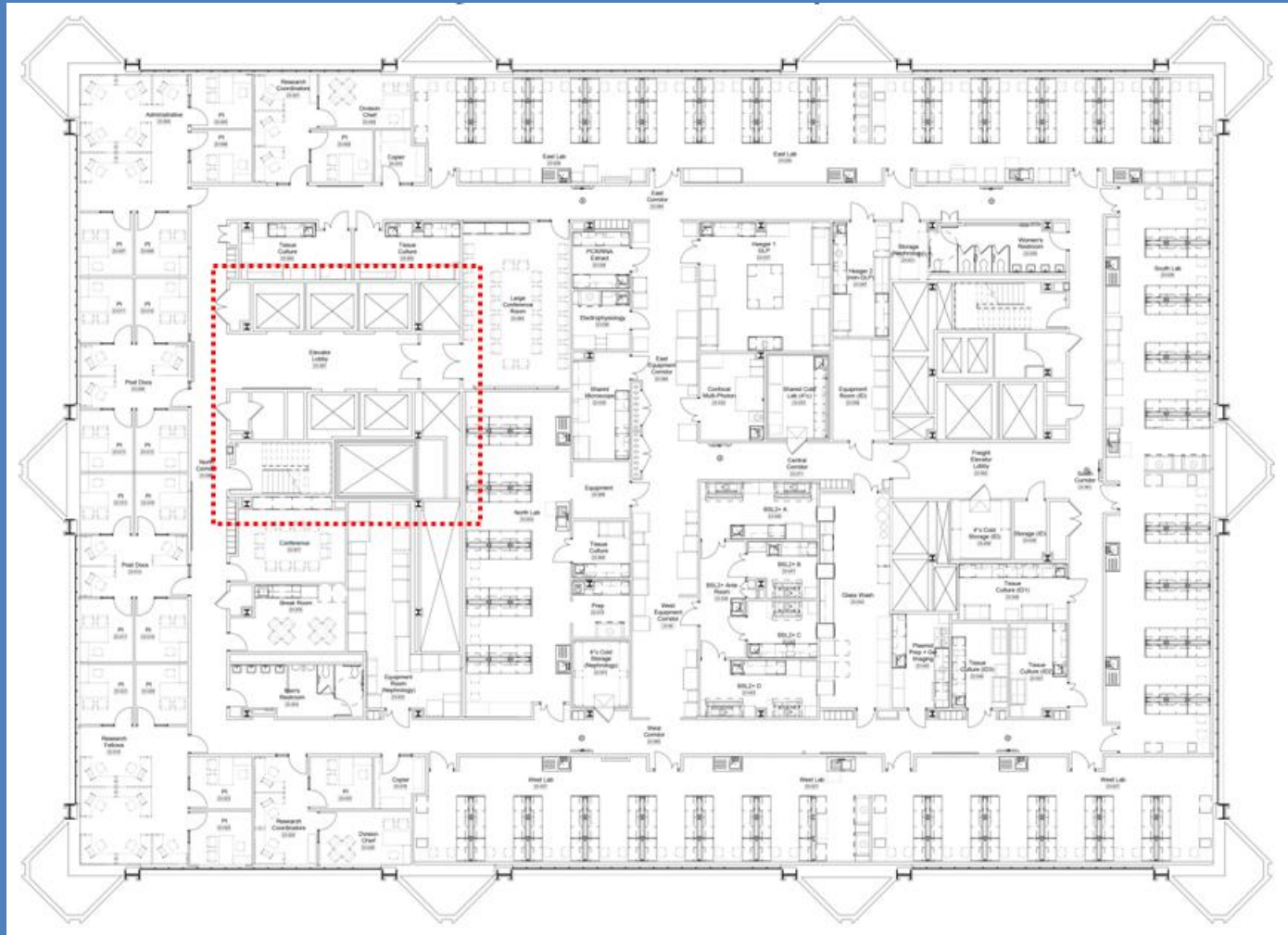
### Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

### Core Layout Examples

- Elevator Layouts
- Mechanical Shaft Layouts
- Stair Layouts
- Core Construction
- Shaft Walls
- Work Session

### Wrap-Up



# Core Layout Examples

## Project Day 11

### Programming Spaces

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- By Department
- Color Layout

### ▪ Core Layout Examples

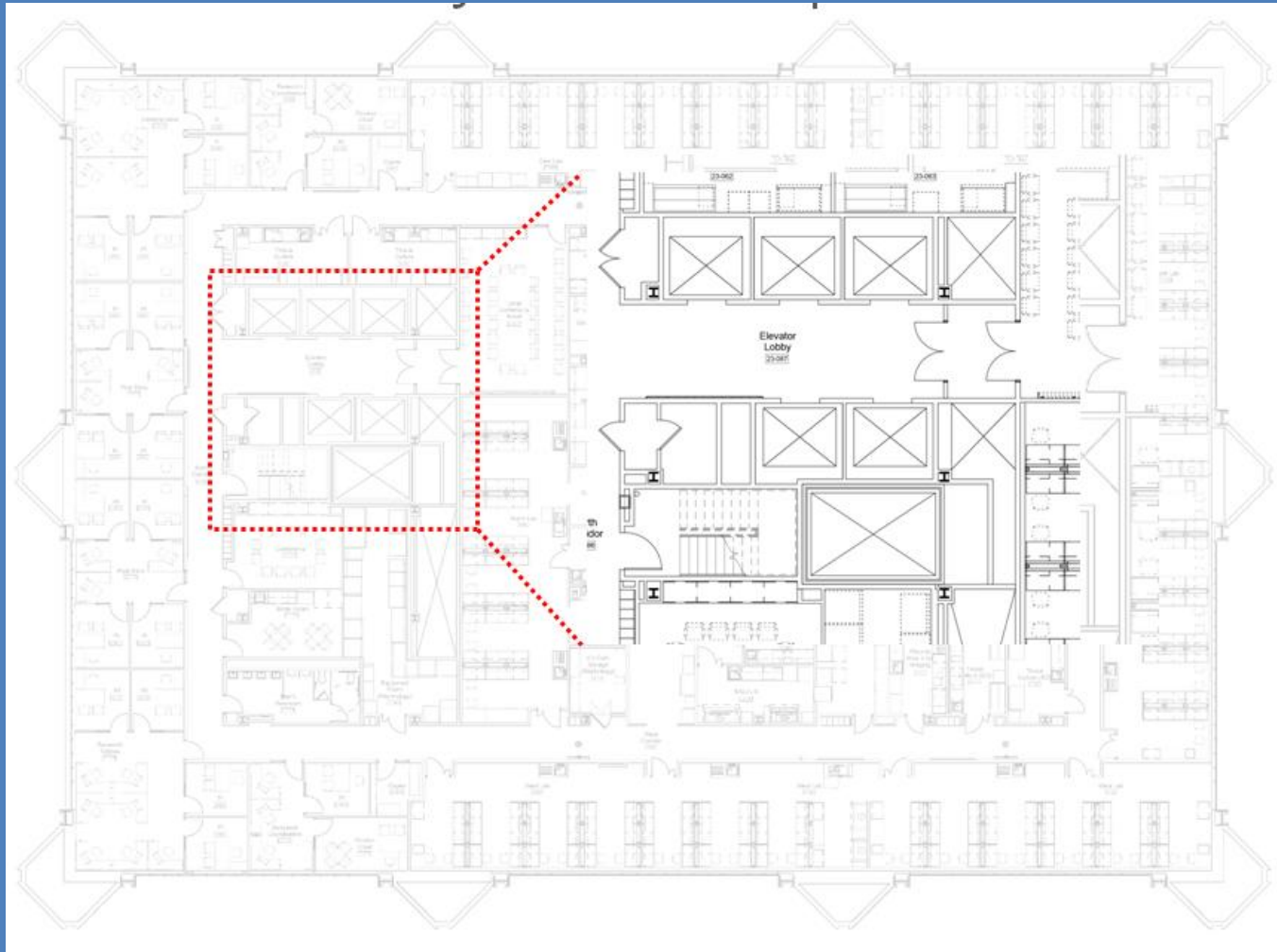
- Elevator Layouts
- Mechanical Shaft Layouts

### ▪ Stair Layouts

- Core Construction
- Shaft Walls

### ▪ Work Session

### Wrap-Up



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- By Department
- Color Layout

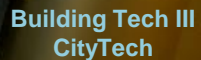
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- Shaft Walls

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## Wrap-Up





# Core Layout Examples

## Project Day 11

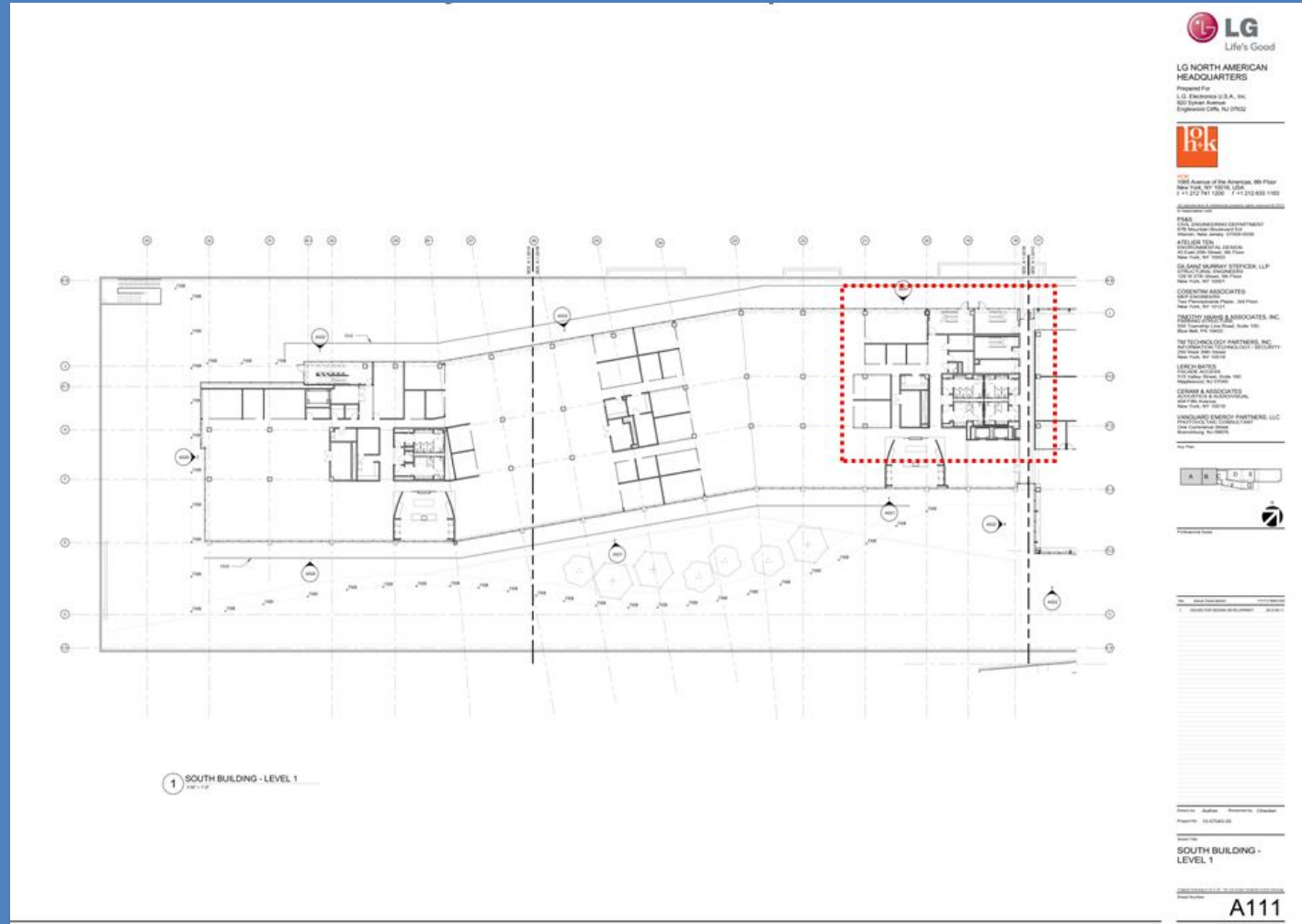
### Programming Spaces

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- By Department
- Color Layout

### Core Layout Examples

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### Wrap-Up



# Core Layout Examples

## Project Day 11

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- Color Layout

### Core Layout Examples

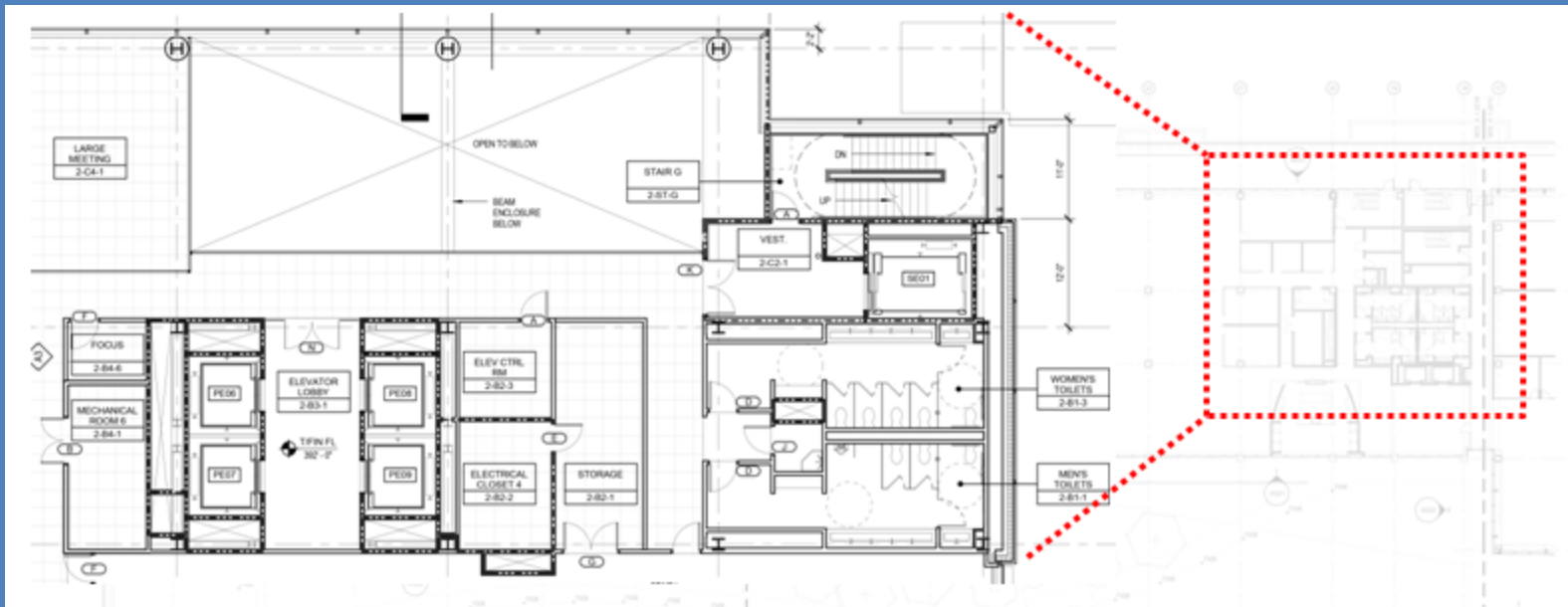
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- Core Construction
- Shaft Walls

### Work Session

### Wrap-Up



## Programming Spaces

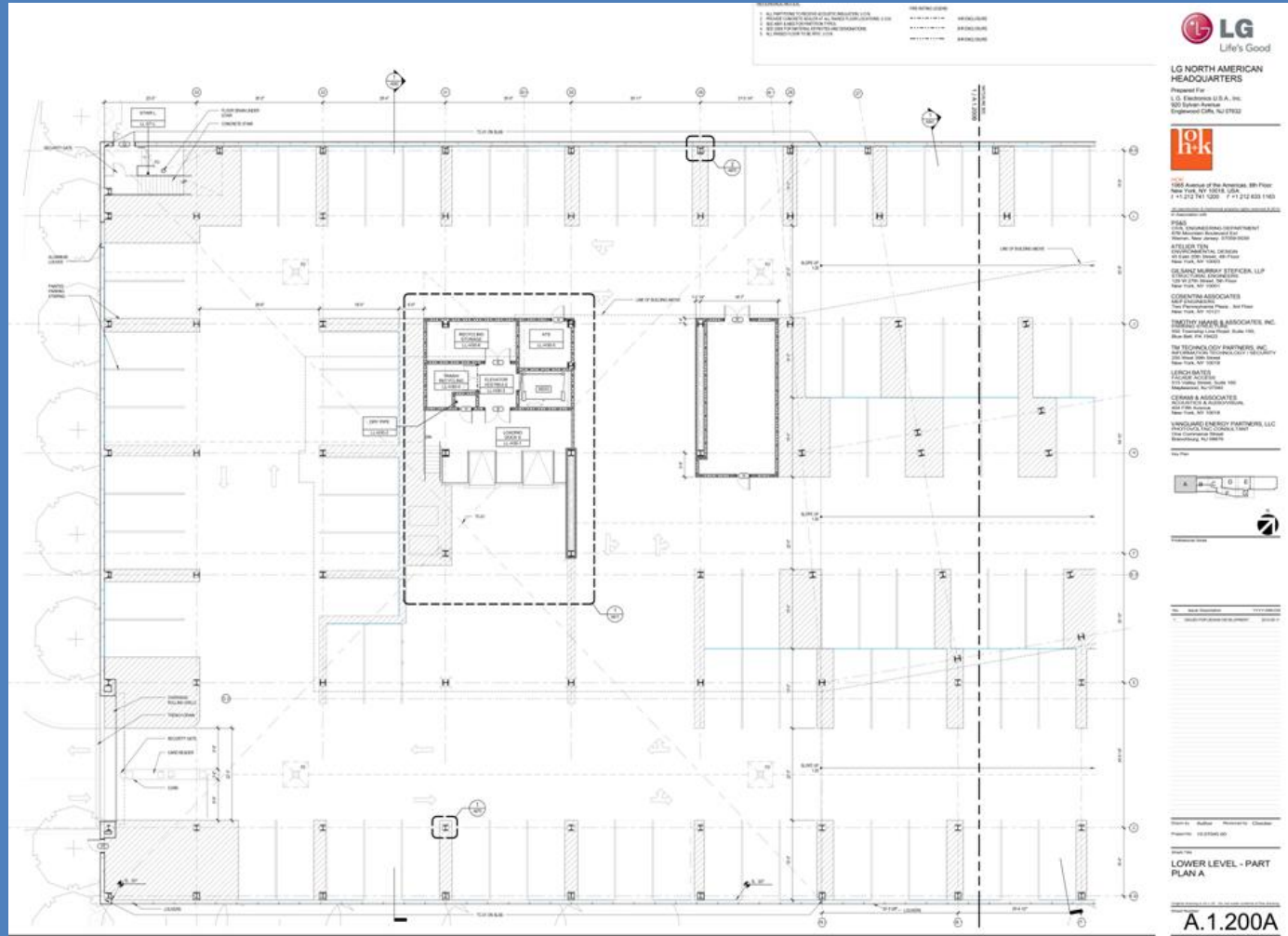
- Spaces & Sizes
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## Core Layout Examples

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## Wrap-Up

# Core Layout Examples



## Programming Spaces

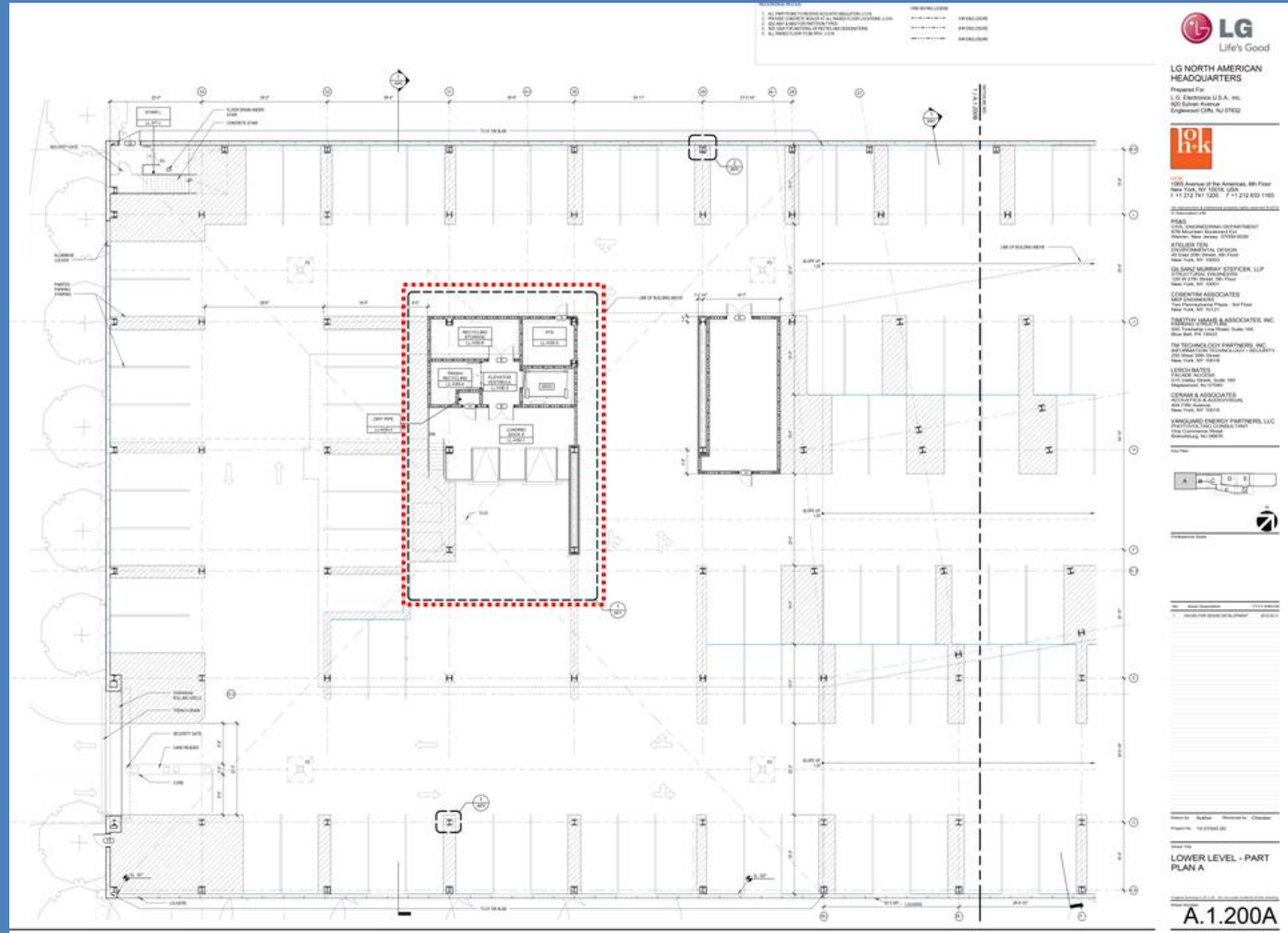
- Spaces & Sizes
- By Department
- Color Layout

## Core Layout Examples

- Elevator Layouts
- Mechanical Shaft Layouts
- Stair Layouts
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- Work Session

## Wrap-Up

# Core Layout Examples





# Core Layout Examples

## Project Day 11

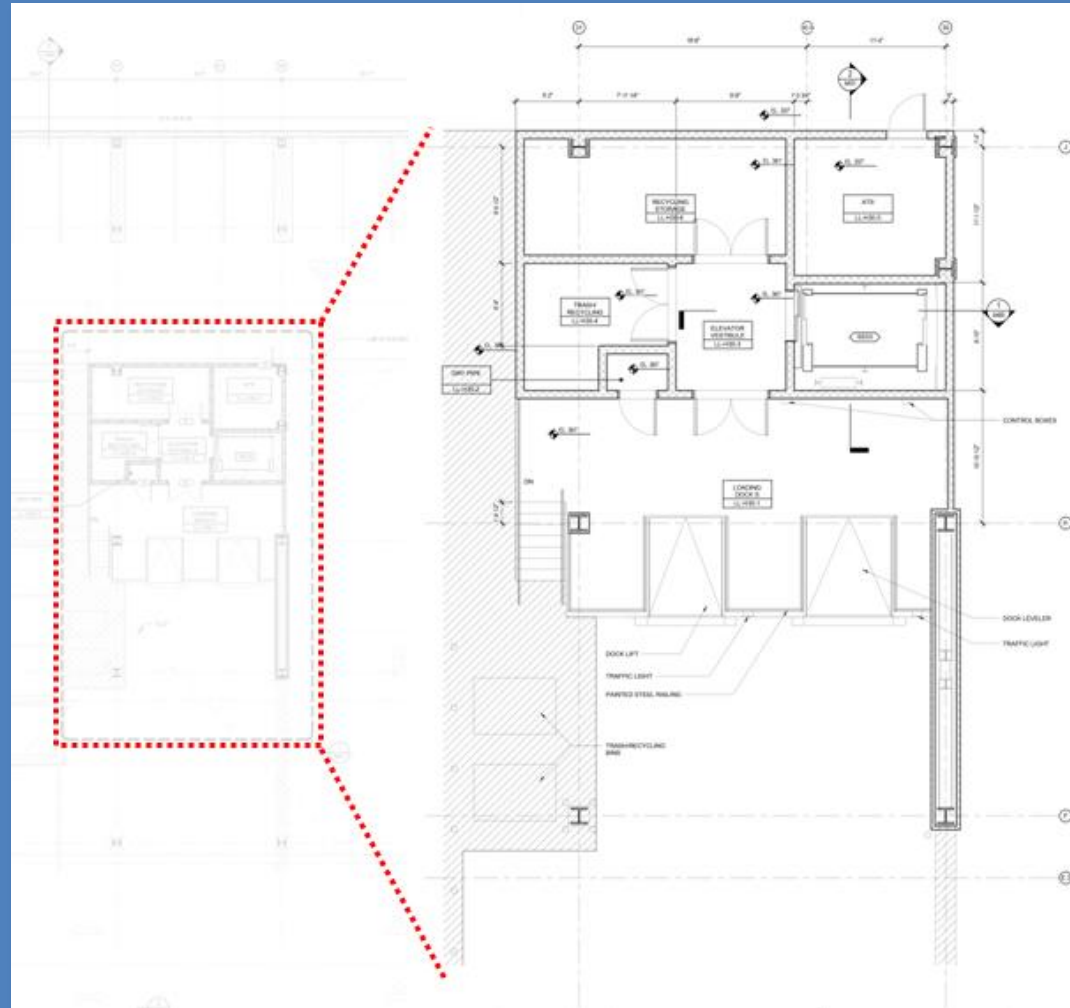
### Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

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### Wrap-Up



# Elevator Layouts

## Project Day 11

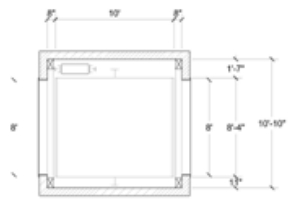
### Programming Spaces

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- By Department
- Color Layout

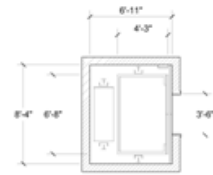
### Core Layout Examples

- Elevator Layouts
- Mechanical Shaft Layouts
- Stair Layouts
- Core Construction
- Shaft Walls
- Work Session

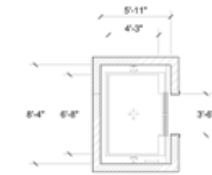
### Wrap-Up



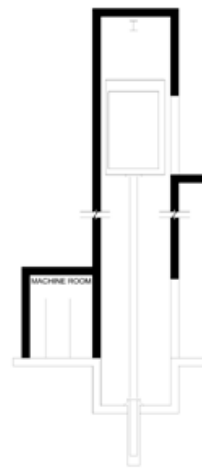
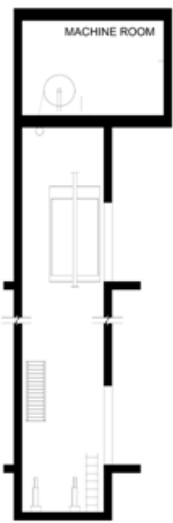
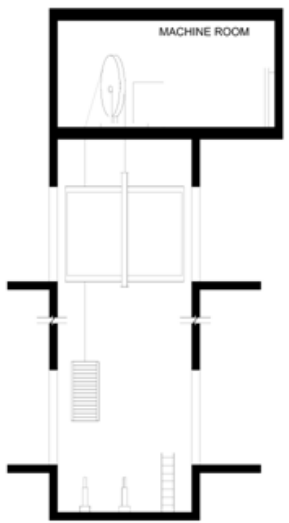
01 FREIGHT ELEVATOR - LOADING DOCK TO LEVEL 7  
8-106 1/4" = 1'-0"



02 PASSENGER ELEVATOR - BASEMENT TO LEVEL 7  
8-106 1/4" = 1'-0"



03 GYM SERVICE ELEVATOR - BASEMENT TO LEVEL 1/MEZZ  
8-106 1/4" = 1'-0"



Design: T. King  
Architect: T. King  
Architect: T. King

Location Information  
Project Name: 2338  
Project Name: 2338  
Project Name: 2338

## ELEVATORS

ARCH 2338  
PROFESSOR CHIN  
ASSIGNMENT  
DATE

scale

Grade

# Elevator Layouts

Project Day 11

Programming  
 Spaces

- Spaces & Sizes
- By Department
- Color Layout

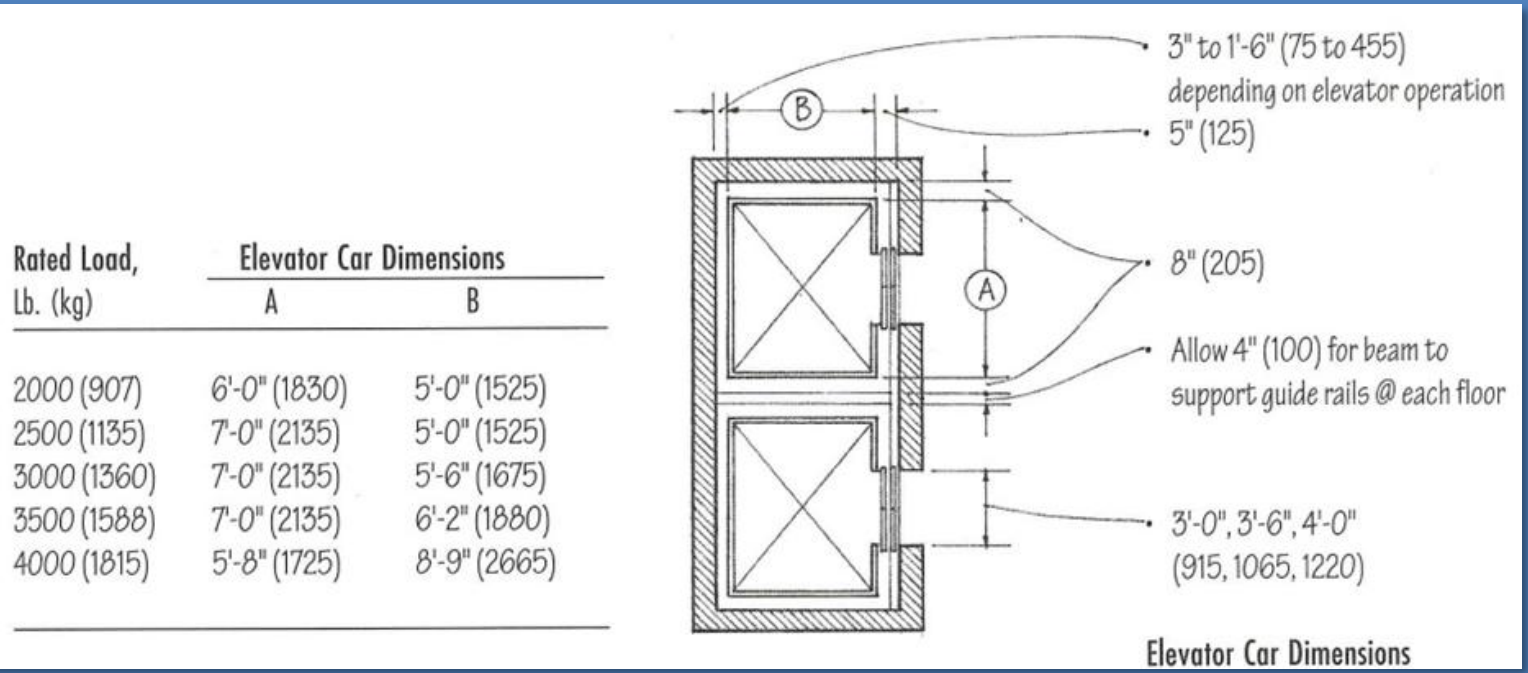
▪ Core Layout  
 Examples  
 ▪ Elevator Layouts

- Mechanical Shaft Layouts
- Stair Layouts

▪ Core Construction  
 ▪ Shaft Walls

▪ Work Session

Wrap-Up



# Elevator Layouts

Project Day 11

Programming  
 Spaces

- Spaces & Sizes
- By Department
- Color Layout

Core Layout  
 Examples

Elevator Layouts

Mechanical Shaft  
 Layouts

Stair Layouts

Core Construction

Shaft Walls

Work Session

Wrap-Up

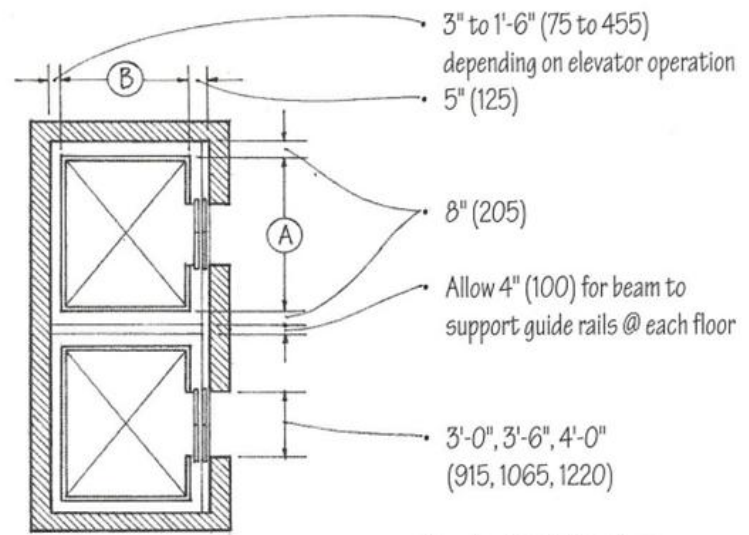
ical Shafts

truction

alls

Work Session

	Rated Load, Lb. (kg)	Elevator Car Dimensions	
		A	B
Passenger	2000 (907)	6'-0" (1830)	5'-0" (1525)
	2500 (1135)	7'-0" (2135)	5'-0" (1525)
	3000 (1360)	7'-0" (2135)	5'-6" (1675)
	3500 (1588)	7'-0" (2135)	6'-2" (1880)
	4000 (1815)	5'-8" (1725)	8'-9" (2665)
Freight	5000	7'-0"	9'-0"



Elevator Car Dimensions



# Elevator Layouts

## Project Day 11

### Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

### Core Layout Examples

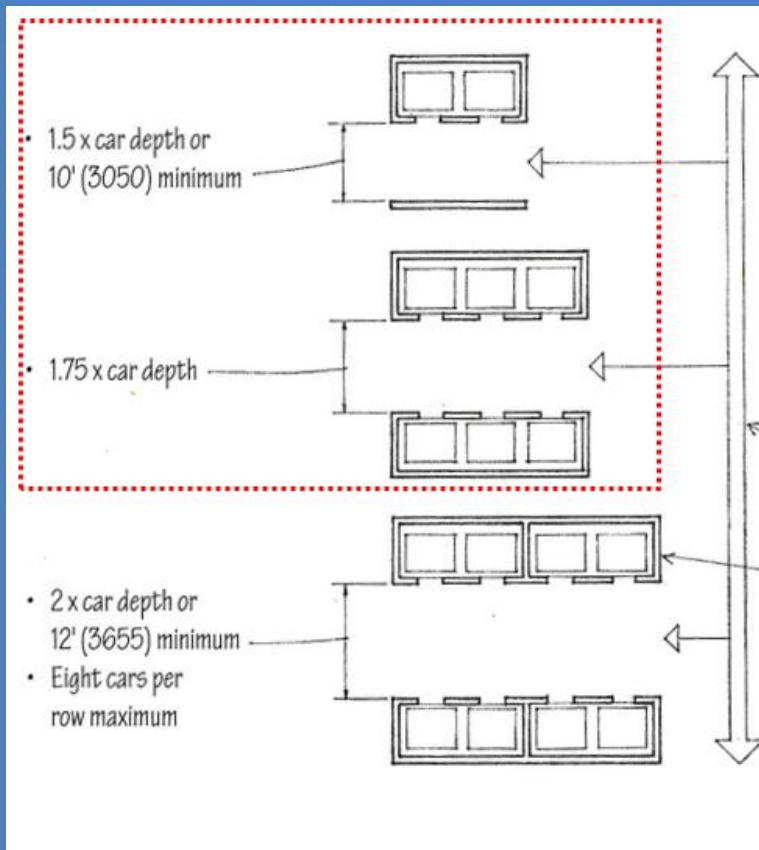
- Elevator Layouts
- Mechanical Shaft Layouts

### Stair Layouts

- Core Construction
- Shaft Walls

### Work Session

### Wrap-Up



### Elevator Layout

The type, size, number, speed, and arrangement of elevators are determined by:

- Type of occupancy
  - Amount and tempo of traffic to be carried
  - Total vertical distance of travel
  - Round-trip time and speed desired
- 
- Banks or rows of elevators in a high-rise building are controlled by a common operating system and respond to a single call button.
  - Elevators should be centrally located near the main entrance to a building and be easily accessible on all floors, but also be placed off of the main circulation path.
  - Two or more hoistways are required for four or more elevators.
- 
- Consult elevator manufacturer for recommended type, size, layout, controls, and installation requirements and details.
  - Consult the building code for structural requirements and shaftway requirements for fire separation, ventilation, and soundproofing.

# Elevator Layouts

Project Day 11

Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

Core Layout Examples

• Elevator Layouts

• Mechanical Shaft Layouts

• Stair Layouts

• Core Construction

• Shaft Walls

• Work Session

Wrap-Up

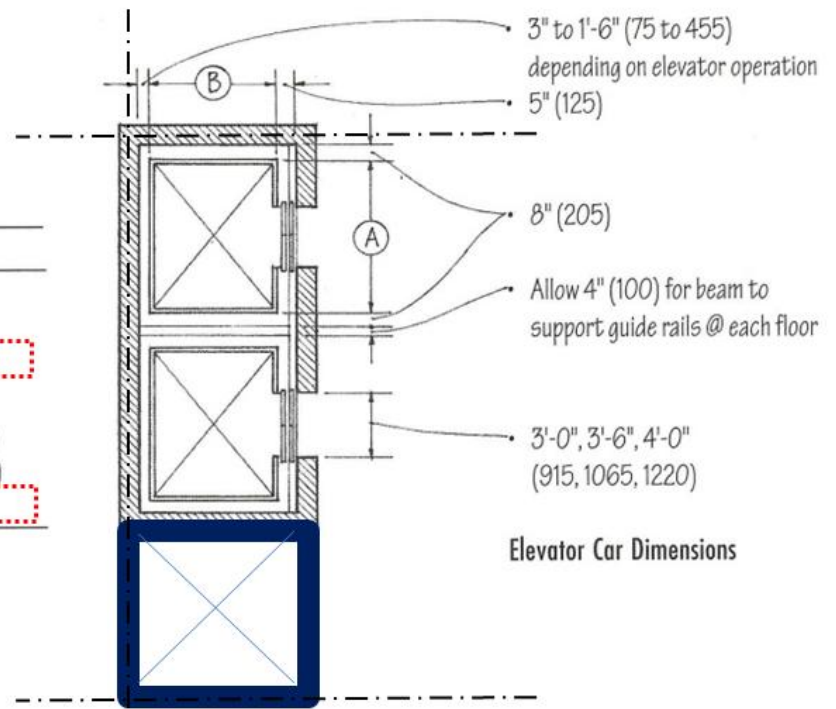
Mechanical Shafts

Construction

Walls

Work Session

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		A	B
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	3000 (1360)	7'-0" (2135)	5'-6" (1675)
	3500 (1588)	7'-0" (2135)	6'-2" (1880)
Freight	4000 (1815)	5'-8" (1725)	8'-9" (2665)
	5000	7'-0"	9'-0"



# Mechanical Shaft Layouts

## Project Day 11

### Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

### Core Layout Examples

### ▪ Elevator Layouts

### ▪ Mechanical Shaft Layouts

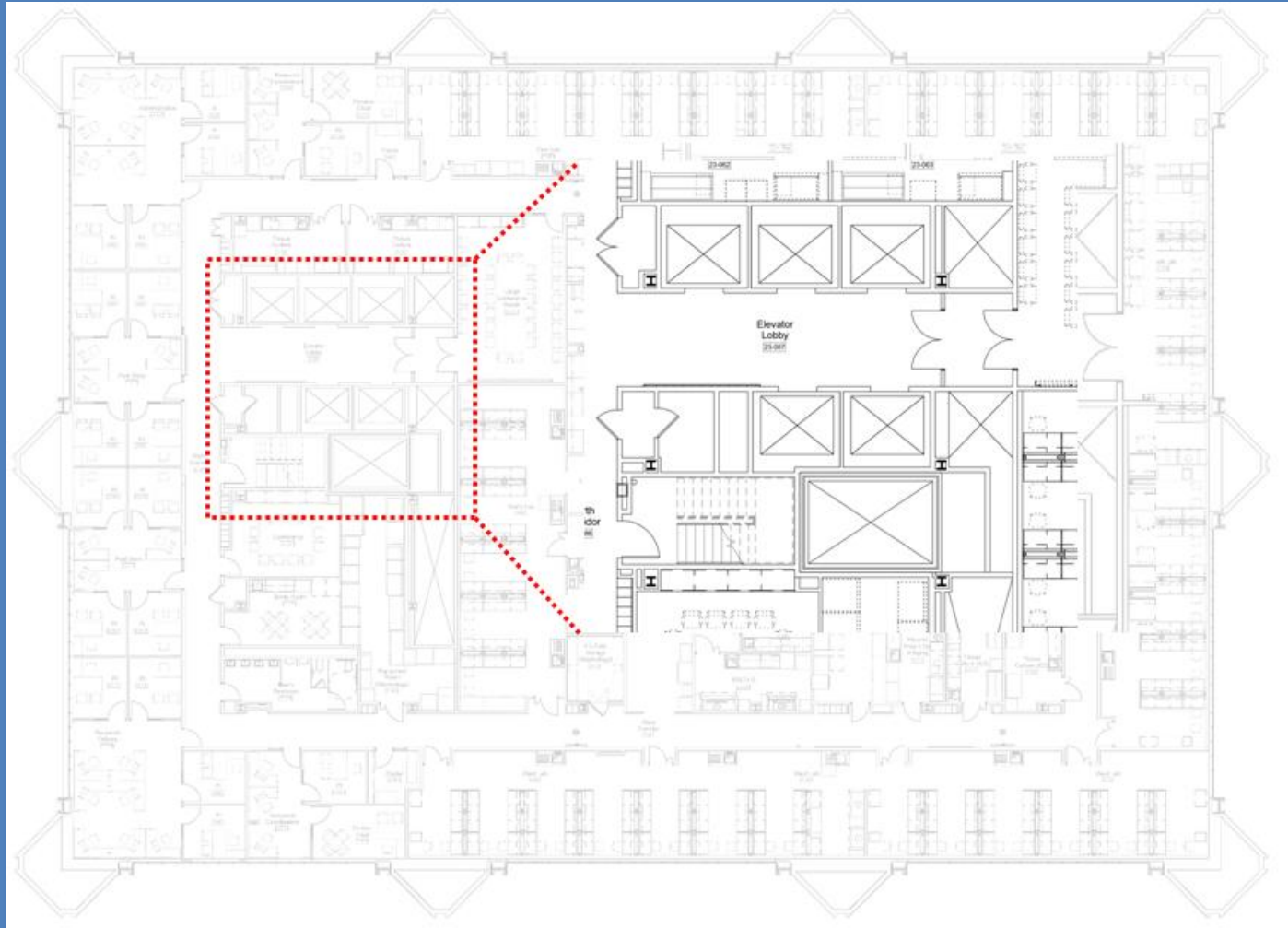
### ▪ Stair Layouts

### ▪ Core Construction

### ▪ Shaft Walls

### ▪ Work Session

### Wrap-Up



# Stair Layouts

## Project Day 11

### Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

### Core Layout Examples

- Elevator Layouts
- Mechanical Shaft Layouts
- Stair Layouts

### Core Construction

### Shaft Walls

### Work Session

### Wrap-Up

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

13 TYPICAL 12' FLR TO FLR U-SHAPED STAIR PLAN  
A-007 1/4" = 1'-0"

14 TYPICAL 14' FLR TO FLR U-SHAPED STAIR PLAN  
A-007 1/4" = 1'-0"

15 TYPICAL 16' FLR TO FLR U-SHAPED STAIR PLAN  
A-007 1/4" = 1'-0"

16 TYPICAL 12' FLR TO FLR U-SHAPED STAIR SECTION  
A-007 1/4" = 1'-0"

17 TYPICAL 14' FLR TO FLR U-SHAPED STAIR SECTION  
A-007 1/4" = 1'-0"

18 TYPICAL 16' FLR TO FLR U-SHAPED STAIR SECTION  
A-007 1/4" = 1'-0"

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

**ALPHA DESIGN**

1000 Broadway Ave. 1212 Avenue B, #102 300 Ave. M, Brooklyn, NY 11218-1000 718.333.1000 718.333.1000

COVER

Address

A.C.E

HIGH LINER

SLAB CELLAR

Notes/Signatures

U-SHAPED STAIRS

Project number \_\_\_\_\_ Project Number \_\_\_\_\_

Date \_\_\_\_\_ Issue Date \_\_\_\_\_

Drawn by \_\_\_\_\_ Edition \_\_\_\_\_

Professor Name \_\_\_\_\_ CHA

Checked by \_\_\_\_\_

**A-007**

Scale 1/4" = 1'-0"

Grade 1/4" = 1'-0"



## Project Day 11

- Spaces & Sizes
- By Department
- Color Layout

- Elevator Layouts
- Mechanical Shaft Layouts

- Core Construction
- Shaft Walls

## Wrap-Up



# Stair Layouts

## Project Day 11

### Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

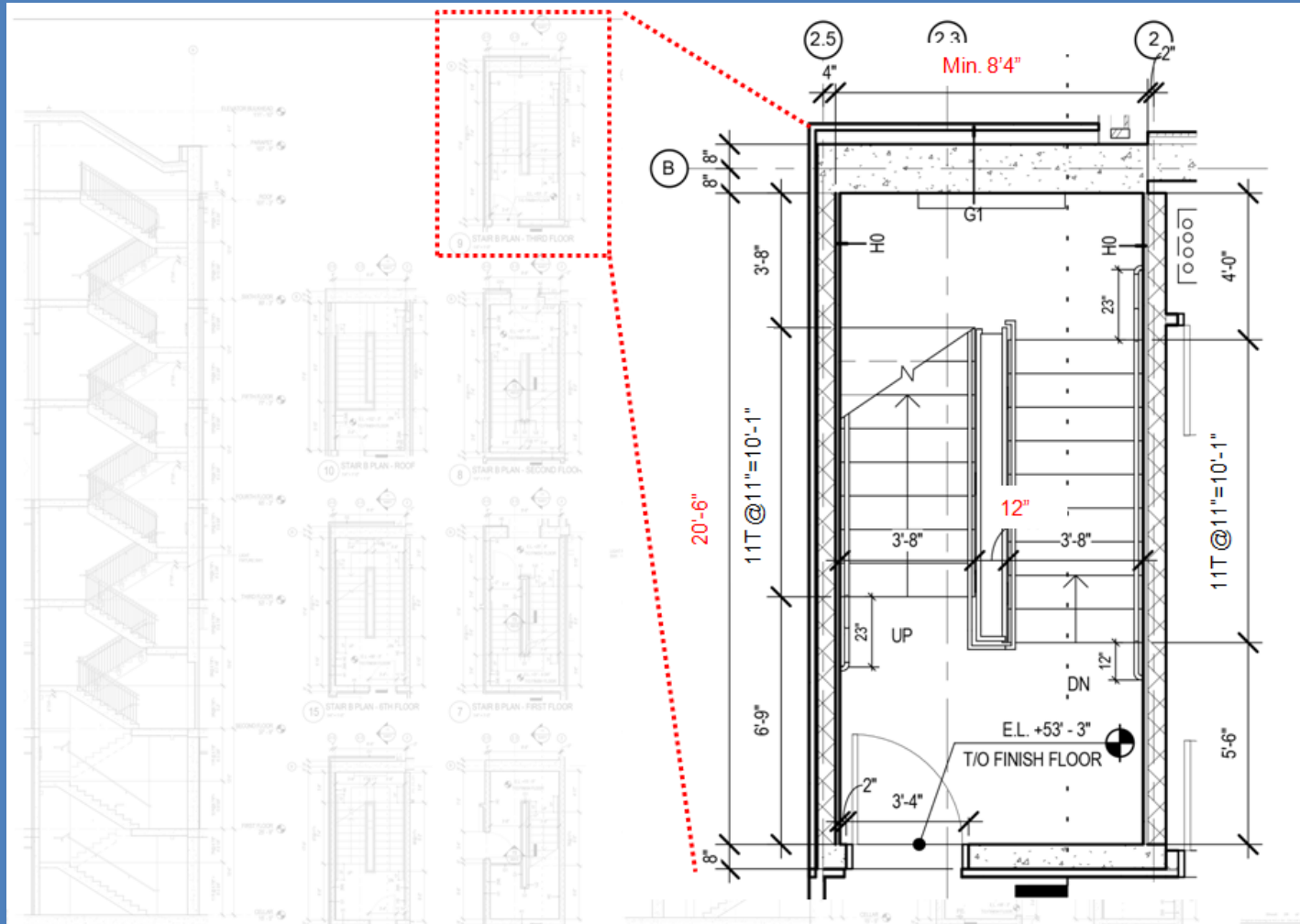
### Core Layout Examples

- Elevator Layouts
- Mechanical Shaft Layouts
- Stair Layouts

- Core Construction
- Shaft Walls

- Work Session

### Wrap-Up



# Core Construction

## Project Day 11

### Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

### Core Layout Examples

- Elevator Layouts
- Mechanical Shaft Layouts
- Stair Layouts

### Core Construction

#### Shaft Walls

#### Work Session

#### Wrap-Up

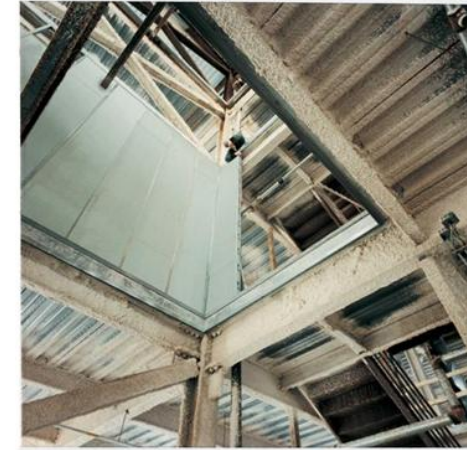
Hydraulic elevators consist of a car supported by a piston that is moved by or moves against a fluid under pressure. A penthouse is not required, but the hydraulic elevator's lower speed and piston length limit its use to buildings up to six stories in height.

- Guide rail
- Hoistway of fire-resistive construction must extend to the underside of a fire-resistive roof, or at least 3' (915) above a non-fire-resistive roof.
- Hydraulic piston
- Machine room houses the hoisting machinery, control equipment, and sheaves for raising and lowering an elevator car; a location at or near the bottom landing is preferred.
- Elevator pit
- Piston cylinder well; depth equals rise or travel + 4' to 7' (1220 to 2135)

Building Construction Illustrated, Frank Ching © 2001



[http://m1xe.com/www/mezmeries/elevator\\_shaft.jpg](http://m1xe.com/www/mezmeries/elevator_shaft.jpg)



<http://www.gypsum.org/using-gypsum-board-for-walls-and-ceilings/using-gypsum-board-for-walls-and-ceilings-section-viii/>

Building Construction Illustrated, Frank Ching © 2001



# Shaft Walls

Project Day 11

Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

Core Layout Examples

- Elevator Layouts
- Mechanical Shaft Layouts
- Stair Layouts

- Core Construction
- Shaft Walls

Work Session

Wrap-Up

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Q<sup>2</sup>  
ASSOCIATES

Channing, Tishani  
Architectural  
Manager, 401-734-1100

Channing, Cindy  
Architectural  
Manager, 401-734-1100

Johanna, Amanda  
Architectural  
Manager, 401-734-1100

Location Information

Project Name: 200  
Project Number: 200 ST

Building: ENCORE, 150  
Block: 150  
Lot: 1  
City: BIR

PARTITION TYPES

ARCH 200  
PROFESSOR CHIN

ASSIGNMENT

DATE: 08/11/13

scale

Grade

TYPE 1-1HR RATING-12FT FLR HT  
TYPE 1A WISOUND ATTENUATION

TYPE 2-1HR RATING-14FT FLR HT  
TYPE 2A WISOUND ATTENUATION

TYPE 3-1HR RATING-16FT FLR HT  
TYPE 3A WISOUND ATTENUATION

TYPE 4-2HR RATING-12FT FLR HT  
TYPE 4A WISOUND ATTENUATION

TYPE 5-2HR RATING-14FT FLR HT  
TYPE 5A WISOUND ATTENUATION

TYPE 6-2HR RATING-16FT FLR HT  
TYPE 6A WISOUND ATTENUATION

TYPE 7-3HR RATING-12FT FLR HT  
TYPE 7A WISOUND ATTENUATION

TYPE 8-3HR RATING-14FT FLR HT  
TYPE 8A WISOUND ATTENUATION

TYPE 9-3HR RATING-16FT FLR HT  
TYPE 9A WISOUND ATTENUATION

TYPE 10 CHASE WALL

TYPE 11 SHAFT WALL

TYPE 12-8 INCH BLOCK WALL

TYPE 13-4 INCH BLOCK WALL

TYPE 14-8 INCH BLOCK WALL WITH FURRING

TYPE 15-8 INCH BLOCK WALL WITH 3-5/8 INCH  
STUD SHEETROCK ON ONE SIDE



# Shaft Walls

## Project Day 11

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### Core Construction

- Shaft Walls

### Work Session

### Wrap-Up

Diagram illustrating the construction details of a shaft wall, showing cross-sections and material specifications.

Labels and details include:

- BOTTOM OF STUC
- "RATED SHAFT WALL TO STRUC" DETAILS INDICATE ATTACHMENT TO STRUC
- 4 AS12, 5 AS12, 6 AS12, 8 AS12
- ATTACH GYP BD TO METAL STUDS BELOW RUNNER TRACK
- RATED MET RUNNER TRACK AS INDICATED ON REFERENCED DET'S
- 2 LAYERS TYPE "X" 5/8" GYP BD
- 1" GYP SHAFT LINER PANELS
- CEILING AS SHOWN
- WHERE NOTED ON PARTN TYPE TAG: ATTACH 2ND LAYER TYPE "X" GYP BD OVER 1" SHAFT LINER PANEL, FULL HT. OF PARTN ASSEMBLY. PROVIDE 2 1/2" X 20 GA. (20 ML MIN) CH MET STUDS WHEN PARTN WIDTH DESIGNATION "2" IS INDICATED. (UL U467 ASSEMBLY)
- PARTITION TYPE: MET CH STUDS INDICATED @ 24" OC, UON

DESIGNATION	STUD WIDTH	UL#
2	2-1/2"	U428
4	4"	U428
6	6"	U428

- WHERE NOTED ON PARTITION TYPE TAG: PROVIDE 1/2" CEMENT BD OUTER LAYER, TYPE "X" 5/8" GYP BD INNER LAYER (UL U439 ASSEMBLY)
- ACOUSTIC INSUL BATTS WHERE NOTED
- MET "J" RUNNER, TRACK ANCH W/ UL COMPLYING FASTENER @ 24" OC MAX
- ACOUSTIC SEALANT @ PARTN TYPES NOTED W/ ACOUSTIC INSUL BATTS
- CONCRETE SLAB
- FIRE RATING: 2 HOURS U/F U439 ETC. BATTING E2 W/ INSULATION

Photograph showing the construction of a shaft wall, illustrating the vertical structure and the use of gypsum board and metal studs.

<http://www.gypsum.org/using-gypsum-board-for-walls-and-ceilings/using-gypsum-board-for-walls-and-ceilings-section-viii/>

# Shaft Walls

## Project Day 11

### Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

### Core Layout Examples

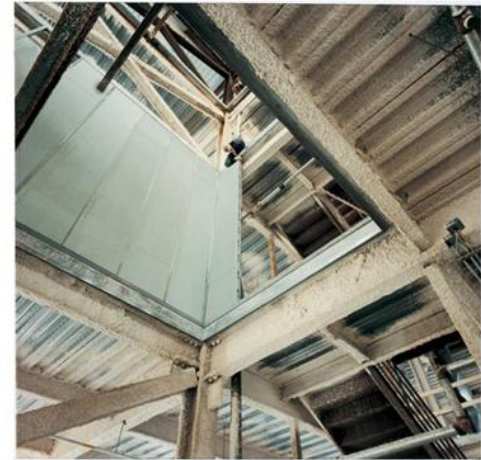
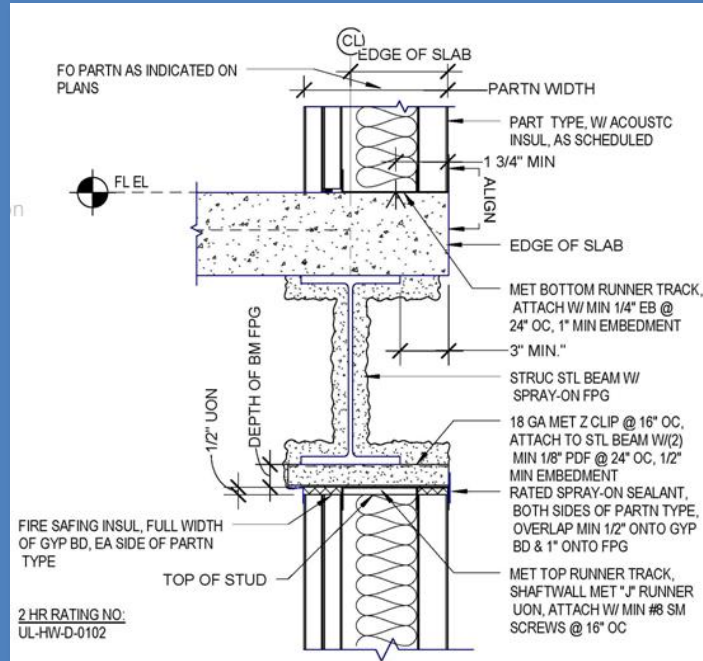
- Elevator Layouts
- Mechanical Shaft Layouts
- Stair Layouts

### Core Construction

- Shaft Walls

### Work Session

### Wrap-Up



<http://www.gypsum.org/using-gypsum-board-for-walls-and-ceilings/using-gypsum-board-for-walls-and-ceilings-section-vii/>

# Shaft Walls

## Project Day 11

### Programming Spaces

- Spaces & Sizes
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- Color Layout

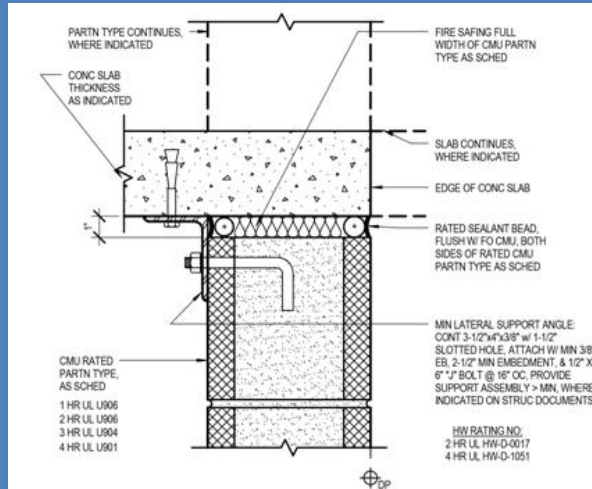
### Core Layout Examples

- Elevator Layouts
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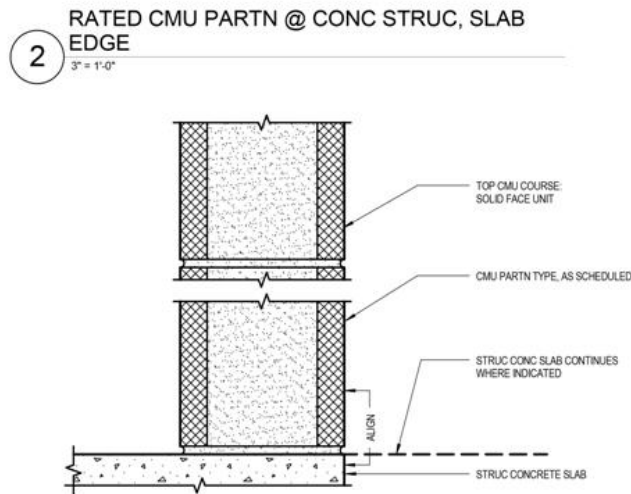
- Core Construction
- Shaft Walls

### Work Session

### Wrap-Up



[http://m1xe.com/www/mezmeries/elevator\\_shaft.jpg](http://m1xe.com/www/mezmeries/elevator_shaft.jpg)



# Core Work Session : Kit of Parts

## Project Day 11

### Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

### Core Layout Examples

- Elevator Layouts
- Mechanical Shaft Layouts

### Stair Layouts

- Core Construction
- Shaft Walls

### Work Session

### Wrap-Up

#### Core Layouts

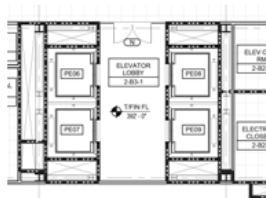
- Examples
- Elevators
- Mechanical Shafts
- Stairs

#### Core Construction

- Shafts
- Shaft Walls

#### Lab- Core Work Session

## ELEVATORS



## LAB BLDG.

**(4) Passenger Elevators**  
Basement to Level 7

Cab Size: Approx. 7'-0"W x 5'-0" D  
\*Refer to your Elevator Studies

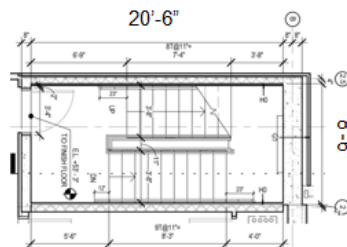
### Freight Elevator

Loading Dock to Level 7

Cab Size: Approx. 7'-0"W x 9'-0" D  
\*Refer to your Elevator Studies

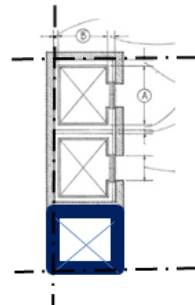
## KIT OF PARTS

## STAIRS



**1 Egress Stair at each end of the bldg. exiting directly onto the street**  
Basement to Level 7

## MECH SHAFTS



At each elevator core

## GYM

**Gym Service Elevator**  
Basement to Level 1

Cab Size: Approx. 7'-0"W x 9'-0" D  
\*Refer to your Elevator Studies

**1 Egress Stair at each end of the gym exiting directly onto the street**  
Basement to Level 1

At elevator core



**Project Day 11**

**Programming Spaces**

- Spaces & Sizes
- By Department
- Color Layout

**Core Layout Examples**

- Elevator Layouts
- Mechanical Shaft Layouts
- Stair Layouts

- Core Construction
- Shaft Walls

- Work Session

**Wrap-Up**

# Project Day 11 - Wrap Up

## Programming Spaces

- Spaces & Sizes
- By Department
- Color Layout

## Core Layout Examples

- Elevator Layouts
- Mechanical Shaft Layouts
- Stair Layouts

## Core Construction

- Shaft Walls

## Work Session