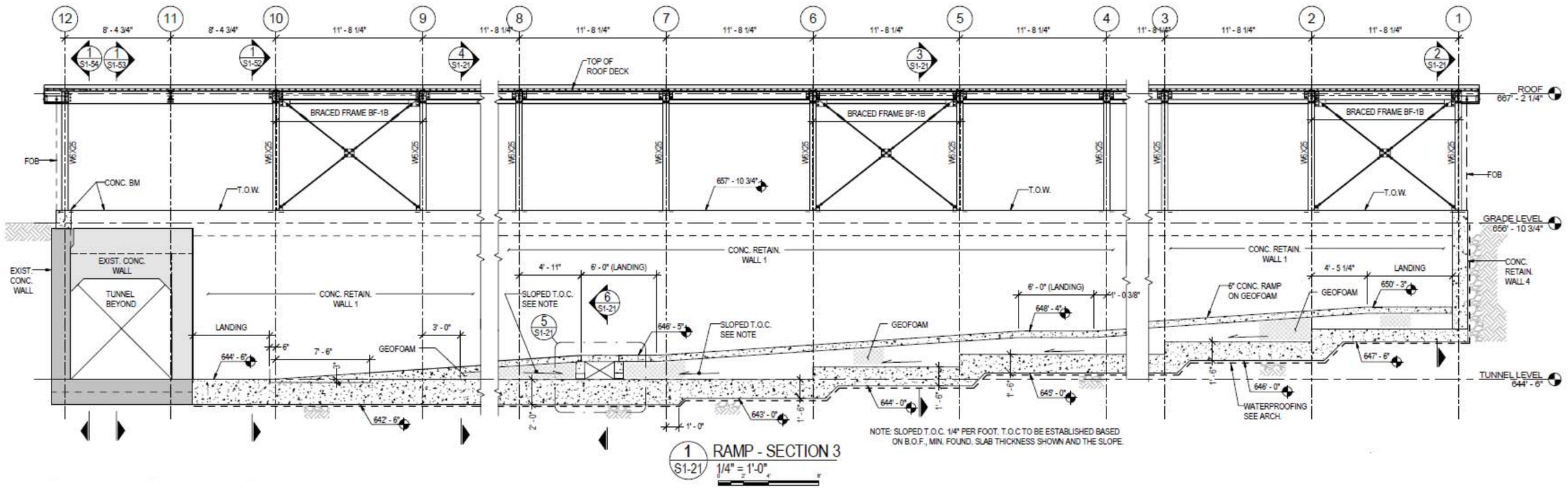
REFERENCES, GRIDS, & GEOMETRY



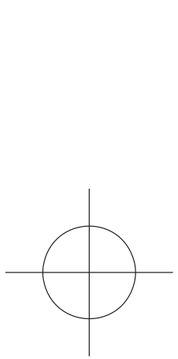
NOTE: SLOPED T.O.C. 1/4" PER FOOT. T.O.C TO BE ESTABLISHED BASED ON B.O.F., MIN. FOUND. SLAB THICKNESS SHOWN AND THE SLOPE.

1 S1-21 RAMP - SECTION 3
1/4" = 1'-0"

REFERENCE:

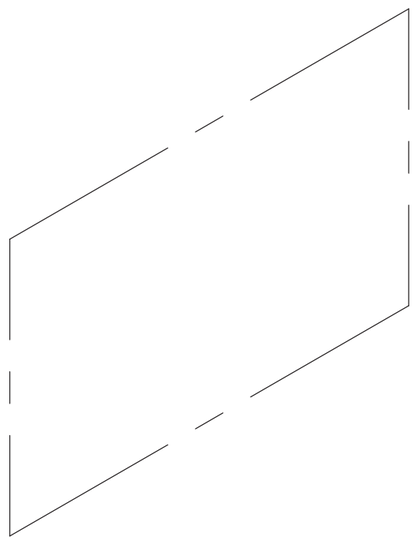
1. the use of a source of information in order to ascertain something.

2. a relation between objects in which one object designates, or acts as a means by which to connect to or link to, another object.



POINT

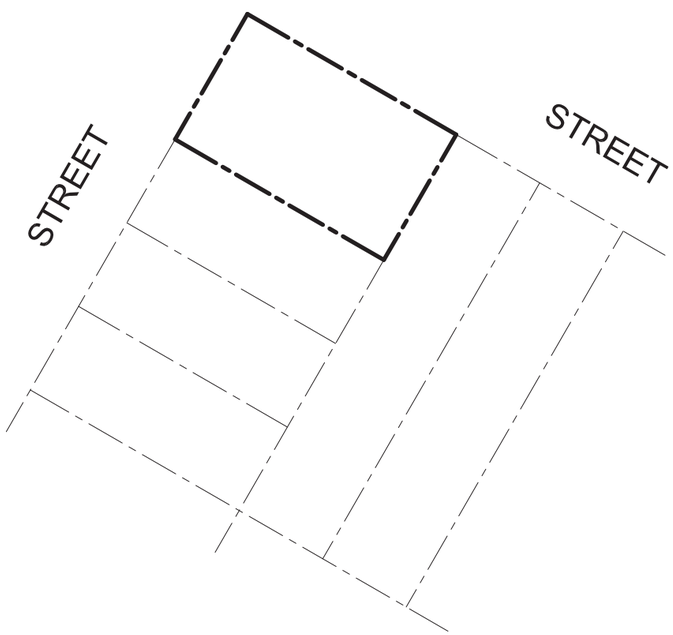
LINE

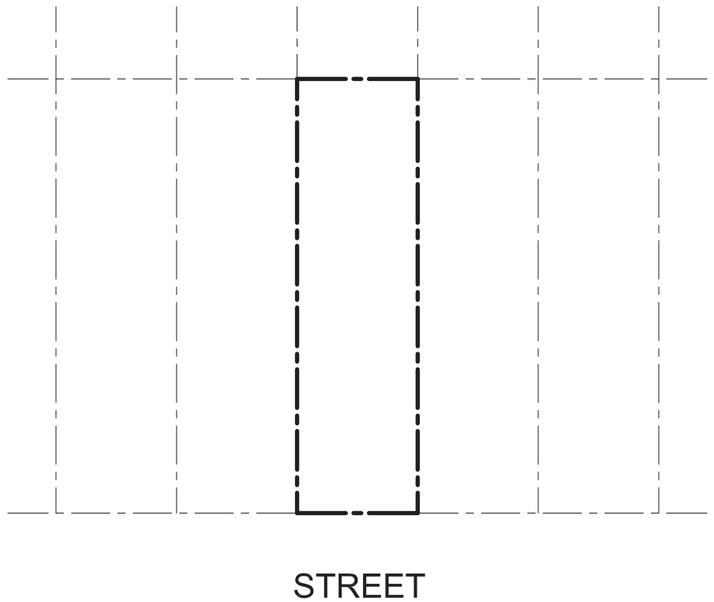


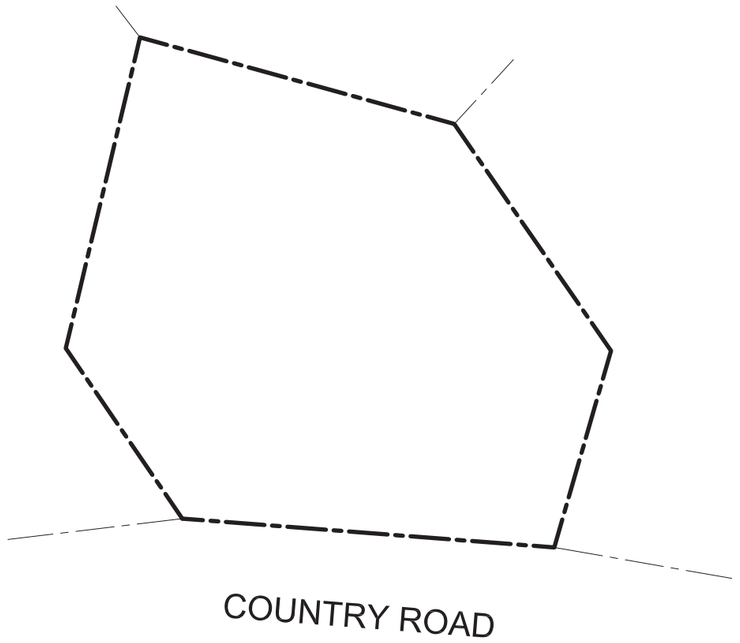
PLANE

REMEMBER: *Always try to start big with the largest overall reference points and work your way down in scale to the smaller details*

3 SAMPLE LOTS

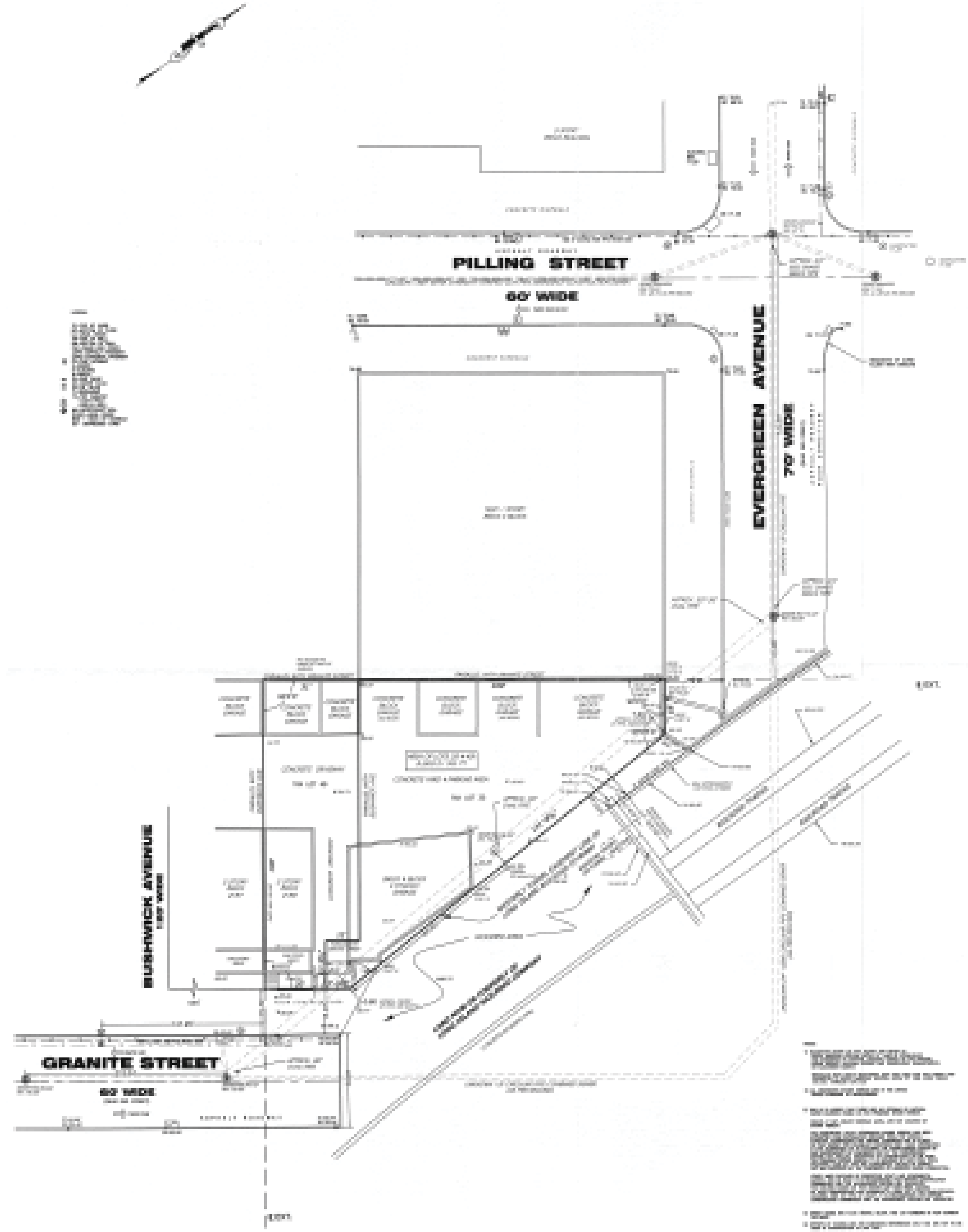




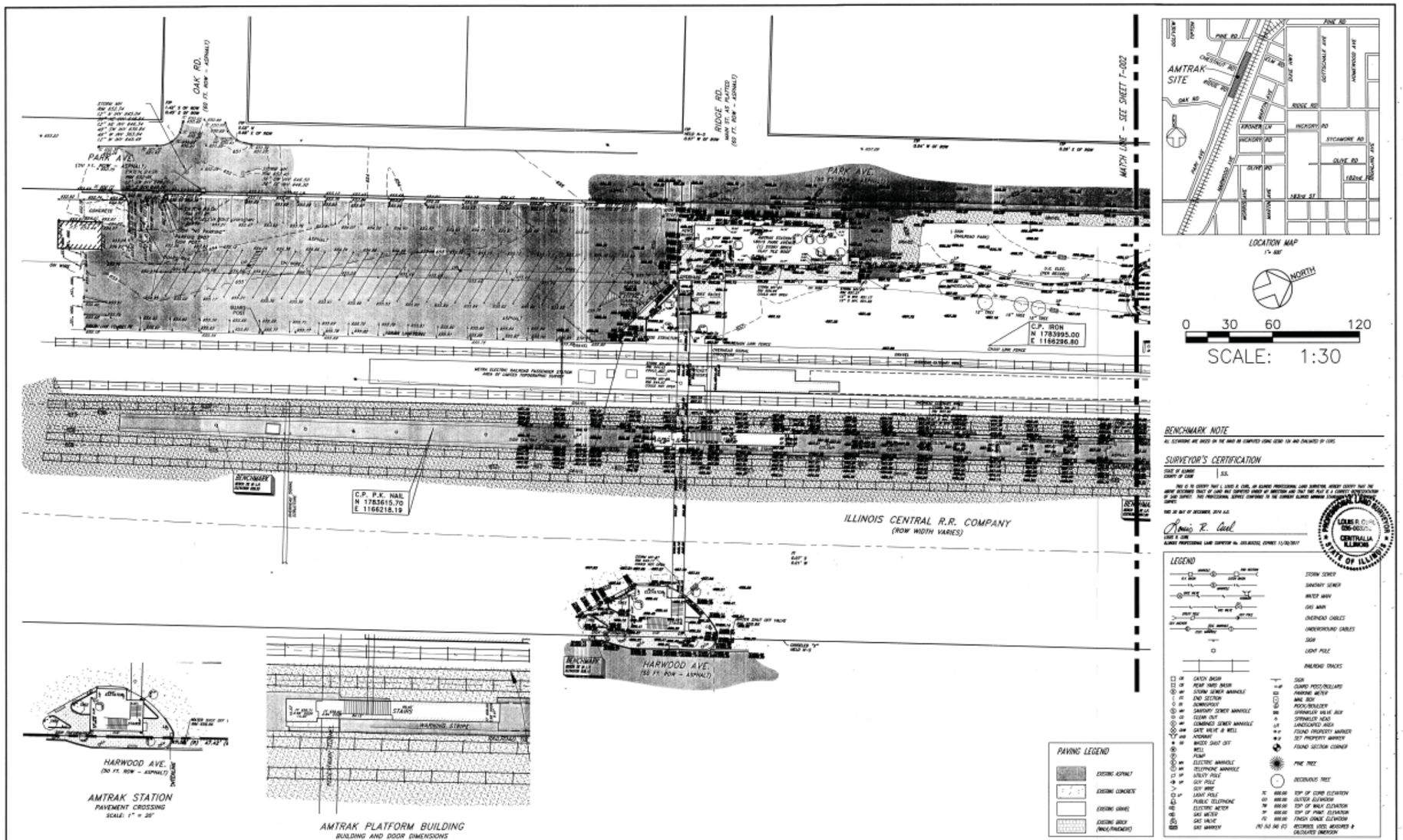


Assume that we have had these lots surveyed by a professional surveyor, so we know the overall dimensions and orientation of each lot

SURVEY EXAMPLES



SURVEY EXAMPLES



No.	Revisions	Date	By
1	REVISED PER CLIENT REVIEW	06-04-14	JK
2	ADDITIONAL SURVEY PER CLIENT	12-30-16	DJA

Amtrak®

Office of Chief Engineer

National Railroad Passenger Corporation
30th Street Station, Philadelphia, Pennsylvania 19104

Approved | Date

HOWARD R. GREEN & ASSOCIATES
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL: (248) 332-7931
FAX: (248) 332-8257
ENGINEERS CIVIL ENGINEERS LAND SURVEYORS LAND PLANNERS

INFORMATION CLASSIFICATION CATEGORY: CONFIDENTIAL INFORMATION

HOMEWOOD CITY, COOK COUNTY, IL
ACCESSIBLE STATIONS DEVELOPMENT PROGRAM
AMTRAK PROJECT No. 20103202
TOPOGRAPHIC SURVEY
Contract No. XXX

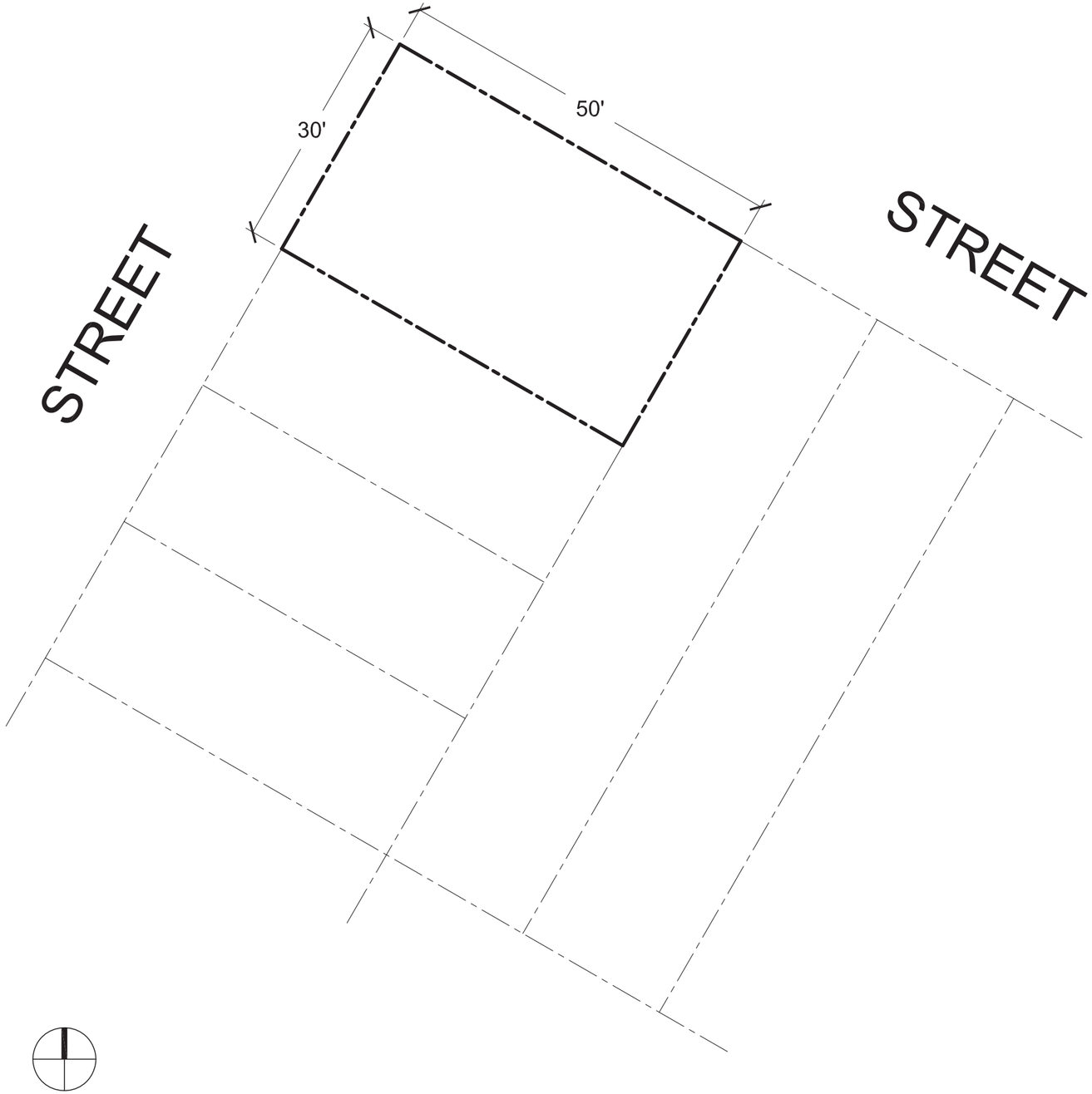
Designed — | Drawn DJA | Checked JCK | Date 12/30/2016

File No.
Function:
Work Dem. No. 941533
Sheet No. 1 OF 2
Dwg No. T-001

LOT 1

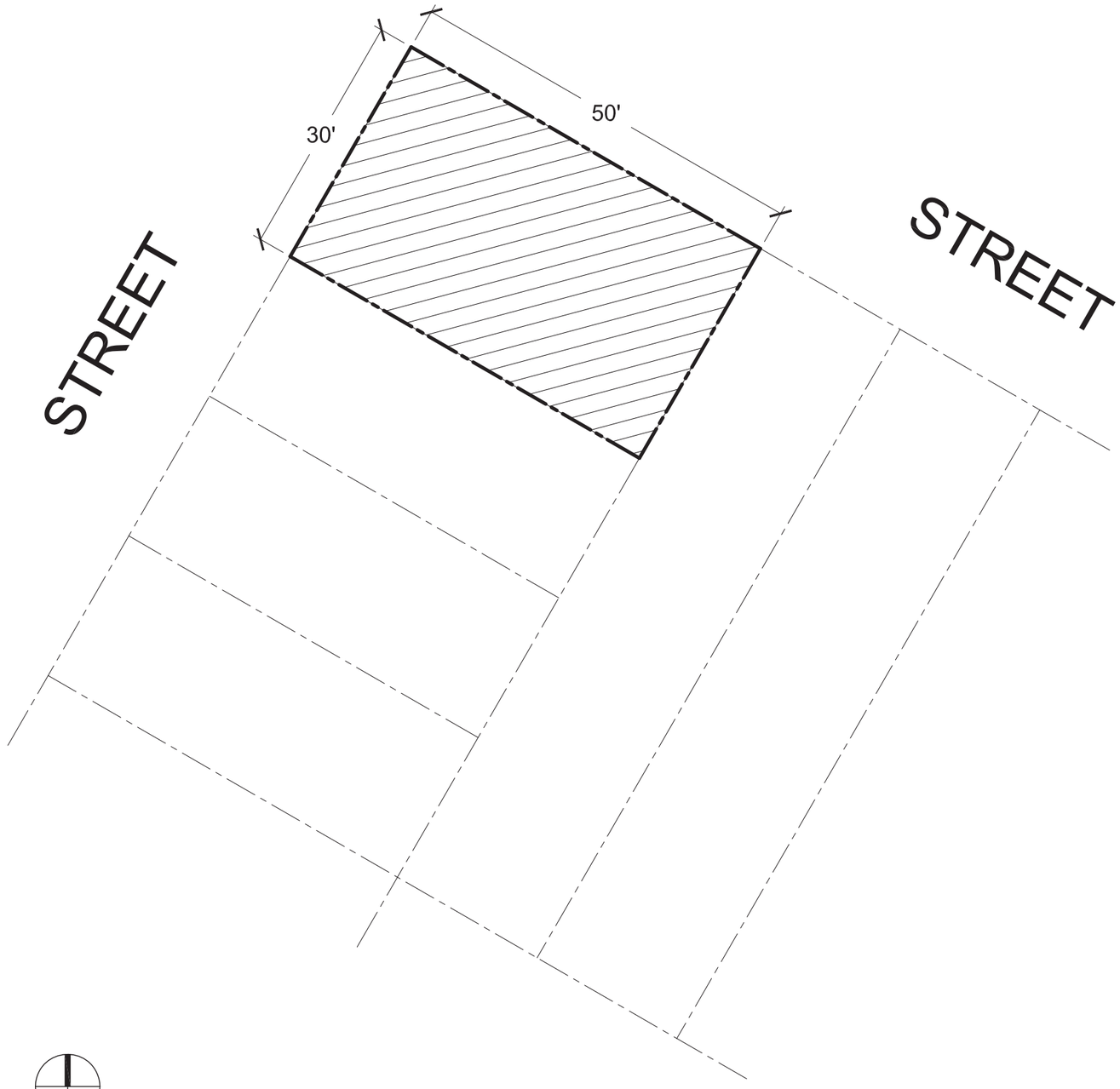
Site Restrictions:

- **There are no setback requirements**
- **Building may occupy entire lot**



LOT 1 BUILDING

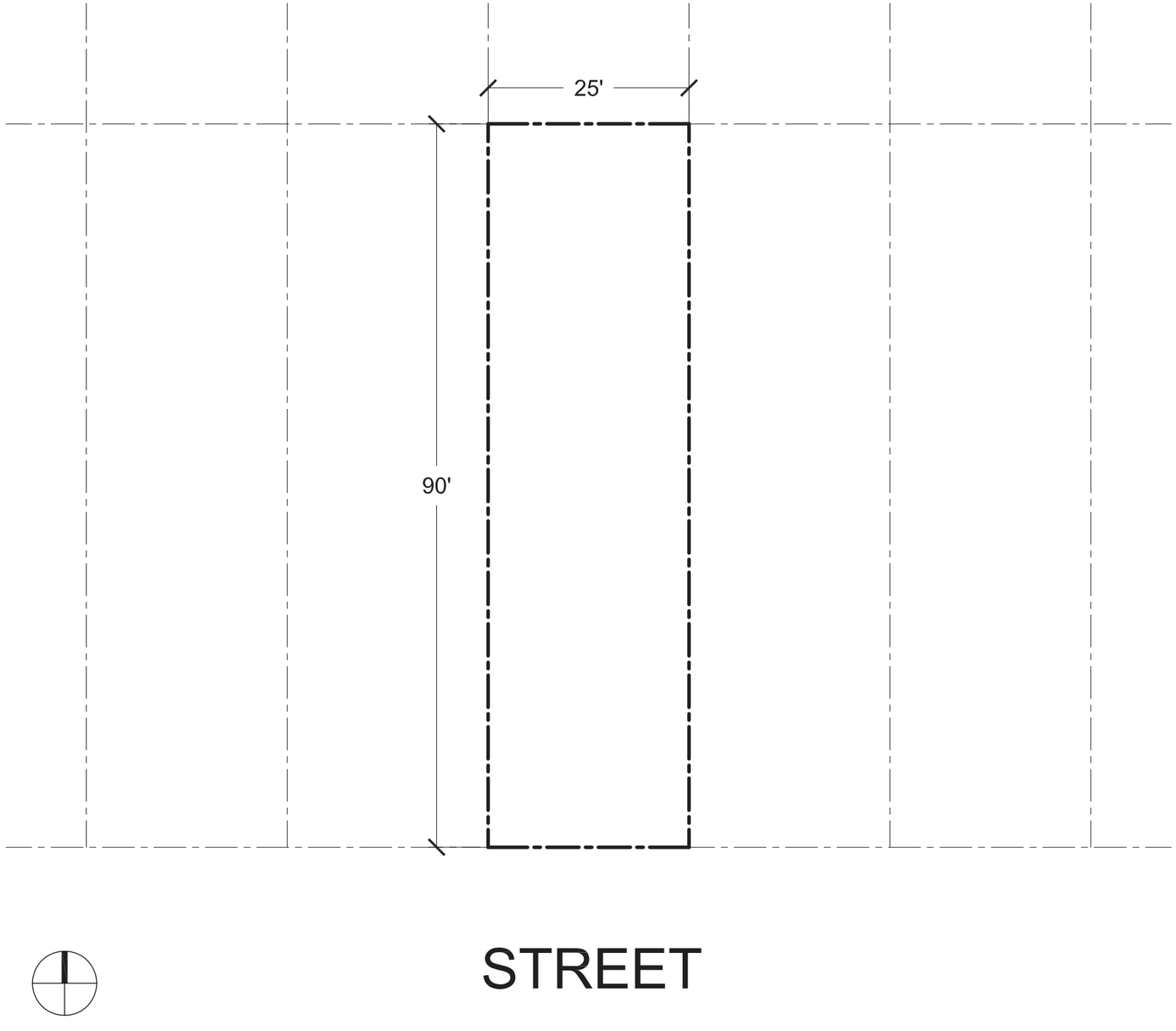
Building Size:
30’ wide x 50’ long



LOT 2

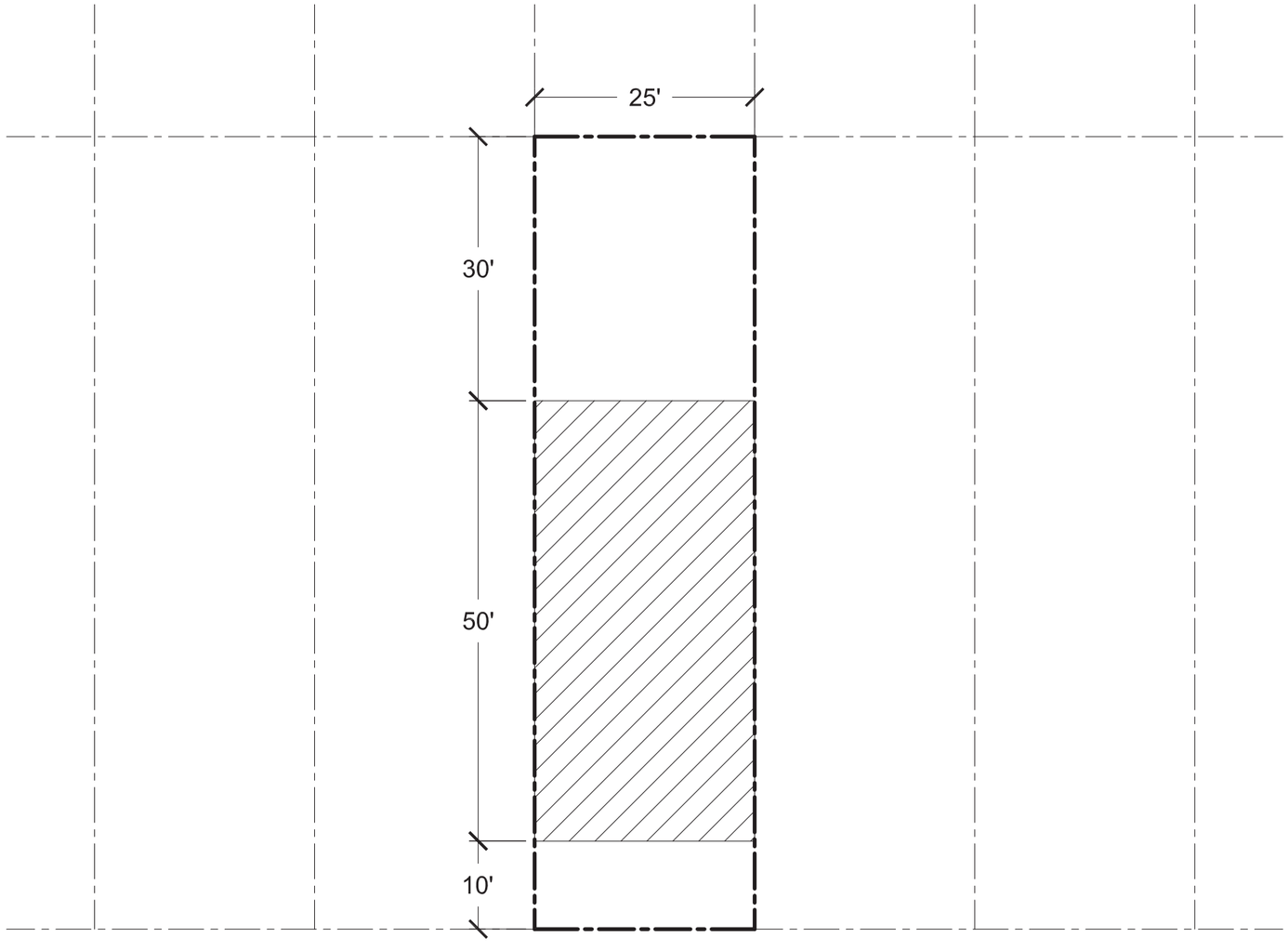
Site Restrictions:

- **10’ minimum required setback at the front (street side) lot line**
- **30’ minimum required setback at the rear lot line**
- **No setbacks required at side lot lines**



LOT 2 BUILDING

Building Size:
25’ wide x 50’ long

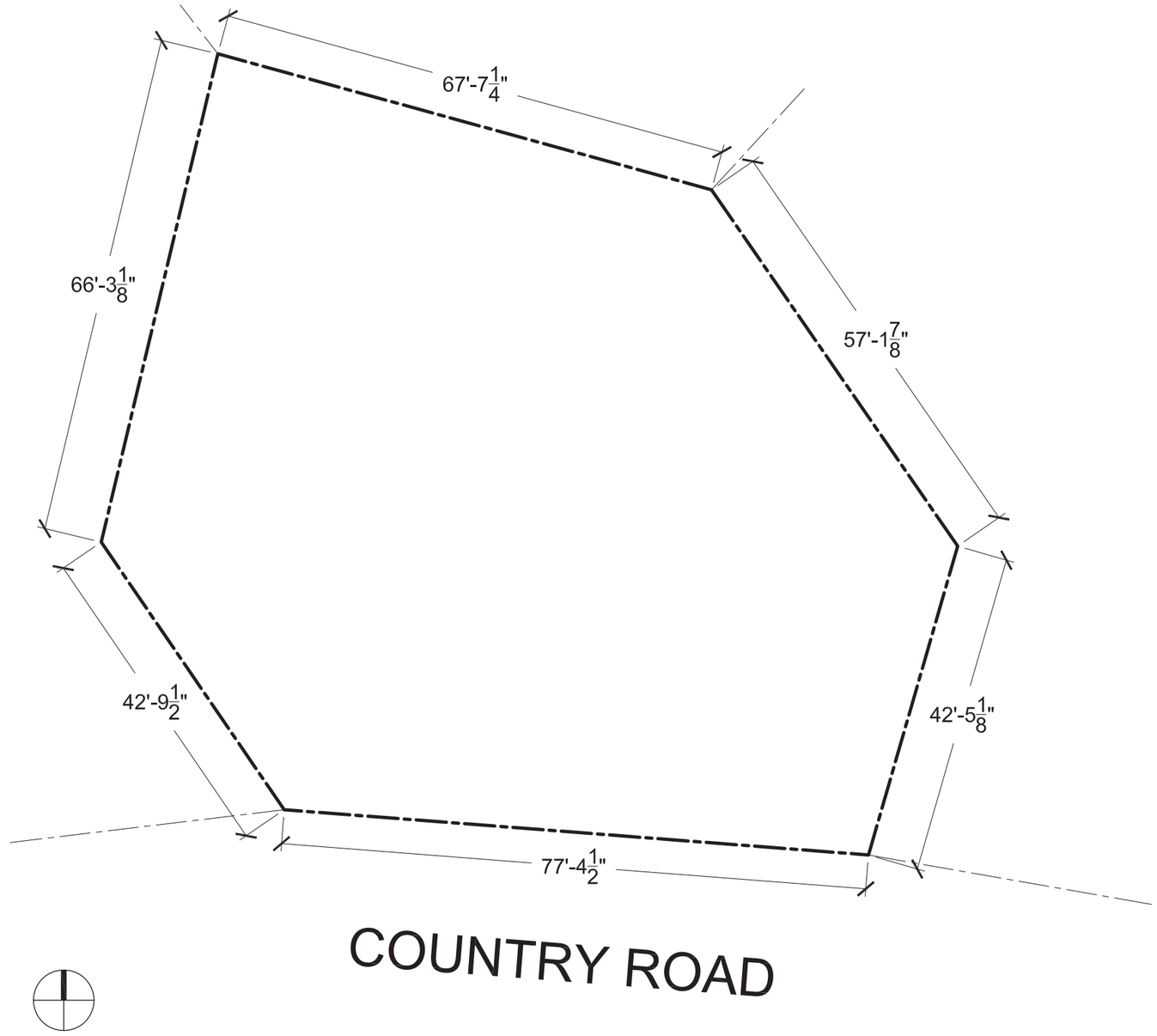


STREET

LOT 3

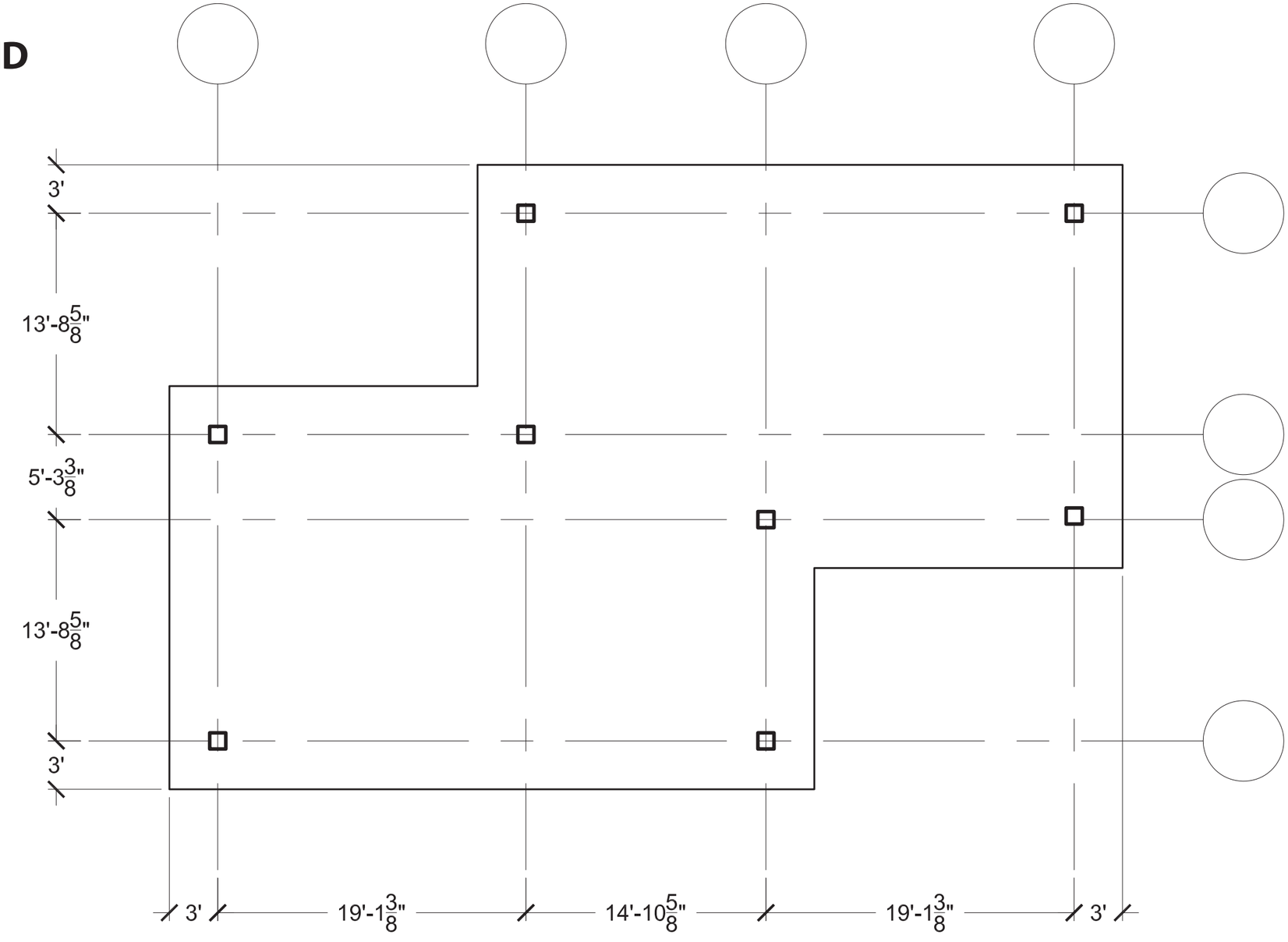
Site Restrictions:

- **No restrictions, building can be placed anywhere on the site**



NEW BUILDING GRID & ENVELOPE

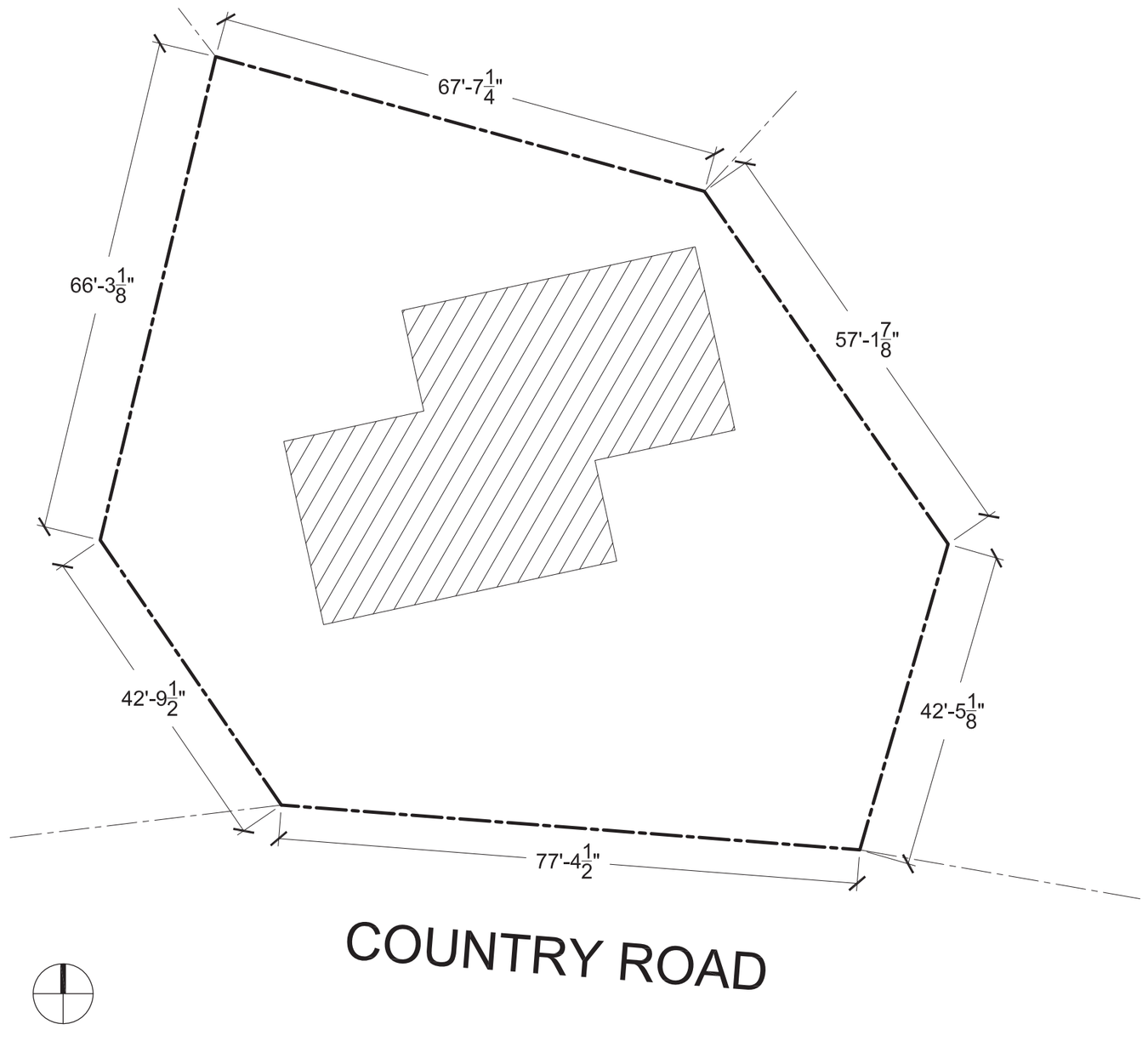
Designed by you - the architect - to meet the client's needs



LOT 3 BUILDING

Site Design:

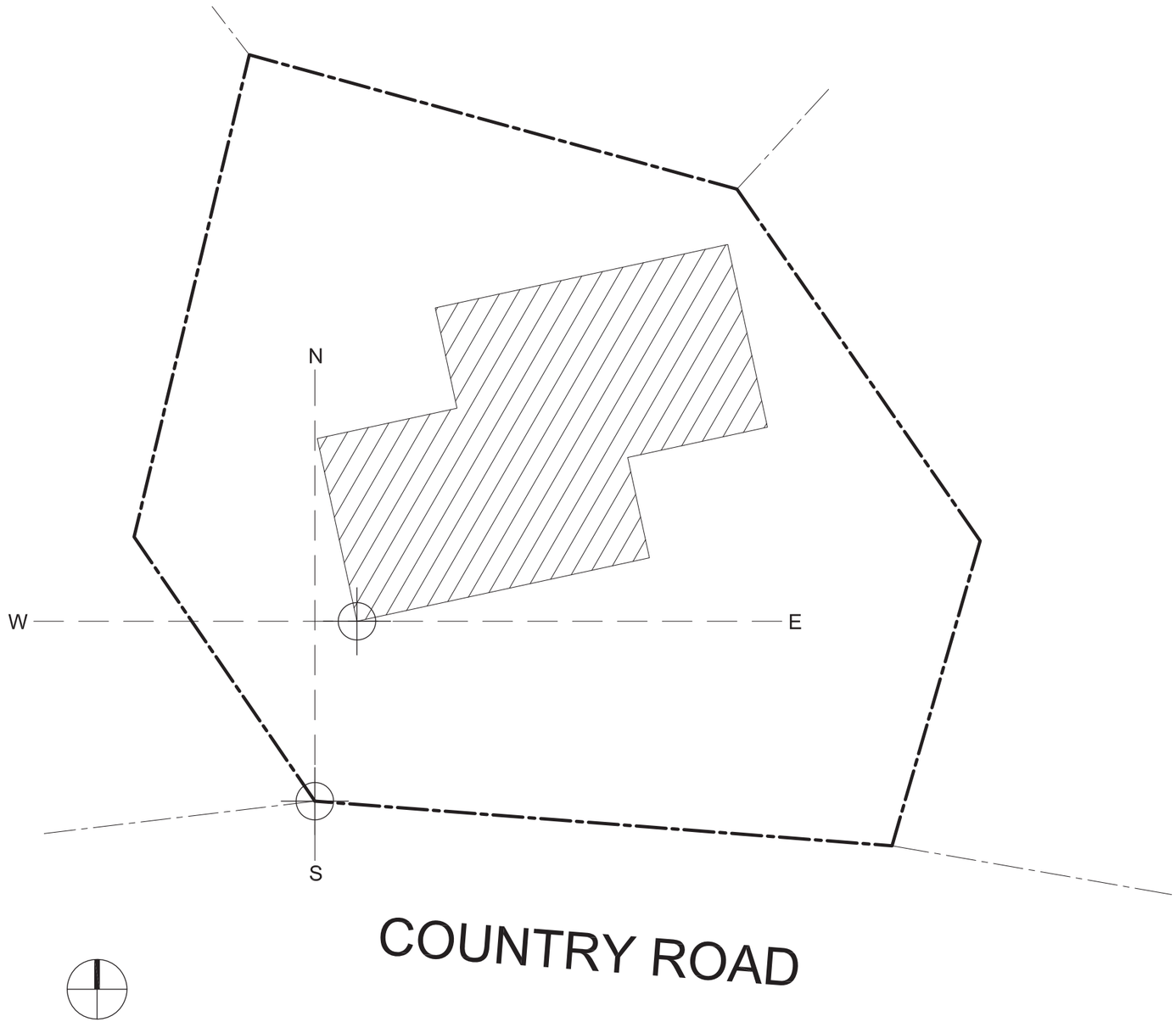
- **Building must be oriented this way in order to maximize views on the site**
- **How do you convey this information accurately to the contractor so that he can lay the building out properly on site?**



REFERENCE POINTS (CONTROL POINTS)

What do we know?

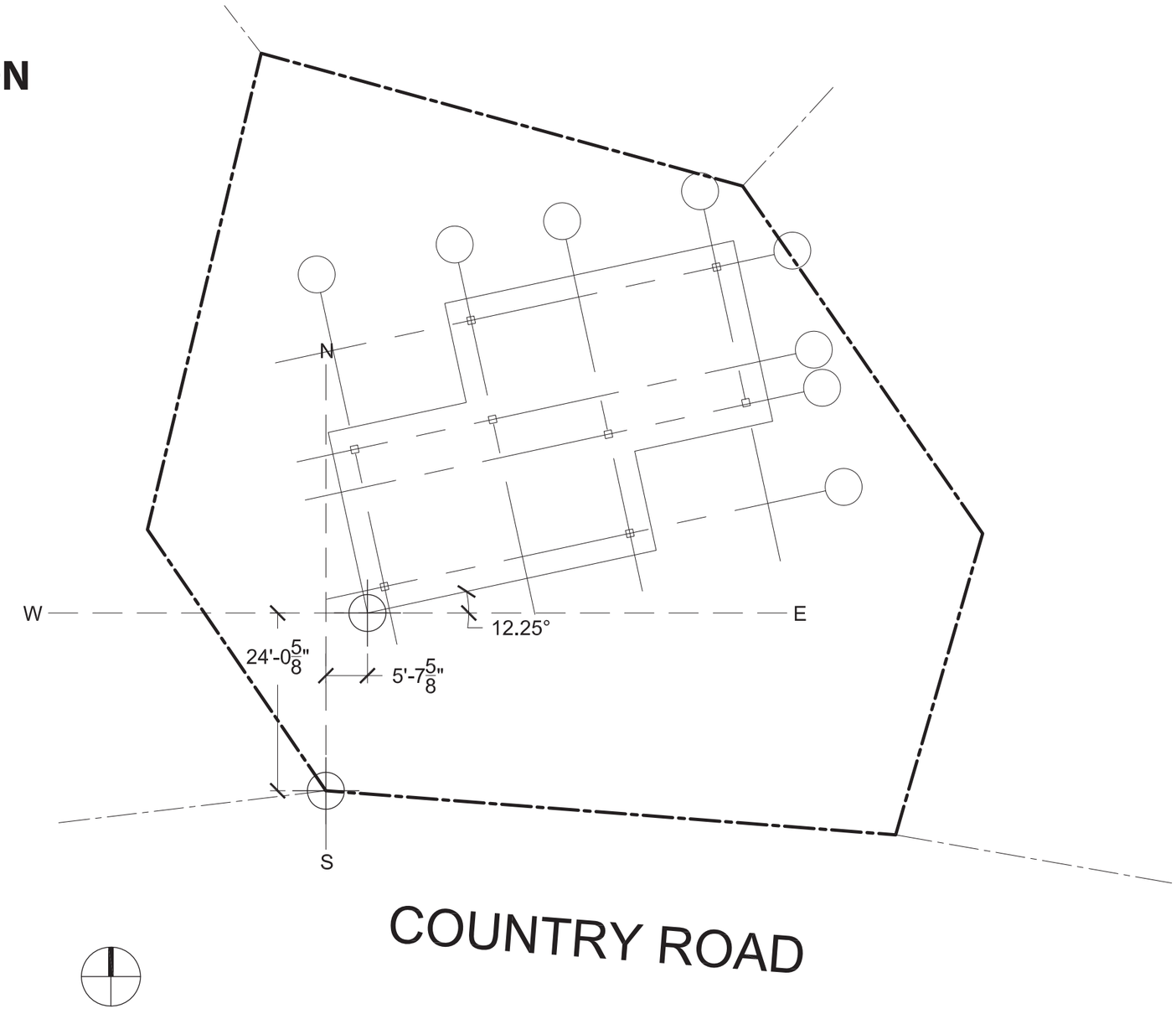
- **The lot has been surveyed, so we know where all of the lot lines are**
- **We also know where north, south, east, and west are**
- **Using our drafting software, we can locate the corner of our building in relation to a given point**



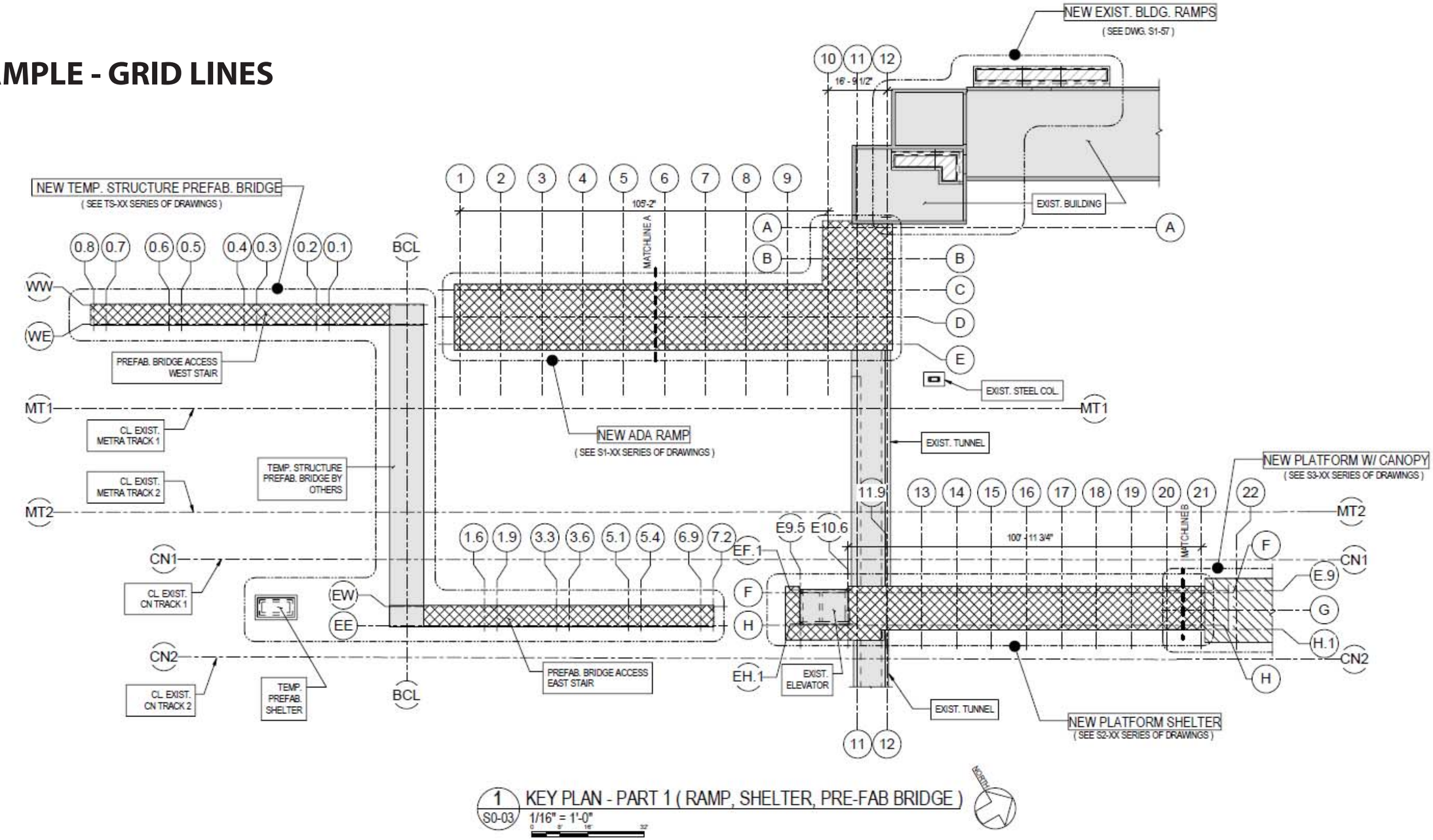
BUILDING LOCATION

Convey Information:

- **Using our survey points and cardinal directions, we can identify precisely the location and orientation of our building on the site, and present that information clearly to the contractor**



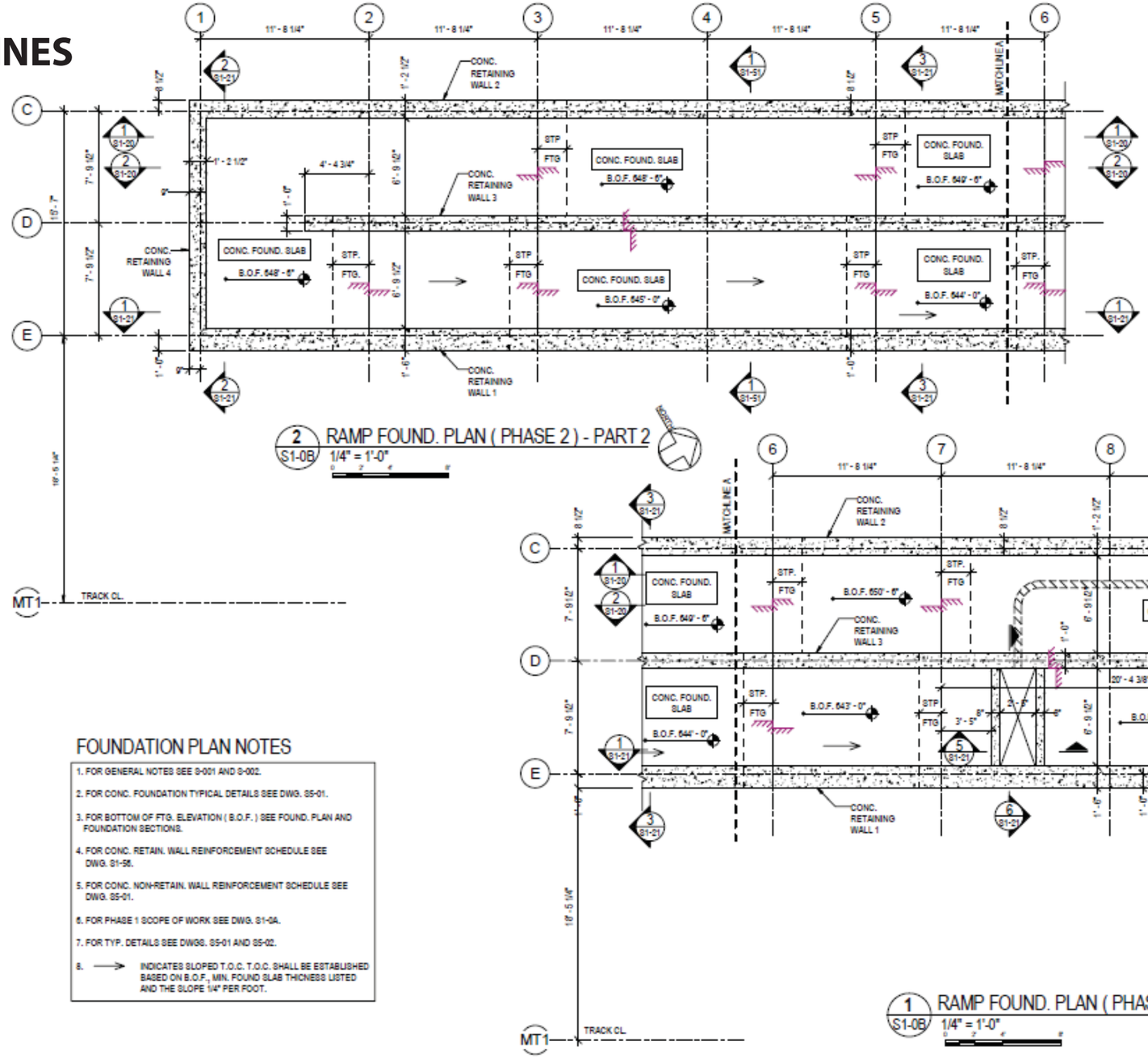
EXAMPLE - GRID LINES



1 S0-03 KEY PLAN - PART 1 (RAMP, SHELTER, PRE-FAB BRIDGE)

1/16" = 1'-0"

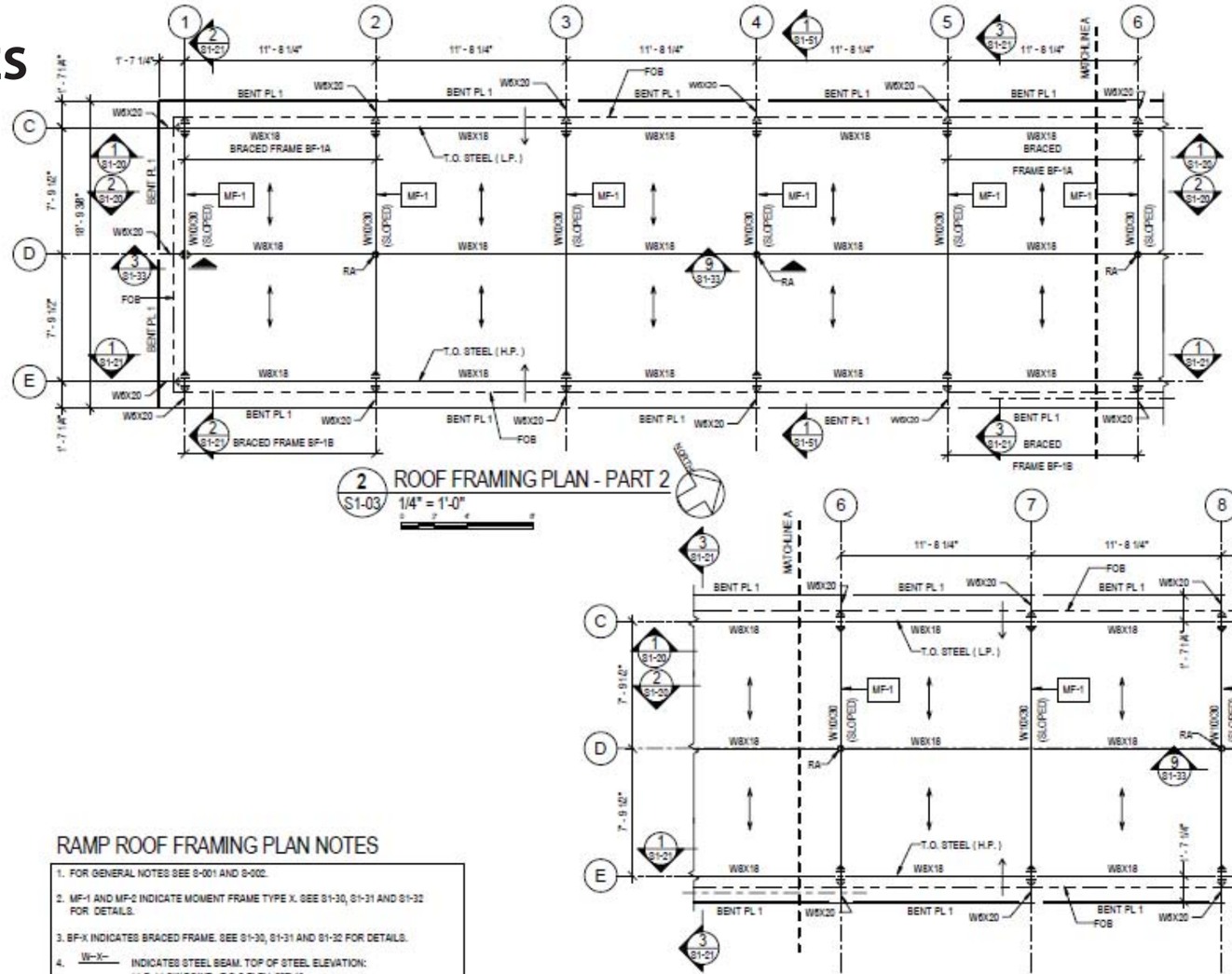
GRID LINES



FOUNDATION PLAN NOTES

1. FOR GENERAL NOTES SEE S-001 AND S-002.
2. FOR CONC. FOUNDATION TYPICAL DETAILS SEE DWG. S5-01.
3. FOR BOTTOM OF FTG. ELEVATION (B.O.F.) SEE FOUND. PLAN AND FOUNDATION SECTIONS.
4. FOR CONC. RETAIN. WALL REINFORCEMENT SCHEDULE SEE DWG. S1-56.
5. FOR CONC. NON-RETAIN. WALL REINFORCEMENT SCHEDULE SEE DWG. S5-01.
6. FOR PHASE 1 SCOPE OF WORK SEE DWG. S1-0A.
7. FOR TYP. DETAILS SEE DWGS. S5-01 AND S5-02.
8. ⟶ INDICATES SLOPED T.O.C. T.O.C. SHALL BE ESTABLISHED BASED ON B.O.F., MIN. FOUND SLAB THICNESS LISTED AND THE SLOPE 1/4" PER FOOT.

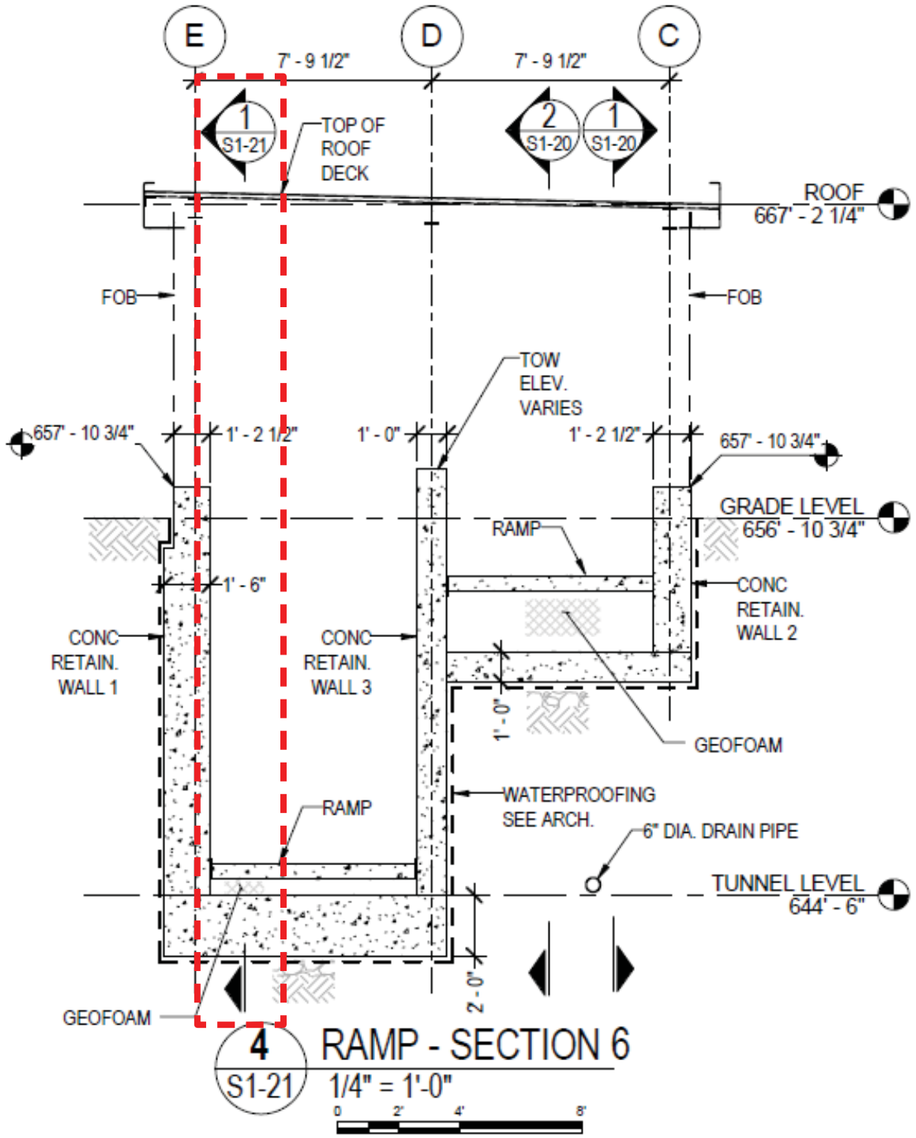
GRID LINES



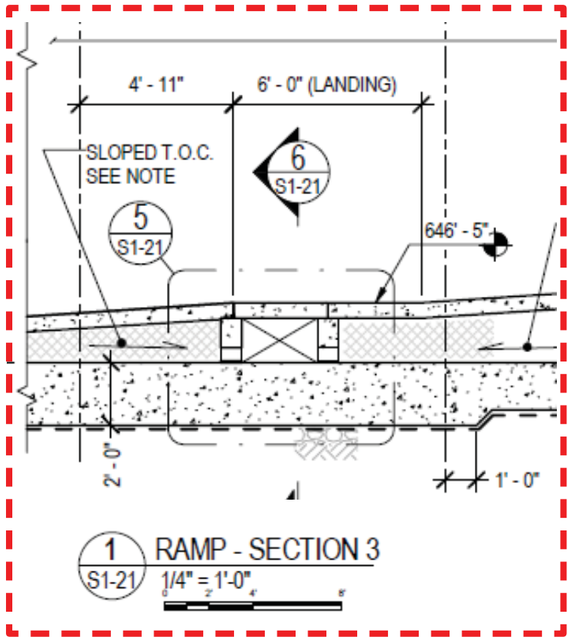
RAMP ROOF FRAMING PLAN NOTES

1. FOR GENERAL NOTES SEE S-001 AND S-002.
2. MF-1 AND MF-2 INDICATE MOMENT FRAME TYPE X. SEE S1-30, S1-31 AND S1-32 FOR DETAILS.
3. BF-X INDICATES BRACED FRAME. SEE S1-30, S1-31 AND S1-32 FOR DETAILS.
4. W-X- INDICATES STEEL BEAM. TOP OF STEEL ELEVATION:
   (L.P.) LOW POINT - T.O.S ELEV. 667'-1"
   (H.P.) HIGH POINT - T.O.S ELEV. 667'-4 3/4"
5. INDICATES MOMENT FRAME CONNECTION.
6. INDICATES CANTILEVER MOMENT CONNECTION.
7. INDICATES SPAN OF 2.0DA, 18 GAGE, ROOF DECK BY VULCRAFT. TOP OF DECK ELEV. (T.O.D) IS 2" ABOVE TOP OF STEEL.
8. "BENT PL 1" INDICATESBENT PLATE SECTION - SEE S5-03 FOR DETAILS. BENT PLATE SECTION SHALL BE HOT DIPPED GALVANIZED. TOP OF "BENT PL" ELEV. IS 667'-10 3/4".
9. FOR ROOF DRAIN LOCATIONS SEE ARCH A-211 AND MEP P-201 DWGS.
10. RA INDICATES ROOF ANCHOR. SEE TYP. DET. ON DWG. S5-03.

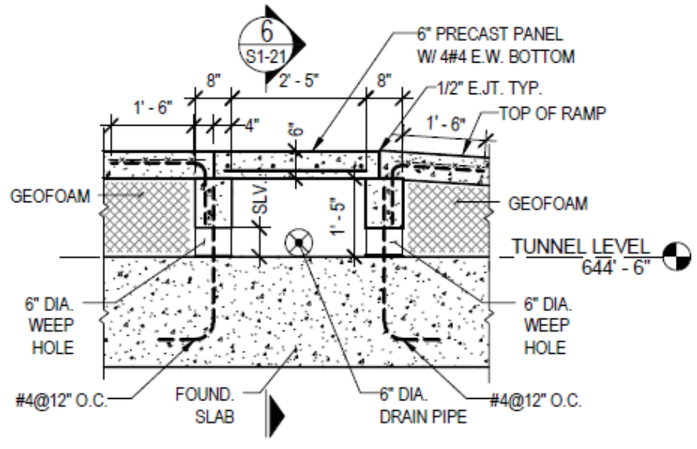
EXAMPLE - GRID LINES, LEVELS, & SCALE



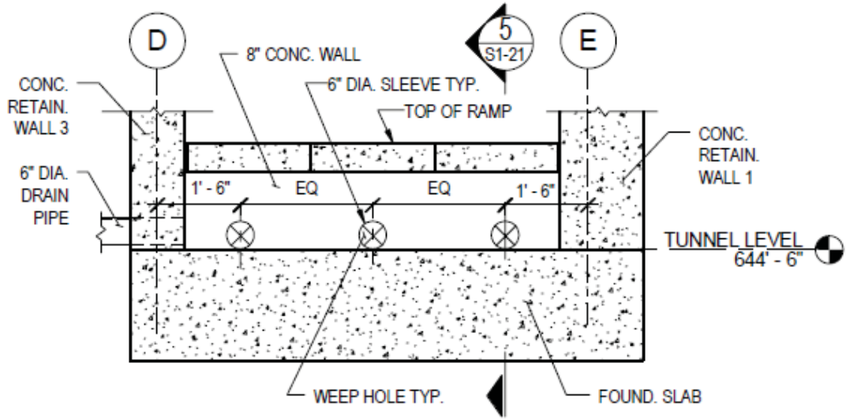
4 S1-21 RAMP - SECTION 6
1/4" = 1'-0"



1 S1-21 RAMP - SECTION 3
1/4" = 1'-0"



5 S1-21 RAMP PIT - SECT. 1
1/2" = 1'-0"



6 S1-21 RAMP PIT - SECT. 2
1/2" = 1'-0"

BUILDING GEOMETRY

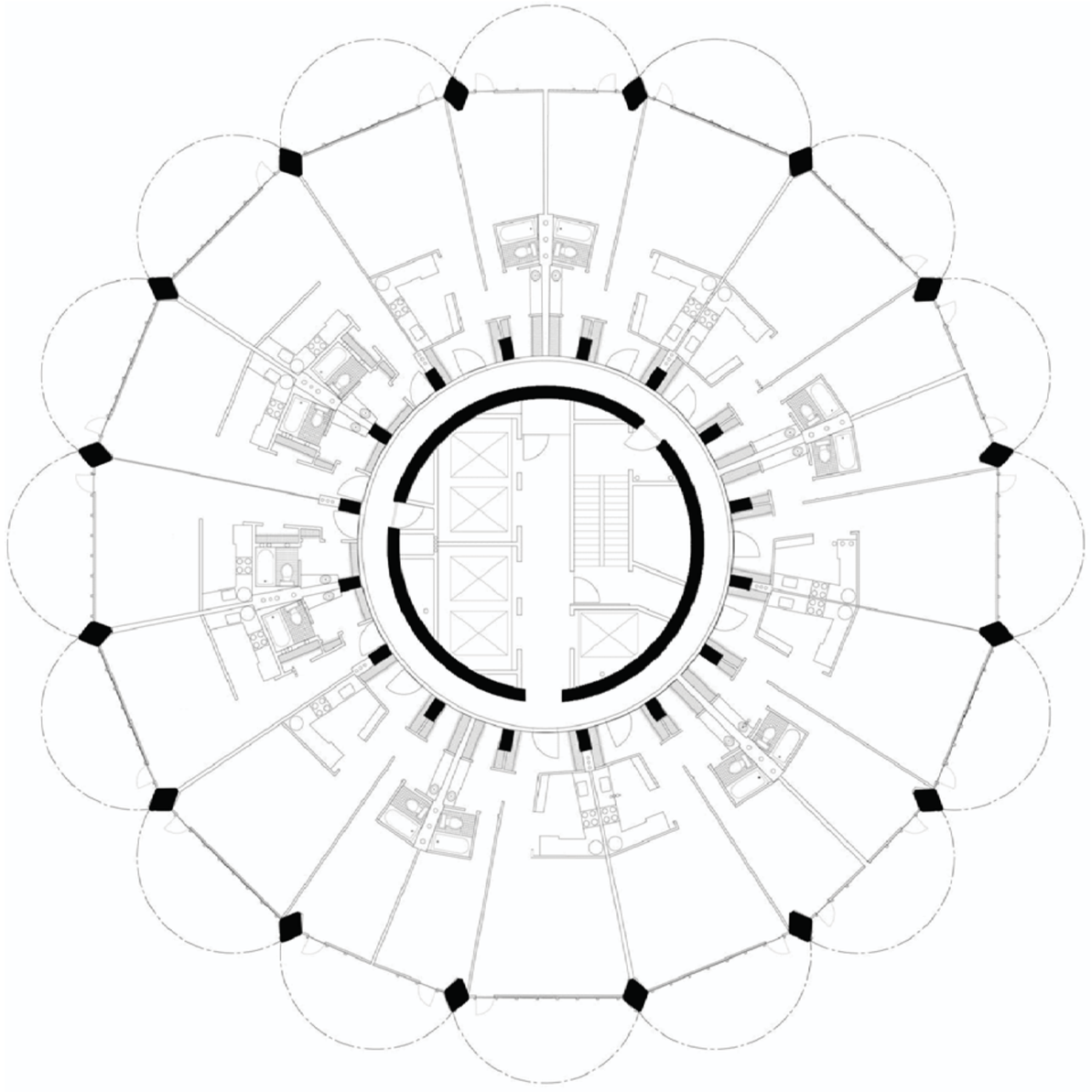
Marina City:

- **Using the Marina City towers in Chicago as an example, we will look at how a building's structural grid and plan geometry can be used to organize program (and vice versa)**

BUILDING GEOMETRY - PLAN

Structure vs Space:

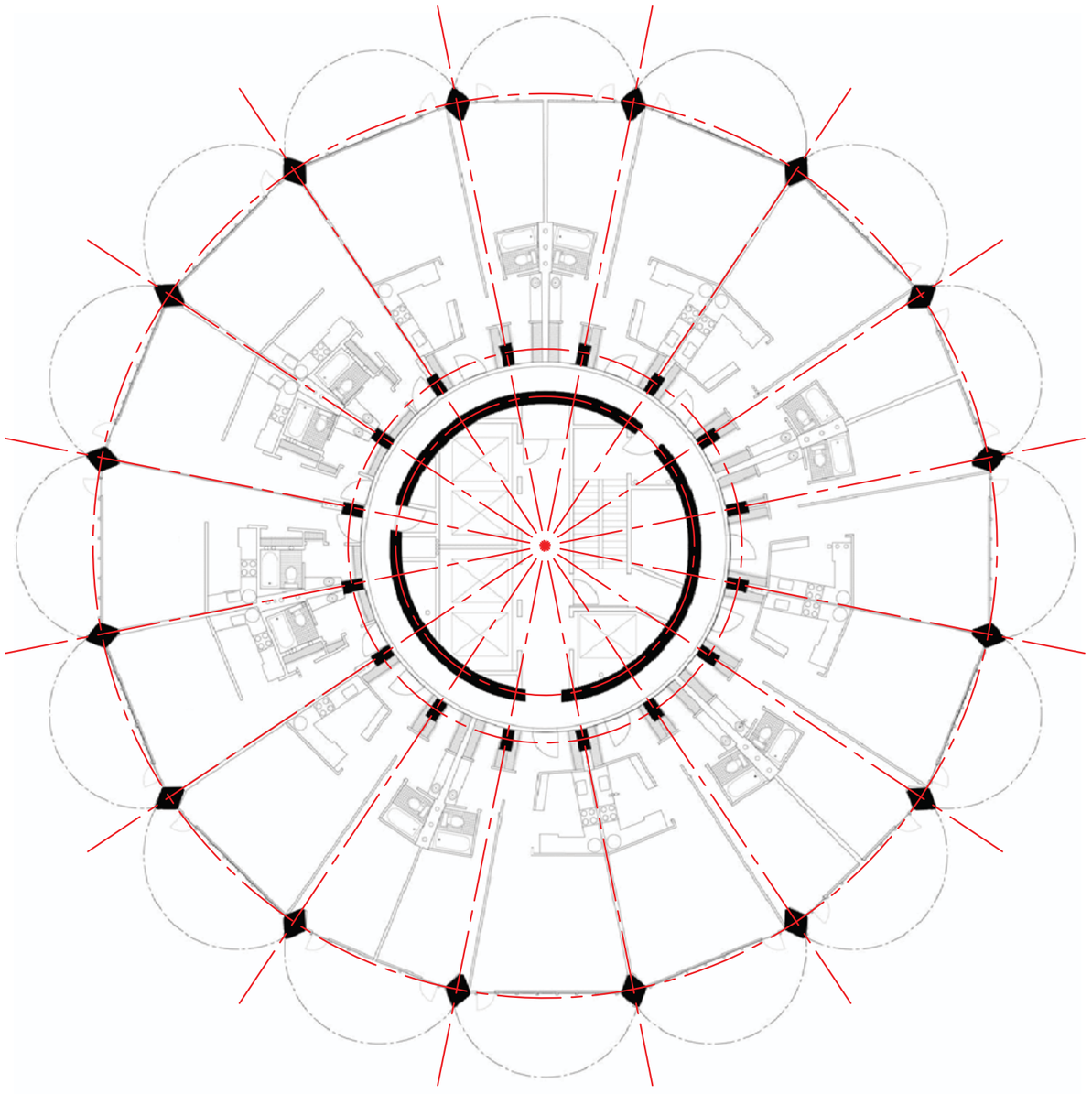
- **Structural elements do not fit in a simple orthogonal grid, but there is a clear organizational geometry here that we can identify...**



BUILDING GEOMETRY - PLAN

Grid Lines:

- **By studying the plan, we can identify the grids which organize the structural elements**
- **This design uses radial geometries (rather than orthogonal) to lay out the building elements in plan**



BUILDING GEOMETRY - PLAN

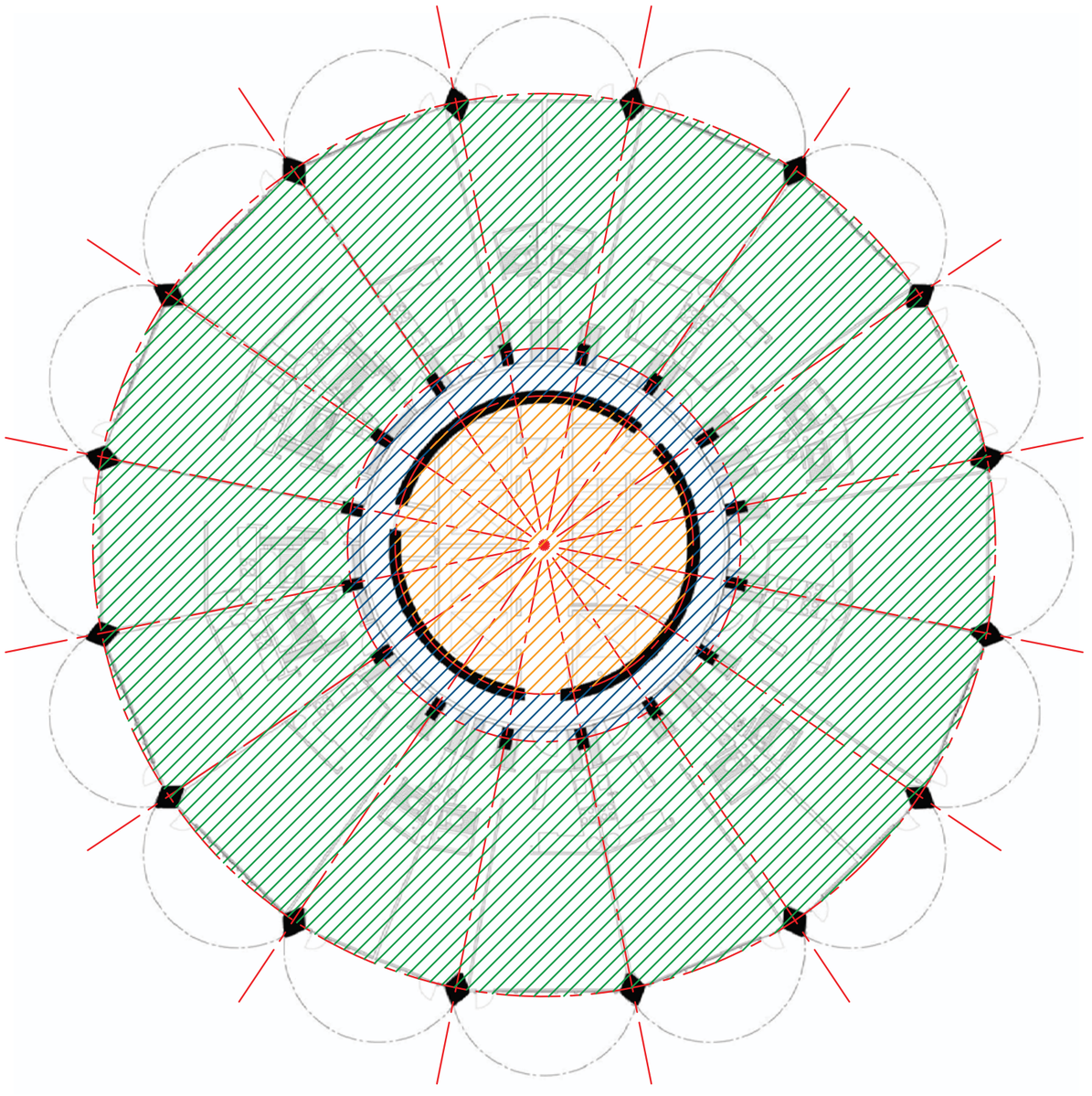
Program Zones:

- **The architect for this building used the structural grid and plan geometries to organize the building's program into zones**

Core / Utilities:

Circulation:

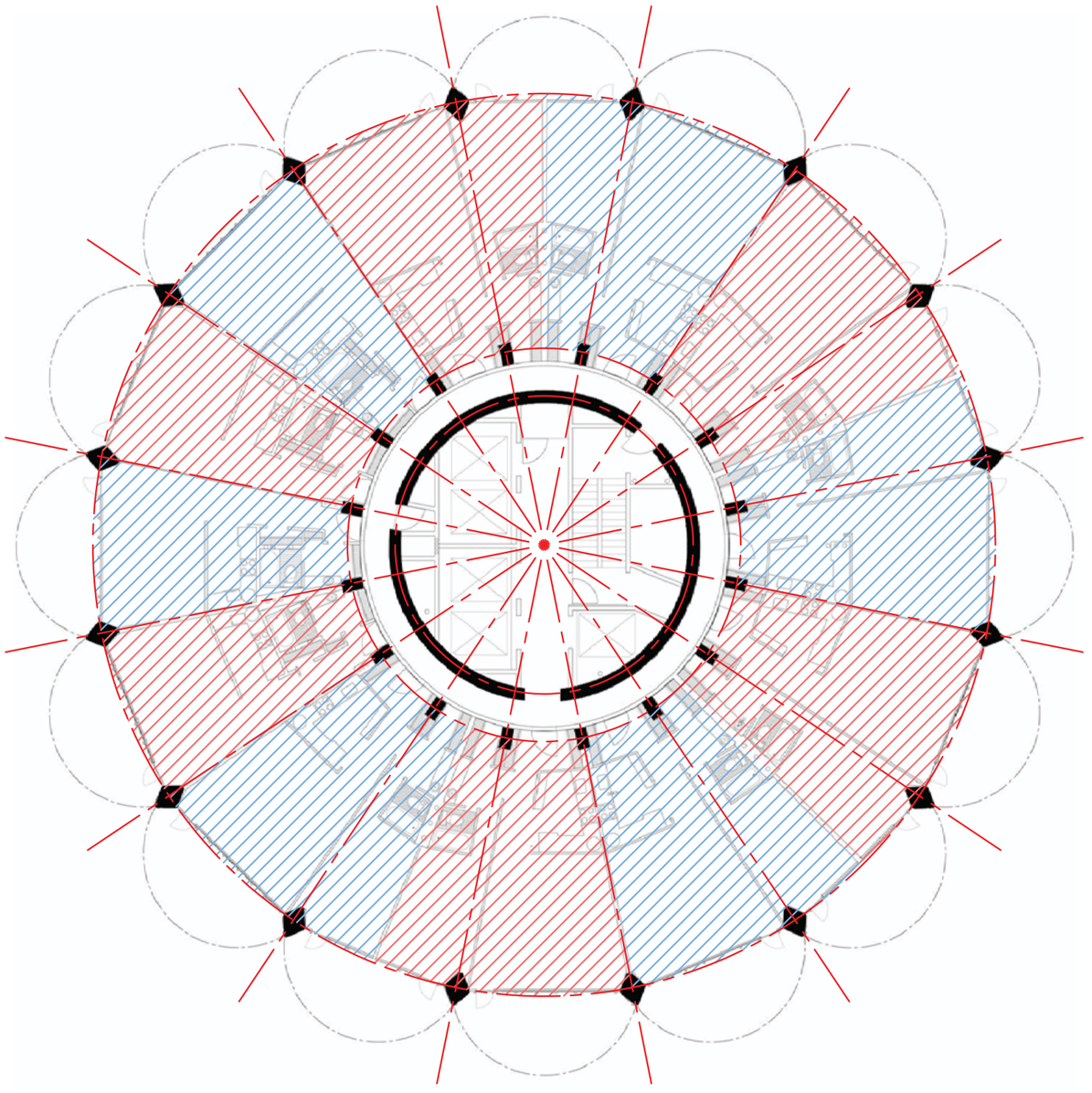
Residential:



BUILDING GEOMETRY - PLAN

Unit Layouts:

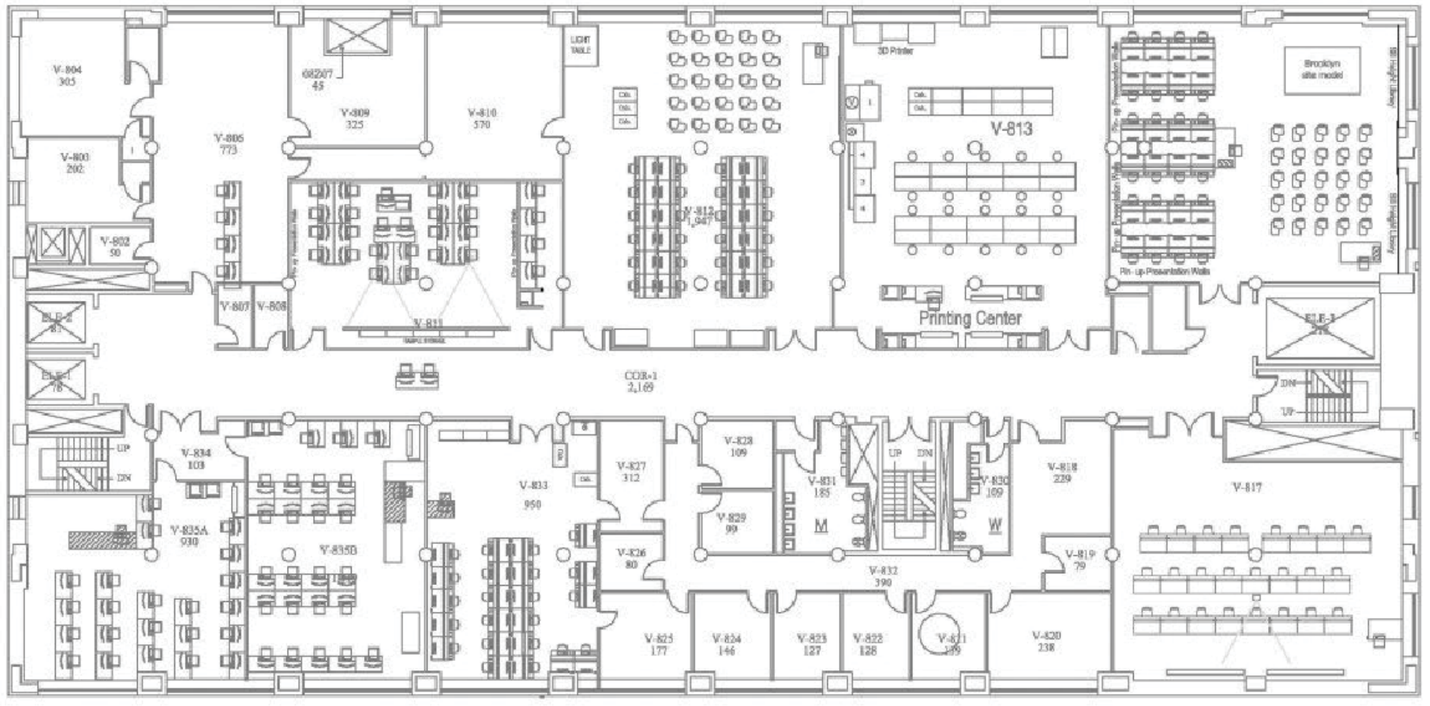
- **The architect also used the structural grid and plan geometries to organize the individual residential units**
- **All units terminate at a structural grid line, or the halfway point between 2 structural grid lines**



LET’S TRY ONE TOGETHER...

Recognize this building?

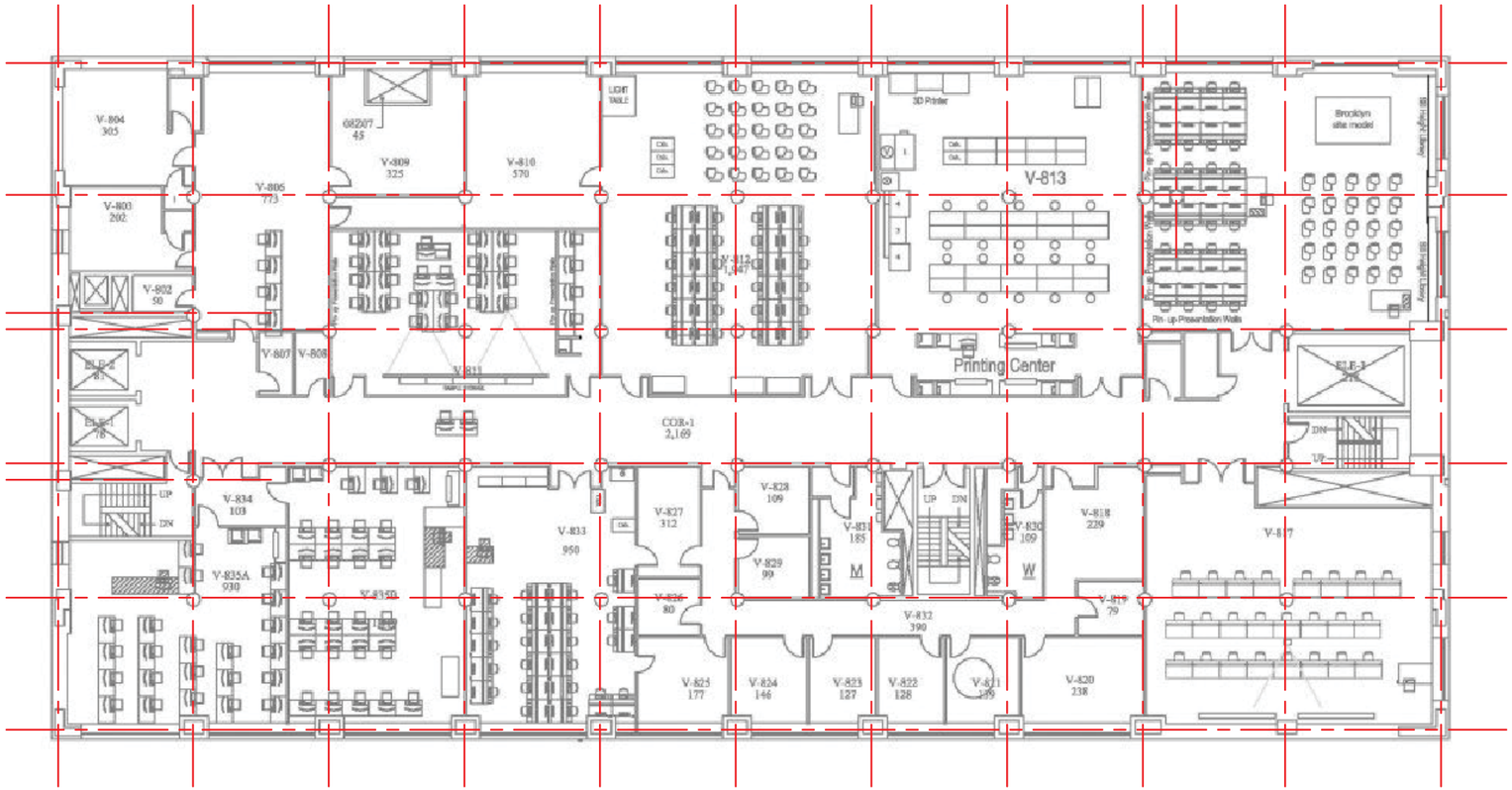
- **Let’s start by trying to figure out the structural grid**



LET’S TRY ONE TOGETHER...

Structural Grid

- **Pay attention to structural elements for clues**
- **Notice any irregularities? Make sure to account for them**
- **Overall this grid is pretty simple**
- **Now let’s look for program zones...**



LET’S TRY ONE TOGETHER...

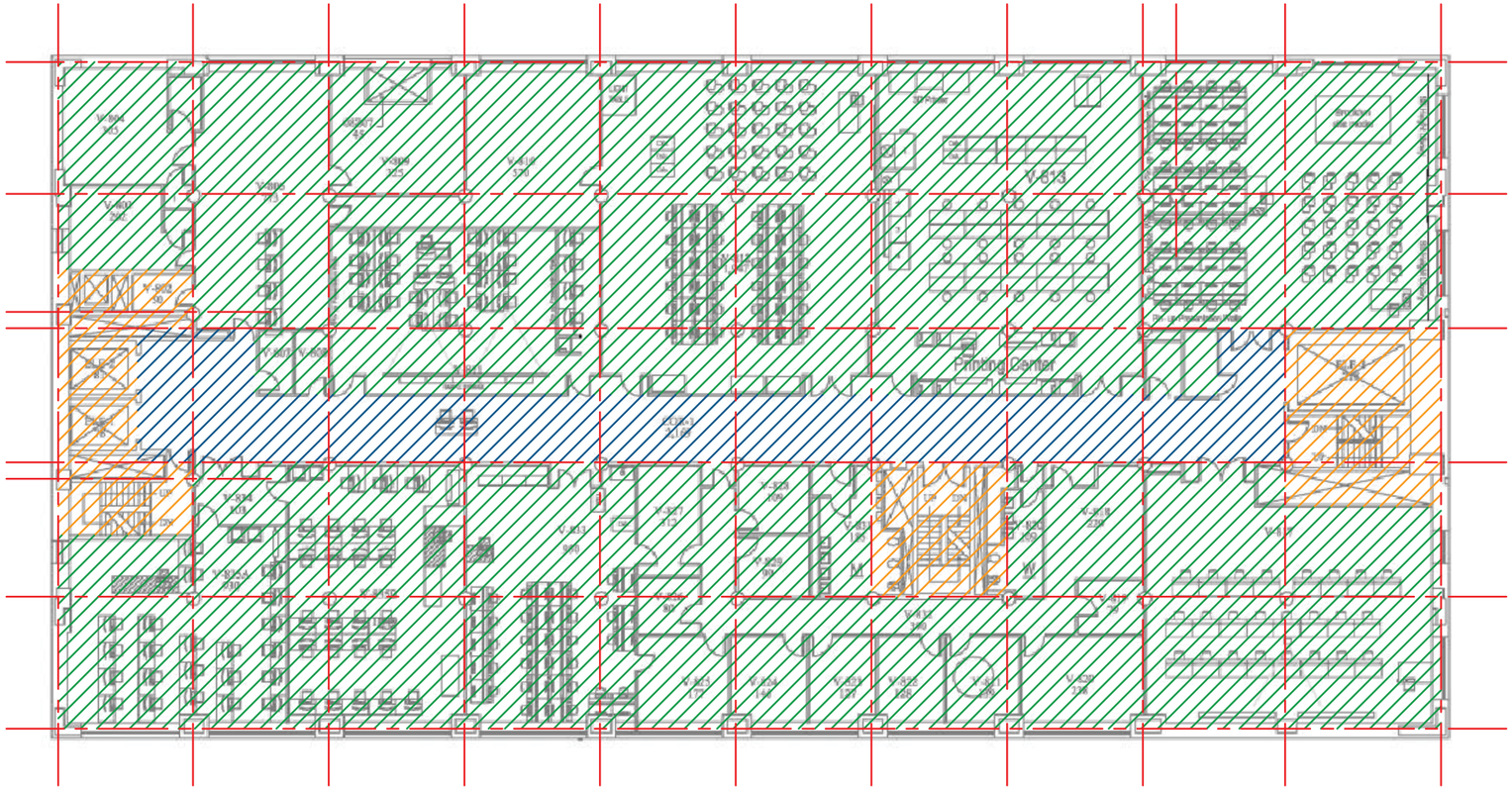
Program Zones

- **Do the structural grid and plan geometries correspond in any way to the program zones?**
- **Are there irregularities?**

Core / Utilities:

Circulation:

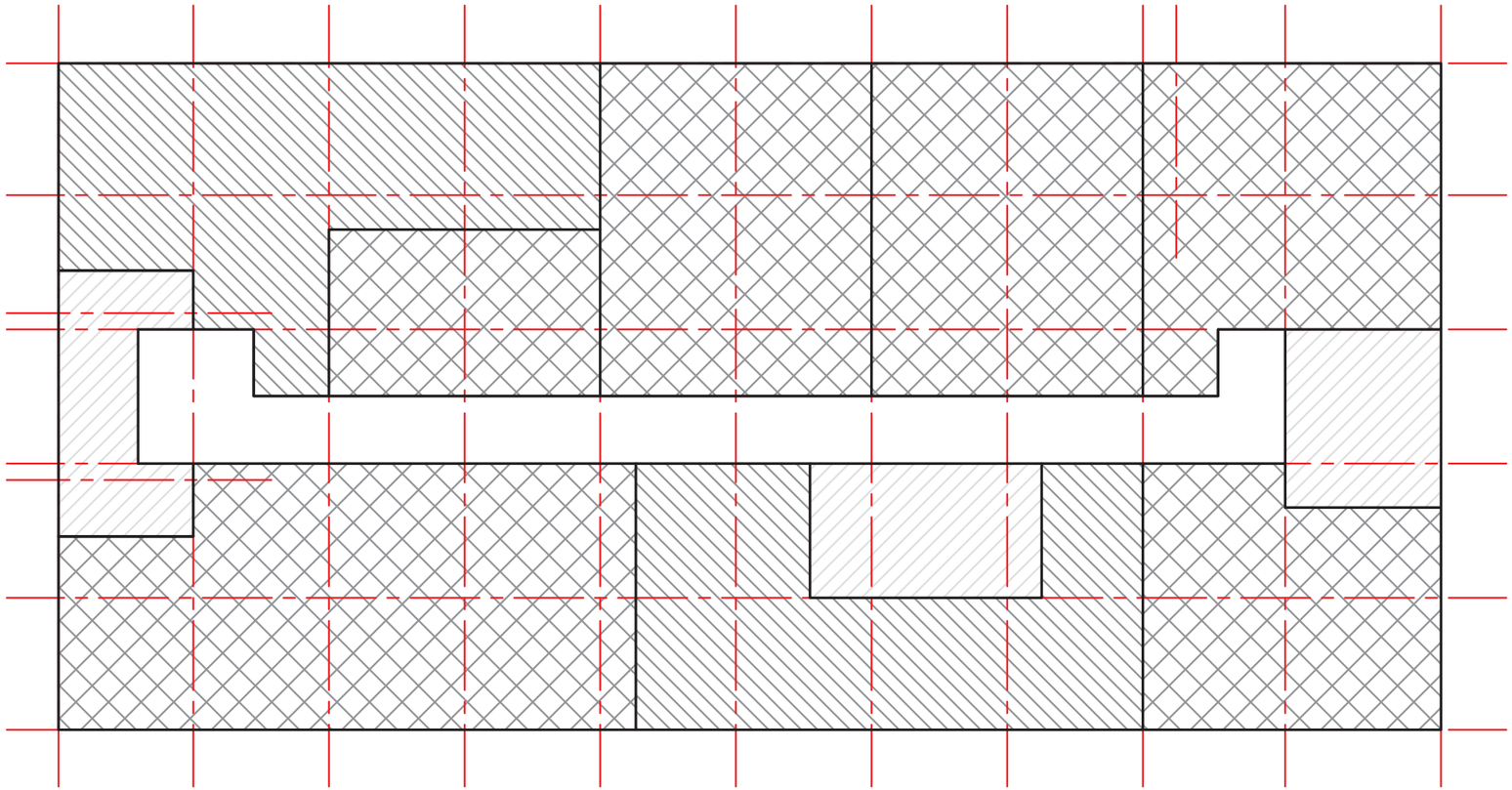
Class / Office:



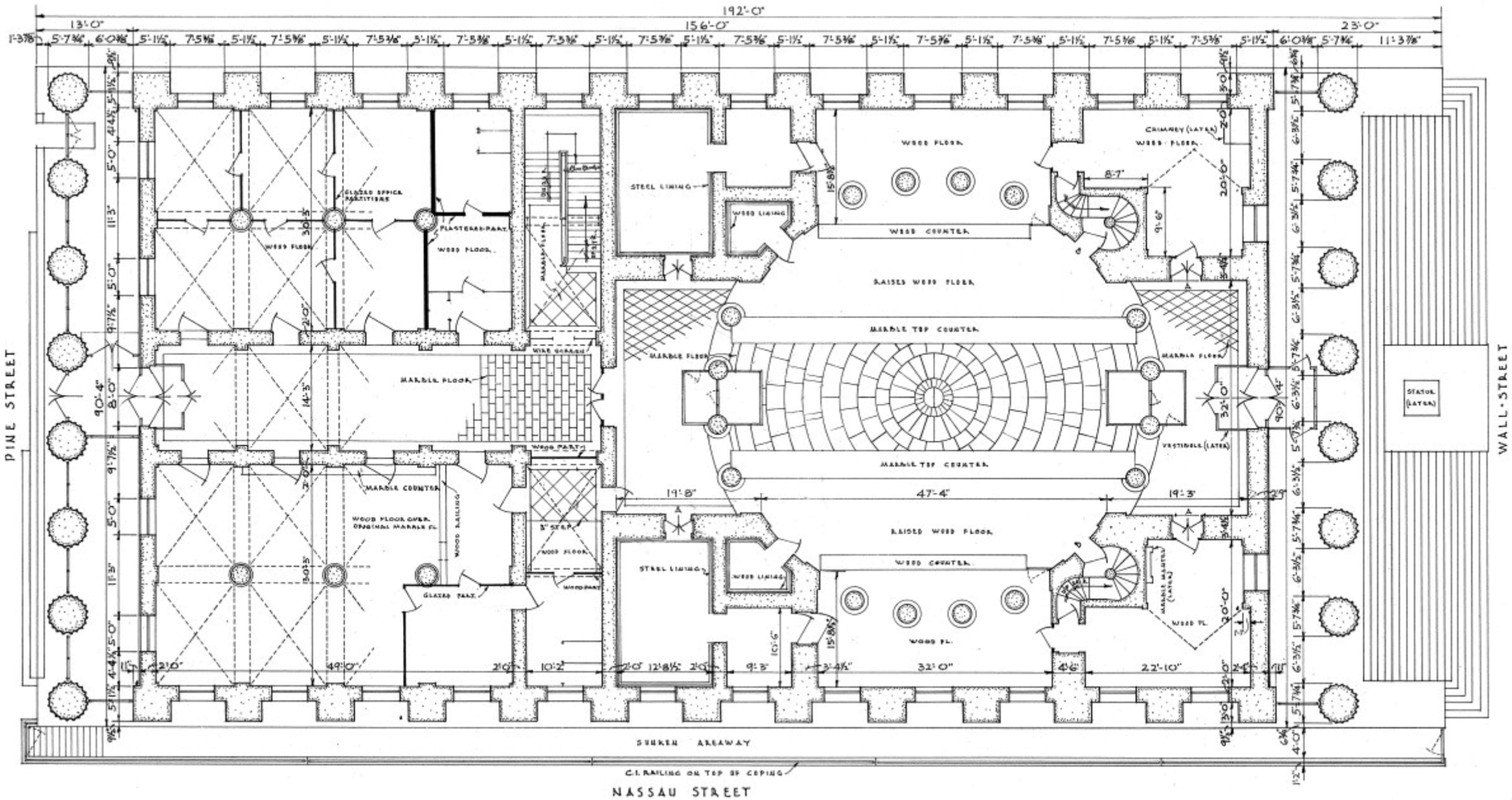
LET'S TRY ONE TOGETHER...

Geometry Diagram

- **Use what we've learned analyzing the plan to create a plan geometry diagram**



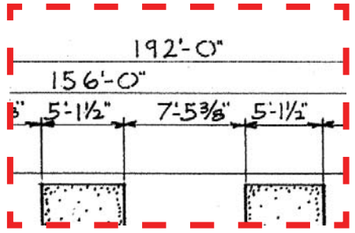
APPLICATION TO FEDERAL HALL PLANS...

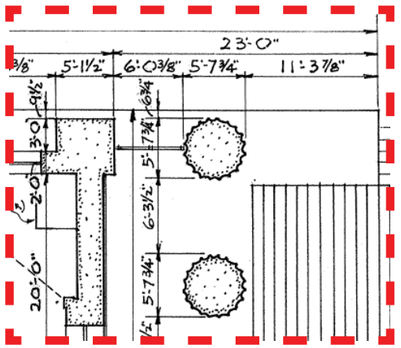


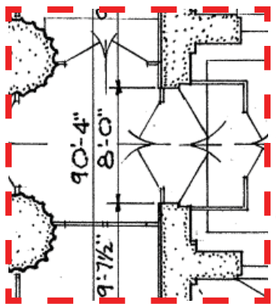
FIRST · FLOOR · PLAN

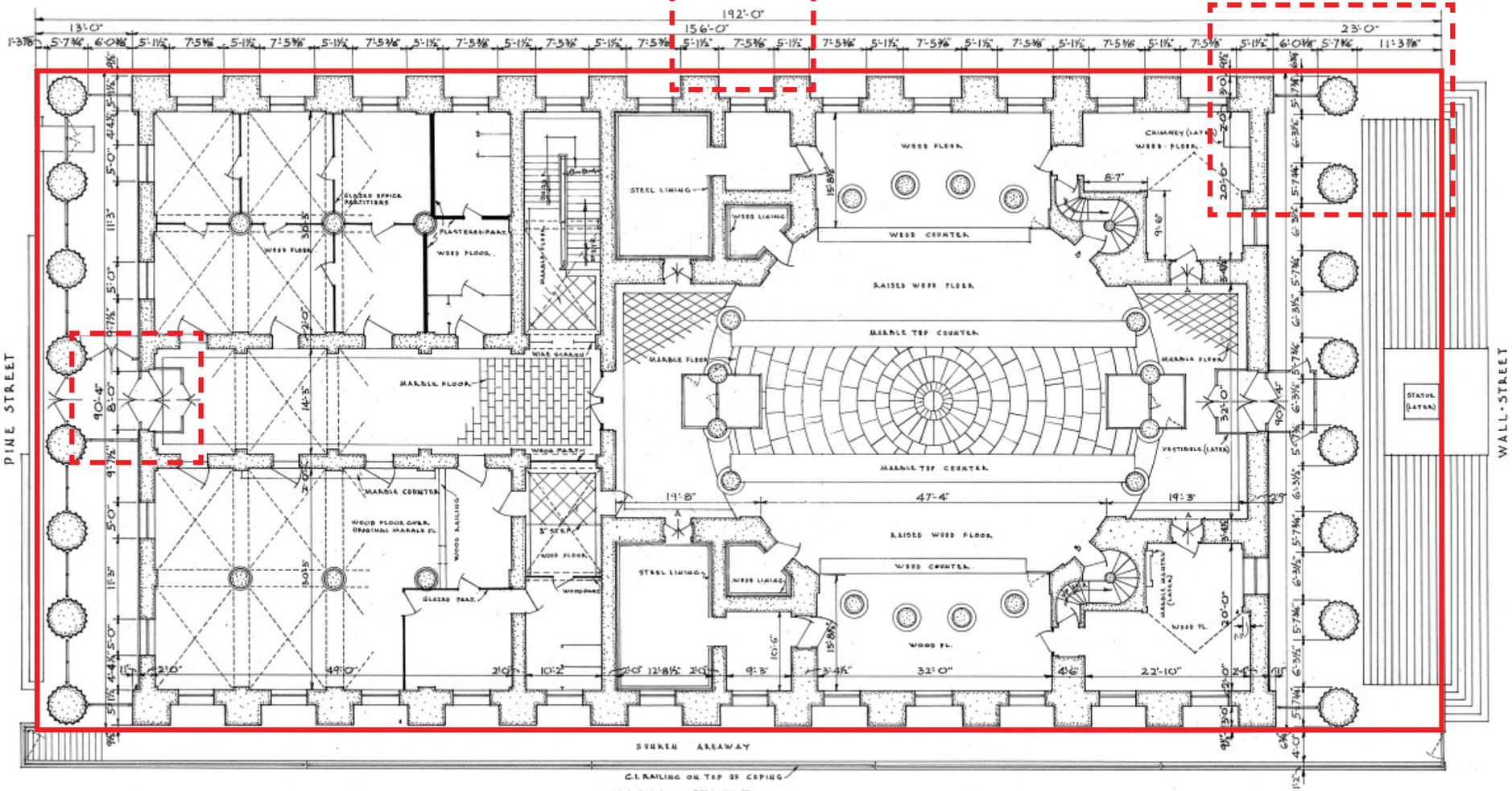
SCALE 3/32"=1'-0"

START BIG, LOCATE REFERENCES





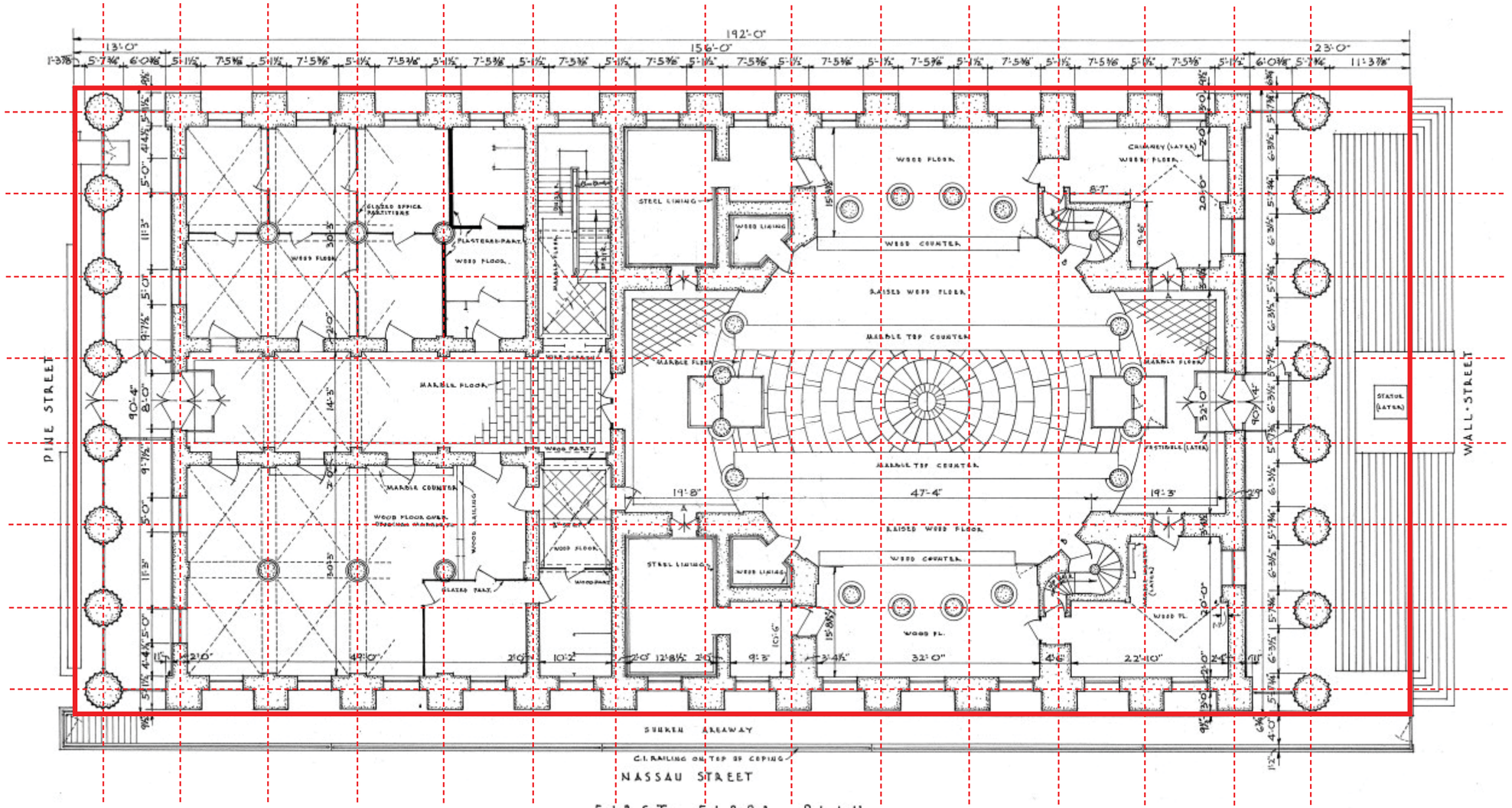




FIRST · FLOOR · PLAN

SCALE 3/32"=1'-0"

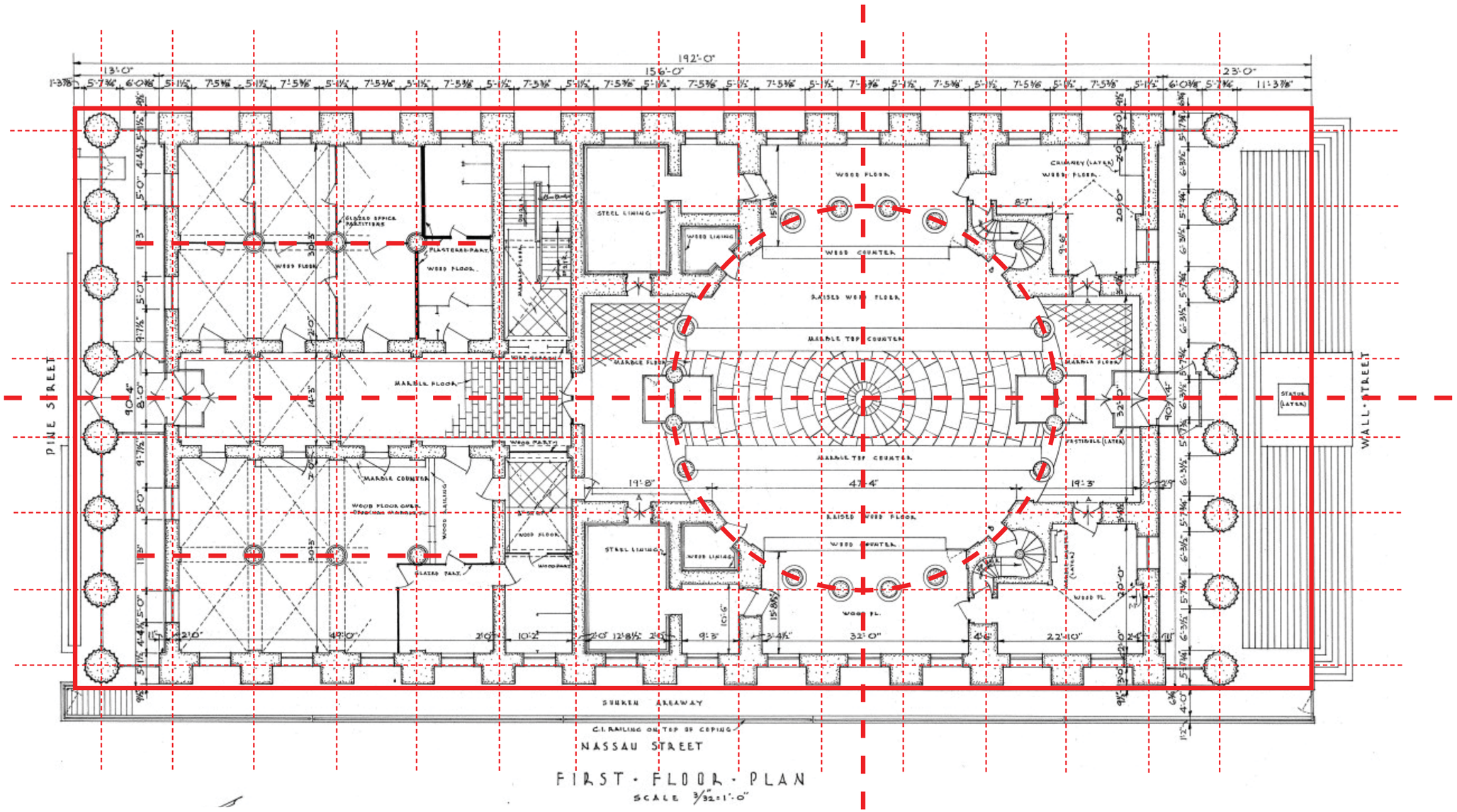
ESTABLISH GRID BASED ON REFERENCE DIMENSIONS



FIRST · FLOOR · PLAN

SCALE 3/32"=1'-0"

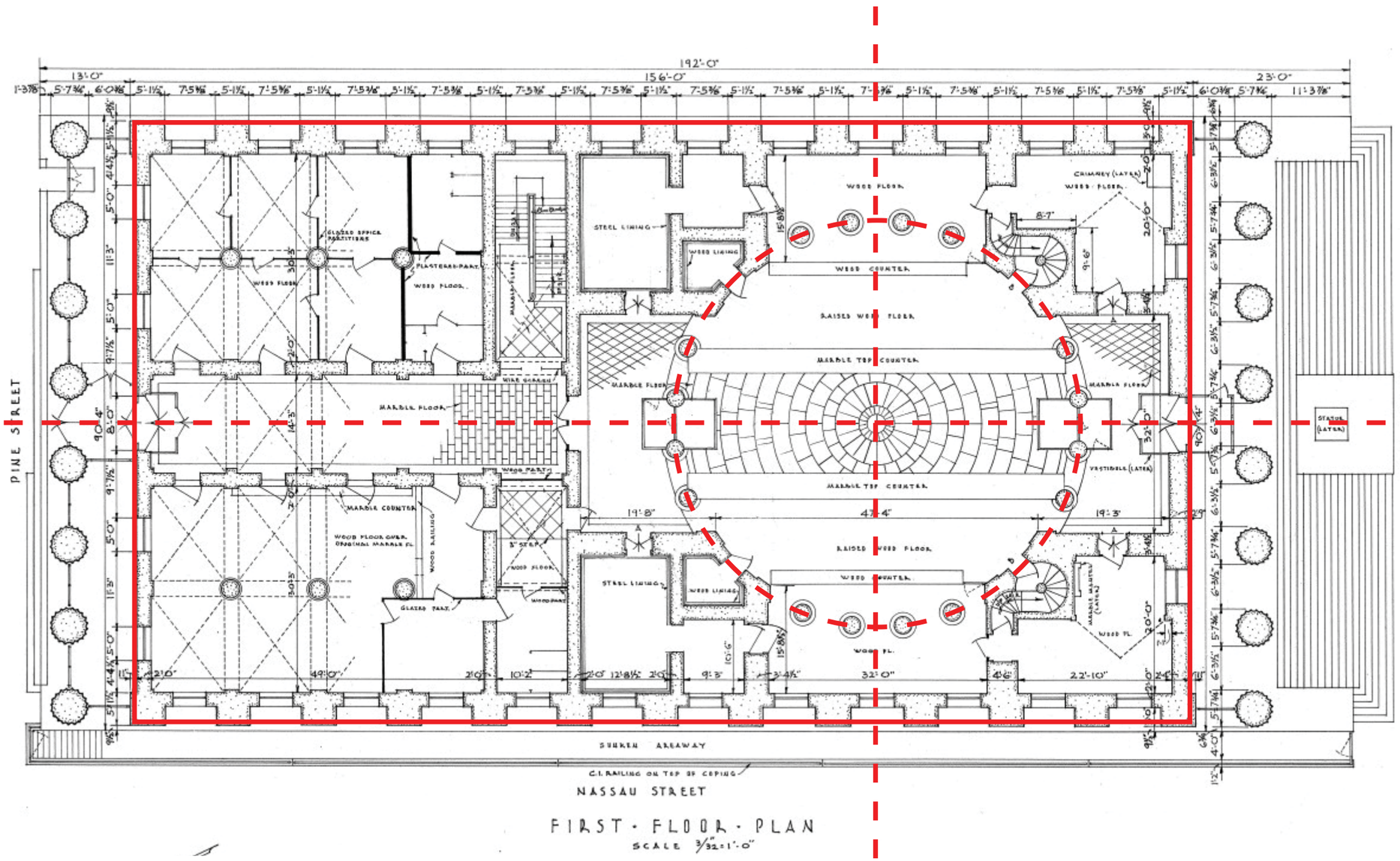
IDENTIFY ANOMALIES / CREATE REFERENCE (CENTER) LINES



FIRST · FLOOR · PLAN

SCALE 3/32"=1'-0"

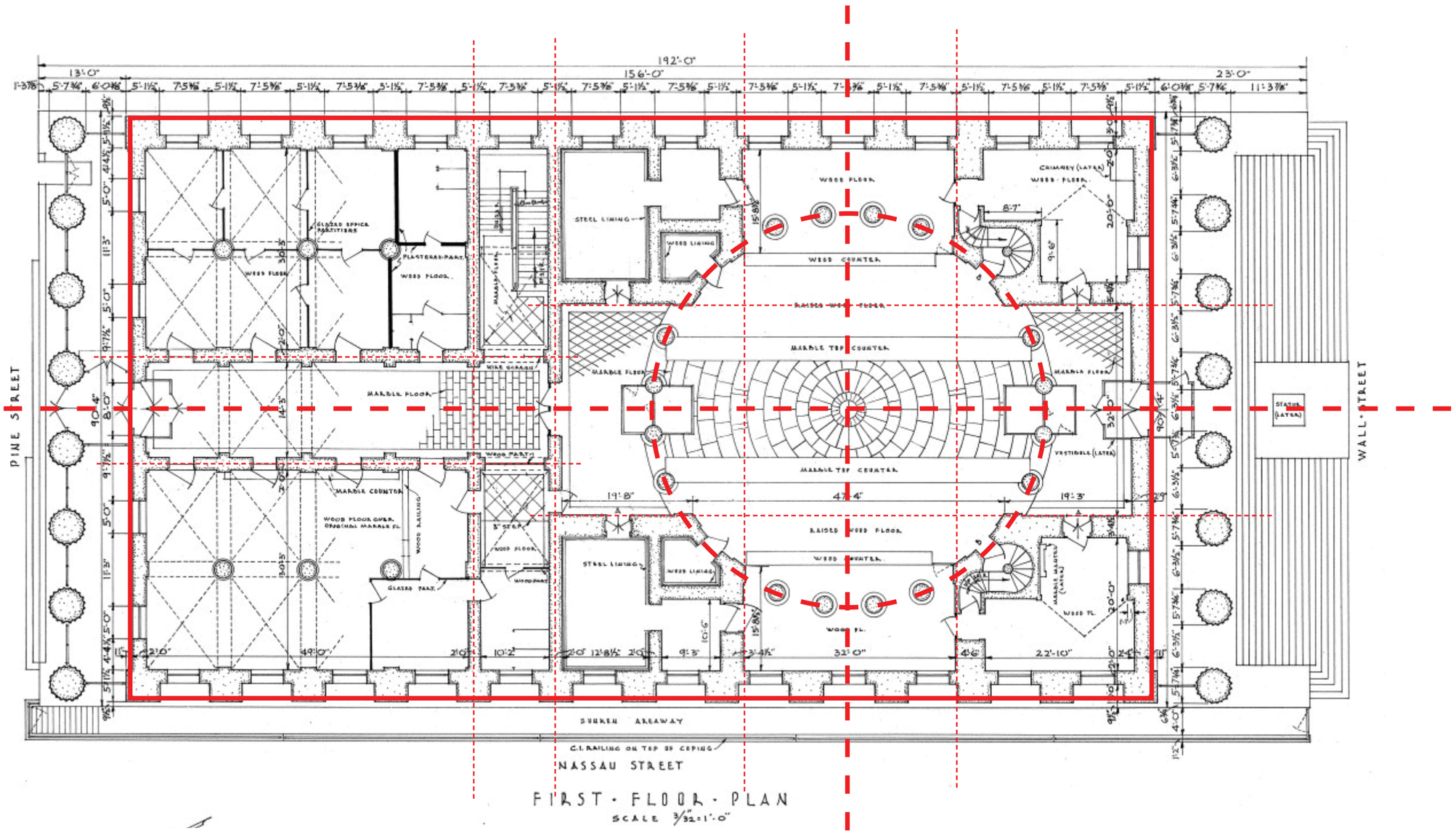
IDENTIFYING PLAN GEOMETRY - BUILDING FOOTPRINT



FIRST · FLOOR · PLAN

SCALE 3/32"=1'-0"

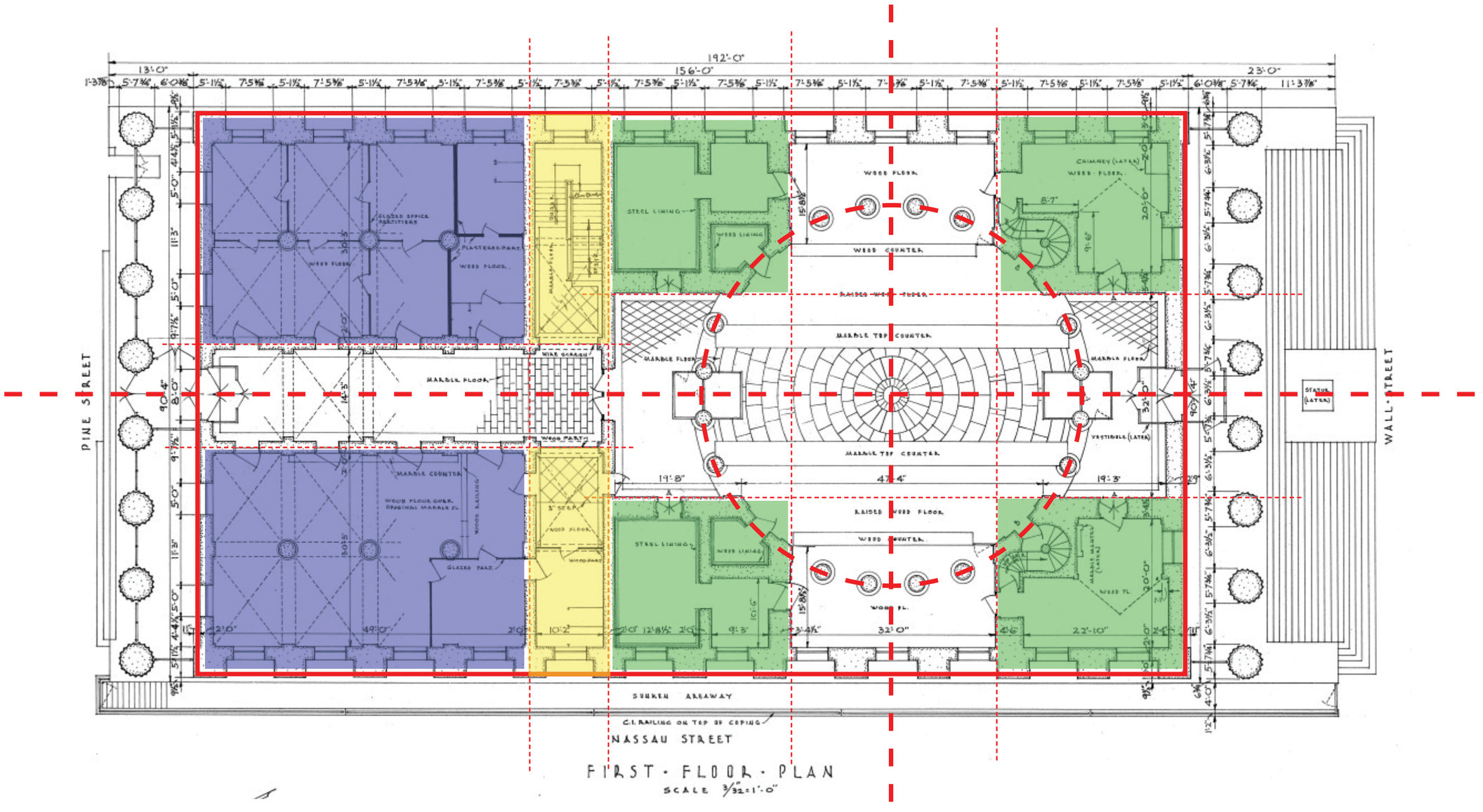
IDENTIFYING PLAN GEOMETRY - KEY OFFSETS / PROGRAM ZONES



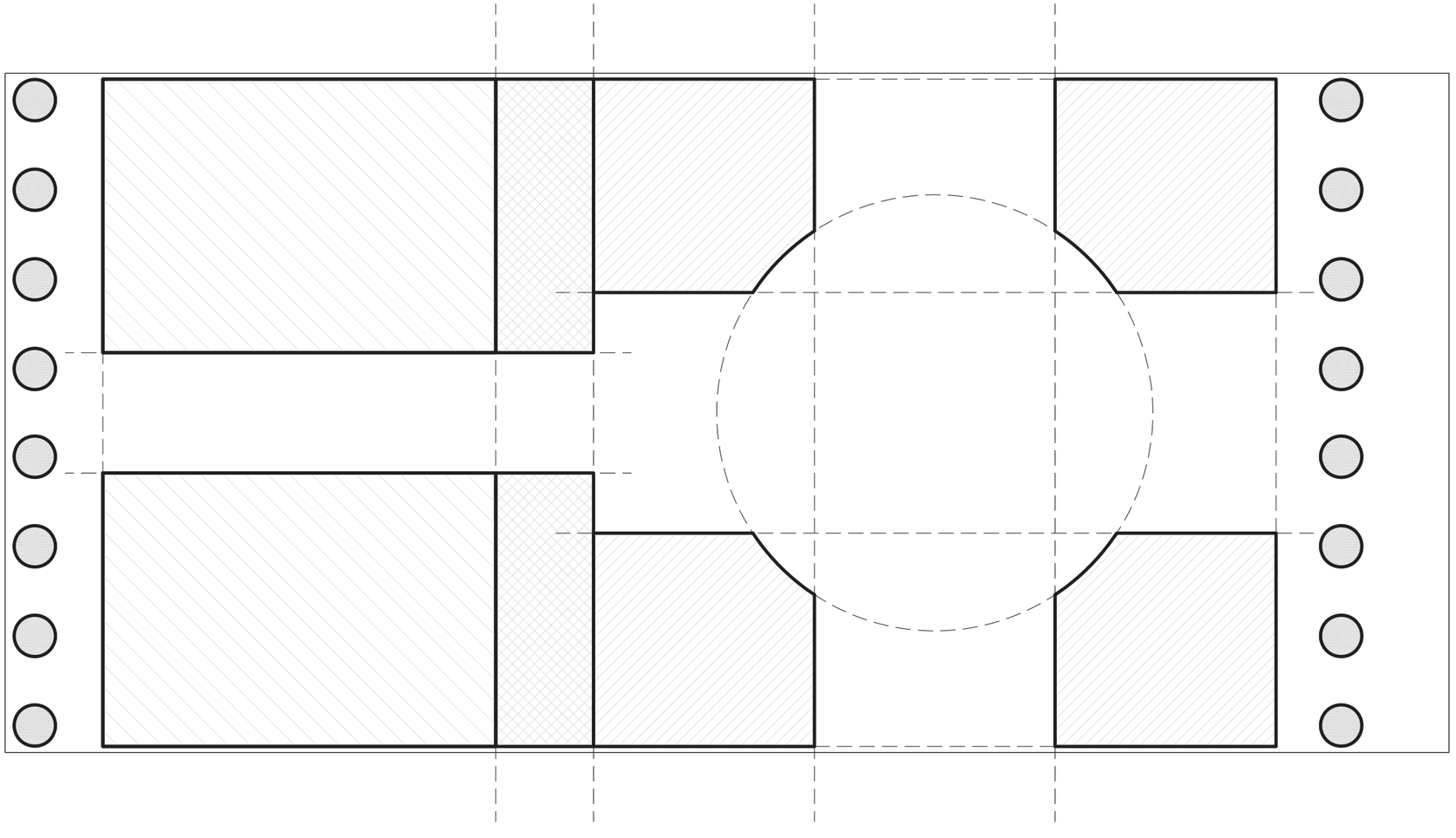
FIRST · FLOOR · PLAN

SCALE 3/32"=1'-0"

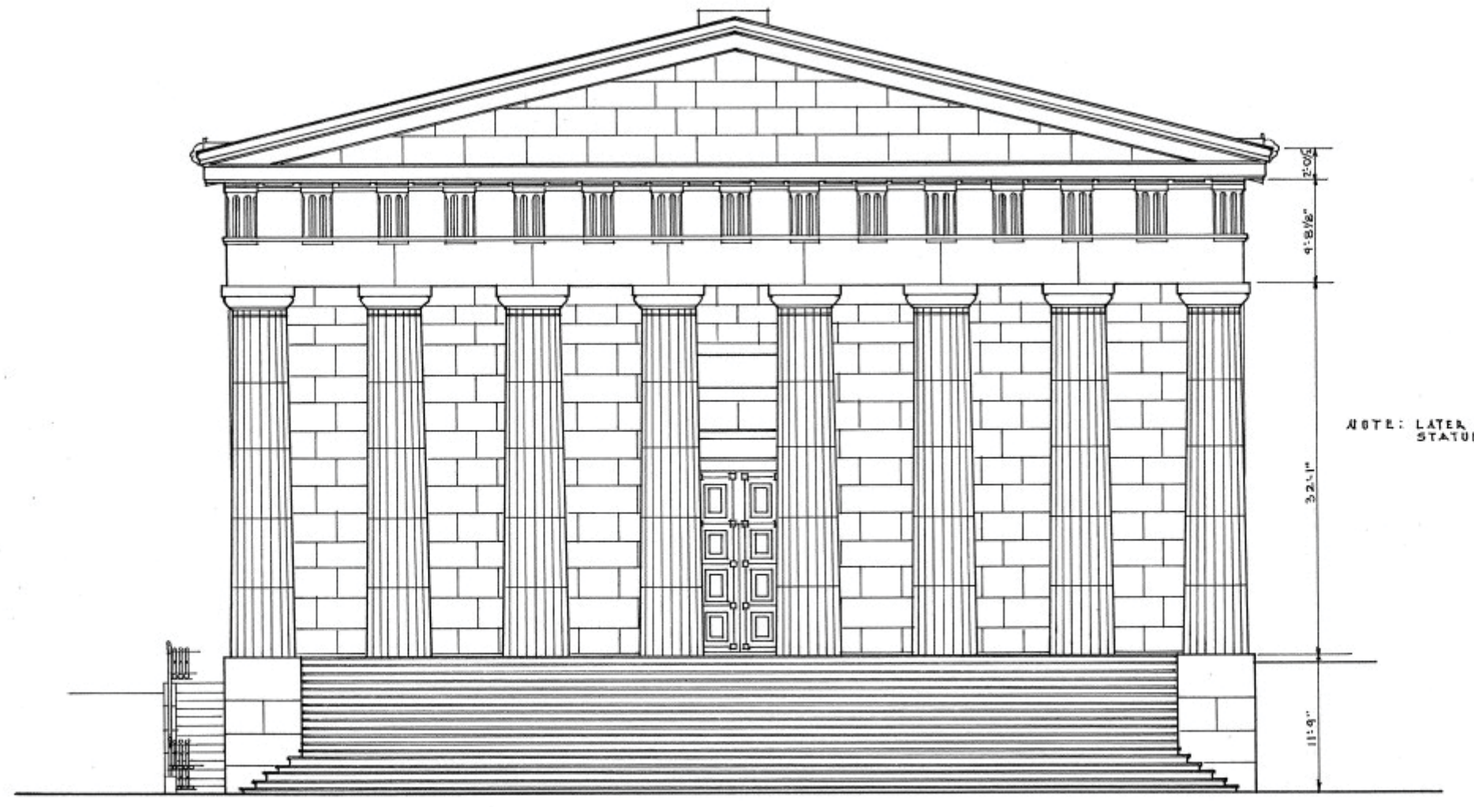
IDENTIFYING PLAN GEOMETRY - BLOCKING / GEOMETRY



GEOMETRY DIAGRAM



APPLICATION TO FEDERAL HALL...

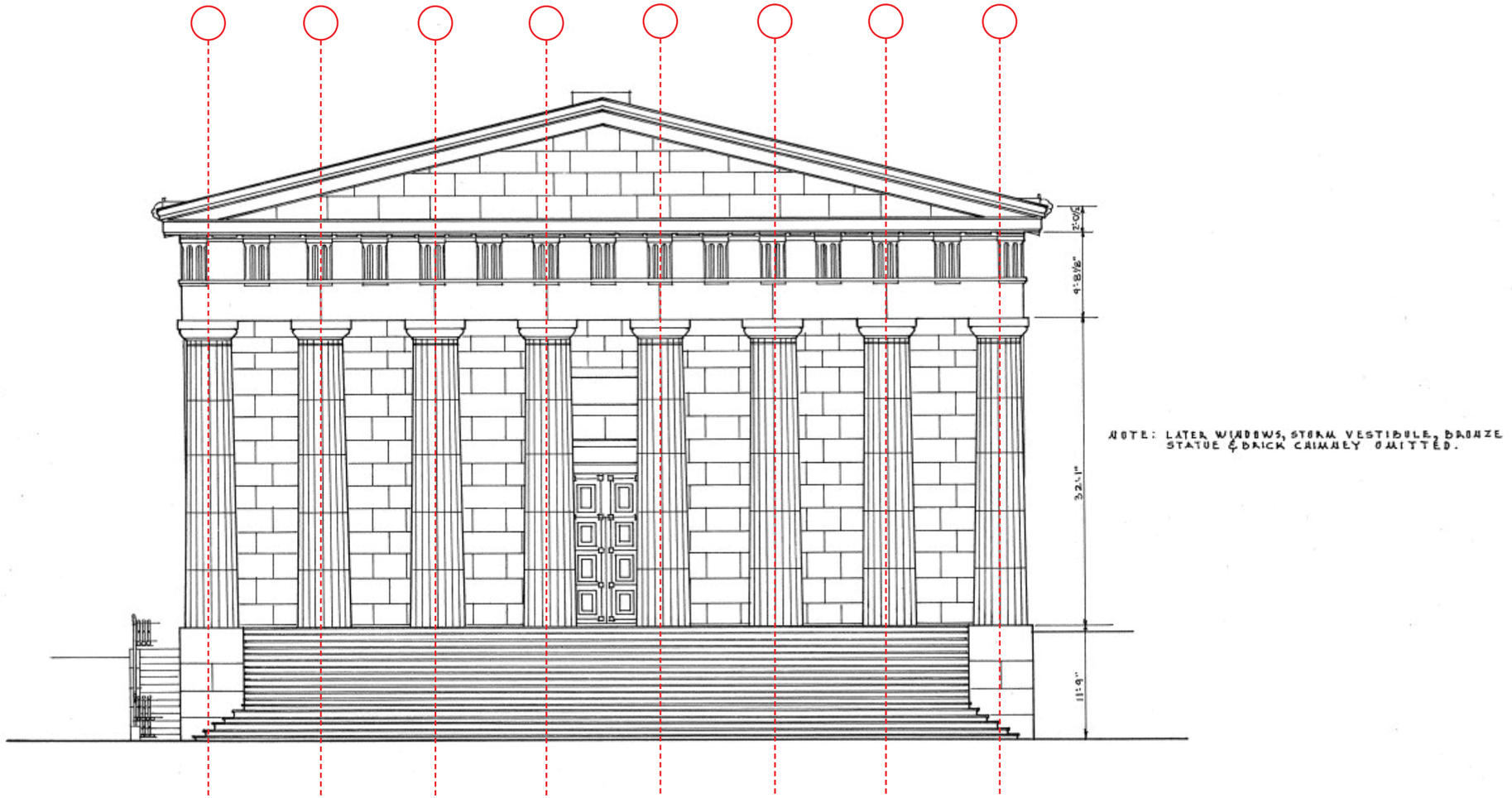


NOTE: LATER WINDOWS, STORM VESTIBULE, BRONZE STATUE & BRICK CHIMNEY OMITTED.

SOUTH (WALL STREET) ELEVATION

SCALE 3/32"=1'-0"

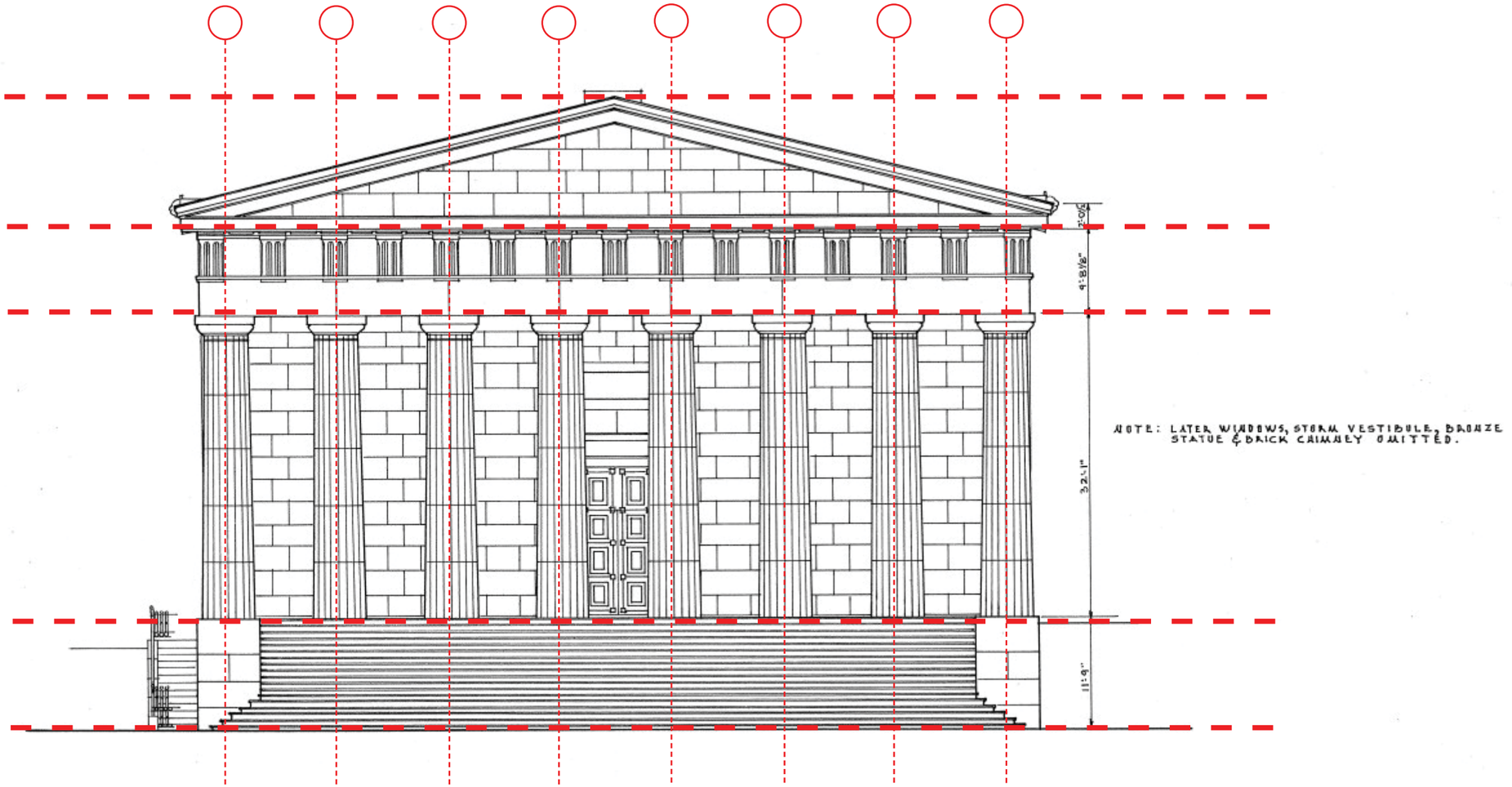
FIELD TRIP EXERCISE - IDENTIFY GRIDS



SOUTH (WALL STREET) ELEVATION

SCALE 3/32"=1'-0"

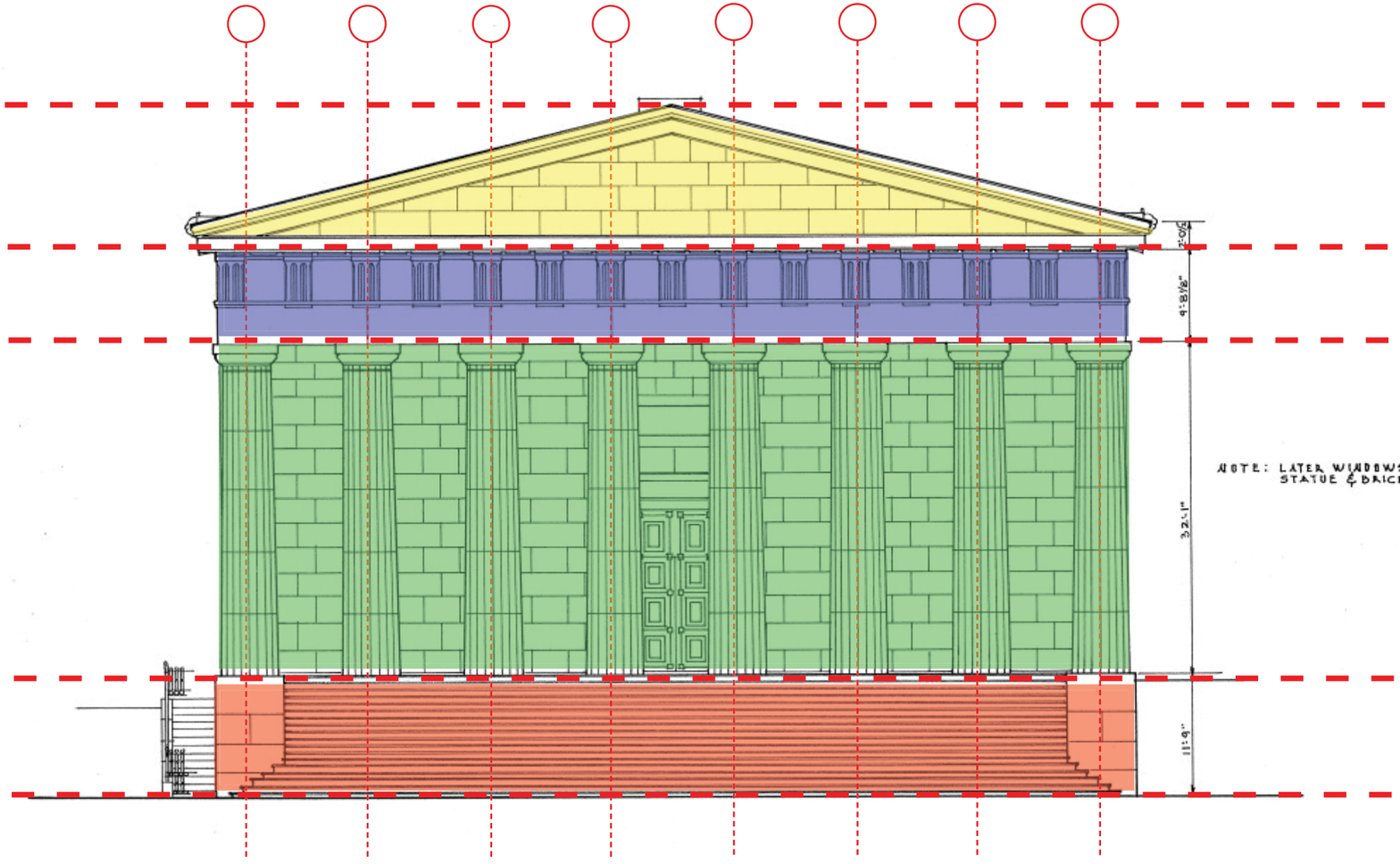
FIELD TRIP EXERCISE - IDENTIFY LEVELS / ZONES



SOUTH (WALL STREET) ELEVATION

SCALE 3/32"=1'-0"

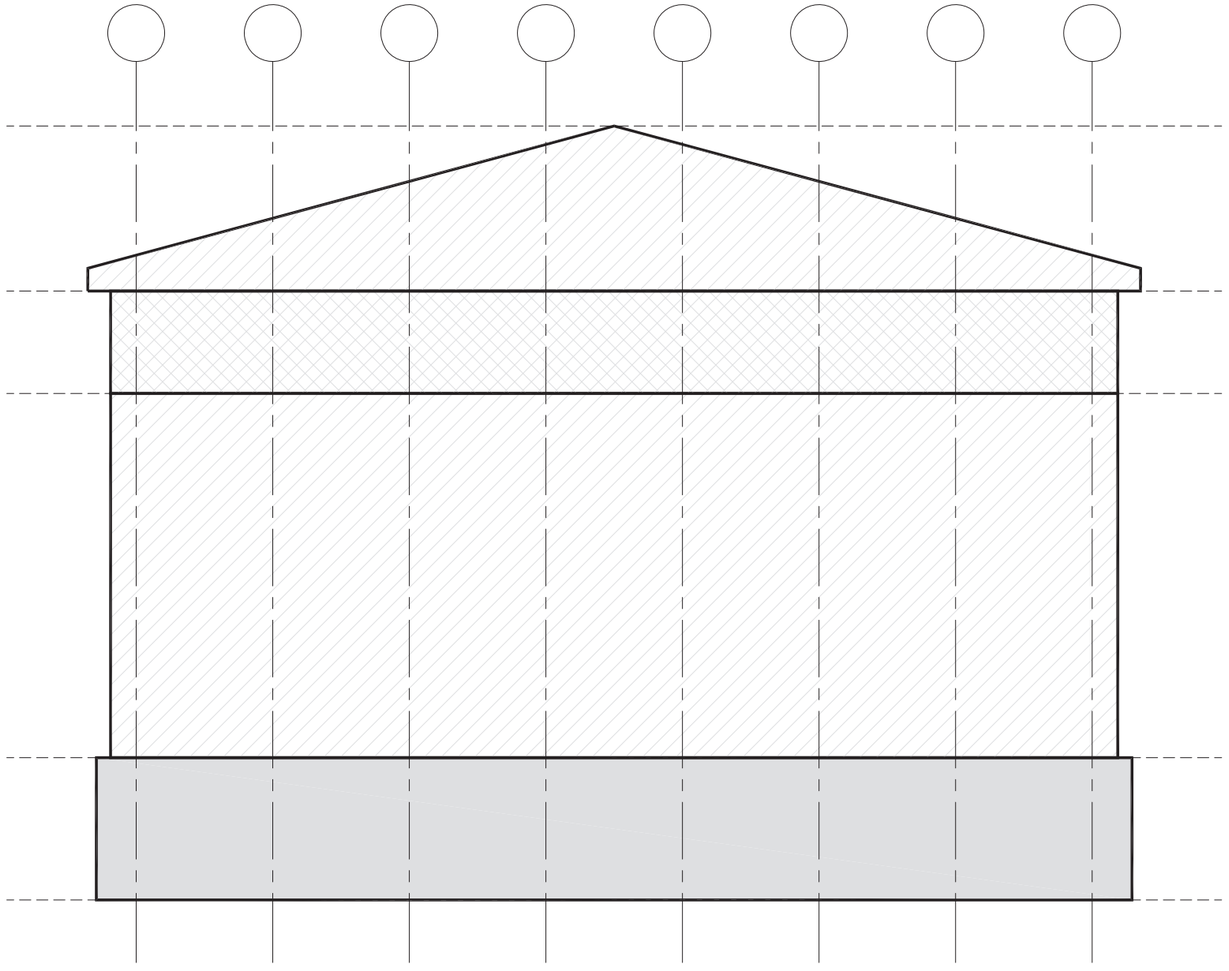
FIELD TRIP EXERCISE - IDENTIFY KEY GEOMETRIES



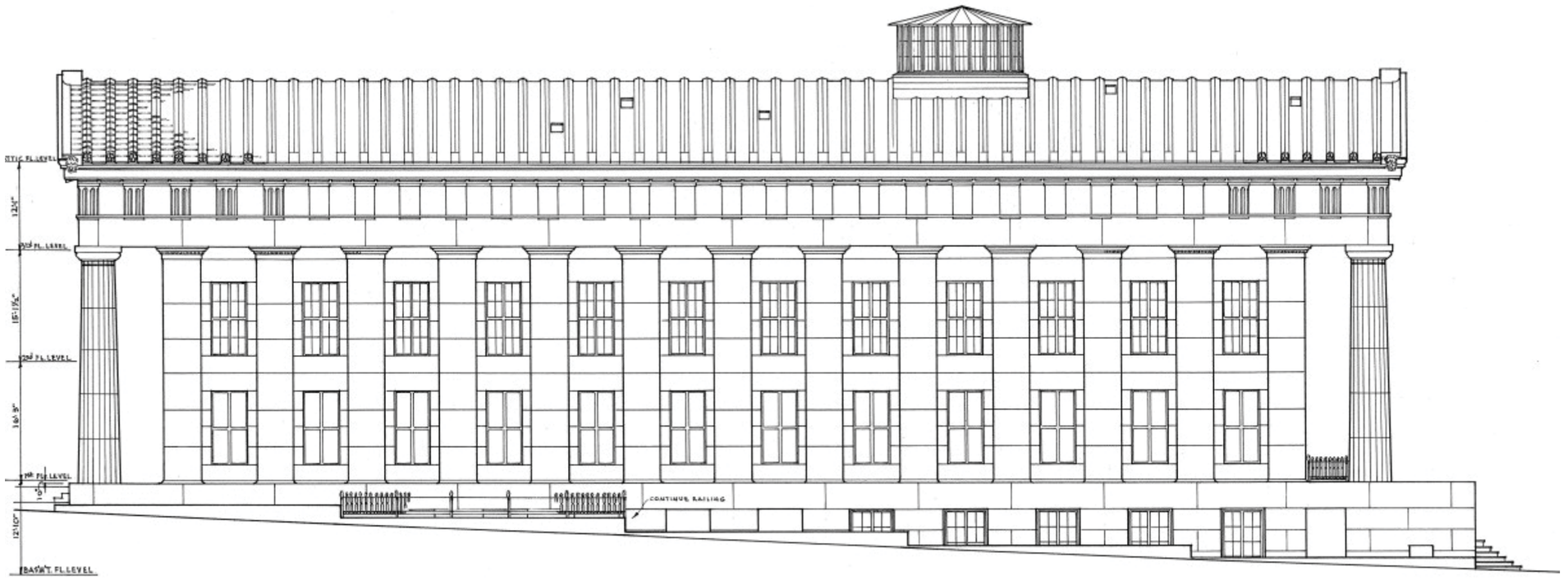
SOUTH (WALL STREET) ELEVATION

SCALE 3/32"=1'-0"

GEOMETRY DIAGRAM



FIELD TRIP EXERCISE

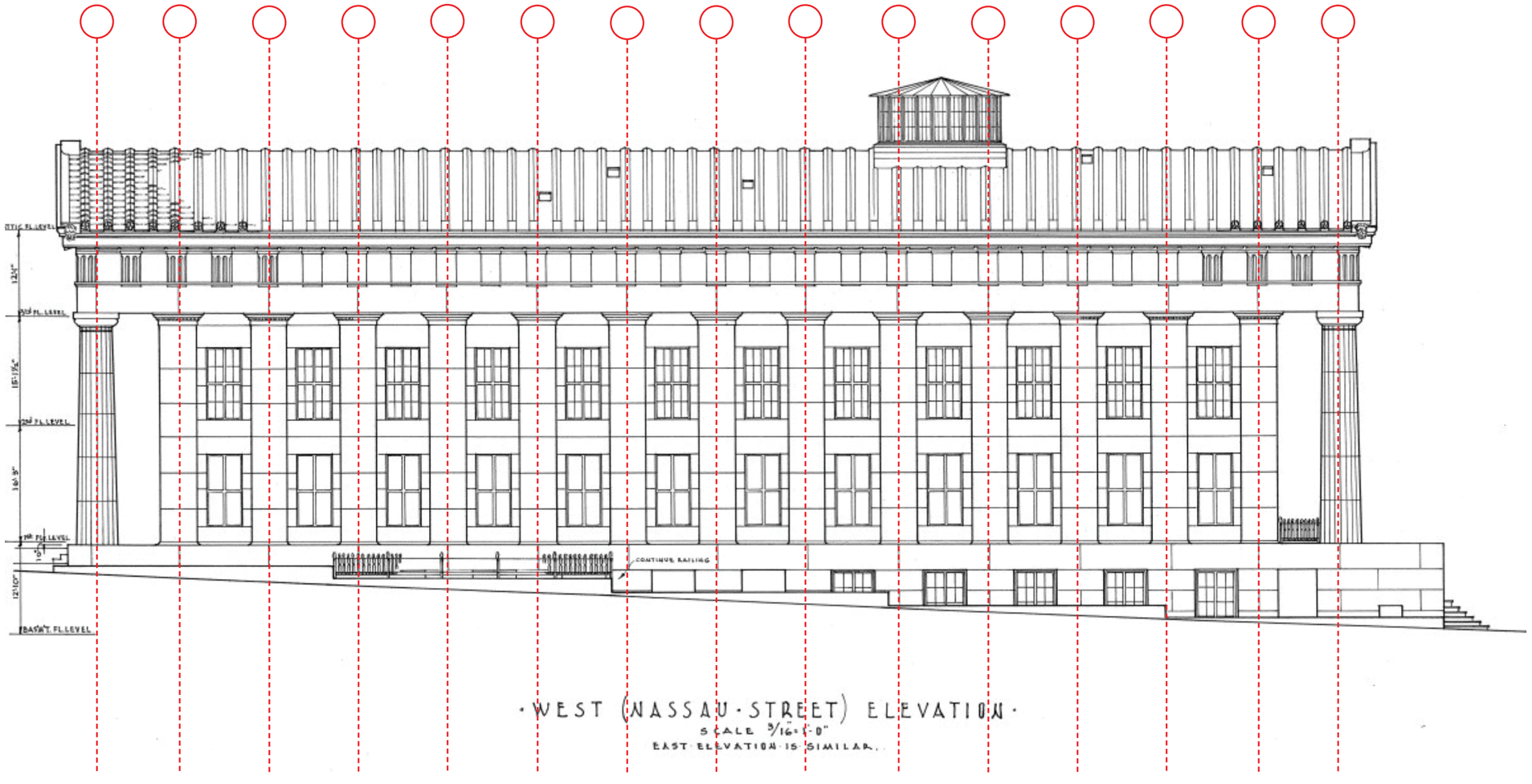


·WEST (NASSAU·STREET) ELEVATION·

SCALE 3/16"=1'-0"

EAST ELEVATION IS SIMILAR.

FIELD TRIP EXERCISE - IDENTIFY GRIDS

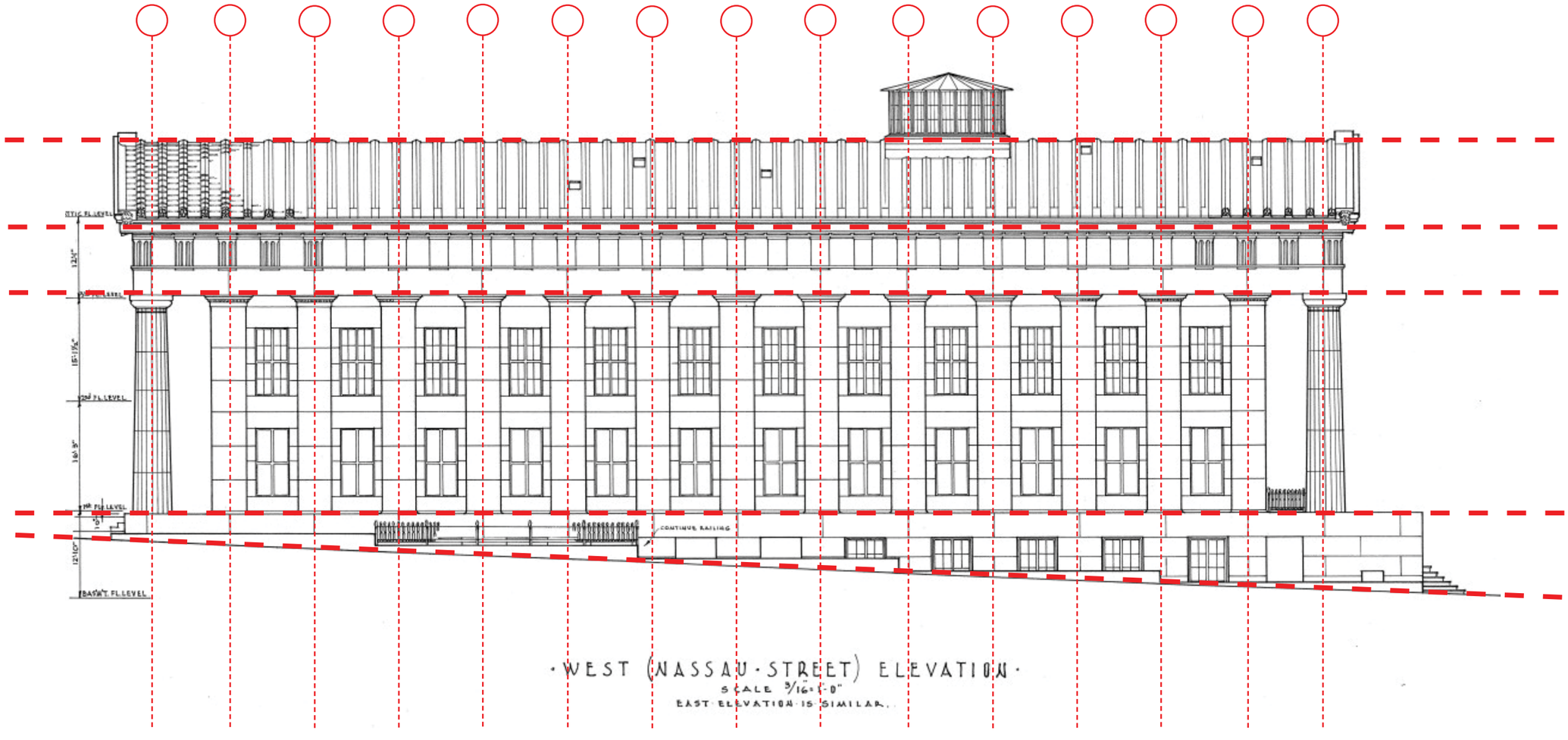


·WEST (NASSAU·STREET) ELEVATION·

SCALE 3/16"=1'-0"

EAST ELEVATION IS SIMILAR.

FIELD TRIP EXERCISE - IDENTIFY LEVELS / ZONES

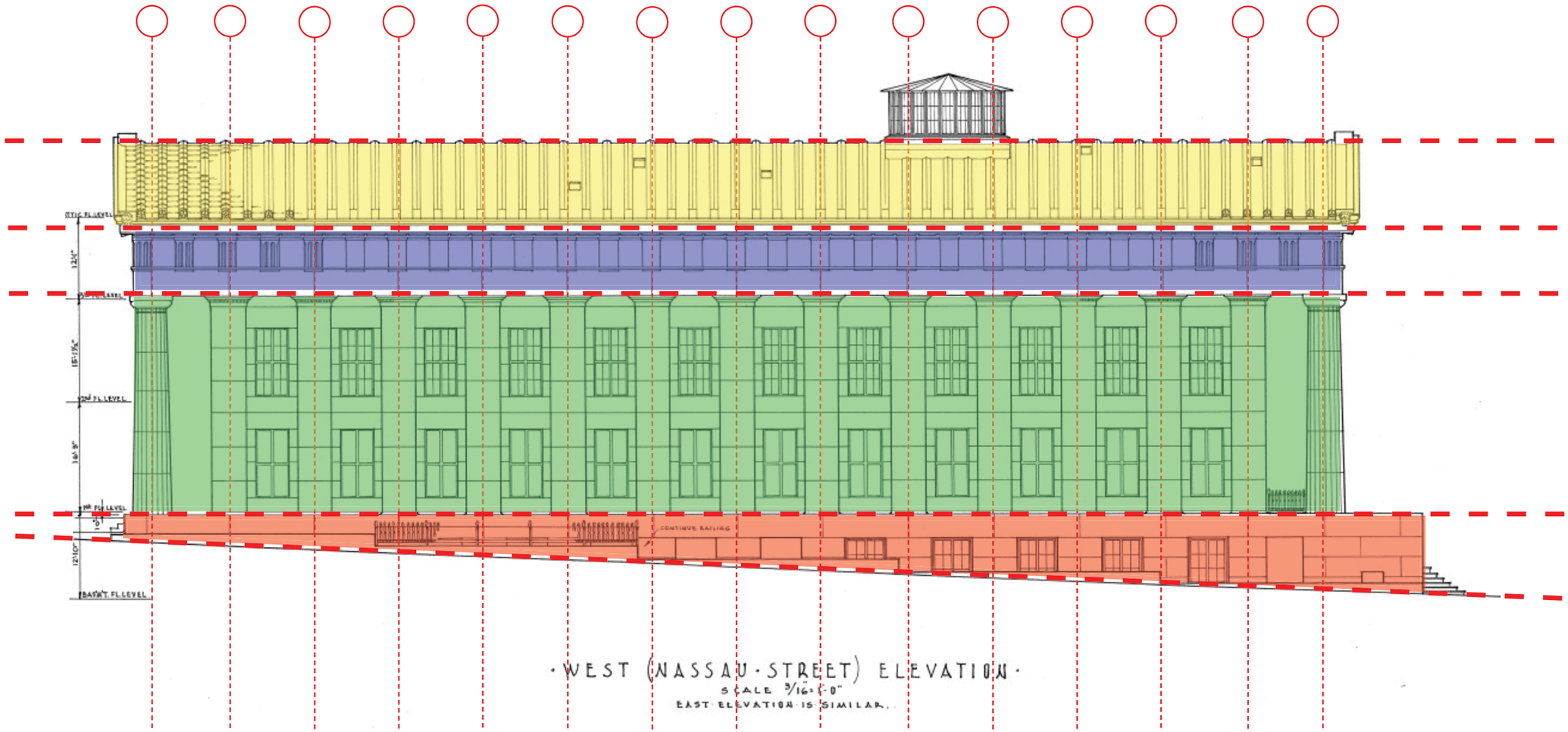


·WEST (NASSAU·STREET) ELEVATION·

SCALE 3/16"=1'-0"

EAST ELEVATION IS SIMILAR.

FIELD TRIP EXERCISE - IDENTIFY LEVELS / ZONES



· WEST (NASSAU · STREET) ELEVATION ·

SCALE 3/16"=1'-0"

EAST ELEVATION IS SIMILAR.