



# As-Built Construction Drawings

Team Middlebury  
US Department of Energy  
2013 Solar Decathlon

August 22, 2013

middsd@middlebury.edu



MIDDLEBURY COLLEGE

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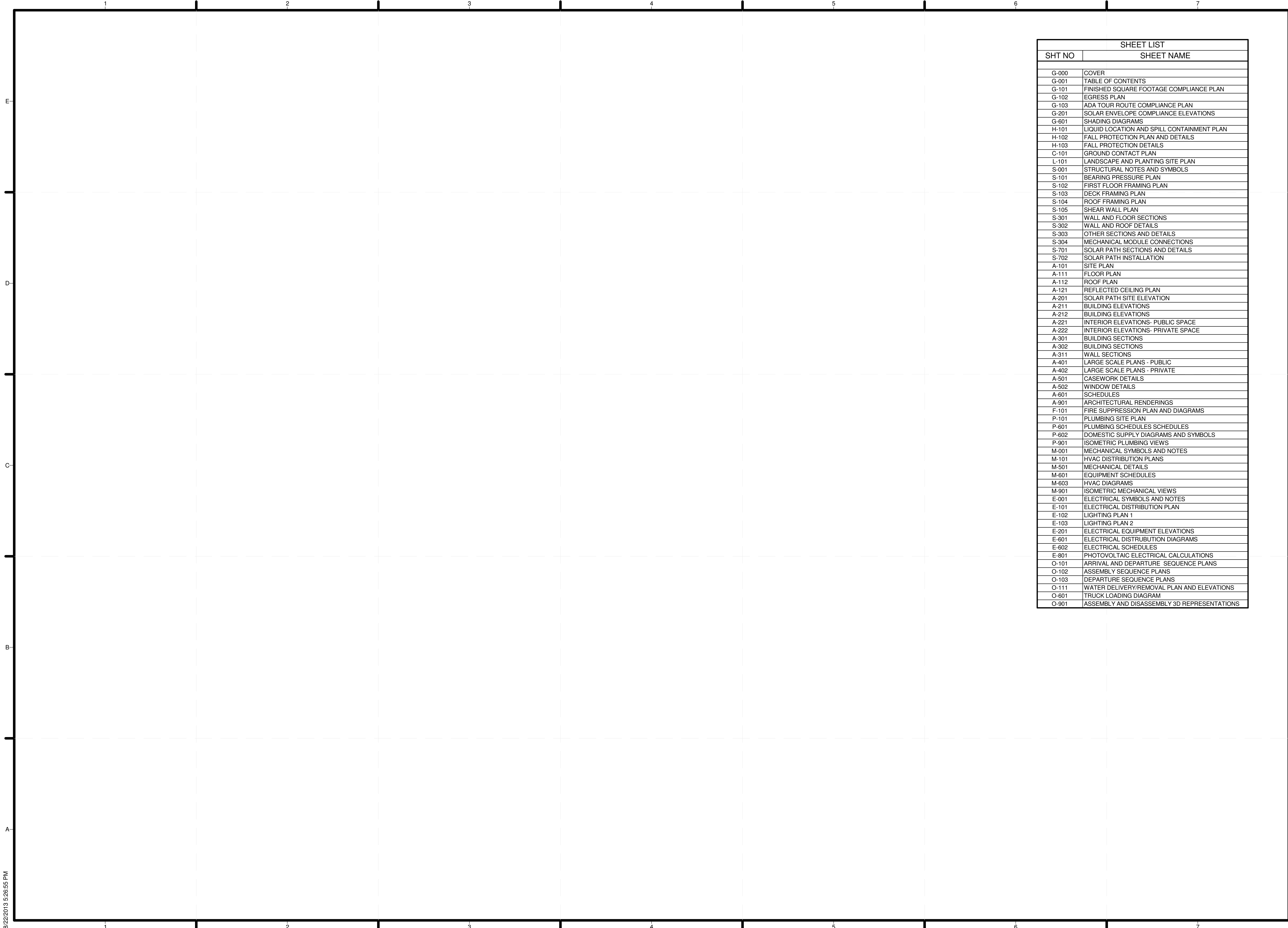
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G-001

GENERAL SHEET NOTES

- 1. FINISHED AREA: 971 SQUARE FEET. FINISHED SQUARE FOOTAGE CALCULATIONS BASED ON AS-BUILT MEASUREMENTS, BUT MAY VARY FROM THE FINISHED SQUARE FOOTAGE OF THE HOUSE AS BUILT AT COMPETITION SITE DUE TO CONSTRUCTION TOLERANCES.. DIMENSIONS ARE TAKEN FROM EXTERIOR FINISH FACE OF WALLS AT T.O. FINISH FLOOR LEVEL.
- 2.



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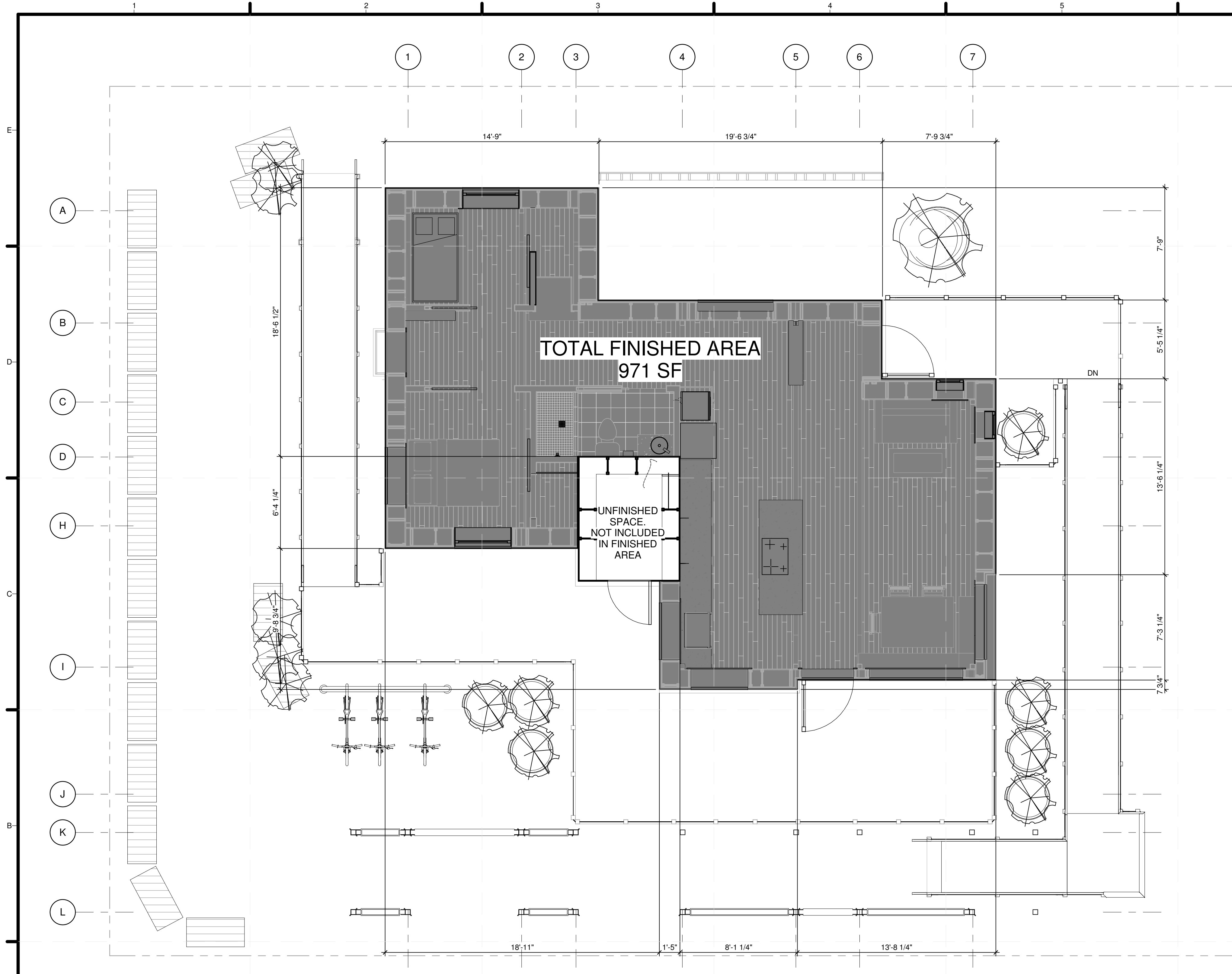
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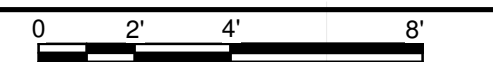
FINISHED SQUARE FOOTAGE COMPLIANCE PLAN

G-101



A1 FINISHED SQUARE FOOTAGE COMPLIANCE PLAN

1/4" = 1'-0"





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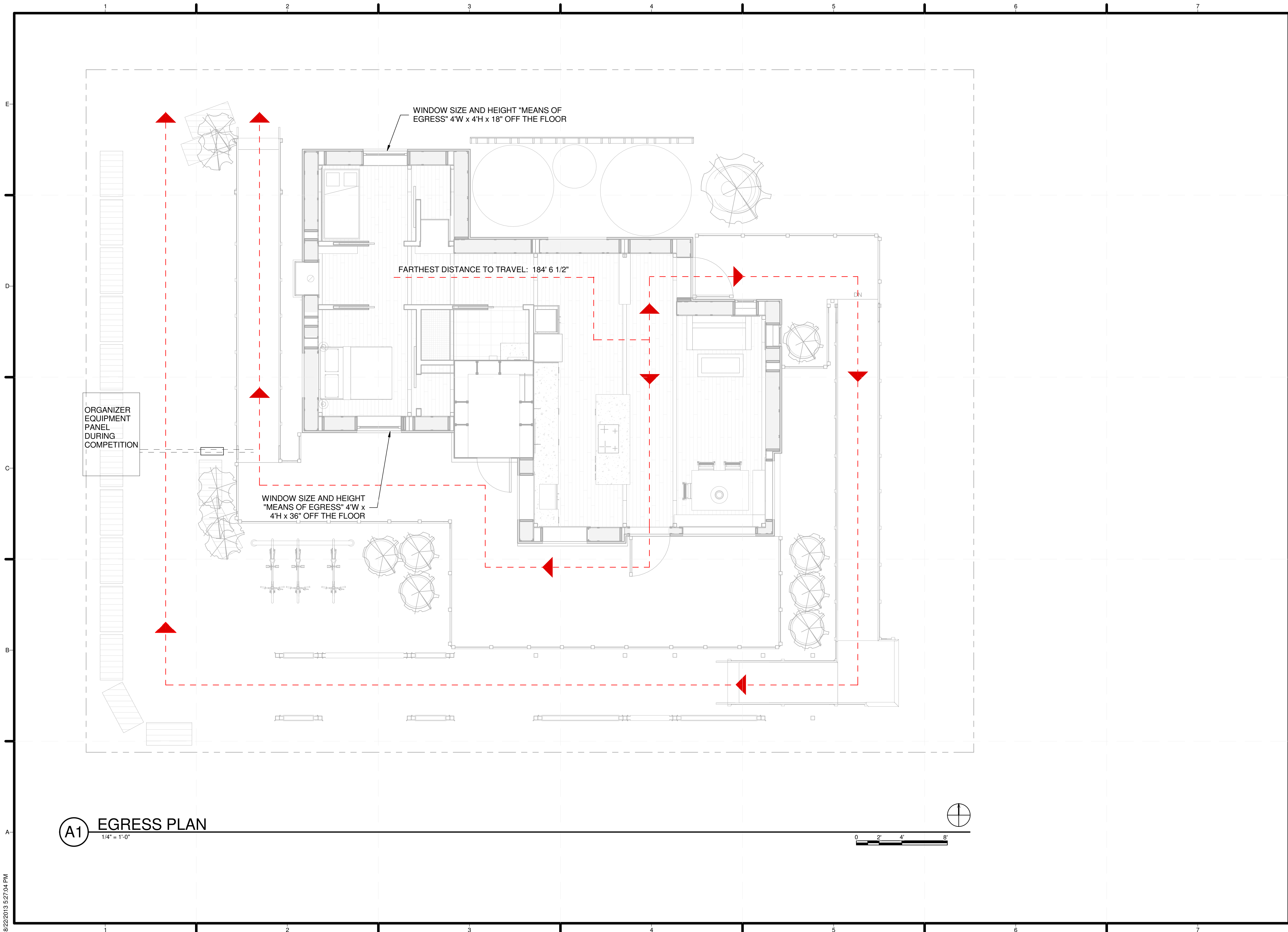
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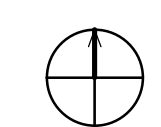
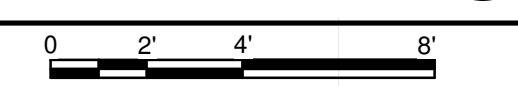
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EGRESS PLAN

G-102



**A1** EGRESS PLAN  
 1/4" = 1'-0"



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**GENERAL SHEET NOTES**

- TOUR ROUTE STATIONS  
 1. THE PATH/5 POINTS  
 2. WELCOME TO THE HOME  
 3. LIVING SPACE  
 4. QUICK TURN-AROUND  
 5. PUBLIC SPACE CONT.  
 6. MECHANICAL MODULE  
 7. MASTER BEDROOM  
 8. GREEN ROOF  
 9. FAREWELL



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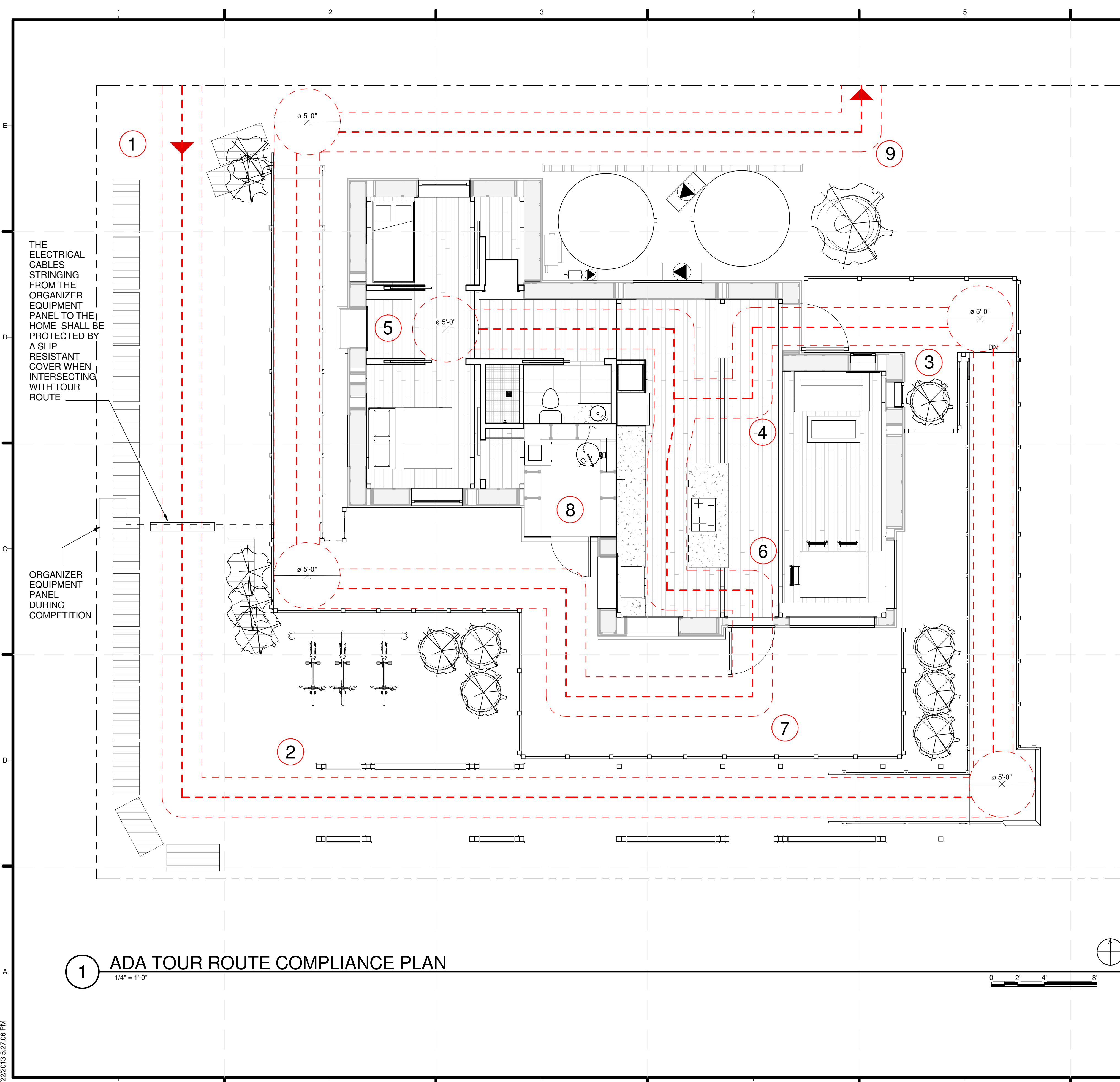
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ADA TOUR ROUTE COMPLIANCE PLAN

**G-103**



THE ELECTRICAL CABLES STRINGING FROM THE ORGANIZER EQUIPMENT PANEL TO THE HOME SHALL BE PROTECTED BY A SLIP RESISTANT COVER WHEN INTERSECTING WITH TOUR ROUTE

ORGANIZER EQUIPMENT PANEL DURING COMPETITION

**1 ADA TOUR ROUTE COMPLIANCE PLAN**  
 1/4" = 1'-0"

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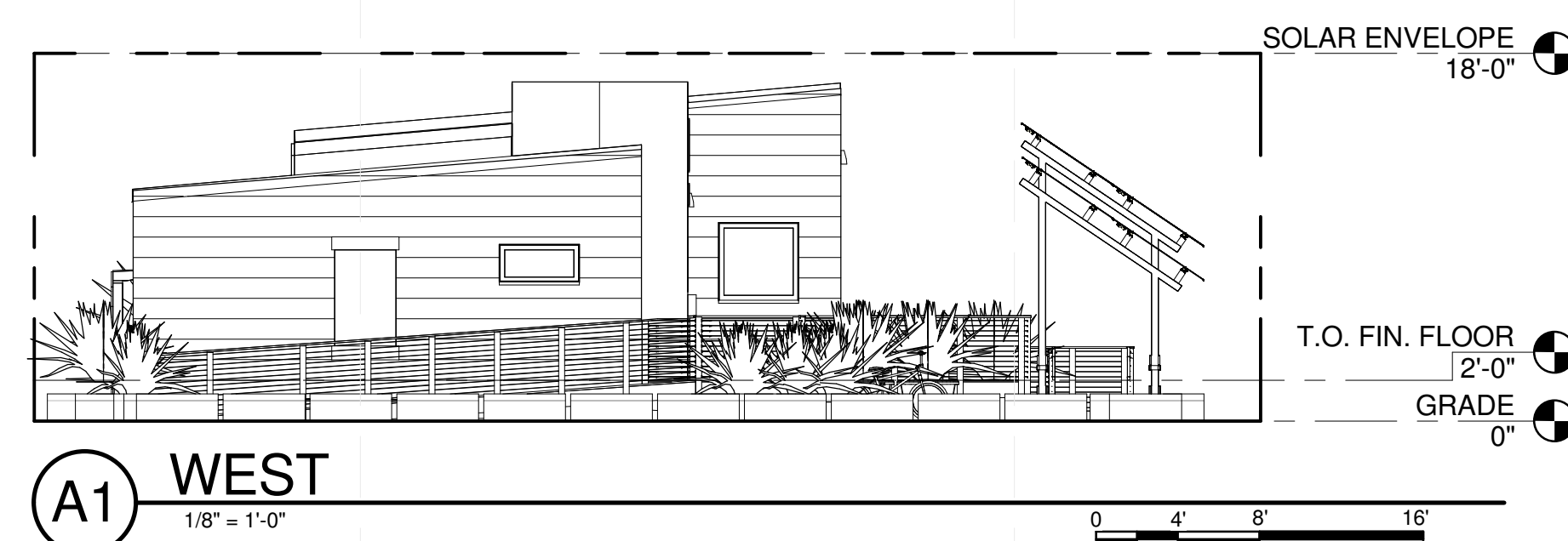
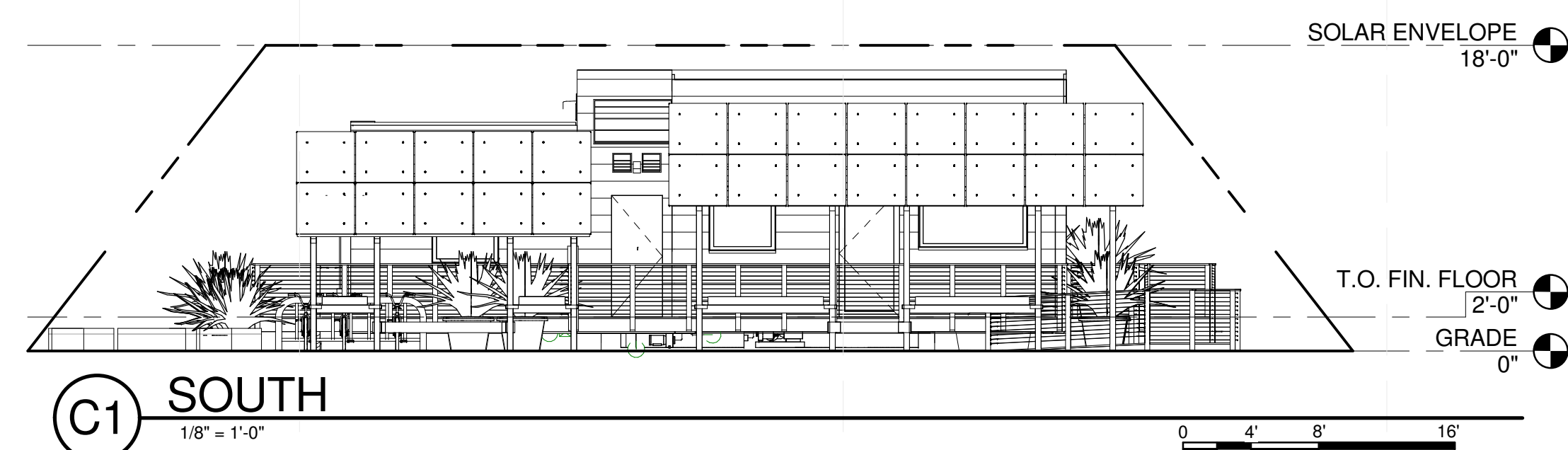
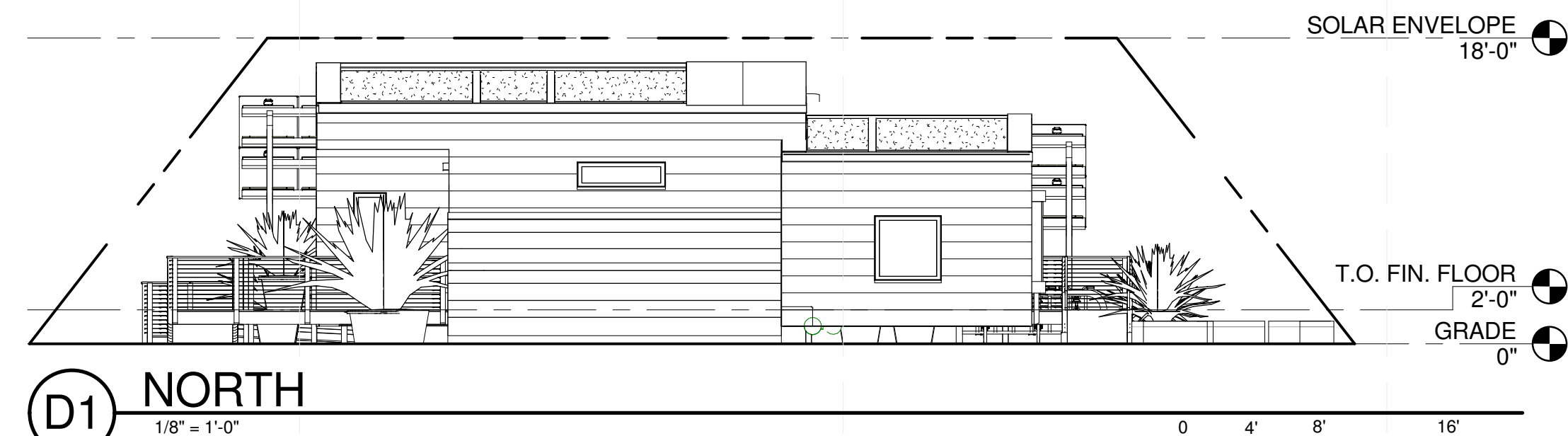
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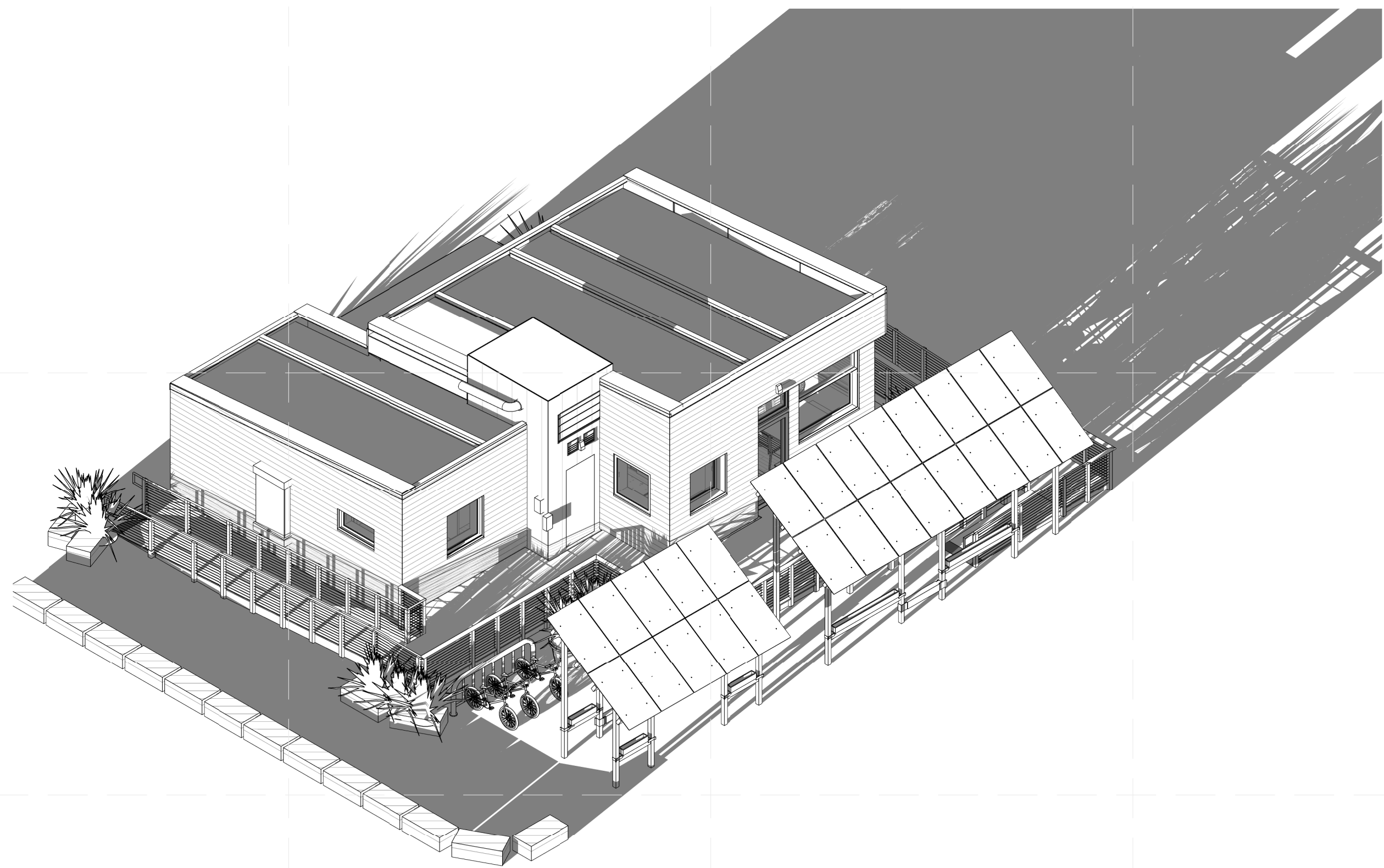
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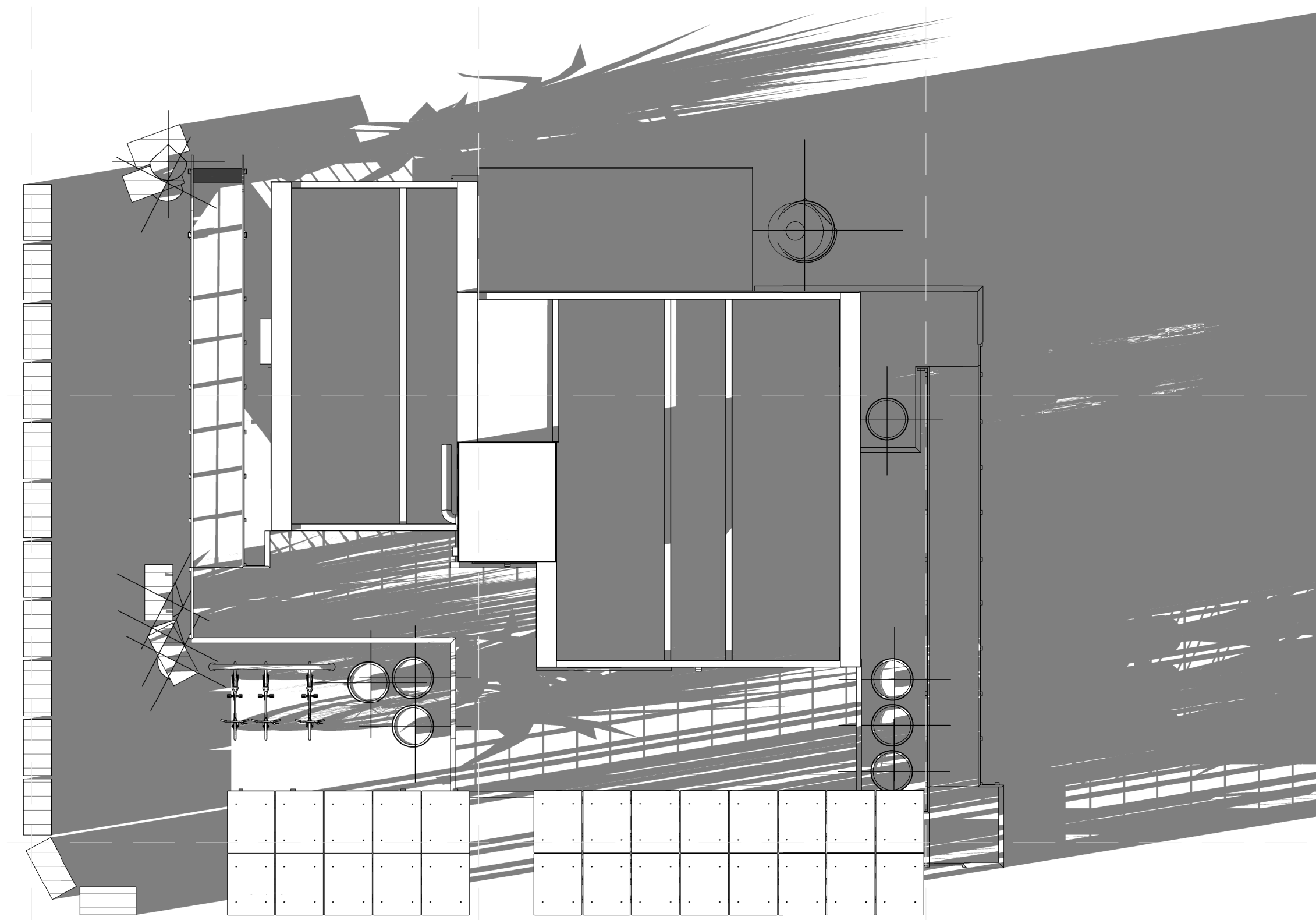
SOLAR ENVELOPE  
 COMPLIANCE  
 ELEVATIONS

G-201

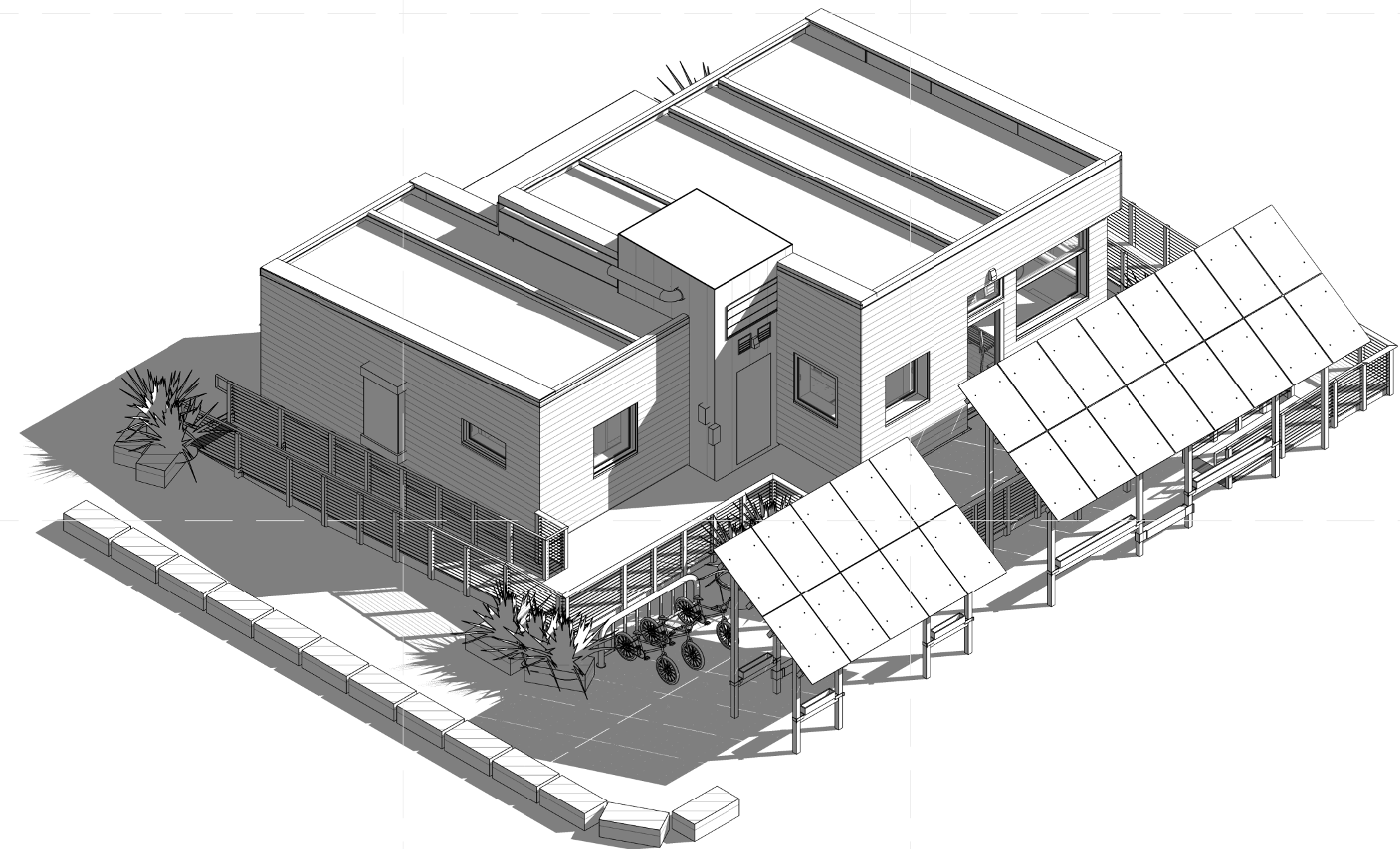




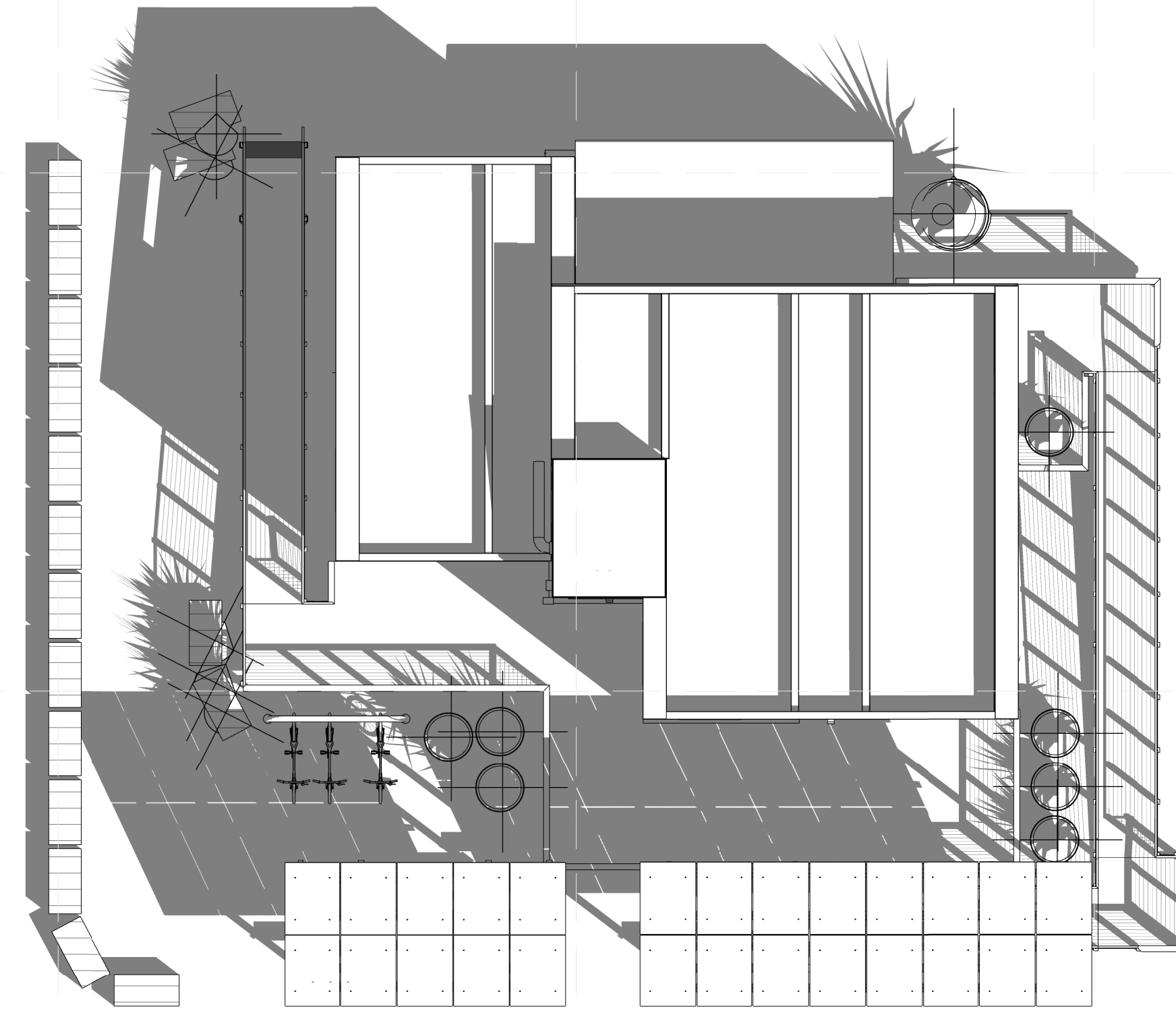
C1 IRVINE 1700 HOURS 10/3/2013 ISOMETRIC



C4 IRVINE 1700 HOURS 10/3/2013 PLAN



A1 IRVINE 0900 HOURS 10/3/2013 ISOMETRIC



A4 IRVINE 0900 HOURS 10/3/2013 PLAN



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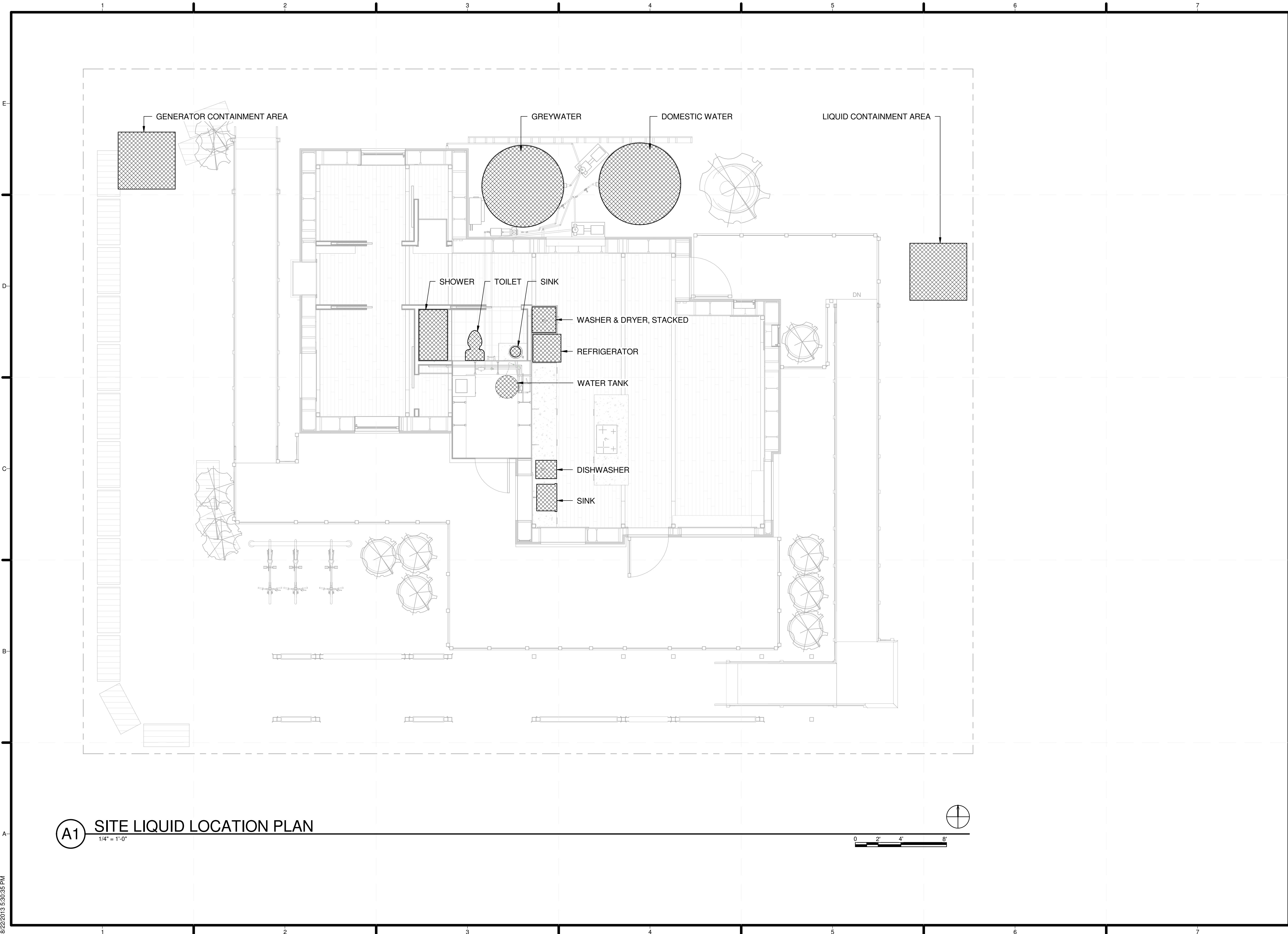
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**SHADING DIAGRAMS**

**G-601**



**A1** SITE LIQUID LOCATION PLAN  
1/4" = 1'-0"



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**LIQUID LOCATION AND  
 SPILL CONTAINMENT  
 PLAN**

**H-101**

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**GENERAL SHEET NOTES**

1. OSHA COMPLIANT GUARDRAILS AROUND UPPER ROOF, ACROSS MECHANICAL MODULE ROOF, AND TANK COVER ROOF, AT LOCATIONS INDICATED.



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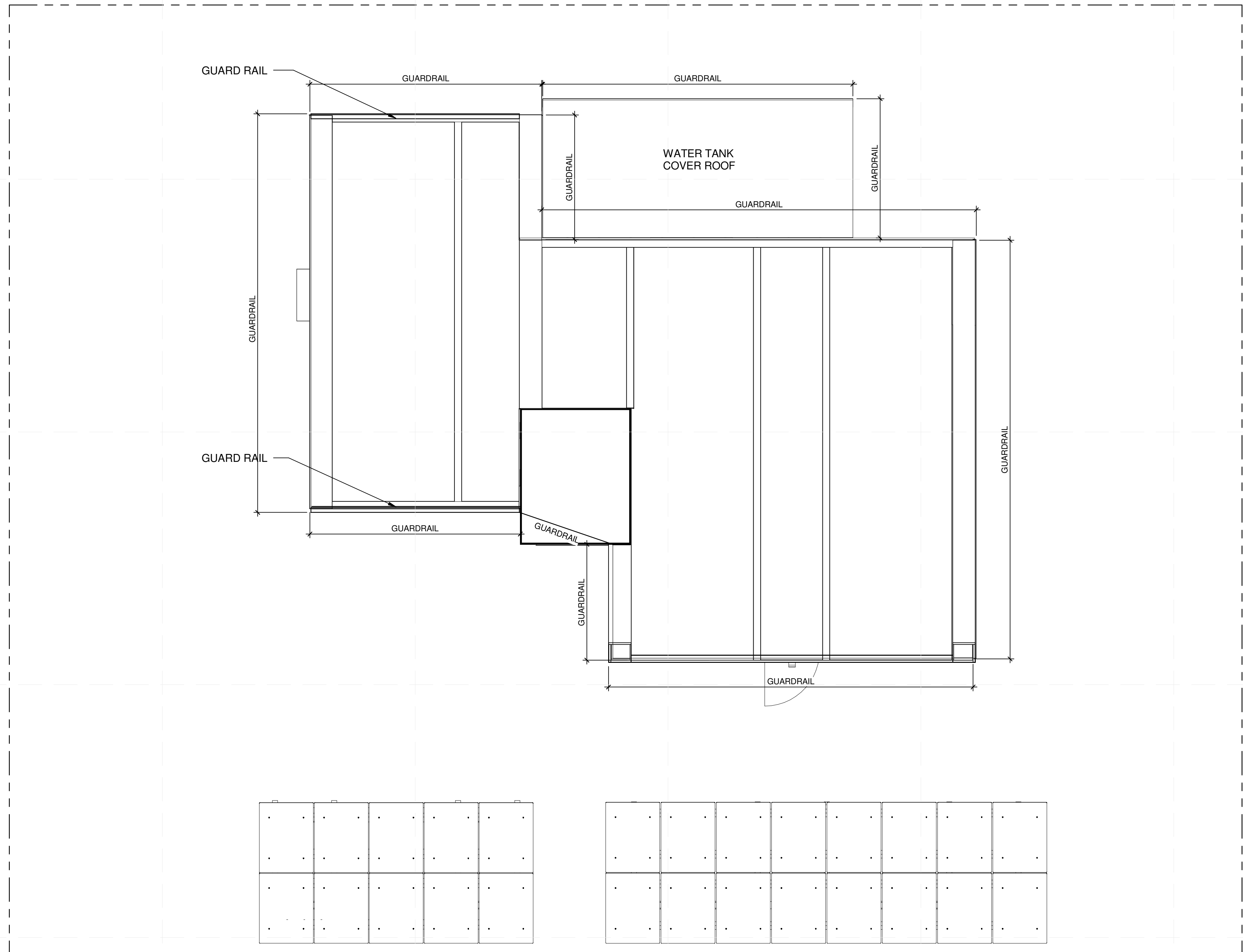
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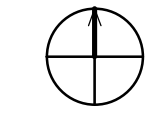
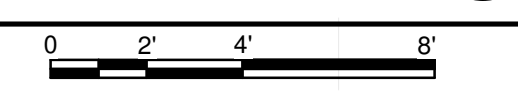
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**FALL PROTECTION PLAN AND DETAILS**

**H-102**



**A1 FALL PROTECTION PLAN**

1/4" = 1'-0"



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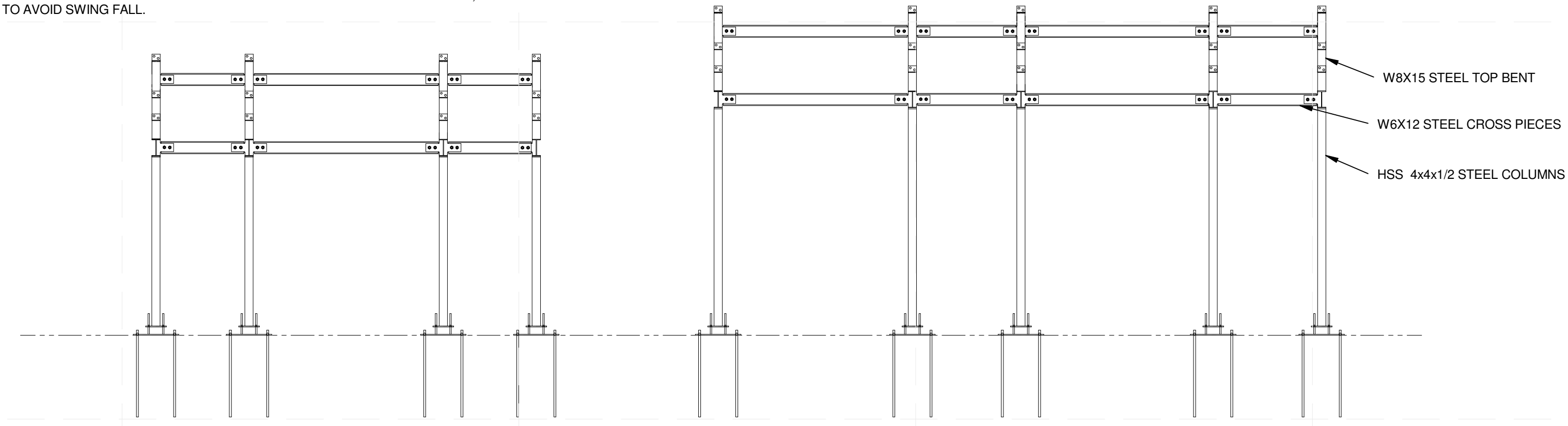
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FALL PROTECTION  
 DETAILS

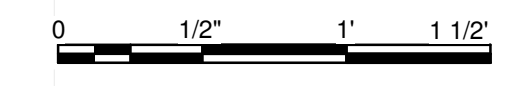
H-103

PERSONAL FALL ARREST SYSTEM  
 DESIGN FOR TWO PERSONAL FALL ARREST SYSTEMS PER STRUCTURE. ONLY ONE ANCHOR PER BEAM AT A TIME.  
 W6X12 AND W8X15 BEAMS OKAY FOR ALL ASSOCIATED FORCES ASSOCIATED WITH ONE PFAS ANCHOR (AT LEAST 5,000LBS).  
 STRUCTURES OKAY FOR ALL FORCES ASSOCIATED WITH TWO PFAS ANCHORS (AT LEAST 10,000LBS).  
 SEE STRUCTURAL CALCULATIONS - PROJECT MANUAL PAGE 103 (SOLAR ARRAY STRUCTURE SECTION)  
 WORKER SHALL NEVER BE MORE THAN 4' FROM THEIR ANCHOR, SO FREE FALL IS LIMITED TO 6' (SRL LIMITS FALL TO 2')  
 ENSURE 100% COVERAGE BY EMPLOYING A TWO LEAD SYSTEM AND CLIPPING INTO THE SECOND ANCHOR BEFORE  
 UNCLIPPING THE FIRST ANCHOR. TRANSITION BETWEEN PARALLEL W6X12 BEAMS AT W8X15 BEAM.  
 ANCHORS ARE PASS THROUGH SLINGS THAT SLIDE PARALLEL TO WORKER, NEVER MORE THAN 15 DEGREES FROM ANCHOR  
 TO AVOID SWING FALL.

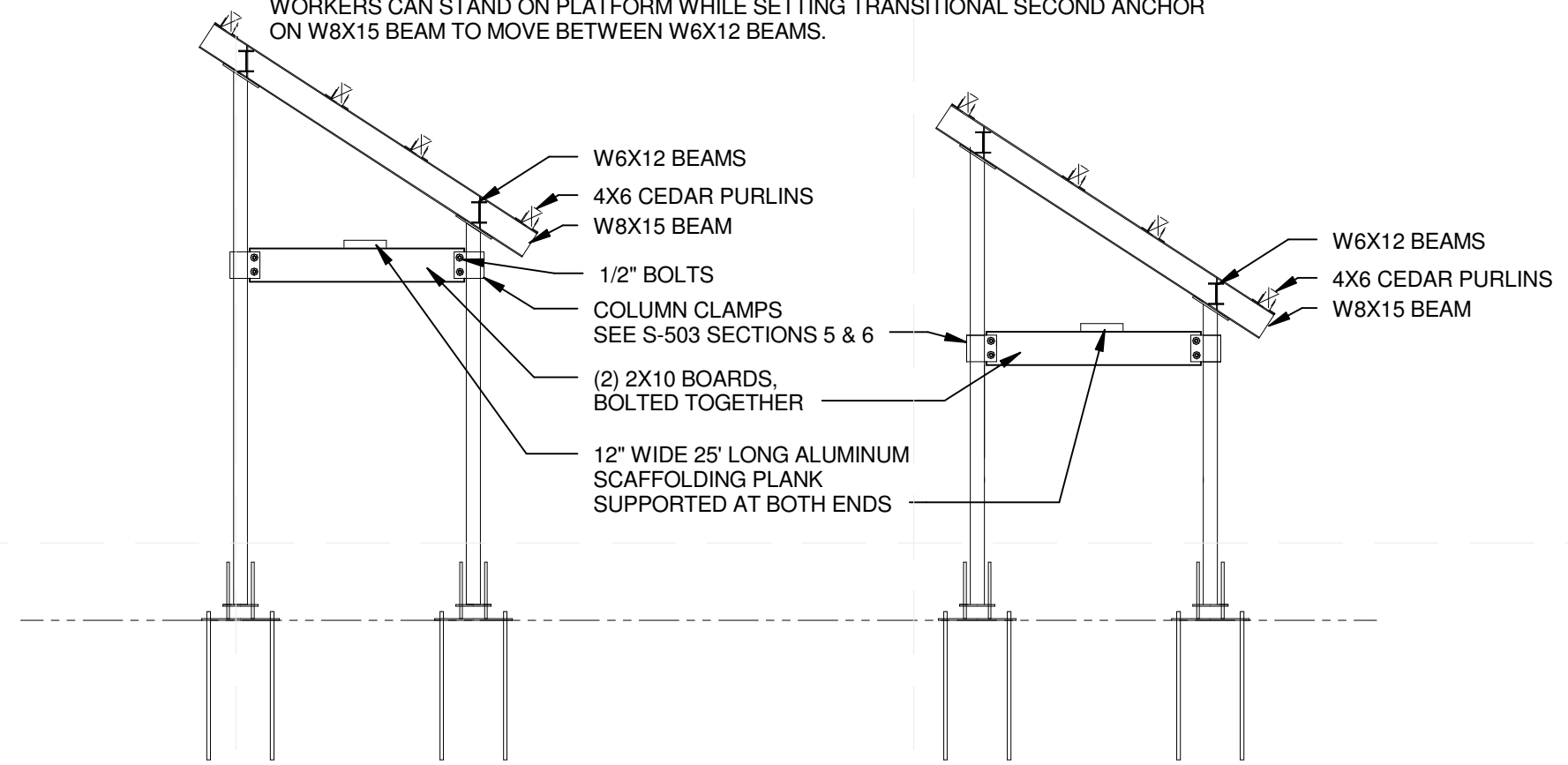


SOLAR PATH PERSONAL FALL ARREST SYSTEM  
 SOUTERN ELEVATION

C1 1/4" = 1'-0"

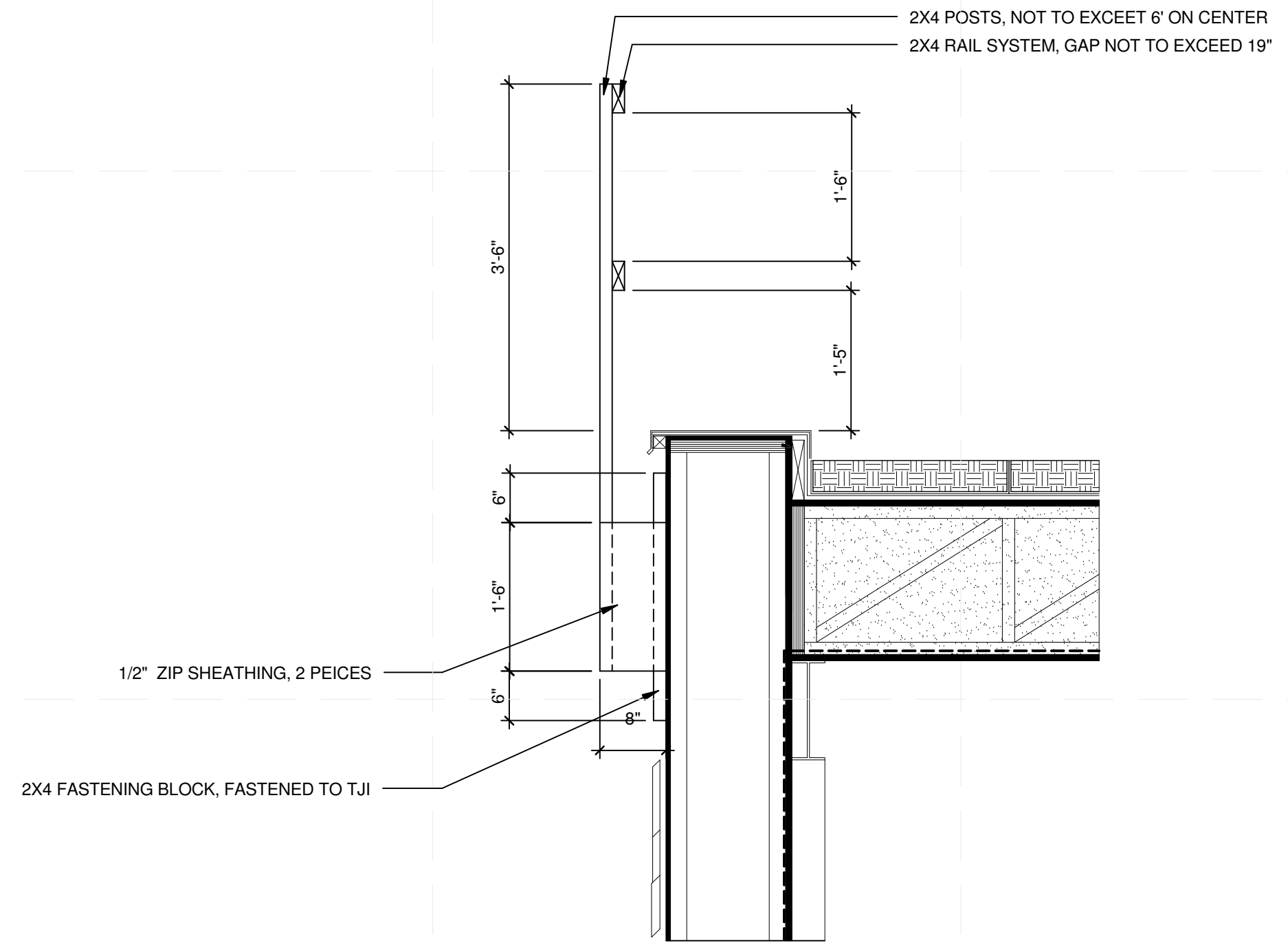
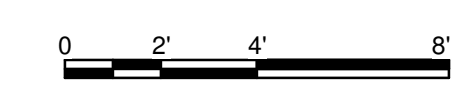


IN ADDITION TO OUR PFAS, THE ADJUSTABLE INTEGRATED SCAFFOLD PROVIDES AN IDEAL PLATFORM FROM WHICH TO MOUNT THE PV MODULES. UP TO 2 PEOPLE AND 750LBS ON PLATFORM. NO GUARDRAIL NECESSARY BECAUSE WORKERS ANCHORED TO PFAS. WORKERS CAN STAND ON PLATFORM WHILE SETTING TRANSITIONAL SECOND ANCHOR ON W8X15 BEAM TO MOVE BETWEEN W6X12 BEAMS.



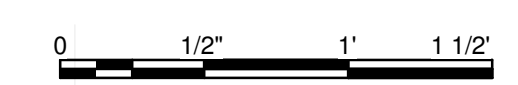
SOLAR PATH PERSONAL FALL ARREST SYSTEM  
 WESTERN ELEVATION

A1 1/4" = 1'-0"



A5 GAURDRAIL DETAIL

3/4" = 1'-0"





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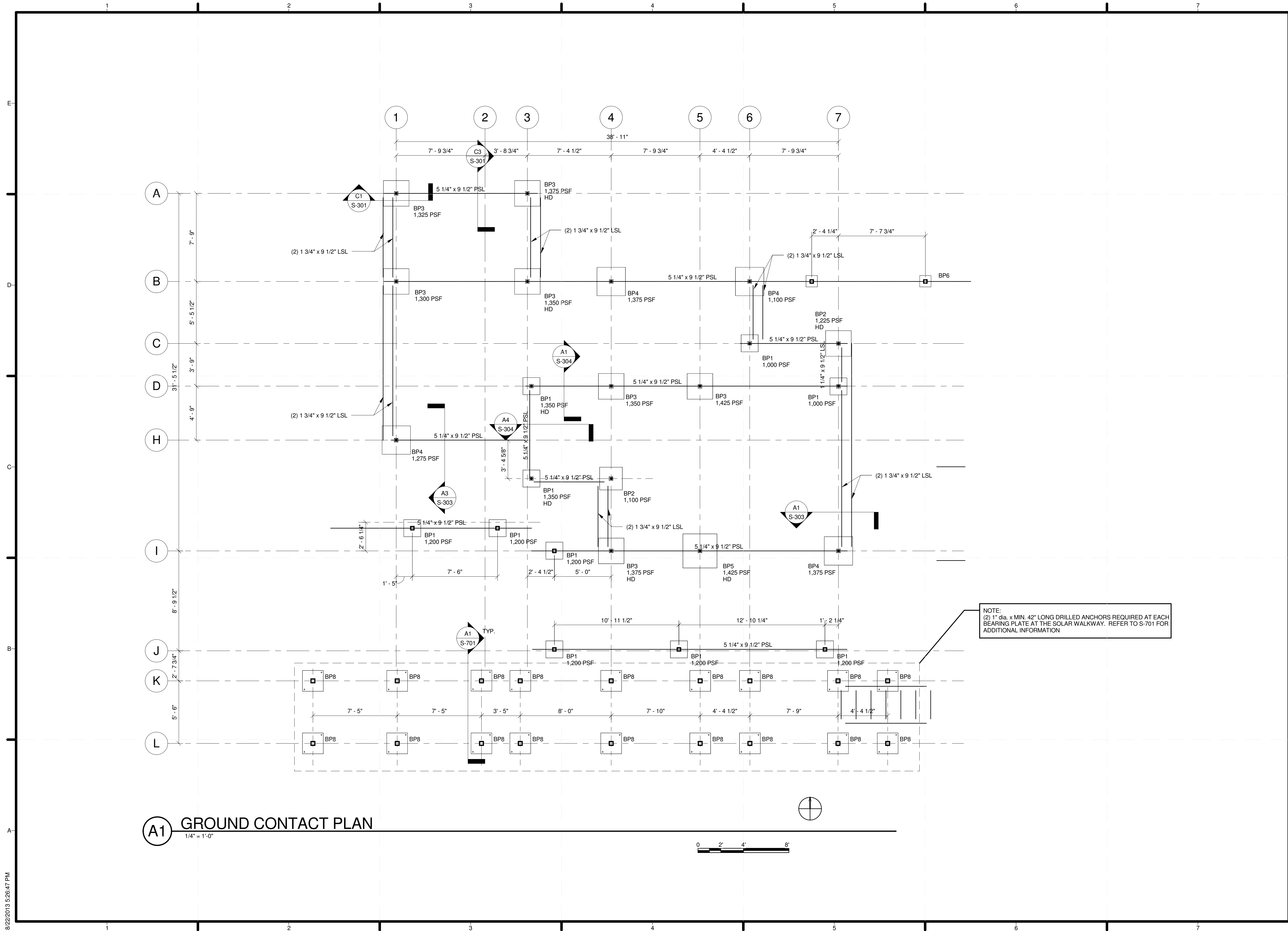


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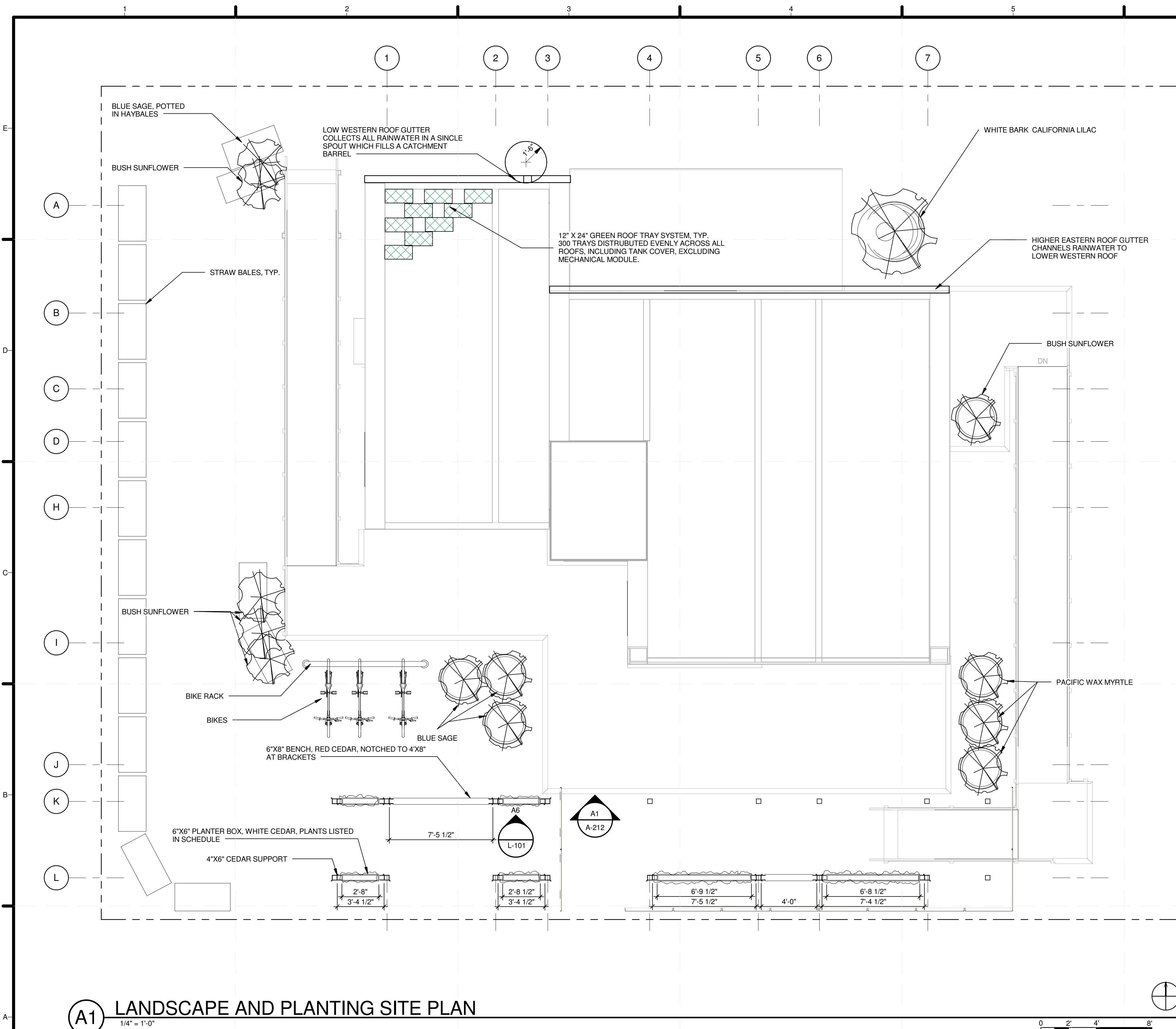
**C-101**



NOTE:  
 (2) 1" dia. x MIN. 42" LONG DRILLED ANCHORS REQUIRED AT EACH BEARING PLATE AT THE SOLAR WALKWAY. REFER TO S-701 FOR ADDITIONAL INFORMATION

**A1** GROUND CONTACT PLAN  
 1/4" = 1'-0"





PLANTING SCHEDULE			
TYPE	COUNT	DESCRIPTION	PLANTER BOX
ABELMOSCHUS ESCULENTUS (OKRA)	4	TYP.	Yes
CALENDULA (MARIGOLD)	4	TYP.	Yes
CEANOTHUS LEUCODERMIS (WHITE BARK CALIFORNIA LILAC AND CHAPARRAL WHITE-THORN)	1	TYP.	
ENCELIA CALIFORNICA (BUSH SUNFLOWER)	5	TYP.	
FESUTCA GLAUCA (BLUE FESCUE)	54	TYP.	
LAVENDULA (LAVENDER)	4	TYP.	Yes
MATRICARIA RECUTITA (CHAMOMILLE)	4	TYP.	Yes
MENTHA (MINT)	4	TYP.	Yes
MYRICA CALIFORNICA (PACIFIC WAX MYRTLE)	3		
ROSMARINUS OFFICINALIS (ROSEMARY)	4	TYP.	Yes
SALVIA CLEVELANDII (BLUE SAGE)	4	TYP.	Yes
SEDUM MIS FLATS	873	SQUARE FLATS WITH SEDUM, WILD STRAWBERRY, YARROW, BUCKWHEAT, AND CALIFORNIA GOLDEN FIELDS	
SOLANUM LYCOPERSICUM (TOMATOES)	4	TYP.	Yes
TROPAEOLUM (NASTURTIUM)	4	TYP.	Yes



MIDDLEBURY COLLEGE

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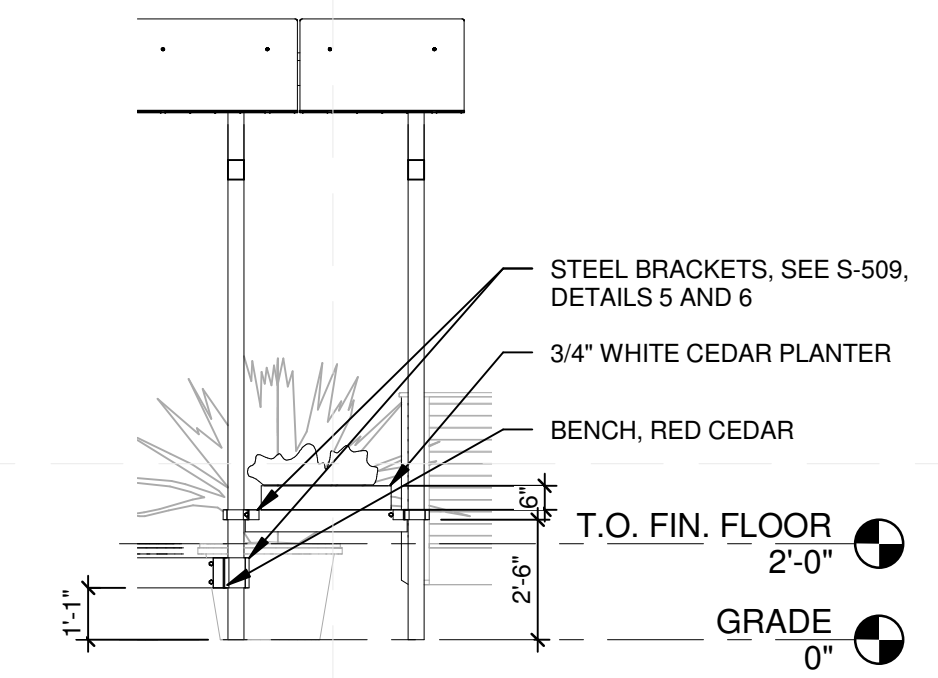
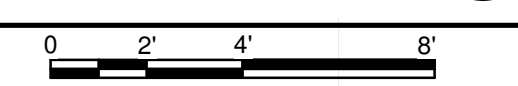
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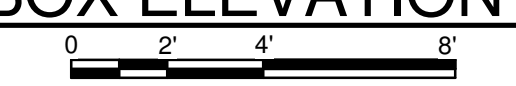
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SHEET TITLE  
 LANDSCAPE AND PLANTING SITE PLAN

**A1** LANDSCAPE AND PLANTING SITE PLAN  
 1/4" = 1'-0"



**A6** PLANTER BOX ELEVATION  
 1/4" = 1'-0"



## GENERAL NOTES

1. IF DEVIATIONS OR CHANGES FROM TO THE APPROVED DESIGN AND "RELEASED FOR PRODUCTION" SHOP DRAWINGS ARE REQUIRED DUE TO INTERFERENCES, FABRICATION ERRORS, OR OTHER CAUSES, THE ENGINEER SHALL BE NOTIFIED. SUBMIT ANY PROPOSED CHANGES TO THE ARCHITECT FOR REVIEW PRIOR TO MAKING CHANGES.

## STRUCTURAL STEEL

### A. SUMMITALS FOR REVIEW:

1. SHOP DRAWINGS: INDICATE PROFILES, SIZES, SPACING, LOCATIONS OF STRUCTURAL MEMBERS, ATTACHMENTS, AND FASTENERS. SHOW ALL CONNECTION DETAILS. INDICATE WELDED CONNECTIONS WITH AWS A2.0 WELDING SYMBOLS. INDICATE NET WELD LENGTHS.

### B. SUMMITALS FOR INFORMATION:

1. MANUFACTURER'S MILL CERTIFICATE: CERTIFY THAT PRODUCTS MEET OR EXCEED SPECIFIED REQUIREMENTS.

2. MILL TEST REPORTS: SUBMIT INDICATING STRUCTURAL STRENGTH, DESTRUCTIVE AND NON-DESTRUCTIVE TEST ANALYSIS.

3. WELDERS CERTIFICATES: CERTIFY WELDERS EMPLOYED ON THE WORK, VERIFYING AWS QUALIFICATION WITHIN THE PREVIOUS 12 MONTHS.

### C. GENERAL:

1. DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STEEL CONSTRUCTION," 9TH EDITION, BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION, AND THE STRUCTURAL WELDING CODE(AWS D1.1) LATEST EDITION, BY THE AMERICAN WELDING SOCIETY.

2. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B (FY=46 KSI). STRUCTURAL PIPES SHALL CONFORM TO ASTM A53, GRADE B. W-SHAPES SHALL CONFORM TO ASTM A992. ALL OTHER STRUCTURAL STEEL SHALL CONFORM TO ASTM A36,(FY= 36 KSI), UNLESS INDICATED OTHERWISE.

3. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 GRADE 36 UNLESS INDICATED OTHERWISE. ALL OTHER BOLTS SHALL CONFORM TO ASTM A325. HIGH STRENGTH LOAD INDICATOR BOLTS MAY BE USED AT THE CONTRACTOR'S OPTION.

4. ALL STRUCTURAL SHOP AND FIELD WELDING SHALL BE MADE WITH ELECTRODES DESIGNED BY E70XX LOW HYDROGEN, IN ACCORDANCE WITH AWS D1.1, PERFORMED BY CERTIFIED WELDERS.

5. GROUT: NON-SHRINK TYPE, PRE-MIXED COMPOUND CONSISTING OF NON-METALLIC AGGREGATE CEMENT, WATER REDUCING AND PLASTICIZING ADDITIVES, CAPABLE OF DEVELOPING A MINIMUM COMPRESSIVE STRENGTH OF 7,000 PSI AT 28 DAYS AS MANUFACTURED BY FIVE STAR PRODUCTS, INC., FAIRFIELD, CT, OR APPROVED EQUIVALENT.

6. TOUCH-UP PRIMER FOR GALVANIZED SURFACES: SEE DIVISION 05 AND 09 SECTIONS

7. SHEAR STUDS SHALL CONFORM TO ASTM A108, UNLESS INDICATED OTHERWISE.

8. FINISH: SEE DIVISION 05 AND 09 SECTIONS.

## ROUGH CARPENTRY

- PRESERVATIVE PRESSURE TREATED LUMBER: SOUTHERN PINE NO.2, AS GRADED BY SPIB.
- LAMINATED VENEER LUMBER (LVL): 1.75" THICK, MICROLAM BY ILEVEL OR APPROVED EQUIVALENT.
- LAMINATED STRAND LUMBER (LSL): 1.25" THICK RIM BOARD OR 1.75" THICK, TIMBERSTRAND BY ILEVEL OR APPROVED EQUIVALENT.
- PARALLEL STRAND LUMBER (PSL): PARALLAM BY ILEVEL OR APPROVED EQUIVALENT.
- ROOF, FLOOR AND WALL SHEATHING: APA RATED PLYWOOD, THICKNESS AS INDICATED IN SCHEDULE. SPAN RATING AS REQUIRED TO SUIT SUPPORT SPACING INDICATED, EXPOSURE DURABILITY 1, THREE SPAN MINIMUM.
- WOOD CONSTRUCTION CONNECTORS: SIMPSON STRONG-TIE OR APPROVED EQUIVALENT. CONNECTORS IN CONTACT WITH PRESSURE TREATED LUMBER SHALL BE STAINLESS STEEL OR STEEL HOT DIP GALVANIZED TO G-185.
- BLOCK ALL SHEAR WALLS AT PANEL JOINTS UNLESS NOTED OTHERWISE.
- ALL WOOD IN CONTACT WITH CONCRETE SHALL BE PRESERVATIVE PRESSURE TREATED, PT.

## PLATE CONNECTED WOOD TRUSSES

- DESIGN TO LOADINGS AND CONFIGURATIONS SHOWN ON DRAWINGS WITH DEFLECTION LIMITED TO 1/360 OF SPAN FOR FLOOR MEMBERS AND 1/240 OF SPAN (INCLUDING CEILING LOAD) FOR ROOF MEMBERS.
- SUBMIT TRUSS SHOP DRAWINGS INCLUDING LAYOUT PLANS CODED TO INDICATE TRUSS DESIGN LOCATIONS AND TRUSS TO TRUSS CONNECTIONS. FOR EACH TRUSS, INDICATE SIZES AND SPACING OF TRUSSES AND ASSOCIATED COMPONENTS, WEB AND CHORD SIZES, PLATE SIZES, FASTENER DESCRIPTIONS AND SPACINGS, LOADS AND TRUSS CAMBERS, AND FRAMED OPENINGS. SUBMIT ALL DESIGN CALCULATIONS INCLUDING DEFLECTIONS.
- PUBLICATIONS: SUBMIT ONE COPY OF BCSI 1-03 AND BCSI B1 SUMMARY SHEET AND PROVIDE TWO COPIES TO ERECTOR TO BE KEPT ON SITE.
- REVIEW OF TRUSS SUBMITTALS BY THE ENGINEER SHALL BE ONLY FOR CONFORMANCE WITH THE DESIGN CONCEPT AND SHALL NOT INDICATE APPROVAL OF THE DESIGN OF THE TRUSS OR ITS COMPONENTS. REVIEW SHALL BE LIMITED TO THE FOLLOWING:
  - VERIFICATION OF CORRECT LOADING USED BY THE TRUSS ENGINEER.
  - REVIEW OF TRUSS REACTIONS AND VERIFICATION THAT BUILDING ELEMENTS ARE ADEQUATE TO SUPPORT TRUSS REACTIONS AS DETERMINED BY THE TRUSS ENGINEER.
  - REVIEW OF TRUSS DEFLECTIONS AS CALCULATED BY THE TRUSS ENGINEER FOR SUITABILITY IN THE OVERALL BUILDING CONFIGURATION.
  - DIMENSIONS WILL BE REVIEWED FOR CONFORMANCE WITH THE BEARING LOCATIONS AS INDICATED ON THE PROJECT DRAWINGS.
- DESIGN AND FABRICATE TRUSSES IN ACCORDANCE WITH TRUSS PLATE INSTITUTE TPI 1-2002.
- TRUSS HANDLING AND INSTALLATION SHALL BE IN ACCORDANCE WITH TPI BCSI 1-03.
- DESIGN TRUSSES UNDER DIRECT SUPERVISION OF A PROFESSIONAL STRUCTURAL ENGINEER EXPERIENCED IN DESIGN OF THIS WORK AND LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED. SHOP DRAWINGS SHALL BEAR THE STAMP OF A PROFESSIONAL ENGINEER.
- MINIMUM MEMBER SIZE SHALL BE 2X4. MINIMUM STRESS VALUES SHALL MEET THE REQUIREMENTS OF SPRUCE-PINE-FIR NO. 1 (NO. 2, 19 PERCENT MAXIMUM AND 7 PERCENT MINIMUM MOISTURE CONTENT. STUD GRADE LUMBER SHALL NOT BE USED.
- STEEL PLATE CONNECTORS SHALL BE ASTM A446 STEEL, GRADE B, HOT DIP GALVANIZED; DIE STAMPED WITH INTEGRAL TEETH THICKNESS AS DETERMINED BY TRUSS ENGINEER.
- TRUSS BRIDGING: TYPE, SIZE AND SPACING RECOMMENDED BY TRUSS MANUFACTURER.
- TRUSS ERECTOR SHALL VERIFY THAT SUPPORTS AND OPENINGS ARE READY TO RECEIVE TRUSSES PRIOR TO BEGINNING WORK.
- MAKE PROVISIONS FOR ERECTION LOADS AND FOR SUFFICIENT TEMPORARY BRACING TO MAINTAIN STRUCTURE PLUMB AND IN TRUE ALIGNMENT UNTIL COMPLETION OF ERECTION AND INSTALLATION OF PERMANENT BRACING.
- PERMANENT BRACING AS SHOWN ON PROJECT DRAWINGS AND AS INDICATED IN BCSI 1-03 SHALL BE COMPLETED NO LATER THAN IMMEDIATELY AFTER INSTALLATION OF TOP CHORD SHEATHING.
- DO NOT FIELD CUT OR ALTER STRUCTURAL MEMBERS WITHOUT APPROVAL OF ARCHITECT/ENGINEER.
- FRAMING MEMBERS SHALL BE INSTALLED A MAXIMUM OF 1/2 INCH FROM TRUE POSITION.

## BASIS OF DESIGN

1. Building Code:	2013 SOLAR DECATHLON BUILDING CODE 2006 VERMONT STATE BUILDING CODE
2. Dead Loads	
a. Roof Dead Load:	45 psf
b. Floor Dead Load:	18 psf
3. Live Loads	
a. Roof Live Load:	20 PSF (IRVINE, CA)
b. Floor Live Load:	50 psf (IRVINE, CA)
c. Floor Live Load (means of egress):	100 psf (IRVINE, CA)
4. Roof Snow Load	
a. Ground Snow Load, Pg:	50 psf
b. Flat Roof Snow Load, Pf:	40 psf
c. Snow Exposure Factor, Ce:	1.0
d. Snow Load Importance Factor, I:	1.0
e. Thermal Factor, Ct:	1.0
5. Wind Design Data	
a. Basic Wind Speed, V:	110 mph (Irvine, CA FOR IBC 2012)
b. Building Risk Category:	II
c. Wind Exposure:	C
d. Internal Pressure Coefficients:	+/- 0.18
e. Components and Cladding Wind Pressure:	per ASCE 7-10
6. Earthquake design data	
a. Seismic Importance Factor, I:	1.0
b. Building Risk Category:	II
c. Mapped Spectral Response Acceleration, SS:	1.53
d. Site Class:	D
e. Spectral Response Coefficient, SDS:	1.02
f. Seismic Design Category:	D
g. Basic Seismic-Force-Resisting System:	Building Frame / Light-Framed Walls Sheathed With Wood Structural Panels
h. Seismic Base Shear:	8.6k
i. Seismic Response Coefficient, Cs:	0.146
j. Response Modification Factor, R:	7
k. Analysis Procedure Used:	Simplified Later Force Analysis Procedure

## SHEATHING SCHEDULE

SHEATHING LOCATION	THICKNESS	FASTENERS AT PANEL EDGES	FASTENERS IN FIELD	DESCRIPTION
WALL PANEL - INTERIOR	3/4"	8d NAILS AT 6"oc	8d NAILS AT 8"oc	---
WALL PANEL - EXTERIOR	1/2"	8d NAILS AT 6"oc	8d NAILS AT 8"oc	---
FLOOR PANEL - TOP	3/4"	8d NAILS AT 6"oc	8d NAILS AT 8"oc	---
ROOF PANEL - EXTERIOR (TOP)	5/8"	8d NAILS AT 6"oc	8d NAILS AT 8"oc	---
ROOF PANEL - INTERIOR	5/8"	8d NAILS AT 6"oc	8d NAILS AT 8"oc	---

## FRAMING SCHEDULE

PANEL TYPE	MEMBER LOCATION	DESCRIPTION	MEMBER SPACING
WALL PANEL	TYP. WALL STUD	14" DEEP TJI 110	24"oc
WALL PANEL	TOP PLATE	(1) 1-3/4" x 14" LVL	-
WALL PANEL	BOTTOM PLATE	(1) 1-3/4" x 14" LVL	-
WALL PANEL	VERTICALS AT END OF PANELS AND PANEL OPENINGS	(1) 1-3/4" x 14" LVL	-
ROOF PANEL	TYP. ROOF TRUSS	18" OPEN-WEB PARALLEL CHORD TRUSS	24"oc
ROOF PANEL	PERIMETER PANEL CLOSURE MEMBER	(1) 1-3/4" x 18" LVL	-
FLOOR PANEL	TYP. FLOOR JOIST	9-1/2" DEEP TJI 230	24"oc
FLOOR PANEL	PERIMETER CLOSURE MEMBER EAST/WEST ENDS	(1) 1-3/4" x 9-1/2" LSL	-
FLOOR PANEL	PERIMETER CLOSURE MEMBER NORTH/SOUTH ENDS	(1) 1-1/4" x 9-1/2" LSL RIM	-
DECK PANEL	TYP. DECK JOIST	2x10 PT SO. PINE #2	16"oc

NOTES:  
1. REFER TO PLANS AND SECTIONS FOR FRAMING MEMBER SIZES NOT INDICATED ON SCHEDULE ABOVE.  
2. PROVIDE 9-1/2" DEEP LSL RIM OR TJI JOIST BLOCKING BETWEEN TJI FLOOR JOISTS AS NOTED ON FLOOR FRAMING PLAN.



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SHEET TITLE

STRUCTURAL NOTES  
AND SYMBOLS

S-001

**GENERAL SHEET NOTES**

1. BOTTOM OF BASE PLATE BEARING ELEVATION = 0'-0" (EXISTING PAVING ELEVATION).



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BEARING PRESSURE PLAN

S-101

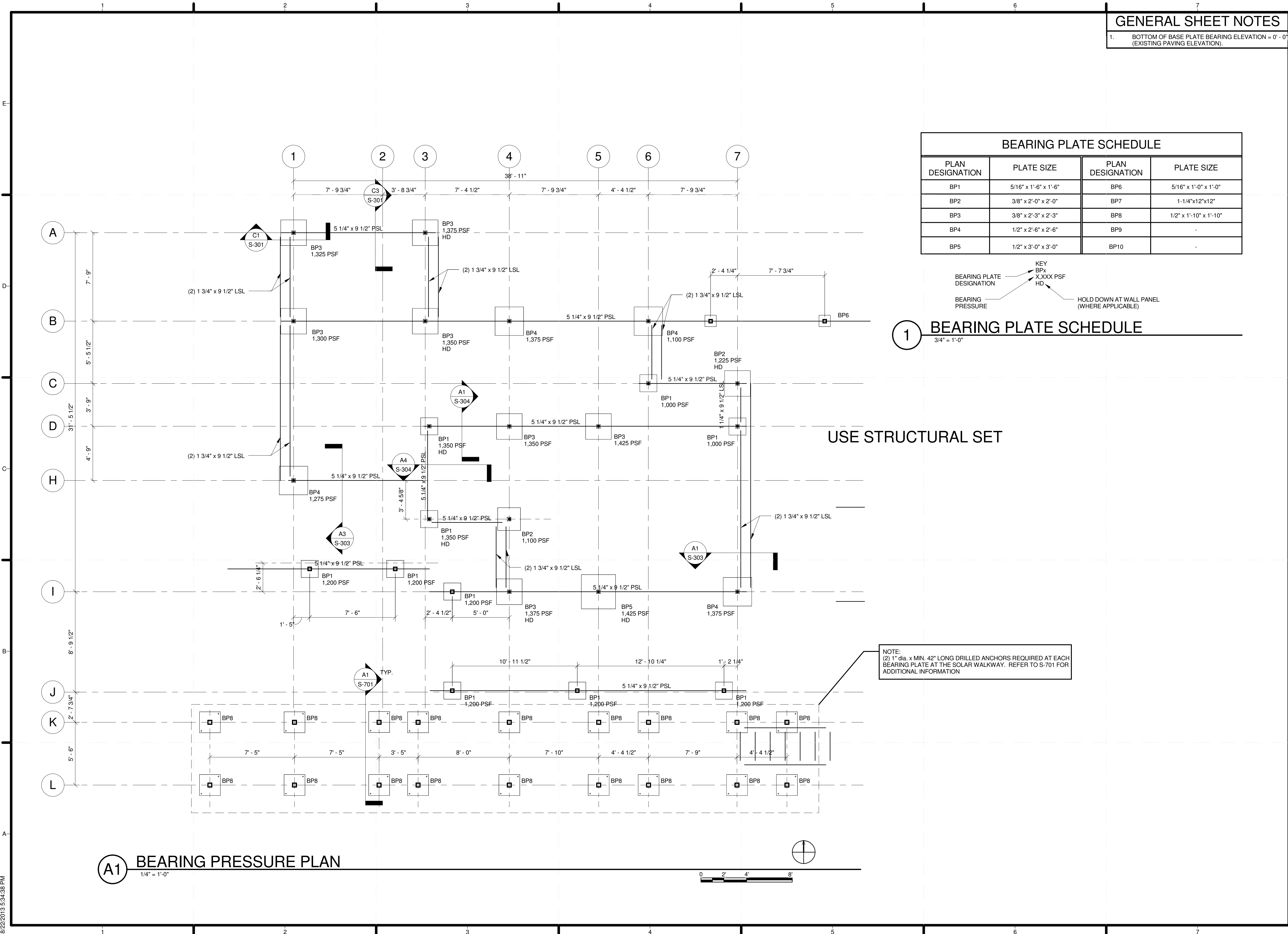
PLAN DESIGNATION	PLATE SIZE	PLAN DESIGNATION	PLATE SIZE
BP1	5/16" x 1'-6" x 1'-0"	BP6	5/16" x 1'-0" x 1'-0"
BP2	3/8" x 2'-0" x 2'-0"	BP7	1-1/4"x12"x12"
BP3	3/8" x 2'-3" x 2'-3"	BP8	1/2" x 1'-10" x 1'-10"
BP4	1/2" x 2'-6" x 2'-6"	BP9	-
BP5	1/2" x 3'-0" x 3'-0"	BP10	-

KEY  
 BPX XXXX PSF  
 HD HOLD DOWN AT WALL PANEL (WHERE APPLICABLE)

**1 BEARING PLATE SCHEDULE**  
 3/4" = 1'-0"

USE STRUCTURAL SET

NOTE:  
 (2) 1" dia. x MIN. 42" LONG DRILLED ANCHORS REQUIRED AT EACH BEARING PLATE AT THE SOLAR WALKWAY. REFER TO S-701 FOR ADDITIONAL INFORMATION



**A1 BEARING PRESSURE PLAN**  
 1/4" = 1'-0"

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**GENERAL SHEET NOTES**

1. TYPICAL SUBFLOOR SHEATHING TO BE 3/4" THICK APA RATED PLYWOOD. SEE SHEATHING SCHEDULE ON S-001 FOR ADDITIONAL INFORMATION.
2. TOP OF SUBFLOOR SHEATHING ELEVATION = 1' - 11 1/4"
3. FASTEN NORTOX LEVELER MOUNTING PLATE TO PSL BEAM WITH (4) LAG SCREWS AFTER BEAM ADJUSTMENT HAS BEEN COMPLETED.



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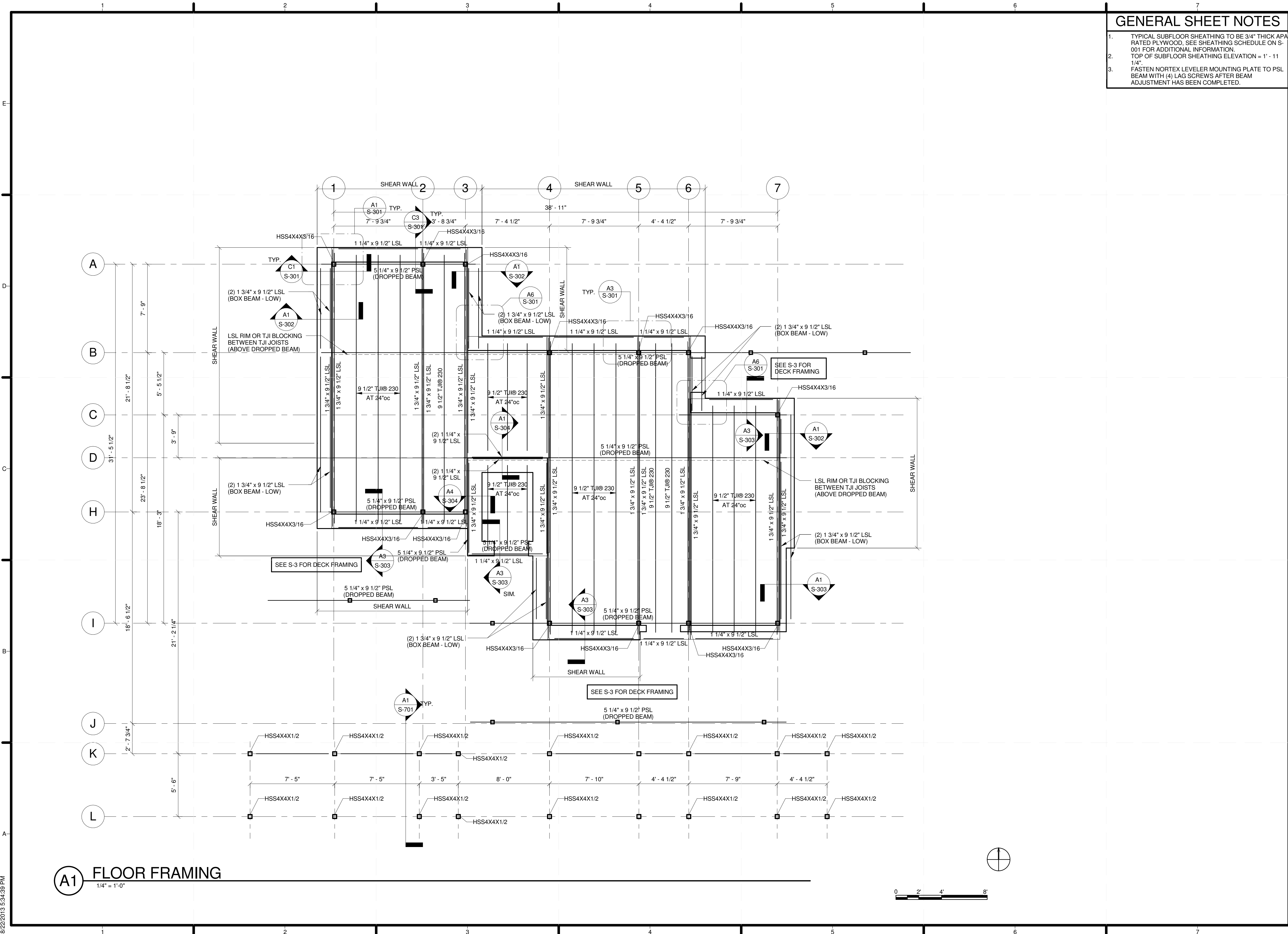
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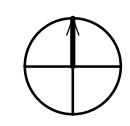
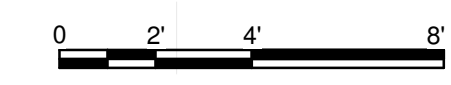
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SHEET TITLE  
**FIRST FLOOR FRAMING PLAN**

**S-102**



**A1 FLOOR FRAMING**  
 1/4" = 1'-0"



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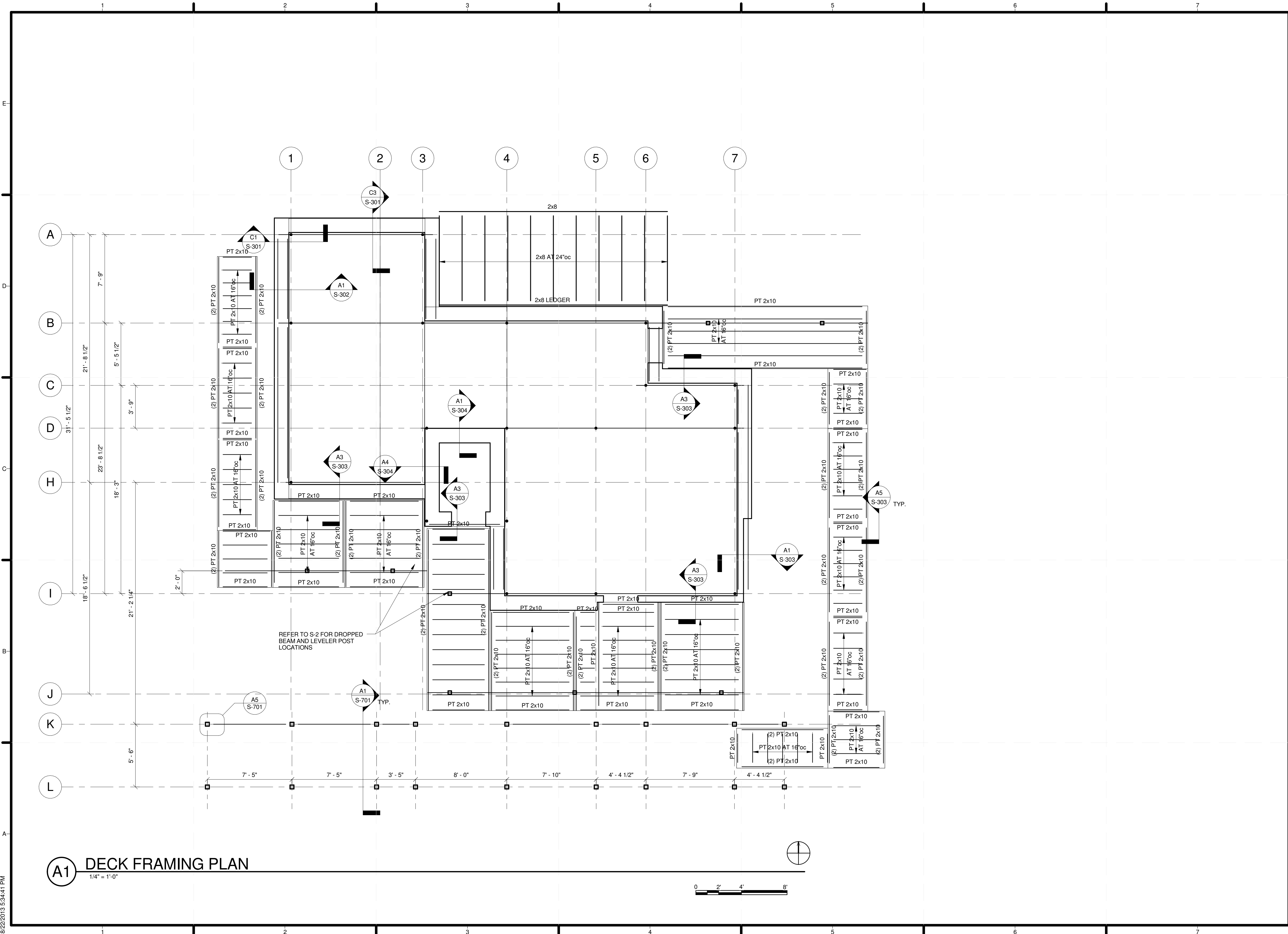
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DECK FRAMING PLAN

S-103



**A1 DECK FRAMING PLAN**  
 1/4" = 1'-0"

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**GENERAL SHEET NOTES**

1. BOTTOM OF ROOF PANEL ELEV. = 14' - 11 3/8"
2. TYPICAL EXTERIOR ROOF SHEATHING TO BE 5/8" THICK APA RATED PLYWOOD. SEE SHEATHING SCHEDULE ON S-001 FOR ADDITIONAL INFORMATION.



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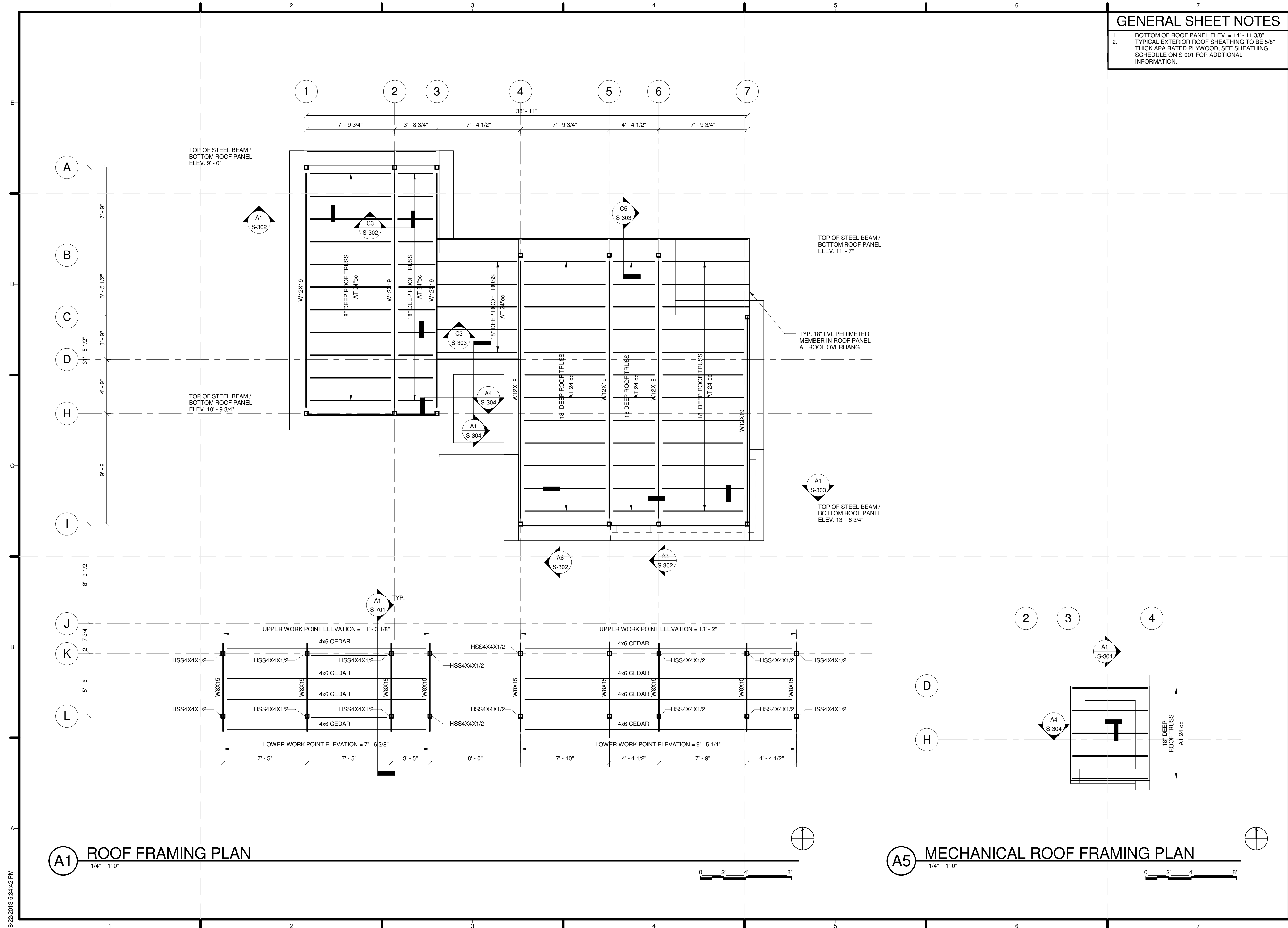


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SHEET TITLE  
**ROOF FRAMING PLAN**

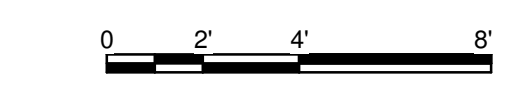
**S-104**



**A1** ROOF FRAMING PLAN  
 1/4" = 1'-0"

**A5** MECHANICAL ROOF FRAMING PLAN  
 1/4" = 1'-0"

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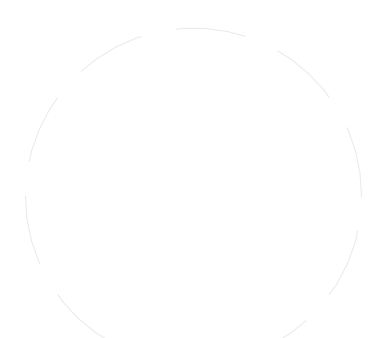


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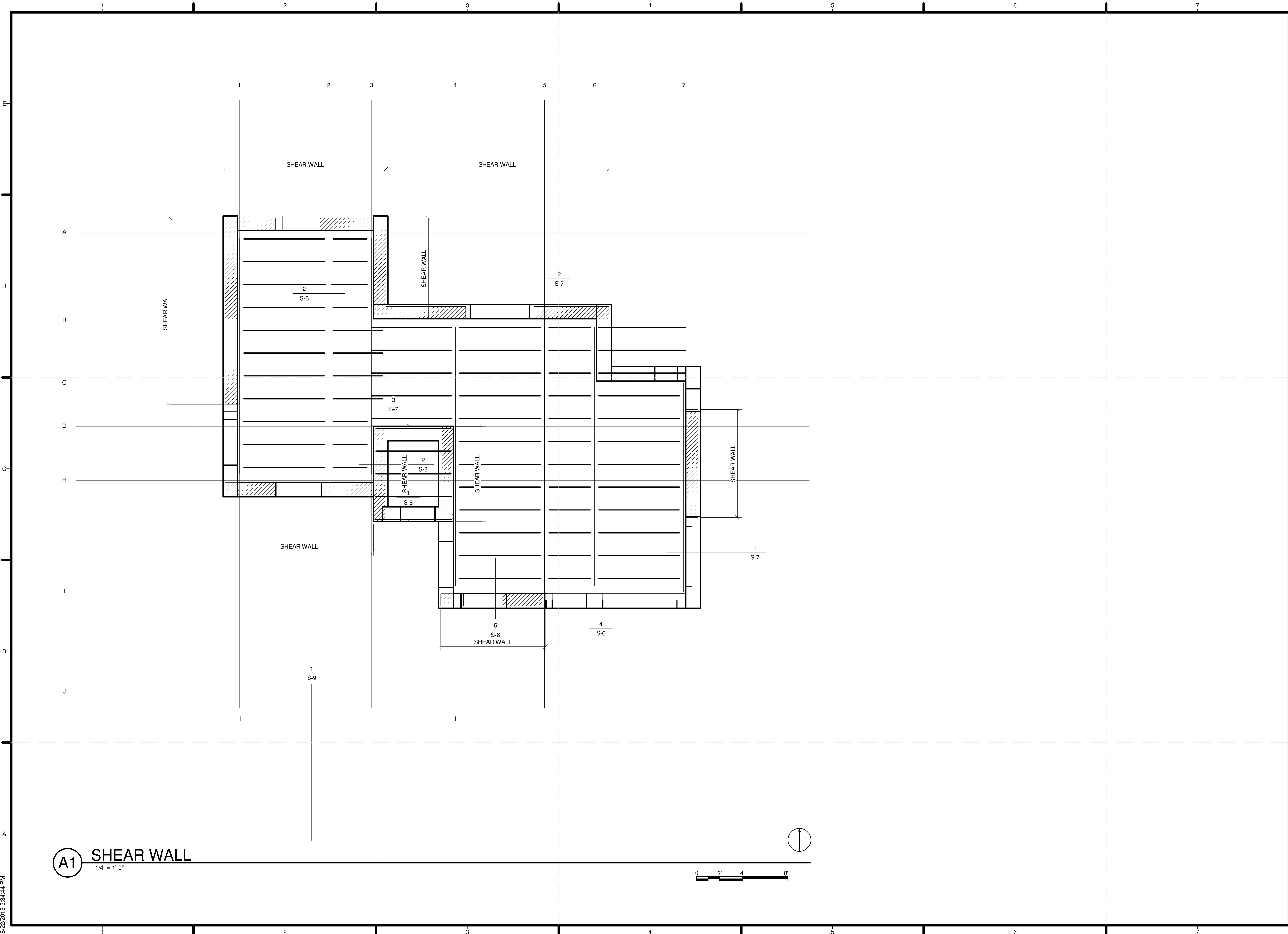
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SHEAR WALL PLAN

S-105



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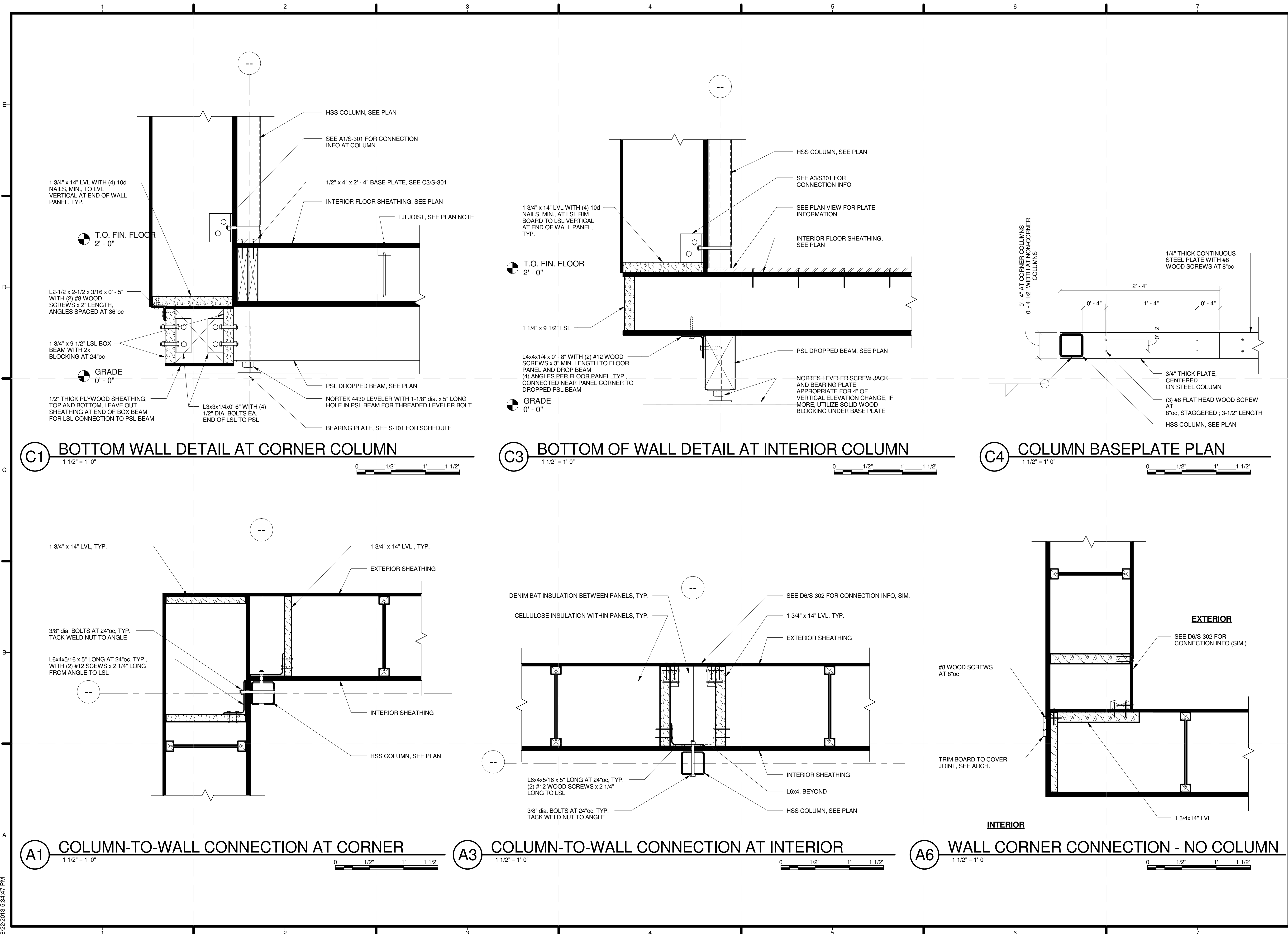
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SHEET TITLE

WALL AND FLOOR SECTIONS

S-301



**C1** BOTTOM WALL DETAIL AT CORNER COLUMN  
 1 1/2" = 1'-0"  
 0 1/2" 1' 1 1/2"

**C3** BOTTOM OF WALL DETAIL AT INTERIOR COLUMN  
 1 1/2" = 1'-0"  
 0 1/2" 1' 1 1/2"

**C4** COLUMN BASEPLATE PLAN  
 1 1/2" = 1'-0"  
 0 1/2" 1' 1 1/2"

**A1** COLUMN-TO-WALL CONNECTION AT CORNER  
 1 1/2" = 1'-0"  
 0 1/2" 1' 1 1/2"

**A3** COLUMN-TO-WALL CONNECTION AT INTERIOR  
 1 1/2" = 1'-0"  
 0 1/2" 1' 1 1/2"

**A6** WALL CORNER CONNECTION - NO COLUMN  
 1 1/2" = 1'-0"  
 0 1/2" 1' 1 1/2"

8/22/2013 5:34:47 PM



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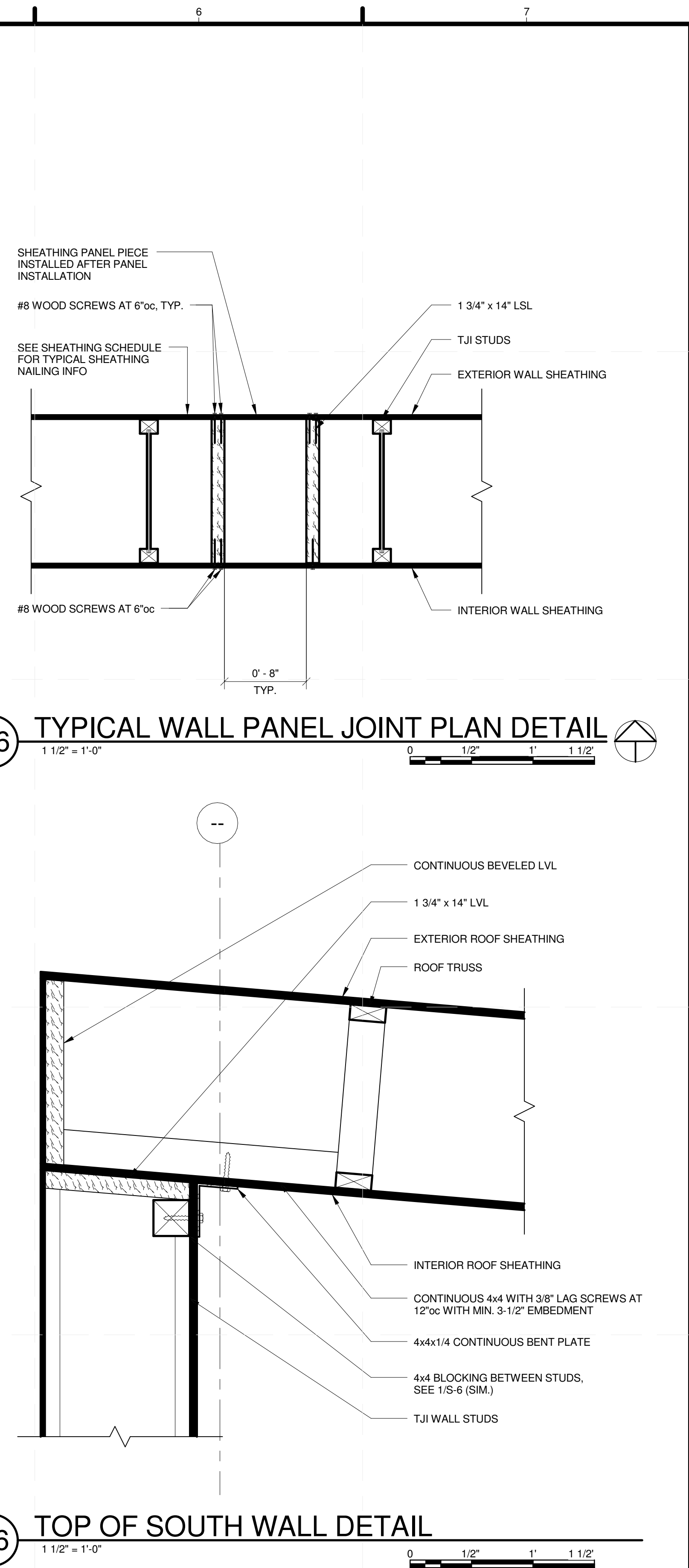
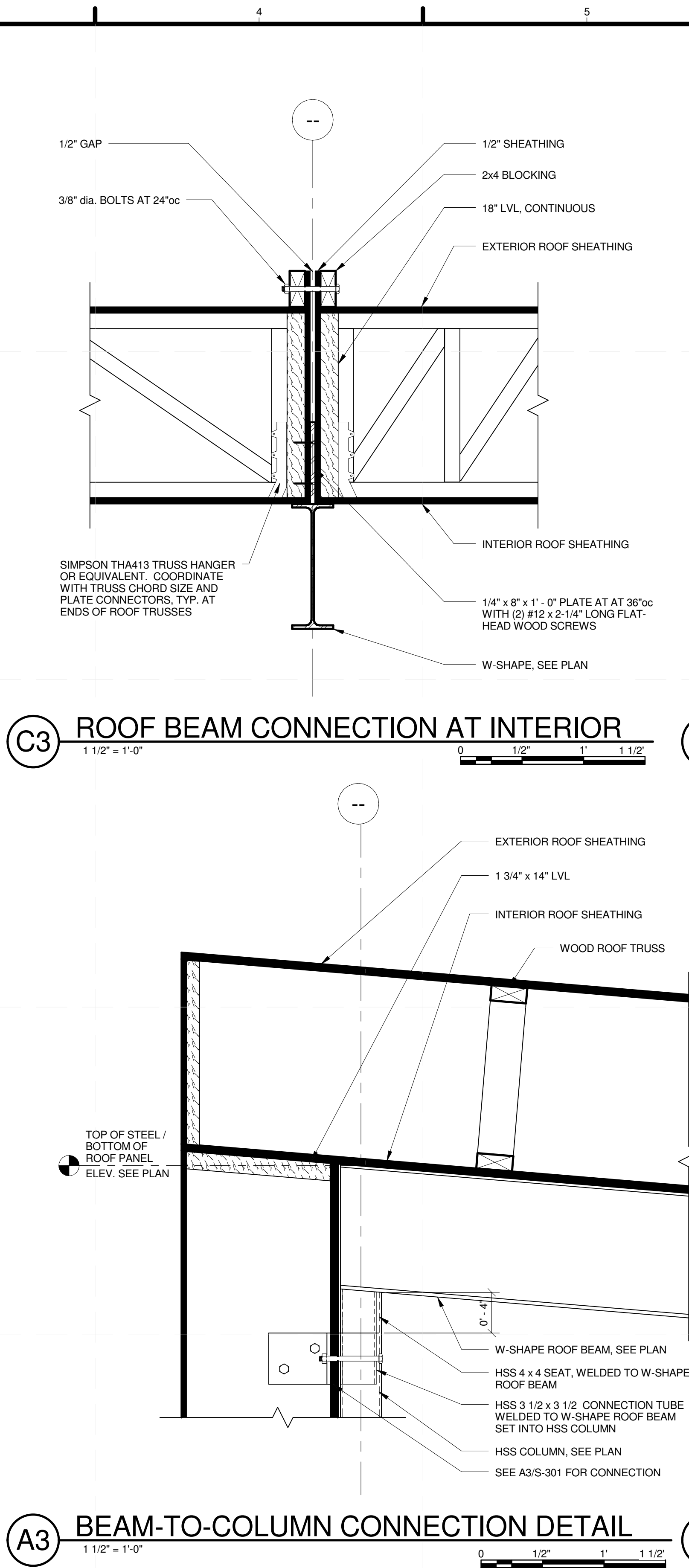
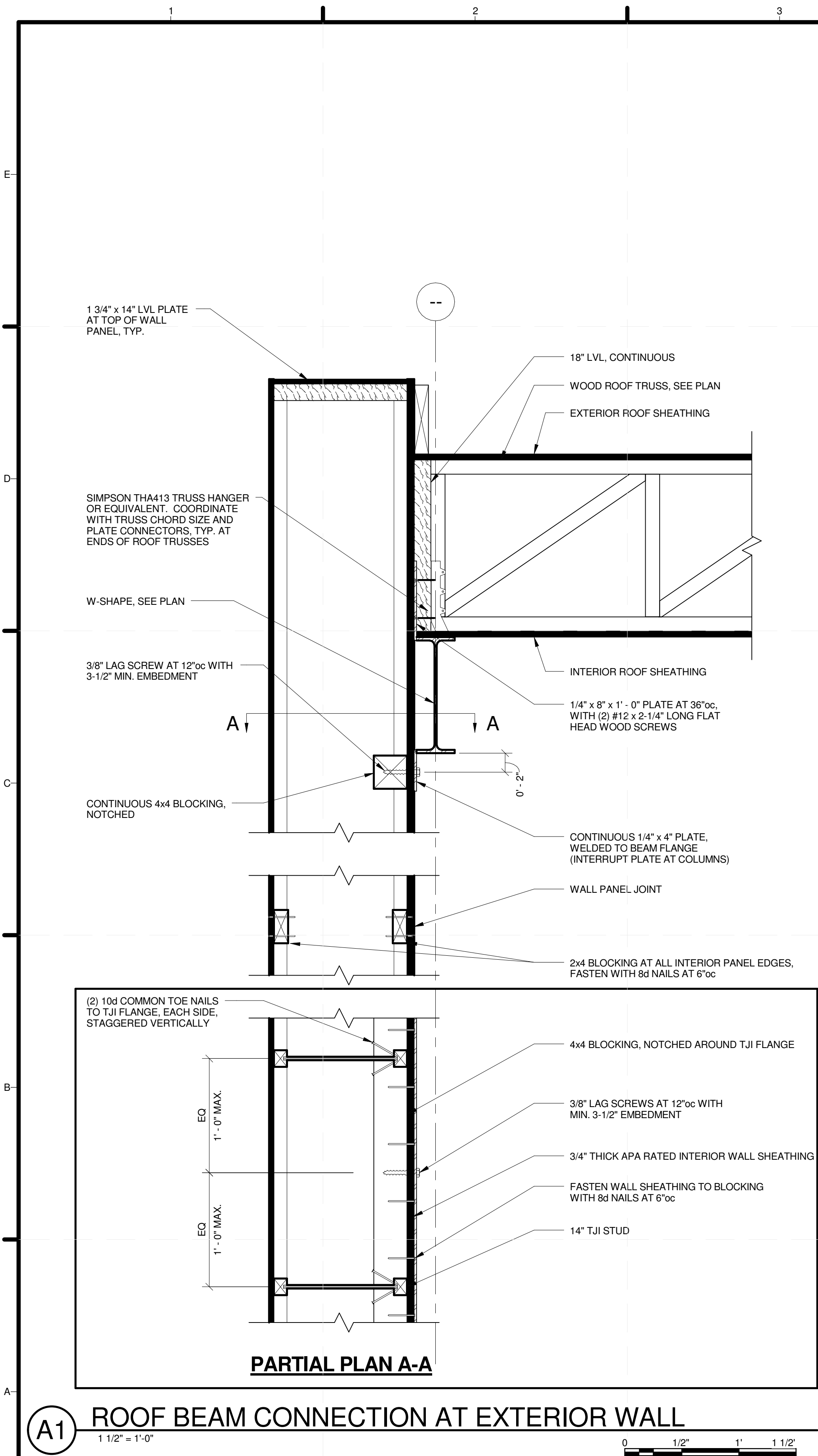
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SHEET TITLE

WALL AND ROOF  
 DETAILS

S-302



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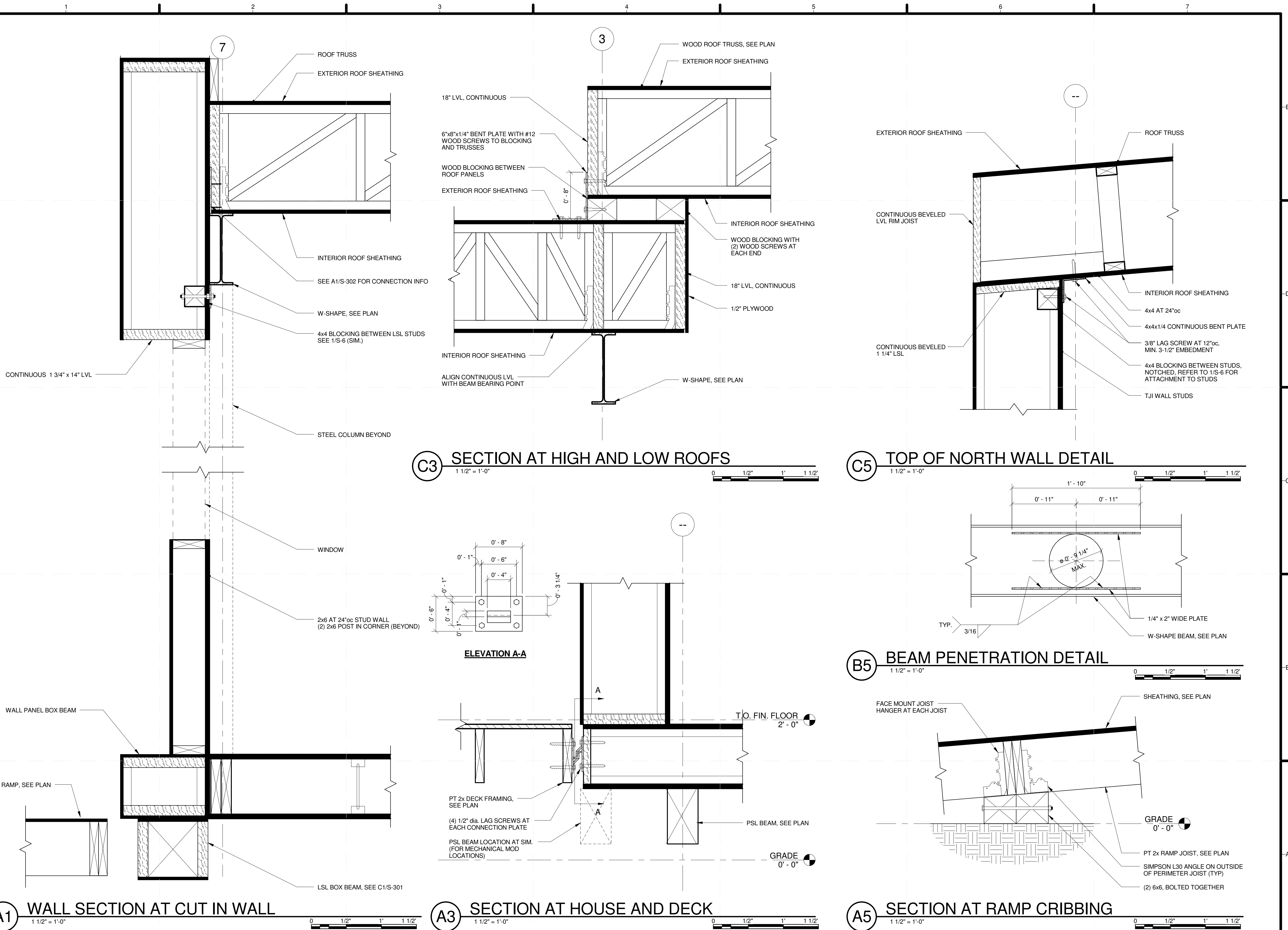
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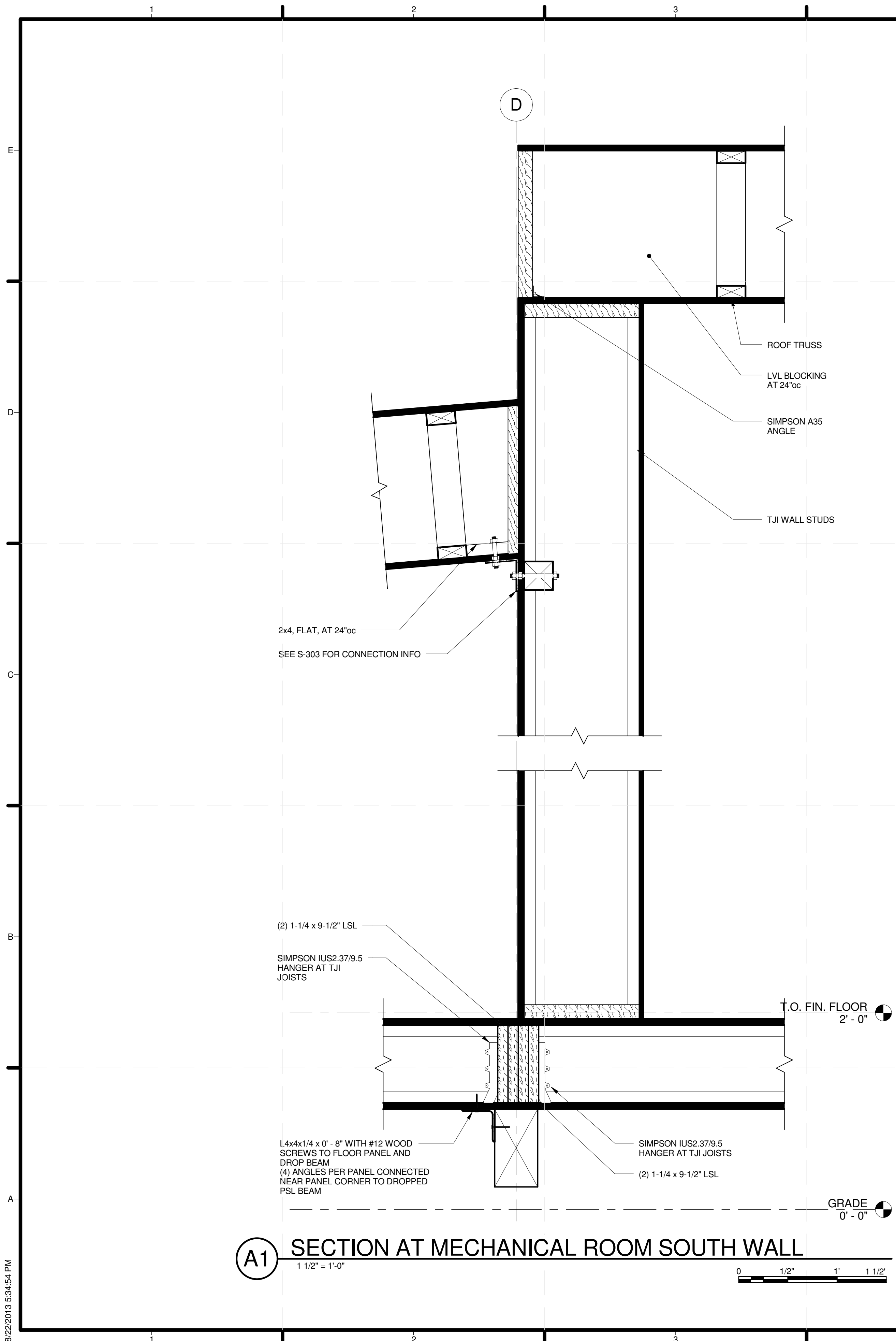
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OTHER SECTIONS AND DETAILS

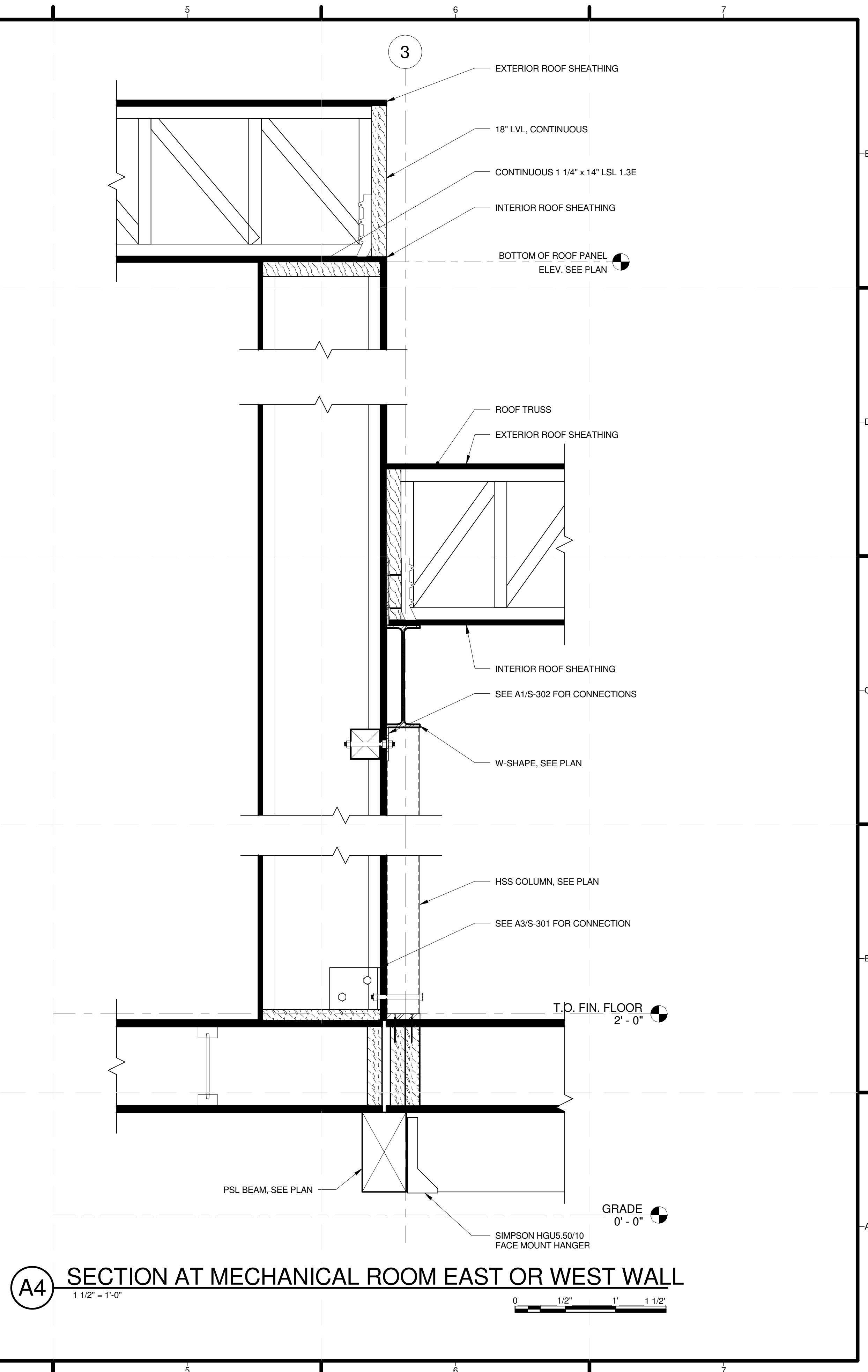
S-303



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**A1** SECTION AT MECHANICAL ROOM SOUTH WALL  
1 1/2" = 1'-0"



**A4** SECTION AT MECHANICAL ROOM EAST OR WEST WALL  
1 1/2" = 1'-0"



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SHEET TITLE  
**MECHANICAL MODULE CONNECTIONS**

**S-304**

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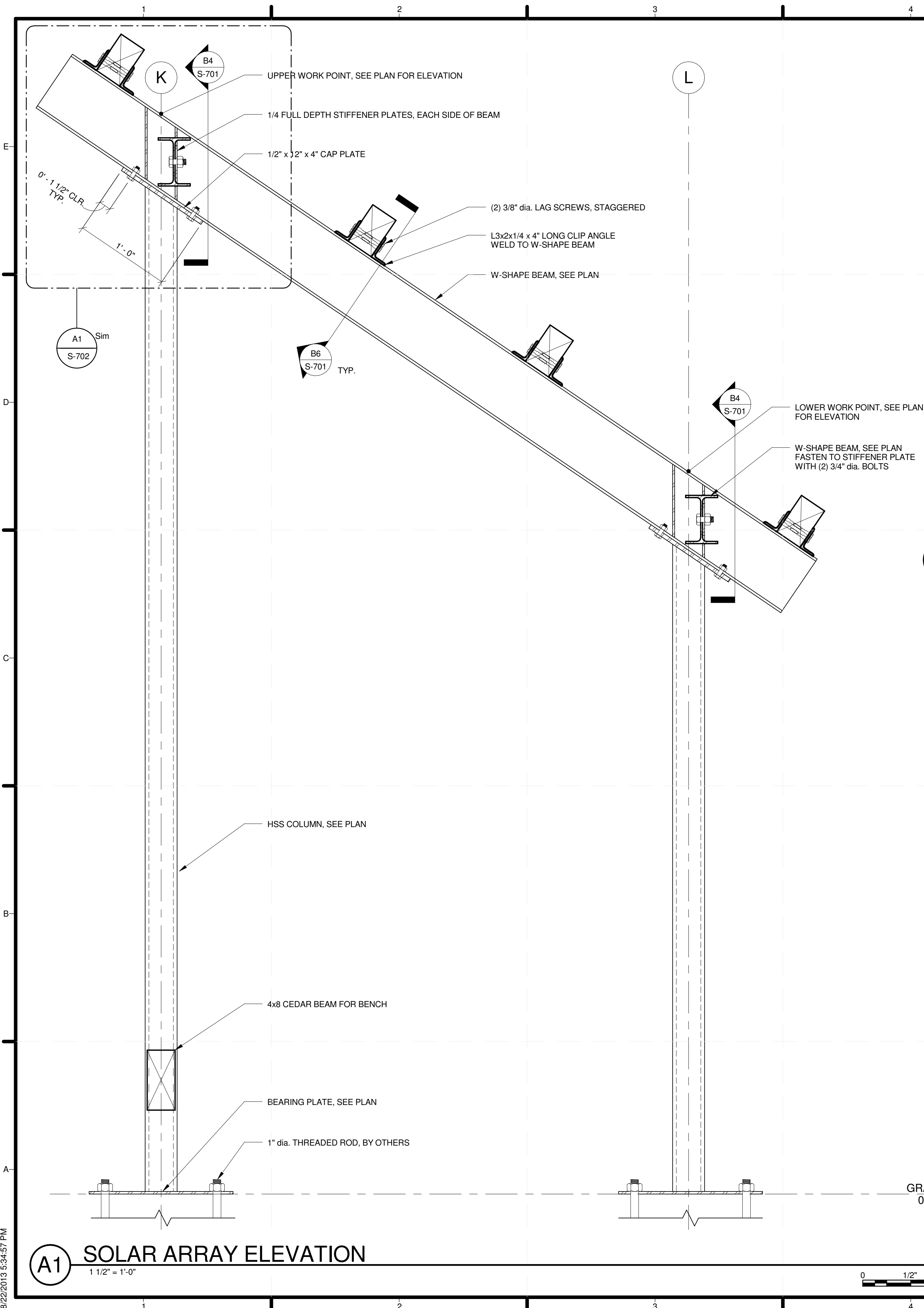
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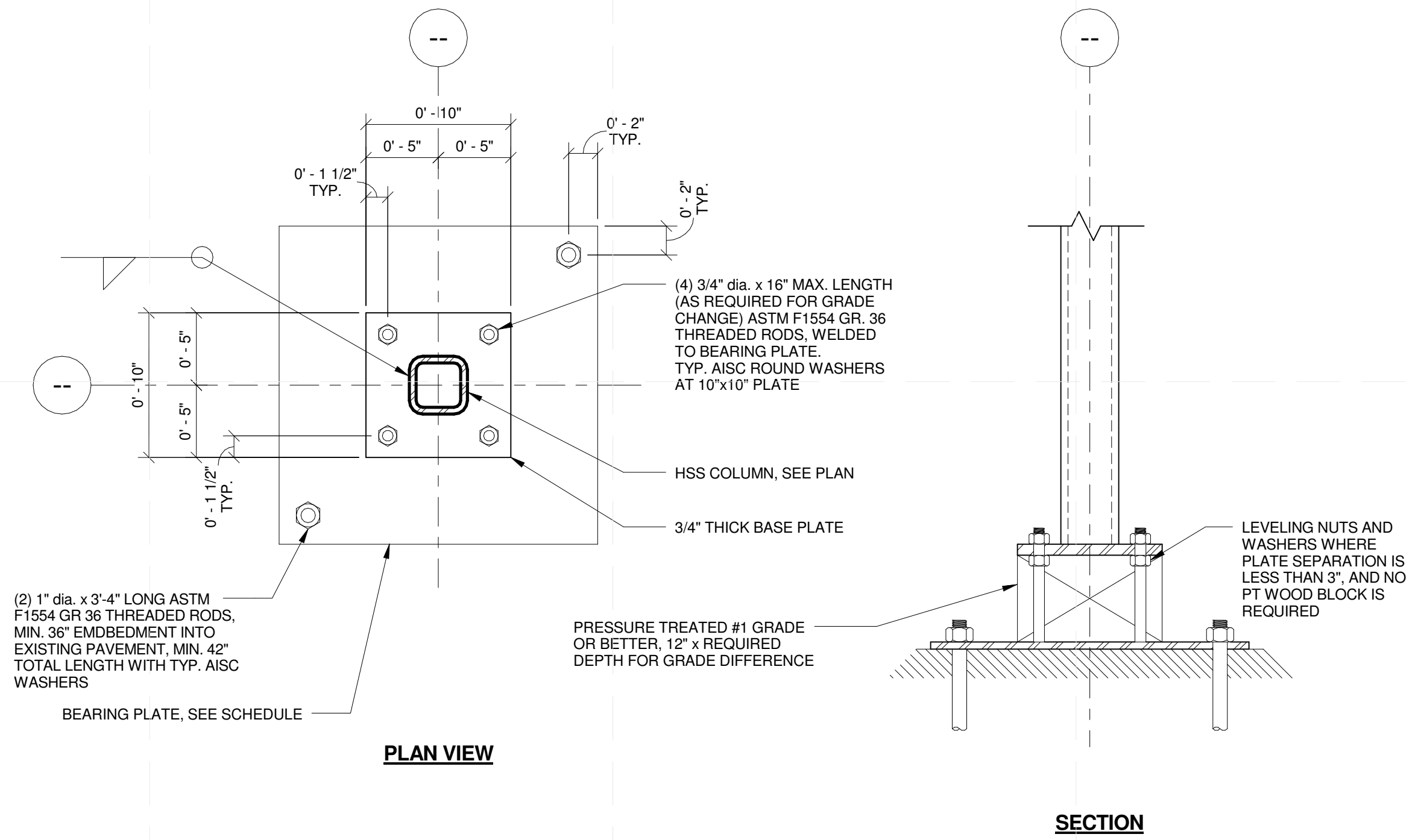
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SOLAR PATH  
 SECTIONS AND  
 DETAILS

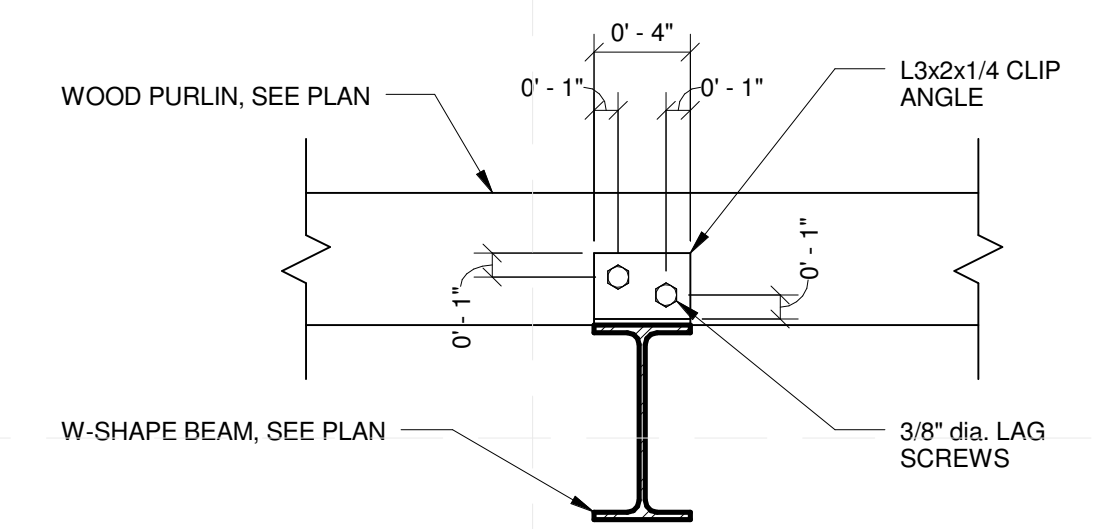
S-701



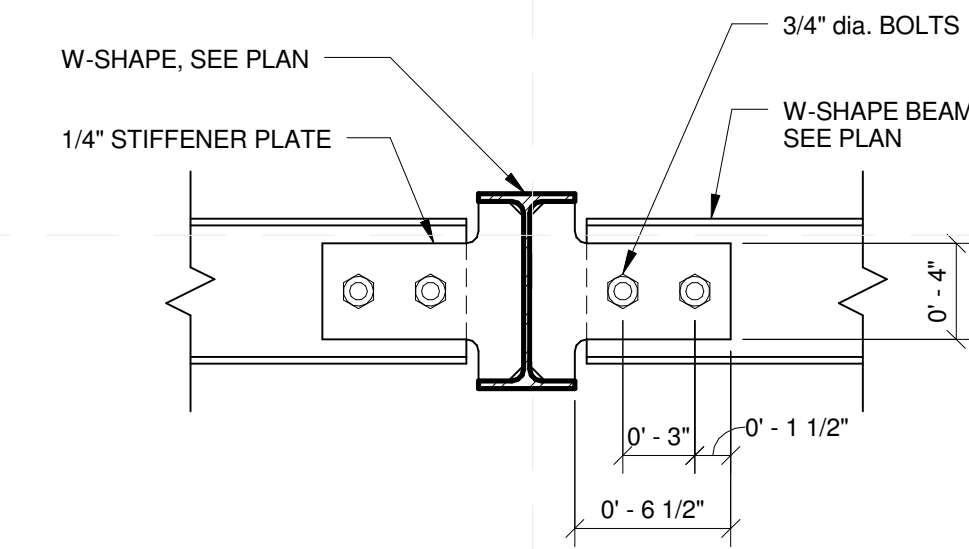
**A1** SOLAR ARRAY ELEVATION  
 1 1/2" = 1'-0"



**D4** SOLAR ARRAY BASE PLATE DETAIL  
 1 1/2" = 1'-0"



**B6** SOLAR ARRAY PURLIN CONNECTION  
 1 1/2" = 1'-0"



**B4** SOLAR ARRAY BEAM-TO-BEAM CONNECTION  
 1 1/2" = 1'-0"

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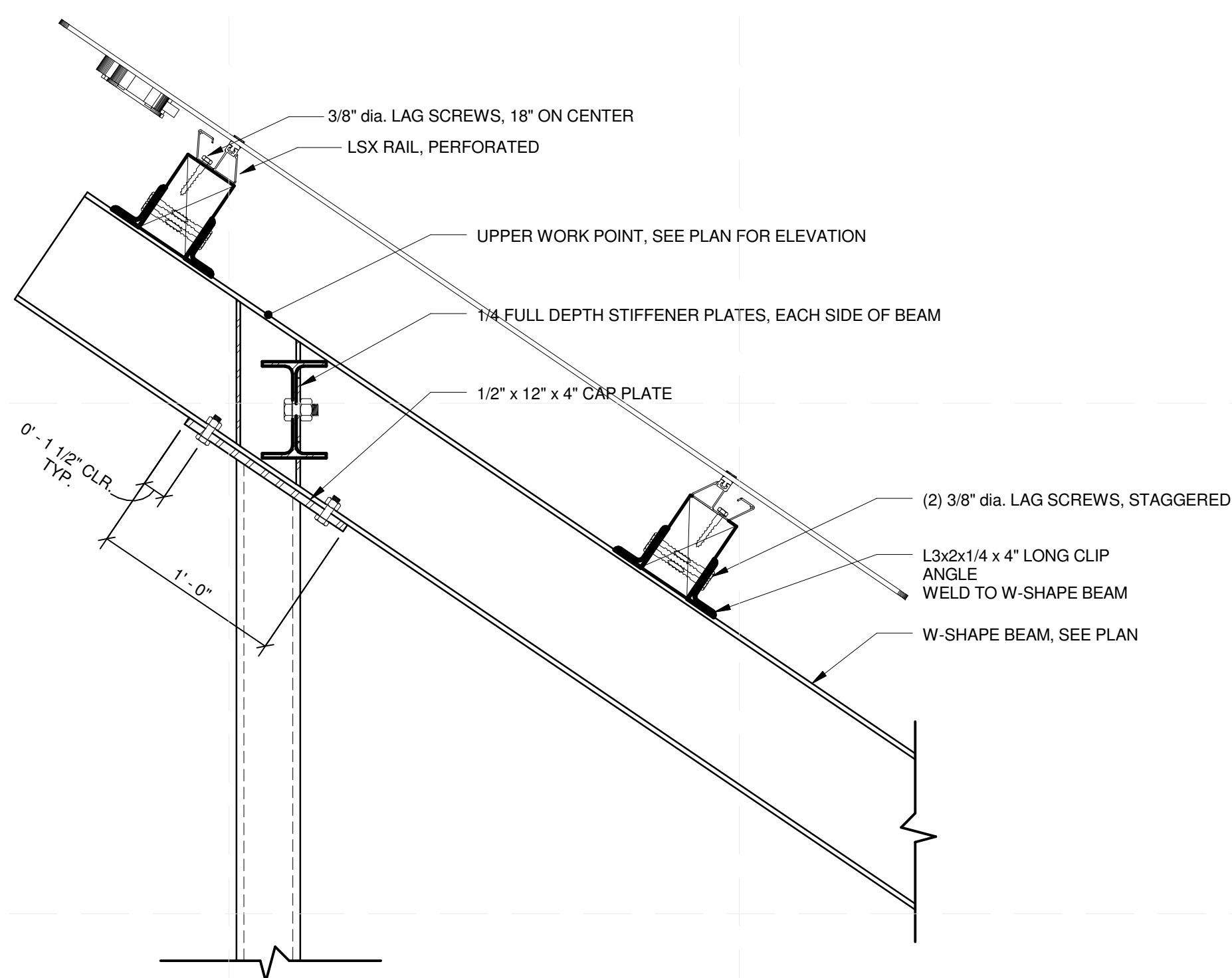
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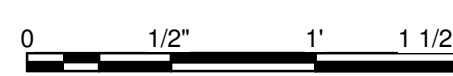
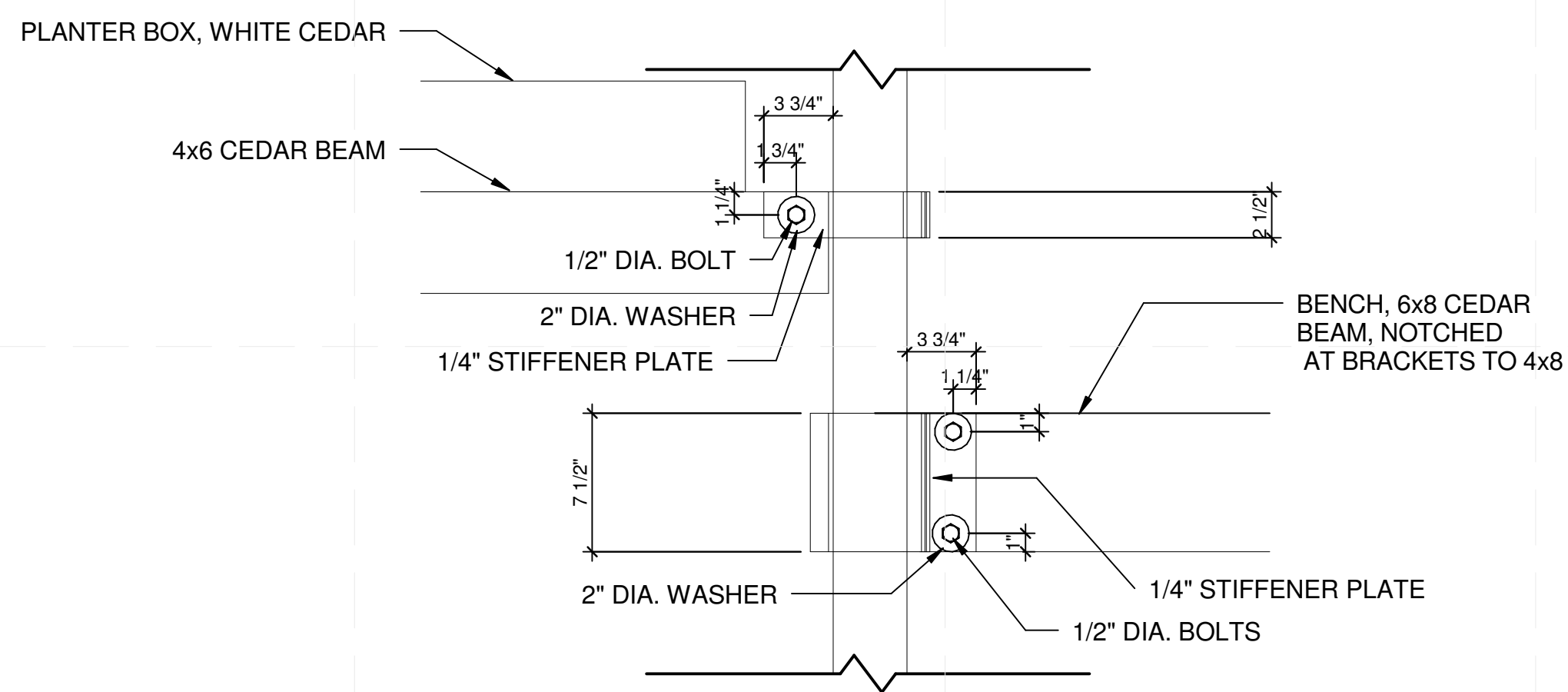
**SOLAR PATH  
INSTALLATION**

**S-702**

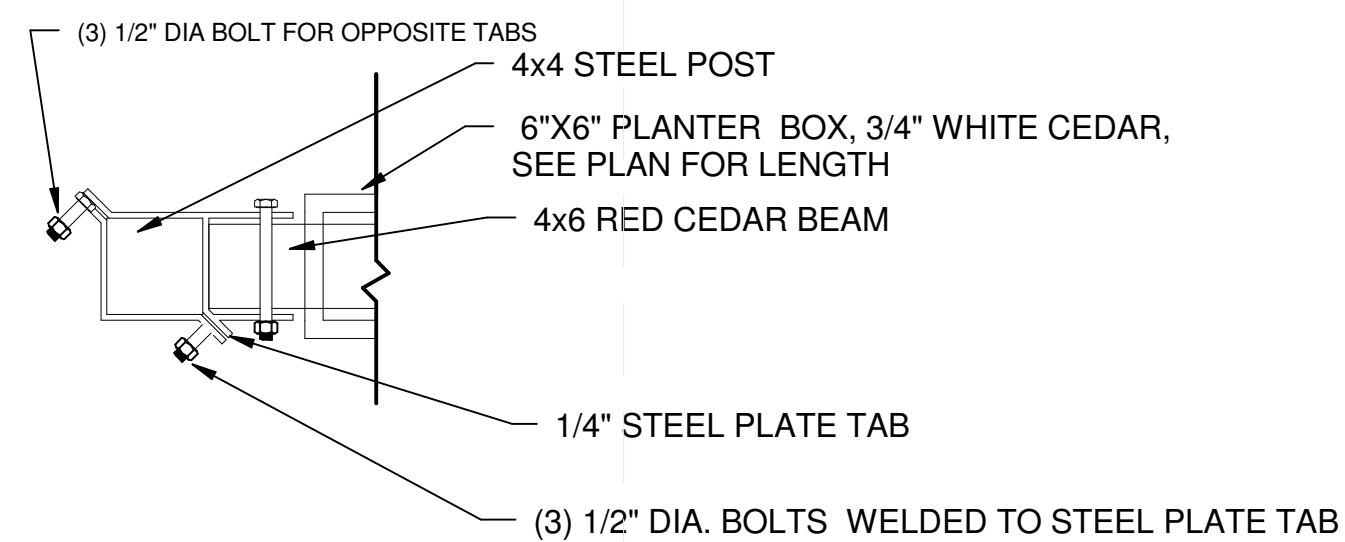
**A1 PV MOUNTING DETAIL**  
1 1/2" = 1'-0"



**C4 SOLAR PATH BENCH BRACKET ELEVATION**  
1 1/2" = 1'-0"



**A5 SOLAR PATH BENCH BRACKET PLAN**  
1 1/2" = 1'-0"





GENERAL SHEET NOTES

1. SEE S-101 FOR GRID DIMENSIONS



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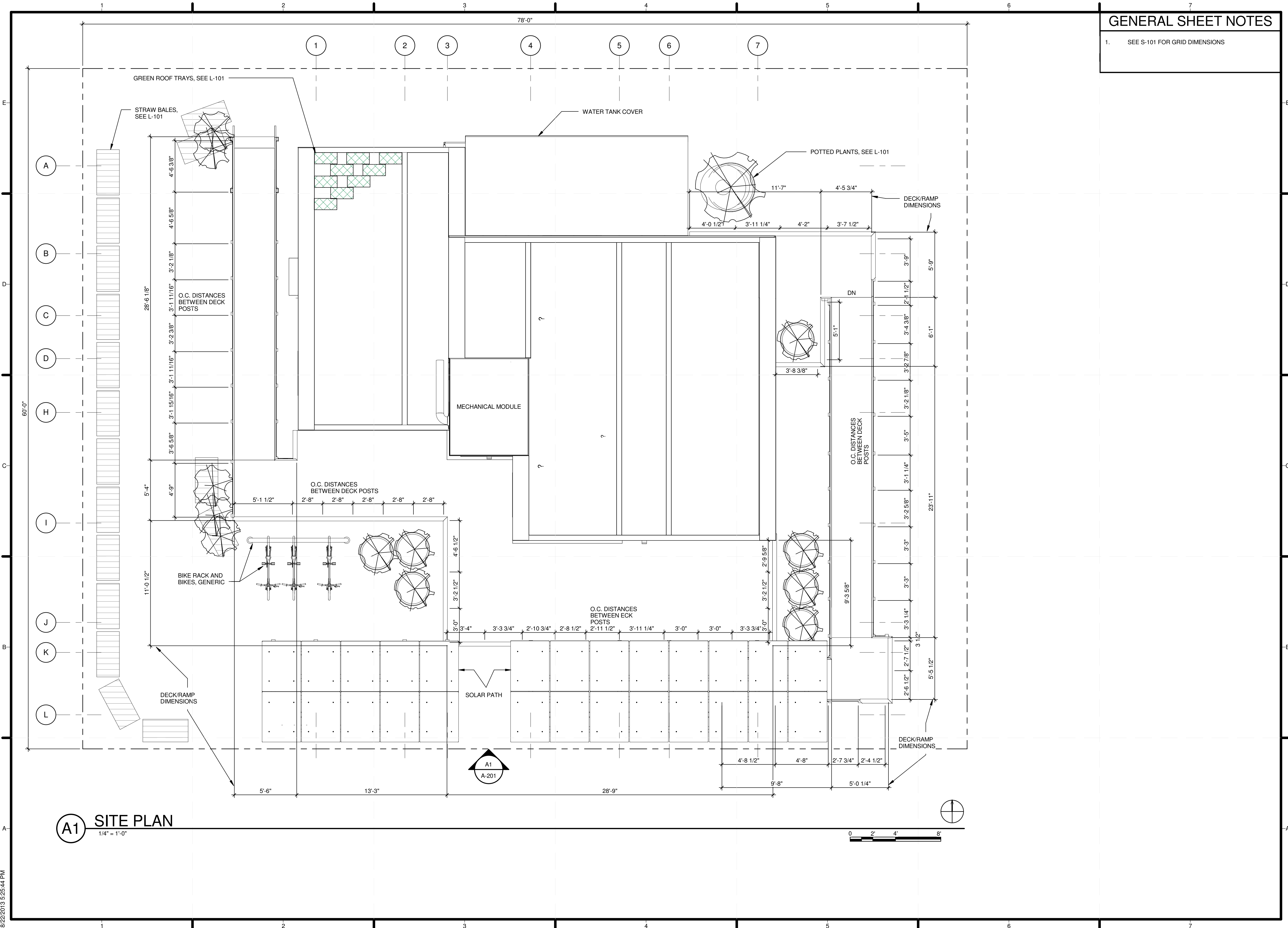
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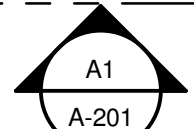
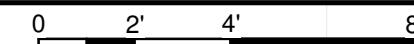
SITE PLAN

A-101



A1 SITE PLAN

1/4" = 1'-0"



**GENERAL SHEET NOTES**

1. ALL DIMENSIONS AT WALLS ARE TO FACE OF FRAME UNLESS OTHERWISE NOTED
2. ALL OPENINGS DIMENSIONED AT CENTER LINES UNLESS OTHERWISE NOTED.
3. SEE S-101 FOR GRID LINES DIMENSIONS.
4. CELLULOSE INSULATION WITHIN WALL PANELS
5. DENIM BAT INSULATION BETWEEN PANELS



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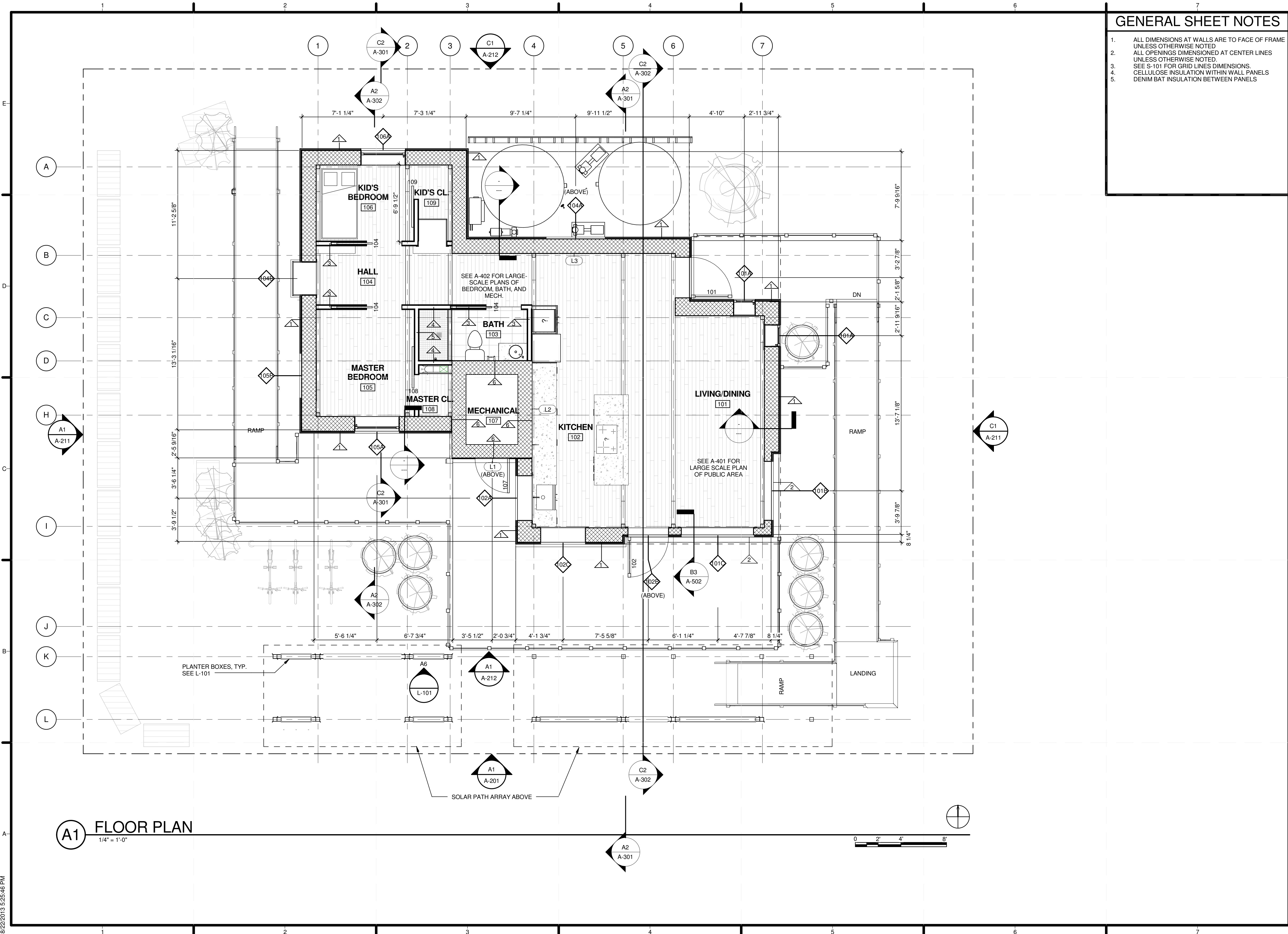
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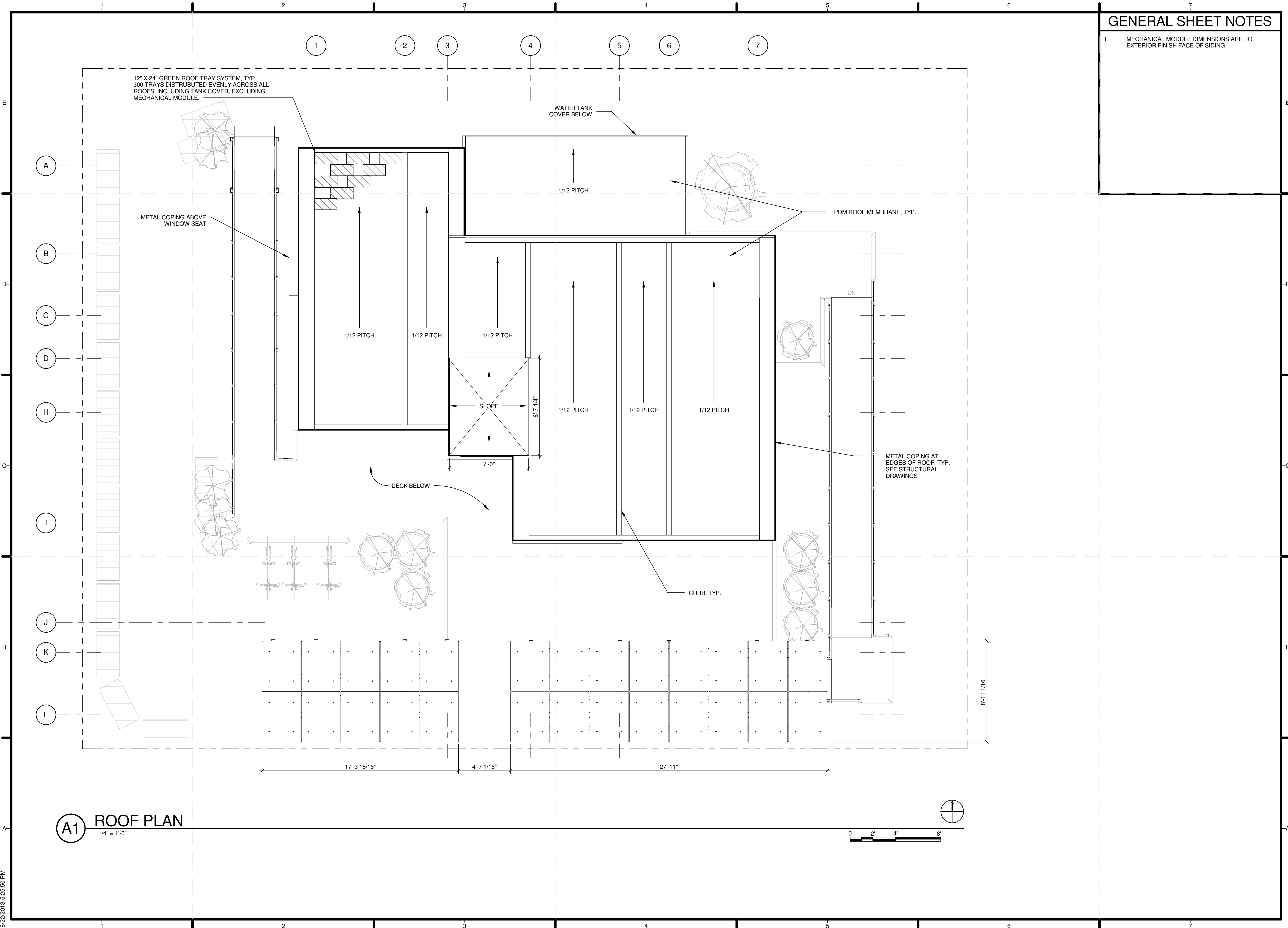
SHEET TITLE

FLOOR PLAN

A-111



**A1 FLOOR PLAN**  
 1/4" = 1'-0"



**GENERAL SHEET NOTES**

1. MECHANICAL MODULE DIMENSIONS ARE TO EXTERIOR FINISH FACE OF SIDING



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SHEET TITLE  
**ROOF PLAN**

**A-112**

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**GENERAL SHEET NOTES**

- OVER-DOOR LIGHTS ARE CENTERED OVER DOOR



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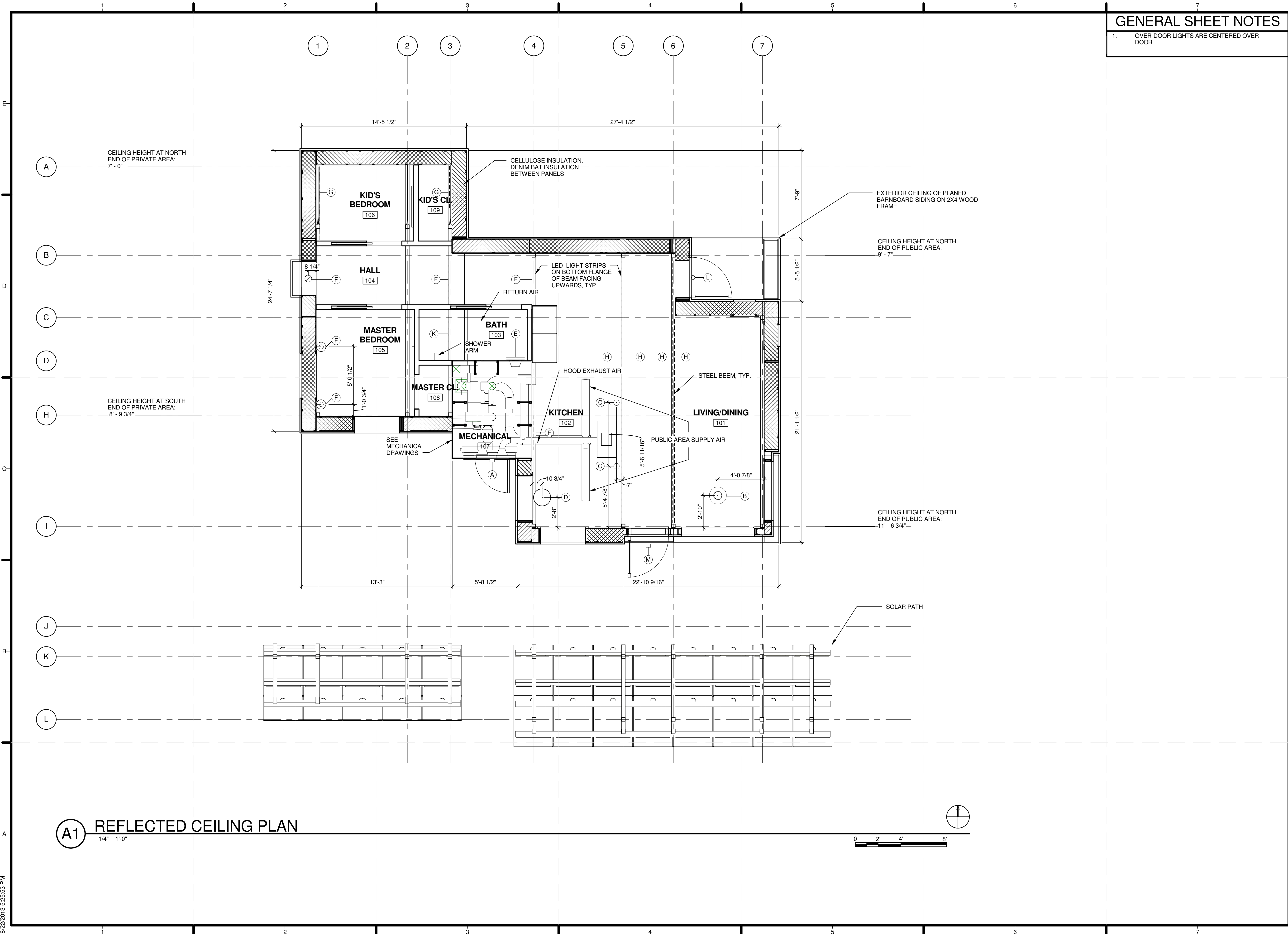
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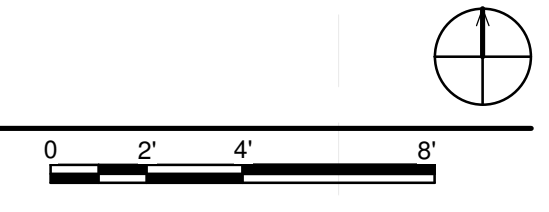
SHEET TITLE

REFLECTED CEILING PLAN

A-121



**A1 REFLECTED CEILING PLAN**  
 1/4" = 1'-0"



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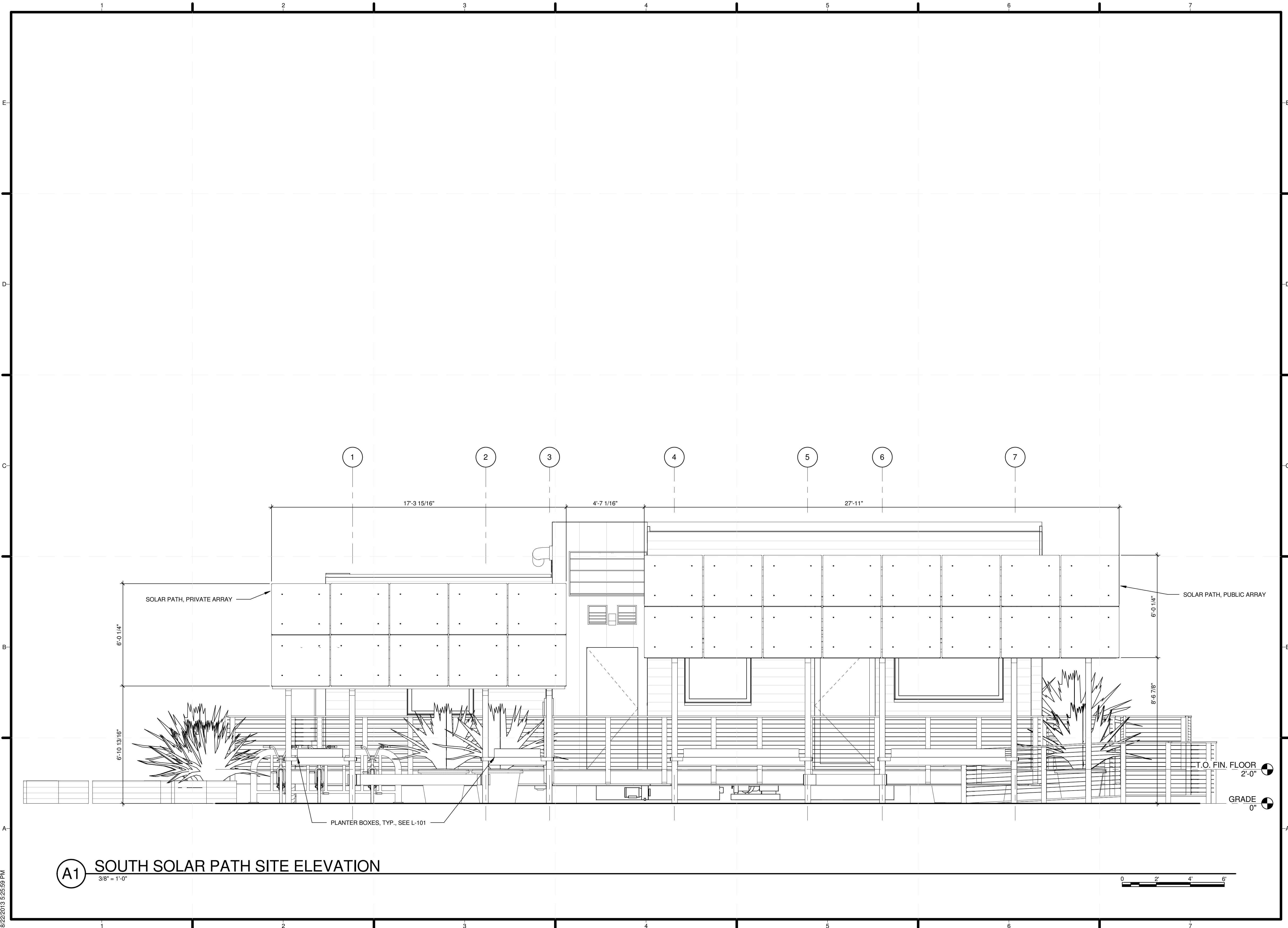
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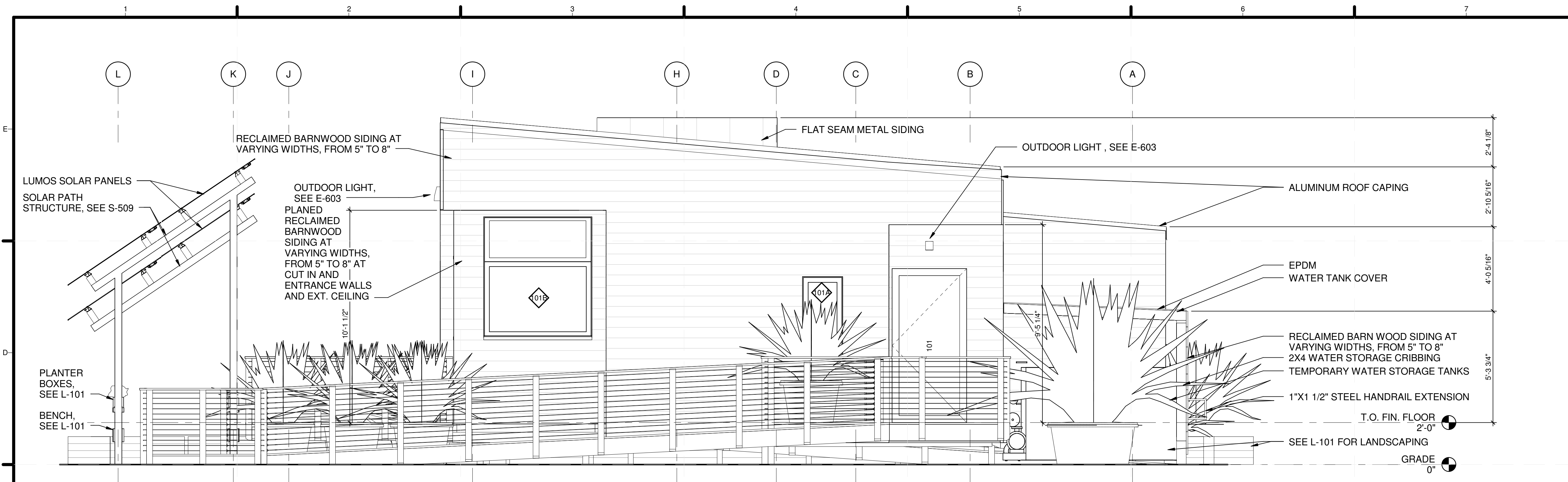
SHEET TITLE  
**SOLAR PATH SITE ELEVATION**

**A-201**

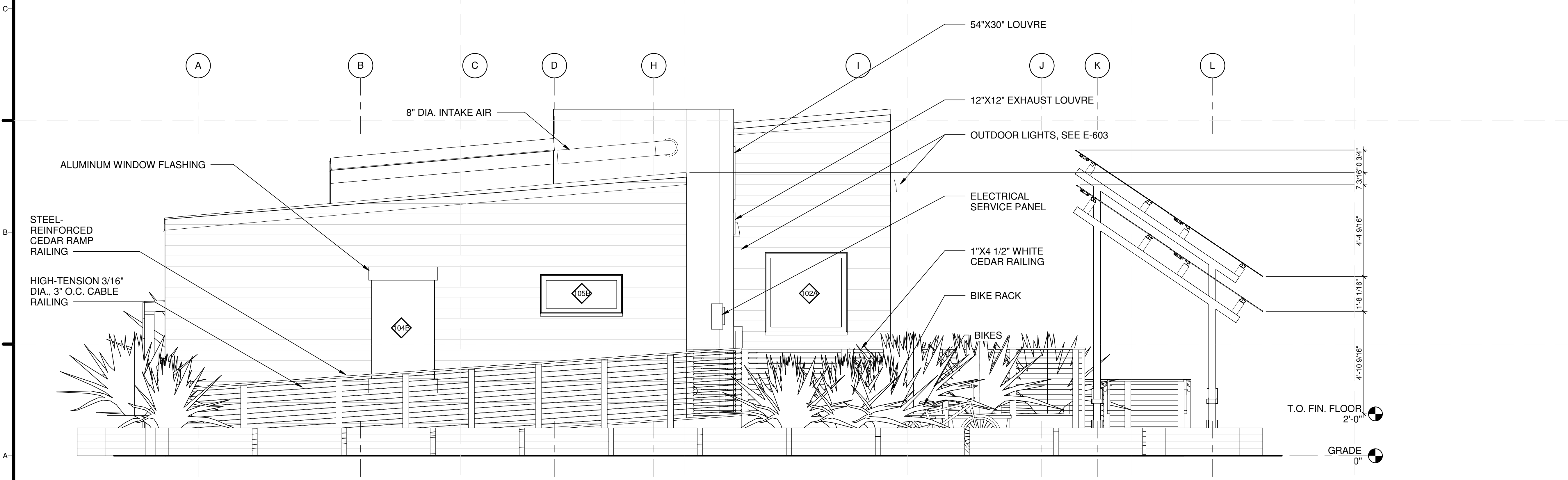
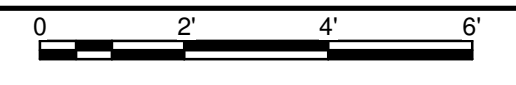


**A1** SOUTH SOLAR PATH SITE ELEVATION  
3/8" = 1'-0"

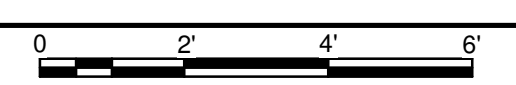
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**C1 EAST BUILDING ELEVATION**  
3/8" = 1'-0"



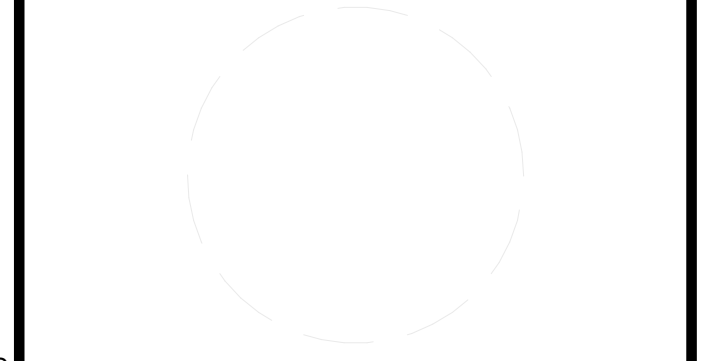
**A1 WEST BUILDING ELEVATION**  
3/8" = 1'-0"



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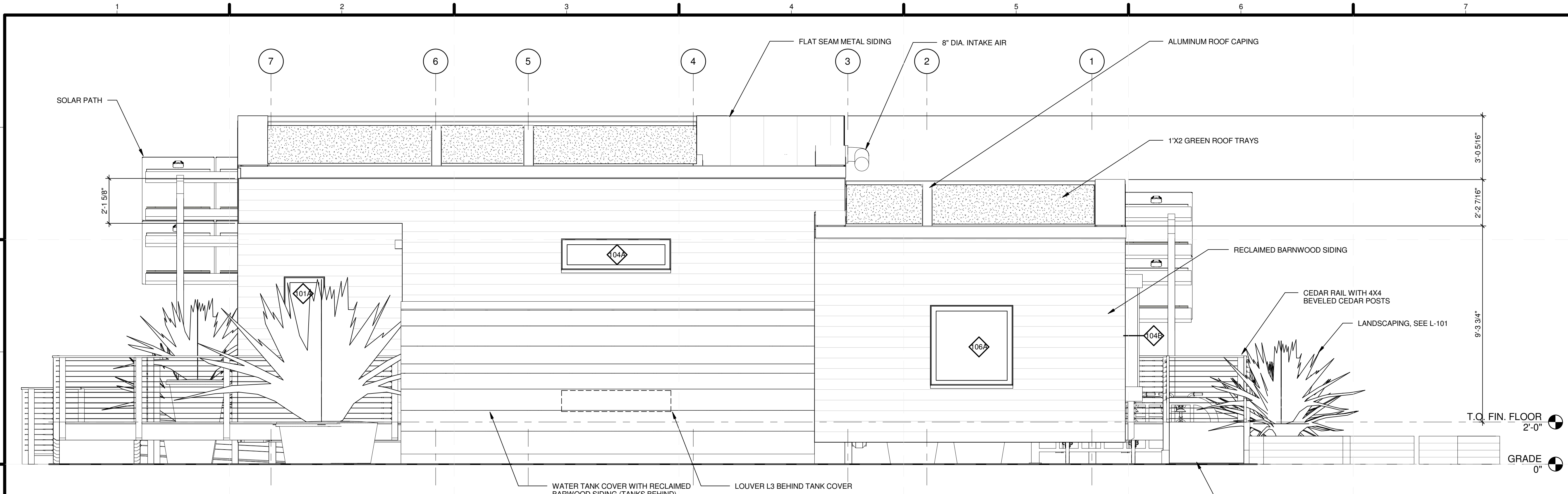
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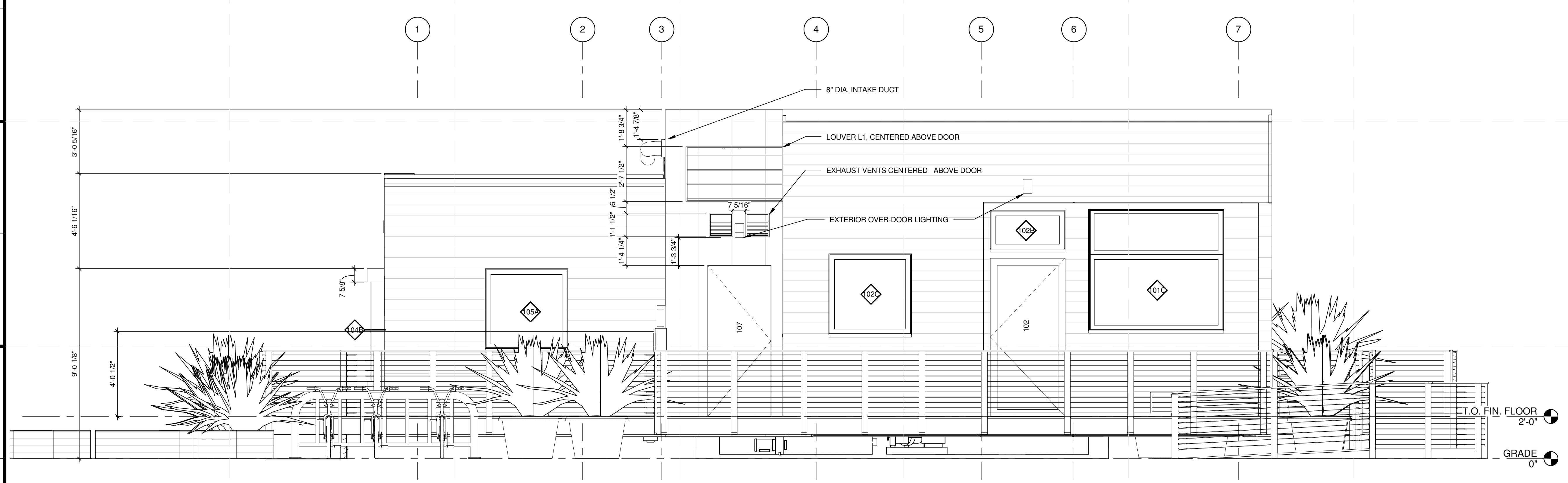
SHEET TITLE  
**BUILDING ELEVATIONS**

**A-211**

8/22/2013 5:26:07 PM



**C1 NORTH BUILDING ELEVATION**  
3/8" = 1'-0"



**A1 SOUTH BUILDING ELEVATION**  
3/8" = 1'-0"



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**BUILDING ELEVATIONS**

**A-212**

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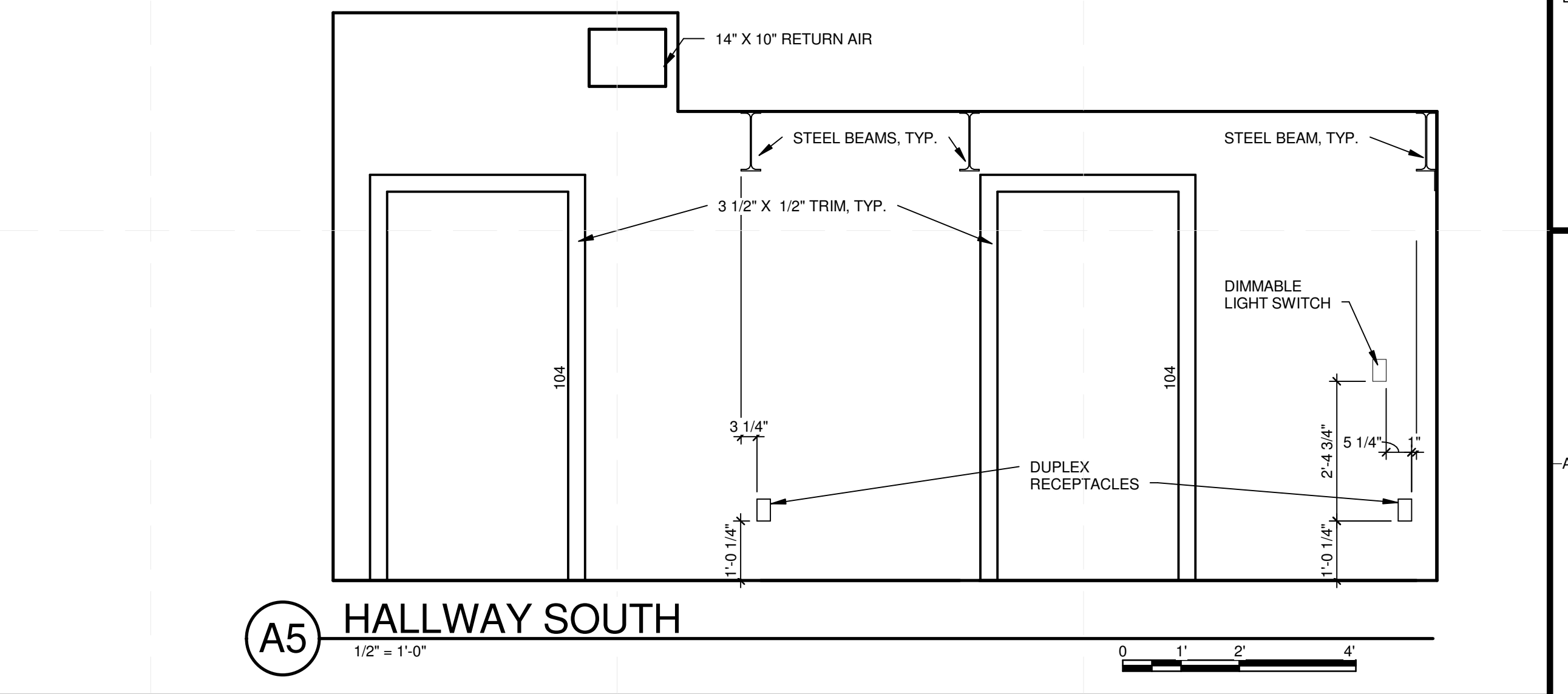
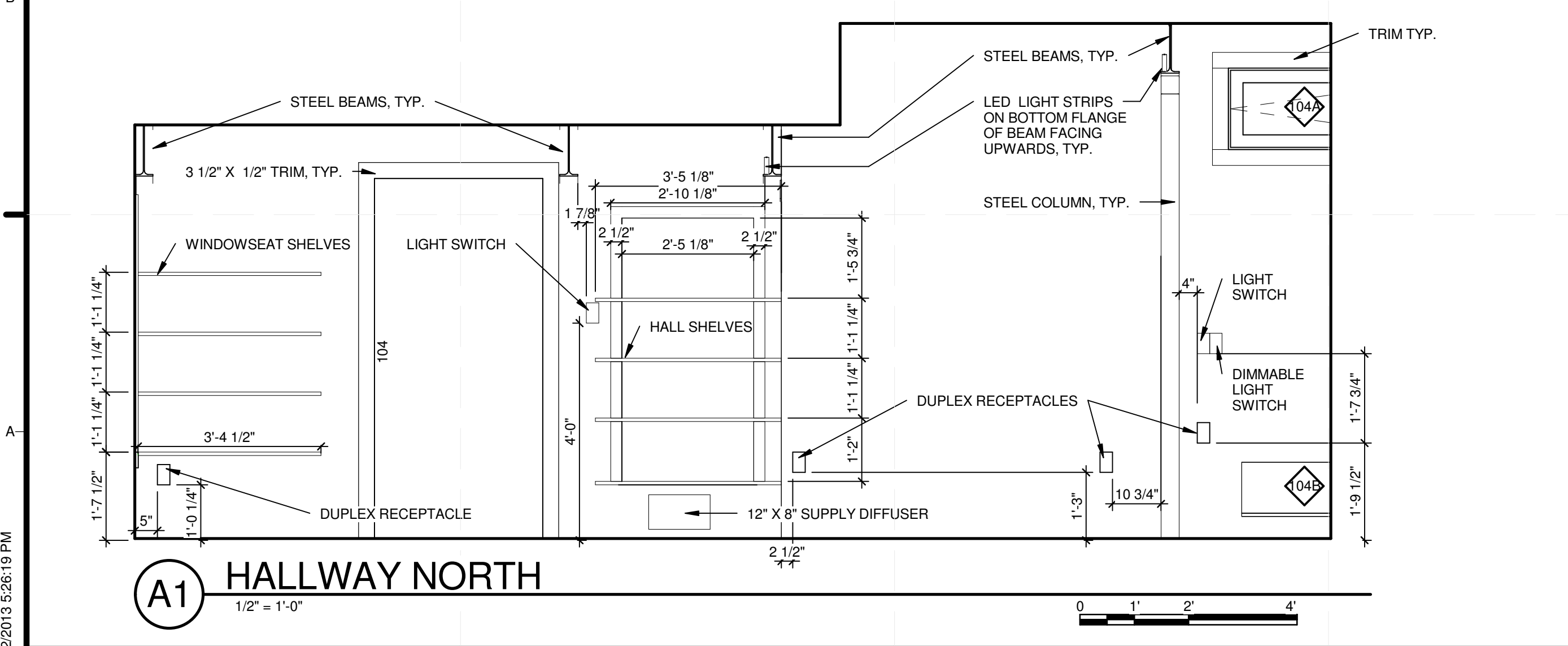
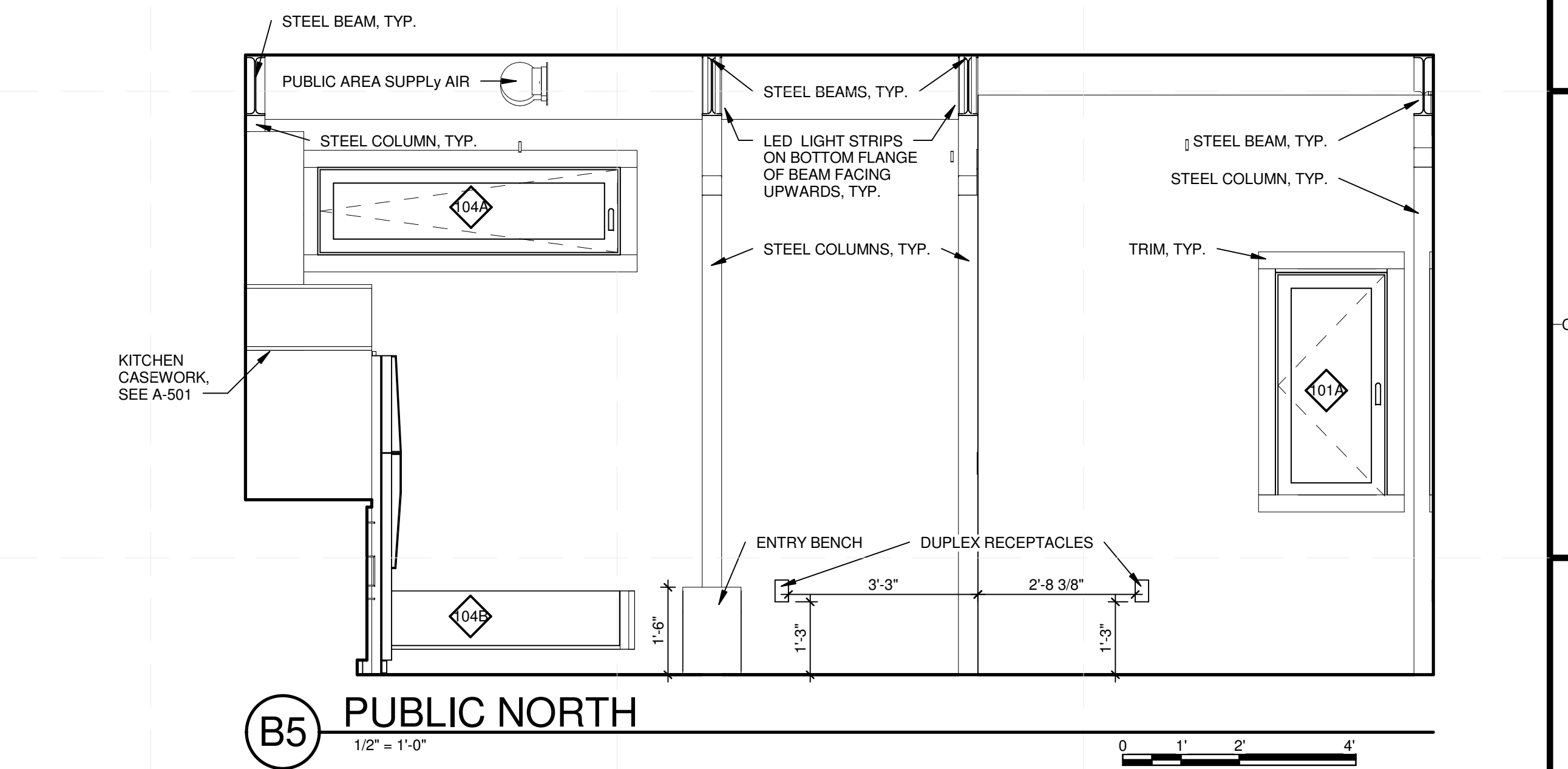
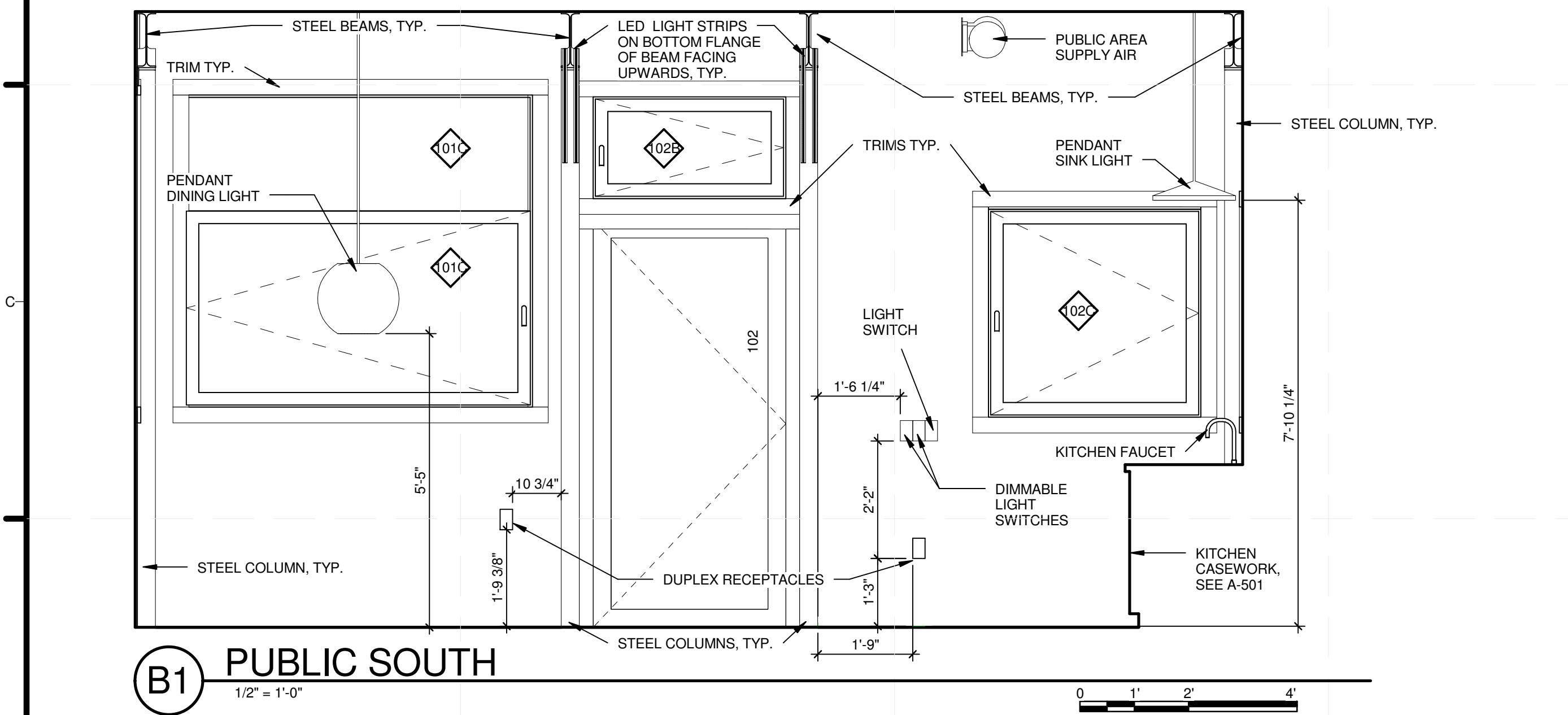
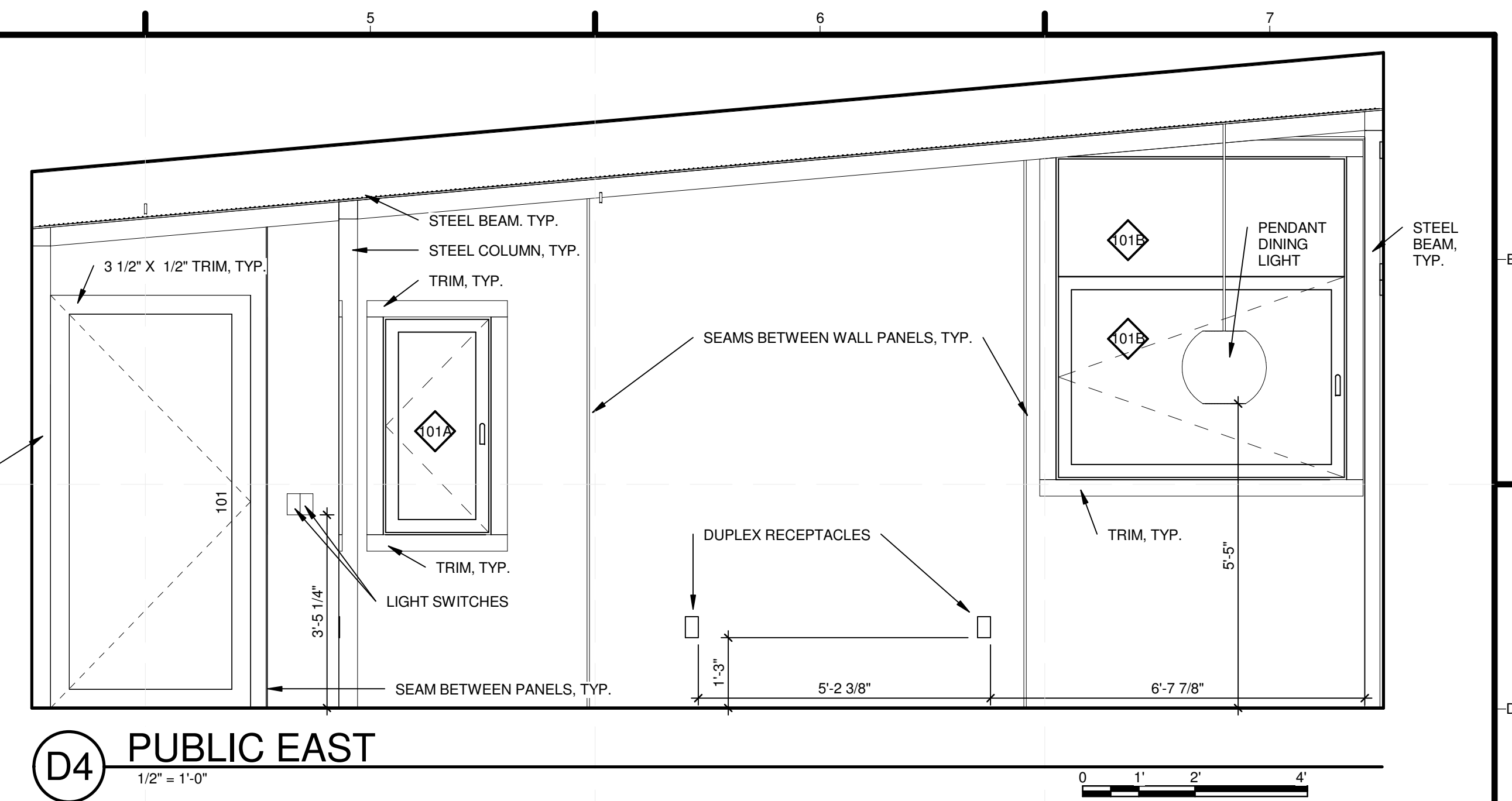
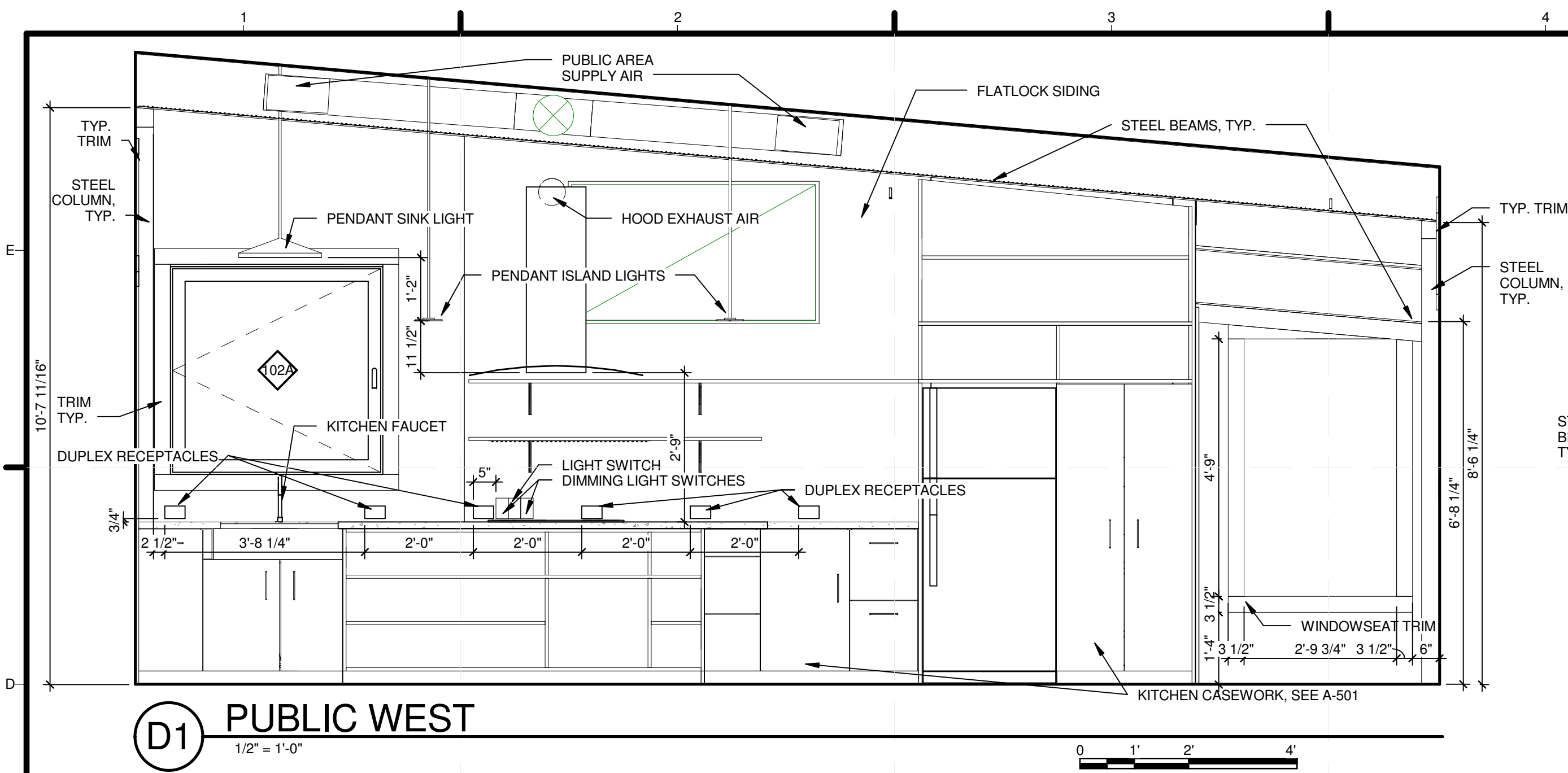
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SHEET TITLE

INTERIOR ELEVATIONS-  
 PUBLIC SPACE

A-221



8/22/2013 5:26:19 PM





MIDDLEBURY COLLEGE

TEAM NAME: TEAM MIDDLEBURY  
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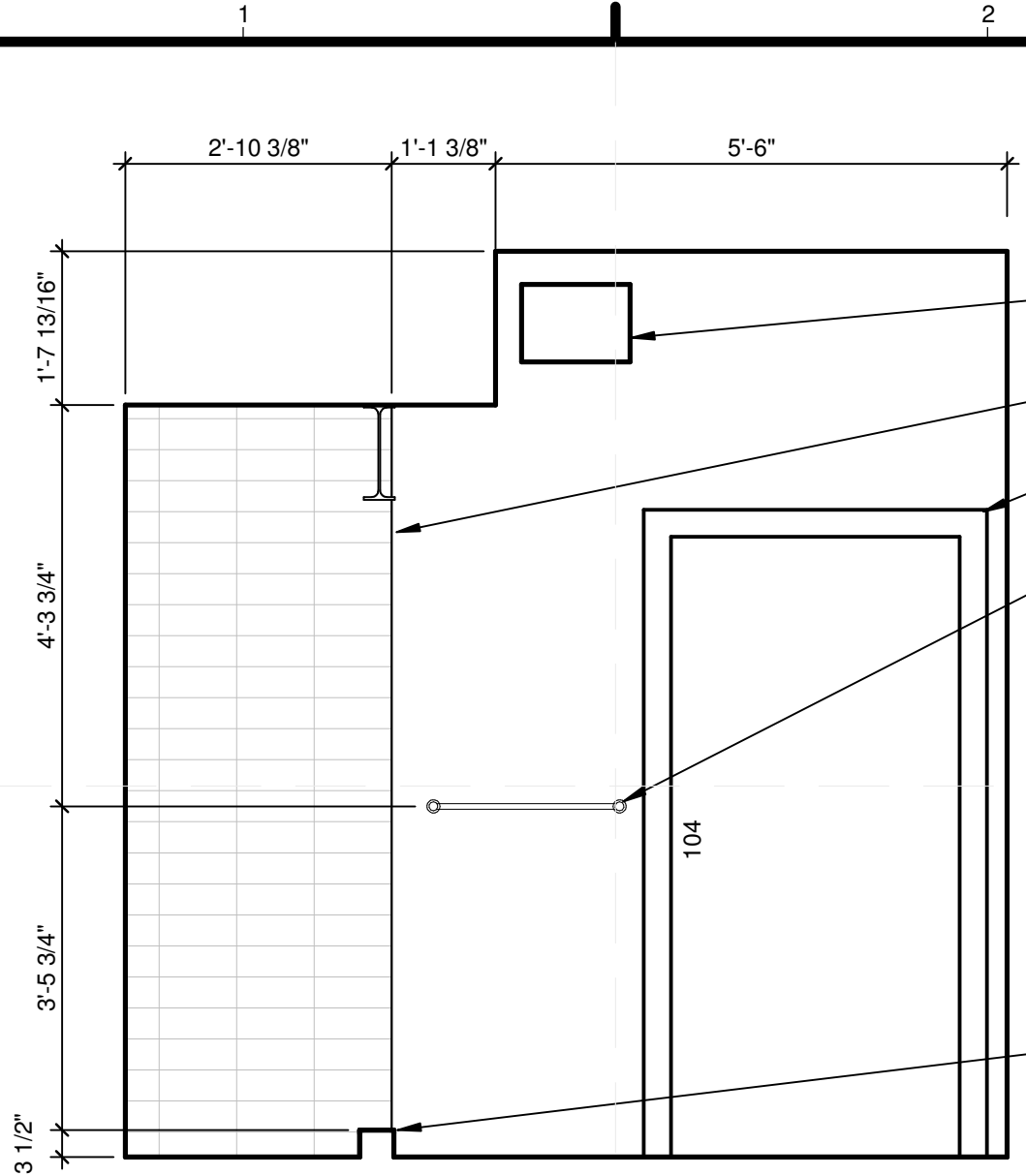
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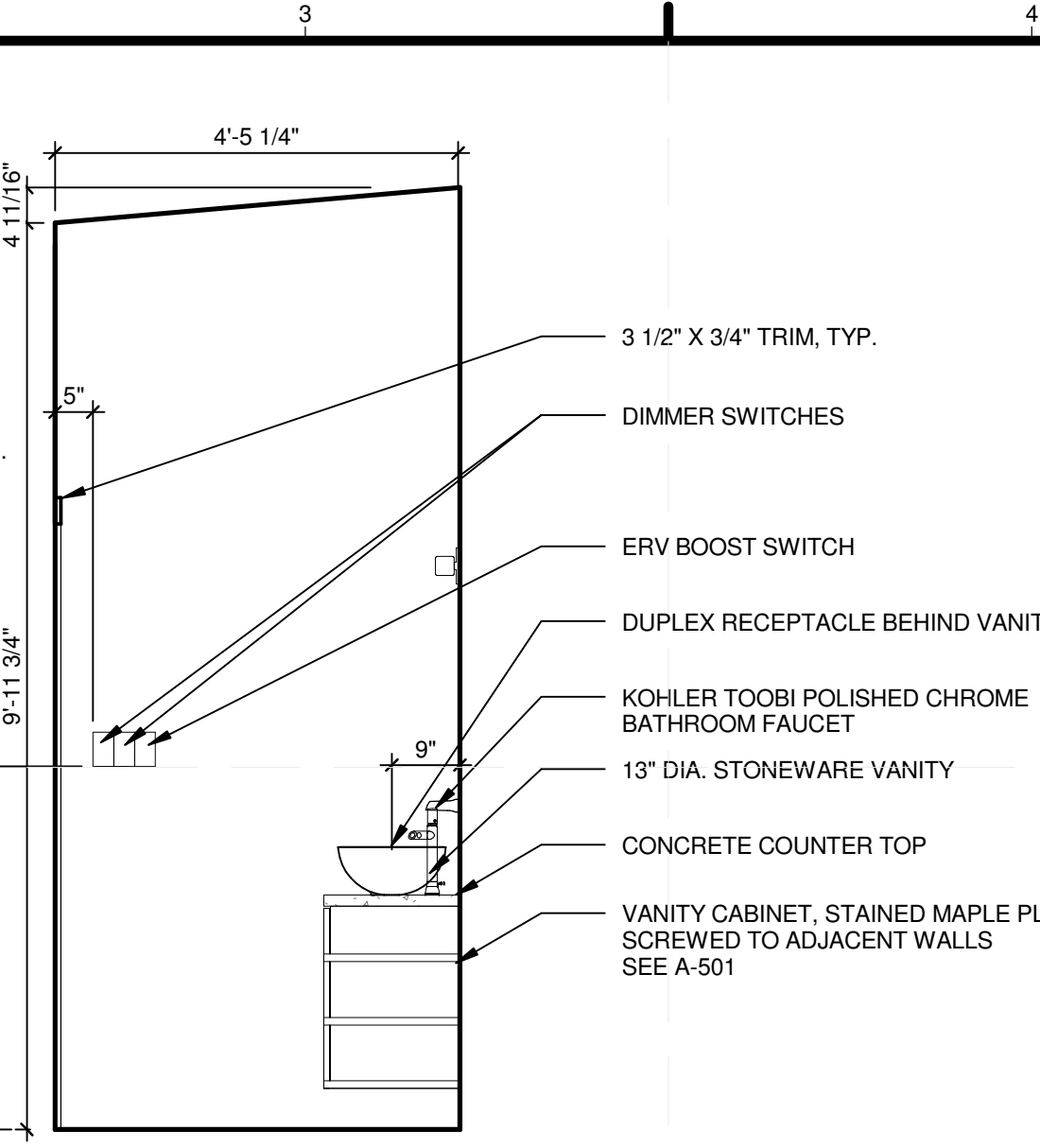
SHEET TITLE

INTERIOR ELEVATIONS-  
 PRIVATE SPACE

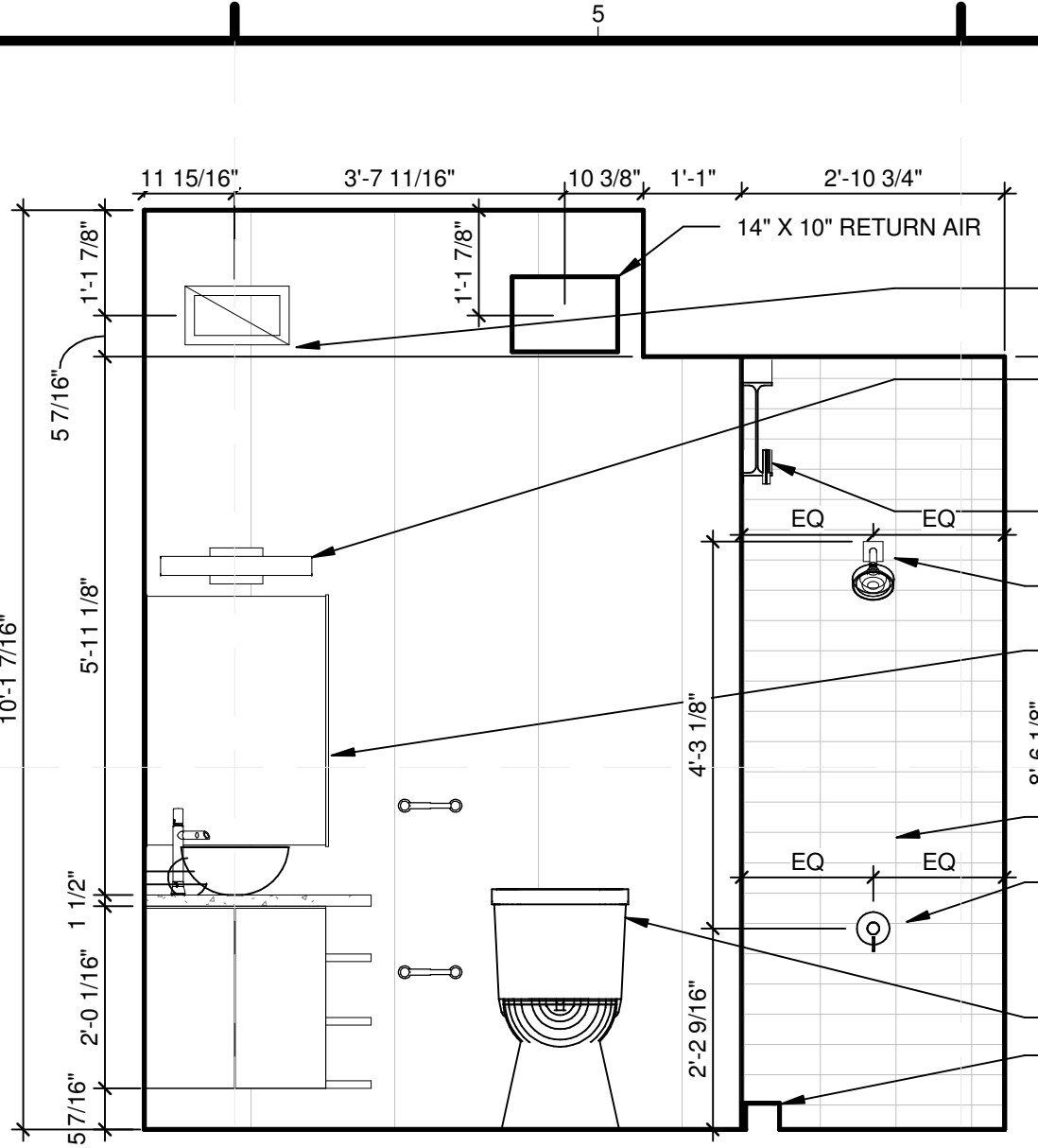
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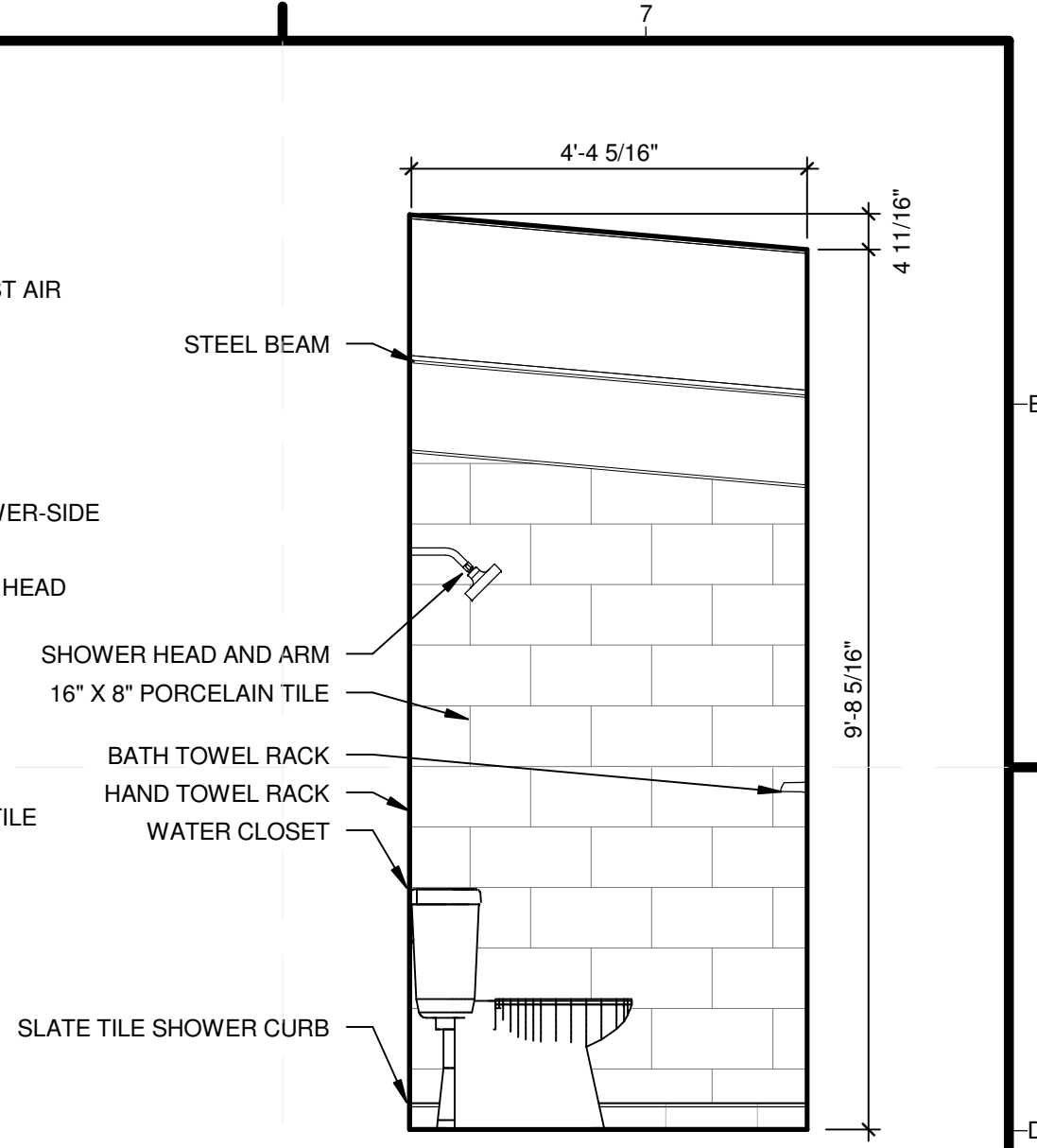
**D1 BATHROOM NORTH**  
 1/2" = 1'-0"  
 0 1' 2' 4'



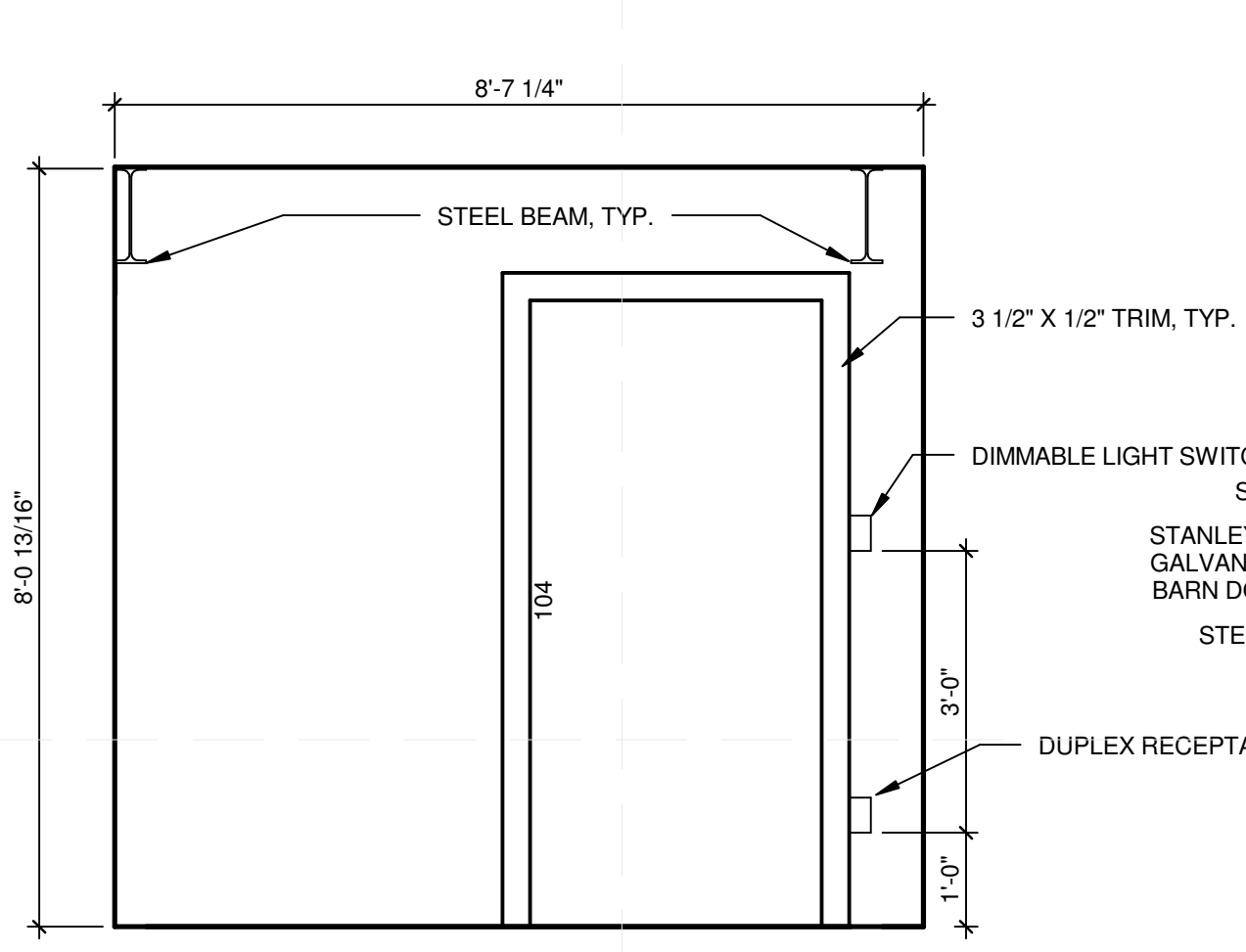
**D3 BATHROOM EAST**  
 1/2" = 1'-0"  
 0 1' 2' 4'



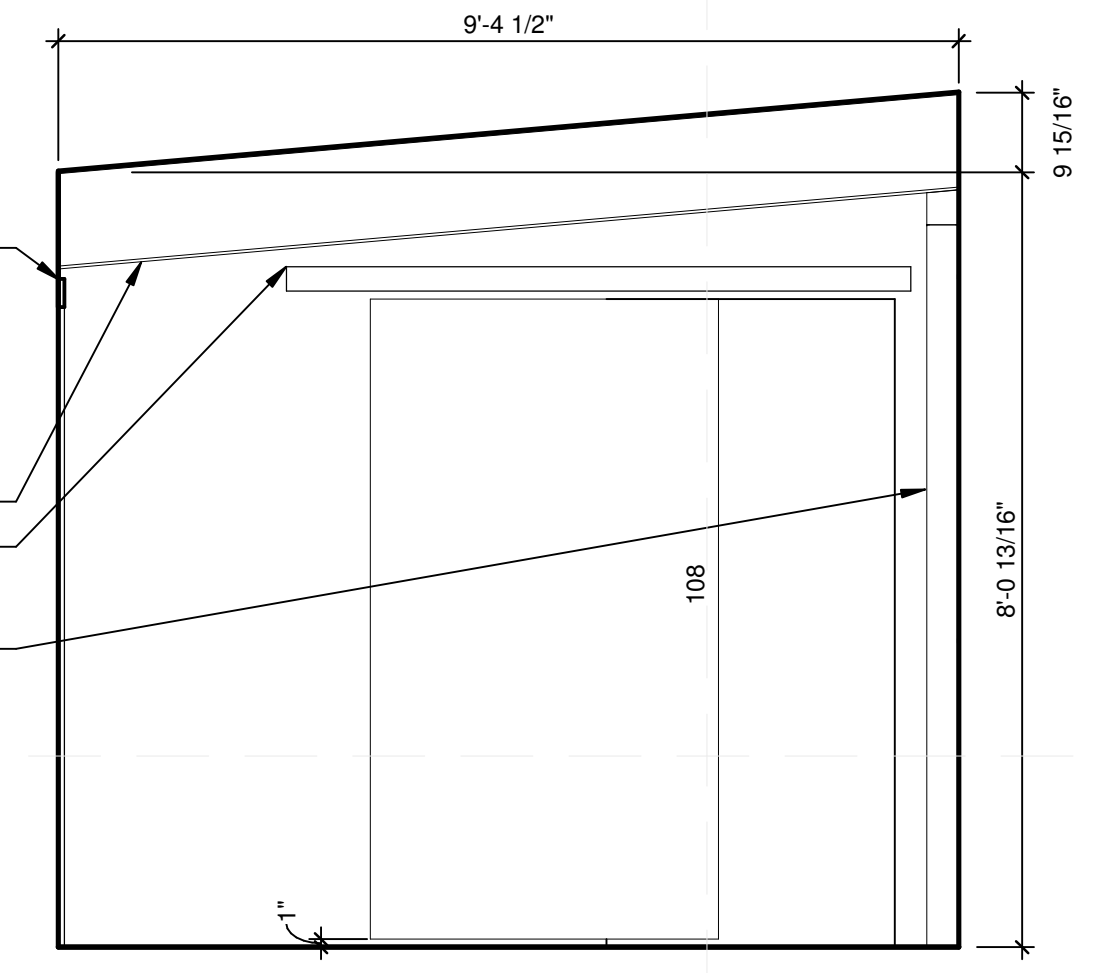
**D4 BATHROOM SOUTH**  
 1/2" = 1'-0"  
 0 1' 2' 4'



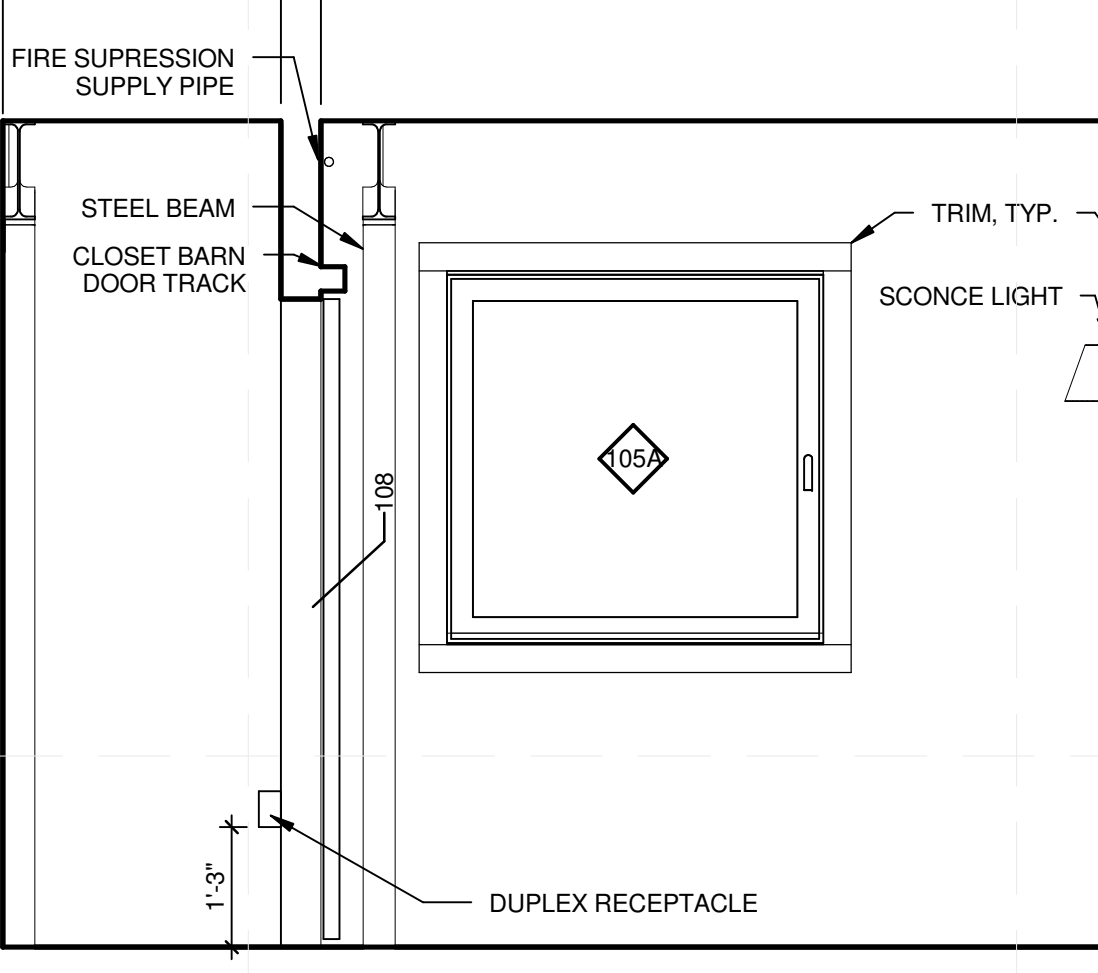
**D6 BATHROOM WEST**  
 1/2" = 1'-0"  
 0 1' 2' 4'



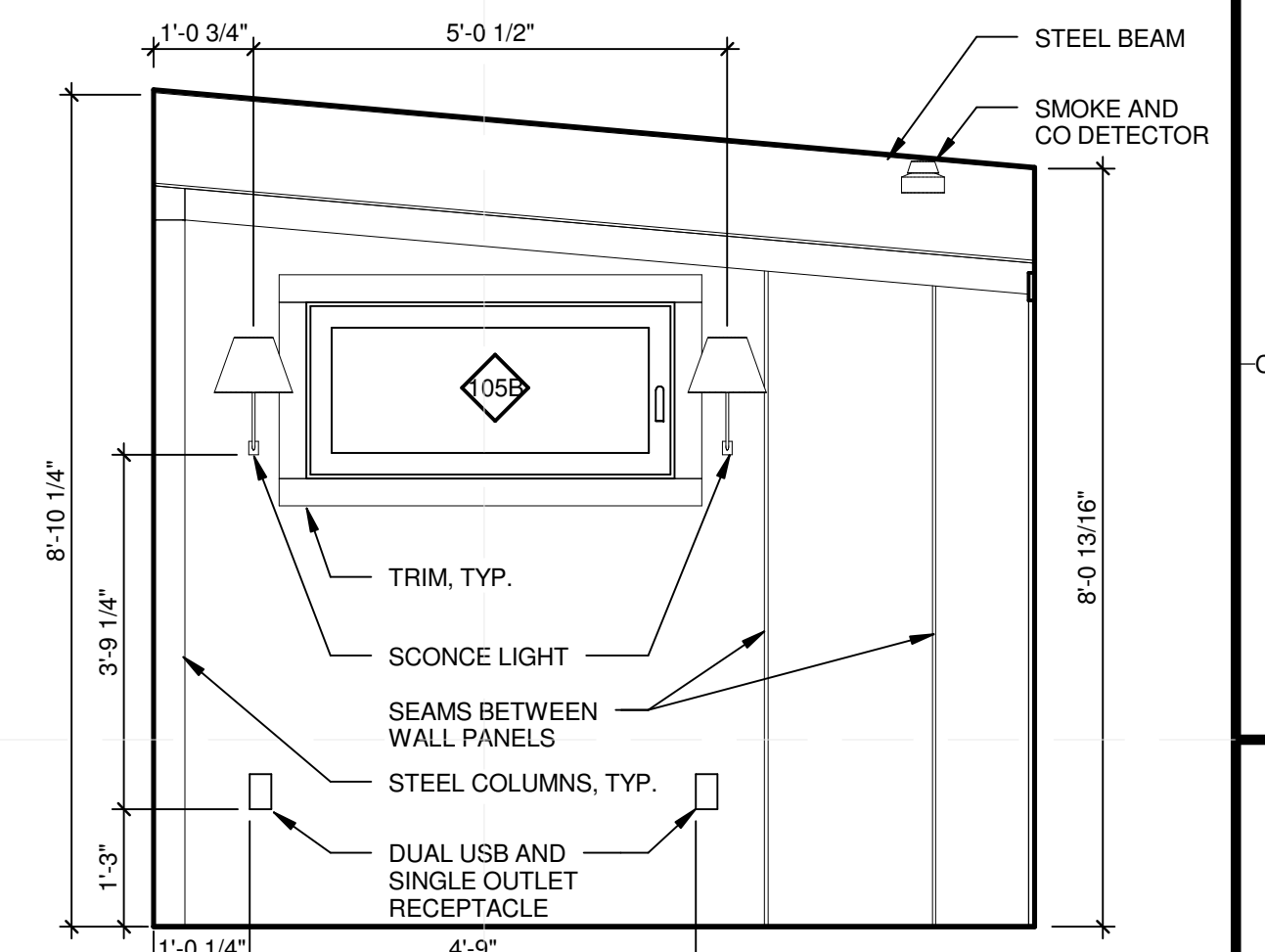
**B1 MASTER BEDROOM NORTH**  
 1/2" = 1'-0"  
 0 1' 2' 4'



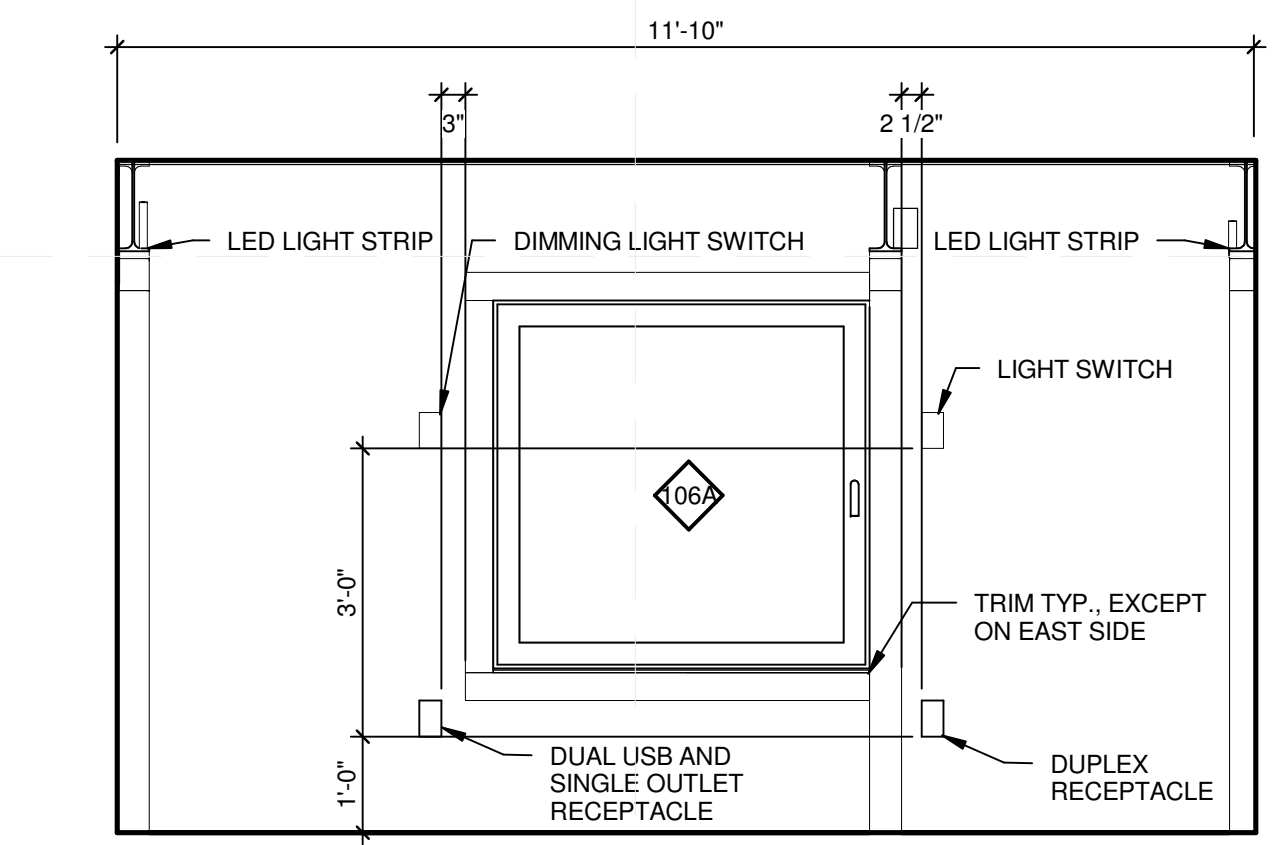
**B3 MASTER BEDROOM EAST**  
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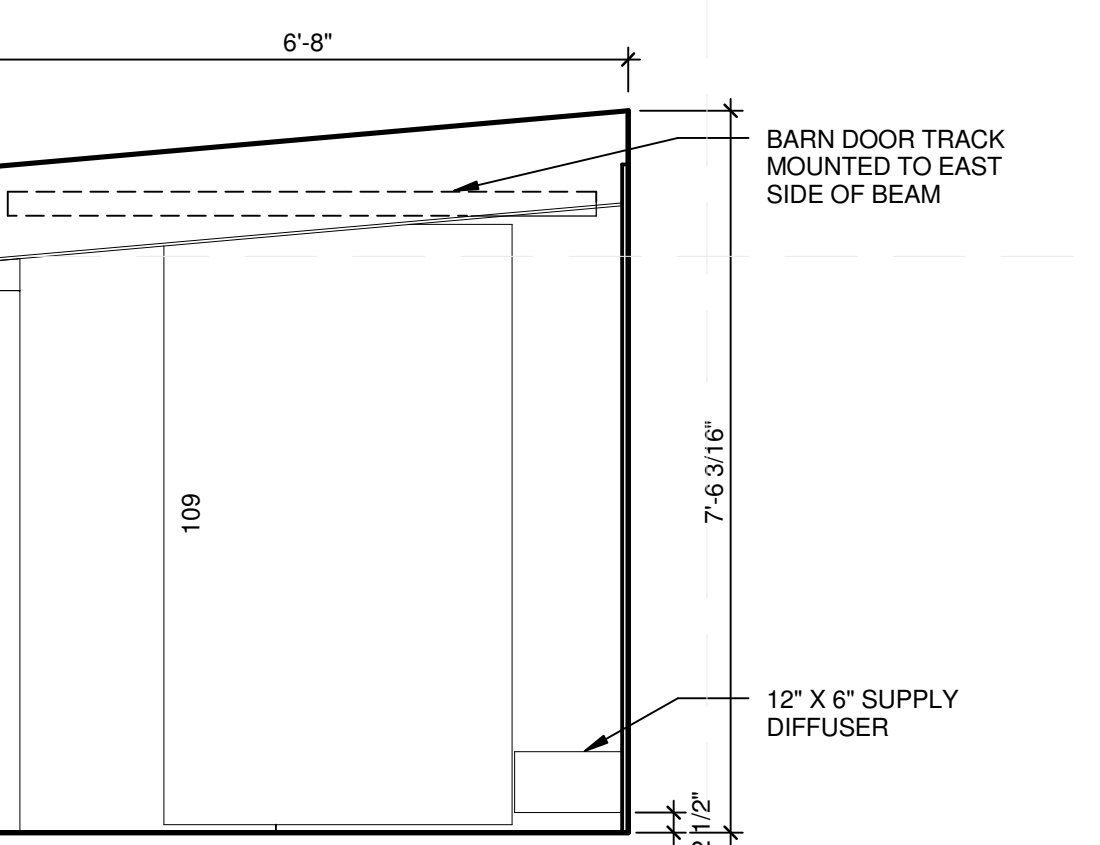
**B4 MASTER BEDROOM SOUTH**  
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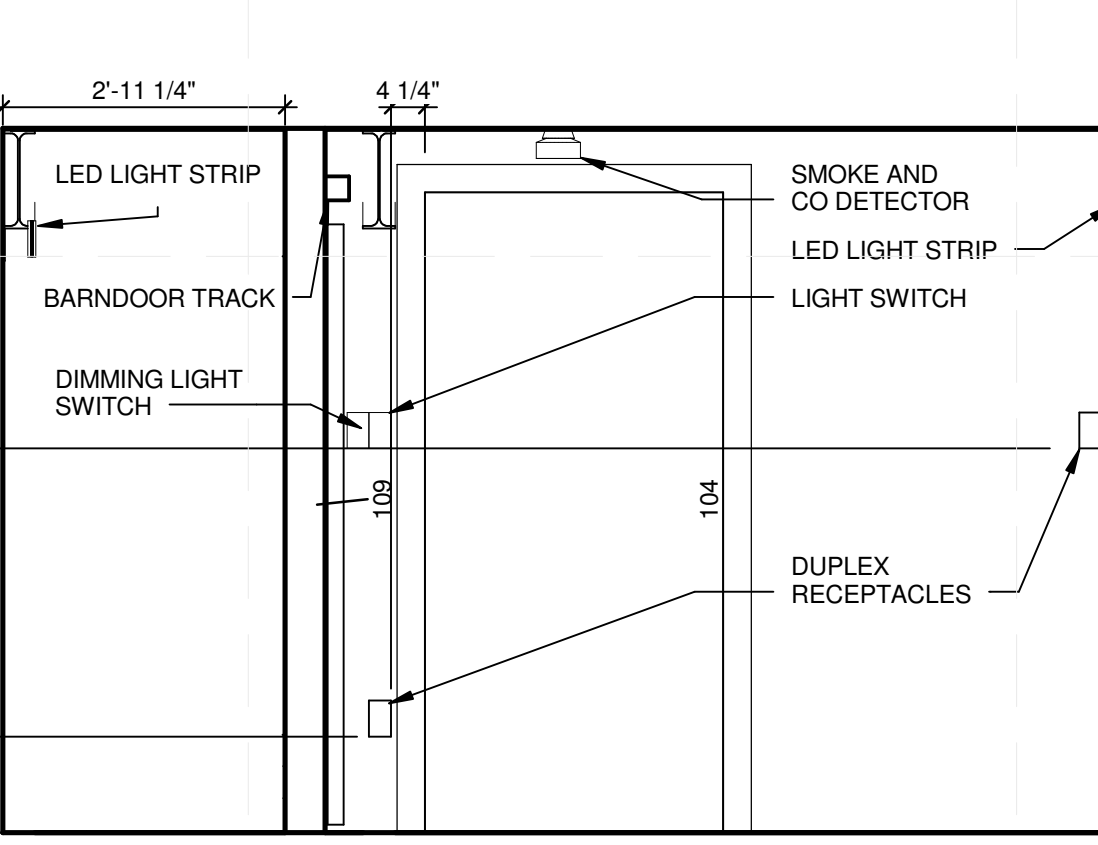
**B6 MASTER BEDROOM WEST**  
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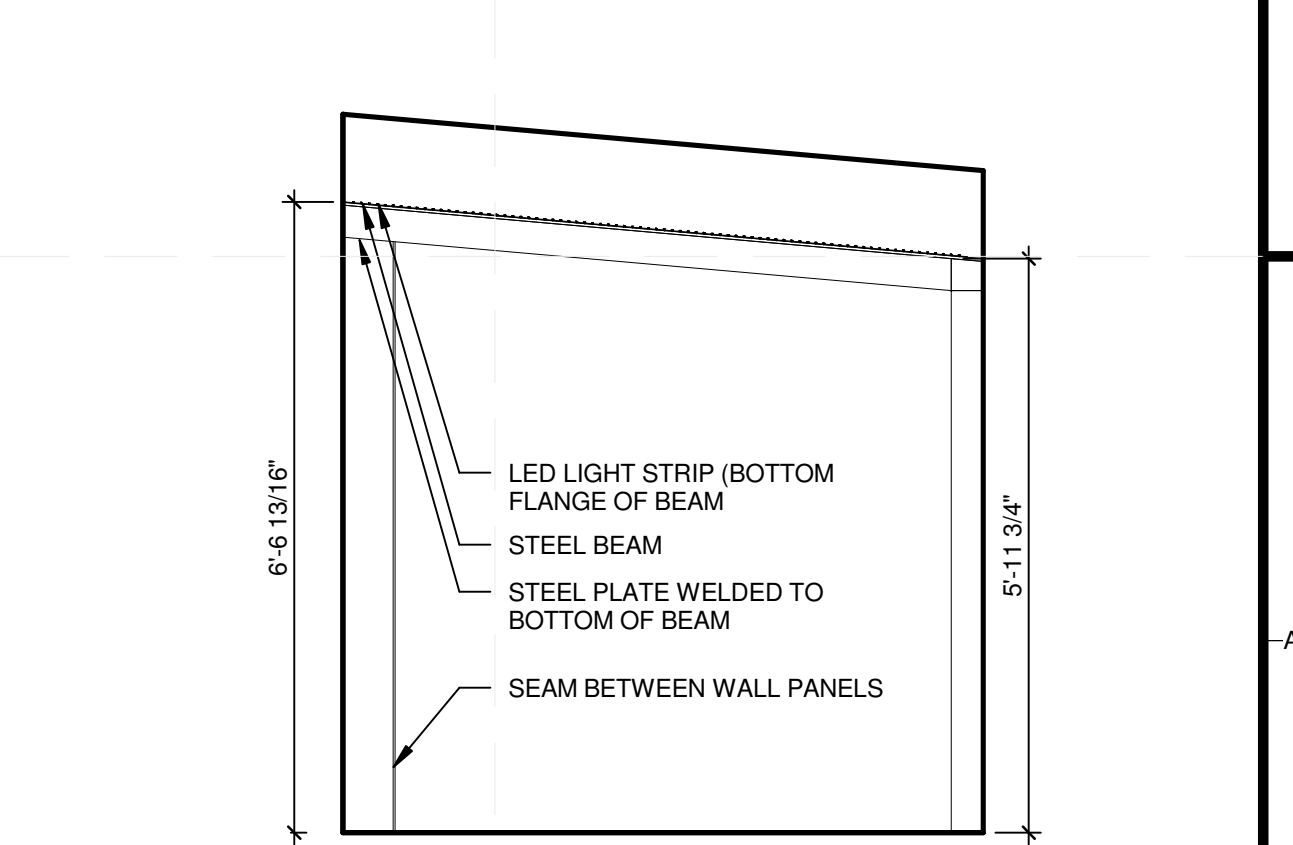
**A1 KID'S BEDROOM NORTH**  
 1/2" = 1'-0"  
 0 1' 2' 4'



**A3 CHILDREN'S BEDROOM EAST**  
 1/2" = 1'-0"  
 0 1' 2' 4'



**A4 CHILDREN'S BEDROOM SOUTH**  
 1/2" = 1'-0"  
 0 1' 2' 4'



**A6 CHILDREN'S BEDROOM WEST**  
 1/2" = 1'-0"  
 0 1' 2' 4'

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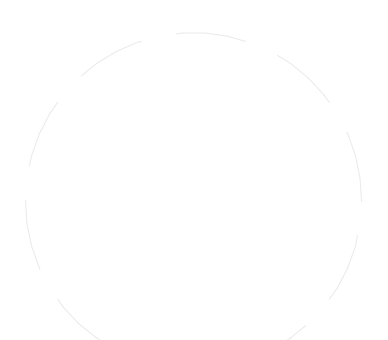


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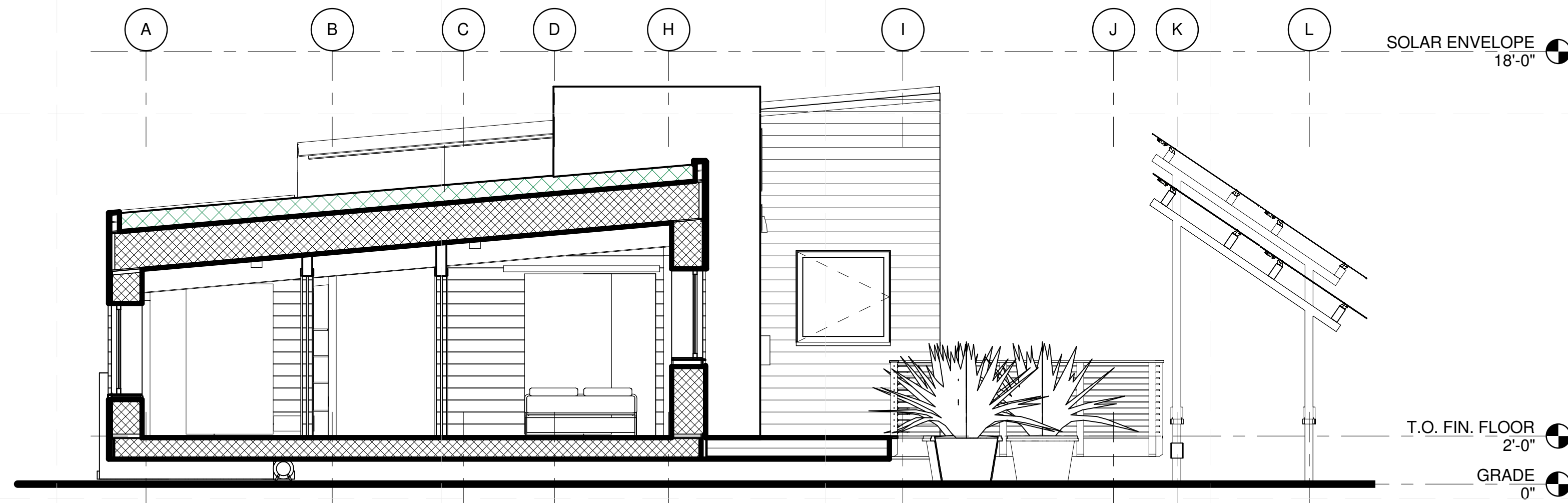
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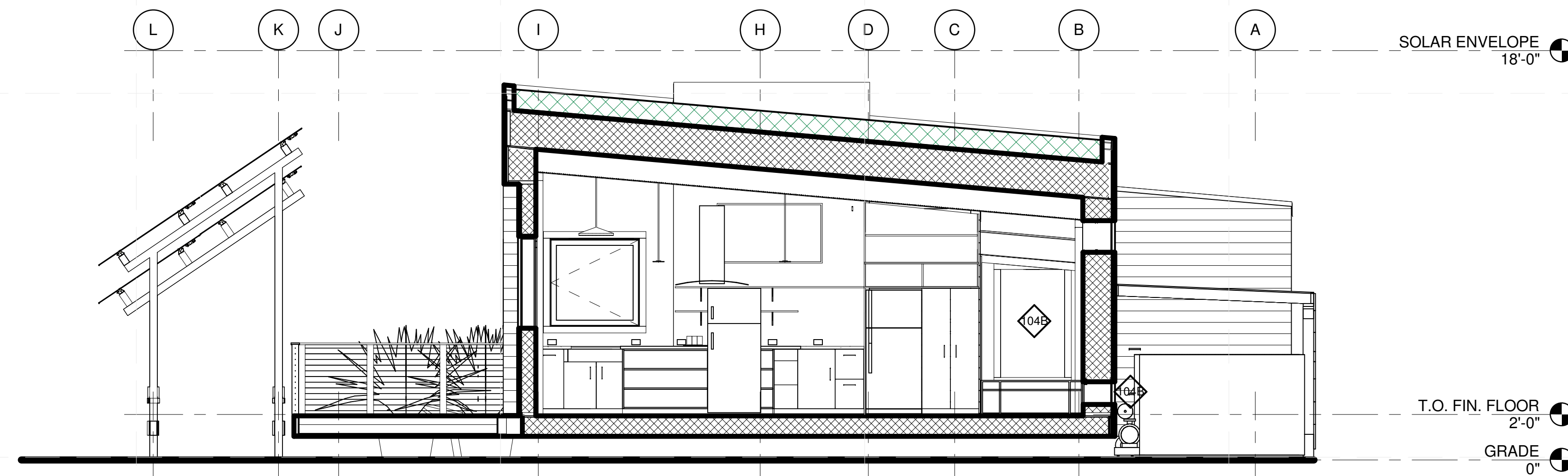
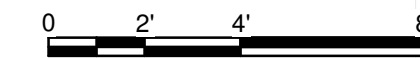
SHEET TITLE

BUILDING SECTIONS

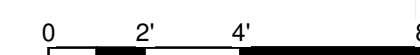
A-301



**C2** PRIVATE EAST  
 1/4" = 1'-0"



**A2** PUBLIC WEST  
 1/4" = 1'-0"





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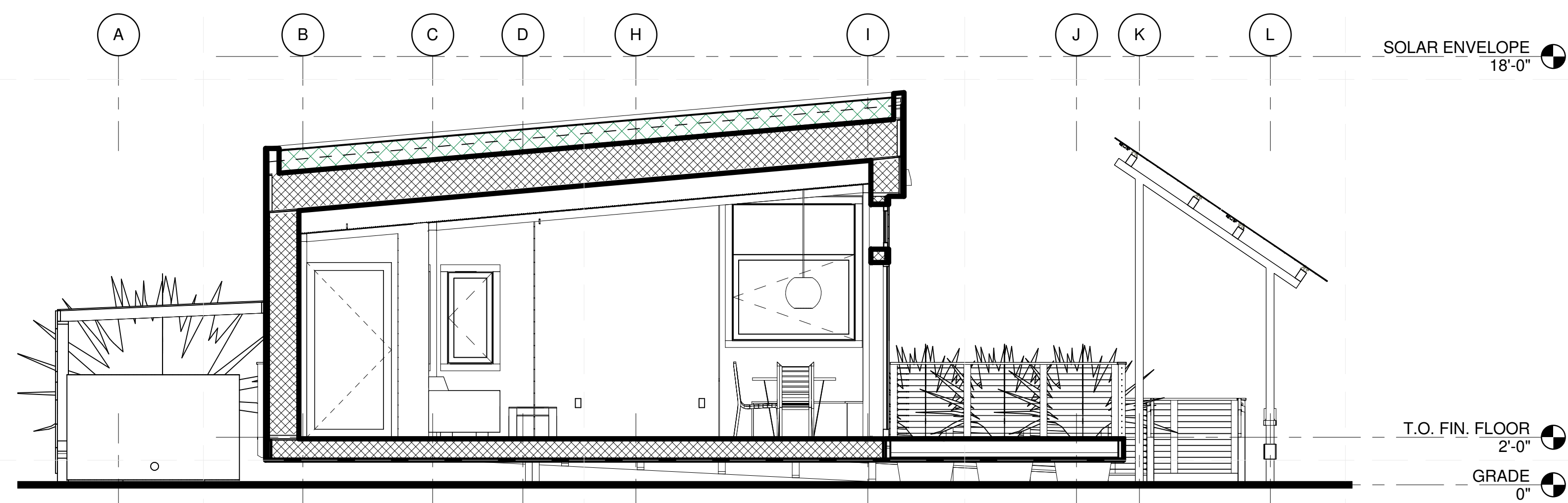
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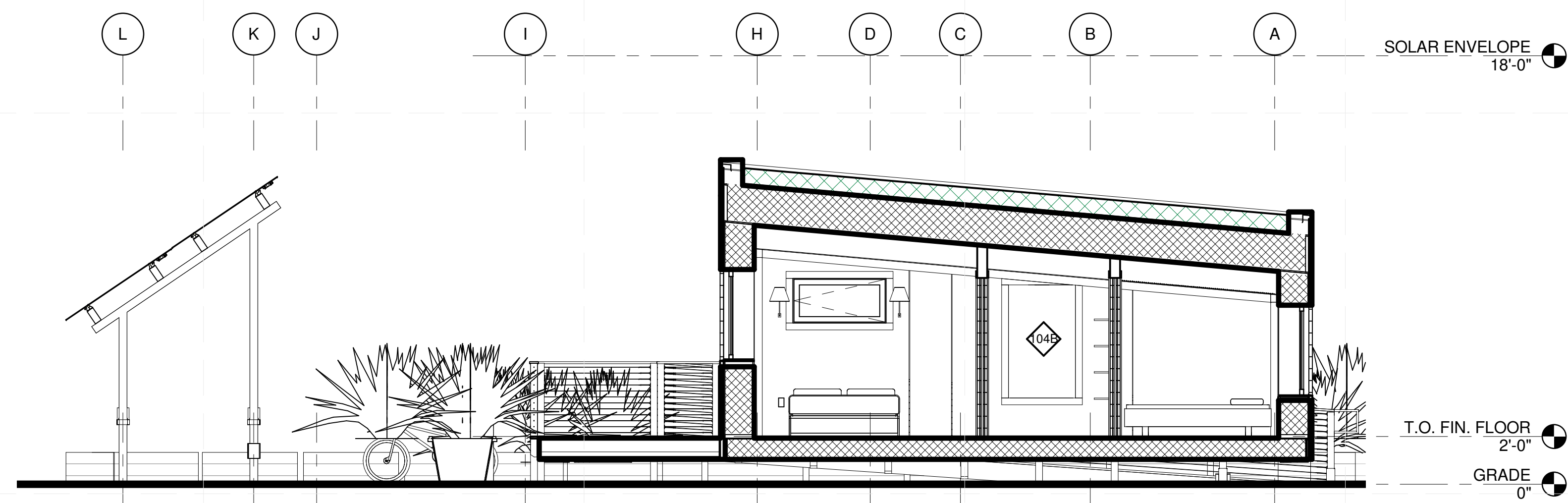
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SHEET TITLE  
**BUILDING SECTIONS**

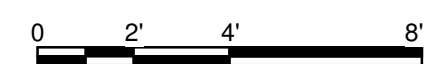
**A-302**



**C2 PUBLIC EAST**  
 1/4" = 1'-0"



**A2 PRIVATE WEST**  
 1/4" = 1'-0"



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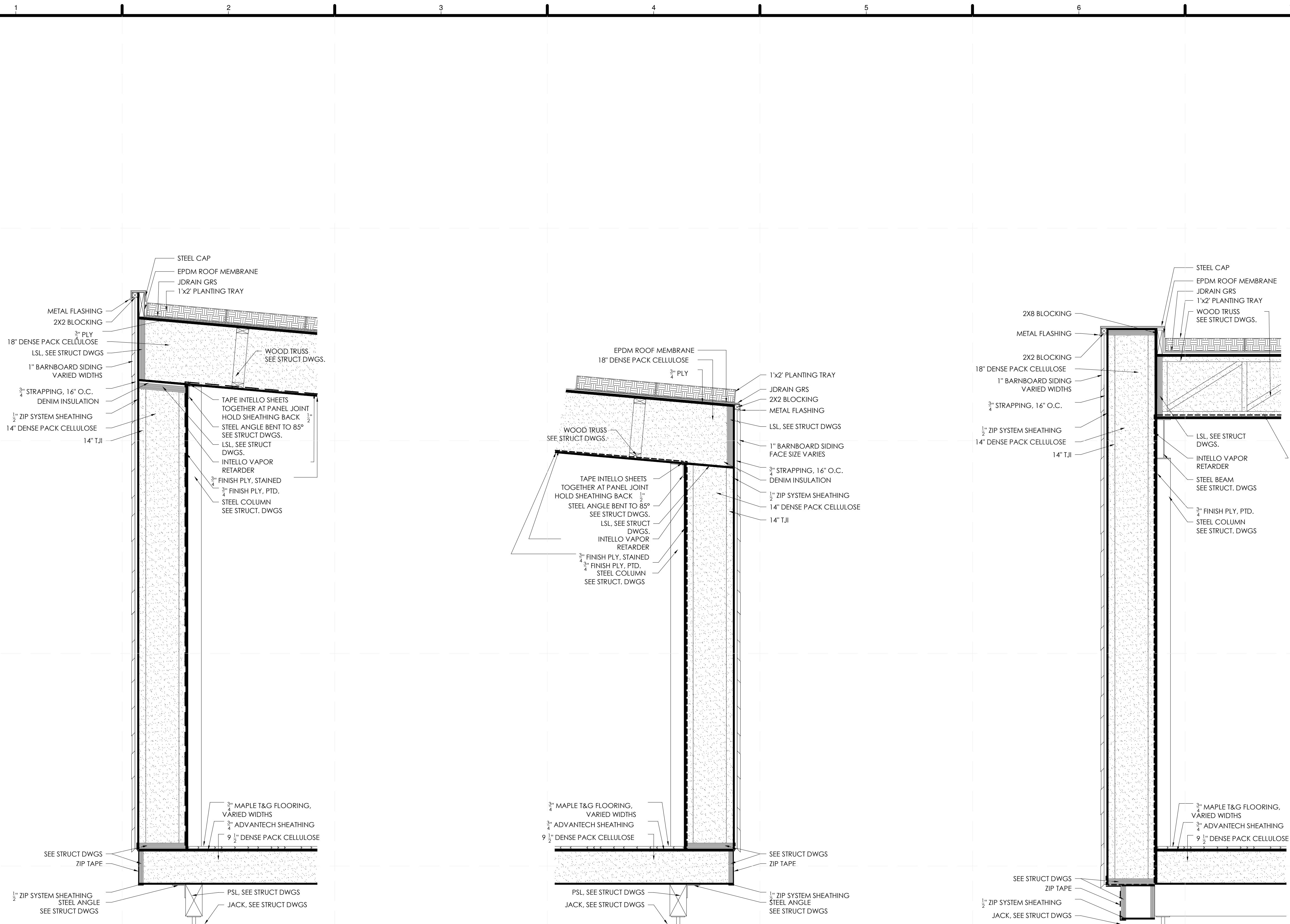
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SHEET TITLE

WALL SECTIONS

A-311



**A1 SOUTH WALL SECTION**  
 3/4" = 1'-0"  
 0 1' 2' 3'

**A4 NORTHERN WALL SECTION**  
 3/4" = 1'-0"  
 0 1' 2' 3'

**A5 EAST AND WEST WALL SECTION**  
 3/4" = 1'-0"  
 0 1' 2' 3'

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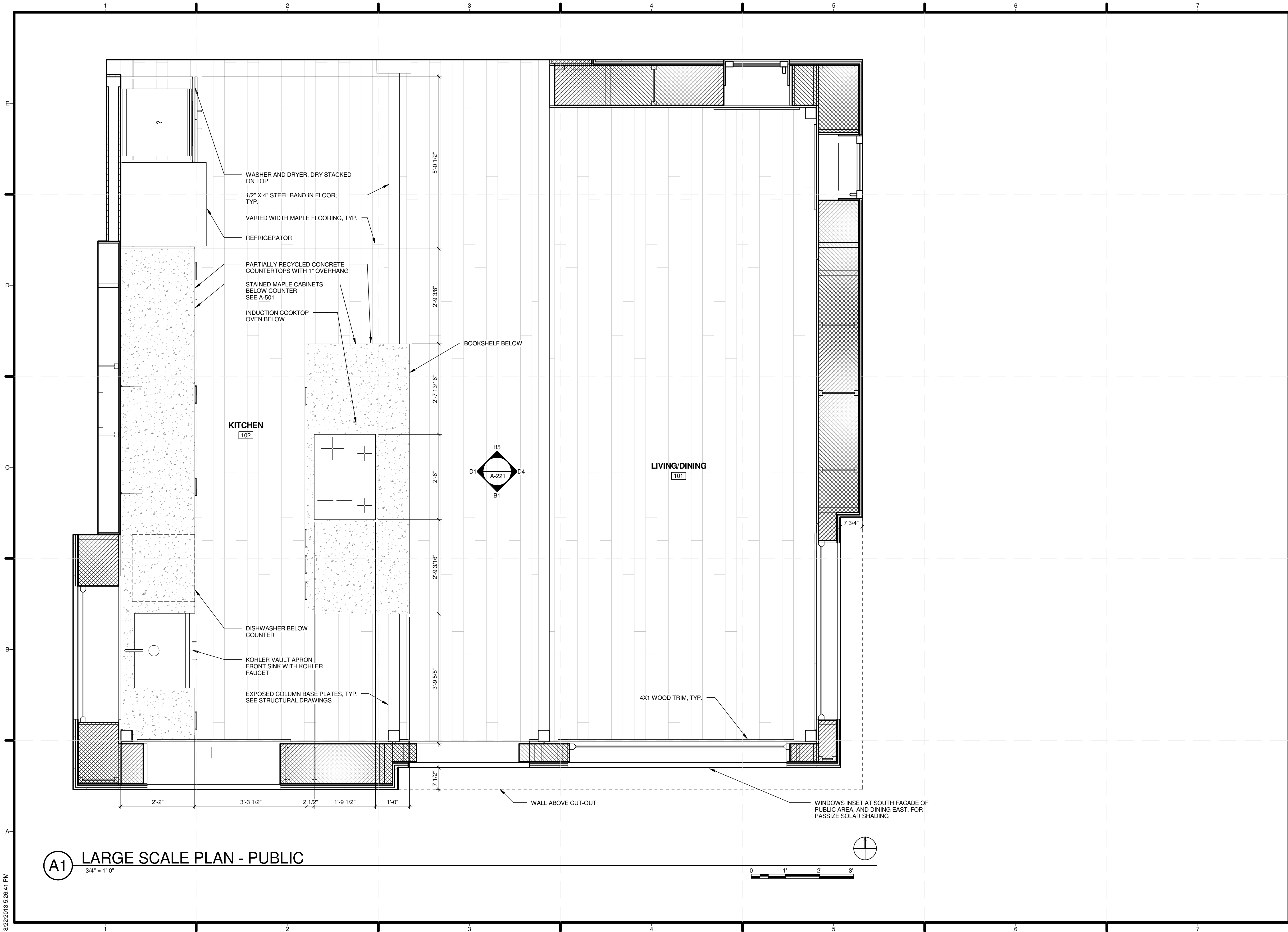
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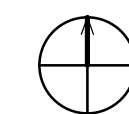
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**LARGE SCALE PLANS - PUBLIC**

**A-401**

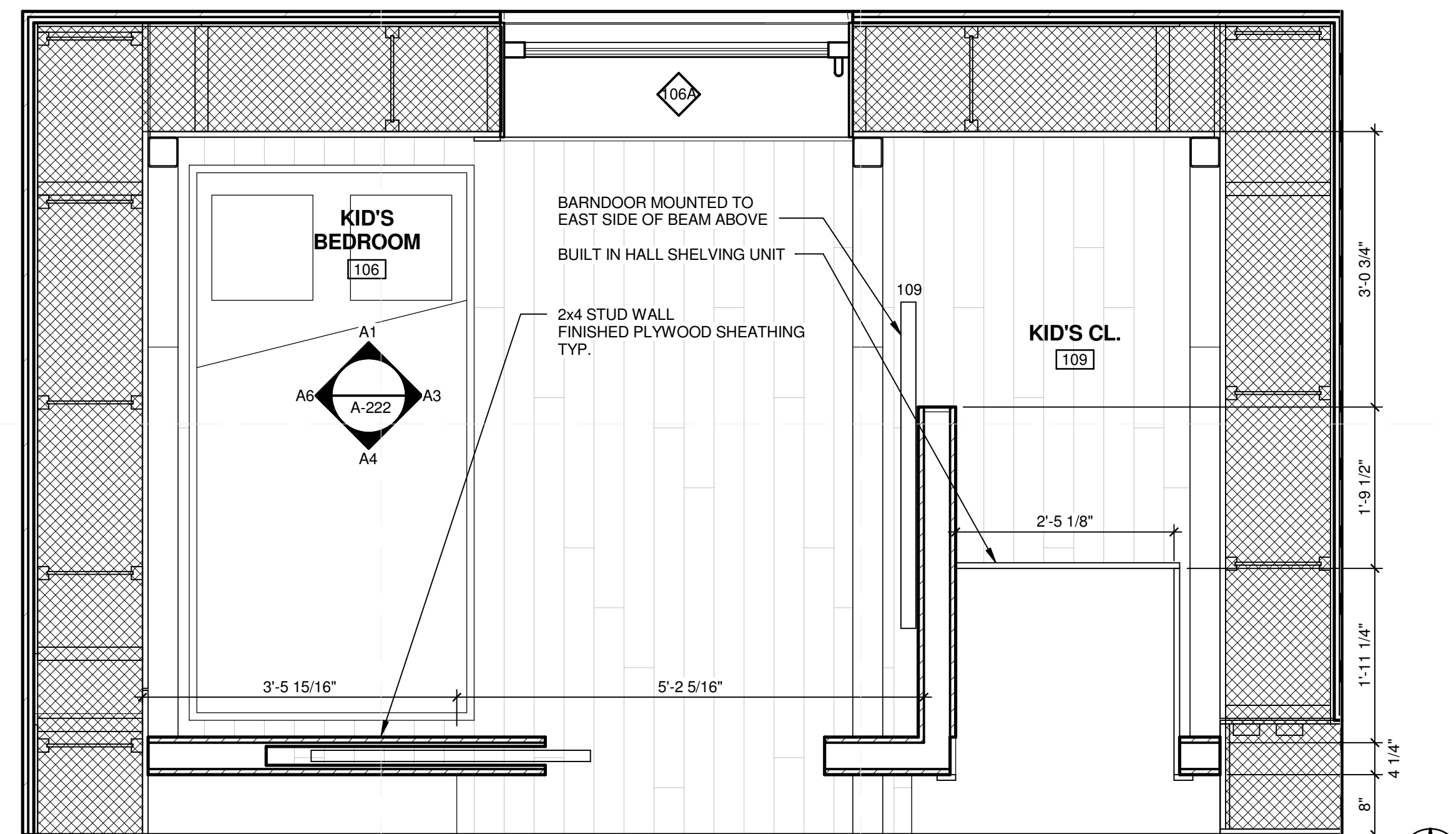


**A1** LARGE SCALE PLAN - PUBLIC

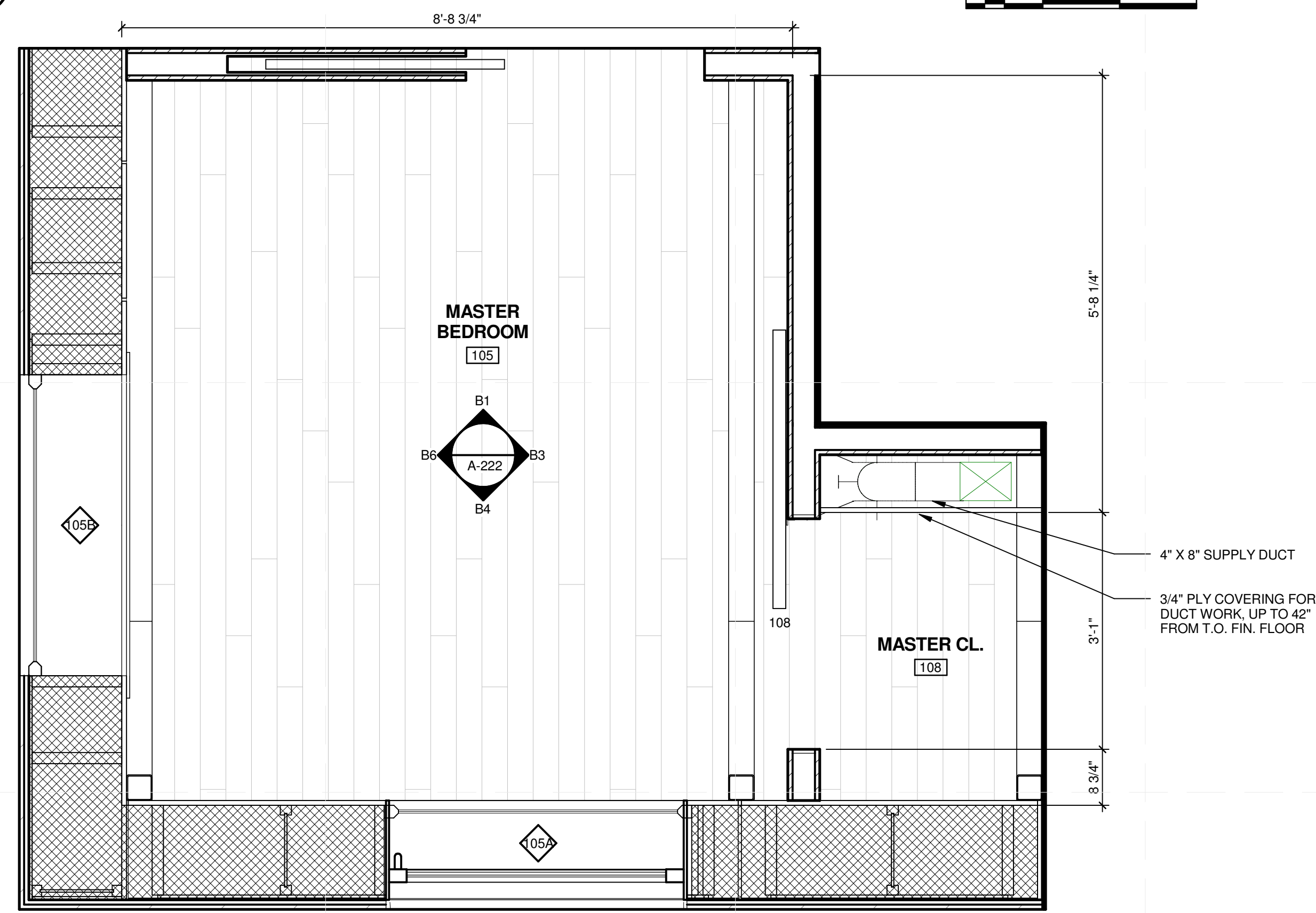
3/4" = 1'-0"



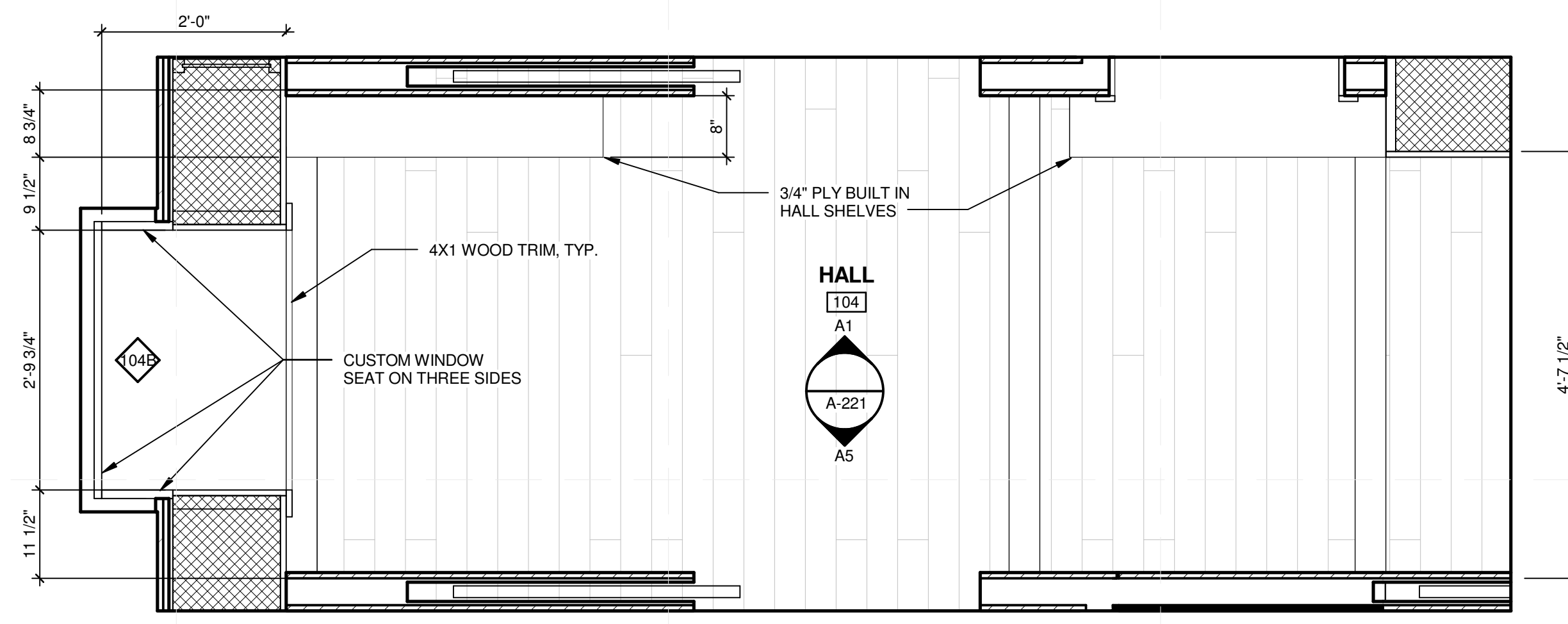
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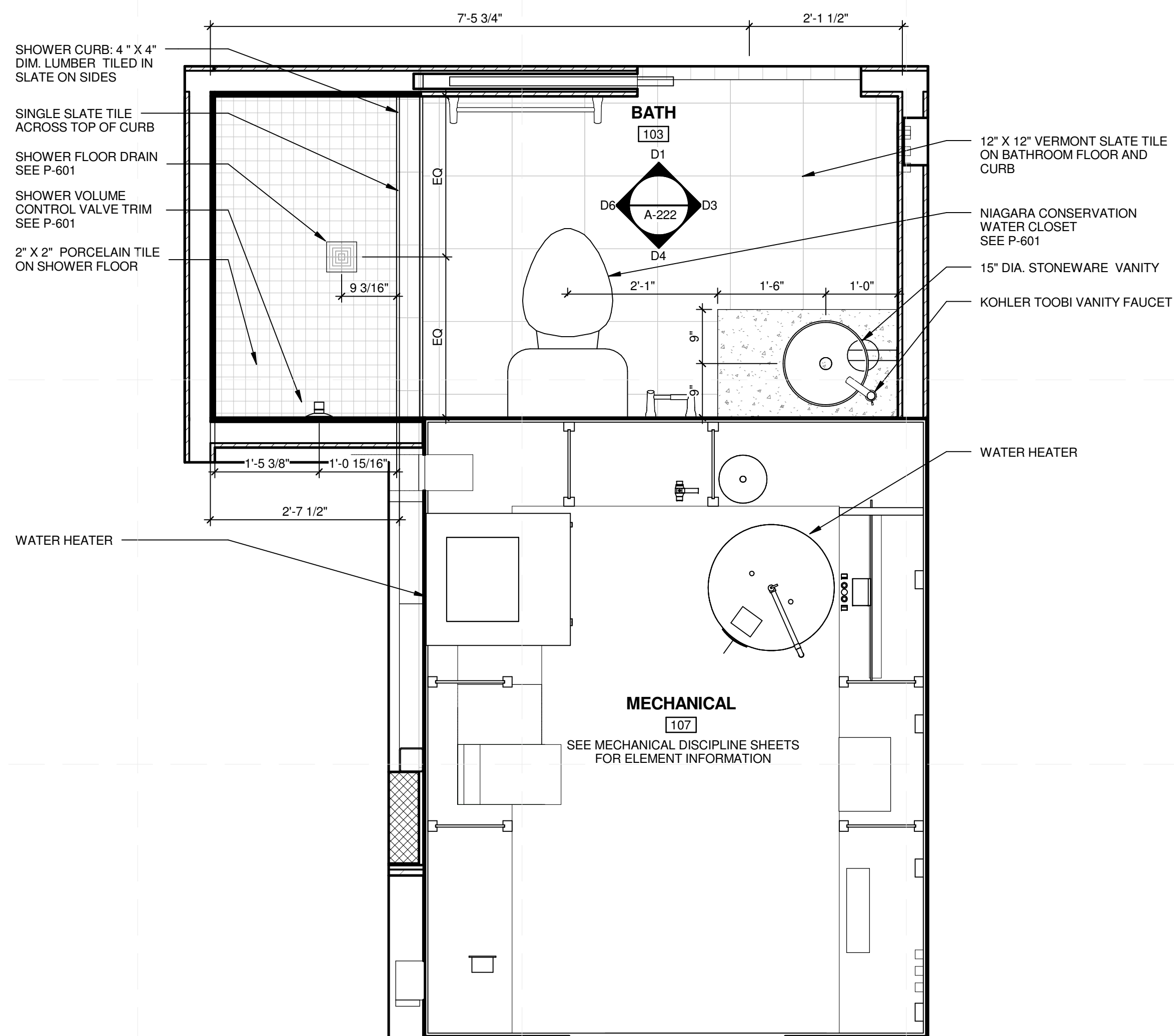
**C1** LARGE SCALE PLAN - KIDS BEDROOM  
3/4" = 1'-0"



**A1** LARGE SCALE PLAN - MASTER BEDROOM AND CLOSET  
3/4" = 1'-0"



**D4** LARGE SCALE PLAN - HALL  
3/4" = 1'-0"



**A4** LARGE SCALE PLAN - MECHANICAL AND BATHROOM  
3/4" = 1'-0"



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SHEET TITLE

LARGE SCALE PLANS - PRIVATE

**A-402**

**GENERAL SHEET NOTES**

1. ALL CABINETS MADE OF 3/4" MAPLE PLY STAINED WITH CHERRY FINISH UNLESS OTHERWISE NOTED
2. 1/8" REVEALS BETWEEN DRAWER/DOOR FACES, 1/4" REVEALS BETWEEN BOTTOM OF COUNTER AND TOP OF FACES. 1/8" REVEAL BETWEEN WALLS.
3. ALL DOORS HAVE ZERO-CLEARANCE HINGES. VERTICAL PULLS INDICATE DOORS, HORIZONTAL PULLS INDICATE DRAWERS
4. ASSEMBLE WITH WOOD GLUE, STAPLES, AND SCREWS. HIDE SCREWS WHEN POSSIBLE. USE 1/8" THICK BUMPERS BETWEEN FACES AND CARCASS



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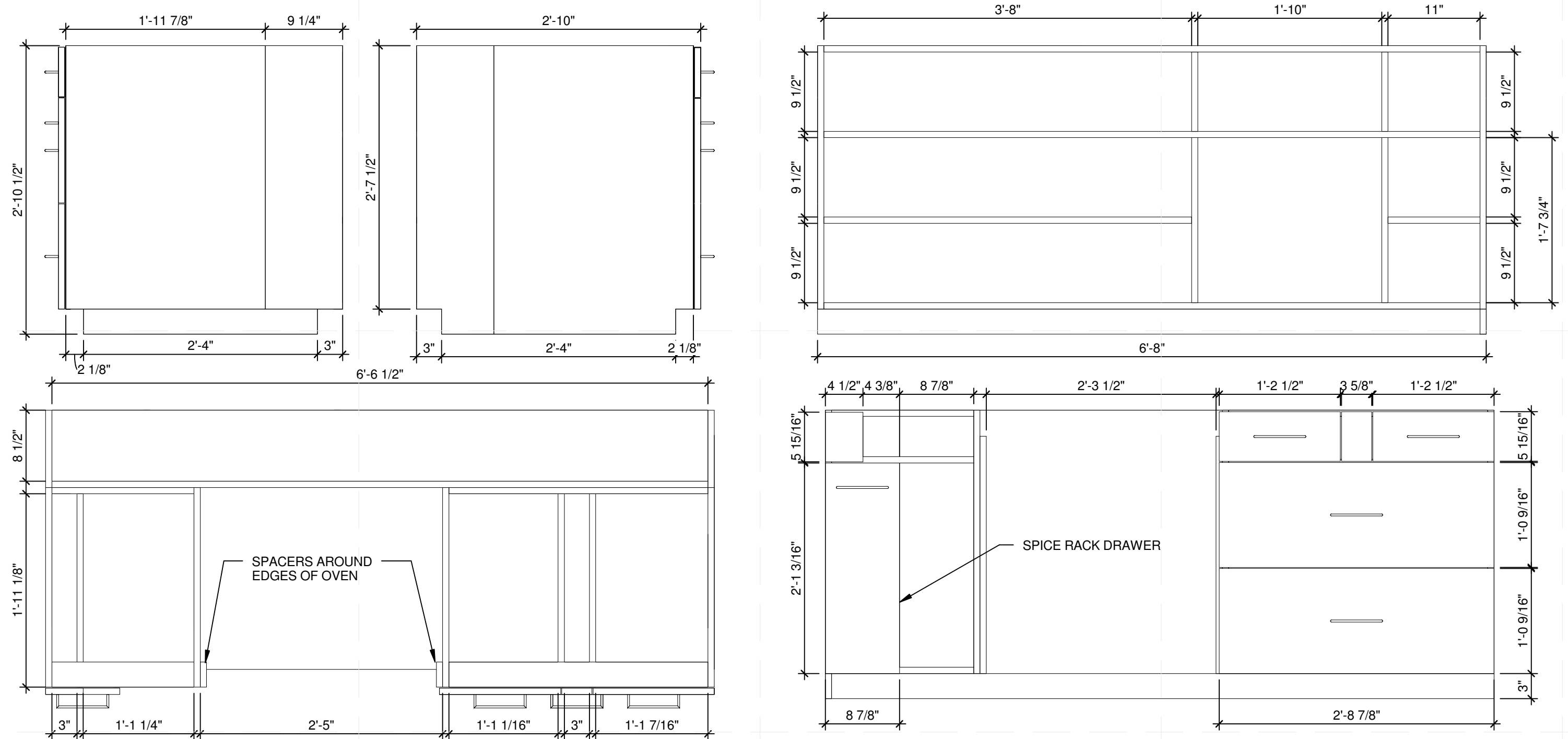
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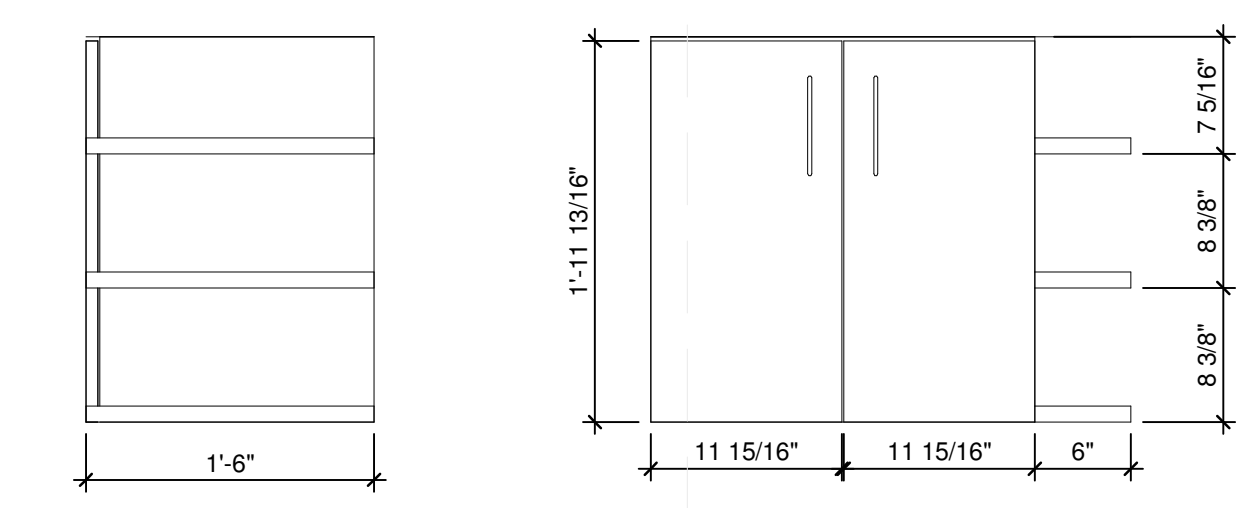
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**CASEWORK DETAILS**

**A-501**

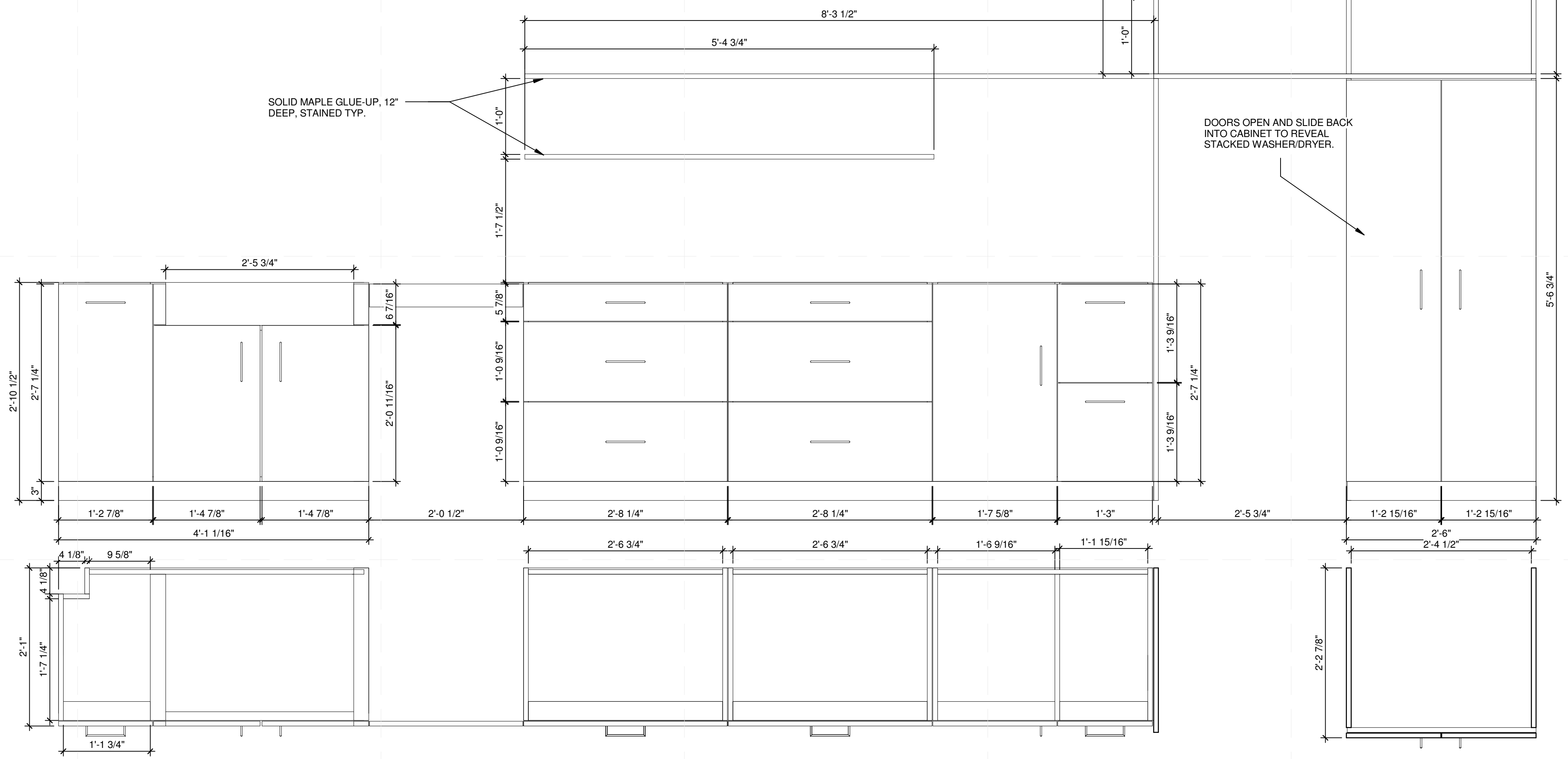
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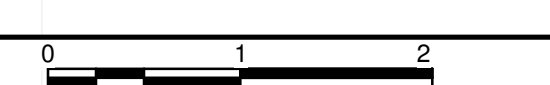
**VANITY**



**KITCHEN COUNTER**



**(A1) CASEWORK DETAILS**  
 1" = 1'-0"



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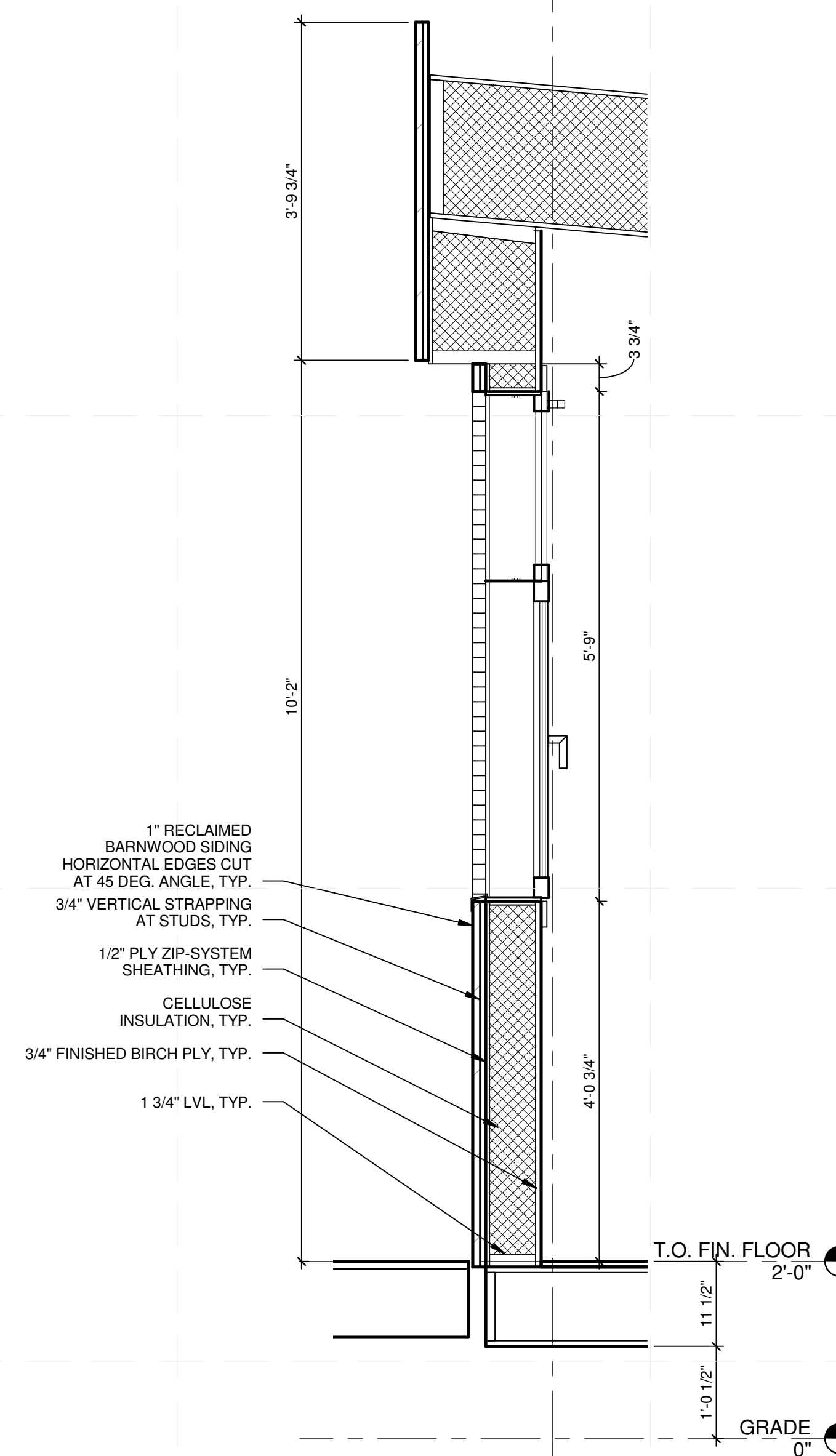
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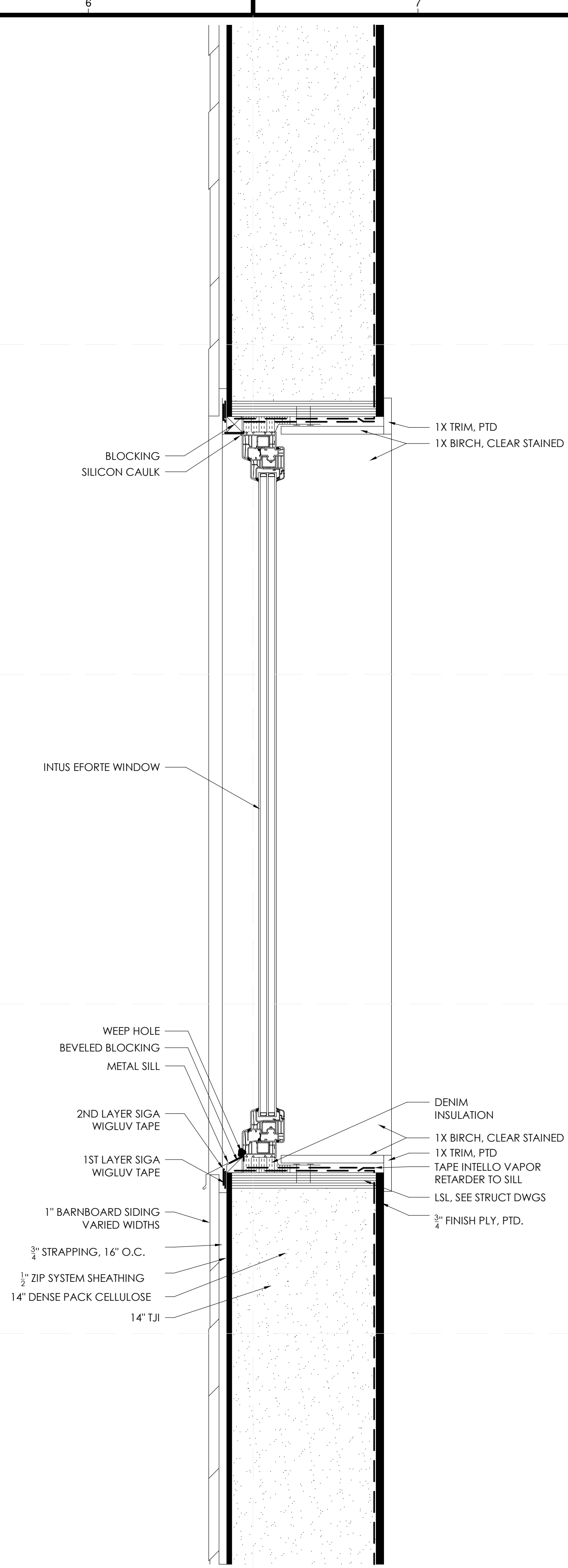
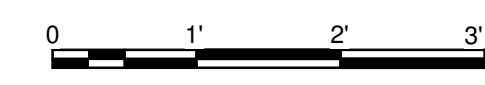
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WINDOW DETAILS

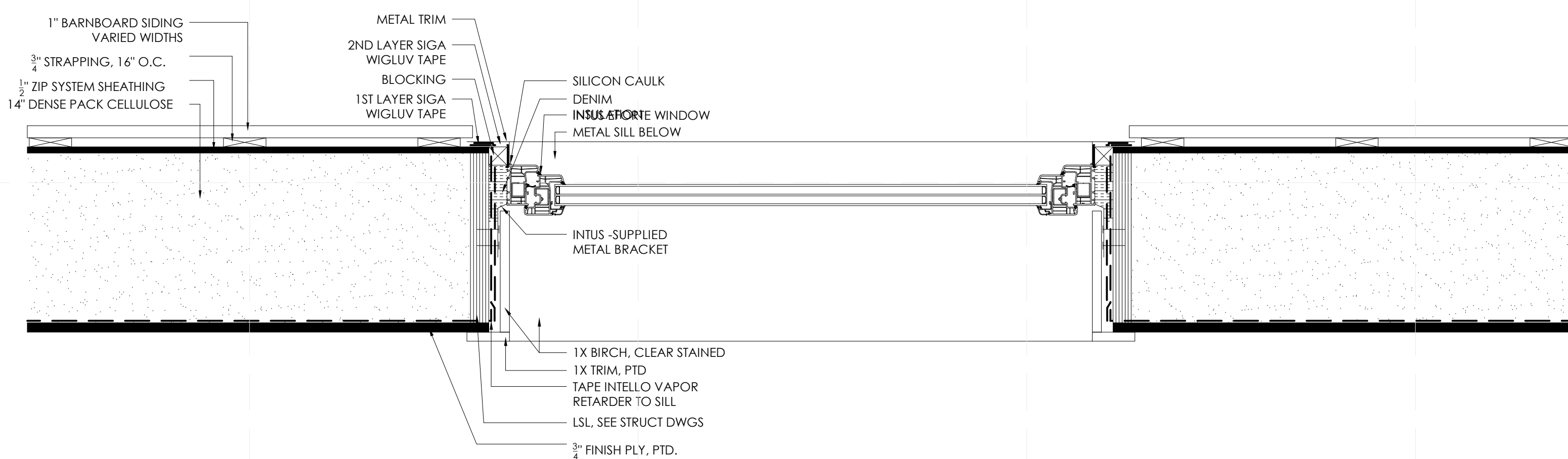
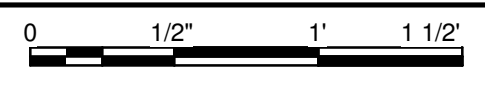
**A-502**



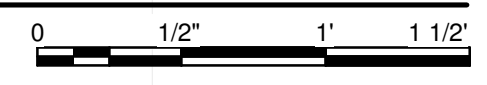
**B3 DINING WALL AND WINDOW DETAIL**  
3/4" - 1'-0"



**A6 TYPICAL HEAD & SILL DETAIL**  
1 1/2" = 1'-0"



**A1 TYPICAL JAMB DETAIL**  
1 1/2" = 1'-0"



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**GENERAL SHEET NOTES**

1. ALL WINDOWS, SWING DOORS, AND INTUS DOORS HAVE 4X1 WOOD FRAME AROUND INSIDE FACES.



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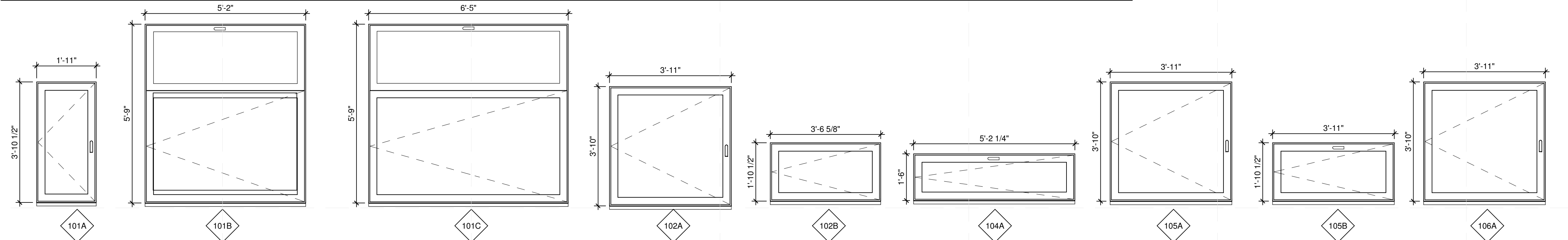
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**SCHEDULES**

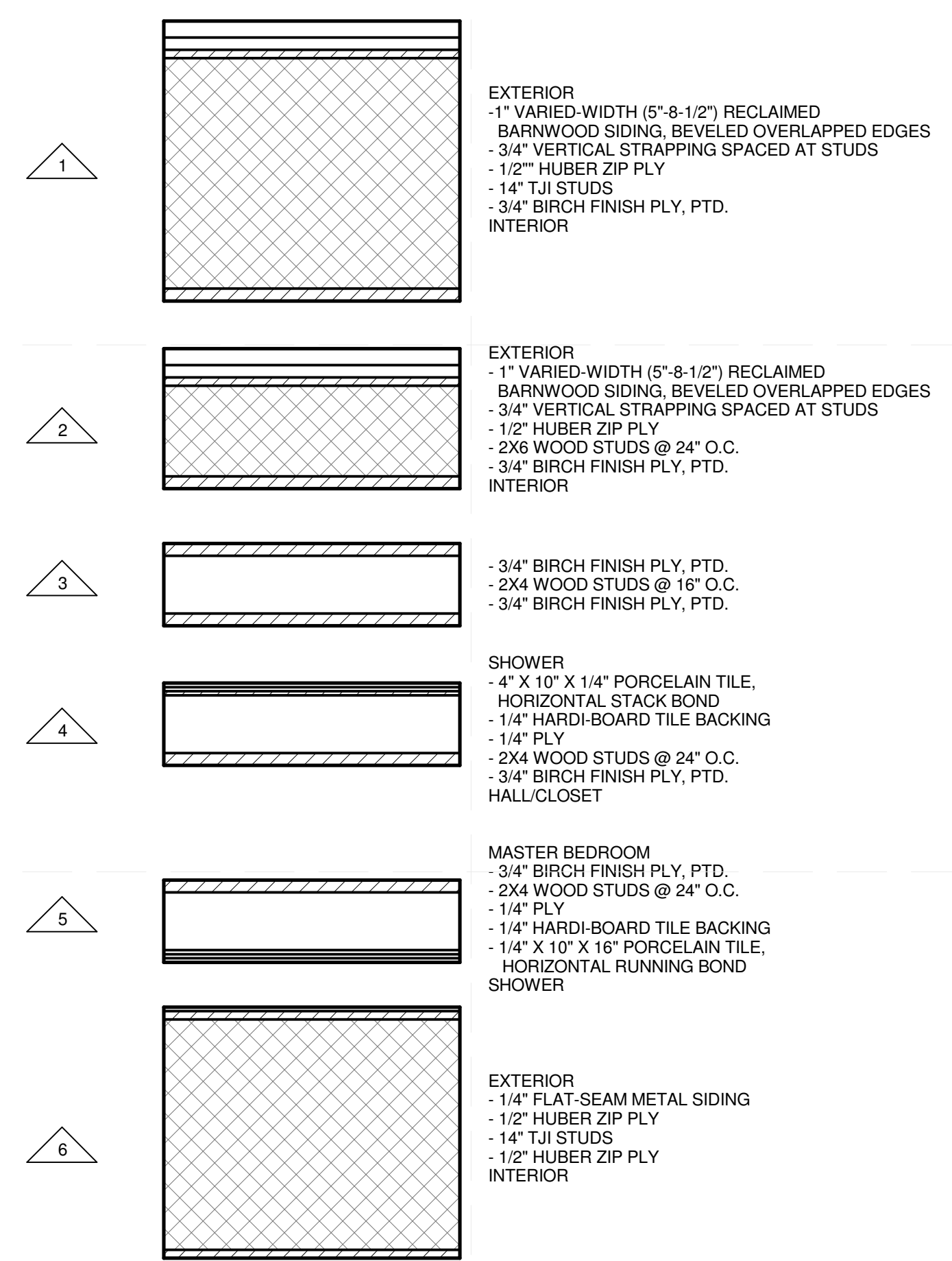
**A-601**

**WINDOW SCHEDULE**

MARK	Count	ROUGH WIDTH	ROUGH HEIGHT	SILL HEIGHT	HEAD HEIGHT	Type	MANUFACTURER	MODEL	MATERIAL	FINISH	FITTING	FRAME	GLAZING THICKNESS	Operation	COMMENTS
101A	2	1'-11"	3'-10 1/2"	3'-1"	6'-11 1/2"	EFORTE LIVING	INTUS	EFORTE	U-PVC	GRAPHIT SCHWARZ	MACOS	INOUITIC	TRIPLE	TILT AND TURN	
101B	1	5'-2"	5'-9"	4'-0 3/4"	9'-9 3/4"	EFORTE DINING EAST	INTUS	EFORTE	U-PVC	GRAPHIT SCHWARZ	MACOS	INOUITIC	TRIPLE	LOWER FIXED, UPPER TILT	
101C	1	6'-5"	5'-9"	4'-0 3/4"	9'-9 3/4"	EFORTE DINING SOUTH	INTUS	EFORTE	U-PVC	GRAPHIT SCHWARZ	MACOS	INOUITIC	TRIPLE	LOWER FIXED, UPPER TILT	
102A	1	3'-11"	3'-10"	3'-10 1/2"	7'-8 1/2"	EFORTE KITCHEN WEST	INTUS	EFORTE	U-PVC	GRAPHIT SCHWARZ	MACOS	INOUITIC	TRIPLE	TILT AND TURN	
102B	1	3'-6 5/8"	1'-10 1/2"	7'-10 7/8"	9'-9 3/8"	EFORTE EXIT SOUTH	INTUS	EFORTE	U-PVC	GRAPHIT SCHWARZ	MACOS	INOUITIC	TRIPLE	FIXED	
102C	1	3'-11"	3'-10"	3'-10 1/2"	7'-8 1/2"	EFORTE KITCHEN SOUTH	INTUS	EFORTE	U-PVC	GRAPHIT SCHWARZ	MACOS	INOUITIC	TRIPLE	TILT AND TURN	
104A	1	5'-2 1/4"	1'-6"	7'-2 3/8"	8'-8 3/8"	EFORTE HALL NORTH	INTUS	EFORTE	U-PVC	GRAPHIT SCHWARZ	MACOS	INOUITIC	TRIPLE	TILT	
104B	1	3'-0"	4'-8 3/8"	1'-6 3/4"	6'-3 1/8"	INSITE_WINDOWSEAT	GENERIC	GENERIC				NONE	DOUBLE	FIXED	THREE WINDOWPANES AROUND SEAT
105A	1	3'-11"	3'-10"	3'-2"	7'-0"	EFORTE BED SOUTH	INTUS	EFORTE	U-PVC	GRAPHIT SCHWARZ	MACOS	INOUITIC	TRIPLE	TILT AND TURN	
105B	1	3'-11"	1'-10 1/2"	4'-9 1/4"	6'-7 3/4"	EFORTE BED WEST	INTUS	EFORTE	U-PVC	GRAPHIT SCHWARZ	MACOS	INOUITIC	TRIPLE	TILT	
106A	1	3'-11"	3'-10"	1'-8 1/2"	5'-6 1/2"	EFORTE BED NORTH	INTUS	EFORTE	U-PVC	GRAPHIT SCHWARZ	MACOS	INOUITIC	TRIPLE	TILT AND TURN	



**C1 WINDOW TYPES**  
 1/2" = 1'-0"

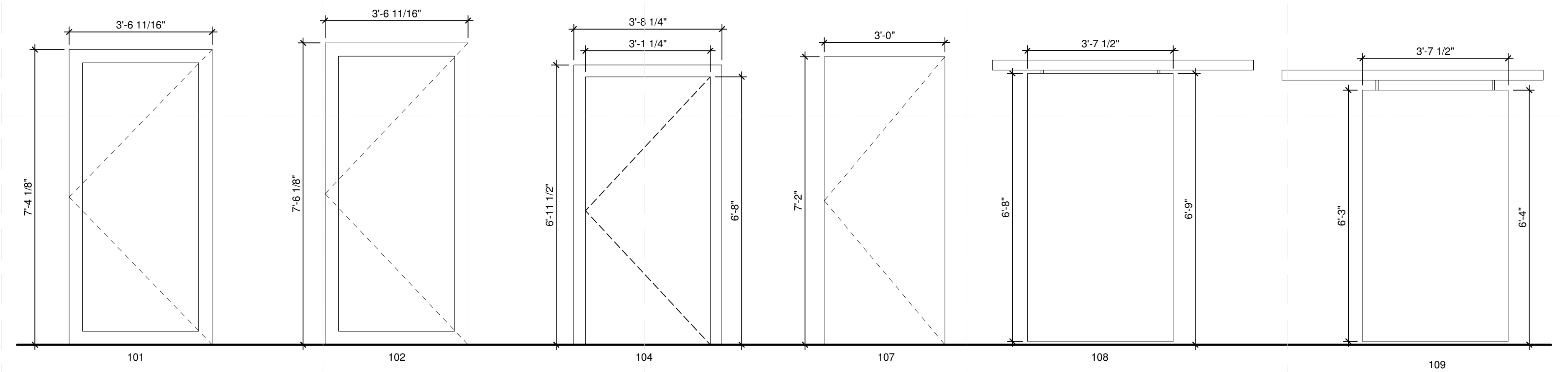


**WALL TYPE SCHEDULE**

TYPE MARK	DESCRIPTION	STRUCTURAL USAGE	WIDTH	COMMENTS
1	TYPICAL EXTERIOR WALL	NON-BEARING	1'-5"	PANELIZED, BOXED IN WITH 1-3/4" X 14" LVLS ON ENDS
2	EXTERIOR WALL AT CUT-OUT	NON-BEARING	8 1/2"	
3	TYPICAL INTERIOR WALL	NON-BEARING	5"	
4	NORTH/SOUTH SHOWER WALL	NON-BEARING	5"	
5	WEST SHOWER WALL	NON-BEARING	5"	
6	MECHANICAL MODULE WALL	BEARING	1'-3 1/4"	WALL INTERRUPTED BY MEP PENETRATIONS, AND NOT SHEATHED ON ALL PARTS OF INTERIOR

**DOOR SCHEDULE**

TYPE MARK	MANUFACTURER	MODEL	DESCRIPTION	WIDTH	HEIGHT	MATERIAL	COUNT	COMMENTS
101	INTUS	EFORTE	SWING	3'-6 11/16"	7'-4 1/8"	U-PVC	1	
102	INTUS	EFORTE	SWING	3'-6 11/16"	7'-6 1/8"	U-PVC	1	
104	GENERIC	GENERIC	POCKET	3'-1 1/4"	6'-8"	WOOD	3	FLUSH
107	THERMA-TRU	TS800	SWING	3'-0"	7'-2"	STEEL	1	FLUSH
108	GENERIC	GENERIC	SLIDING BARN TRACK	3'-0"	6'-8"	WOOD	1	FLUSH
109	GENERIC	GENERIC	SLIDING BARN TRACK	3'-0"	6'-3"	WOOD	1	FLUSH, TRACK MOUNTED TO STEEL BEAM



**A1 WALL TYPES**  
 1 1/2" = 1'-0"

**A3 DOOR TYPES**  
 1/2" = 1'-0"

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**GENERAL SHEET NOTES**

1. RENDERINGS BASED ON SCHEMATIC DESIGN.



MIDDLEBURY COLLEGE

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III	8/22/2013	AS BUILT DOCUMENTATION

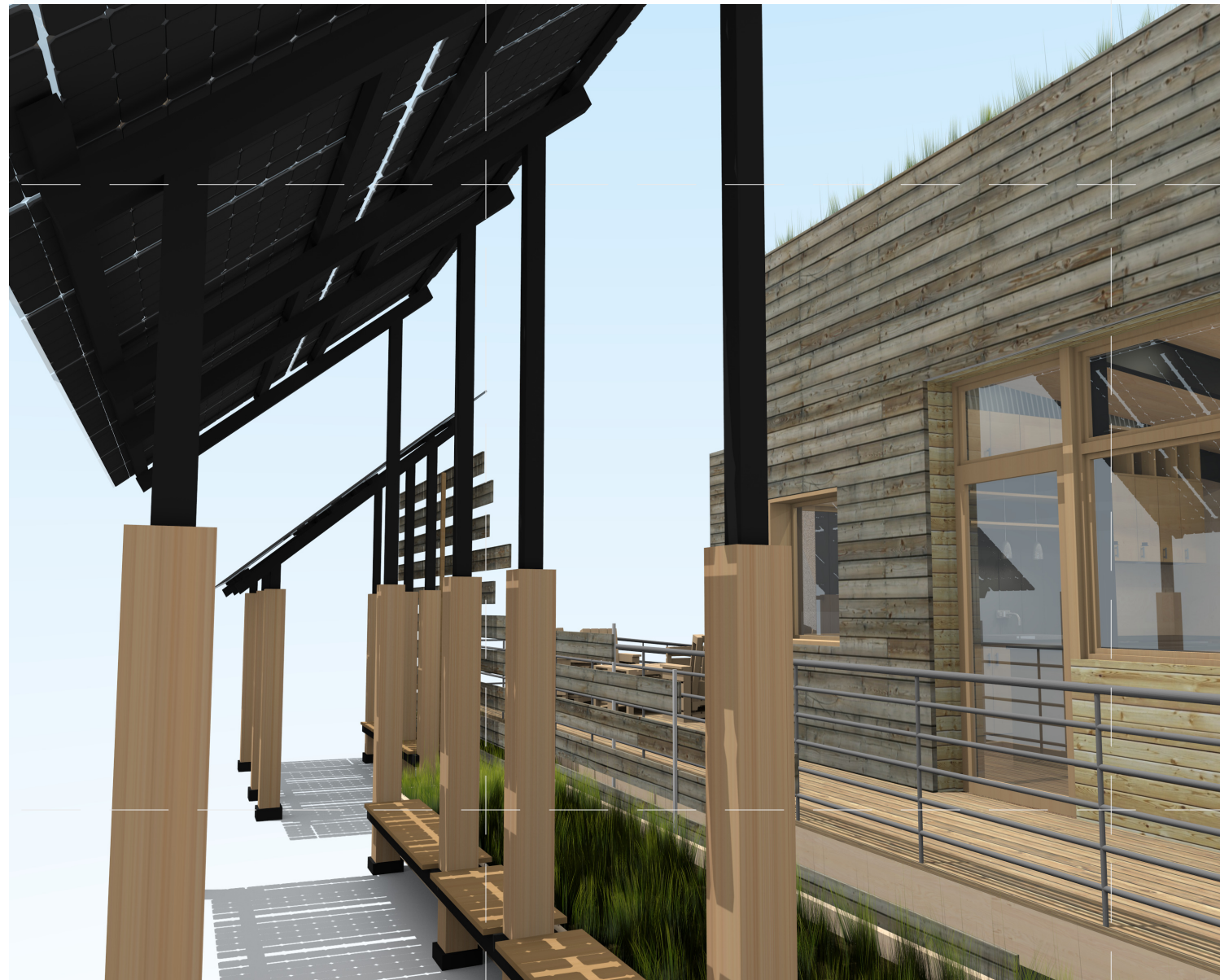
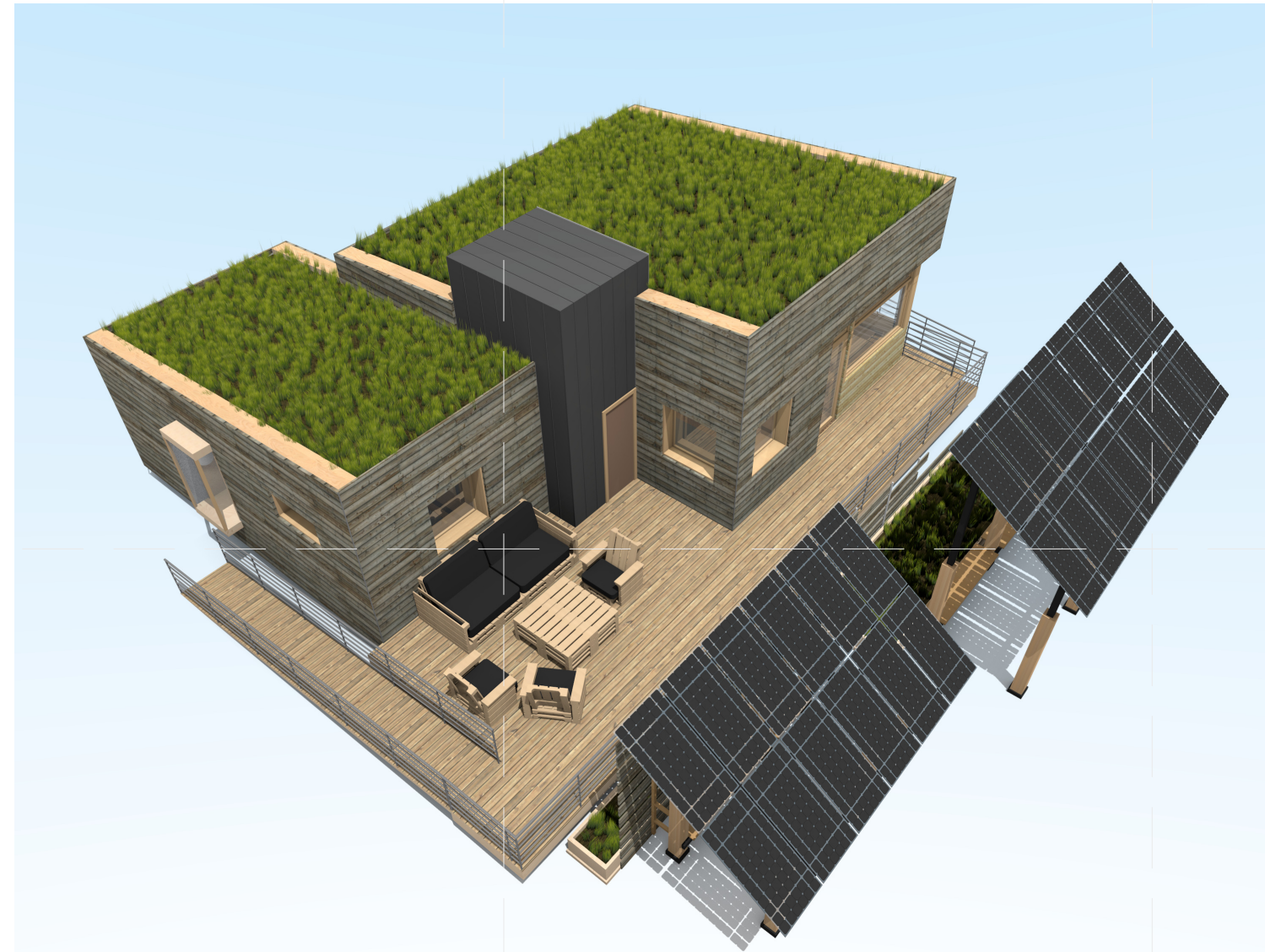
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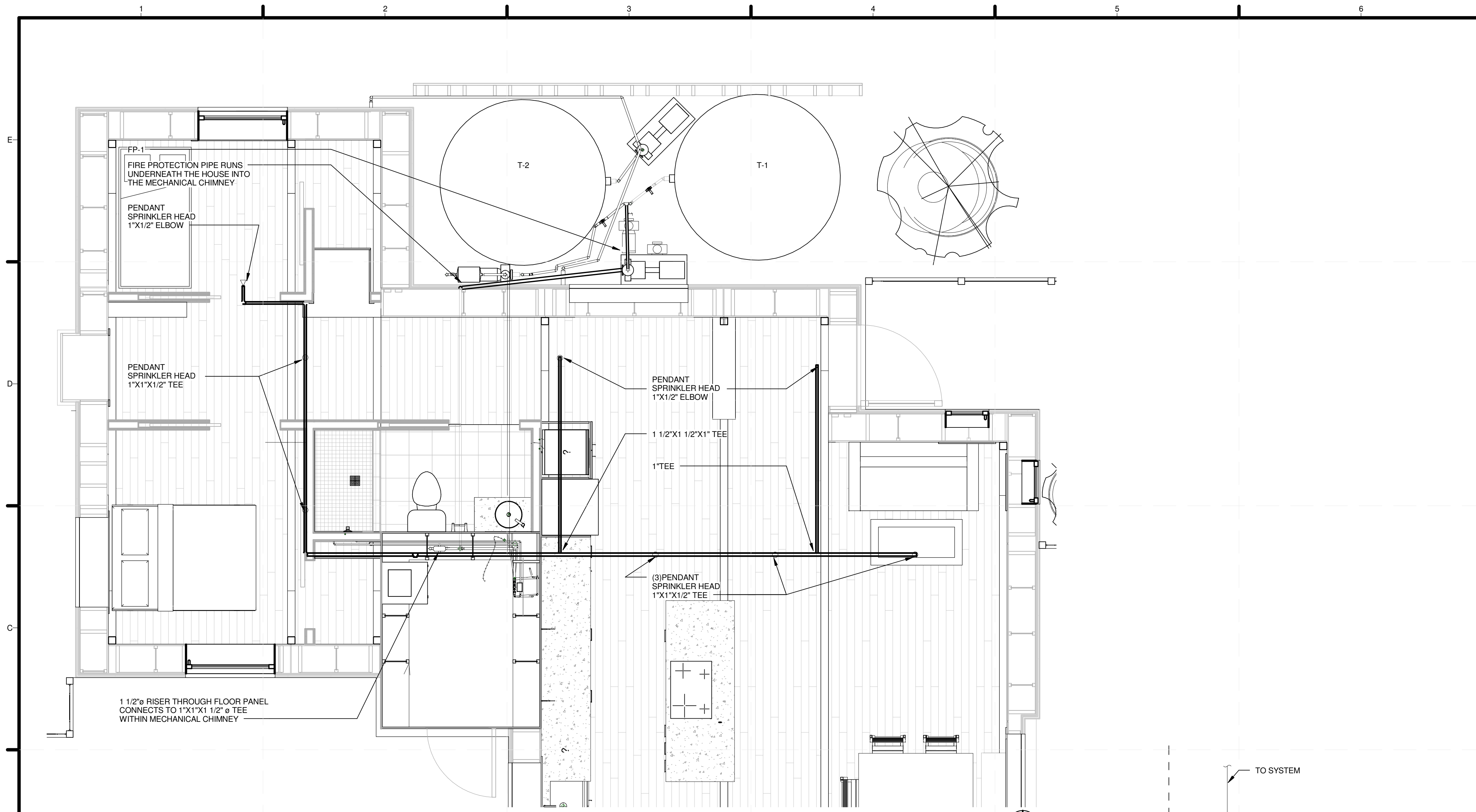
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SHEET TITLE

**ARCHITECTURAL  
RENDERINGS**

**A-901**





**GENERAL SHEET NOTES**

1. FIRE PROTECTION SYSTEM TO BE DESIGNED AND INSTALLED PER NFPA 13D STANDARDS. SYSTEM SHALL ALSO COMPLY WITH FM GLOBAL AND MIDDLEBURY COLLEGE REQUIREMENTS AS WELL AS THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
2. ALL NORTH-SOUTH ORIENTED FIREPROTECTION PIPES ON CEILING SHALL FOLLOW 5 DEG. SLOPE OF CEILING.
3. ALL FIRE PROTECTION PIPES ARE 1" UNLESS OTHERWISE SPECIFIED.
4. SEE PLUMBING SCHEDULE DRAWING FOR FIRE PROTECTION ENTRANCE DIAGRAM. COORDINATE EXACT RISER LOCATION IN FIELD.
5. NEW RESIDENTIAL FIRE ALARM SYSTEM SHALL BE PER THESE DRAWINGS, SPECIFICATIONS, MIDDLEBURY COLLEGE, LOCAL FIRE MARSHALL, AND ALL OTHER RELEVANT CODES, INCLUDING NFPA, VERMONT FIRE AND SAFETY CODE, AND NATIONAL ELECTRIC CODE.
6. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL LABOR AND MATERIALS NECESSARY TO PROVIDE A COMPLETE, CODE COMPLIANT FIRE ALARM SYSTEM.
7. THE DRAWINGS ARE SCHEMATIC IN NATURE AND INDICATE GENERAL ARRANGEMENT AND ROUTING OF CONDUIT OR CABLING. THE ELECTRICAL CONTRACTOR SHALL NOT INSTALL EQUIPMENT, DEVICES, OR CONDUIT IN A NON-CODE COMPLIANT FASHION DUE TO DRAWING'S INTERPRETATION. THE ELECTRICAL CONTRACTOR SHALL PROVIDE MODIFICATIONS OF ILLUSTRATED WORK (FIRE ALARM VENDOR ONE-LINE DRAWINGS) IN ORDER TO ACCOMMODATE JOB CONDITIONS AT NO EXTRA COST TO THE OWNER.
8. THE CONTRACTOR SHALL VERIFY POWER SUPPLY REQUIREMENTS AND CIRCUIT CAPACITIES REQUIRED FOR COMPLETE SYSTEM.
9. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL LABOR, MATERIALS, TOOLS EQUIPMENT, SERVICES, AND RELATED ACCESSORIES NEEDED FOR THE COMPLETE INSTALLATION OF ALL WORK SHOWN ON THE DRAWINGS AND REQUIRED BY CODE.
10. COORDINATE ALL WORK WITH OTHER TRADES. PROVIDE A COORDINATION DRAWING TO THE ENGINEER CONSTRUCTION MANAGER, MIDDLEBURY COLLEGE, FIRE MARSHALL, AND ANY OTHER TRADES SHOWING THE LOCATION OF ALL DEVICES AND EQUIPMENT.
11. ADJACENT TO EACH DEVICE IS A NUMBER INDICATING THE NUMBER OF DEVICES ON THE FLOOR INDICATED. HOWEVER, CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING FINAL COUNT BASED ON FINAL LAYOUT BY FIRE ALARM VENDOR.
12. ALL INSTALLATIONS SHALL BE AS DICTATED IN PROJECT SPECIFICATIONS.
13. CONTRACTOR SHALL VERIFY CANDELA OUTPUT OF ALL VISUAL COORDINATE WITH MECHANICAL CONTRACTOR ALL DEVICES REQUIRED FOR MECHANICAL AND PLUMBING EQUIPMENT.
14. ALL SMOKE DETECTORS (AND COMBINATION CO DETECTOR) ARE SOUNDER BASED UNLESS OTHERWISE NOTED.



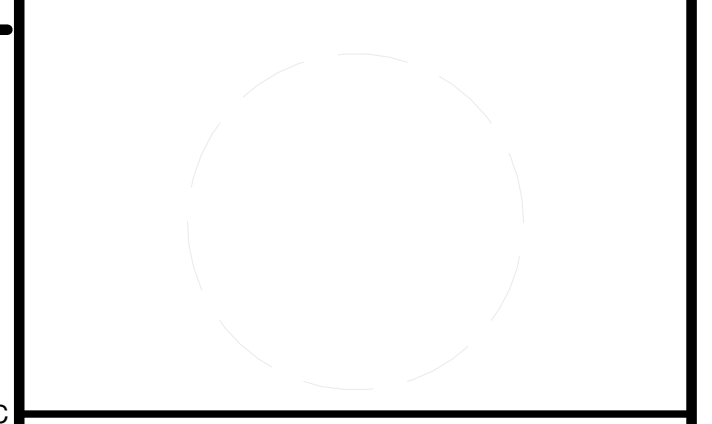
**MIDDLEBURY COLLEGE**

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**FIRE SUPPRESSION LEGEND**

- SMOKE DETECTOR/CARBON MONOXIDE COMBO
- SPRINKLER TAMPER SWITCH
- SPRINKLER FLOW SWITCH
- FIRE ALARM HORN STROBE
- WALL MOUNTED EXTERIOR (CO) ALARM BLUE LIGHT

MARK	DATE	DESCRIPTION
I	10/11/2012	80% COMPLETE SUBMISSION
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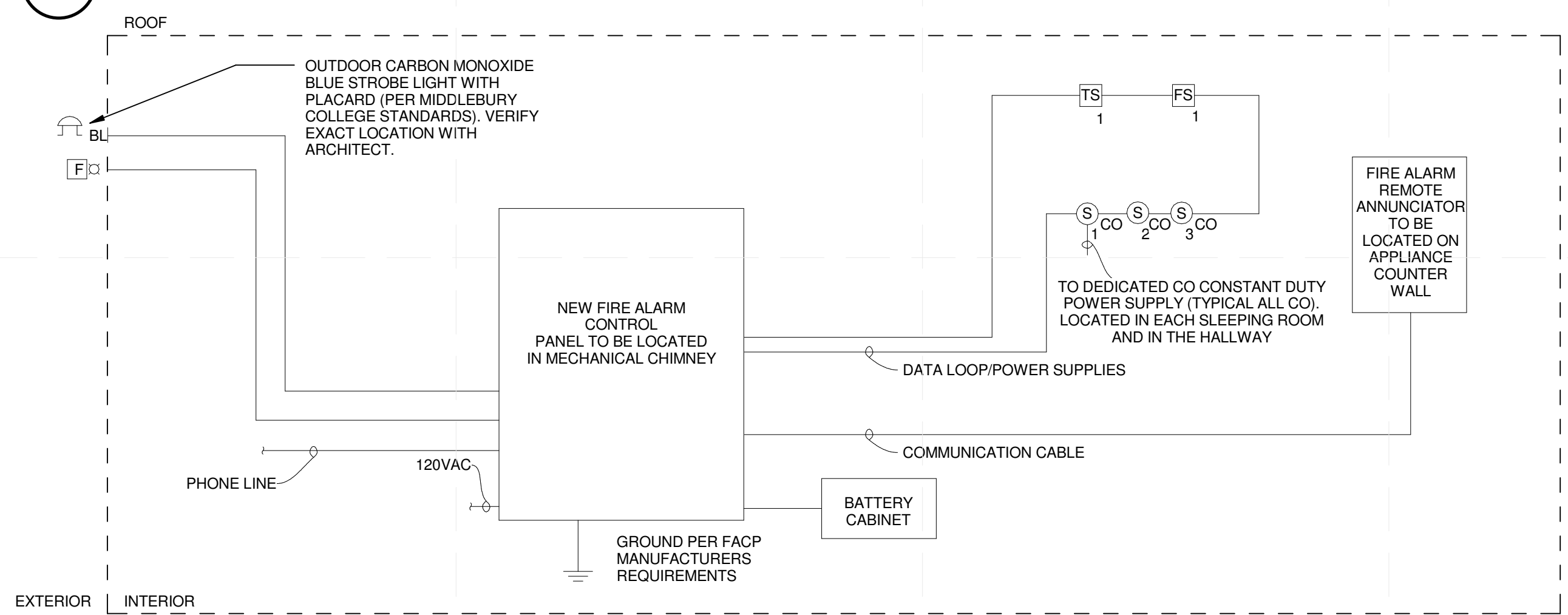
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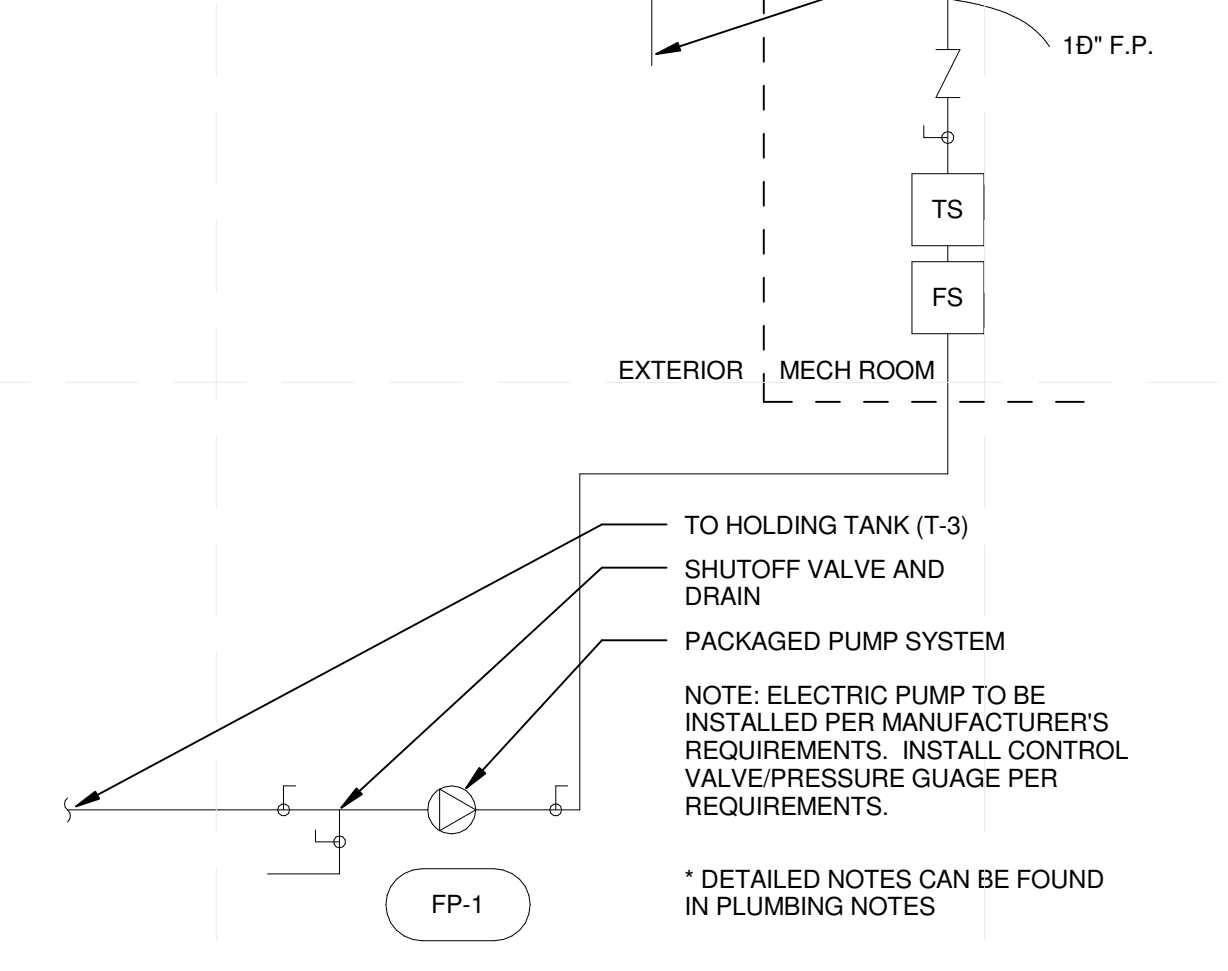
**FIRE SUPPRESSION PLAN AND DIAGRAMS**

**F-101**

**(B1) FIRE SUPPRESSION PLAN**  
3/8" = 1'-0"



**(A1) FIRE DETECTION AND ALARM DIAGRAM**  
1/4" = 1'-0"



**(A4) FIRE SUPPRESSION DIAGRAM**  
1/2" = 1'-0"

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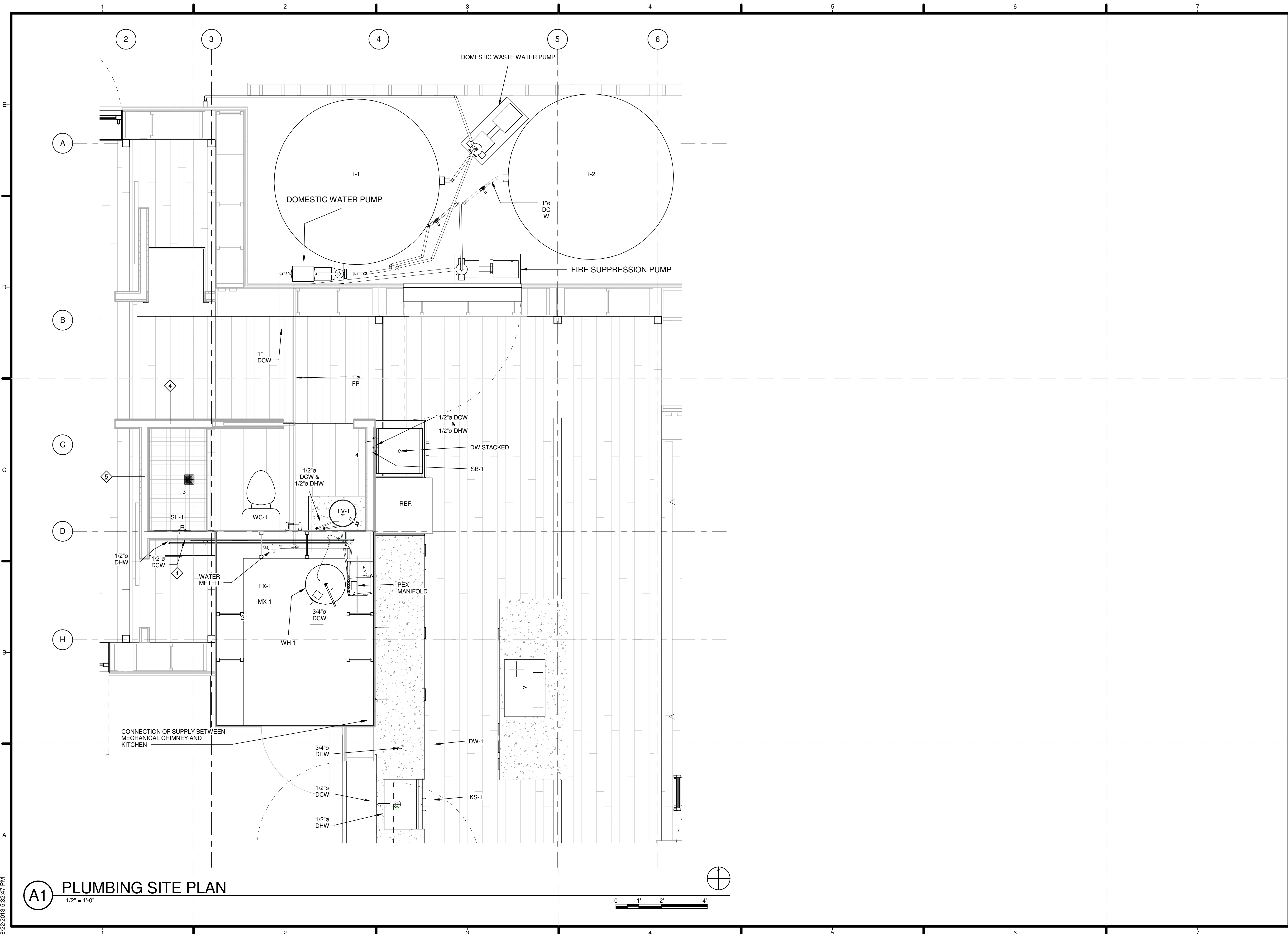
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MARK DATE DESCRIPTION

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**PLUMBING SITE PLAN**

**P-101**



**A1** PLUMBING SITE PLAN  
 1/2" = 1'-0"

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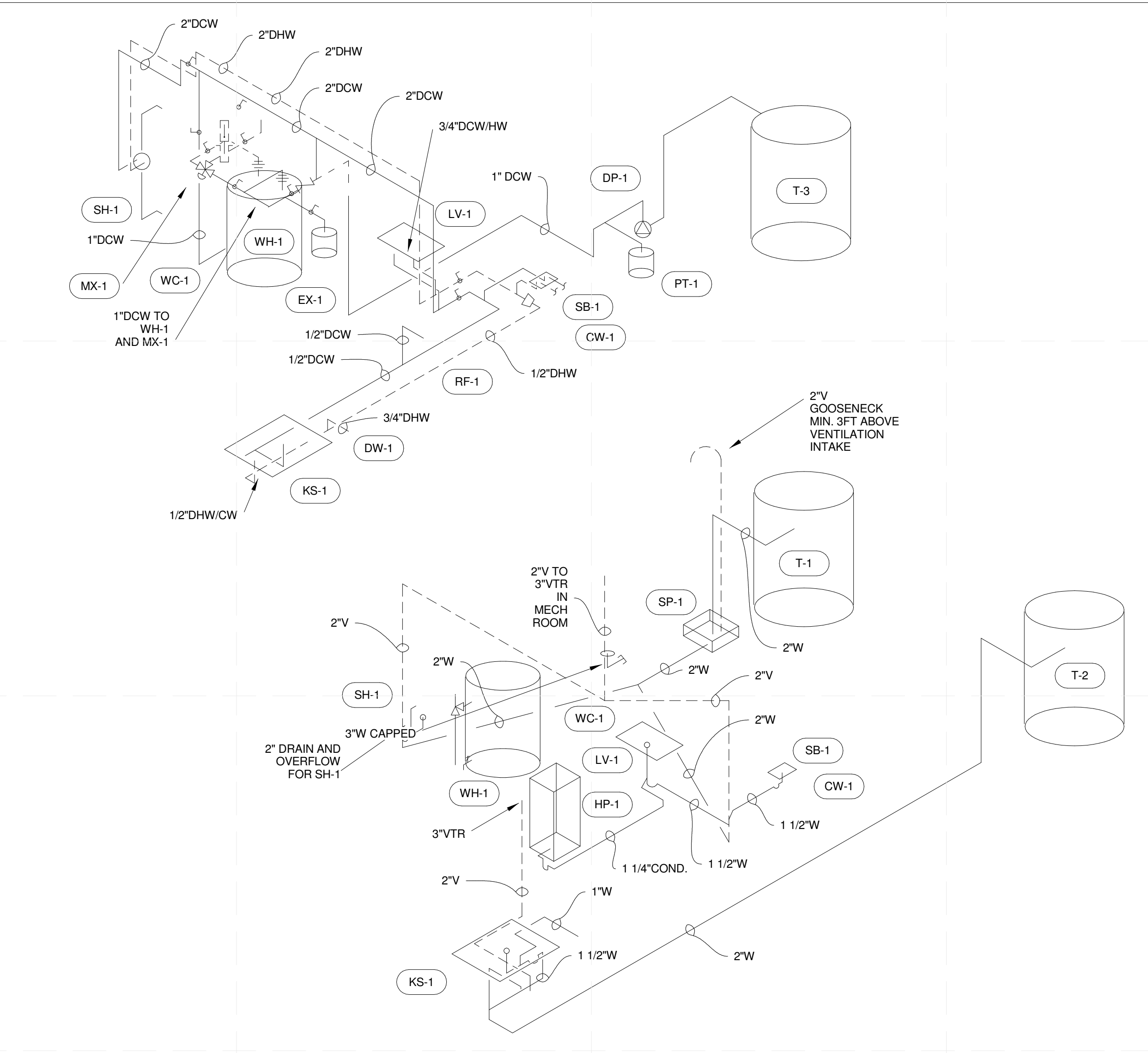
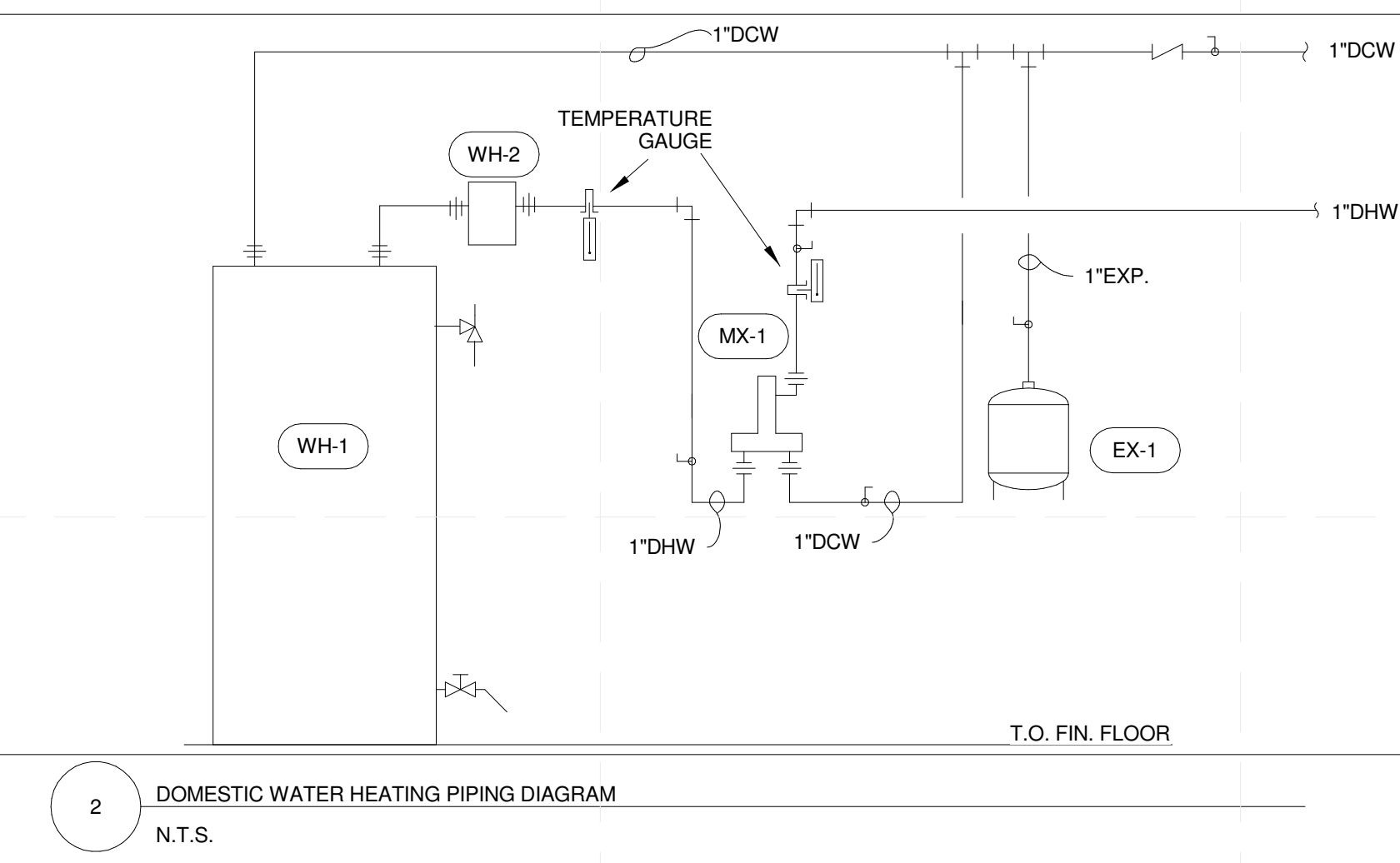
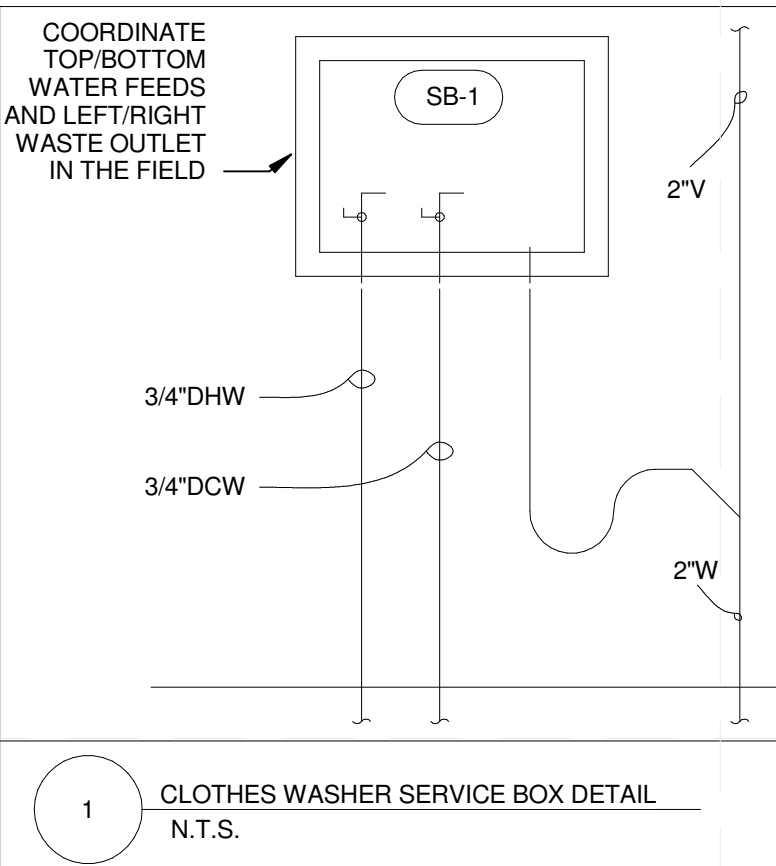
Mark	Description	Manufacturer	Model	Count	C.W.	H.W.	VENT	WASTE	REMARKS
7	DOMESTIC WATER EXPANSION TANK	AMTROL	ST-5	1	3/4"	0"	0"	0"	PROVIDE PROPER SUPPORT FOR TANK FROM STRUCTURE. TANK TO BE 2.0 GALLON WITH .45 ACCEPTANCE FACTOR.
1	WATER CLOSET	NIAGARA CONSERVATION	N7717	1	1/2"	0"	2"	3"	TOILET IS TO DROP BELOW THE FLANGE AND BE CAPPED. DO NOT CONNECT TOILET WASTE.
8	SPLIT SYSTEM INDOOR HEAT PUMP UNIT	DAIKIN	FTQ18PAVJU	1	0"	0"	0"	1 1/2"	SLOPE CONDENSATE AND CONNECT TO WASTE. PROVIDE DRAINAGE UNIT OF CONDENSATE.
2	PEX DISTRIBUTION MANIFOLD	VIEGA	36144	1	1"	1"	0"	0"	INSTALL PER MANUFACTURER'S GUIDELINES. SIZE OUTGOING PIPES ACCORDING TO PLUMBING MODEL NEEDS.
3	40 GALLON ELECTRIC WATER HEATER	BRADFORD WHITE	M-2-HE40S6DS	1	1"	3/4"	0"	0"	REFER TO MECHANICAL SCHEDULE. INSTALL PER MANUFACTURER'S GUIDELINES. PIPE PER MIXING VALVE MANUFACTURER'S GUIDELINES.
4	TOOBI TALL SINGLE-CONTROL LAVATORY FAUCET	KOHLER	K-8990-7	1	1/2"	1/2"	1 1/2"	1 1/2"	PROVIDE WITH OFFSET GRID DRAIN WITH CP BRASS TAIL PIECE AND P-TRAP.
2	LEAD FREE THERMOSTATIC MIXING VALVE	CALEFFI	521519	1	3/4"	3/4"	0"	0"	FABRICATE STRUT RACK AND MOUNT UNIT. PIPE PER MANUFACTURER'S DIAGRAMS. PROVIDE DISCHARGE THERMOMETER, SET DISCHARGE TO 120 DEG. F.
5	TANKLESS WATER HEATER	ECOSMART US	ECO 11	1	1/2"	1/2"	0"	0"	INSTALL PER MANUFACTURER'S GUIDELINES. PROVIDE 220/SINGLE ELECTRICAL SUPPLY. MAKE SURE SYSTEM IS FLUSHED BEFORE TURNED ON.
16	SHOWER ARM	KOHLER	K-7395	1	1/2"	1/2"	0"	0"	INSTALL PER MANUFACTURER'S GUIDELINES.
17	MULTI-FUNCTION SHOWERHEAD	KOHLER	K-T-14781	1	1/2"	1/2"	0"	0"	INSTALL PER MANUFACTURER'S GUIDELINES.
19	STANCE VALVE TRIM	KOHLER	K-T14782	1	0"	0"	0"	0"	INSTALL PER MANUFACTURER'S GUIDELINES. CONNECTS TO PRESSURE-BALANCE VALVE.
3	PRESSURE-BALANCING VALVE	KOHLER	K-304	1	1/2"	1/2"	0"	0"	CONNECTS TO SHOWER VALVE TRIM.
7	24" COMPACT WASHER	BOSCH	WAS24460UC	1	1/2"	1/2"	1 1/2"	1 1/2"	CONNECT TO SERVICE BOX.
21	24" COMPACT DRYER	BOSCH	WTE86300US	1	0"	0"	0"	3/8"	CONNECT TO SERVICE BOX.
6	RECESSED CLOTHES WASHER SERVICE BOX	ISP CORPORATION	MWB19	1	1/2"	1/2"	2"	0"	INSTALL PER MANUFACTURER'S GUIDELINES. DRAINS BOTH THE CLOTHES WASHER AND THE CONDENSER DRYER. PROVIDE QUARTER TURN VALVES AND REQUIRED.
6	SHOWER DRAIN	KOHLER	K-9136	1	0"	0"	0"	2"	INSTALL PER MANUFACTURER'S GUIDELINES. CAN USE 2" OR 3" PVC DRAIN CONNECTION.
6	FLOW METER	ONICON	F-3100	1	3/4"	0"	0"	0"	FLOW METER CONNECTS INTO DOMESTIC WATER INLINE AND REQUIRES 3 INCHES OF STRAIGHT PIPE ON BOTH INLET AND OUTLET SIDES.
9	TOP MOUNT KITCHEN SINK WITH FAUCET	KOHLER	K-3936-NA	1	0"	0"	0"	1 1/2"	INSTALL PER MANUFACTURER'S GUIDELINES. ALLOW A MINIMUM OF 3" CLEARANCE FOR THE BACK 1" SINK RIM FLANGE FOR CLIP ATTACHMENT.
4	DOMESTIC WATER PUMP	GRUNDFOS	MO3-35AB-A-B VBP	1	1"	0"	0"	0"	PROTECT PUMP FROM DIRECT RAINFALL OR SUNLIGHT. CONNECT TO PRESSURE TANK. PUMP TO HAVE INTEGRAL CONTROLS TO MAINTAIN WATER PRESSURE.
11	VANITY SINK	CUSTOM STONEWARE		1	0"	0"	2"	1 1/2"	PLACE ON VANITY COUNTERTOP AND CONNECT THE REQUIRED PROPER DRAIN WITH PLUMBER'S ADHESIVE.
12	24" COMPACT WASHER	BOSCH	WAS24460UC	1	1/2"	1/2"	1 1/2"	1 1/2"	INSTALL PER MANUFACTURER'S GUIDELINES. SCHEDULED TO BE PLACED BENEATH CLOTHES DRYER. PLUGS INTO CLOTHES DRYER. 240V-3PRONG.
	DISHWASHER	BOSCH	ASCENTA-SHX 3AR75UC	1	0"	3/8"	0"	1"	WASTE CONNECTS TO THE KITCHEN SINK'S P-TRAP. PLUG INTO OUTLET BEHIND DISHWASHER.

Mark	Family	Type	Count	Size
147	Elbow - Generic	Standard	1	0"ø-0"ø
148	Transition - Generic	Standard	1	1"ø-0"ø
149	Elbow - Generic	Standard	1	1"ø-1"ø
396	Elbow - Generic	Standard	1	0"ø-0"ø
397	Transition - Generic	Standard	1	1"ø-0"ø
398	Elbow - Generic	Standard	1	1"ø-1"ø
477	Tee - Generic	Standard	1	2"ø-2"ø-2"ø
570	Transition - Generic	Standard	1	1"ø-0"ø
571	Elbow - Generic	Standard	1	0"ø-0"ø
834	Elbow - Generic	Standard	1	1"ø-1"ø
845	Transition - Generic	Standard	1	1"ø-1"ø
846	Transition - Generic	Standard	1	1"ø-1"ø
995	Transition - Generic	Standard	1	1"ø-1"ø
21	Elbow - Generic	Standard	1	2"ø-2"ø
29	Elbow - Generic	Standard	1	2"ø-2"ø
30	Transition - Generic	Standard	1	2"ø-1"ø
35	Tee - Generic	Standard	1	2"ø-2"ø-2"ø
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49	Transition - Generic	Standard	1	2"ø-1"ø
60	Elbow - Generic	Standard	1	1"ø-1"ø
62	Tee - Generic	Standard	1	1"ø-1"ø-1"ø
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87	Elbow - Generic	Standard	1	1"ø-1"ø
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137	Transition - Generic	Standard	1	2"ø-1"ø
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410	Elbow - Generic	Standard	1	1"ø-1"ø
419	Elbow - Generic	Standard	1	1"ø-1"ø

Mark	Family	Type	Count	Size
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424	Transition - Generic	Standard	1	3"ø-1"ø
435	Elbow - Generic	Standard	1	1"ø-1"ø
436	Transition - Generic	Standard	1	3"ø-1"ø
466	Tee - Generic	Standard	1	1"ø-1"ø-1"ø
468	Transition - Generic	Standard	1	3"ø-2"ø
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474	Elbow - Generic	Standard	1	1"ø-1"ø
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487	Elbow - Generic	Standard	1	1"ø-1"ø
488	Elbow - Generic	Standard	1	1"ø-1"ø
503	Transition - Generic	Standard	1	1"ø-1"ø
504	Elbow - Generic	Standard	1	1"ø-1"ø
514	Tee - Generic	Standard	1	1"ø-1"ø-1"ø
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614	Transition - Generic	Standard	1	1"ø-1"ø
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619	Elbow - Generic	Standard	1	1"ø-1"ø
706	Elbow - Generic	Standard	1	1"ø-1"ø
717	Elbow - Generic	Standard	1	1"ø-1"ø
718	Transition - Generic	Standard	1	1"ø-1"ø
725	Elbow - Generic	Standard	1	0"ø-0"ø
730	Elbow - Generic	Standard	1	1"ø-1"ø
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754	Elbow - Generic	Standard	1	1"ø-1"ø
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762	Elbow - Generic	Standard	1	1"ø-1"ø
772	Elbow - Generic	Standard	1	1"ø-1"ø

Mark	Family	Type	Count	Size
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780	Elbow - Generic	Standard	1	1"ø-1"ø
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790	Transition - Generic	Standard	1	1"ø-1"ø
795	Elbow - Generic	Standard	1	0"ø-0"ø
796	Transition - Generic	Standard	1	1"ø-0"ø
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801	Elbow - Generic	Standard	1	1"ø-1"ø
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808	Transition - Generic	Standard	1	1"ø-1"ø
809	Elbow - Generic	Standard	1	1"ø-1"ø
810	Elbow - Generic	Standard	1	1"ø-1"ø
815	Elbow - Generic	Standard	1	1"ø-1"ø
817	Elbow - Generic	Standard	1	1"ø-1"ø
819	Elbow - Generic	Standard	1	1"ø-1"ø
822	Transition - Generic	Standard	1	1"ø-1"ø
828	Elbow - Generic	Standard	1	1"ø-1"ø
833	Elbow - Generic	Standard	1	1"ø-1"ø
835	Transition - Generic	Standard	1	1"ø-1"ø
838	Elbow - Generic	Standard	1	1"ø-1"ø
858	Elbow - Generic	Standard	1	1"ø-1"ø
861	Elbow - Generic	Standard	1	1"ø-1"ø
862	Transition - Generic	Standard	1	1"ø-1"ø
863	Elbow - Generic	Standard	1	1"ø-1"ø
864	Transition - Generic	Standard	1	1"ø-1"ø
867	Elbow - Generic	Standard	1	1"ø-1"ø
869	Elbow - Generic	Standard	1	1"ø-1"ø
872	Elbow - Generic	Standard	1	1"ø-1"ø
873	Transition - Generic	Standard	1	1"ø-1"ø
878	Elbow - Generic	Standard	1	1"ø-1"ø
879	Elbow - Generic	Standard	1	1"ø-1"ø
880	Elbow - Generic	Standard	1	1"ø-1"ø
889	Elbow - Generic	Standard	1	1"ø-1"ø
890	Transition - Generic	Standard	1	1"ø-1"ø
894	Elbow - Generic	Standard	1	1"ø-1"ø
896	Elbow - Generic	Standard	1	1"ø-1"ø
940	Elbow - Generic	Standard	1	1"ø-1"ø
941	Transition - Generic	Standard	1	1"ø-1"ø
942	Elbow - Generic	Standard	1	1"ø-1"ø
943	Elbow - Generic	Standard	1	1"ø-1"ø
947	Elbow - Generic	Standard	1	1"ø-1"ø
948	Transition - Generic	Standard	1	2"ø-1"ø
957	Elbow - Generic	Standard	1	1"ø-1"ø
1030	Elbow - Generic	Standard	1	1"ø-1"ø
1035	Elbow - Generic	Standard	1	1"ø-1"ø
1036	Transition - Generic	Standard	1	2"ø-1"ø
1037	Elbow - Generic	Standard	1	1"ø-1"ø
1060	Elbow - Generic	Standard	1	1"ø-1"ø
1082	Tee - Generic	Standard	1	1"ø-1"ø-1"ø
1085	Elbow - Generic	Standard	1	1"ø-1"ø
1086	Transition - Generic	Standard	1	1"ø-1"ø

Mark	Family	Type	Count	Size
1088	Elbow - Generic	Standard	1	1"ø-1"ø
1093	Elbow - Generic	Standard	1	1"ø-1"ø
1094	Elbow - Generic	Standard	1	1"ø-1"ø
1095	Transition - Generic	Standard	1	1"ø-1"ø
1101	Elbow - Generic	Standard	1	1"ø-1"ø
1108	Elbow - Generic	Standard	1	1"ø-1"ø
1154	Elbow - Generic	Standard	1	1"ø-1"ø
1174	Tee - Generic	Standard	1	1"ø-1"ø-1"ø
1176	Transition - Generic	Standard	1	1"ø-1"ø
1183	Elbow - Generic	Standard	1	1"ø-1"ø
1185	Elbow - Generic	Standard	1	1"ø-1"ø
1186	Transition - Generic	Standard	1	2"ø-1"ø
1191	Elbow - Generic	Standard	1	1"ø-1"ø
1192	Transition - Generic	Standard	1	2"ø-1"ø
1231	Elbow - Generic	Standard	1	1"ø-1"ø
1232	Transition - Generic	Standard	1	2"ø-1"ø
1236	Elbow - Generic	Standard	1	2"ø-2"ø
1237	Elbow - Generic	Standard	1	2"ø-2"ø
1242	Elbow - Generic	Standard	1	2"ø-2"ø
1243	Elbow - Generic	Standard	1	2"ø-2"ø
1244	Transition - Generic	Standard	1	2"ø-2"ø
1247	Elbow - Generic	Standard	1	1"ø-1"ø
1248	Transition - Generic	Standard	1	2"ø-1"ø
1249	P_Trapp_VCV_40_14157	SOIL PIPE CAST IRON	1	2"ø-2"ø
1285	Tee - Generic	Standard	1	2"ø-2"ø-2"ø
1288	Elbow - Generic	Standard	1	2"ø-2"ø
1289	Transition - Generic	Standard	1	2"ø-2"ø
1296	Elbow - Generic	Standard	1	2"ø-2"ø
1298	Elbow - Generic	Standard	1	2"ø-2"ø
1310	Elbow - Generic	Standard	1	2"ø-2"ø
1312	Transition - Generic	Standard	1	2"ø-1"ø
1313	Transition - Generic	Standard	1	2"ø-1"ø
1319	Elbow - Generic	Standard	1	2"ø-2"ø
1321	Tee - Generic	Standard	1	2"ø-2"ø-2"ø
1323	Transition - Generic	Standard	1	2"ø-1"ø
1324	Transition - Generic			



4 DOMESTIC AND SANITARY ONE-LINE DIAGRAMS  
N.T.S.

PLUMBING LEGEND	
SYMBOL	DESCRIPTION
	BRASS BODY, STAINLESS STEEL BALL, BALL VALVE
	BUTTERFLY VALVE
	GATE VALVE
	SWING CHECK VALVE
	P-TRAP ASSEMBLY
	PIPE DROP/DN.
	PIPE RISE/UP
	PIPE CAP
	PIPE CONTINUATION
	PIPE CLEANOUT
	CONNECT TO EXISTING
	BALANCE VALVE
	MIXING VALVE - ASSE 1017 APPROVED
	REGULATING VALVE OR SOLENOID VALVE
	PRESSURE RELIEF VALVE
	HOSE BIB
	AIR VENT
	FLOOR DRAIN
	P-TRAP WASTE
	PIPE PITCH
	PIPE REDUCER
	PIPE STRAINER
	PIPE TEE DOWN
	PIPE TEE
	PIPE UNION
	TEMPERATURE GAUGE
	PRESSURE GAUGE
	PUMP
	SPECIFIC PLUMBING INSTALLATION NOTES
	PLUMBING EQUIPMENT TAG
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DN.	DOWN
V	SANITARY VENT
VTR	VENT THROUGH ROOF
W	SANITARY WASTE

\*DIAGRAM 3 CAN BE FOUND IN F-602

1 DOMESTIC SUPPLY DIAGRAMS  
3/8" = 1'-0"

PLUMBING SPECIFIC NEW WORK NOTES:

- DOMESTIC HOT AND COLD WATER PIPING TO BE RUN IN THE CAVITY BEHIND THE TOE KICK SPACE OF CABINETS.
- PIPE DOMESTIC HOT WATER HEATER AND MIXING VALVE PER MANUFACTURER'S RECOMMENDATIONS.
- DOMESTIC WATER PIPING TO DROP BELOW TO SHOWER FIXTURE IN CLOSET.
- DOMESTIC WATER PIPING RUN LOW UNDER BATHROOM COUNTER. CONNECT TO SERVICE BOX FOR WASHER MACHINE AND RUN TO KITCHEN SINK AS SHOWN.
- PIPE CONDENSATE DRAINAGE (WITH P-TRAP) TO LAVATORY WASTE LINE. CONNECT IN VERTICAL PRIOR TO P-TRAP.
- VENT LINE TO BE RUN EXPOSED NEAR CEILING. WASTE FOR SHOWER, ALONG WITH LAVATORY AND CLOTHES WASHER ARE TO BE 2" AND RUN BELOW HOUSE AS HIGH AS POSSIBLE. SLOPE TO SUMP PUMP. CAP WATER CLOSET LINE JUST BELOW DISCHARGE FLANGE.
- PLUG ORIGINAL HOLE IN SUMP PUMP AND CUT NEW INLET HOLE WHERE AT WASTE LINE INVERT HEIGHT. SUMP TO DISCHARGE TO TANK T-2.

A1 P-001 - PLUMBING SYMBOLS AND NOTES  
1/4" = 1'-0"



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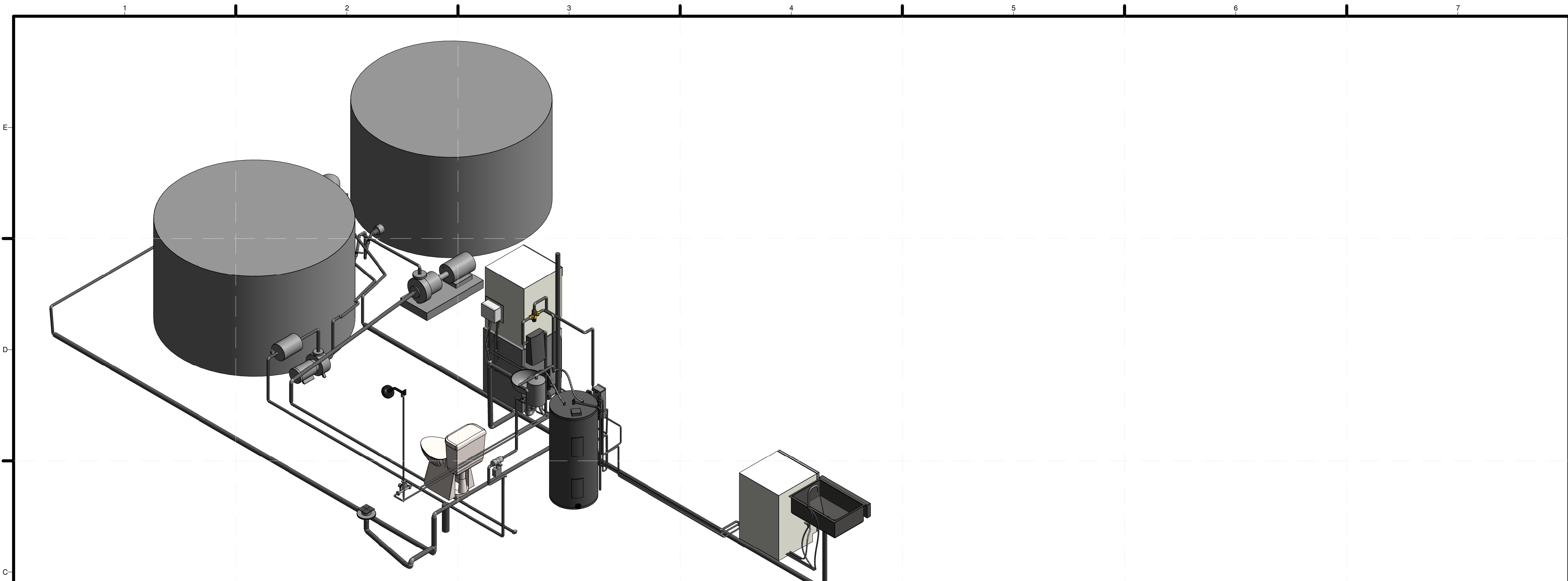


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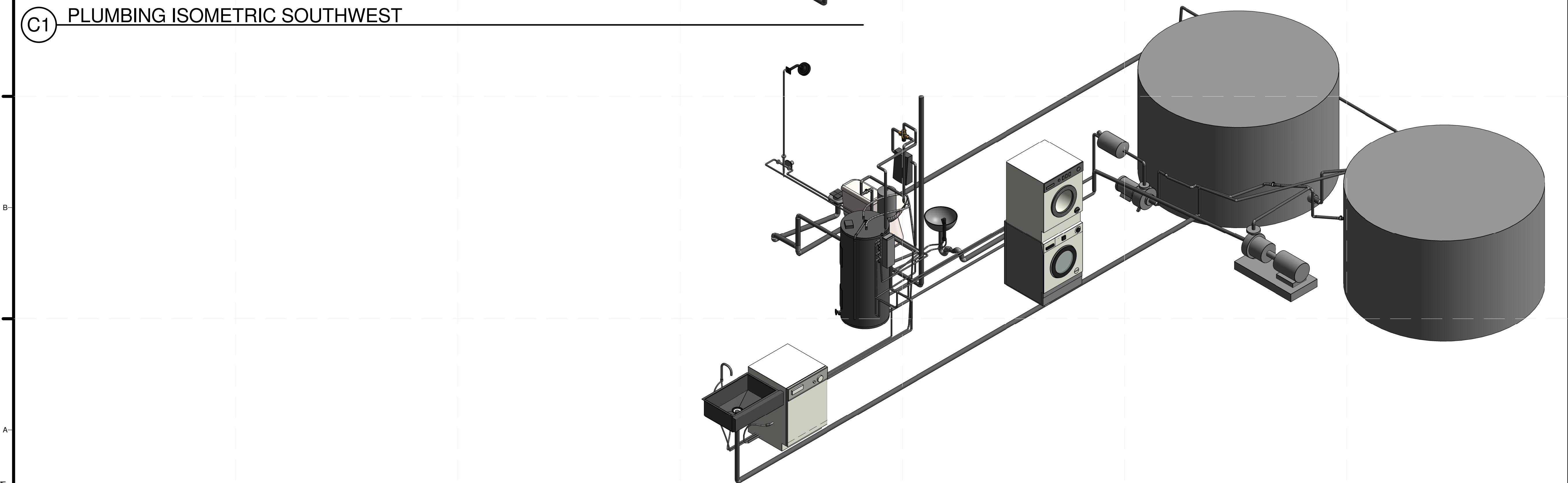
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SHEET TITLE  
DOMESTIC SUPPLY  
DIAGRAMS AND  
SYMBOLS

P-602



(C1) PLUMBING ISOMETRIC SOUTHWEST



(A3) PLUMBING ISOMETRIC SOUTHEAST



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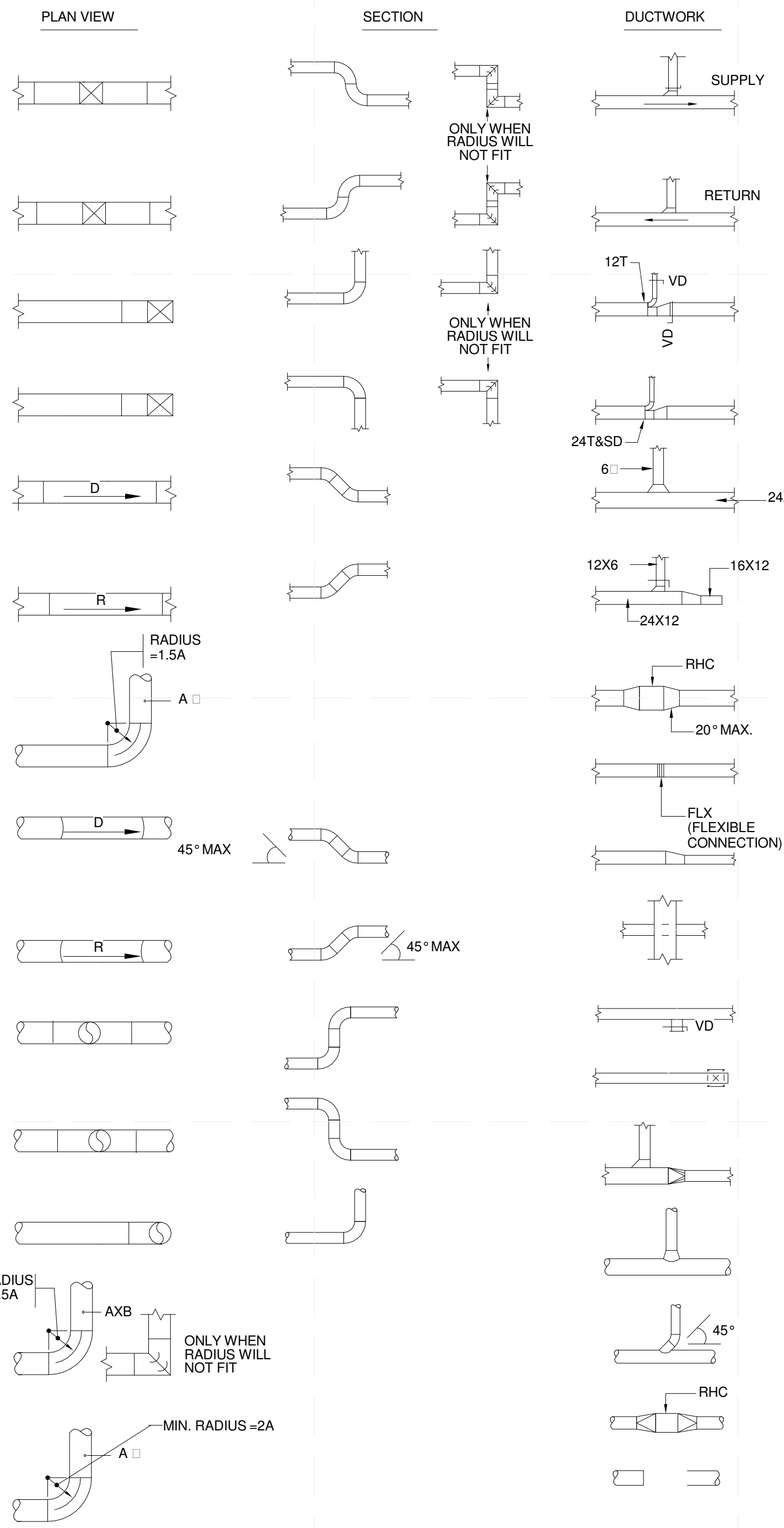
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 ISOMETRIC PLUMBING VIEWS

P-901

HVAC LEGEND (DOUBLE-LINE DUCTWORK)



HVAC LEGEND

HVAC PIPING ABBREVIATIONS		HVAC SYMBOLS	
DCW	DOMESTIC COLD WATER	[Symbol]	AIR VENT
DHW	DOMESTIC HOT WATER	[Symbol]	BALL VALVE
HWR	HOT WATER HEATING RETURN	[Symbol]	BALANCE VALVE
HWS	HOT WATER HEATING SUPPLY	[Symbol]	BUTTERFLY VALVE
COND	CONDENSATE	[Symbol]	BUTTERFLY VALVE
W	SANITARY WASTE	[Symbol]	CHECK VALVE
V	VENT	[Symbol]	AUTOMATIC CONTROL VALVE (TWO-WAY)
		[Symbol]	AUTOMATIC CONTROL VALVE (THREE WAY)
		[Symbol]	FLANGED CONNECTION
		[Symbol]	FLEXIBLE CONNECTOR
		[Symbol]	GATE VALVE
		[Symbol]	NEEDLE VALVE
		[Symbol]	WHEEL VALVE
		[Symbol]	PIPE CAP
		[Symbol]	PRESSURE GAUGE
		[Symbol]	THERMOMETER
		[Symbol]	HOSEBIBB
		[Symbol]	PUMP
		[Symbol]	PIPE TURNED DOWN
		[Symbol]	PIPE TURNED UP
		[Symbol]	PIPE OUTLET
		[Symbol]	PIPE PITCH
		[Symbol]	PIPE REDUCER
		[Symbol]	PIPE STRAINER
		[Symbol]	PIPE TEE DOWN
		[Symbol]	PIPE TEE FLANGE
		[Symbol]	PIPE UNION
		[Symbol]	PIPE WELL
		[Symbol]	PUMP SUCTION DIFFUSER
		[Symbol]	RELIEF VALVE
		[Symbol]	TRIPLE DUTY VALVE
		[Symbol]	VALVE
		[Symbol]	VOLUME DAMPER
		[Symbol]	MOTORIZED VALVE ACTUATOR

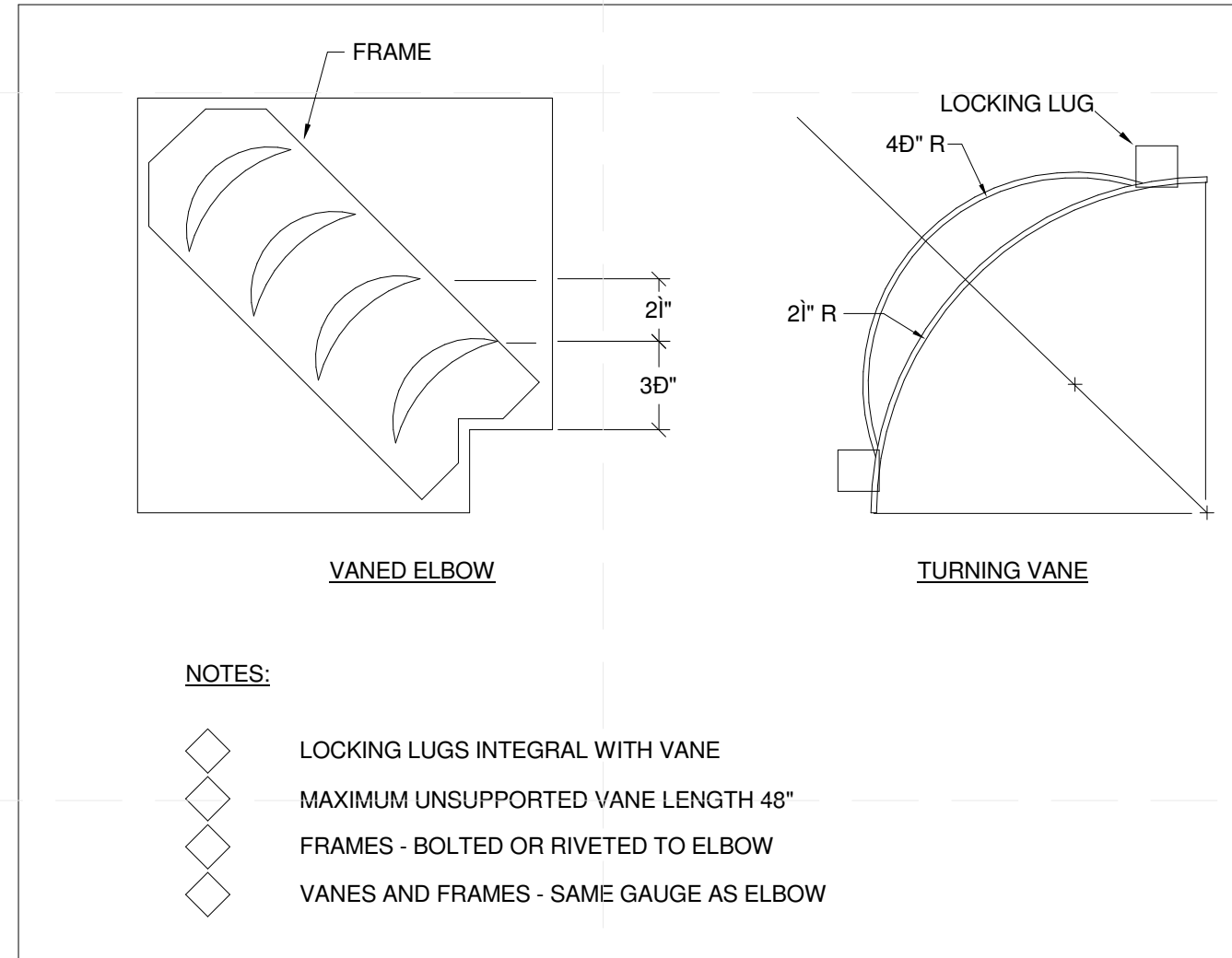
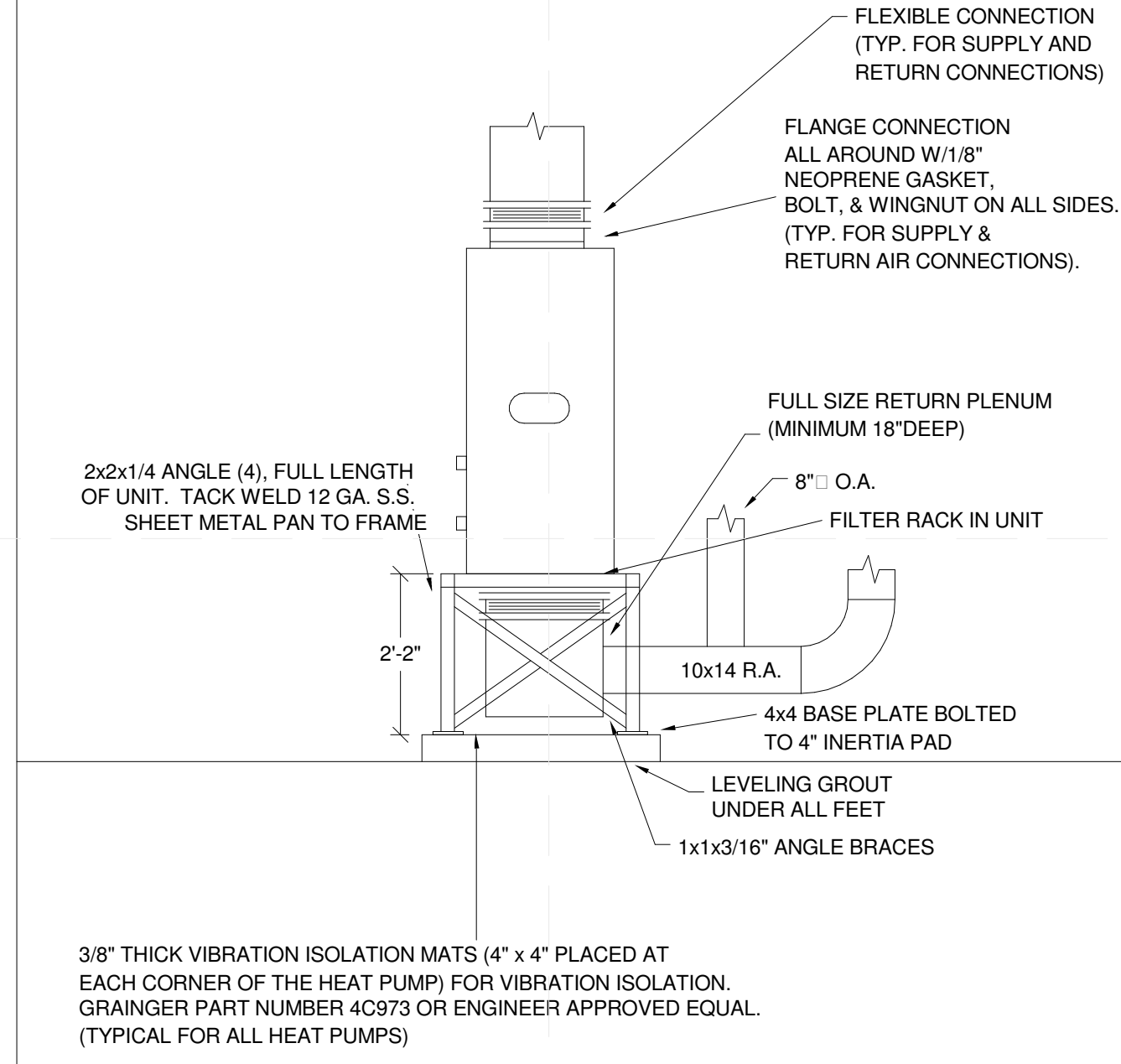
HVAC DUCTWORK ABBREVIATIONS	
E.A.	GENERAL/TOILET EXHAUST AIR
O.A.	OUTDOOR AIR
R.A.	RETURN AIR
S.A.	SUPPLY AIR

HVAC ABBREVIATIONS	
A.F.F.	ABOVE FINISHED FLOOR
DN.	DOWN
HWP	HOT WATER PUMP
O.B.V.D.	OPPOSED BLADE VOLUME DAMPER

HVAC EQUIPMENT TAG LEGEND

NEW EQUIPMENT DESIGNATION		EQUIPMENT NUMBER	
CD	CONTROL DAMPER	EX	EXPANSION TANK
OU	OUTDOOR HEAT PUMP	OU	OUTDOOR HEAT PUMP
CP	CIRCULATING PUMP	FT	FIN TUBE RADIATION
COND	CONDENSING UNIT	HP	HEAT PUMP
ERV	ENERGY RECOVERY VENTILATOR	SC	SOLAR COLLECTOR
		KH	KITCHEN HOOD
		SD	SOLAR COLLECTOR CONTROLLER
		L	LOUVER
		WH	WATER HEATER



GENERAL DISCIPLINE NOTES

- ALL NEW DUCTING SHALL BE RATED FOR AN AIR PRESSURE OF 6" W.G.
- ALL INSULATION SHALL BE FURNISHED AND INSTALLED AS PER THE SPECIFICATIONS. PROVIDE SHEET METAL GUAGE AND HANGER SPACING PER THE 1995 EDITION OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS.
- ALL 90 DEG. ELBOWS SHALL BE PROVIDED WITH TURNING VANES. PROVIDE TWO (2) TURNING VANES FOR DUCT WORK UNDER 12" WIDE, AND PROVIDE THREE (3) TURNING VANES FOR DUCTS BETWEEN 12" AND 18" WIDE. PROVIDE AN ADDITIONAL TURNING VANE FOR EVERY MULTIPLE OF 3" IN DUCT WIDTH. INSTALL TURNING VANES AS PER 1995 EDITION OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS. THE DRAWINGS ARE SCHEMATIC IN NATURE, FIELD COORDINATION IS REQUIRED.
- FLEXIBLE DUCTS NOT PERMITTED ON INLET OR OUTLET OF VAV BOXES.
- ALL VOLUME DAMPERS SHALL BE LOCKING QUADRANT TYPE AND SHALL HAVE A ROUND SHAFT WITH SHAFT SEALS AT THE PENETRATIONS IN THE DUCTWORK. VOLUME DAMPER NOT CONFORMING TO THE ULTRA-LOW LEAK STANDARD SHALL BE REMOVED AND REPLACED AT MECHANICAL CONTRACTOR'S EXPENSE.
- 4" MAXIMUM FLEXIBLE AIR DUCTS ON ALL TAKEOFFS.
- A MAXIMUM OF 90 DEG. CHANGE IN DIRECTION SHALL BE ALLOWED IN ALL FLEXIBLE DUCT TAKE-OFFS. ALL FLEXIBLE DUCTWORK SHALL BE SUPPORTED. ANY FLEXIBLE DUCT TAKE-OFFS NOT SUPPORTED OR WITH GREATER THAN 90 DEG. CHANGE IN DIRECTION SHALL BE REMOVED AND REPLACED AT MECHANICAL CONTRACTOR'S EXPENSE.
- A MAXIMUM OF 90 DEG. CHANGE IN DIRECTION SHALL BE ALLOWED IN ALL FLEXIBLE DUCT TAKE-OFFS. ALL FLEXIBLE DUCTWORK SHALL BE SUPPORTED. ANY FLEXIBLE DUCT TAKE-OFFS NOT SUPPORTED OR WITH GREATER THAN 90 DEG. CHANGE IN DIRECTION SHALL BE REMOVED AND REPLACED AT MECHANICAL CONTRACTOR'S EXPENSE.
- ALL SUSPENDED DUCT WORK, AND PIPING, SHALL BE PROVIDED WITH SEISMIC BRACING AS REQUIRED. SIZE RESTRAINTS AS PER SEISMIC ZONE TWO (2) REQUIREMENTS. ALL EQUIPMENT SHALL BE PROVIDED WITH SEISMIC BRACING.
- ALL DUCT WORK 144 SQ. IN. AND OVER IN CROSS SECTIONAL AREA SHALL BE FABRICATED USING DUCT-MATE FLANGES. NO SLIP AND DRIVE CONNECTIONS SHALL BE PERMITTED. TDF CONNECTIONS ARE ACCEPTABLE FOR DUCT JOINTS OVER 30" AND 4" W.G. PRESSURE.



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 MECHANICAL SYMBOLS AND NOTES

M-001





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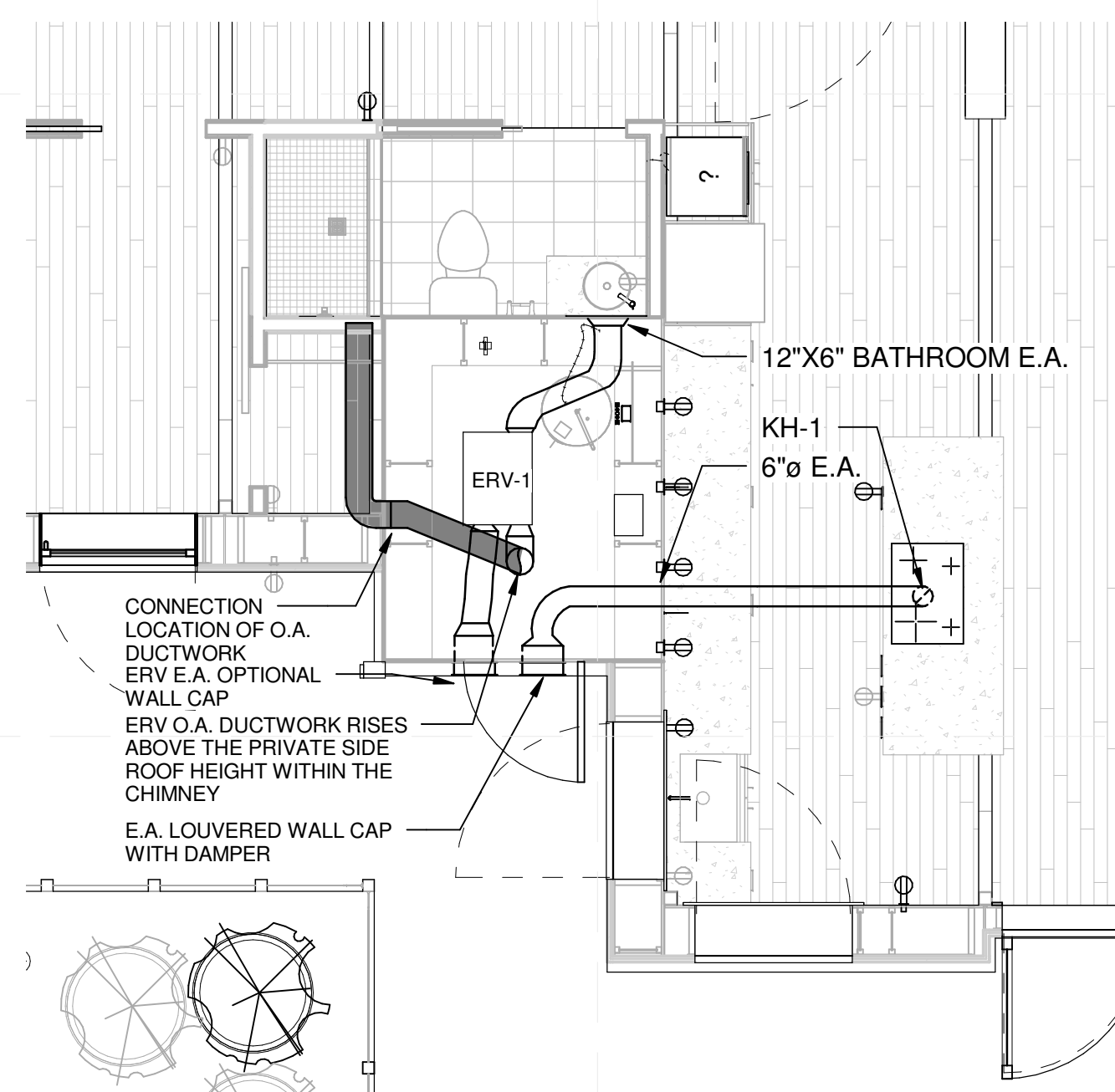
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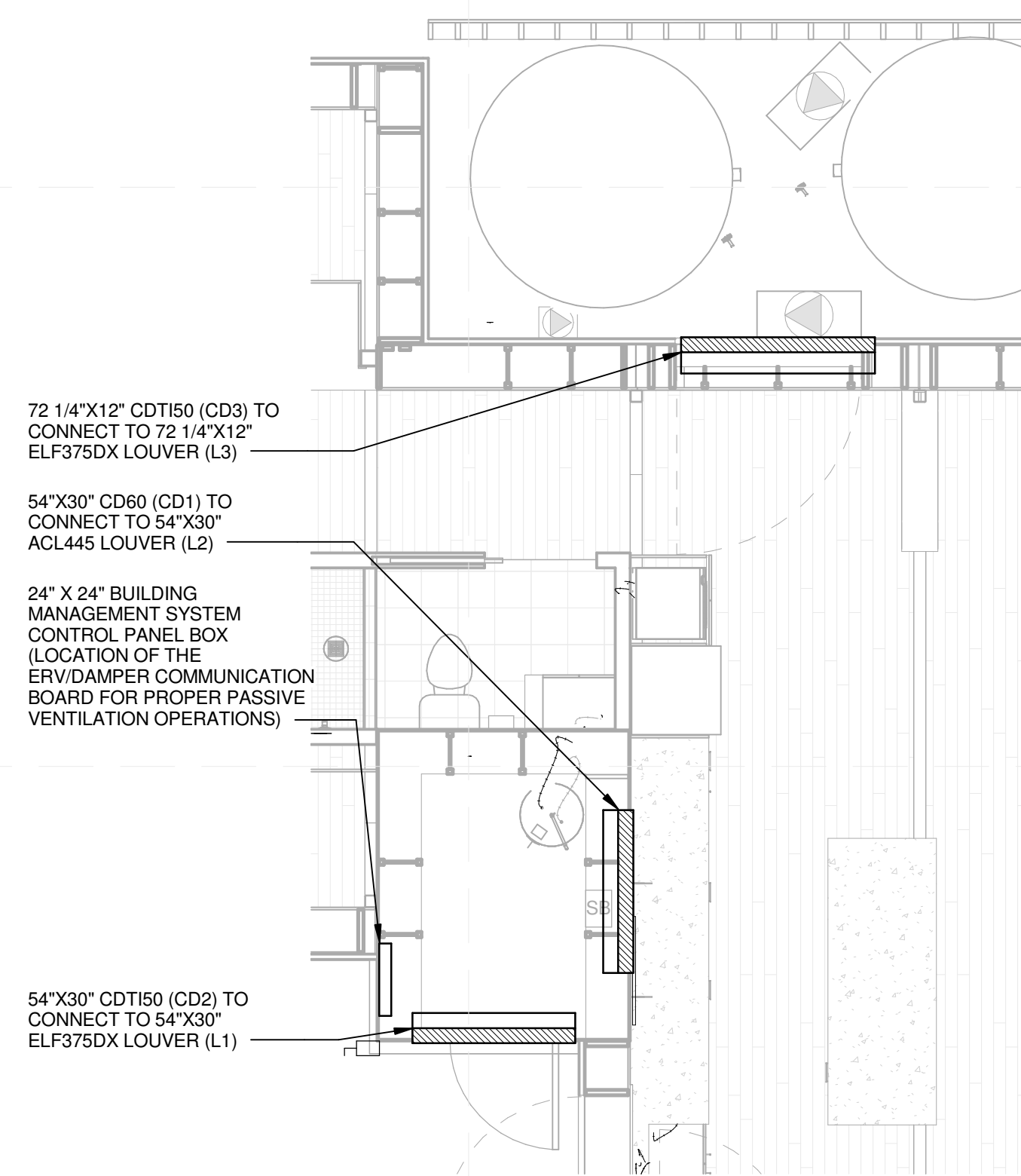
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HVAC DISTRIBUTION  
 PLANS

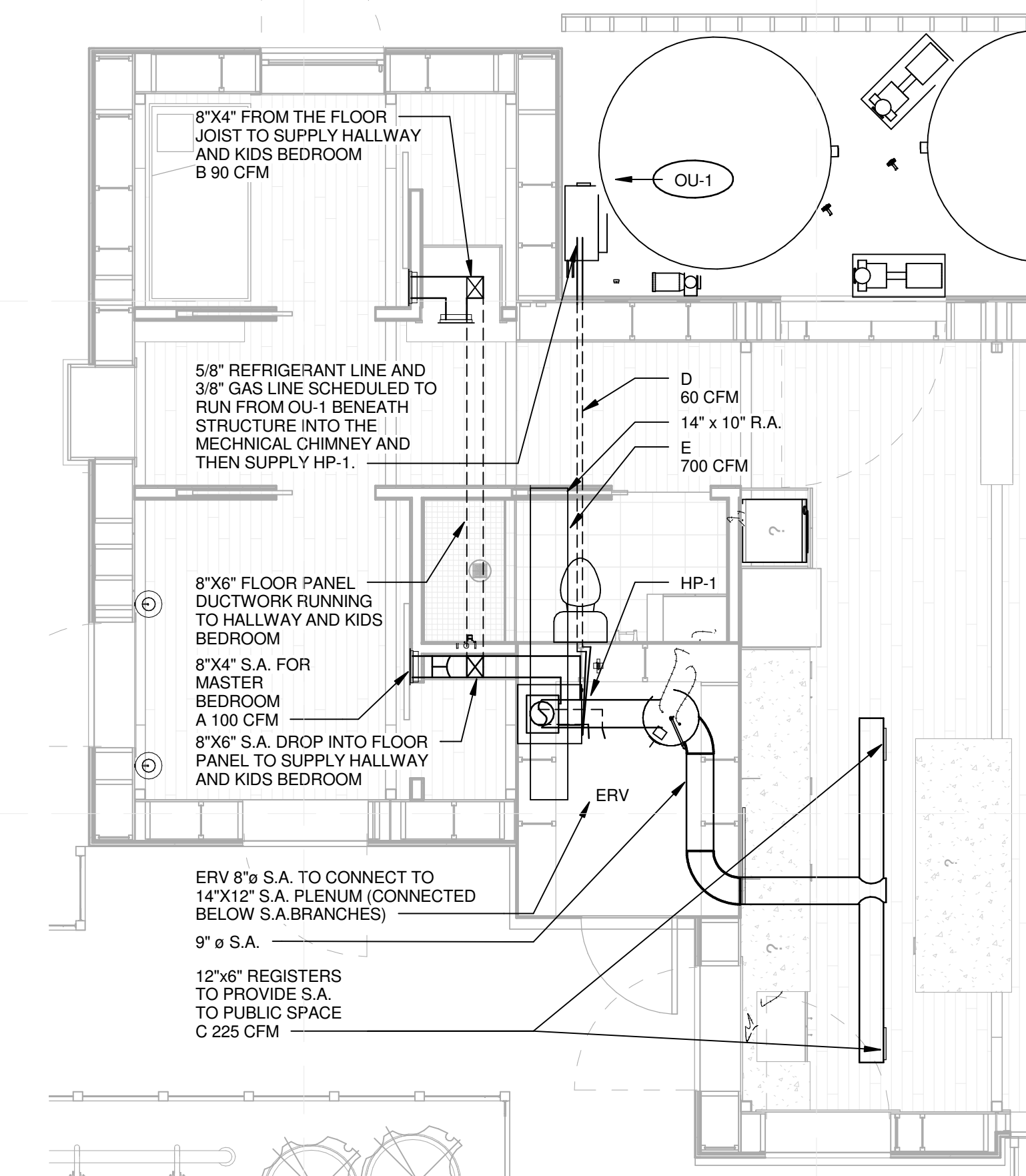
M-101



**A1** EXHAUST AND OUTDOOR AIR PLAN  
 1/4" = 1'-0"



**A3** PASSIVE VENTILATION DISTRIBUTION PLAN  
 1/4" = 1'-0"



**A5** EQUIPMENT AND SUPPLY/RETURN AIR PLAN  
 1/4" = 1'-0"

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ENERGY RECOVERY VENTILATOR SCHEDULE																									
					SUPPLY FAN							EXHAUST FAN		DAMPERS	RETURN AIR PRE-FILTER	OUTDOOR AIR PRE-FILTER									
TAG	DESCRIPTION	MAKE & MODEL	SUPPLY AIR	EXHAUST AIR	TYPE	BLADE TYPE	MAX E.S.P.	MOTOR	RPM	VOLTS	□	AMPS	B.H.P.	TYPE	BLADE TYPE	MAX E.S.P.	MOTOR	RPM	VOLTS	□	AMPS	B.H.P.	TYPE	TYPE	TYPE
(ERV)	ENERGY RECOVERY VENTILATOR	ULTIMATE AIR 200DX	200 CFM	200 CFM	IMP.	BACKWARD INCLINE	0.4" W.C.	PSC	-	120	1	2.5	-	IMP.	BACKWARD INCLINE	0.4" W.C.	PSC	-	120	1	2.5	-	LOW LEAK W/OPOSED BLADES	PANEL TYPE	PANEL TYPE

REMARKS:  
 1. PROVIDE UNIT WITH ENTHALPY CORE.  
 2. PROVIDE UNIT WITH DEFROST CONTROLS AND DRAIN PAN. CONNECT DRAIN TO CONDENSATE DRAIN OFF OF HEAT PUMP PIPED TO LAVATORY DRAIN.  
 3. PROVIDE WITH BOOST CONTROLLER TIMER (SEE CONTROLS). ENSURE UNIT COMES WITH ECONOCOOL CONTROLS, PROVIDE SWITCH PER CONTROLS DRAWING.  
 4. UNIT TO BE WALL MOUNTED. PROVIDE PROPER SUPPORT.  
 5. SEE CONTROLS DRAWING FOR UNIT OPERATION.  
 6. UNIT TO COME WITH CO2 OPTIONAL MONITOR (ACI A/CO2-R-REL-2K) TO BE MOUNTED IN LIVING ROOM.  
 7. PROVIDE WITH WALL TERMINATION KITS (WITH BACKDRAFT/BUTTERFLY DAMPERS) MODEL # 9087. PROVIDE WITH 1/4" SCREENS.

HOT WATER HEATER SCHEDULE						
TAG	DESCRIPTION	MAKE & MODEL	DIMENSIONS	CAPACITY	W. INPUT	REMARKS:
(WH-1)	ELECTRIC WATER HEATER	AO SMITH CONSERVATIONIST PXHS-40	22-1/2" x 47"	40 GAL	(1) 4500W	1
(WH-2)	ELECTRIC TANKLESS WATER HEATER	ECOSMART ECO 11	12" x 9.75" x 3.75"	2 GPM	13600W	2

REMARKS:  
 1. WATER HEATER TO BE STRAPPED AT IT'S 1/3 AND 2/3 HEIGHT TO THE WALL TO PREVENT TIPPING PER SEISMIC CODE REQUIREMENTS.  
 2. ELECTRIC TANKLESS WATER HEATER TO BE CONNECTED TO ELECTRIC WATER HEATER IN ORDER TO PROVIDE HOT WATER NECESSARY.

EXPANSION TANK SCHEDULE						
TAG	DESCRIPTION	MAKE AND MODEL	CAPACITY	ACCEPTANCE	DIMENSIONS	REMARKS:
	DOMESTIC HOT WATER EXPANSION TANK	SEE PLUMBING SCHEDULES	-	-	-	-

REMARKS:  
 1. PIPE WITH ISOLATION VALVES AND DRAIN.  
 2. FIELD ADJUST PRECHARGE PRESSURE TO MATCH SYSTEM FILL PRESSURE PRIOR TO CONNECTION TO SYSTEM.

CONTROL DAMPER SCHEDULE				
TAG	DESCRIPTION	MAKE & MODEL	DUCT SIZE	REMARKS:
(CD1)	FREE COOLING INTAKE LOUVER CONTROL DAMPER	RUSKIN CD-60	54"x30"	PROVIDE 24 VOLT ACTUATOR
(CD2)	FREE COOLING EXHAUST LOUVER CONTROL DAMPER	RUSKIN CDTI-50	54"x30"	PROVIDE 24 VOLT ACTUATOR INSULATED CONTROL DAMPER.
(CD3)	FREE COOLING EXHAUST LOUVER CONTROL DAMPER	RUSKIN CDTI-50	72 1/4"x12"	PROVIDE 24 VOLT ACTUATOR INSULATED CONTROL DAMPER.
(CD4)	ERV SUPPLY-TO-RETURN CONTROL DAMPER	RUSKIN CDR25	8"	PROVIDE 24 VOLT ACTUATOR
(CD5)	ERV SUPPLY-TO-SUPPLY CONTROL DAMPER	RUSKIN CDR25	8"	PROVIDE 24 VOLT ACTUATOR
(CD6)	HEAT PUMP SUPPLY CONTROL DAMPER	RUSKIN CD-60	14"x12"	PROVIDE 24 VOLT ACTUATOR

REMARKS:  
 1. SEE CONTROLS FOR OPERATION OF DAMPER.  
 2. DAMPERS 1, 2 AND 3 SHALL BE NORMALLY CLOSED. SEE CONTROLS ONE-LINE DRAWING FOR CD-3 TO CD-5.

SPLIT SYSTEM A/C SCHEDULE												
TAG	DESCRIPTION	MAKE & MODEL	CFM	REFRIGERANT	COOLING CAP.	HEATING CAP.	COOLING CONDITIONS (°F)	HEATING CONDITIONS (°F)	ELECTRICAL	M.C.A.	OUTDOOR UNIT	REMARKS
	INDOOR VERTICAL DUCTED HEAT PUMP	DAIKIN FTQ18PBVJU	420-600	R-410A	18,000 BTU/HR	20,000 BTU	INDOOR: 80°F DB/67° WB OUTDOOR: 95°F DB	INDOOR: 70°F DB OUTDOOR: 47°DB/43°WB	208V/1P	1.6		1,2,3,4,5,6

REMARKS:  
 1. FURNISH AND INSTALL ALL LIQUID/SUCTION PIPING BETWEEN EVAPORATOR AND CONDENSING UNIT. COORDINATE PIPE SIZING AND ROUTING WITH MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS.  
 2. PROVIDE STRUCTURAL SUPPORT FROM FLOOR PER MANUFACTURER'S REQUIREMENTS WITH VIBRATION ISOLATION FOR EVAPORATOR UNIT.  
 3. PIPE CONDENSATE TO NEAREST DRAIN. SEE PLAN DRAWINGS.  
 4. EACH UNIT TO BE INSTALLED WITH WIRED WALL MOUNTED TEMPERATURE CONTROLLER. COORDINATE THERMOSTAT LOCATION WITH OWNER PRIOR TO INSTALLATION.  
 5. UNIT SHALL HAVE RETURN AIR FILTERS. SEE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR MORE INFORMATION.  
 6. UNIT SHALL BE PROVIDED WITH WIRED REMOTE CONTROLLER BRCE1E71.

TAG	DESCRIPTION	MAKE & MODEL	REFRIGERANT	CAPACITY BTU/HR	AMBIENT °F	ELECTRICAL	M.C.A.	MAX BRK.	REMARKS
	OUTDOOR UNIT	DAIKIN RZQ18PVJU9	R-410A	18,000 HEATING 20,000 COOLING	14.0 (HEATING) 104.0 (COOLING)	208V/1P	16.5 AMP	20 AMP	1,2,3

REMARKS:  
 1. FURNISH AND INSTALL ALL LIQUID/SUCTION PIPING BETWEEN EVAPORATOR UNITS AND CONDENSING UNIT. PIPE SIZING IS AS FOLLOWS: REFRIGERANT = 5/8" ; GAS = 3/8".  
 2. OUTDOOR UNIT TO BE PROVIDED WITH OPTIONAL WIND BAFFLE.  
 3. INSTALL PER MANUFACTURER'S REQUIREMENTS.

LOUVER SCHEDULE							
TAG	DESCRIPTION	MAKE & MODEL	OPENING SIZE	DEPTH	AIRFLOW	SP	REMARKS:
(L1)	ALUMINUM STATIONARY LOUVER	RUSKIN ELF375DX	54"W X 30"H	4"	600 CFM	0.02	◇◇◇◇
(L2)	ALUMINUM SOUND ATTENUATING LOUVER	RUSKIN ACL445	54"W X 30"H	4"	600 CFM	0.02	
(L3)	ALUMINUM STATIONARY LOUVER	RUSKIN ELF375DX	72 1/4"WX12"H	4"	600 CFM	0.02	
(L4)	ALUMINUM STATIONARY LOUVER	RUSKIN ELF375DX	12"WX12"H	4"	- CFM	0.02	◇
(L5)	ALUMINUM STATIONARY LOUVER	RUSKIN ELF375DX	12"WX12"H	4"	- CFM	0.02	◇

REMARKS:  
 1. COORDINATE EXACT LOUVER SIZE WITH ARCHITECTURAL DETAILS AND DIMENSIONS.  
 2. PROVIDE BIRD SCREEN.  
 3. COLOR SHALL BE SELECTED BY THE OWNER. SUBMIT COLOR CHART TO OWNER.  
 4. USED FOR EXHAUST OF KITCHEN HOOD AND EXHAUST OF ERV.

FAN SCHEDULE					
TAG	DESCRIPTION	MAKE & MODEL	CFM	ELECTRICAL	REMARKS:
	KITCHEN HOOD EXHAUST FAN	FRIGIDAIRE FHPC3660L S	400	120V/1P/60HZ	◇

REMARKS:  
 1. KITCHEN HOOD TO BE 3 SPEED FAN EXTRA QUIET OPERATION. MAXIMUM OF 400 CFM OF FLOW. PROVIDE CONNECTION TO 6" EXHAUST DUCT TO OUTDOOR AIR WALL CAP.

DIFFUSER, REGISTER & GRILLE SCHEDULE							
TAG	MAKE & MODEL	PANEL	NECK	TYPE	MOUNTING	MAX. CFM	REMARKS:
	NAILOR 49481-O-8X4-F-AW-A	8X4	8X4	SUPPLY GRILLE	SIDEWALL	110	◇◇
	NAILOR 61DH-10X5-S-AW (PROVIDE INTEGRAL DAMPER)	8X4	8X4	SUPPLY GRILLE	SIDEWALL	100	◇◇
	NAILOR 6145H-12X6-S-AW	12X6	12X6	RETURN GRILLE	SIDEWALL	180	◇◇
	NAILOR 6145H-14X10-S-AW	14X10	14X10	RETURN GRILLE	SIDEWALL	700	◇◇
	NAILOR 6145H-12X6-S-AW	12X6	12X6	SUPPLY GRILLE	DUCT	225	◇◇

REMARKS:  
 1. PROVIDE BRANCH VOLUME DAMPER FOR ALL DIFFUSERS AND GRILLES WITHOUT INTEGRAL DAMPERS.  
 2. VOLUME DAMPERS SHALL BE 18 GA. MINIMUM WITH ROUND SHAFT, SHAFT SEALS AND LOCKING QUADRANT TYPE OPERATOR.  
 3. CODE COMPLIANT FLEXIBLE CONNECTIONS TO DIFFUSERS WITH ROUND NECKS MAY BE USED. MAXIMUM LENGTH OF FLEXIBLE DUCT TO BE 4'. (ERV ONLY)  
 4. CONNECT FLEXIBLE AIR DUCT TO DIFF./REG. NECK WITH S.S. DRAW CLAMP. (ERV ONLY)  
 5. IF DUCT BRANCH TO DIFFUSER IS NOT TAGGED IN THE PLAN, THE BRANCH SIZE SHALL BE EQUAL TO THE DIFFUSER NECK SIZE.  
 6. PROVIDE WITH INTEGRAL VOLUME DAMPER.

DUCT SCHEDULE					
Mark	Family	Type	Count	Size	
7	Rectangular Duct	Radius Elbows / Taps	1	8"x6"	
13	Rectangular Duct	Radius Elbows / Taps	1	8"x6"	
23	Rectangular Duct	Mitered Elbows / Taps	1	8"x4"	
24	Rectangular Duct	Mitered Elbows / Taps	1	8"x4"	
38	Rectangular Duct	Mitered Elbows / Taps	1	22"x15"	
42	Round Duct	Taps	1	6"	
43	Round Duct	Taps	1	9"	
65	Rectangular Duct	Radius Elbows / Taps	1	54"x30"	
67	Rectangular Duct	Radius Elbows / Taps	1	14"x10"	
93	Round Duct	Taps / Short Radius	1	8"	
100	Rectangular Duct	Mitered Elbows / Taps	1	12"x12"	
112	Rectangular Duct	Radius Elbows / Taps	1	54"x30"	
126	Round Duct	Taps	1	8"	
10	Round Duct	Taps	1	6"	
14	Round Duct	Taps	1	8"	
16	Round Duct	Taps	1	6"	
17	Round Duct	Taps	1	6"	
19	Rectangular Duct	Radius Elbows / Taps	1	8"x8"	
28	Rectangular Duct	Mitered Elbows / Taps	1	8"x4"	
30	Rectangular Duct	Radius Elbows / Taps	1	14"x12"	

DUCT SCHEDULE					
Mark	Family	Type	Count	Size	
32	Round Duct	Taps	1	9"	
33	Round Duct	Taps	1	9"	
34	Round Duct	Taps	1	9"	
35	Rectangular Duct	Radius Elbows / Taps	1	8"x8"	
36	Rectangular Duct	Radius Elbows / Taps	1	8"x8"	
37	Rectangular Duct	Radius Elbows / Taps	1	8"x8"	
39	Rectangular Duct	Radius Elbows / Taps	1	14"x10"	
54	Rectangular Duct	Radius Elbows / Taps	1	10"x14"	
55	Rectangular Duct	Radius Elbows / Taps	1	14"x10"	
56	Rectangular Duct	Radius Elbows / Taps	1	14"x10"	
57	Rectangular Duct	Radius Elbows / Taps	1	10"x14"	
62	Round Duct	Taps / Short Radius	1	8"	
69	Round Duct	Taps / Short Radius	1	8"	
70	Round Duct	Taps / Short Radius	1	8"	
72	Round Duct	Taps	1	8"	
73	Round Duct	Taps	1	8"	
75	Round Duct	Taps	1	6"	
81	Round Duct	Taps / Short Radius	1	8"	
82	Round Duct	Taps / Short Radius	1	8"	
84	Round Duct	Taps	1	6"	

DUCT FITTING SCHEDULE					
Mark	Family	Type	Count	Size	
468	Round Transition - Angle	45 Degree	1	8"ø-6"ø	
483	Round Elbow	1.5 D	1	6"ø-6"ø	
505	Round Takeoff	Standard	1	10"ø-10"ø	
579	Rectangular to Round Transition - Angle	45 Degree	1	12"x12"-6"ø	
580	Round Elbow	1.5 D	1	6"ø-6"ø	
38	Rectangular Elbow - Mitered	Standard	1	8"x4"-8"x4"	
39	Rectangular Transition - Angle	45 Degree	1	8"x4"-4"x8"	
43	Rectangular Elbow - Mitered	Standard	1	4"x8"-4"x8"	
81	Round Takeoff	Standard	1	8"ø-8"ø	
103	Round Takeoff	Standard	1	8"ø-8"ø	
111	Rectangular Elbow - Radius	1 W	1	8"x6"-8"x6"	
119	Round Elbow	1 D	1	6"ø-6"ø	
126	Rectangular Elbow - Mitered	Standard	1	8"x8"-8"x8"	
137	Rectangular Elbow - Mitered	Standard	1	8"x6"-8"x6"	
138	Rectangular Transition - Angle	45 Degree	1	8"x8"-6"x8"	
142	Rectangular Elbow - Radius	1.5 W	1	6"x8"-6"x8"	
149	Rectangular to Round Transition - Angle	45 Degree	1	12"x6"-6"ø	
151	Round Union	Standard	1	9"ø-9"ø	
157	Round Elbow	1.5 D	1	9"ø-9"ø	
160	Round Elbow	1.5 D	1	9"ø-9"ø	
163	Rectangular Elbow - Mitered	Standard	1	8"x8"-8"x8"	
164	Rectangular Elbow - Mitered	Standard	1	8"x8"-8"x8"	
166	Round Elbow	1 D	1	6"ø-6"ø	

DUCT FITTING SCHEDULE					
Mark	Family	Type	Count	Size	
191	Rectangular to Round Transition - Angle	45 Degree	1	12"x6"-8"ø	
244	Rectangular Elbow - Radius	1.5 W	1	10"x14"-10"x14"	
260	Rectangular Elbow - Radius	1.5 W	1	14"x10"-14"x10"	
262	Rectangular Elbow - Radius	1.5 W	1	14"x10"-14"x10"	
266	Rectangular Elbow - Radius	1.5 W	1	10"x14"-10"x14"	
268	Rectangular Elbow - Radius	1.5 W	1	14"x10"-14"x10"	
273	Round Elbow	1.5 D	1	6"ø-6"ø	
276	Round Transition - Angle	45 Degree	1	8"ø-6"ø	
277	Round Elbow	1.5 D	1	8"ø-8"ø	
278	Round Elbow	1.5 D	1	8"ø-8"ø	
279	Round Elbow	1.5 D	1	8"ø-8"ø	
287	Round Takeoff	Standard	1	8"ø-8"ø	
294	Round Elbow	1 D	1	8"ø-8"ø	
295	Round Elbow	1 D	1	8"ø-8"ø	
296	Round Elbow	1 D	1	8"ø-8"ø	
298	Round Elbow	1 D	1	8"ø-8"ø	
301	Round Tee	Standard	1	8"ø-8"ø-8"ø	
304	Round Takeoff	Standard	1	8"ø-8"ø	
326	Round Elbow	1.5 D	1	8"ø-8"ø	
330	Round Transition - Angle	45 Degree	1	8"ø-6"ø	
343	Round Elbow	1.5 D	1	6"ø-6"ø	
344	Round Transition - Angle	45 Degree	1	8"ø-6"ø	
356	Rectangular to Round Transition - Angle	45 Degree	1	12"x12"-8"ø	
357	Round Transition - Angle	45 Degree	1	8"ø-6"ø	
147	Round Elbow	1.5 D	1	9"ø-9"ø	

### GENERAL SHEET NOTES

- OUTDOOR AIR INTAKE DUCT IS TO BE ROUTED TO THE EXTERIOR WALL CAP (SUPPLIED WITH UNIT) BY RISING IN THE EXTERIOR WALL OF THE MECHANICAL CHIMNEY TO CAP.
- RETURN AIR DUCT IS TO RUN EXPOSED NEAR THE CEILING TO THE RETURN AIR GRILLE ABOVE THE DOOR.
- 6" S.A. DUCT TO DROP BELOW FLOOR AT WALL IN CLOSET AND SHALL RUN IN JOIST SPACE TO FLOOR REGISTER. 9" X 6" S.A. DUCT IS TO RUN UNDER 6" S.A. DUCT AND ALSO DROP INTO JOIST SPACE TO SERVE (2) FLOOR REGISTERS AS SHOWN. DUCT TO BE 6" TOTAL OUTSIDE DIAMETER WHEN PASSING THROUGH FLOOR JOIST (UNINSULATED WHEN PASSING THROUGH).
- HEAT PUMP IS TO BE MOUNTED ON STAND AS PER MANUFACTURER'S RECOMMENDATIONS. CONNECT SUPPLY AIR DUCT INTO BOTTOM.
- KITCHEN HOOD EXHAUST DUCT AND SUPPLY AIR DUCTS ARE TO RUN EXPOSED NEAR CEILING. SUPPLY DUCT TO RUN OVER KITCHEN EXHAUST. ERV IS TO BE MOUNTED TO WALL AT APPROXIMATELY 7' AFF. LOUVER TO BE LOCATED AS HIGH AS POSSIBLE IN WALL.



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SHEET TITLE  
**EQUIPMENT SCHEDULES**  
**M-601**

- ### GENERAL SHEET NOTES
1. PROVIDE POWER SUPPLY FOR DAMPERS. 24VAC.
  2. PROVIDE ACTUATORS FOR ALL DAMPERS.
  3. "ECONOCOOL" AND FREE COOLING DAMPER SWITCH TO BE COMBINED INTO (1) SWITCH (2) BUTTONS. LABEL ALL SWITCHES.
  4. GROUP THE ERV SPEED CONTROLLER, HEAT PUMP CONTROLLER, AND "ECONOCOOL"/FREE COOLING DAMPER SWITCH TOGETHER ON HALLWAY WALL.
  5. LABEL ALL SWITCHES.



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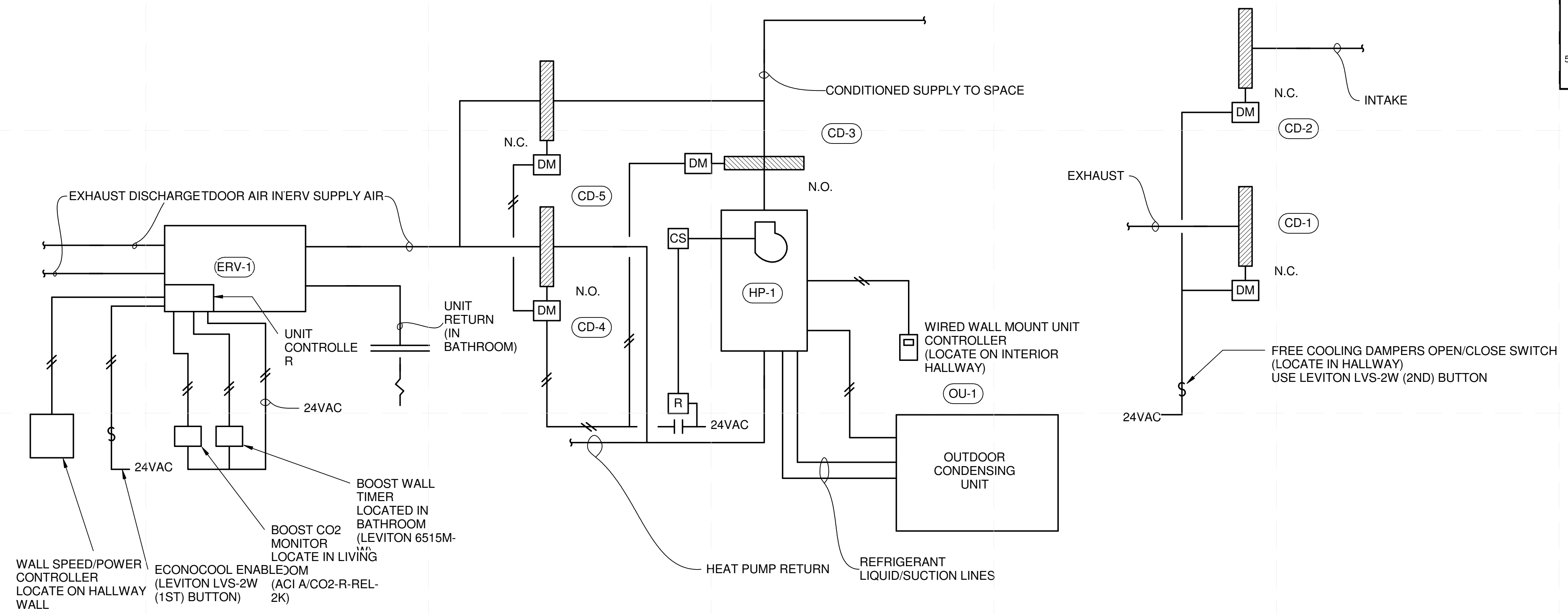


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SHEET TITLE  
**HVAC DIAGRAMS**

**M-603**



### ENERGY RECOVERY VENTILATOR SEQUENCE OF OPERATIONS

ENERGY RECOVERY VENTILATOR SHALL OPERATE USING FACTORY SUPPLIED WALL CONTROLLER. UNIT SHALL BE MANUALLY STARTED AND RUN CONTINUOUSLY EXCEPT AS NOTED. UNIT SHALL BE BALANCED TO SUPPLY A CONTINUOUS 75 CFM UNLESS.

THE OPTIONAL BOOST CONTROLLER TIMER SWITCH SHALL BE LOCATED IN THE BATHROOM. WHEN AN OCCUPANT ENTERS THE BATHROOM, THEY SHALL ACTIVATE THE SWITCH WHICH BOOSTS THE UNIT TO 180 CFM FOR A PROGRAMMED AMOUNT OF TIME (2 MINUTES ADJ.). AFTER THAT PERIOD OF TIME, THE UNIT SHALL REVERT BACK TO REGULAR OPERATION.

THE CO2 MONITOR SHALL BE LOCATED IN THE LIVING ROOM. WHEN THE MONITOR SENSES A RISE IN CO2 LEVELS ABOVE SET POINT, THE UNITS AIRFLOW SHALL BE INCREASED. WHEN OUTDOOR AIR CONDITIONS ARE ACCEPTABLE, OCCUPANTS MAY MANUALLY SWITCH THE UNIT TO "ECONOCOOL" MODE TO PROVIDE "FREE" COOLING TO THE SPACE.

### SPLIT-SYSTEM HEAT PUMP HEATING AND COOLING SYSTEM (INDOOR AND OUTDOOR UNIT) SEQUENCE OF OPERATIONS

FURNISH AND INSTALL A FACTORY PROVIDED WALL MOUNTED CONTROLLER TO OPERATE HEAT PUMP UNIT. SEE ELECTRICAL DRAWINGS FOR POWER.

SYSTEM SHALL BE CAPABLE OF HEATING OR COOLING, AND DEHUMIDIFICATION MODE.

PROVIDE WIRING CONNECTIONS PER THE MANUFACTURER'S INSTRUCTIONS.

### FREE COOLING/VENTILATION SYSTEM INTERCONNECTION SEQUENCE OF OPERATIONS

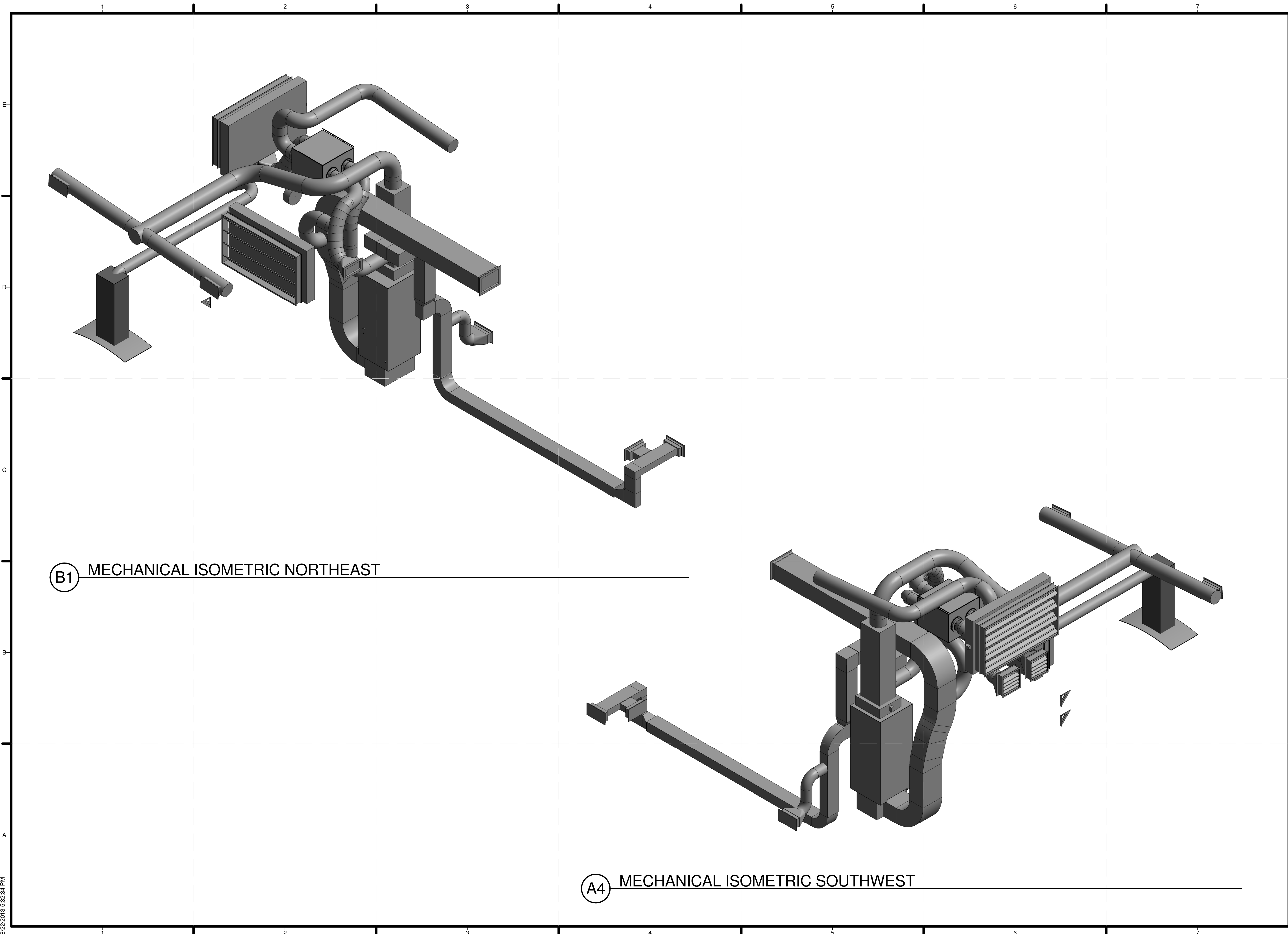
NORMAL OPERATION: WINDOWS ARE CLOSED, THE FREE COOLING LOUVER DAMPERS ARE CLOSED.

WHEN FREE COOLING IS DESIRED, THE OCCUPANTS SHOULD OPERATE THE "FREE COOLING DAMPER" SWITCH TO OPEN. THE SWITCH SHALL OPEN BOTH CONTROL DAMPERS CD-1 & 2. THE OCCUPANTS SHALL ALSO TURN THE HEAT PUMP "OFF" AND THE ERV FROM THEIR WALL CONTROLLERS.

### ERV/HEAT PUMP DAMPERS SEQUENCE OF OPERATIONS

CONTROL DAMPERS CD-3, 4, 5 SHALL OPERATE TOGETHER TO UTILIZE THE SUPPLY DUCTWORK TO DISTRIBUTE VENTILATION AIR WHEN THE HEAT PUMP IS NOT IN OPERATION. WHEN THE HEAT PUMP IS RUNNING, CONTROL DAMPERS CD-3 AND 4 SHALL BE OPEN AND CD-5 SHALL BE CLOSED. WHEN THE HEAT PUMP IS NOT IN OPERATION, CONTROL DAMPERS CD-3 AND 4 SHALL BE CLOSED AND CD-5 SHALL BE OPEN. CONTROL DAMPER ACTUATION SHALL BE TRIGGERED FROM A CURRENT SWITCH AND RELAY CONNECTED TO THE HEAT PUMP FAN MOTOR.

**A1** HVAC SYSTEM DIAGRAM  
 3/8" = 1'-0"



**B1** MECHANICAL ISOMETRIC NORTHEAST

**A4** MECHANICAL ISOMETRIC SOUTHWEST



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SHEET TITLE  
**ISOMETRIC MECHANICAL VIEWS**

**M-901**

SYMBOL	DESCRIPTION
	DISCONNECT SWITCH
	CABLE TV COAX JACK
	PHONE JACK AND DATA JACK
	DUPLEX RECEPTACLE
	QUADPLEX RECEPTACLE
	GFCI RECEPTACLE
	JUNCTION BOX
	TYPICAL LIGHT SWITCH. "3" INDICATES 3-WAY.
	TYPICAL LIGHT FIXTURE. "d" INDICATES LOCAL SWITCH CONTROL. "A" INDICATES FIXTURE.
	TYPICAL WALL SCONCE LIGHT FIXTURE. SEE ABOVE FOR "d" AND "A".
	TYPICAL ROUND OR VALANCE LIGHT FIXTURE. SEE TYPICAL LIGHT ABOVE FOR CONTROL LABELLING.
	HOME RUN
	READING NOOK LED STRIP LIGHTS

ELECTRICAL SPECIFIC NEW WORK NOTES:

- THE TWO "OUTSIDE JUNCTION BOXES" ARE IN THE CENTRAL ISLAND FOR THE OVEN AND THE INDUCTION COOKTOP. THE "CENTER" JUNCTION BOX IS IN THE CEILING TO POWER THE KITCHEN RANGE HOOD.
- (3) FIXTURES TO BE MOUNTED ON BUILT-IN BENCH. COORDINATE EXACT LOCATION IN THE FIELD MEETING NEC SPACING REQUIREMENTS.
- DISCONNECT FOR CIRCUIT #31 IS TO POWER ERV-1. PROVIDE RECEPTACLE AS NEEDED.
- RECEPTACLES MOUNTED AT KITCHEN COUNTER TO BE LOCATED AT 42" AFF.
- COORDINATE EXACT LOCATION AND REQUIREMENTS FOR CO "BLUE LIGHT" AND EXTERIOR HORN STROBE WITH MIDDLEBURY COLLEGE.
- MOUNT FLOW AND TAMPER SWITCH PER NFPA REQUIREMENTS. COORDINATE EXACT LOCATION IN FIELD. MOUNT IN MECHANICAL ROOM IF POSSIBLE.
- PROVIDE EXTERIOR RATED DISCONNECTS FOR FIRE PUMP AND DOMESTIC WATER PUMP. PROVIDE RECEPTACLES AS NECESSARY.
- LED STRIP FIXTURES ARE TO BE MOUNTED ON STRUCTURAL BEAMS. COORDINATE EXACT MOUNTING REQUIREMENTS AND FIXTURES WITH OWNER.
- FABRICATE A STRUCTURAL CEILING OVER ELECTRICAL PANEL TO MEET NEC REQUIREMENTS FOR CLEARANCES. COORDINATE EXACT CEILING IN FIELD.
- PROVIDE DISCONNECTS FOR WH-1, ERV-1, CP-1 AND HP-1 AND CIRCUIT PER PANEL SCHEDULE. COORDINATE EXACT LOCATION IN FIELD.

FIRE ALARM LEGEND	
	SMOKE DETECTOR/CARBON MONOXIDE COMBO
	SPRINKLER TAMPER SWITCH
	SPRINKLER FLOW SWITCH
	FIRE ALARM HORN STROBE WALL MOUNTED EXTERIOR (CO) ALARM BLUE LIGHT

ELECTRICAL LEGEND	
	NEW ELECTRICAL WORK TO BE PROVIDED

GENERAL DISCIPLINE NOTES

- THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL LABOR AND MATERIALS NECESSARY TO PROVIDE A COMPLETE, CODE COMPLIANT ELECTRICAL SYSTEM. THE DRAWINGS ARE SCHEMATIC IN NATURE AND INDICATE GENERAL ARRANGEMENT AND ROUTING OF CIRCUITS. THE ELECTRICAL CONTRACTOR SHALL NOT INSTALL EQUIPMENT, DEVICES, OR CONDUIT IN A NON-CODE COMPLIANT FASHION DUE TO DRAWINGS INTERPRETATION. THE ELECTRICAL CONTRACTOR SHALL PROVIDE MODIFICATIONS OF ILLUSTRATED WORK IN ORDER TO ACCOMMODATE JOB CONDITIONS AT NO EXTRA COST TO THE OWNER. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING POWER AND THE FINAL ELECTRICAL CONNECTIONS TO ALL EQUIPMENT REQUIRING POWER INDICATED ON THE ARCHITECTURAL AND MECHANICAL DRAWINGS. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE.
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE (NEC.)
- ALL ELECTRICAL EQUIPMENT AND LUMINARIES SHALL BE GROUNDED IN ACCORDANCE WITH ARTICLE 250 OF THE NEC.
- THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, SERVICES AND RELATED ACCESSORIES NEEDED FOR THE COMPLETE INSTALLATION OF ALL WORK SHOWN ON THE DRAWINGS AND REQUIRED BY CODE.
- COORDINATE ALL WORK WITH OTHER TRADES. PROVIDE A COORDINATION DRAWING TO THE ENGINEER, CONSTRUCTION MANAGER, AND ALL OTHER TRADES SHOWING THE LOCATION OF ALL DEVICES AND EQUIPMENT.
- THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY POWER AND LIGHTING DURING ALL PHASES OF THE WORK.
- PROVIDE POWER TO ALL HEAT PUMP LOCATIONS FOR HVAC CONTROLS.
- ALL INSTALLATIONS SHALL BE AS DICTATED IN PROJECT SPECIFICATIONS.
- PRIOR TO BID, COORDINATE WITH HVAC CONTROLS CONTRACTOR ALL POWER REQUIREMENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL 120V AND ABOVE CIRCUITS FOR CONTROLS.
- COORDINATE ALL FLOOR OUTLET LOCATIONS WITH ARCHITECTURAL DRAWINGS.
- COORDINATE ALL SWITCH AND RECEPTACLE LOCATIONS AND ORIENTATIONS WITH ARCHITECTURAL DRAWINGS.
- ELEVATIONS SHALL REFERENCE ARCHITECTURAL DRAWINGS FOR ALL DEVICES INCLUDING BUT NOT LIMITED TO, SWITCHES, RECEPTACLES, LIGHT FIXTURES, FIRE ALARM, DATA/COMMUNICATION DEVICES.
- ALL AREAS SPECIFIED IN NEC ARTICLE 210.52, ALL 125V 15A AND 20A RECEPTACLES ARE TO BE TAMPER RESISTANT.
- ALL EXTERIOR ELECTRICAL DEVICES ARE TO BE WEATHER PROOF.
- PROVIDE DISCONNECT SWITCHES FOR ALL EQUIPMENT IN MECHANICAL ROOM.
- SMOKE ALARMS TO BE INTERCONNECTED (HARD-WIRED).



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ELECTRICAL SYMBOLS AND NOTES

E-001

Solar Decathlon Electrical Service Calculations						
<u>Lighting Load Calculations:</u>						
		Floor	Sq.Ft	Watts	NEC Code	Applicable Demand
		Living Space	800	2400	3W/sq.ft	NEC 220.12
	Total	Sq.Ft	Amps	Voltage	Watts	
		800	10.00	240	2400	
				Watts		
		Demand		2400	100%	NEC 220.42
		Total		2400		
<u>Mechanical Equipment:</u>						
			Amps	Voltage	Watts	
		ERV	6	120	540	NEC 220.53 75% Demand
		Heat Pump	20	240	4800	
		Dom. Pump	9.2	120	828	NEC 220.53 75% Demand
		Fire Pump	8.6	240	1548	NEC 220.53 75% Demand
		Water Heater	20	240	3600	NEC 220.53 75% Demand
		Solar Pack	2	120	180	NEC 220.53 75% Demand
		Total	65.8	240	11496	
<u>Appliances:</u>						
	Quantity	Appliance	Amps	Voltage	Watts	
	1	Kitchen Hood	4	120	360	NEC 220.53 75% Demand
	1	Refrigerator	15	120	1350	NEC 220.53 75% Demand
	1	Induction Cooktop	40	240	9600	Not Counted
	1	Oven	30	240	7200	Not Counted
		Combined Ranges	46	240	11000	NEC 220.55 Column C
	1	Washer	9	120	810	NEC 220.53 75% Demand
	1	Dryer	15	120	1800	NEC 220.54
	1	Dishwasher	12	120	1080	NEC 220.53 75% Demand
	1	Microwave	12.5	120	1125	NEC 220.53 75% Demand
		Total	73	240	17525	
	Totals		Amps	Voltage	Watts	
		Mechanical	NA	NA	11496	
		Appliances	NA	NA	17525	
		General Lighting	NA	NA	2400	
		Total	130.920833	240	31421	
		Service	Triplex	Conduit		
		200A-240V, Single Phase Service	AL #250 XHHW-2	2 1/2"		
			NEC Table 310.15	NEC Table C.1	Vermont Utility Code Section 507	

A4 ELECTRICAL SERVICE CALCULATIONS

3/8" = 1'-0"



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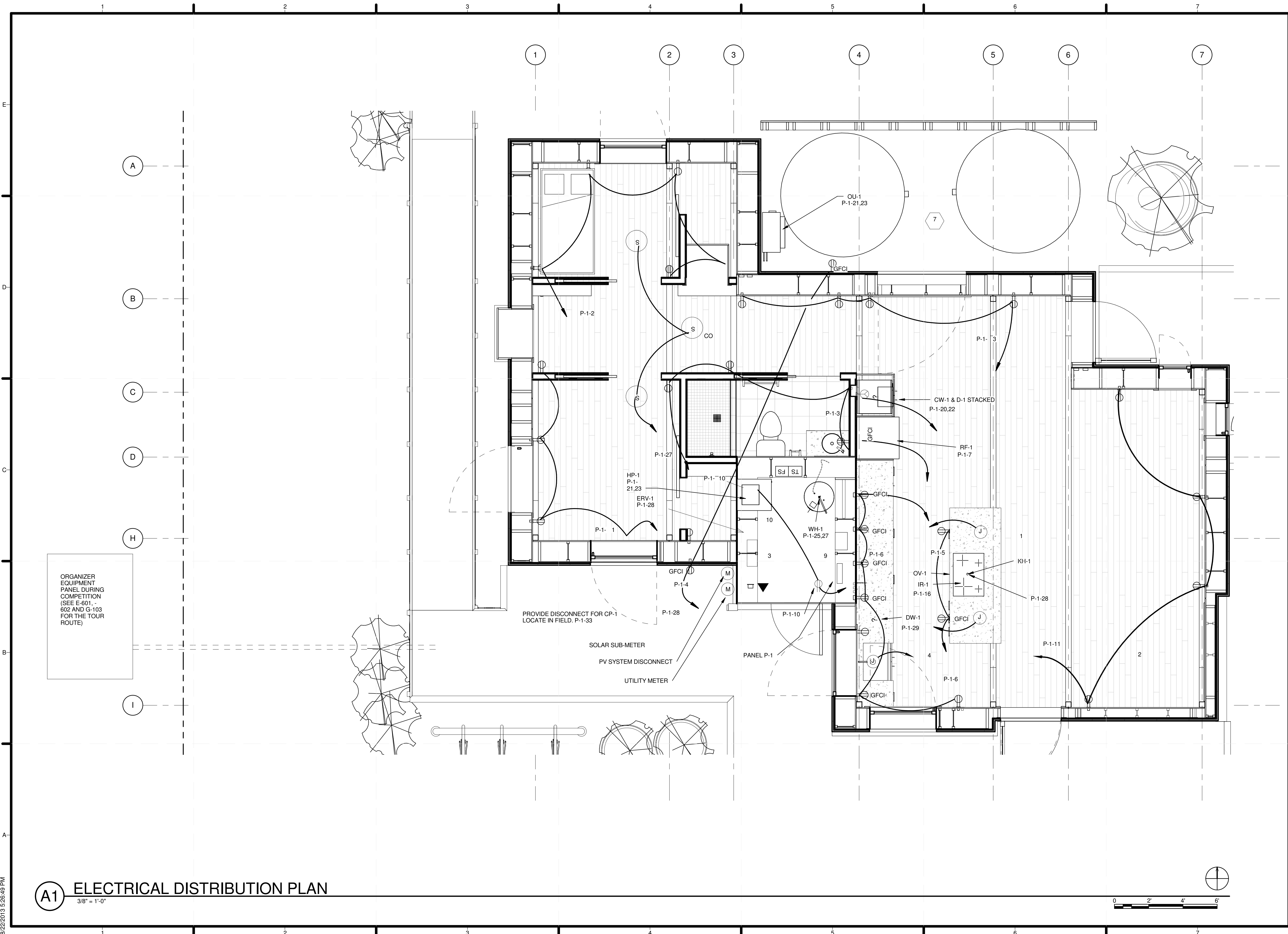
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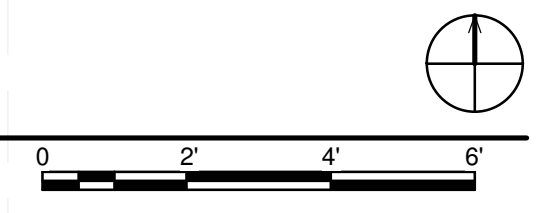
ELECTRICAL  
 DISTRIBUTION PLAN

E-101

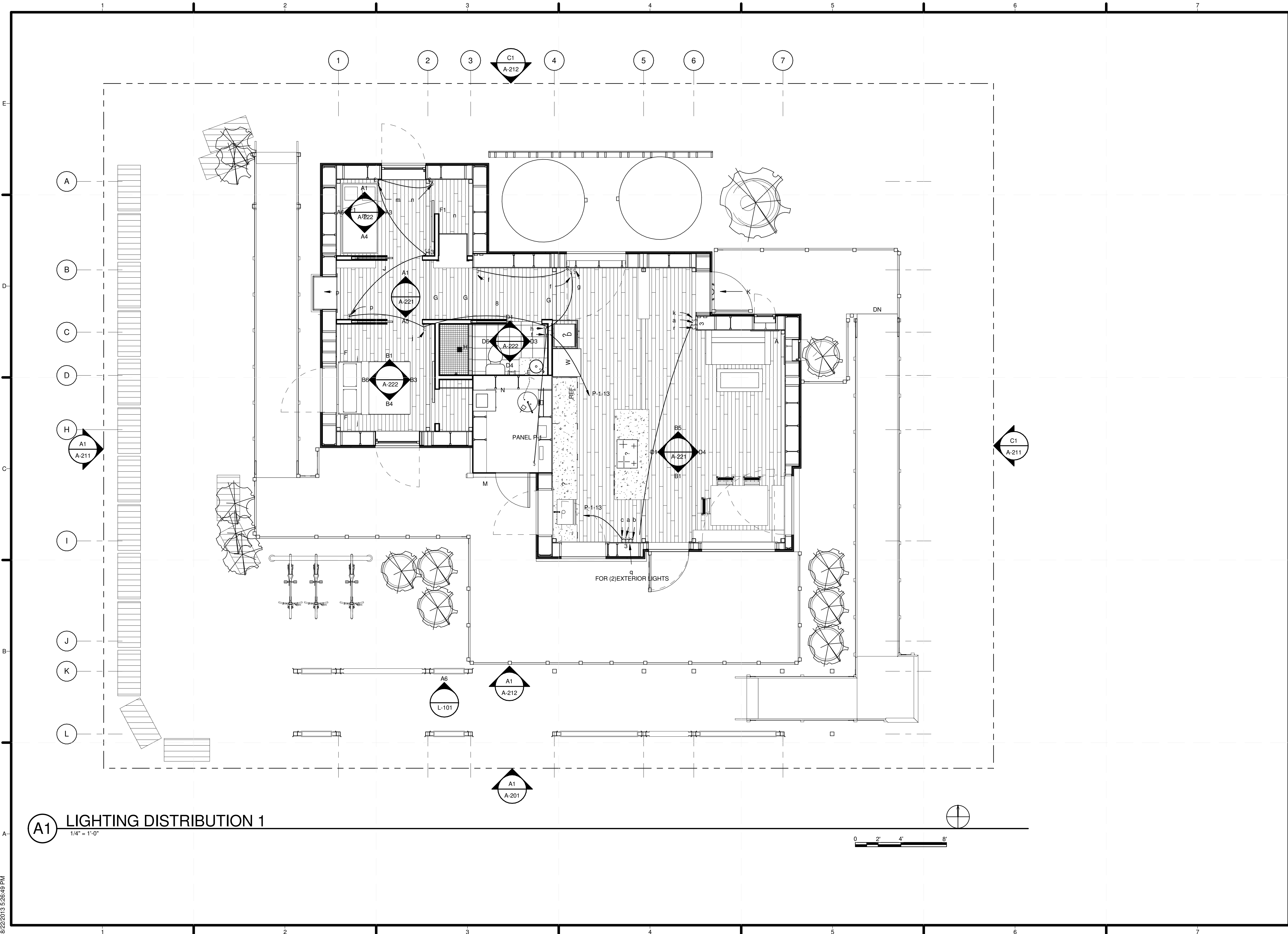


ORGANIZER  
 EQUIPMENT  
 PANEL DURING  
 COMPETITION  
 (SEE E-601, -  
 602 AND G-103  
 FOR THE TOUR  
 ROUTE)

**A1** ELECTRICAL DISTRIBUTION PLAN



8/22/2013 5:26:49 PM



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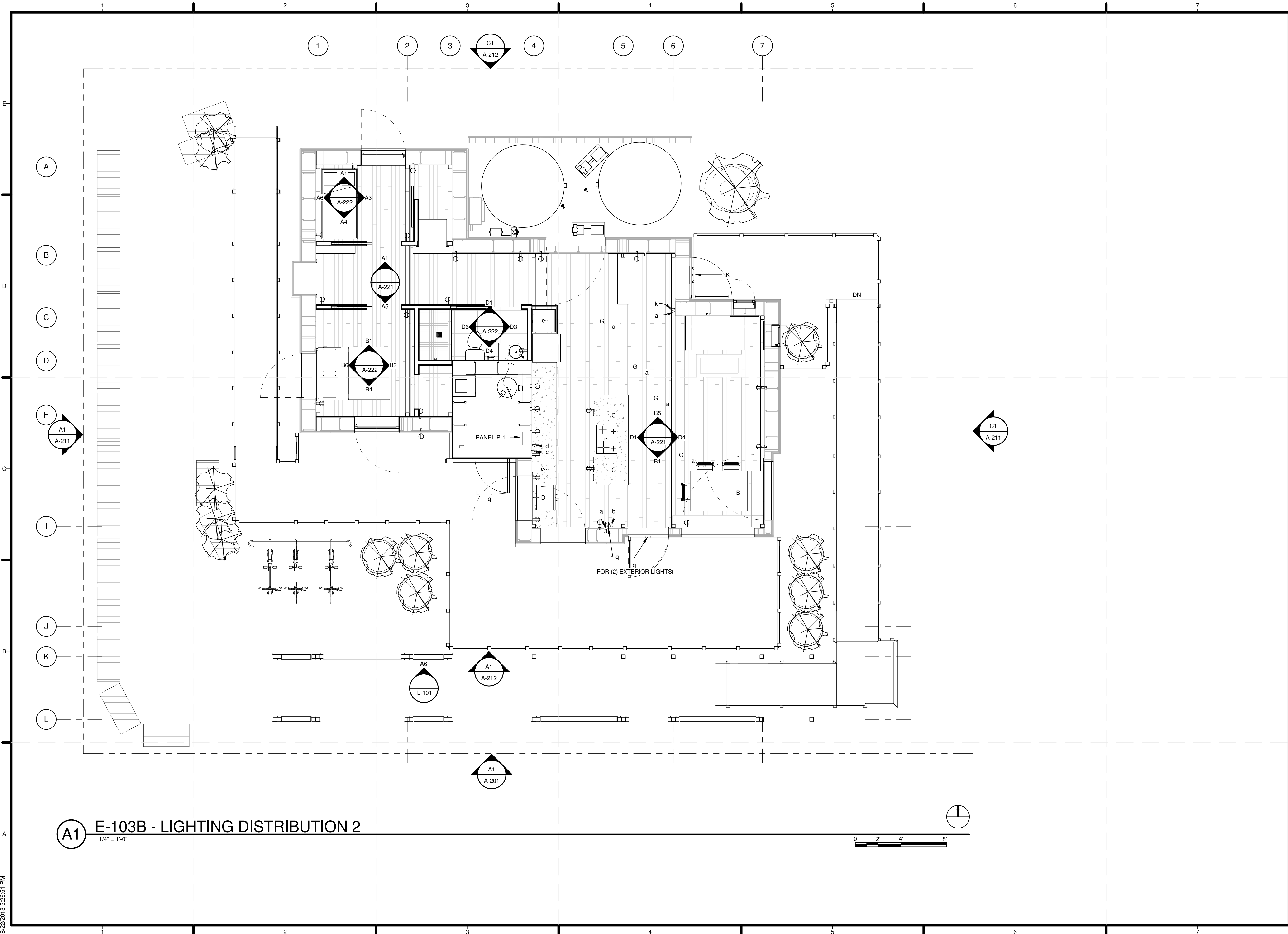
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**LIGHTING PLAN 1**

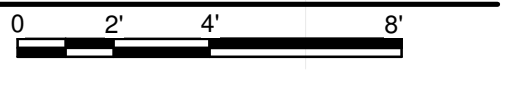
**E-102**

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**A1** E-103B - LIGHTING DISTRIBUTION 2  
1/4" = 1'-0"



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**LIGHTING PLAN 2**

**E-103**

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**GENERAL SHEET NOTES**

1. MAIN CIRCUIT BREAKER BOARD IS TO BE LOCATED IN THE MECHANICAL CHIMNEY. THE DIMENSIONS OF THIS ELEMENT IS THE FOLLOWING - W:14" x H:43.4" x D:3.8"
2. ORGANIZER EQUIPMENT TO BE LOCATED ABOVE THE ELECTRICAL MAIN BREAKER IN THE MECHANICAL ROOM. IF NEEDED, EXTRA SPACE IS AVAILABLE TO THE LEFT OF THE BREAKER BOX.
3. AURORA 6000 PV INVERTER
4. THE CLEARANCE FOR MAIN BREAKER BOARD FOLLOWS NEC 110.26 CLEARANCE REQUIREMENTS. PANEL BOARD SHALL HAVE 30 INCHES OF WORKING SPACE AND 90 DEGREE SPACING FOR HINGED ACCESS DOOR
- 5.



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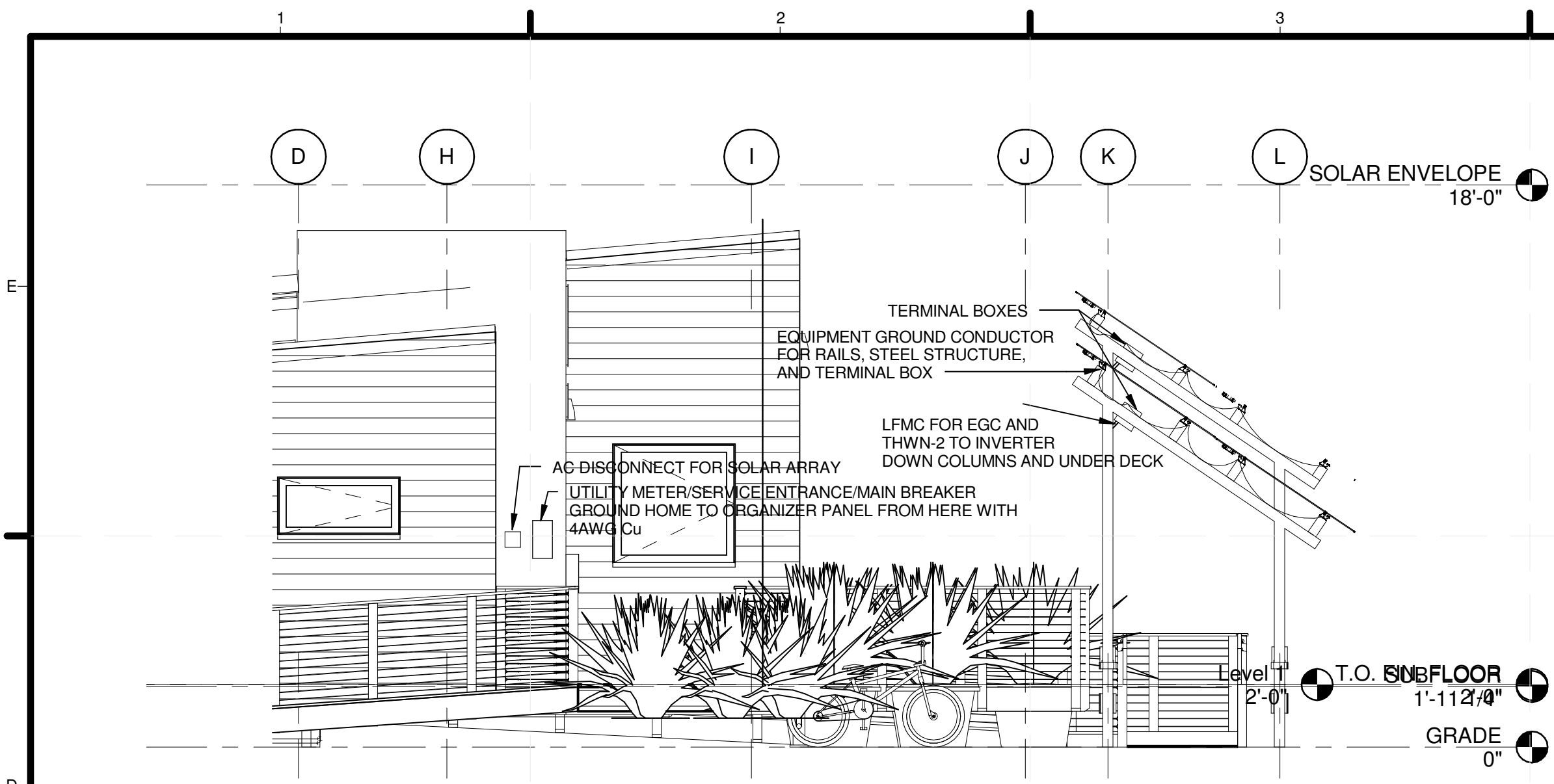


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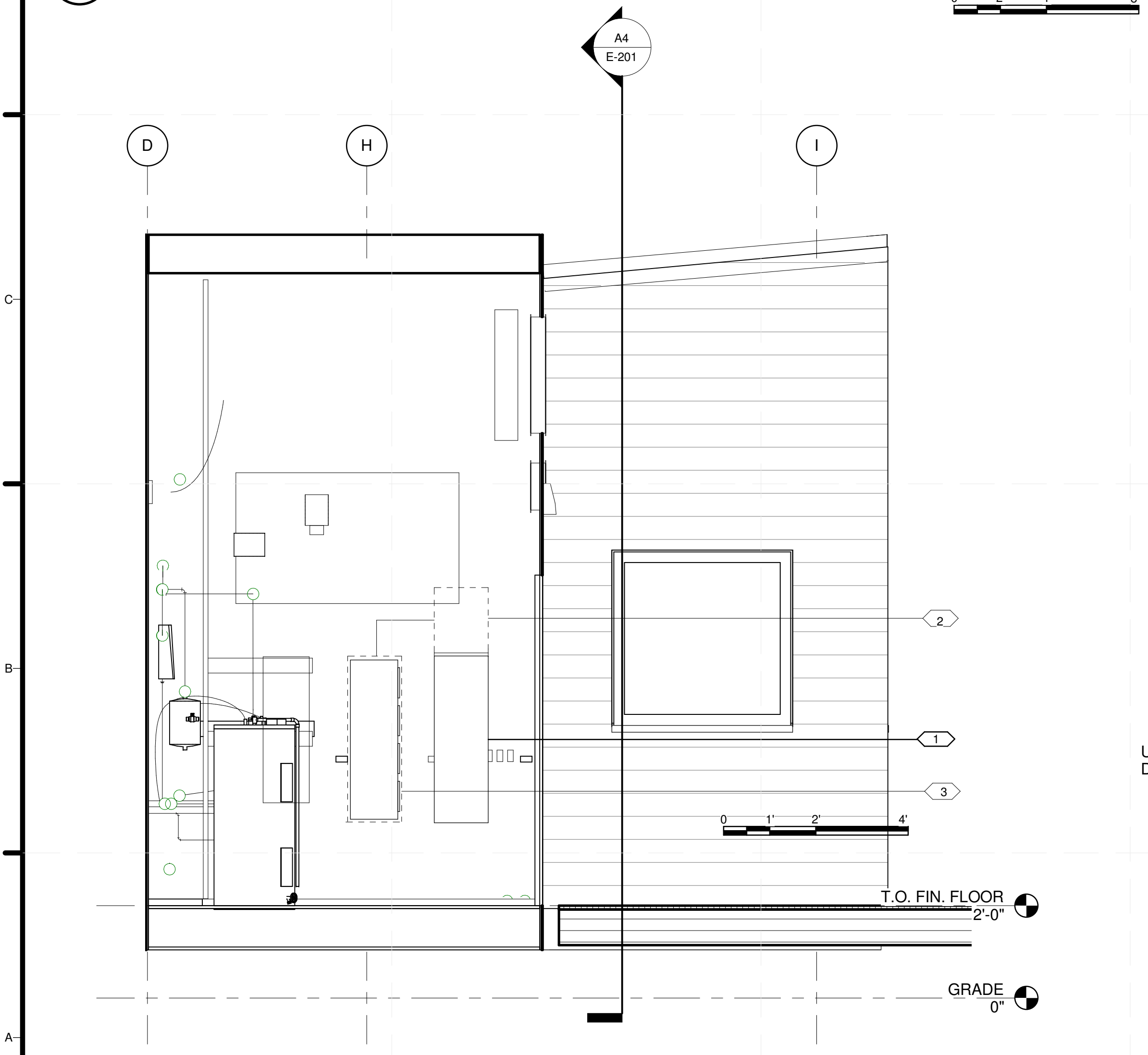
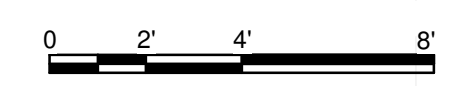
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**ELECTRICAL EQUIPMENT ELEVATIONS**

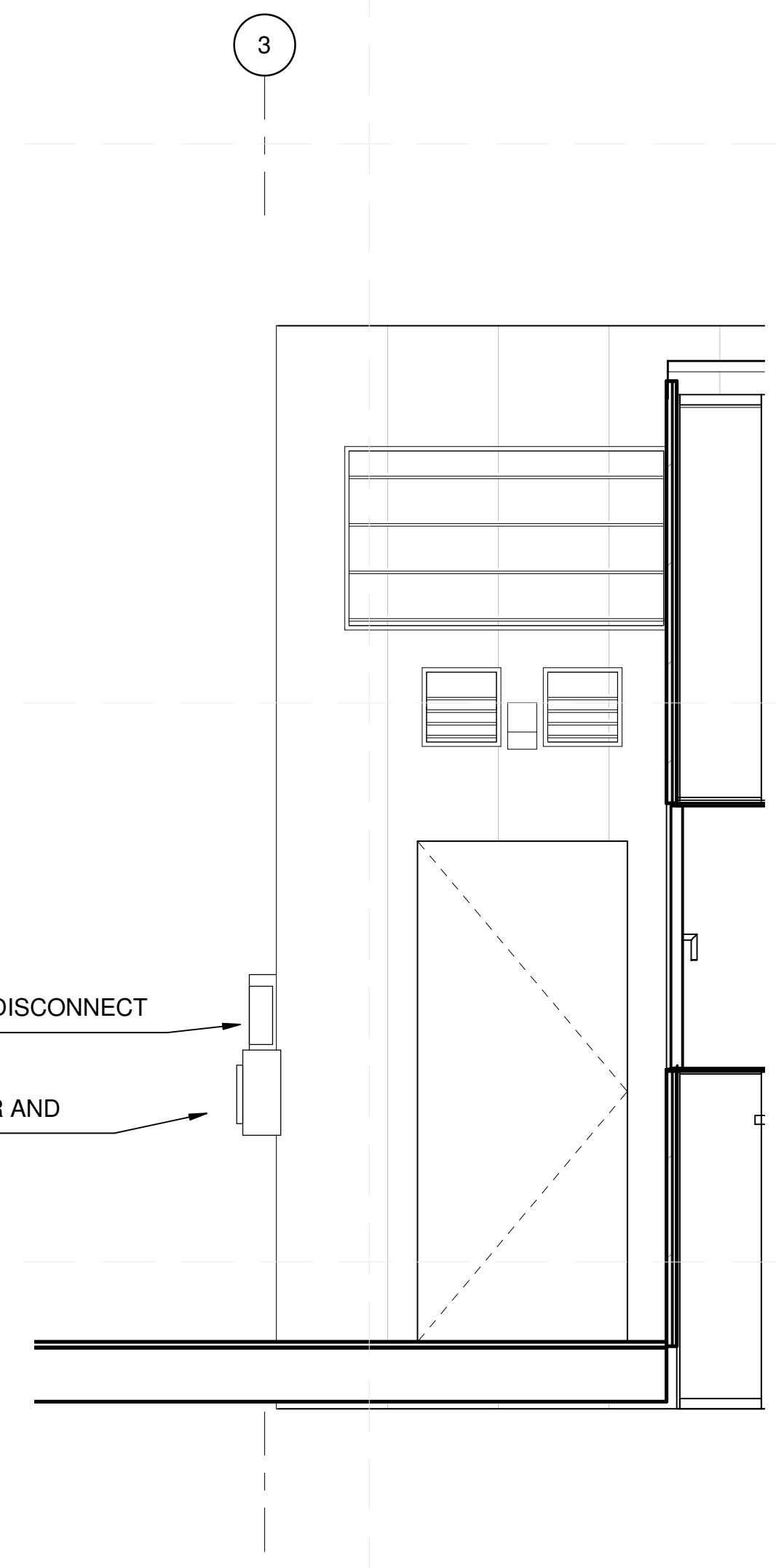
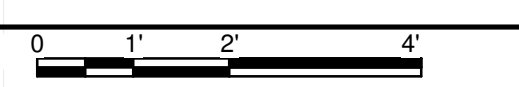
**E-201**



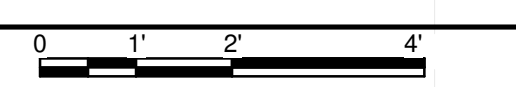
**(D1) WESTERN EXTERIOR ELECTRICAL ELEVATION**  
 1/4" = 1'-0"



**(A1) ELECTRICAL EQUIPMENT ELEVATION**  
 1/2" = 1'-0"



**(A4) METER HOUSING**  
 1/2" = 1'-0"





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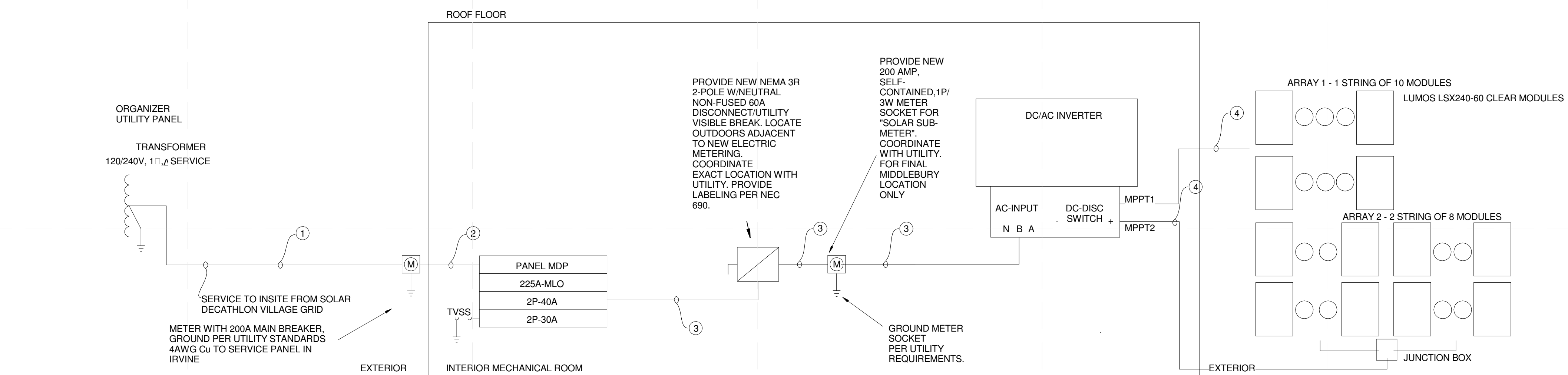
SHEET TITLE

ELECTRICAL  
 DISTRIBUTION  
 DIAGRAMS

E-601

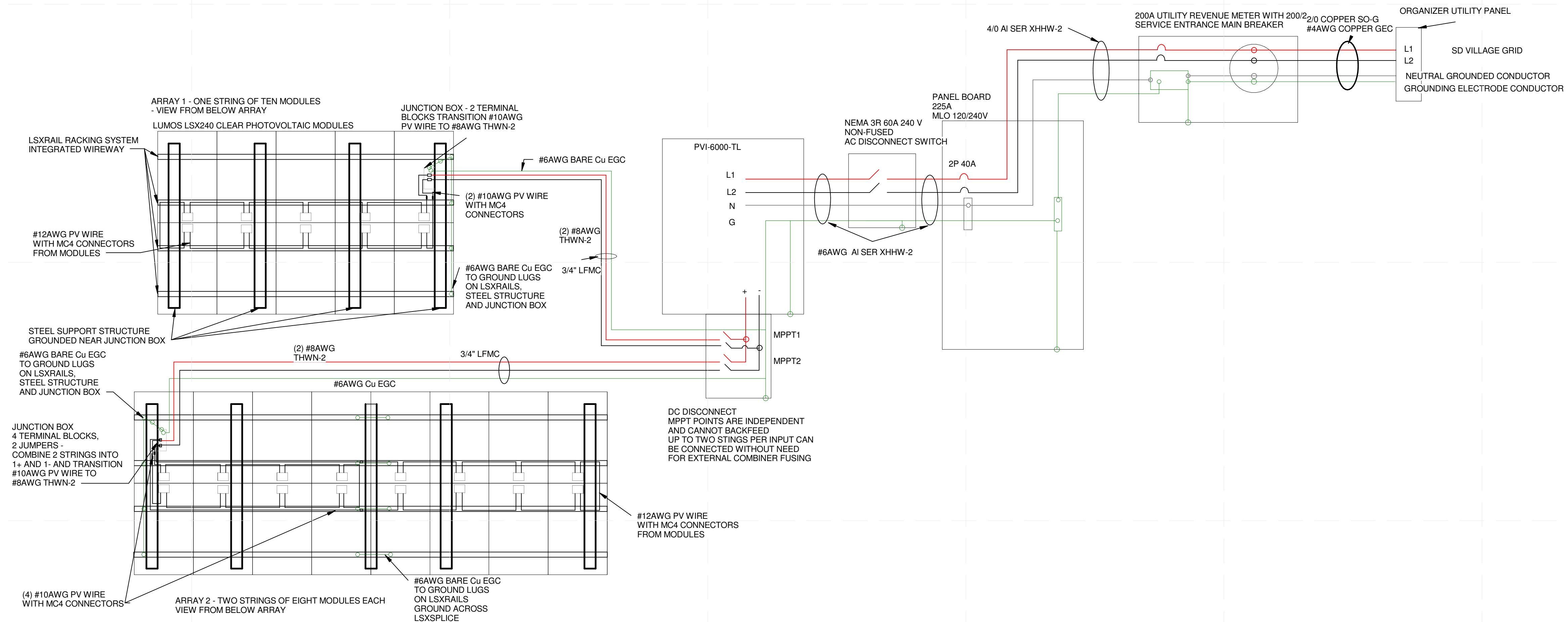
D1 ONE-LINE DIAGRAM

1/4" = 1'-0"



A1 THREE-LINE DIAGRAM

1/2" = 1'-0"



TAG	CONDUIT/CABLE	CONDUCTORS	NEUTRAL	GROUND	AMPACITY	NOTES
①	20 SO-G	(2) 20 Cu	(1) 20 Cu	(1) #14AWG Cu	150 AMPS	1
②	40 SER	(2) 40 Al	(1) 40 AL	(1) 20 AL	150 AMPS	-
③	#14AWG SER	(2) #14 Al	(1) #14AWG Al	(1) #14AWG Al	40 AMPS	-
④	3" LFM	(2) #8 Cu	-	(2) #14AWG Cu	15 AMPS	-

NOTES:  
1. SERVICE ENTRANCE.

ELECTRICAL PANEL SCHEDULE: PANEL P1		VOLTAGE: 120/240V		NEUTRAL: COPPER		LOCATION: SEE DRAWINGS		FED FROM: SEE ONELINE	
AMPERAGE:	225A	NEUTRAL RATING:	100%	MAKE:	GE	225 AMP	42-SPACE	42-CIRCUIT	MAIN BREAKER
INTERRUPTANCE:	22 KAIC	MAIN TYPE:	M.L.O.	MODEL NUMBER:	TM4222CCU				
PHASE:	1PH	MAIN RATING:	225A	MOUNTING:	SURFACE				
WIRE:	3W	TRIM STYLE:	HINGED DOOR IN DOOR						

LOAD DESCRIPTION	CKT. BKR.	A			CKT. NO.	B			CKT. BKR.	LOAD DESCRIPTION
		A	B	C		A	B	C		
MASTER BEDROOM RECEPTACLES	1P-20A				1	2			1P-20A	SECOND BEDROOM RECEPTACLES
HALLWAY RECEPTACLES	1P-20A				3	4			1P-20A	EXTERIOR RECEPTACLES (SP-1)
KITCHEN ISLAND RECEPTACLES	1P-20A				5	6			1P-20A	KITCHEN COUNTER RECEPTACLES
REFRIGERATOR (RF-1)	1P-20A				7	8			1P-20A	BATHROOM RECEPTACLE
SPARE	1P-20A				9	10			1P-20A	MECH ROOM/CTRL CAB/WATER METER
LIVING ROOM RECEPTACLES	1P-20A				11	12			1P-20A	SPARE
EASTERN AREA LIGHTING	1P-20A				13	14			1P-20A	WESTERN AREA LIGHTING
SPARE (DW-1)	1P-20A				15	16			2P-40A	INDUCTION RANGE (IR-1)
COOK TOP	2P-30A				17	18			-	-
HEAT PUMP SPLIT SYSTEM (OU-1) (HP-1)	2P-20A				19	20			2P-30A	CLOTHES WASHER/DRYER (CD-1)
WATER HEATER TANK	2P-30A				21	22			-	-
DISHWASHER	DW-1	1P-15A			23	24			2P-30A	AMP METER (WH-1)
FIRE PROTECTION PUMP	2P-30A				25	26			1P-20A	HOOD & MECH ROOM
HEAT PUMP CONDENSER UNIT	OU-1	1P-20A			27	28			1P-15A	KITCHEN HOOD (KH-1)
SPARE	2P-30A				29	30			1P-20A	KITCHEN COUNTER RECEPTACLE
					31	32			2P-60A	ECOSMART WATER HEATER (WH-2)
					33	34			-	-
					35	36			1P-20A	KITCHEN GFCI
					37	38			2P-40A	PV INVERTER FEED IN
					39	40			-	-
					41	42			-	-
TOTAL		0.0	0.0	0.0	0.0	0.0	0.0	0.0	TOTAL	

NOTES:  
1. NEUTRAL SHARING IS NOT PERMITTED. PROVIDE ONE NEUTRAL PER CIRCUIT.  
2. ARC FAULT INTERRUPTER BREAKERS (AFCI) FOR ALL NON-GFI RECEPTACLE CIRCUITS IN LIVING ROOM, BEDROOM, DINING ROOM AND CORRIDORS.  
3. TWO SPARE BREAKERS SHALL BE AFCI TYPE.  
4. EXACT NUMBER OF USED BREAKERS MAY VARY FROM SCHEDULE DEPENDING ON UNIT. COORDINATE WITH PLANS AND IN FIELD.

TAG	DESCRIPTION	MAKE & MODEL	LAMP(S)	ELEC.	REMARKS
(A)	MECH. ROOM WALL LIGHT	PHILIPS 17W LED A SHAPE	A12/ E26 BASE	120 V	FIXTURE TO BE MOUNTED ON WALL IN MECHANICAL ROOM. COORDINATE LOCATION WITH EQUIPMENT IN FIELD. OWNER TO SELECT FIXTURE.
(B)	PENDANT MOUNT DINING TABLE FIXTURE	GRAY PANTS MOON_18 SCRAPLIGHTS	(1) E26 BASE	120 V	COORDINATE FIXTURE MOUNTING WITH OWNER. COORDINATE DIMMING (FIXTURE AND SWITCH). MOUNT ON CEILING IN LOCATION SHOWN ON PLAN DRAWINGS.
(C)	PENDANT MOUNT KITCHEN FIXTURE	HAGEN LIGHTING ET2 E20263	(1) 3W LED	120 V	COORDINATE FIXTURE MOUNTING WITH OWNER. COORDINATE DIMMING (FIXTURE AND SWITCH). MOUNT ON CEILING IN LOCATION SHOWN ON PLAN DRAWINGS.
(D)	PENDANT MOUNT OVER KITCHEN SINK FIXTURE	SEA GULL 6519 PENDANT	(1) E26 BASE	120 V	COORDINATE FIXTURE MOUNTING WITH OWNER. COORDINATE DIMMING (FIXTURE AND SWITCH). MOUNT ON CEILING IN LOCATION SHOWN ON PLAN DRAWINGS.
(E)	BATHROOM VANITY WALL SCONCE	PLC WALL SCONCE PLC 7530	(2) A19 BULBS	120 V	COORDINATE FIXTURE MOUNTING WITH OWNER. COORDINATE DIMMING (FIXTURE AND SWITCH). MOUNT ON WALL IN LOCATION SHOWN ON PLAN DRAWINGS.
(F)	MASTER BEDROOM WALL SCONCE	COSTANZINA WALL LIGHT	E12 BULB	120 V	COORDINATE FIXTURE MOUNTING WITH OWNER. COORDINATE DIMMING (FIXTURE AND SWITCH). MOUNT ON WALL IN LOCATION SHOWN ON PLAN DRAWINGS.
(G)	KIDS BEDROOM LED STRIP LIGHTS	ELEMENTAL LED EL-BULK100HD	3W PER FT.	120 V	COORDINATE FIXTURE MOUNTING WITH OWNER. COORDINATE DIMMING (FIXTURE AND SWITCH). MOUNT ON WALL IN LOCATION SHOWN ON PLAN DRAWINGS.
(H)	BEAM MOUNTED LED STRIP LIGHTS	ELEMENTAL LED EL-BULK100HD	.3W PER FT.	120 V	CONNECTS TO 12V DIMMER DRIVER. COORDINATE DIMMING (FIXTURE AND SWITCH). MOUNT ON CEILING IN LOCATION SHOW ON PLAN DRAWINGS.
(K)	OVER SHOWER BEAM MOUNTED LED STRIP LIGHT	WATERPROOF FLEXIBLE LED EL-IMGWPRB12VSP-WW	3W PER FT	120 V	CONNECT TO 12V DIMMER DRIVER WITHIN THE MECHANICAL CHIMNEY. CHASE WIRE THROUGH MASTER CLOSET TO THE BATHROOM SHOWER VIA APPROPRIATE WAY. COORDINATE DIMMING (FIXTURE AND SWITCH).
(L)	EXTERIOR WALL MOUNTED ENTRY LIGHT FIXTURE	6" CORD MOUNT CYLINDER	(1) A19 BULB	120 V	COORDINATE FIXTURE WITH OWNER. COORDINATE DIMMING (FIXTURE AND SWITCH). MOUNT ON EXTERIOR WALL IN LOCATION SHOW ON PLAN DRAWINGS.
(M)	EXTERIOR WALL MOUNTED DECK LIGHT FIXTURE	ACCESS LIGHTING 20337MG	(1) 13W CFL	120 V	COORDINATE FIXTURE WITH OWNER. COORDINATE DIMMING (FIXTURE AND SWITCH). MOUNT ON EXTERIOR WALL IN LOCATION SHOW ON PLAN DRAWINGS.

LIGHTING NOTES:  
1. PROVIDE DRIVERS FOR LED FIXTURE. VERIFY DIMMERS ARE COMPATIBLE WITH DRIVER IF DIMMING FIXTURE IS UTILIZED.  
2. ALL FIXTURE COLORS AND TRIMS SHALL BE VERIFIED WITH OWNER.  
3. COORDINATE EXACT FIXTURE LOCATIONS IN THE FIELD.  
4. COORDINATE ALL LAMPING INCLUDING BULBS WITH OWNER. VERIFY IF LED BULBS ARE TO BE INSTALLED.

TAG	DESCRIPTION	MAKE/MODEL	HP	FLA	V	PH	CONDUCTORS	GROUND	BREAKER SIZE	NOTES:
(HP-1)	INDOOR HEAT PUMP UNIT	SEE MECHANICAL SCHEDULES DRAWING	-	1.5	240	1	2#12	1#12	15A	①
(OU-1)	OUTDOOR HEAT PUMP CONDENSING UNIT	SEE MECHANICAL SCHEDULES DRAWING	-	16.5	240	1	2#12	1#12	20A	①
(ERV-1)	ENERGY RECOVERY VENTILATOR	SEE MECHANICAL SCHEDULES DRAWING	-	6.0	120	1	2#12	1#12	20A	②
(WH-1)	ELECTRIC HOT WATER HEATER	SEE MECHANICAL SCHEDULES DRAWING	-	-	240	1	2#10	1#10	30A	③
(WH-2)	ELECTRIC TANKLESS WATER HEATER	SEE MECHANICAL SCHEDULES DRAWING	-	5	120	1	2#12	1#6	60A	④
(SP-1)	GRAY WATER SUMP PUMP	SEE PLUMBING SCHEDULES DRAWING	1/3	4.1	120	1	2#12	1#12	20A	⑤
(KH-1)	ISLAND KITCHEN EXHAUST HOOD	SEE MECHANICAL SCHEDULES DRAWING	-	4.0	120	1	2#12	1#12	15A	⑥
(DP-1)	DOMESTIC WATER SUPPLY PUMP	SEE PLUMBING SCHEDULES DRAWING	0.79	7.2	120	1	2#12	1#10	20A	⑦
(CD-1)	CLOTHES DRYER	FRIGIDAIRE FAQE7001LW	-	24	240	1	2#10	1#10	30A	
(CW-1)	CLOTHES WASHER	FRIGIDAIRE FAFW3801LW	-	9	120	1	2#12	1#12	20A	
(RF-1)	REFRIGERATOR	WHIRLPOOL WRT359SFB	-	-	120	1	2#12	1#12	20A	
(IR-1)	ISLAND INDUCTION RANGE	BOSCH NIT306SUC	-	30	240	1	2#8	1#10	40A	⑧
(OV-1)	ISLAND UNDER COUNTER OVEN	BOSCH HBN9450UC	-	25	240	1	2#10	1#10	30A	⑧
(DW-1)	DISHWASHER	BOSCH SHX3AR75UC	-	12	120	1	2#12	1#12	20A	⑨
(CP-1)	CIRCULATOR PUMP	SEE MECHANICAL SCHEDULES	-	-	120	1	2#12	1#12	20A	⑩

SCHEDULE NOTES:  
1. HEAT PUMP INDOOR FAN COIL UNIT AND OUTDOOR CONDENSING UNIT ARE POWERED FROM THE SAME CIRCUIT. POWER IS SPLIT TO INDOOR UNIT AND OUTDOOR UNIT WITH A DISCONNECT SWITCH PROVIDED FOR EACH. PROVIDE A 240V, 20A DISCONNECT SWITCH RATED FOR EXTERIOR APPLICATIONS FOR THE OUTDOOR UNIT.  
2. ENERGY RECOVERY VENTILATOR HAS CORD. PROVIDE WITH LOCAL DISCONNECT SWITCH TO DISABLE UNIT.  
3. HOT WATER HEATER IS TO HAVE (1) 4500W BACKUP ELEMENT. PROVIDE POWER FOR ELECTRIC WATER HEATER AND INSTALL DISCONNECT SWITCH ON WALL ADJACENT TO HEATER.  
4. FASTEN AND TIGHTEN WIRES. MAKE SURE SYSTEM IS FLUSHED OF WATER BEFORE TURNED ON.  
5. SUMP PUMP SP-1 IS TO CONNECT PLUG INTO OUTDOOR RECEPTACLE. SP-2 IS TO PLUG INTO OUTLET UNDERNEATH KITCHEN SINK.  
6. KITCHEN ISLAND HOOD IS TO BE FED FROM AN OVERHEAD JUNCTION BOX. CONNECT POWER AS PER MANUFACTURER'S RECOMMENDATIONS.  
7. PROVIDE LOCAL OUTDOOR DISCONNECT SWITCHES FOR DP-1. PROVIDE RECEPTACLE FOR DP-1.  
8. ISLAND RANGE AND ISLAND OVEN ARE TO CONNECT INTO JUNCTION BOXES IN ISLAND. COORDINATION EXACT LOCATION IN FIELD.  
9. CONNECT DISHWASHER INTO JUNCTION BOX LOCATED BEHIND UNIT UNDER CABINETS.  
10. PROVIDE DISCONNECT FOR PUMP CP-1.



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SHEET TITLE  
**ELECTRICAL SCHEDULES**

**E-602**

**Current Carrying Conductor Sizing**

Current:  $(8.62A=I_{sc})(1.25) = 10.775A$  max  $I_{sc}$  per string (NEC 2011 690.8(A)(1))  
Array 1 is one string of 10 solar modules  
Array 2 is two strings of 8 solar modules each

75° C ambient temperature = 0.5 derate factor for 90° C rated conductor (NEC Table 310.15(B))

(2)(a)  
Conduit Fill Adjustment (NEC Table 310.15(B)(3)(a):  
Fewer than 4 conductors = no adjustment factor

**Conductor Sizing**

#8AWG:  $55A \times .5 = 27.5A > 10.775A$   
#10AWG:  $40A \times .5 = 20A > 10.775A$   
#12AWG:  $30A \times .5 = 15A > 10.775A$   
Can use #12AWG and larger

**Voltage Drop Calculations**

$$V_d = \left( \frac{I \times 2 \times d}{1000ft} \right) \times \left( R \frac{\Omega}{kft} \right)$$

$$\%V_{drop} = \left( \frac{V_d}{V_{nom}} \right) \times 100\%$$

I = 8.62A

d = 50ft

R #10AWG = 1.21 Ω/kft, R #8AWG = .764 Ω/kft

V<sub>nom</sub> = 24V per panel (String 1 = 240V, Strings 2, 3 = 192V)

**#10AWG Uncoated Copper**

$$V_d = \left( \frac{8.62A \times 2 \times 50ft}{1000ft} \right) \times \left( \frac{1.21\Omega}{kft} \right) = 1.043V$$

$$\%V_{drop} = \left( \frac{1.043V}{192V} \right) \times 100\% = .543\%$$

**#8AWG Uncoated Copper**

$$V_d = \left( \frac{8.62A \times 2 \times 50ft}{1000ft} \right) \times \left( \frac{0.764\Omega}{kft} \right) = 0.659V$$

$$\%V_{drop} = \left( \frac{0.659V}{192V} \right) \times 100\% = .343\%$$

Either #10AWG or #8AWG conductors adequately limit voltage drop

**Inverter Array Wiring Termination:** Pressure Clamp accepts #4AWG - #8AWG

**Conclusion:** Use **#8AWG THWN-2** to ensure minimal voltage drop, adequate overcurrent protection, and proper connection at inverter array wiring termination

**Equipment Grounding Conductor** (NEC 690.47(C), 250.120(C))

Use **#6AWG Bare Copper** so EGC does not need to be protected in a raceway

**Conduit Sizing** (NEC Annex Table C.1, Chapter 9 Table 5 & 8)

LFMC with three conductors  
Cross-Sectional Area of LFMC (NEC Chapter 9 Table 4)  
½" = 81mm<sup>2</sup> at 40% fill  
¾" = 140mm<sup>2</sup> at 40% fill  
1" = 226mm<sup>2</sup> at 40% fill

#6AWG Bare Copper Area = 17.09mm<sup>2</sup>  
#8AWG THWN-2 Area = 23.61mm<sup>2</sup> x 2 conductors = 47.22 mm<sup>2</sup>  
Total Area: 64.31mm<sup>2</sup>

**Conclusion:** Can use ½" LMFC, but use ¾" **LMFC** for ease of pull.

**Maximum Voltage** (NEC 690.7(A))

Middlebury, VT Record Low = -35.6°C  
Monocrystalline Silicon Module - Correction Factor = 1.25 (NEC Table 690.7)  
Adjusted voltage for lowest ambient temperature =  
rated open circuit voltage (Voc) x correction factor =  
37.0V x 1.25 = **46.25V**  
46.25V x 10 modules in the largest string = 462.5 max Voc < 600Vmax

**DC Disconnect Fuse Sizing** (PVI-6000-TL Technical Manual)

Max  $I_{sc}$  of Array: MPPT1 = 10.775A, MPPT2 = 21.55A  
Each MPPT is rated for up to 22A max  $I_{sc}$   
MPPTs are independent and cannot backfeed each other and up to four strings can be connected (two per input) without the need for external combiner fusing

**Inverter Output Circuit**

Circuit Sizing (NEC 690.8(B)(3))  
Max inverter output current = 28A AC (inverter specs)  
28A x 1.25 = 35A  
**40A Circuit Breaker** located opposite utility input, suitable for backfeed  
Use **#6AWG Aluminum SE-R XHHW-2** per NEC Table 310.15(B)(16)

**Panel Suitability:**

PV OCPD + Main OCPD ≤ 120% of service panel rating  
120% of service panel rating = 1.2 x 225A = 270A  
200A Main Utility Breaker in Utility Meter  
PV + 200A ≤ 270A  
PV ≤ 270A - 200A = 70A which can be provided by PV Array  
PV Array feeds **40A breaker in 200A Main Distribution Panel** (can expand by 30A in future) (NEC 2011 705.12(D))  
Panel Output Conductor (NEC Table 310.15(B)(16))  
Use **4/0 Aluminum SE-R XHHW-2**

**Grounding:**

Equipment Grounding Conductor: at least #8AWG Aluminum XHHW-2 for a 40A breaker per NEC 2011 Table 250.122, use **#6AWG Aluminum XHHW-2** in #6AWG Al SER  
Grounding Electrode Conductor: **2/0 Copper SO-G** from Service Panel to Utility Meter (NEC 2011 690.47(C), 250.166),  
minimum **#4AWG bare or insulated Copper** to Organizer Utility Panel (DOE Building Code Section 6-0) from Main Utility Meter



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SHEET TITLE  
**PHOTOVOLTAIC  
ELECTRICAL  
CALCULATIONS**

**E-801**

- GENERAL SHEET NOTES**
- CONTAINERS WILL ARRIVE 24 HOURS BEFORE COMPETITION AND WILL WAIT IN STAGING AREA UNTIL REQUIRED.
  - CONTAINERS WILL REMAIN IN STAGING AREA UNTIL REQUIRED FOR LOADING, THEN WILL RETURN THERE BEFORE DEPARTING FOR THE RAILYARD AS A GROUP.



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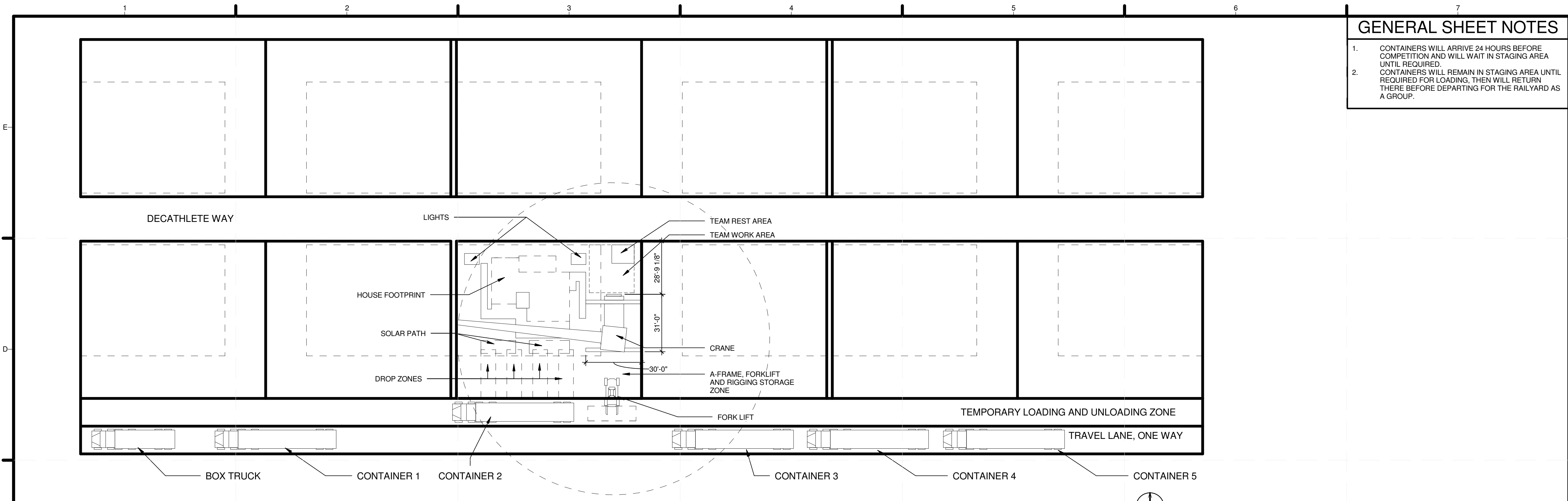


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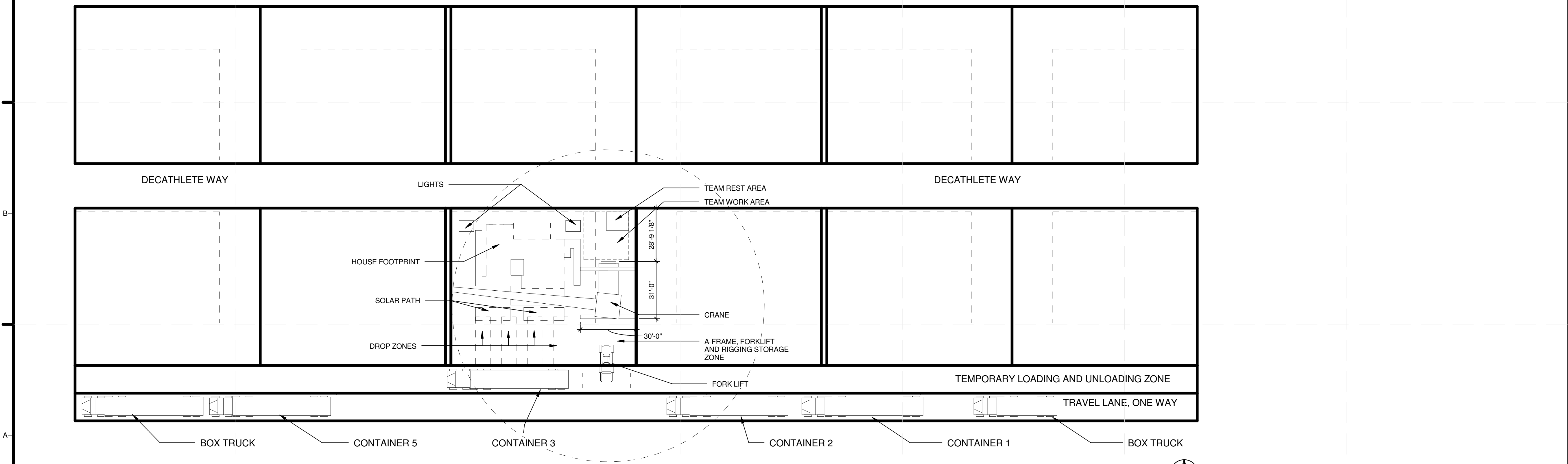
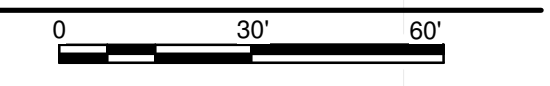
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**SHEET TITLE**  
 ARRIVAL AND DEPARTURE SEQUENCE PLANS

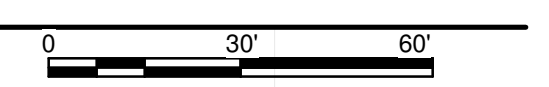
**O-101**



**(C1) ARRIVAL SEQUENCE**  
 1" = 30'-0"



**(A1) DEPARTURE SEQUENCE**  
 1" = 30'-0"



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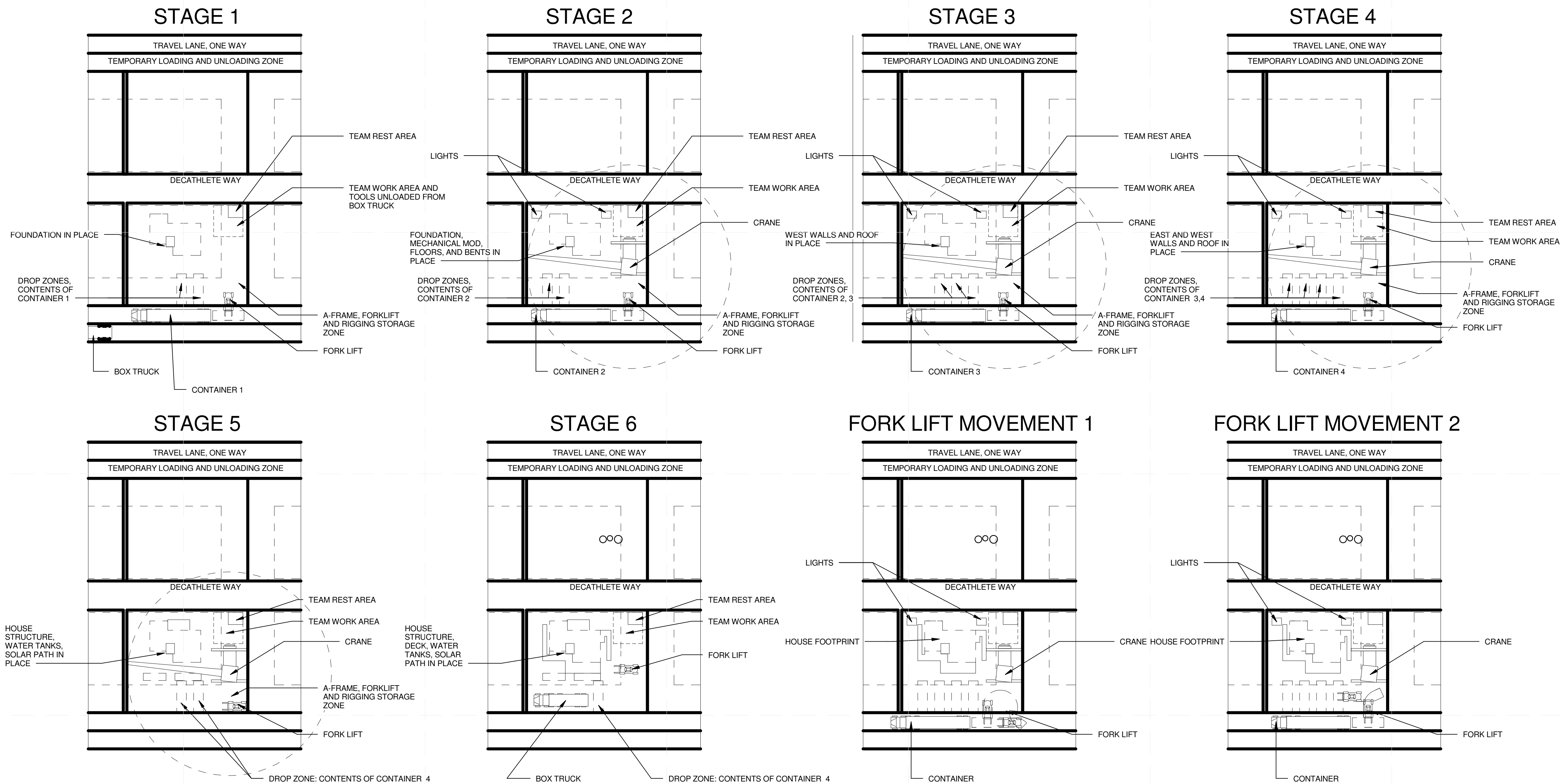
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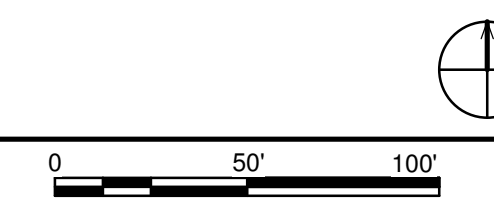
SHEET TITLE

ASSEMBLY SEQUENCE PLANS

O-102



A1 ASSEMBLY SEQUENCE PLANS  
1" = 50'-0"





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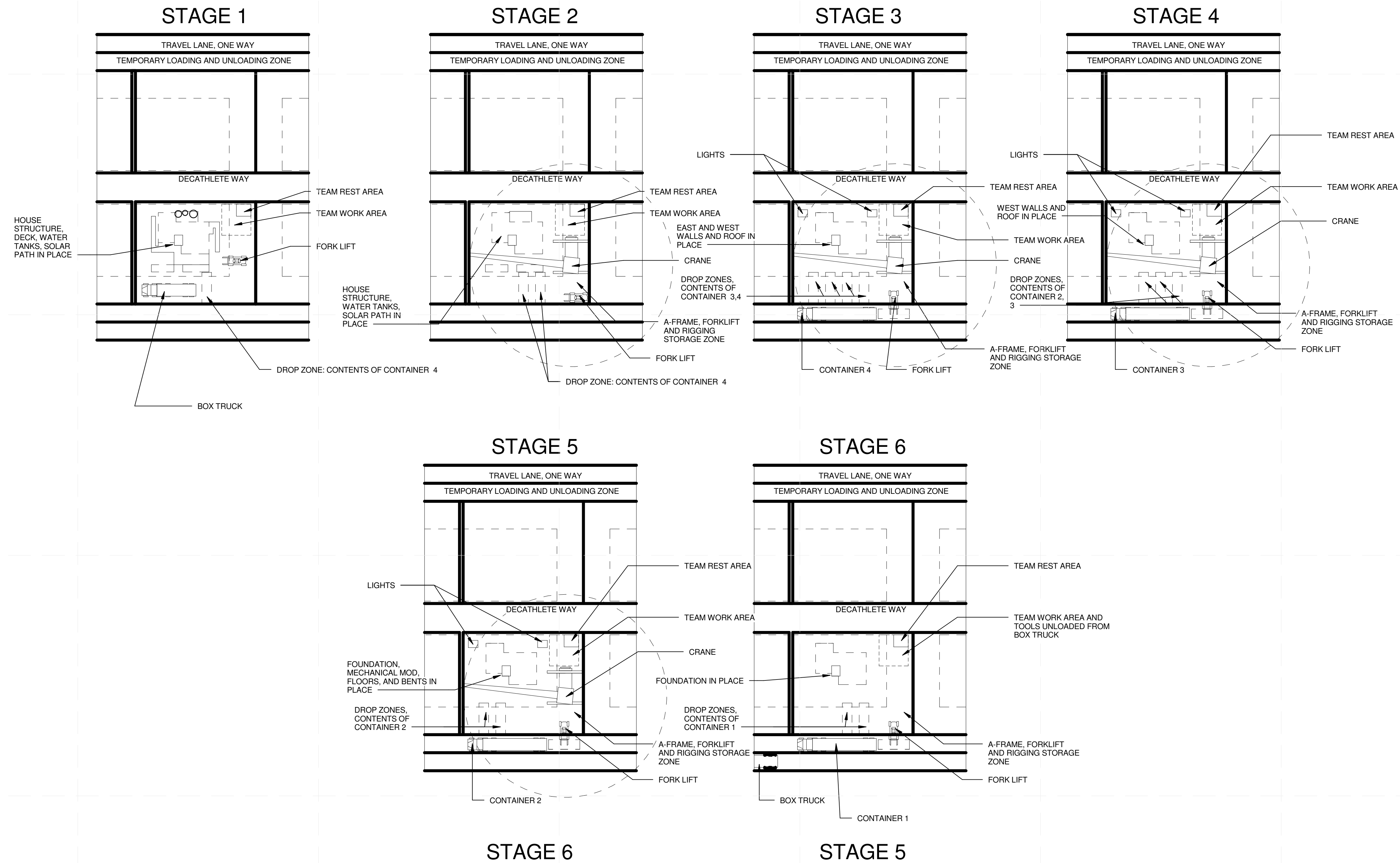
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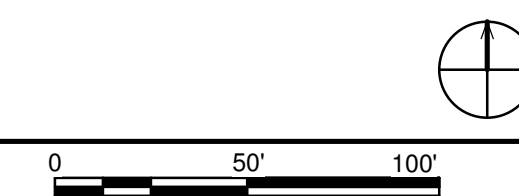
SHEET TITLE

DEPARTURE  
 SEQUENCE PLANS

O-103



**A1** DISASSEMBLY SEQUENCE PLANS  
 1" = 50'-0"



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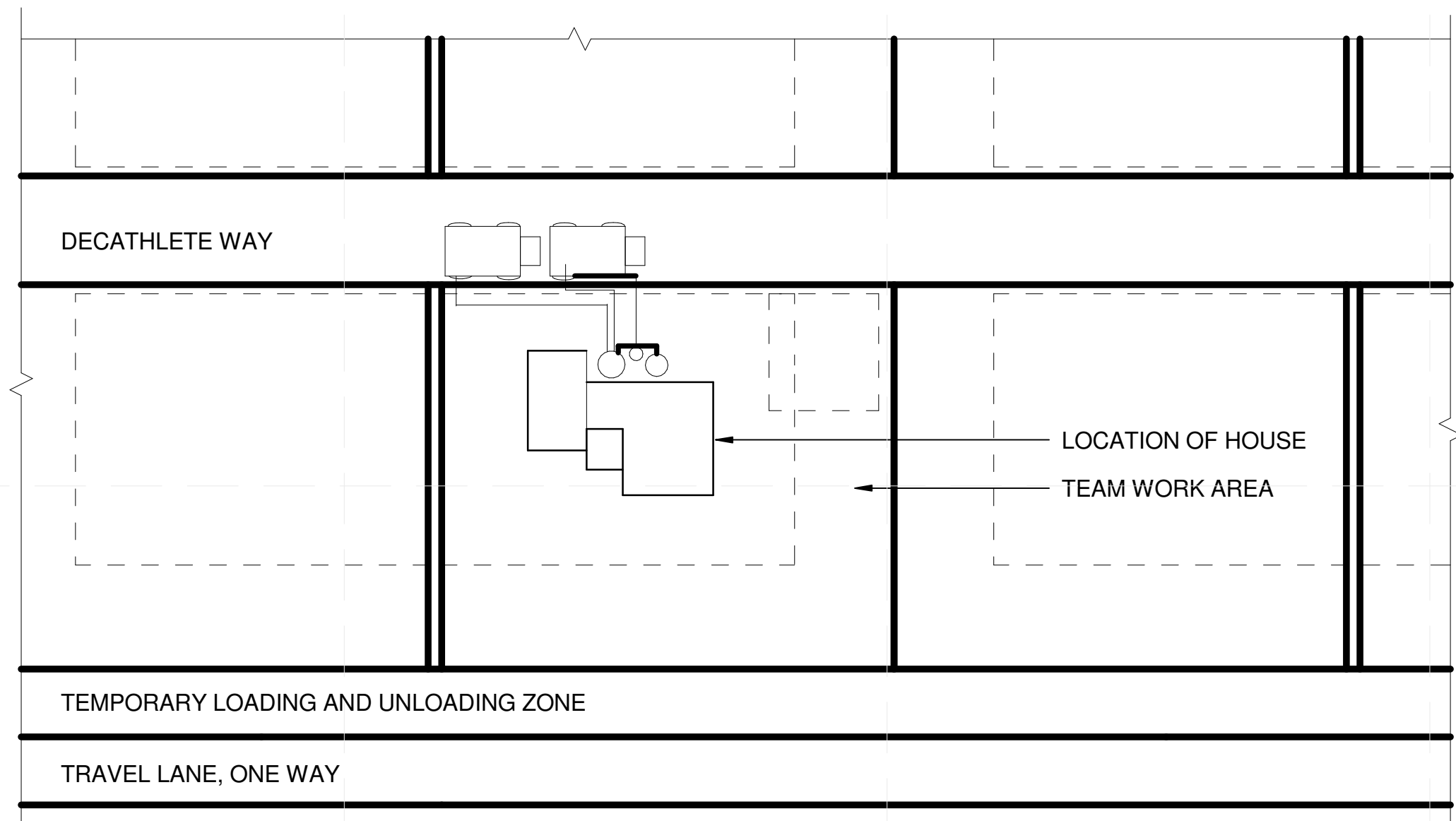
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SHEET TITLE  
**WATER DELIVERY/REMOVAL PLAN AND ELEVATIONS**

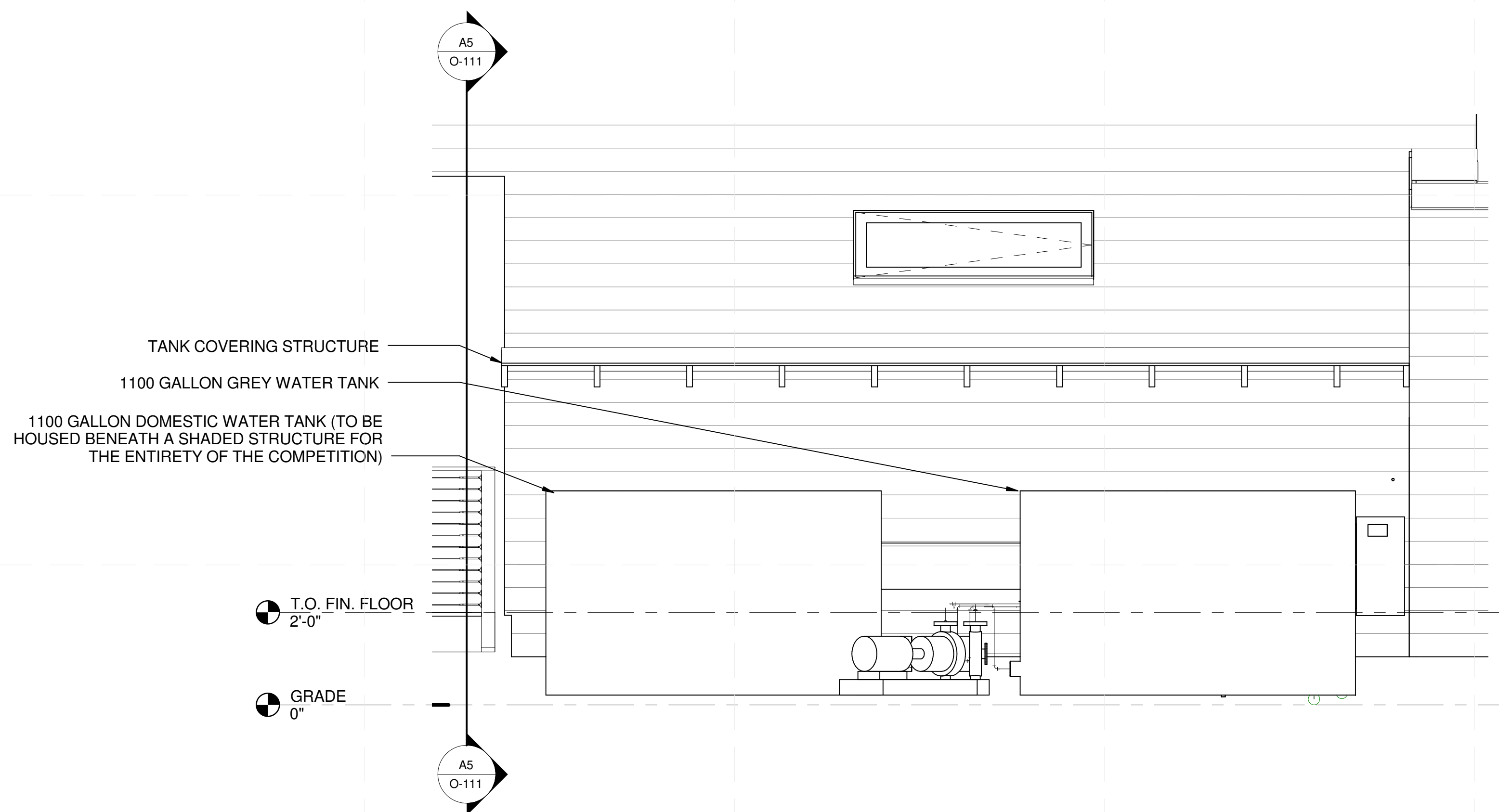
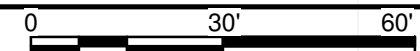
**O-111**



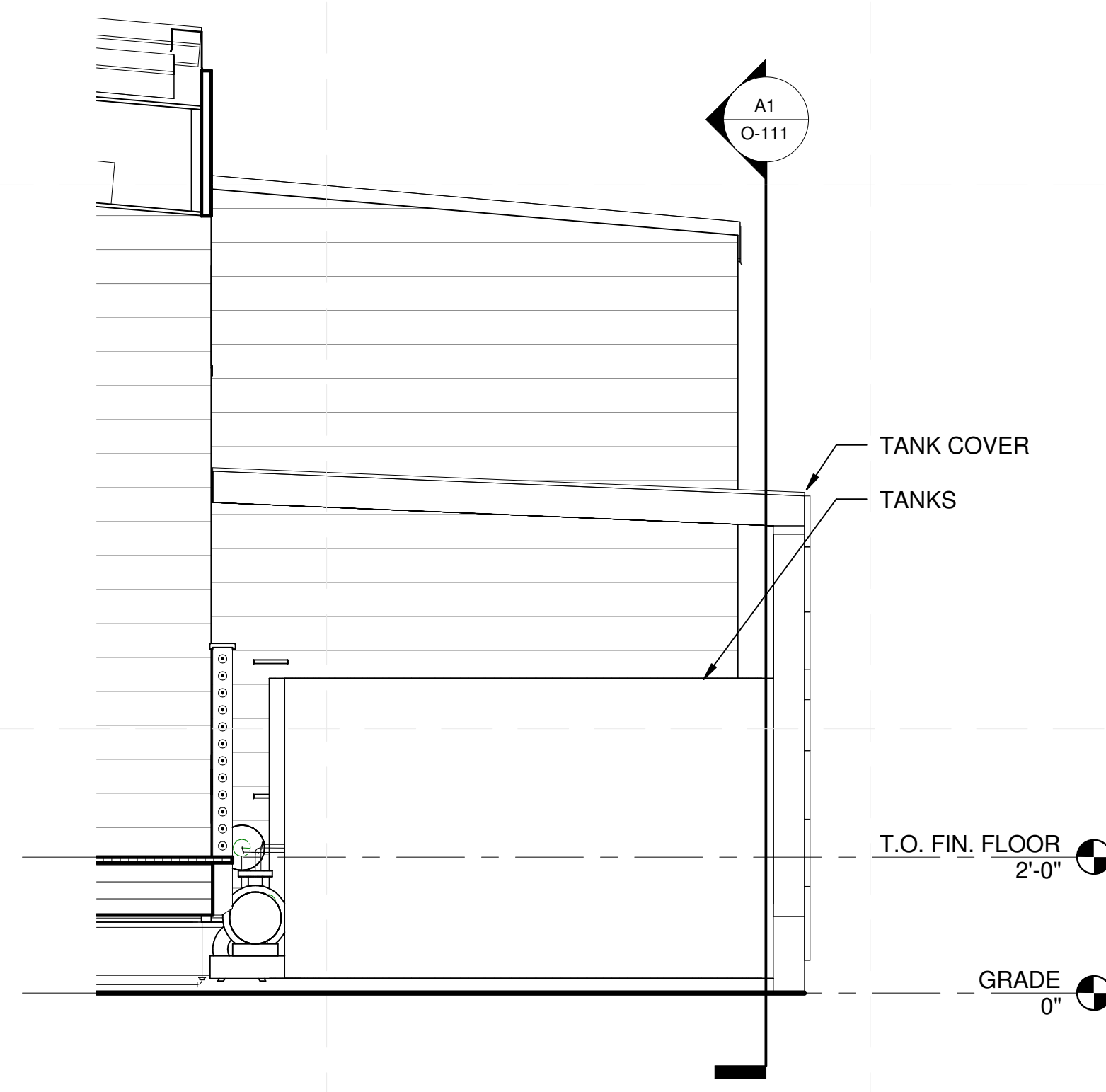
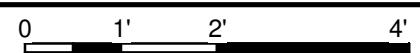
**DELIVERY**  
WATER TRUCK(S) WILL ARRIVE FROM THE NORTHWEST CORNER OF LOT AND A MINIMUM OF SIX TEAM MEMBERS WILL ASSIST IN MOVING THE WATER HOSE FROM THE TRUCK(S) TO THE DOMESTIC WATER TANK LOCATED ON THE NORTH END OF THE SITE.

**REMOVAL**  
UPON REMOVAL A MINIMUM OF SIX TEAM MEMBERS WILL ASSIST IN DIRECTING THE WATER HOSE FROM THE WATER TRUCK(S) TO THE TANKS IN ORDER TO DRAIN ALL OF THE WATER FROM DOMESTIC WATER, GREY WATER, BLACK WATER TANKS. THE WATER TRUCK(S) WILL BE LOCATED ON THE NORTHWEST SIDE OF THE HOME.

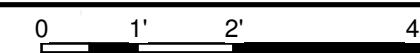
**C1 WATER DELIVERY AND REMOVAL**  
1" = 30'-0"



**A1 WATER TANK ELEVATION NORTH**  
1/2" = 1'-0"



**A5 WATER DELIVERY/REMOVAL ELEVATION EAST**  
1/2" = 1'-0"





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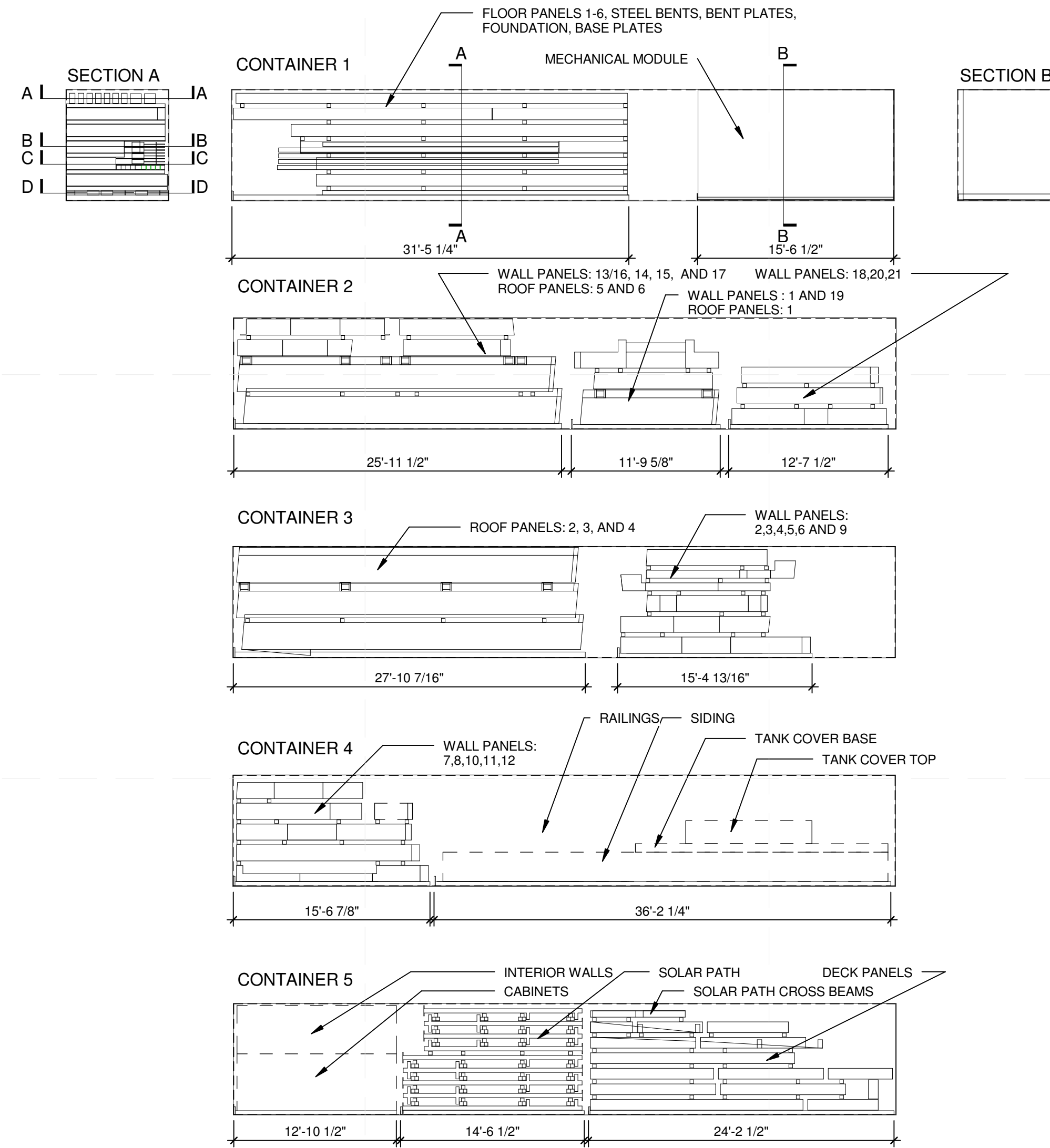
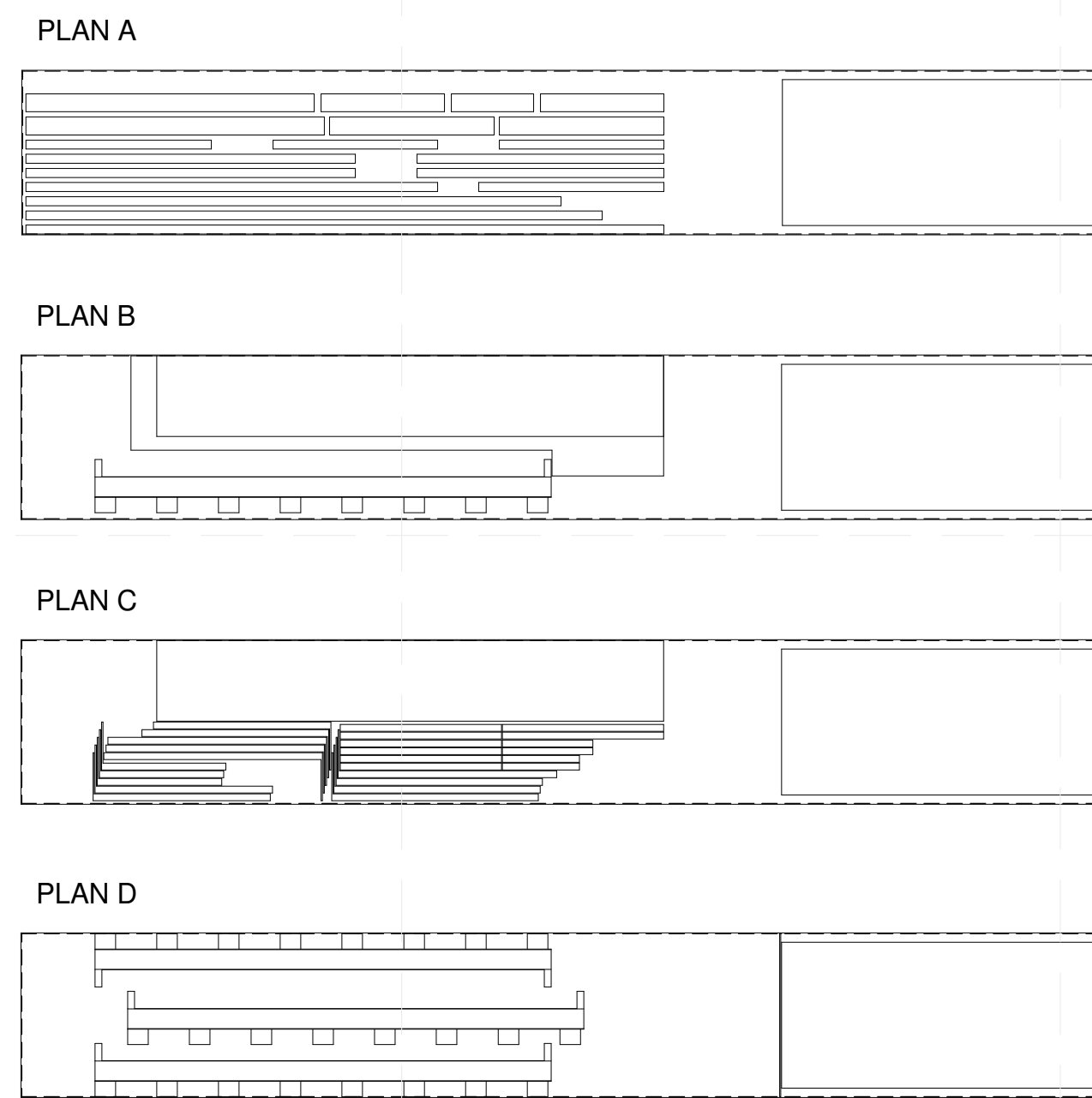
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SHEET TITLE

TRUCK LOADING  
 DIAGRAM

O-601



**B1** CONTAINER LOADING DIAGRAM  
 1/8" = 1'-0"

**GENERAL SHEET NOTES**

1. REPRESENTATIONAL ONLY, ACTUAL ASSEMBLY AND DISASSEMBLY ORDER MAY VARY SLIGHTLY



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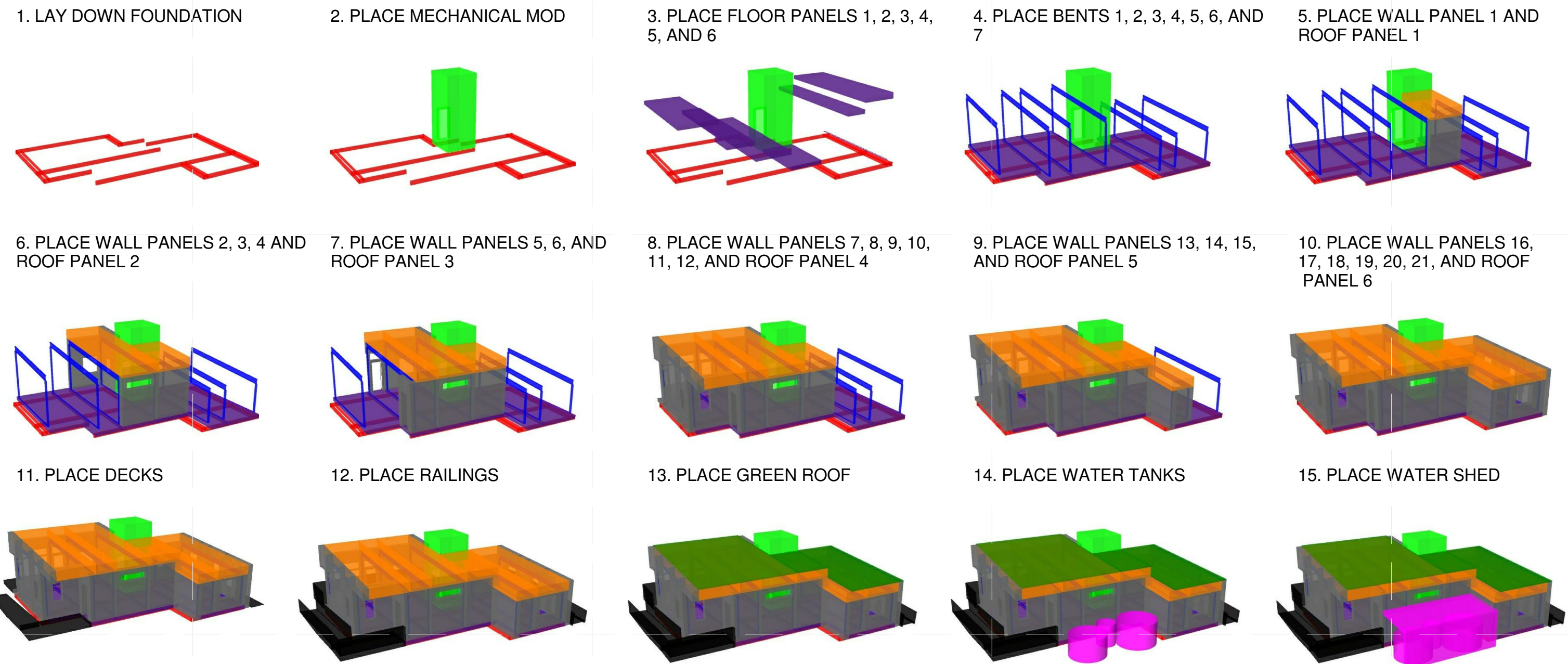
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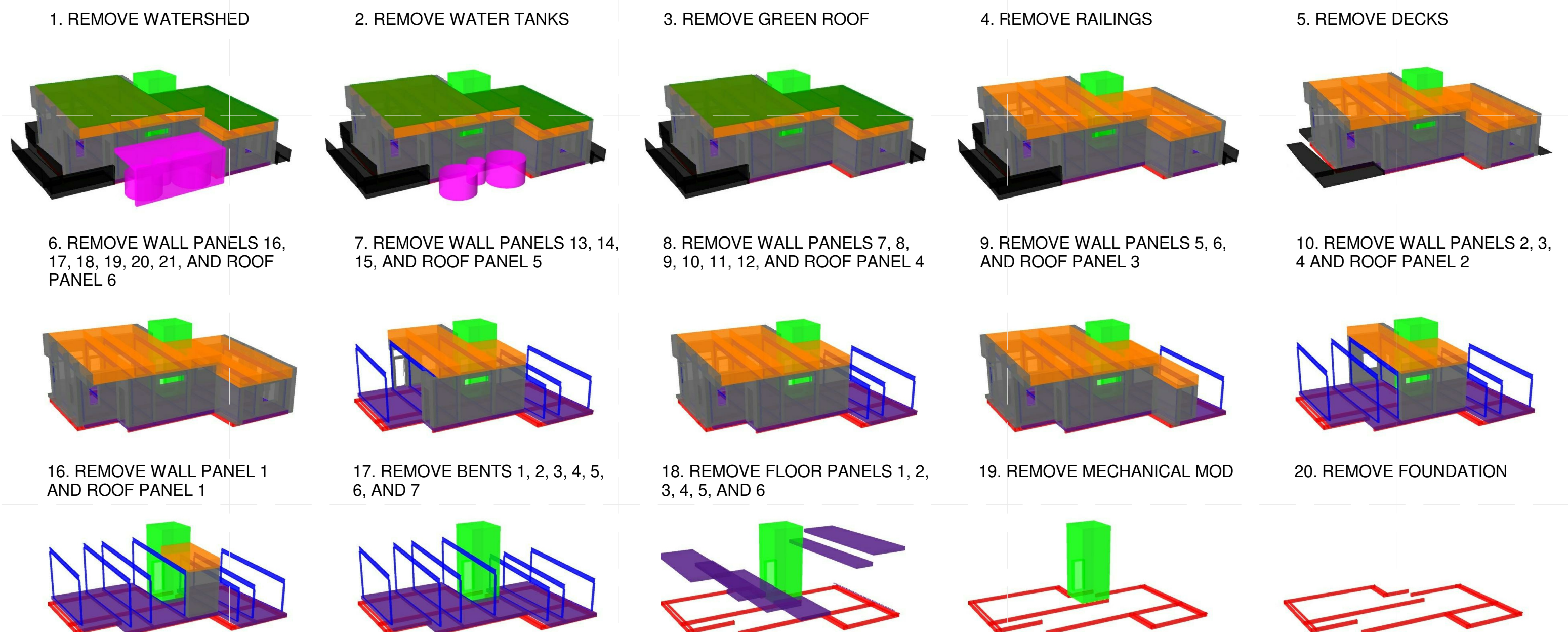
SHEET TITLE

**ASSEMBLY AND  
 DISASSEMBLY 3D  
 REPRESENTATIONS**

**O-901**



**C2 ASSEMBLY SEQUENCE**  
 1/16" = 1'-0"



**A2 DISASSEMBLY SEQUENCE**  
 1/16" = 1'-0"

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