

GENERAL BUILDING CODE NOTES

GENERAL BUILDING CONSTRUCTION

SECTION R302 FIRE-RESISTANT CONSTRUCTION

R302.1 EXTERIOR WALLS
CONSTRUCTION, PROJECTIONS, OPENINGS AND PENETRATIONS OF EXTERIOR WALLS OR DWELLINGS AND ACCESSORY BUILDINGS SHALL COMPLY WITH TABLE R-302.1.1. OR DWELLINGS EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM INSTALLED IN ACCORDANCE WITH SECTION P2904 SHALL COMPLY WITH TABLE R302.1(2).

R302.9 FLAME SPREAD INDEX AND SMOKE-DEVELOPED INDEX FOR WALL AND CEILING FINISHES.
FLAME SPREAD AND SMOKE DEVELOPED INDEXES FOR WALL AND CEILING FINISHES SHALL BE IN ACCORDANCE WITH SECTIONS R302.9.1 THROUGH R302.9.4

R302.9.1 FLAME SPREAD INDEX
WALL AND CEILING FINISHES SHALL HAVE A FLAME SPREAD INDEX NOT GREATER THAN 200.

EXCEPTION: FLAME SPREAD INDEX REQUIREMENTS FOR FINISHES SHALL NOT APPLY TO TRIM DEFINED AS PICTURE MOLDS, CHAIR RAILS, BASEBOARDS AND HANDRAILS, TO DOORS AND WINDOWS OR THEIR FRAMES; OR TO MATERIALS THAT ARE LESS THAN 1/2 INCH IN THICKNESS CEMENTED TO THE SURFACE OF WALLS OR CEILING FINISHES. THESE MATERIALS EXHIBIT FLAME SPREAD INDEX VALUES NOT GREATER THAN 100 AND A NONCOMBUSTIBLE BACKING.

R302.9.2 SMOKE-DEVELOPED INDEX
WALL AND CEILING FINISHES SHALL HAVE A SMOKE-DEVELOPED INDEX OF NOT GREATER THAN 450.

R302.10 FLAME SPREAD INDEX AND SMOKE-DEVELOPED INDEX FOR INSULATION
FLAME SPREAD AND SMOKE-DEVELOPED INDEX FOR INSULATION SHALL BE IN ACCORDANCE WITH SECTIONS R302.10.1 THROUGH R302.10.5.

R302.10.1 INSULATION
INSULATION MATERIALS, INCLUDING FACINGS, SUCH AS VAPOR RETARDERS AND VAPOR-PERMEABLE MEMBRANES INSTALLED WITHIN FLOOR-CEILING ASSEMBLIES, ROOF-CEILING ASSEMBLIES, WALL ASSEMBLIES, CEILING AND ATTICS SHALL HAVE A FLAME SPREAD INDEX NOT TO EXCEED 25 WITH AN ACCOMPANYING SMOKE-DEVELOPED INDEX NOT TO EXCEED 450 WHERE TESTED IN ACCORDANCE WITH ASTM E 84 OR UL 723.

R302.11 FIREBLOCKING
IN COMBUSTIBLE CONSTRUCTION, FIREBLOCKING SHALL BE PROVIDED TO CUT OFF BOTH VERTICAL AND HORIZONTAL CONCEALED DRAFT OPENINGS AND TO FORM AND EFFECTIVE FIRE BARRIER BETWEEN STORIES, AND BETWEEN A TOP STORY AND THE ROOF SPACE.

FIREBLOCKING SHALL BE PROVIDED IN WOOD-FRAMED CONSTRUCTION IN THE FOLLOWING LOCATIONS:

- IN CONCEALED SPACES OF STUD WALLS AND PARTITIONS, INCLUDING FURRED SPACES AND PARALLEL ROWS OF STUDS OR STAGGERED STUDS, AS FOLLOWS:
 - VERTICALLY AT THE CEILING AND FLOOR LEVELS.
 - HORIZONTALLY AT INTERVALS NOT EXCEEDING 10 FEET.
- AT INTERCONNECTIONS BETWEEN CONCEALED VERTICAL AND HORIZONTAL SPACES SUCH AS OCCUR AT SOFFITS, DROP CEILINGS AND COVE CEILINGS.
- IN CONCEALED SPACES BETWEEN STAIR STRINGERS AT THE TOP AND BOTTOM OF THE RUN. ENCLOSED SPACES UNDER STAIRS SHALL COMPLY WITH SECTION R302.7.
- AT OPENINGS AROUND VENTS, PIPES, DUCTS, CABLES AND WIRES AT CEILING AND FLOOR LEVEL, WITH AN APPROVED MATERIAL TO RESIST THE FREE PASSAGE OF FLAME AND PRODUCTS OF COMBUSTION. THE MATERIAL FILLING THIS ANNULAR SPACE SHALL NOT BE REQUIRED TO MEET THE ASTM E 136 REQUIREMENTS.

R302.13 FIRE PROTECTION OF FLOORS

EXCEPTIONS:
1. FLOOR ASSEMBLIES LOCATED DIRECTLY OVER A SPACE PROTECTED BY AN AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION P2904, NFPA 13D, OR OTHER APPROVED EQUIVALENT SPRINKLER SYSTEM.

- FLOOR ASSEMBLIES LOCATED DIRECTLY OVER A CRAWL SPACE NOT INTENDED FOR STORAGE OF FUEL-BURNING APPLIANCES.
- PORTIONS OF FLOOR ASSEMBLIES SHALL BE PERMITTED TO BE UNPROTECTED WHERE COMPLYING WITH THE FOLLOWING.
- WOOD FLOOR ASSEMBLIES USING DIMENSION LUMBER OR STRUCTURAL COMPOSITE LUMBER EQUAL TO OR GREATER THAN 2-INCH BY 10-INCH NOMINAL DIMENSION, OR OTHER APPROVED FLOOR ASSEMBLIES DEMONSTRATING EQUIVALENT FIRE PERFORMANCE.

R302.14 COMBUSTIBLE INSULATION CLEARANCE
COMBUSTIBLE INSULATION SHALL BE SEPARATED NOT LESS THAN 3 INCHES FROM RECESSED LUMINAIRES, FAN MOTORS AND OTHER HEAT-PRODUCING DEVICES.
RECESSED LUMINAIRES INSTALLED IN THE BUILDING THERMAL ENVELOPE SHALL MEET THE REQUIREMENTS OF SECTION N1102.4.5 OF THIS CODE.

G2 FINISHED SQUARE FOOTAGE COMPLIANCE PLAN

APPLICABLE BUILDING CODES

I. EXHIBIT SITE: DENVER, COLORADO

- 2016 SOLAR DECATHLON BUILDING CODE (SDBC)
- 2017 SOLAR DECATHLON RULES (SDR)
- 2015 INTERNATIONAL BUILDING CODE (IBC)
- 2015 INTERNATIONAL RESIDENTIAL CODE (IRC)
- 2014 NATIONAL ELECTRIC CODE (NEC)
- 2015 INTERNATIONAL FIRE CODE (IFC)
- 2016 DENVER BUILDING AND FIRE CODE (BDC)

II. PERMANENT SITE: RICHMOND, CALIFORNIA

- 2013 CALIFORNIA BUILDING CODE (CBC)
- 2013 CALIFORNIA RESIDENTIAL CODE (CRC)
- 2013 CALIFORNIA ENERGY CODE
- 2013 CALIFORNIA GREEN BUILDING STANDARDS CODE

ACCESSIBILITY

2010 STANDARD FOR ACCESSIBLE DESIGN

SECTION 504 OF THE UNIFORM FEDERAL ACCESSIBILITY STANDARDS (UFAS) REHABILITATION ACT OF 1973

G1 RELEVANT BUILDING CODES

SECTION R303 LIGHT, VENTILATION AND HEATING

R303.1 HABITABLE ROOMS
HABITABLE ROOMS SHALL HAVE AN AGGREGATE GLAZING AREA OF NOT LESS THAN 8 PERCENT OF THE FLOOR AREA OF SUCH ROOMS. NATURAL VENTILATION SHALL BE THROUGH WINDOWS, SKYLIGHTS, DOORS, LOUVERS OR OTHER APPROVED OPENINGS TO THE OUTDOOR AIR. SUCH OPENINGS SHALL BE PROVIDED WITH READY ACCESS OR SHALL OTHERWISE BE READILY CONTROLLABLE BY THE BUILDING OCCUPANTS. THE OPENABLE AREA TO THE OUTDOORS SHALL BE NOT LESS THAN 4 PERCENT OF THE FLOOR AREA BEING VENTILATED.

R303.3 BATHROOMS
BATHROOMS, WATER CLOSET COMPARTMENTS AND OTHER SIMILAR ROOMS SHALL BE PROVIDED WITH AGGREGATE GLAZING AREA IN WINDOWS OF NOT LESS THAN 3 SQUARE FEET, ONE-HALF OF WHICH MUST BE OPENABLE.
EXCEPTION: THE GLAZED AREAS SHALL NOT BE REQUIRED WHERE ARTIFICIAL LIGHT AND A LOCAL EXHAUST SYSTEM ARE PROVIDED. THE MINIMUM LOCAL EXHAUST RATES SHALL BE DETERMINED IN ACCORDANCE WITH SECTION M1507. EXHAUST AIR FROM THE SPACE SHALL BE EXHAUSTED DIRECTLY TO THE OUTDOORS.

R303.4 MECHANICAL VENTILATION
WHERE THE AIR INFILTRATION RATE OF A DWELLING UNIT IS 5 AIR CHANGES PER HOUR OR LESS WHERE TESTED WITH BLOWER DOOR AT A PRESSURE OF 0.2 INCH W.C. IN ACCORDANCE WITH SECTION N1102.4.12, THE DWELLING UNIT SHALL BE PROVIDED WITH WHOLE-HOUSE MECHANICAL VENTILATION IN ACCORDANCE WITH SECTION M1507.3.

R303.5 OPENING LOCATION
INTAKE AND EXHAUST OPENINGS SHALL BE LOCATED IN ACCORDANCE WITH SECTIONS R303.5.1 AND R303.5.2.

R303.5.1 INTAKE OPENINGS
MECHANICAL AND GRAVITY OUTDOOR AIR INTAKE OPENINGS SHALL BE LOCATED NOT LESS THAN 10 FEET FROM ANY HAZARDOUS OR NOXIOUS CONTAMINANT, SUCH AS VENTS, CHIMNEYS, PLUMBING VENTS, STREETS, ALLEYS, PARKING LOTS AND LOADING DOCKS. FOR THE PURPOSE OF THIS SECTION, THE EXHAUST FROM DWELLING UNIT TOILET ROOMS, BATHROOMS, AND KITCHENS SHALL NOT BE CONSIDERED AS HAZARDOUS OR NOXIOUS.

EXCEPTIONS:
1. THE 10-FOOT SEPARATION IS NOT REQUIRED WHERE THE INTAKE OPENING IS LOCATED 3 FEET OR GREATER BELOW THE CONTAMINANT SOURCE.
2. VENTS AND CHIMNEYS SERVING FUEL-BURNING APPLIANCES SHALL BE TERMINATED IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF CHAPTERS 16 AND 24.
3. CLOTHES DRYER EXHAUST DUCTS SHALL BE TERMINATED IN ACCORDANCE WITH SECTION M1502.3.

R303.5.2 EXHAUST OPENINGS
EXHAUST AIR SHALL NOT BE DIRECTED ONTO WALKWAYS.

R303.6 OUTSIDE OPENING PROTECTION
AIR EXHAUST AND INTAKE OPENINGS THAT TERMINATE OUTDOORS SHALL BE PROTECTED WITH CORROSION-RESISTANT SCREENS, LOUVERS OR GRILLES HAVING AN OPENING SIZE OF NOT LESS THAN 1/4 INCH AND A MAXIMUM OPENING SIZE OF 1/2 INCH IN ANY DIMENSION. OPENINGS SHALL BE PROTECTED AGAINST LOCAL WEATHER CONDITIONS. OUTDOOR AIR EXHAUST AND INTAKE OPENINGS SHALL MEET THE PROVISIONS FOR EXTERIOR WALL OPENING PROTECTIVES IN ACCORDANCE WITH THIS CODE.

R303.7 INTERIOR STAIRWAY ILLUMINATION
INTERIOR STAIRWAYS SHALL BE PROVIDED WITH AN ARTIFICIAL LIGHT SOURCE TO ILLUMINATE THE LANDINGS AND TREADS. THE LIGHT SOURCE SHALL BE CAPABLE OF ILLUMINATING TREADS AND LANDINGS TO LEVELS OF NOT LESS THAN 1 FOOT-CANDLE (11LUX) AS MEASURED AT THE CENTER OF TREADS AND LANDINGS. THERE SHALL BE A WALL SWITCH AT EACH FLOOR LEVEL TO CONTROL THE LIGHT SOURCE WHERE THE STAIRWAY HAS SIX OR MORE RISERS.
EXCEPTION: A SWITCH IS NOT REQUIRED WHERE REMOTE, CENTRAL OR AUTOMATIC CONTROL OF LIGHTING IS PROVIDED.

R303.8 EXTERIOR STAIRWAY ILLUMINATION
EXTERIOR STAIRWAYS SHALL BE PROVIDED WITH AN ARTIFICIAL LIGHT SOURCE LOCATED AT THE TOP LANDING OF THE STAIRWAY. EXTERIOR STAIRWAYS PROVIDING ACCESS TO A BASEMENT FROM THE OUTDOOR GRADE LEVEL SHALL BE PROVIDED WITH AN ARTIFICIAL LIGHT SOURCE LOCATED AT THE BOTTOM LANDING OF THE STAIRWAY.

R303.9 REQUIRED GLAZED OPENINGS
REQUIRED GLAZED OPENINGS SHALL OPEN DIRECTLY ONTO A STREET OR PUBLIC ALLEY, OR A YARD OR COURT LOCATED ON THE SAME LOT AS THE BUILDING.

EXCEPTIONS:
1. REQUIRED GLAZED OPENINGS THAT FACE INTO A ROOFED PORCH WHERE THE PORCH ABUTS A STREET, YARD OR COURT AND THE LONGER SIDE OF THE PORCH IS NOT LESS THAN 65 PERCENT UNOBSTRUCTED AND THE CEILING HEIGHT IS NOT LESS THAN 7 FEET.
2. EAVE PROJECTIONS SHALL NOT BE CONSIDERED AS OBSTRUCTING THE CLEAR OPEN SPACE OF A YARD OR COURT.
3. REQUIRED GLAZED OPENINGS THAT FACE INTO THE AREA UNDER DECK, BALCONY, BAY, OR FLOOR CANTILEVER WHERE A CLEAR VERTICAL SPACE NOT LESS THAN 36 INCHES IN HEIGHT IS PROVIDED.

SECTION R304 MINIMUM ROOM AREAS

R304.1 MINIMUM AREA
HABITABLE ROOMS SHALL HAVE A FLOOR AREA OF NOT LESS THAN 70 SQUARE FEET.
EXCEPTION: KITCHENS

R304.2 MINIMUM DIMENSIONS
HABITABLE ROOMS SHALL NOT BE LESS THAN 7 FEET IN ANY HORIZONTAL DIMENSION.
EXCEPTION: KITCHENS

SECTION R305 CEILING HEIGHT

R305.1 MINIMUM HEIGHT
HABITABLE SPACE, HALLWAYS AND PORTIONS OF BASEMENTS CONTAINING THESE SPACES SHALL HAVE A CEILING HEIGHT OF NOT LESS THAN 7 FEET. BATHROOMS, TOILET ROOMS AND LAUNDRY ROOMS SHALL HAVE A CEILING HEIGHT OF NOT LESS THAN 6 FEET 8 INCHES.

SECTION R307 TOILET, BATH AND SHOWER SPACES

R307.1 SPACE REQUIRED
FIXTURES SHALL BE SPACED IN ACCORDANCE WITH FIGURE R307.1, AND IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION R2705.1

SECTION R310 EMERGENCY ESCAPE AND RESCUE OPENINGS

R310.1 EMERGENCY ESCAPE AND RESCUE OPENING REQUIRED BASEMENTS, HABITABLE ATTICS AND EVERY SLEEPING ROOM SHALL HAVE NOT LESS THAN ONE OPERABLE EMERGENCY ESCAPE AND RESCUE OPENING. EMERGENCY ESCAPE AND RESCUE OPENINGS SHALL OPEN DIRECTLY INTO A PUBLIC WAY, OR TO A YARD OR COURT THAT OPENS TO A PUBLIC WAY.

R310.1.1 OPERATIONAL CONSTRAINTS AND OPENING CONTROL DEVICES
EMERGENCY ESCAPE AND RESCUE OPENINGS SHALL BE OPERATIONAL FROM THE INSIDE OF THE ROOM WITHOUT THE USE OF KEYS, TOOLS OR SPECIAL KNOWLEDGE. WINDOW OPENING CONTROL DEVICES COMPLYING WITH ASTM F 2090 SHALL BE PERMITTED FOR USE ON WINDOW SERVING AS A REQUIRED EMERGENCY ESCAPE AND RESCUE OPENING.

R310.2.1 MINIMUM OPENING AREA
EMERGENCY AND ESCAPE RESCUE OPENINGS SHALL HAVE A NET CLEAR OPENING OF NOT LESS THAN 5.7 SQUARE FEET. THE NET CLEAR OPENING DIMENSIONS REQUIRED BY THIS SECTION SHALL BE OBTAINED BY THE NORMAL OPERATION OF THE EMERGENCY ESCAPE AND RESCUE OPENING FROM THE INSIDE. THE NET CLEAR HEIGHT OPENINGS SHALL BE NOT LESS THAN 24 INCHES AND THE NET CLEAR WIDTH SHALL BE NOT LESS THAN 20 INCHES.

EXCEPTION: GRADE FLOOR OR BELOW GRADE OPENINGS SHALL HAVE A NET CLEAR OPENING OF NOT LESS THAN 5 SQUARE FEET.

R310.2.2 WINDOW SILL HEIGHT
WHERE A WINDOW IS PROVIDED AS THE EMERGENCY ESCAPE AND RESCUE OPENING, IT SHALL HAVE A SILL HEIGHT OF NOT MORE THAN 44 INCHES ABOVE THE FLOOR.

SECTION R311 MEANS OF EGRESS

R311.1 MEANS OF EGRESS
DWELLINGS SHALL BE PROVIDED WITH A MEANS OF EGRESS IN ACCORDANCE WITH THIS SECTION. THE MEANS OF EGRESS SHALL PROVIDE A CONTINUOUS AND UNOBSTRUCTED PATH OF VERTICAL AND HORIZONTAL EGRESS TRAVEL FROM ALL PORTIONS OF THE DWELLING TO THE REQUIRED EGRESS DOOR WITHOUT REQUIRING TRAVEL THROUGH A GARAGE. THE REQUIRED EGRESS DOOR SHALL OPEN DIRECTLY INTO A PUBLIC WAY OR TO A YARD OR COURT THAT OPENS TO A PUBLIC WAY.

R311.2 EGRESS DOOR
NOT LESS THAN ONE EGRESS DOOR SHALL BE PROVIDED FOR EACH DWELLING UNIT. THE EGRESS DOOR SHALL BE SIDE-HINGED AND SHALL PROVIDE A CLEAR WIDTH OF NOT LESS THAN 32 INCHES WHERE MEASURED BETWEEN THE FACE OF THE DOOR AND THE STOP. WITH THE DOOR OPEN 90 DEGREES. THE CLEAR HEIGHT OF THE DOOR OPENING SHALL BE NOT LESS THAN 78 INCHES IN HEIGHT MEASURED FROM THE TOP OF THE THRESHOLD TO THE BOTTOM OF THE STOP. OTHER DOORS SHALL NOT BE REQUIRED TO COMPLY WITH THESE MINIMUM DIMENSIONS. EGRESS DOORS SHALL BE READILY OPENABLE FROM INSIDE THE DWELLING WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE OR EFFORT.

R311.3 FLOORS AND LANDINGS AT EXTERIOR DOORS
THERE SHALL BE A LANDING OR FLOOR ON EACH SIDE OF EACH EXTERIOR DOOR. THE WIDTH OF EACH LANDING SHALL BE NOT LESS THAN THE DOOR SERVED. EVERY LANDING SHALL HAVE A DIMENSION OF NOT LESS THAN 36 INCHES MEASURED IN THE DIRECTION OF TRAVEL. THE SLOPE AT EXTERIOR LANDINGS SHALL NOT EXCEED 1/4 UNIT VERTICAL IN 12 UNITS HORIZONTAL (2 PERCENT).

R311.3.1 FLOOR ELEVATIONS AT THE REQUIRED EGRESS DOORS
LANDINGS OR FINISHED FLOORS AT THE REQUIRED EGRESS DOOR SHALL BE NOT MORE THAN 1 1/2 INCHES LOWER THAN THE TOP OF THE THRESHOLD.
EXCEPTION: THE LANDING OR FLOOR ON THE EXTERIOR SIDE SHALL BE NOT MORE THAN 7 3/4 INCHES BELOW THE TOP OF THE THRESHOLD PROVIDED THE DOOR DOES NOT SWING OVER THE LANDING OR FLOOR.
WHERE EXTERIOR LANDINGS OR FLOORS SERVING THE REQUIRED EGRESS DOOR ARE NOT AT GRADE, THEY SHALL BE PROVIDED WITH ACCESS TO GRADE BY MEANS OF A RAMP IN ACCORDANCE WITH SECTION R311.8 OR A STAIRWAY IN ACCORDANCE WITH SECTION R311.7.

SECTION R312 GUARDRAILS

R312.1.1 WHERE REQUIRED
GUARDS SHALL BE LOCATED ALONG OPEN-SIDED WALKING SURFACES, INCLUDING STAIRS, RAMPS AND LANDINGS, THAT ARE LOCATED MORE THAN 30 INCHES MEASURED VERTICALLY TO THE FLOOR OR GRADE BELOW AT ANY POINT WITHIN 36 INCHES HORIZONTALLY TO THE EDGE OF THE OPEN SIDE. INSECT SCREENING SHALL NOT BE CONSIDERED AS A GUARD.

R312.1.2 HEIGHT
REQUIRED GUARDS AT OPEN-SIDED WALKING SURFACES, INCLUDING STAIRS, PORCHES, BALCONIES OR LANDINGS, SHALL BE NOT LESS THAN 36 INCHES HIGH MEASURED VERTICALLY ABOVE THE ADJACENT WALKING SURFACE, ADJACENT FIXED SEATING OR THE LINE CONNECTING THE LEADING EDGES OF THE TREADS.

R312.1.3 OPENING LIMITATIONS
REQUIRED GUARDS SHALL NOT HAVE OPENINGS FROM THE WALKING SURFACE TO THE REQUIRED GUARD HEIGHT WHICH ALLOW PASSAGE OF A SPHERE 4 INCHES IN DIAMETER.

SECTION R324 SOLAR ENERGY SYSTEMS

R324.1 GENERAL
SOLAR ENERGY SYSTEMS SHALL COMPLY WITH THE PROVISIONS OF THIS SECTION.

R324.2 SOLAR THERMAL SYSTEMS
SOLAR THERMAL SYSTEMS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH CHAPTER 23 AND THE INTERNATIONAL FIRE CODE.

R324.3 PHOTOVOLTAIC SYSTEMS
PHOTOVOLTAIC SYSTEMS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH SECTIONS R324.3.1 THROUGH R324.6.1 AND NFPA 70. INVERTERS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 1741. SYSTEMS CONNECTED TO THE UTILITY GRID SHALL USE INVERTERS LISTED FOR UTILITY INTERACTION.

R324.3.1 EQUIPMENT LISTINGS
PHOTOVOLTAIC PANELS AND MODULES SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 1703.

R324.4 ROOFTOP-MOUNTED PHOTOVOLTAIC SYSTEMS
ROOFTOP-MOUNTED PHOTOVOLTAIC PANEL SYSTEMS INSTALLED ON OR ABOVE THE ROOF COVERING SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH SECTION R907.

R324.4.1 ROOF LIVE LOAD
ROOF STRUCTURES THAT PROVIDE SUPPORT FOR PHOTOVOLTAIC PANEL SYSTEMS SHALL BE DESIGNED FOR APPLICABLE ROOF LIVE LOAD. THE DESIGN OF ROOF STRUCTURES NOT COVERED BY PHOTOVOLTAIC PANELS SHALL BE DESIGNED FOR ROOF LIVE LOAD. ROOF STRUCTURES THAT PROVIDE SUPPORT FOR PHOTOVOLTAIC PANEL SYSTEMS SHALL BE DESIGNED FOR LIVE LOAD, LR, FOR THE LOAD CASE WHERE THE PHOTOVOLTAIC PANEL SYSTEM IS NOT PRESENT.

SECTION R907 ROOFTOP-MOUNTED PHOTOVOLTAIC SYSTEMS

R907.1 ROOFTOP-MOUNTED PHOTOVOLTAIC PANELS OR MODULES SHALL BE INSTALLED IN ACCORDANCE WITH THIS SECTION, SECTION R324 AND NFPA 70.

R907.2 WIND RESISTANCE
ROOFTOP-MOUNTED PHOTOVOLTAIC PANEL OR MODULES SYSTEMS SHALL BE INSTALLED TO RESIST THE COMPONENT AND CLADDING LOADS SPECIFIED IN TABLE R301.2(2), ADJUSTED FOR HEIGHT AND EXPOSURE IN ACCORDANCE WITH TABLE R301.2(3).

R907.3 FIRE CLASSIFICATION
ROOFTOP-MOUNTED PHOTOVOLTAIC PANELS OR MODULES SHALL HAVE THE SAME FIRE CLASSIFICATION AS THE ROOF ASSEMBLY REQUIRED IN SECTION R902.

R907.4 INSTALLATION
ROOFTOP-MOUNTED PHOTOVOLTAIC PANELS OR MODULES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

R907.5 PHOTOVOLTAIC PANELS AND MODULES
ROOFTOP-MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 1703 AND SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.

FIRE PROTECTION AND FIRE RESISTANCE

BUILDING TO BE FULLY SPRINKLERED WITH NFPA 13D SYSTEM (SDBC 3-11)
PORTABLE FIRE EXTINGUISHER PROVIDED 1
SMOKE ALARMS PROVIDED 3
CARBON MONOXIDE ALARMS PROVIDED 3

DESCRIPTION	REFERENCE	MIN. FIRE RESISTANCE RATING OR % OPENING PERMITTED	FIRE SEPARATION DISTANCE (D)
TYPE V-A STRUCTURAL FRAME BEARING WALLS FLOOR ROOF	IBC TABLE 601	1-HR 1-HR 1-HR	
EXTERIOR WALLS FIRE WALL FIRE BARRIER FIRE PARTITIONS SMOKE BARRIER SMOKE PARTITION	IBC TABLE 602 IBC TABLE 705.4 IBC TABLE 707.3.10 IBC 708 IBC 709 IBC 710	1-HR 2-HR 2-HR 1-HR 1-HR RATING NOT REQUIRED	D < 30'

MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE (D) AND DEGREE OF OPENING FOR SPRINKLERED BUILDING	IBC 705.8	NOT PERMITTED 15% 25% 45% 75% NO LIMIT NO LIMIT NO LIMIT	D < 3' 3' < D < 5' 5' < D < 10' 10' < D < 25' 15' < D < 20' 20' < D < 25' 25' < D < 30' 30' < D
OPENINGS IN A FIRE BARRIER MAX. AGGREGATE WIDTH OF THE LENGTH OF THE WALL		25%	

NOTE (IFC 903.2.11.1.4)
WHERE EXTERIOR WALL OPENINGS ARE PERMITTED BY IBC TABLE 705.8 TO BE UP TO 50% OF THE EXTERIOR WALL AREA, OPENINGS SHALL BE PROTECTED BY CLOSELY SPACED SPRINKLERS, 6' ON CENTER AND LOCATED WITHIN 6-12 INCHES OF THE WALL. THE SPRINKLERS SHALL DISTRIBUTE A MINIMUM OF 3 GPM PER LINEAR FOOT OF WALL OPENING.

G3 FIRE PROTECTION AND FIRE RESISTANCE REGULATION

MEANS OF EGRESS

DESCRIPTION	REFERENCE	CODE REQUIREMENT	PROVIDED
OCCUPANCY TYPE	IBC 310		R-2
TYPE OF CONSTRUCTION	IBC TABLE 504.3		V-A
OCCUPANT LOAD FACTOR (OLF) GROSS FLOOR AREA DESIGN OCCUPANT LOAD = GROSS FLOOR AREA / OLF	IBC TABLE 1004.1.2	200 GROSS	
MAXIMUM OCCUPANT LOAD AUTOMATIC FIRE SPRINKLER SYSTEM	SDBC 3-2.C SDBC 3-11	49 NFPA 13D	NFPA 13D
EXIT ACCESS TRAVEL DISTANCE COMMON PATH OF EGRESS TRAVEL	IBC 1017.2 IBC 1006.2.1 EX1	250' MAX. 125' MAX.	
DISTANCE BETWEEN EXIT ACCESS DOORWAYS AS FRACTION OF OVERALL DIAGONAL DIMENSION OF THE AREA TO BE SERVED (SPRINKLERED)	IBC 1007.1.1 EX2	NOT LESS THAN 1/3	LESS THAN 1/3
NUMBER OF EXITS PER DWELLING UNIT	IBC 1006.1 EX1	ONE	ONE
NUMBER OF EXITS PER HABITABLE ROOM	IBC 1006.3.2 EX5	ONE	ONE
NUMBER OF EMERGENCY ESCAPE AND RESCUE OPENINGS FROM SLEEPING ROOM	IBC 1006.3.2(2)	TWO: 5 SQ. FT. MIN. 20" MIN. WIDE, 24" MIN. HIGH LESS THAN 44" SILL HEIGHT	ONE
CEILING HEIGHT	IBC 1003.2 SDBC	7'-6" MIN. 7'-0" MIN.	
CORRIDOR WIDTH WITHIN DWELLING UNIT DOOR OPENING CLEAR WIDTH DOOR HARDWARE HEIGHT	IBC TABLE 1020.2 IBC 1010.1.1 IBC 1010.1.9.2	36" MIN. 32" MIN. 34" MIN. AFF. 48" MAX. AFF.	
THRESHOLDS AT DOORWAYS - HEIGHT ABOVE THE FINISHED FLOOR OR LANDING	SDBC 4-4	1/2" MAX.	

G4 EGRESS REGULATIONS

SOLAR DECATHLON PROJECT LIMITS

REGULATION	LIMITATION	PROPOSED
SOLAR ENVELOPE: HEIGHT EAST TO WEST NORTH TO SOUTH FINISHED SQUARE FOOTAGE (ANSI Z765-2003)	18" MAX. 78" MAX. 60" MAX.	600 SQ.FT. MIN. TO 1000 SQ.FT. MAX.
ALLOWABLE CONSTRUCTED FOOTPRINT	2,700 SQ.FT.	

G5 SOLAR DECATHLON REGULATIONS

RISE
UC BERKELEY / UNIVERSITY OF DENVER

RISE - UC Berkeley

TEAM NAME **RISE**

ADDRESS **390 S 34 STREET RICHMOND, CA, 94804**

CONTACT **berkeleysolardecathlon@gmail.com https://solardecathlon.berkeley.edu**

CONSULTANTS

CLIENT

U.S. DEPARTMENT OF ENERGY

SOLAR DECATHLON 2017

WWW.SOLARDECATHLON.GOV



MARK	DATE	DESCRIPTION
04	8-10-2017	AS-BUILTS

LOT NUMBER 105

DRAWN BY PAMELA TANG

CHECKED BY

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SHEET TITLE

BUILDING CODES

G-003

ACCESSIBLE PATH OF TRAVEL

SD BUILDING CODE 4-1: ACCESSIBLE ROUTE - INTERIOR

AN ACCESSIBLE ROUTE SHALL BE PROVIDED WITHIN THE LIMITS TO ALL SPACES HANDRAILS TO THE PUBLIC AS PART OF THE TOUR. COMPONENTS OF THE ACCESSIBLE ROUTE USED BY THE TOURING PUBLIC MUST COMPLY WITH 2010 STANDARD FOR ACCESSIBLE DESIGN. OTHER ACCESSIBLE FEATURES MAY BE INCLUDED IN ROOMS SUCH AS KITCHENS AND BATHROOMS AT THE DISCRETION OF THE DESIGNERS. IF ANY OF THE FEATURES ARE AVAILABLE AND INTENDED FOR USE BY THE PUBLIC, THEY SHALL BE ACCESSIBLE IN ACCORDANCE WITH THE 2010 STANDARD FOR ACCESSIBLE DESIGN. VOLUNTARY ACCESSIBILITY PROVIDED OUTSIDE OF AREAS ACCESSIBLE TO THE TOURING PUBLIC SHOULD COMPLY WITH 2015 IBC CHAPTER 11 AND ICC/ANSI A117.1-2009 FOR THE LEVEL OF ACCESSIBILITY DESIRED.

ADA 2010 CHAPTER 4: ACCESSIBLE ROUTES

402.2 COMPONENTS
ACCESSIBLE ROUTES SHALL CONSIST OF ONE OR MORE OF THE FOLLOWING COMPONENTS: WALKING SURFACES WITH A RUNNING SLOPE NOT STEEPER THAN 1:20. DOORWAYS, RAMPS, CURB RAMPS EXCLUDING THE FLARED SIDES, ELEVATORS, AND PLATFORM LIFTS. ALL COMPONENTS OF AN ACCESSIBLE ROUTE SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF CHAPTER 4.

403 WALKING SURFACES

403.1 GENERAL
WALKING SURFACES THAT ARE A PART OF AN ACCESSIBLE ROUTE SHALL COMPLY WITH 403.

403.2 FLOOR OR GROUND SURFACE
FLOOR OR GROUND SURFACE SHALL COMPLY WITH 302. 302 - FLOOR OR GROUND SURFACES

302.1 GENERAL
FLOOR AND GROUND SURFACES SHALL BE STABLE, FIRM, AND SLIP RESISTANT AND SHALL COMPLY WITH 302. 302.3 OPENINGS
OPENINGS IN FLOOR OR GROUND SURFACES SHALL NOT ALLOW PASSAGE OF A SPHERE MORE THAN 1/2 INCH DIAMETER EXCEPT AS ALLOWED IN 407.4.3, 409.4.3, 410.4, 810.5.3 AND 810.10. ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

403.3 SLOPE
THE RUNNING SLOPE OF WALKING SURFACES SHALL NOT BE STEEPER THAN 1:20. THE CROSS SLOPE OF WALKING SURFACES SHALL NOT BE STEEPER THAN 1:48.

403.4 CHANGES IN LEVEL
CHANGES IN LEVEL SHALL COMPLY WITH 303. 303 CHANGES IN LEVEL

303.2 VERTICAL
CHANGES IN LEVEL OF 1/4 INCH HIGH MAXIMUM SHALL BE PERMITTED TO BE VERTICAL.

303.3 BEVELED
CHANGES IN LEVEL BETWEEN 1/4 INCH HIGH MINIMUM AND 1/2 INCH HIGH MAXIMUM SHALL BE BEVELED WITH A SLOPE NOT STEEPER THAN 1:2.

303.4 RAMPS
CHANGES IN LEVEL GREATER THAN 1/2 INCH HIGH SHALL BE RAMPED, AND SHALL COMPLY WITH 405 OR 406.

SD BUILDING CODE 4-4: CHANGES IN ELEVATION

ALL CHANGES IN ELEVATION (INCLUDING EVEN MINOR CHANGES IN AREAS SUCH AS DOOR THRESHOLDS) MUST BE CONSIDERED ALONG AN ACCESSIBLE ROUTE. CHANGES NOT EXCEEDING 0.25 INCHES ARE ACCEPTABLE.
a. ELEVATION CHANGES BETWEEN 0.25 INCHES AND 0.5 INCHES SHALL BE BEVELED AT A MAXIMUM OF 1:2 SLOPE.
b. ANY CHANGE IN ELEVATION EXCEEDING 0.5 INCHES SHALL BE BY A RAMP WITH A MAXIMUM SLOPE OF 1:12.
c. SLOPED WALKING SURFACES COMPLYING WITH 2010 STANDARD FOR ACCESSIBLE DESIGN SECTION 403 SHALL BE PERMITTED.

RAMP

SD BUILDING CODE 4-3: ACCESSIBILITY - RAMPS

4-3.a "RAMP" IS ANY SLOPING SURFACE USED AS PART OF THE CIRCULAR CROSS SECTION OF THE RAMP IN EXCESS OF 1:20. SLOPING SURFACES LESS THAN 1:20 SHALL COMPLY WITH 2010 STANDARD FOR ACCESSIBLE DESIGN.

4-3.b THE SLOPE OF A RAMP CANNOT EXCEED 1:12.

4-3.c AT THE TOP AND BOTTOM OF ANY RAMP, A LANDING 60 INCHES LONG IS REQUIRED.

4-3.d A 60 INCHES BY 60 INCHES LANDING IS REQUIRED AT ANY POINT WHERE A RAMP CHANGES DIRECTIONS.

4-3.f TEAMS MUST DESIGN AND PROVIDE A METAL PLATE TRANSITION COMPONENT BETWEEN THE ACCESS RAMP AND THE WALKING SURFACE OF THE COMPETITION SITE. IF THE EDGE EXCEEDS 1/4 INCH THICKNESS, IT SHALL BE PROVIDED WITH A 1:2 BEVEL. IF THE CONNECTED RAMP EXCEEDS 5% SLOPE, THE TRANSITION PLATE AND THE RAMP MUST BE PROVIDED WITH HANDRAILS AND EDGE PROTECTION. BOTH SHALL EXTEND ONTO THE TRANSITION PLATE WITH THE HANDRAILS EXTENDING 12 INCHES BEYOND THE TERMINATION OF THE TRANSITION PLATE. THE DESIGN OF THE TRANSITION PLATE SHALL ACCOMMODATE THE LATERAL LOADS PLACED ON THE HANDRAILS AND EXTENSIONS WITHOUT RELYING ON GROUND EMBEDMENT FOR SUPPORT.

ADA 2010

405 RAMPS

405.2 SLOPE
RAMP RUNS SHALL HAVE A RUNNING SLOPE NOT STEEPER THAN 1:12.
405.3 CROSS SLOPE. CROSS SLOPE OF RAMP RUNS SHALL NOT BE STEEPER THAN 1:48.

405.5 CLEAR WIDTH.
THE CLEAR WIDTH OF A RAMP RUN AND, WHERE HANDRAILS ARE PROVIDED, THE CLEAR WIDTH BETWEEN HANDRAILS SHALL BE 36 INCHES MINIMUM.

405.6 RISE.
THE RISE FOR ANY RAMP RUN SHALL BE 30 INCHES MAXIMUM.

405.7 LANDINGS.
RAMPS SHALL HAVE LANDINGS AT THE TOP AND THE BOTTOM OF EACH RAMP RUN. LANDINGS SHALL COMPLY WITH 405.7.

405.7.1 SLOPE.
LANDINGS SHALL COMPLY WITH 302. CHANGES IN LEVEL ARE NOT PERMITTED.

405.7.2 WIDTH.
THE LANDING CLEAR WIDTH SHALL BE AT LEAST AS WIDE AS THE WIDEST RAMP RUN LEADING TO THE LANDING.

405.7.3 LENGTH.
THE LANDING CLEAR LENGTH SHALL BE 60 INCHES LONG MINIMUM.

405.7.4 CHANGE IN DIRECTION.
RAMPS THAT CHANGE DIRECTION BETWEEN RUNS AT LANDINGS SHALL HAVE A CLEAR LANDING 60 INCHES MINIMUM BY 60 INCHES MINIMUM.

405.7.5 DOORWAYS.
WHERE DOORWAYS ARE LOCATED ADJACENT TO A RAMP LANDING, MANEUVERING CLEARANCES REQUIRED BY 404.2.4 AND 404.3.2 SHALL BE PERMITTED TO OVERLAP THE REQUIRED LANDING AREA.

405.8 HANDRAILS.
RAMP RUNS WITH A RISE GREATER THAN 6 INCHES SHALL HAVE HANDRAILS COMPLYING WITH 505.

405.9 EDGE PROTECTION.
EDGE PROTECTION COMPLYING WITH 405.9.1 OR 405.9.2 SHALL BE PROVIDED ON EACH SIDE OF RAMP RUNS AND AT EACH SIDE OF RAMP LANDINGS.

405.9.1 EXTENDED FLOOR OR GROUND SURFACE
THE FLOOR OR GROUND SURFACE OF THE RAMP RUN OR LANDING SHALL EXTEND 12 INCHES MINIMUM BEYOND THE INSIDE FACE OF A HANDRAIL COMPLYING WITH 505.

SD BUILDING CODE 4-5: DOORS AND DOOR APPROACHES

ALL DOORS SHALL COMPLY WITH THE 2010 STANDARD FOR ACCESSIBLE DESIGN SECTION 404.

a. DOORS THAT CAN BE FIXED IN AN OPEN POSITION MAY BE ACCEPTED AS PART OF THE ACCESSIBLE ROUTE IF 32 INCHES MINIMUM CLEARANCE IS PROVIDED THROUGH THE DOOR OPENING WITH THE DOOR SECURED IN THE FULLY OPEN POSITION.

b. DOORS WITHOUT REQUIRED MANEUVERING CLEARANCES THAT ARE INTENDED TO REMAIN OPEN DURING THE PUBLIC TOUR MUST BE CLEARLY IDENTIFIED ON THE PLANS AND APPROVED BY THE SOLAR DECATHLON BUILDING OFFICIAL.

ADA 2010

403.5 CLEARANCES. WALKING SURFACES SHALL PROVIDE CLEARANCES COMPLYING WITH 403.5.

403.5.1 CLEAR WIDTH. EXCEPT AS PROVIDED IN 403.5.2 AND 403.5.3, THE CLEAR WIDTH OF WALKING SURFACES SHALL BE 36 INCHES MINIMUM.

403.5.3 PASSING SPACES. AN ACCESSIBLE ROUTE WITH A CLEAR WIDTH LESS THAN 60 INCHES SHALL PROVIDE PASSING SPACES AT INTERVALS OF 200 FEET MAXIMUM. PASSING SPACES SHALL BE EITHER: A SPACE 60 INCHES MINIMUM BY 60 INCHES MINIMUM. OR, AN INTERSECTION OF TWO WALKING SURFACES PROVIDING A T-SHAPED SPACE COMPLYING WITH 304.3.2 WHERE THE BASE AND ARMS OF THE T-SHAPED SPACE EXTEND 48 INCHES MINIMUM BEYOND THE INTERSECTION.

404 DOORS, DOORWAYS, AND GATES

404.2.3 CLEAR WIDTH. DOOR OPENINGS SHALL PROVIDE A CLEAR WIDTH OF 32 INCHES MINIMUM. CLEAR OPENINGS OF DOORWAYS WITH SWINGING DOORS SHALL BE MEASURED BETWEEN THE FACE OF THE DOOR AND THE STOP. WITH THE DOOR OPEN 90 DEGREES. OPENINGS MORE THAN 24 INCHES DEEP SHALL PROVIDE A CLEAR OPENING OF 36 INCHES MINIMUM. THERE SHALL BE NO PROJECTIONS INTO THE REQUIRED CLEAR OPENING WIDTH LOWER THAN 34 INCHES ABOVE THE FINISH FLOOR OR GROUND. PROJECTIONS INTO THE CLEAR OPENING WIDTH BETWEEN 34 INCHES AND 80 INCHES ABOVE THE FINISH FLOOR OR GROUND SHALL NOT EXCEED 4 INCHES.

404.2.4 MANEUVERING CLEARANCES
MINIMUM MANEUVERING CLEARANCES AT DOORS AND GATES SHALL COMPLY WITH 404.2.4. MANEUVERING CLEARANCES SHALL EXTEND THE FULL WIDTH OF THE DOORWAY AND THE REQUIRED LATCH SIDE OR HINGE SIDE CLEARANCE.

404.2.4.1 SWINGING DOORS AND GATES
SWINGING DOORS AND GATES SHALL HAVE MANEUVERING CLEARANCES COMPLYING WITH TABLE 404.2.4.1.

404.2.4.2 DOORWAYS WITHOUT DOORS OR GATES, SLIDING DOORS, AND FOLDING DOORS
DOORWAYS LESS THAN 36 INCHES WIDE WITHOUT DOORS OR GATES, SLIDING DOORS, OR FOLDING DOORS SHALL HAVE MANEUVERING CLEARANCES COMPLYING WITH TABLE 404.2.4.2.

404.2.9 DOOR AND GATE OPENING FORCE
FIRE DOORS SHALL HAVE A MINIMUM OPENING FORCE ALLOWABLE BY THE APPROPRIATE ADMINISTRATIVE AUTHORITY. THE FORCE FOR PUSHING OR PULLING OPEN A DOOR OR GATE OTHER THAN FIRE DOORS SHALL BE AS FOLLOWS:

1. INTERIOR HINGED DOORS AND GATES: 5 POUNDS MAXIMUM.
2. SLIDING OR FOLDING DOORS: 5 POUNDS MAXIMUM. THESE FORCES DO NOT APPLY TO THE FORCE REQUIRED TO RETRACT LATCH BOLTS OR DISENGAGE OTHER DEVICES THAT HOLD THE DOOR OR GATE IN A CLOSED POSITION.

505 HANDRAILS

SD BUILDING CODE 4-3

4-3.e HANDRAILS ARE REQUIRED IF THE RAMP'S RISE EXCEEDS 6 INCHES. HANDRAILS SHALL BE CONTINUOUS AND BE PROVIDED WITH 12 INCHES EXTENSIONS BEYOND THE TOP AND BOTTOM OF THE RAMP'S SLOPING SURFACE. HANDRAILS WITH A CIRCULAR CROSS SECTION SHALL HAVE AN OUTSIDE DIAMETER OF AT LEAST 1.25 INCHES AND NOT GREATER THAN 2 INCHES. IF THE HANDRAIL IS NOT CIRCULAR, IT SHALL HAVE A PERIMETER DIMENSION OF AT LEAST 4 INCHES AND NOT GREATER THAN 6.25 INCHES WITH A MAXIMUM CROSS-SECTION DIMENSION OF 2.25 INCHES. HANDRAILS SHALL BE UNIFORM IN HEIGHT, NOT LESS THAN 34 INCHES AND NOT MORE THAN 38 INCHES ABOVE THE WALKING SURFACE OF THE RAMP.

ADA 2010

505.2 WHERE REQUIRED
HANDRAILS SHALL BE PROVIDED ON BOTH SIDES OF STAIRS AND RAMPS.

505.3 CONTINUITY
HANDRAILS SHALL BE CONTINUOUS WITHIN THE FULL LENGTH OF EACH STAIR FLIGHT OR RAMP RUN. INSIDE HANDRAILS ON SWITCHBACK OR DOGLEG STAIRS AND RAMPS SHALL BE CONTINUOUS BETWEEN FLIGHTS OR RUNS.

505.4 HEIGHT
TOP OF GRIPPING SURFACES OF HANDRAILS SHALL BE 34 INCHES MINIMUM AND 38 INCHES MAXIMUM VERTICALLY ABOVE WALKING SURFACES, STAIR NOSINGS, AND RAMP SURFACES. HANDRAILS SHALL BE AT A CONSISTENT HEIGHT ABOVE WALKING SURFACES, STAIR NOSINGS, AND RAMP SURFACES.

505.5 CLEARANCE
CLEARANCE BETWEEN HANDRAIL GRIPPING SURFACES AND ADJACENT SURFACES SHALL BE 1 1/2 INCHES MINIMUM.

505.6 GRIPPING SURFACE
HANDRAIL GRIPPING SURFACES SHALL BE CONTINUOUS ALONG THEIR LENGTH AND SHALL NOT BE OBSTRUCTED ALONG THEIR TOPS OR SIDES. THE BOTTOMS OF HANDRAIL GRIPPING SURFACES SHALL NOT BE OBSTRUCTED FOR MORE THAN 20 PERCENT OF THEIR LENGTH. WHERE PROVIDED, HORIZONTAL PROJECTIONS SHALL OCCUR 1 1/2 INCHES MINIMUM BELOW THE BOTTOM OF THE HANDRAIL GRIPPING SURFACE.

505.7 CROSS SECTION
HANDRAIL GRIPPING SURFACES SHALL HAVE A CROSS SECTION COMPLYING WITH 505.7.1 OR 505.7.2.

505.7.1 CIRCULAR CROSS SECTION
HANDRAIL GRIPPING SURFACES WITH A CIRCULAR CROSS SECTION SHALL HAVE AN OUTSIDE DIAMETER OF 1 1/4 INCHES MINIMUM AND 2 INCHES MAXIMUM.

505.7.2 NON-CIRCULAR CROSS SECTIONS
HANDRAIL GRIPPING SURFACES WITH A NON-CIRCULAR CROSS SECTION SHALL HAVE A PERIMETER DIMENSION OF 4 INCHES MINIMUM AND 6 1/4 INCHES MAXIMUM, AND A CROSS-SECTION DIMENSION OF 2 1/4 INCHES MAXIMUM.

505.10 HANDRAIL EXTENSIONS
HANDRAIL GRIPPING SURFACES SHALL EXTEND BEYOND AND IN THE SAME DIRECTION OF STAIR FLIGHTS AND RAMP RUNS IN ACCORDANCE WITH 505.10.

505.10.1 TOP AND BOTTOM EXTENSION AT RAMPS
RAMP HANDRAILS SHALL EXTEND HORIZONTALLY ABOVE THE LANDING FOR 12 INCHES MINIMUM BEYOND THE TOP AND BOTTOM OF RAMP RUNS. EXTENSIONS SHALL RETURN TO A WALL, GUARD, OR THE LANDING SURFACE, OR SHALL BE CONTINUOUS TO THE HANDRAIL OF AN ADJACENT RAMP RUN.

505.10.2 TOP EXTENSION AT STAIRS
AT THE TOP OF A STAIR FLIGHT, HANDRAILS SHALL EXTEND HORIZONTALLY ABOVE THE LANDING FOR 12 INCHES MINIMUM BEGINNING DIRECTLY ABOVE THE FIRST RISER NOSING. EXTENSIONS SHALL RETURN TO A WALL, GUARD, OR THE LANDING SURFACE, OR SHALL BE CONTINUOUS TO THE HANDRAIL OF AN ADJACENT STAIR FLIGHT.

505.10.3 BOTTOM EXTENSION AT STAIRS
AT THE BOTTOM OF A STAIR FLIGHT, HANDRAILS SHALL EXTEND AT THE SLOPE OF THE STAIR FLIGHT FOR A HORIZONTAL DISTANCE AT LEAST EQUAL TO ONE TREAD DEPTH BEYOND THE LAST RISER NOSING. EXTENSION SHALL RETURN TO A WALL, GUARD, OR THE LANDING SURFACE, OR SHALL BE CONTINUOUS TO THE HANDRAIL OF AN ADJACENT STAIR FLIGHT.

TABLE 404.2.4.1 MANEUVERING CLEARANCES AT MANUAL SWINGING DOORS AND GATES

TYPE OF USE		MINIMUM MANEUVERING CLEARANCE	
APPROACH DIRECTION	DOOR OR GATE SIDE	PERPENDICULAR TO DOORWAY	PARALLEL TO DOORWAY (BEYOND LATCH SIDE UNLESS NOTED)
FROM FRONT	PULL	60 INCHES	18 INCHES
FROM FRONT	PUSH	48 INCHES	0 INCHES
FROM HINGE SIDE	PULL	60 INCHES	36 INCHES
FROM HINGE SIDE	PULL	54 INCHES	42 INCHES
FROM HINGE SIDE	PUSH	42 INCHES	22 INCHES
FROM LATCH SIDE	PULL	48 INCHES	24 INCHES
FROM LATCH SIDE	PUSH	42 INCHES	24 INCHES

TABLE 404.2.4.2 MANEUVERING CLEARANCES AT DOORWAYS WITHOUT DOORS OR GATES, MANUAL SLINGING DOORS, AND MANUAL FOLDING DOORS

MINIMUM MANEUVERING CLEARANCE		
APPROACH DIRECTION	PERPENDICULAR TO DOORWAY	PARALLEL TO DOORWAY (BEYOND STOP/LATCH SIDE UNLESS NOTED)
FROM FRONT	48 INCHES	0 INCHES
FROM SIDE	42 INCHES	0 INCHES
FROM POCKET/HINGE SIDE	42 INCHES	22 INCHES
FROM STOP/LATCH SIDE	42 INCHES	24 INCHES



TEAM NAME	RISE
ADDRESS	390 S 34 STREET, RICHMOND, CA 94804
CONTACT	berkeleysolardecathlon@gmail.com https://solardecathlon.berkeley.edu

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MARK	DATE	DESCRIPTION

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SHEET TITLE

ACCESSIBLE REGULATIONS

G-004

TEAM NAME RISE
 ADDRESS 390 S 34 STREET,
 RICHMOND, CA 94804
 CONTACT berkeleysolardecathlon@gmail.com
 https://solardecathlon.berkeley.edu

CONSULTANTS

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**EAST AND WEST
 ELEVATION COMPLIANCE**

G-202

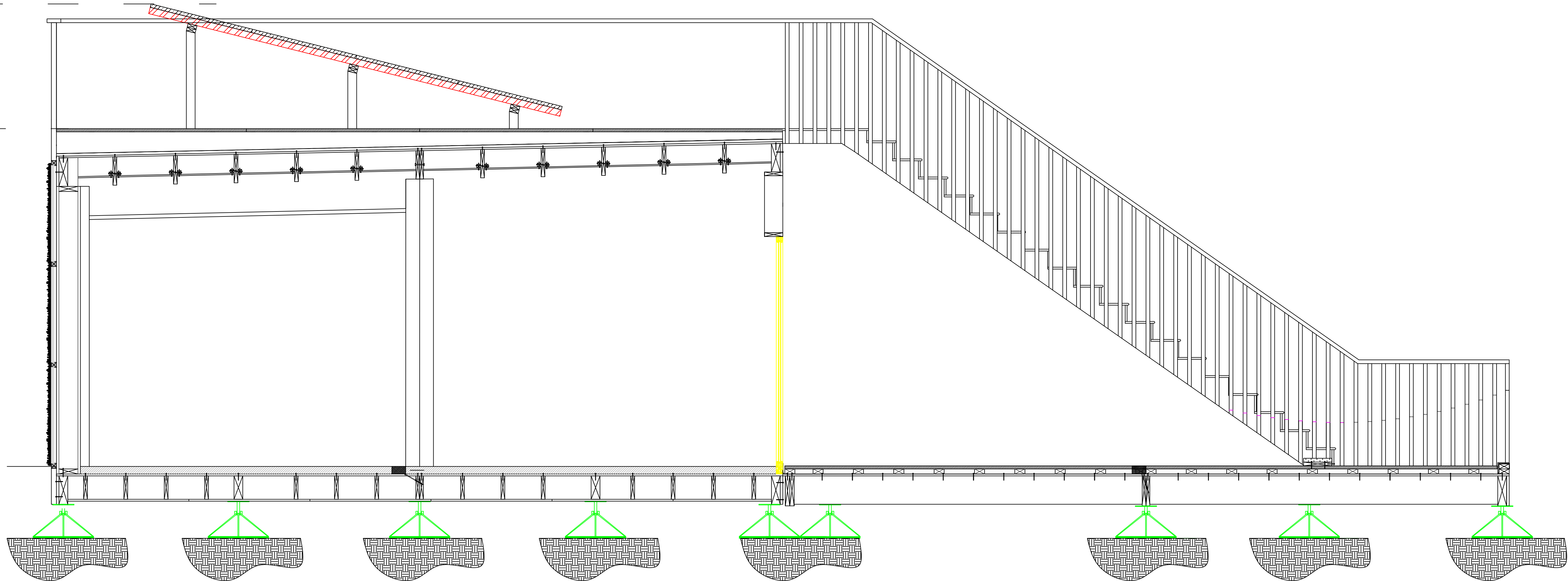
MAX SOLAR ENVELOPE
18'

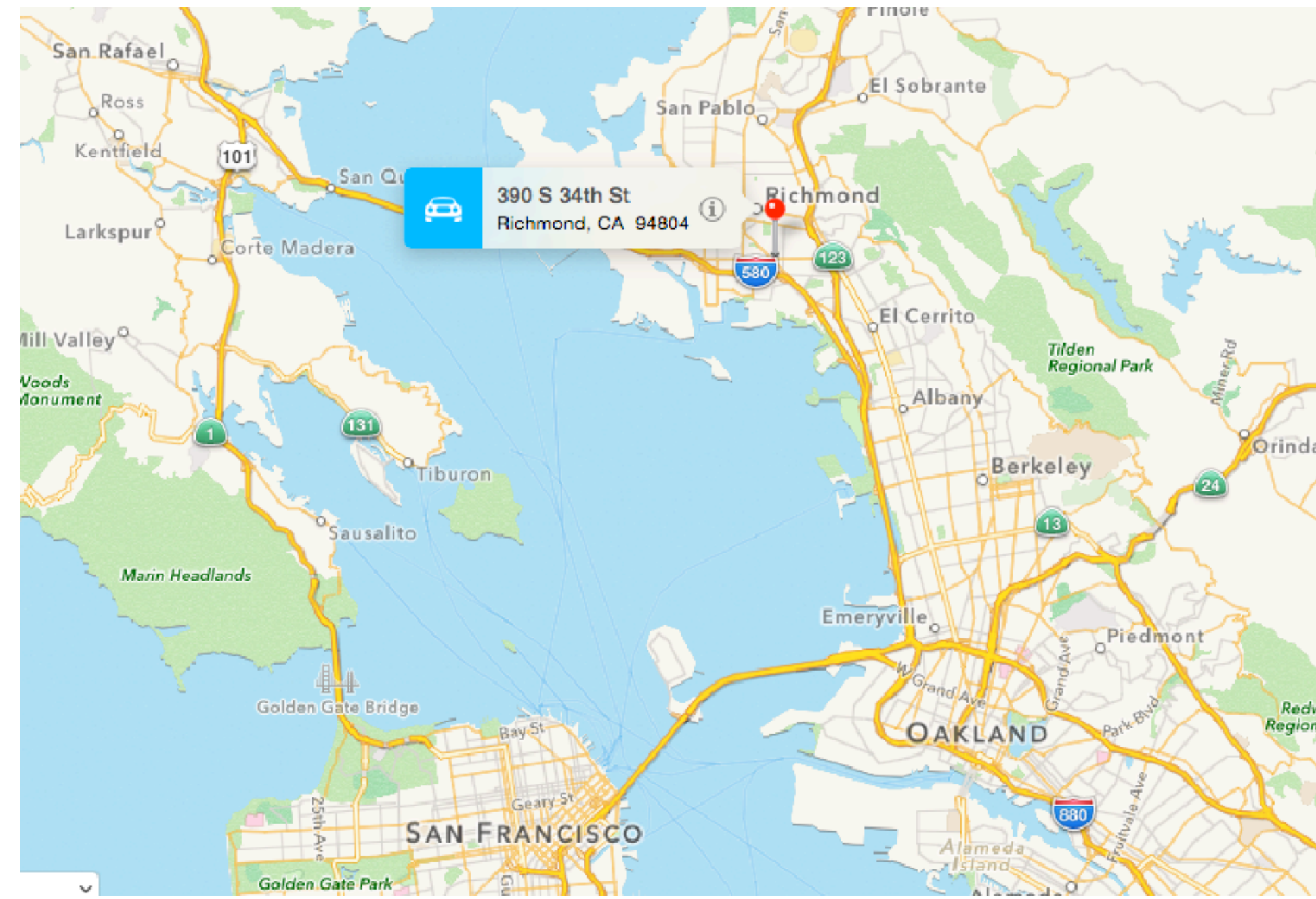
TOP OF CONSTRUCTED SPACE
17' 5-5/8"

FINISHED ROOF
13' 1-1/8"

FINISHED FLOOR
2'-6 1/2"

GRADE LEVEL
0'





TEAM NAME RISE
ADDRESS 390 S 34 STREET,
RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS

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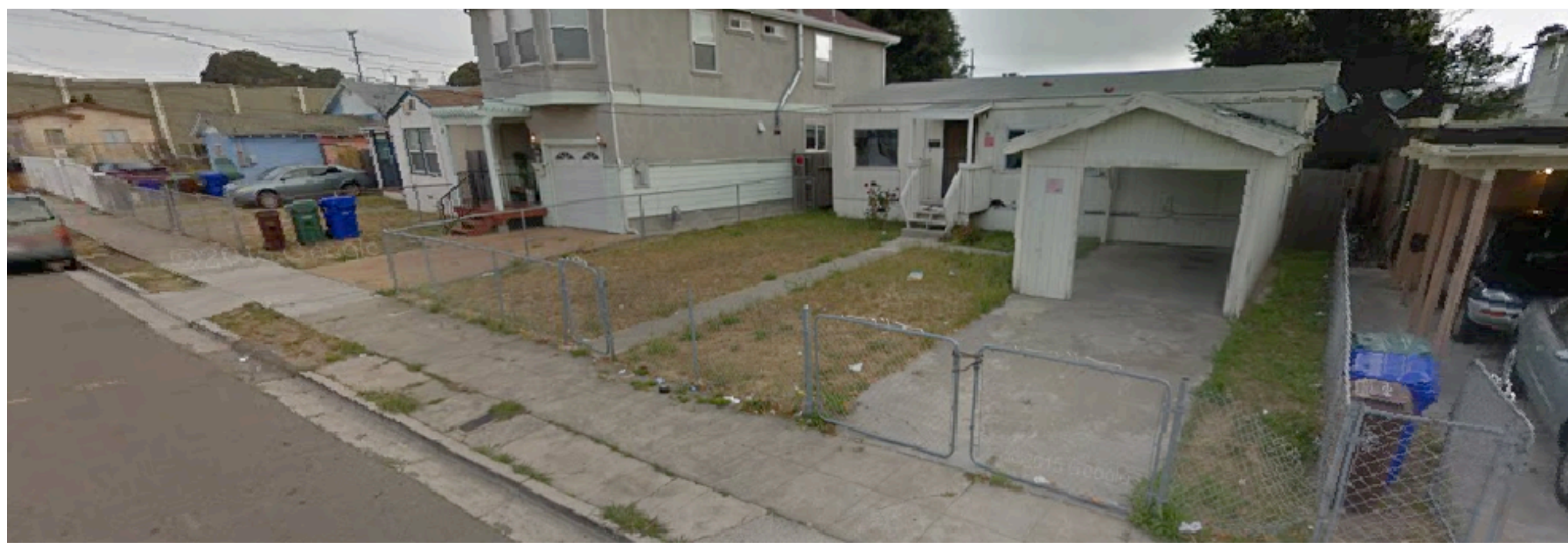


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SITE INVESTIGATION



RISE - UC Berkeley

TEAM NAME RISE
 ADDRESS 390 S 34 STREET,
 RICHMOND, CA 94704
 CONTACT berkeleysolardecathlon@gmail.com
 https://solardecathlon.berkeley.edu

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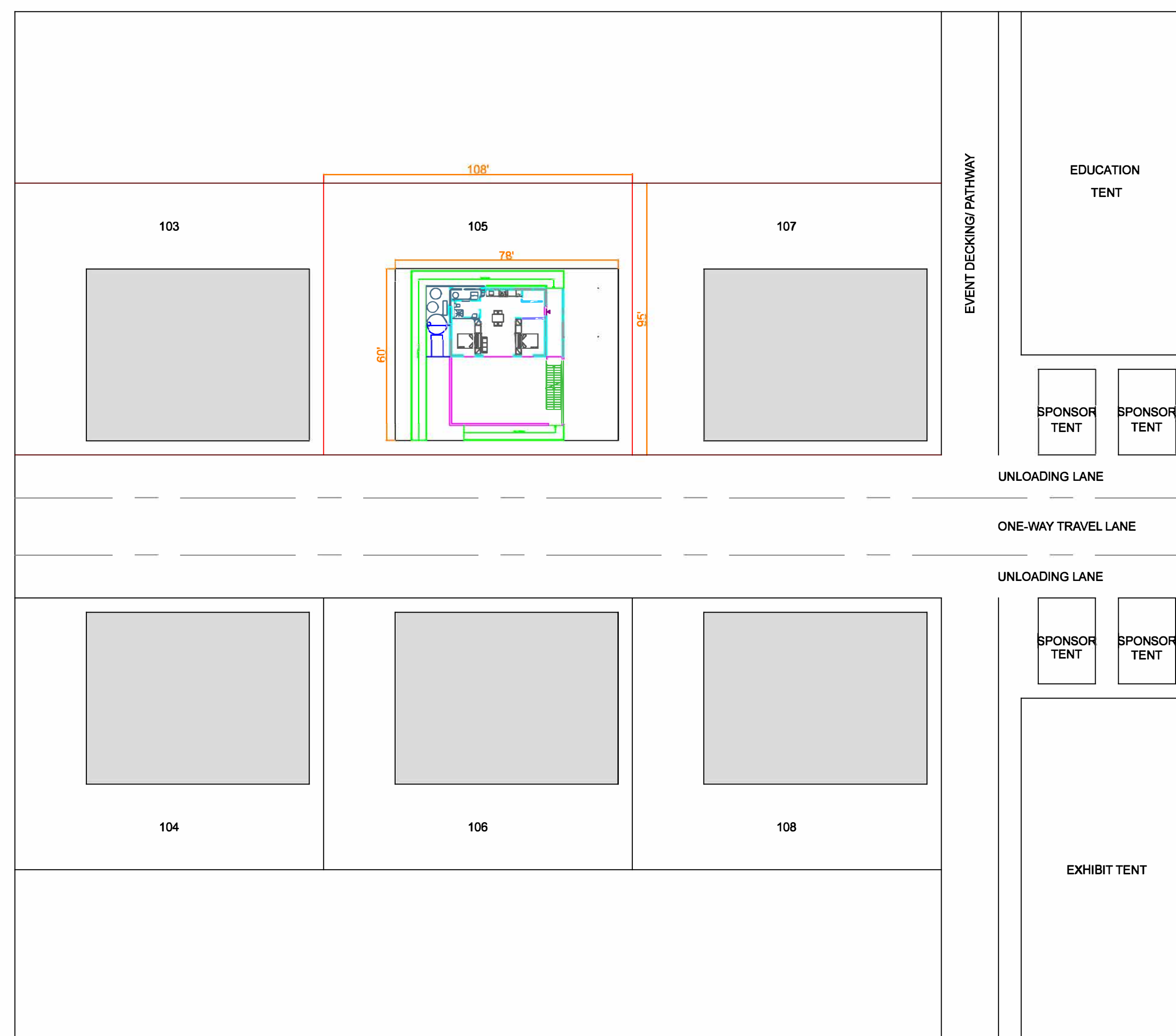


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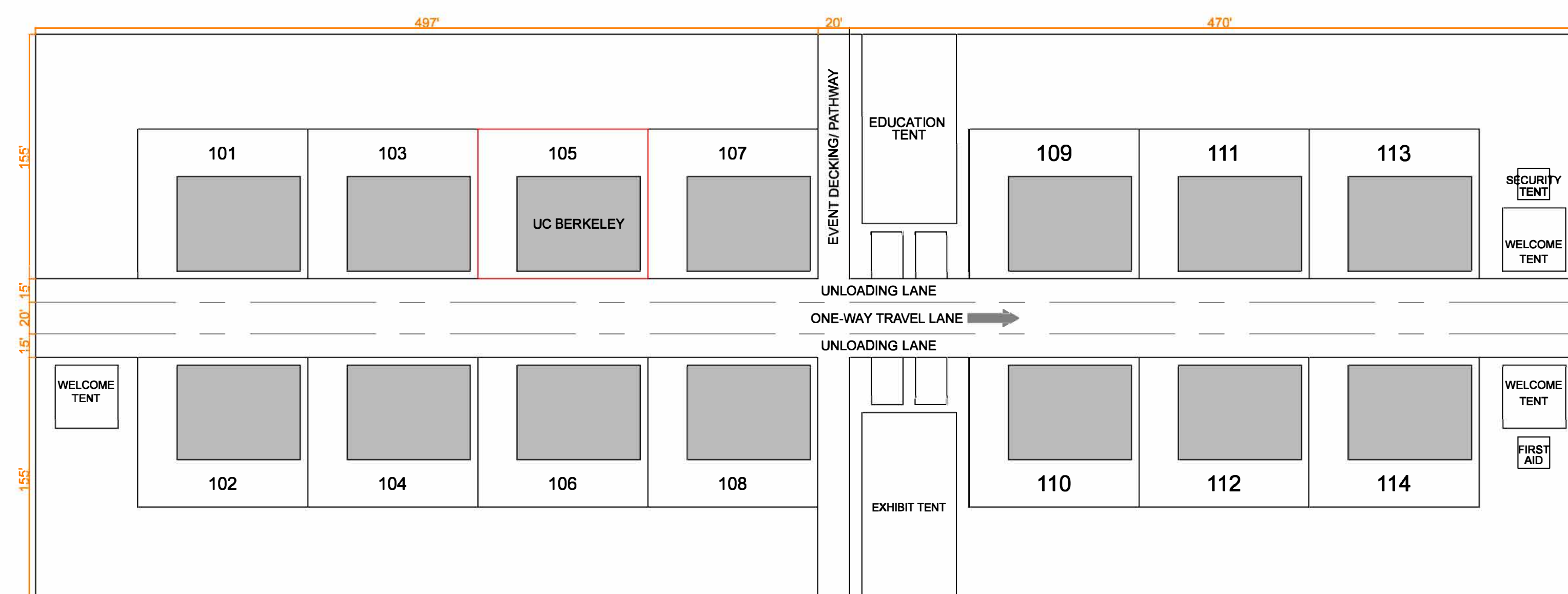
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COMPETITION SITE PLAN



A2 COMPETITION SITE DETAIL
 Scale 1/32" = 1'-0"



A1 COMPETITION SITE PLAN
 Scale 1/64" = 1'-0"

TEAM NAME RISE
ADDRESS 390 S 34 STREET,
RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS

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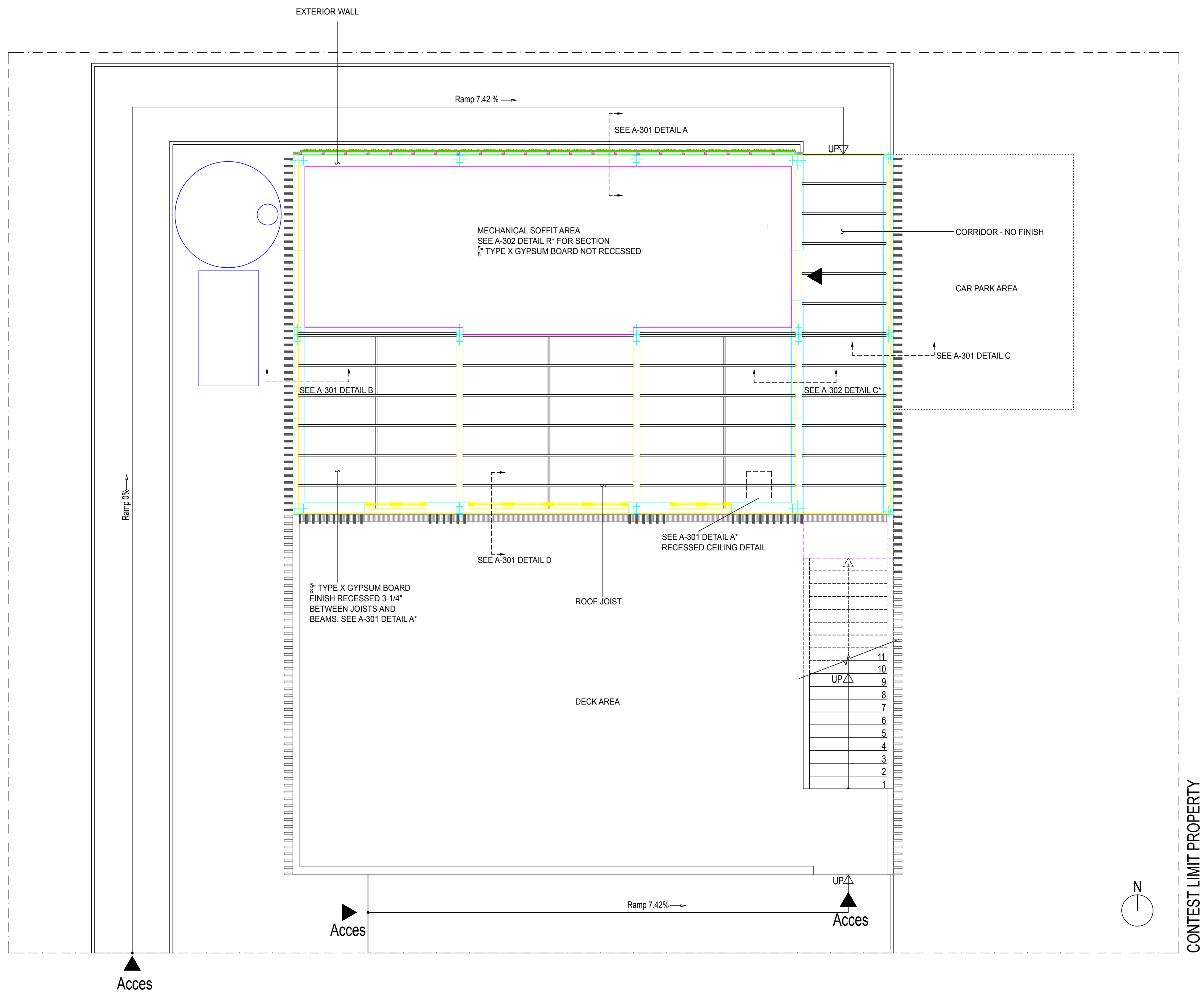


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SHEET TITLE
**REFLECTED
CEILING PLAN**

A-121



A Reflected Ceiling Plan
Scale 1/4" = 1'-0"

RISE

TEAM NAME RISE
ADDRESS 390 S 34 STREET,
RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS:
IAN KELSO
JOHN-MICHAEL WONG
PAUL WESTERMANN

CLIENT
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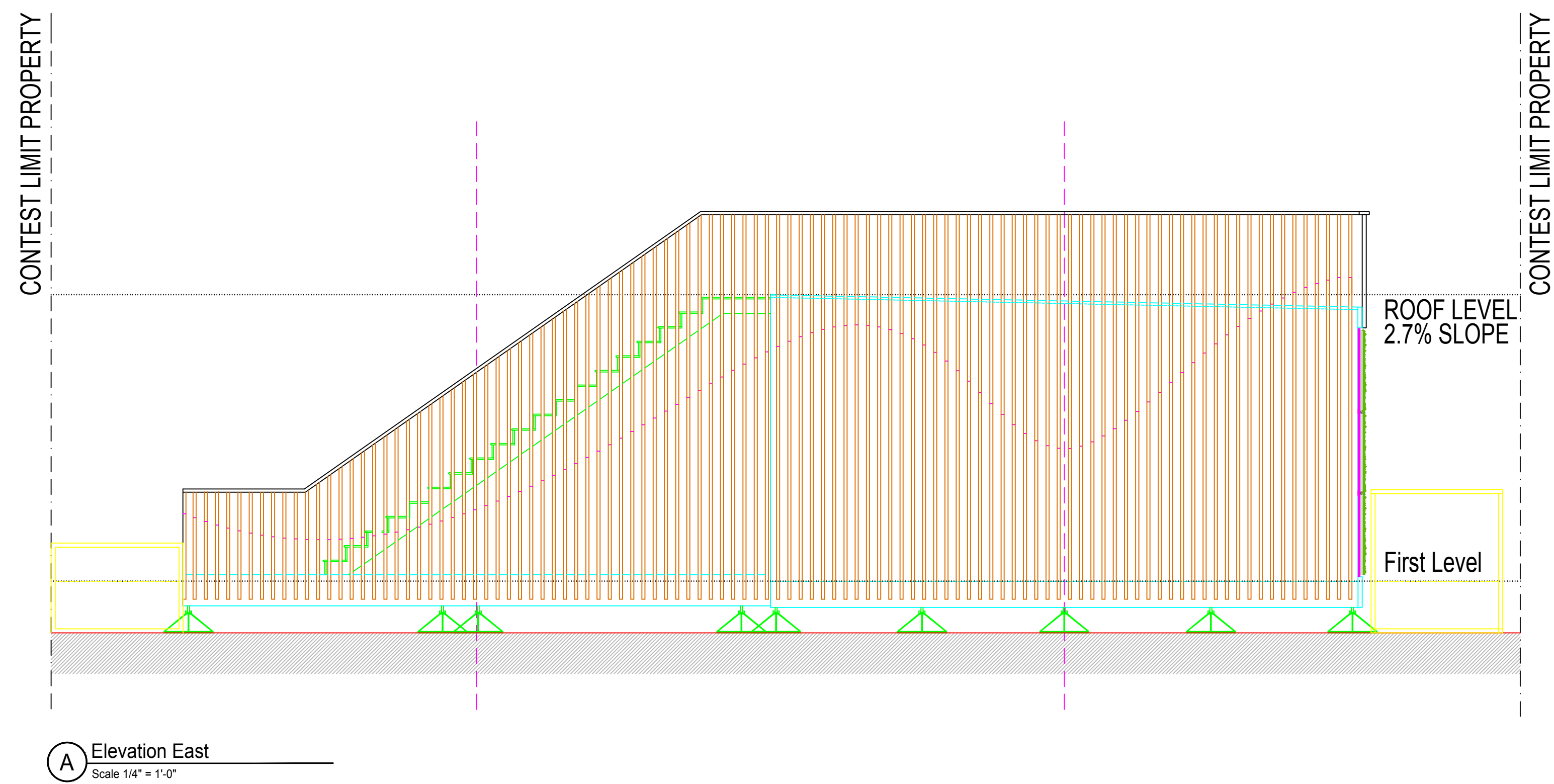
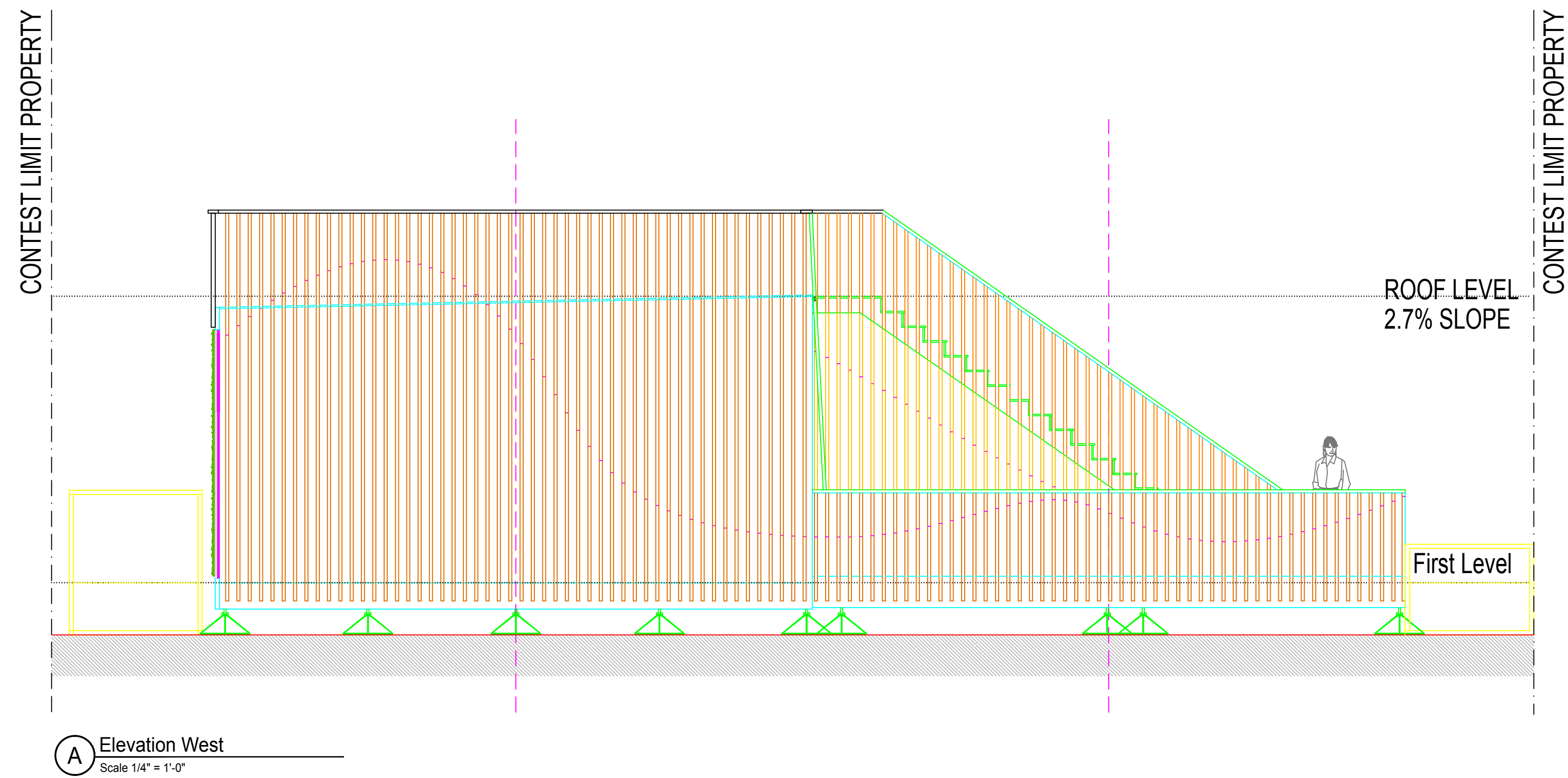
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SHEET TITLE

**BUILDING
ELEVATIONS**

A-201



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TEAM NAME RISE
ADDRESS 390 S 34 STREET,
RICHMOND, CA, 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS:
IAN KELSO
JOHN-MICHAEL WONG
PAUL WESTERMANN

CLIENT
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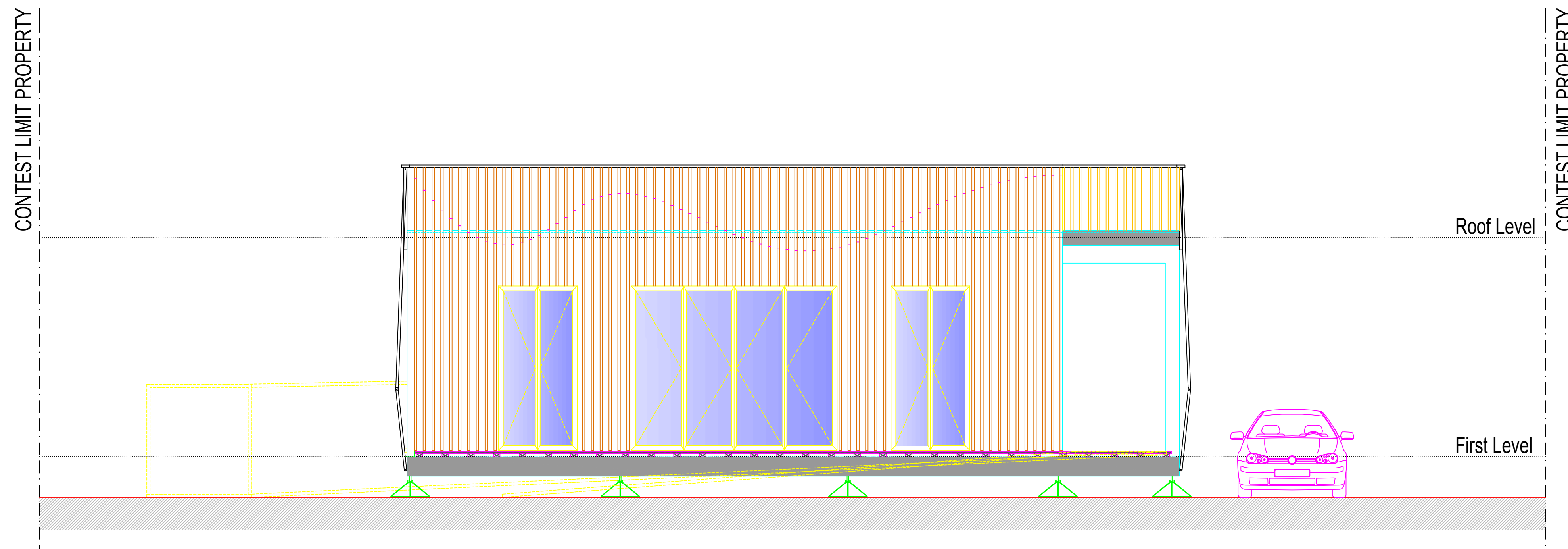
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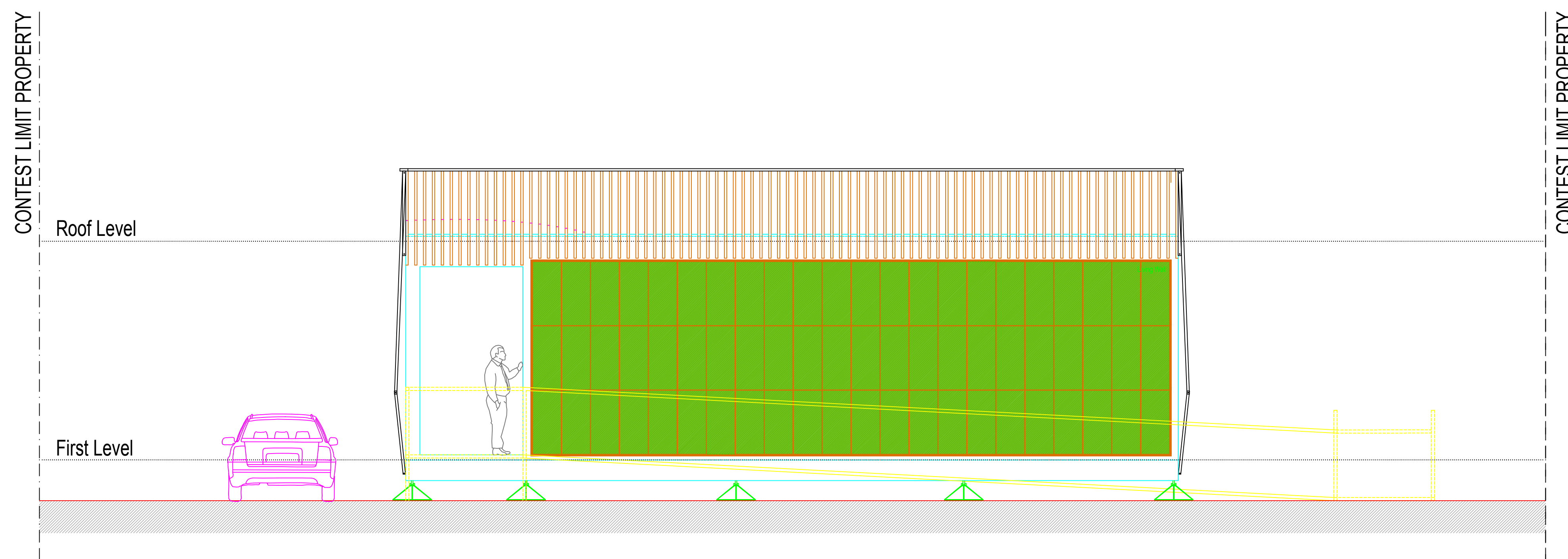
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**BUILDING
ELEVATIONS**

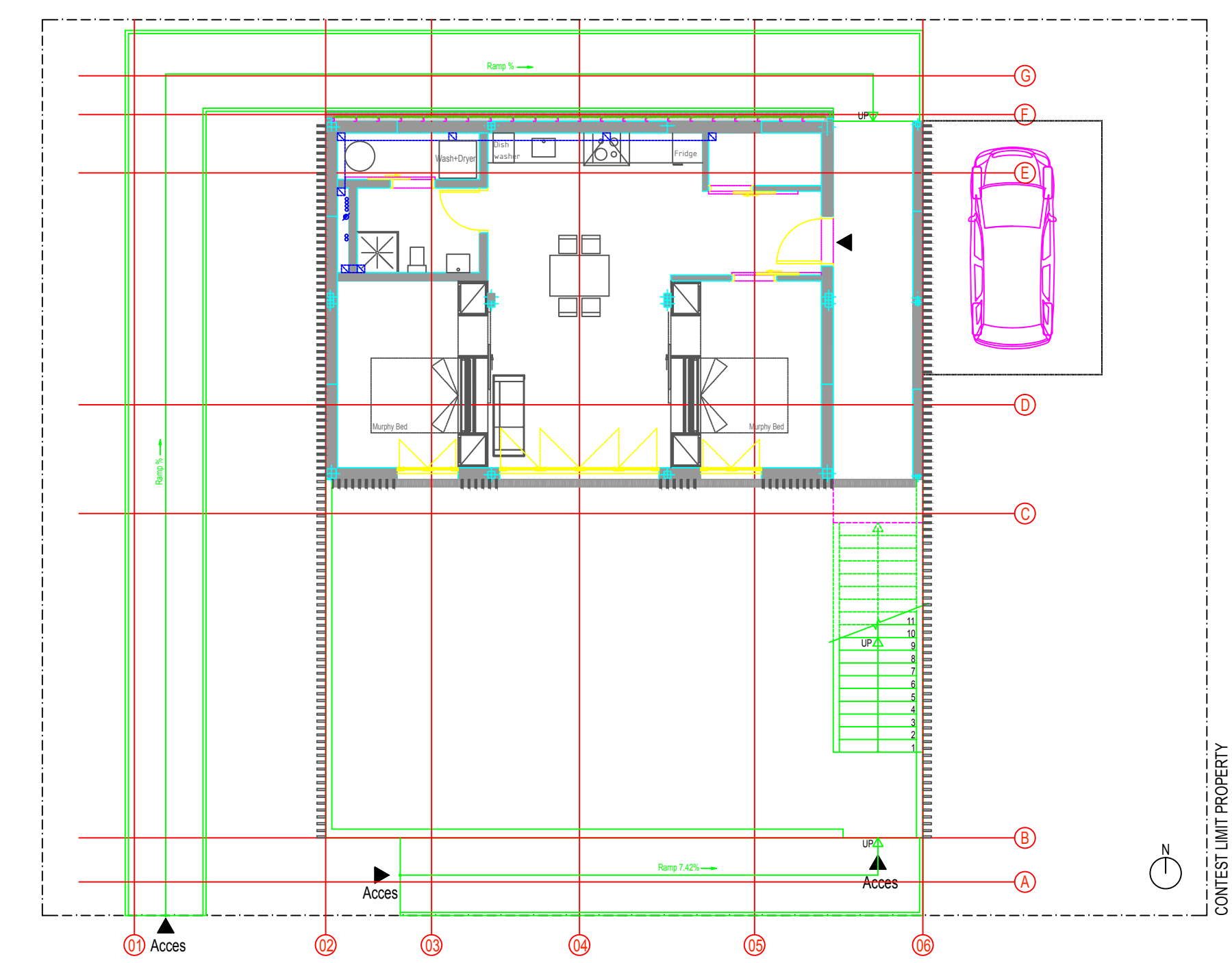
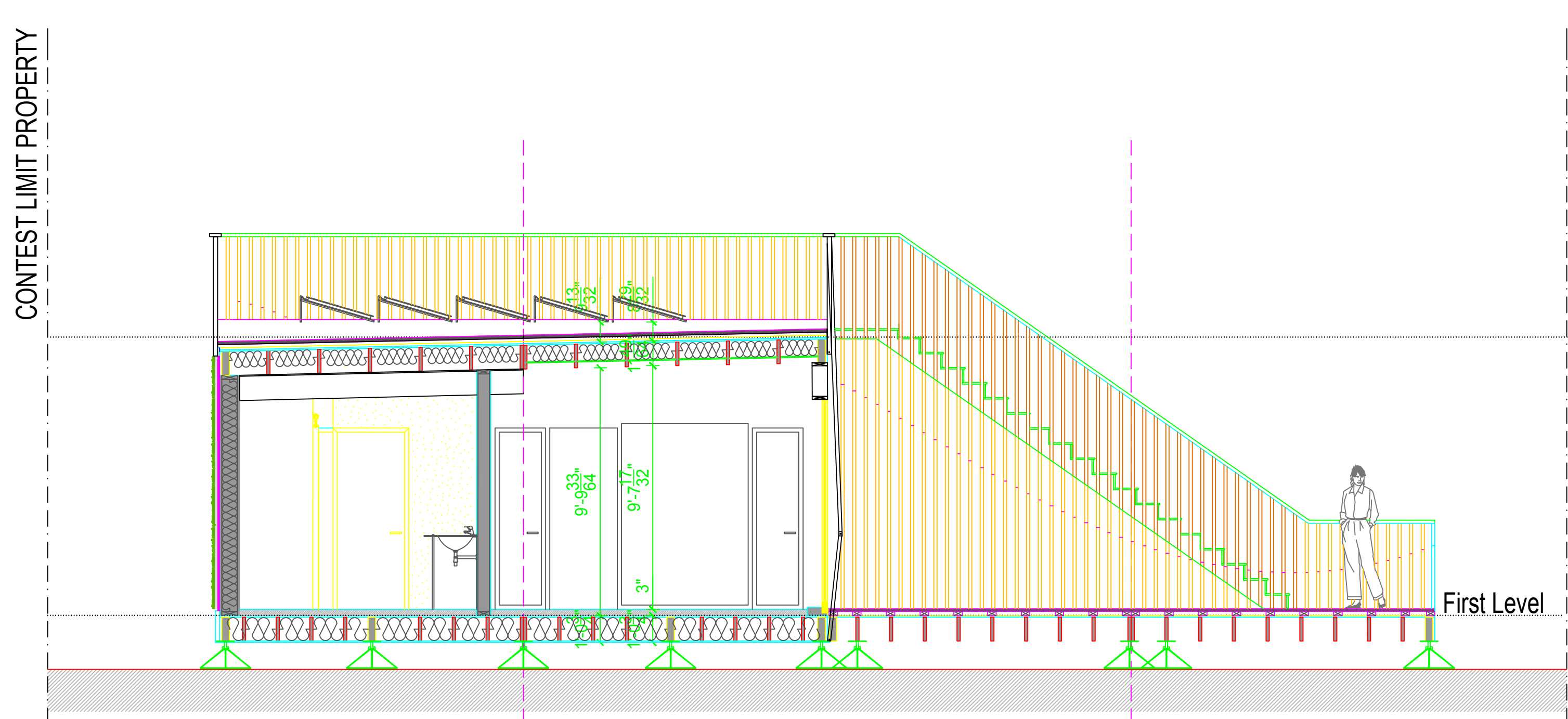
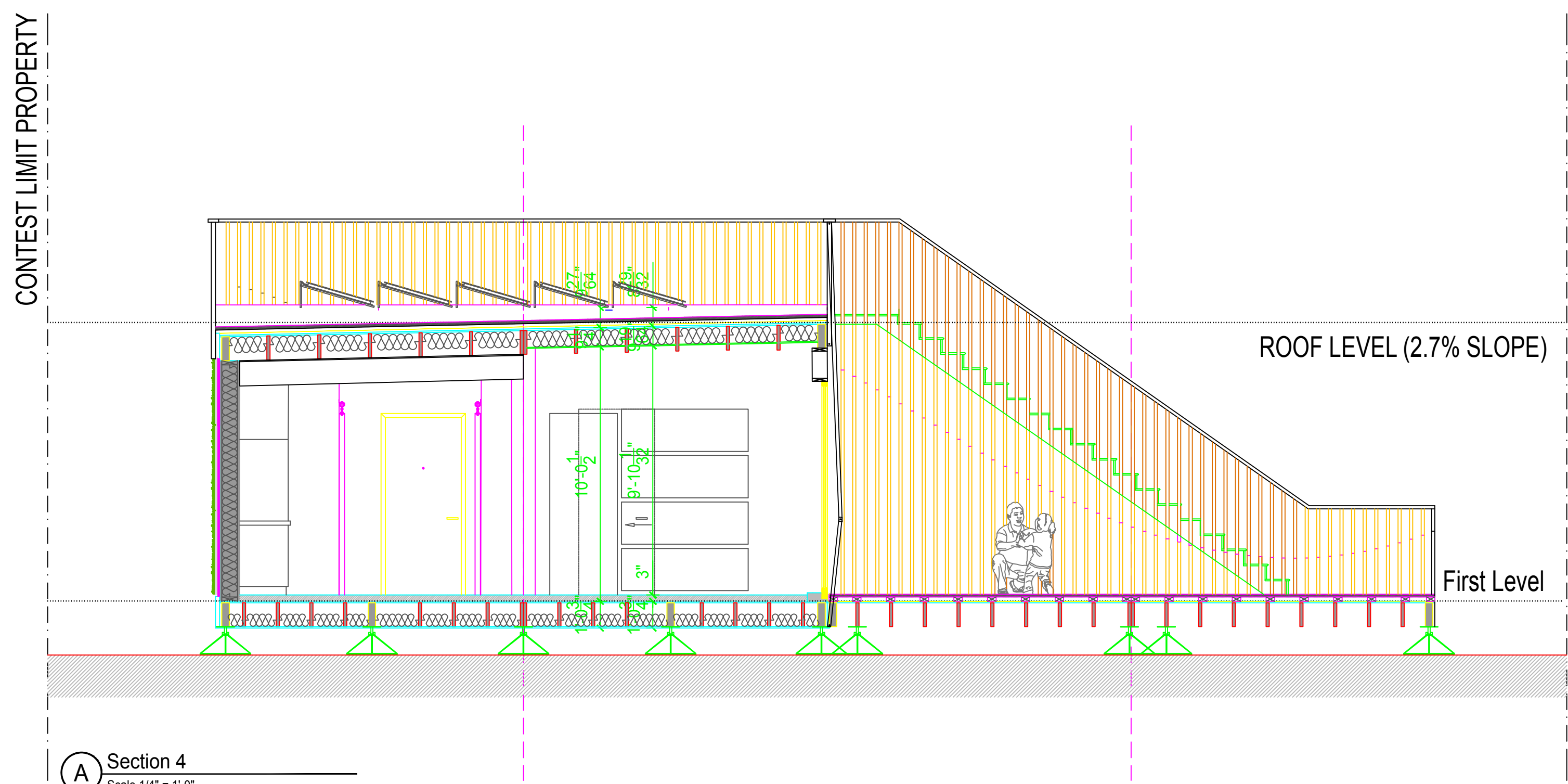
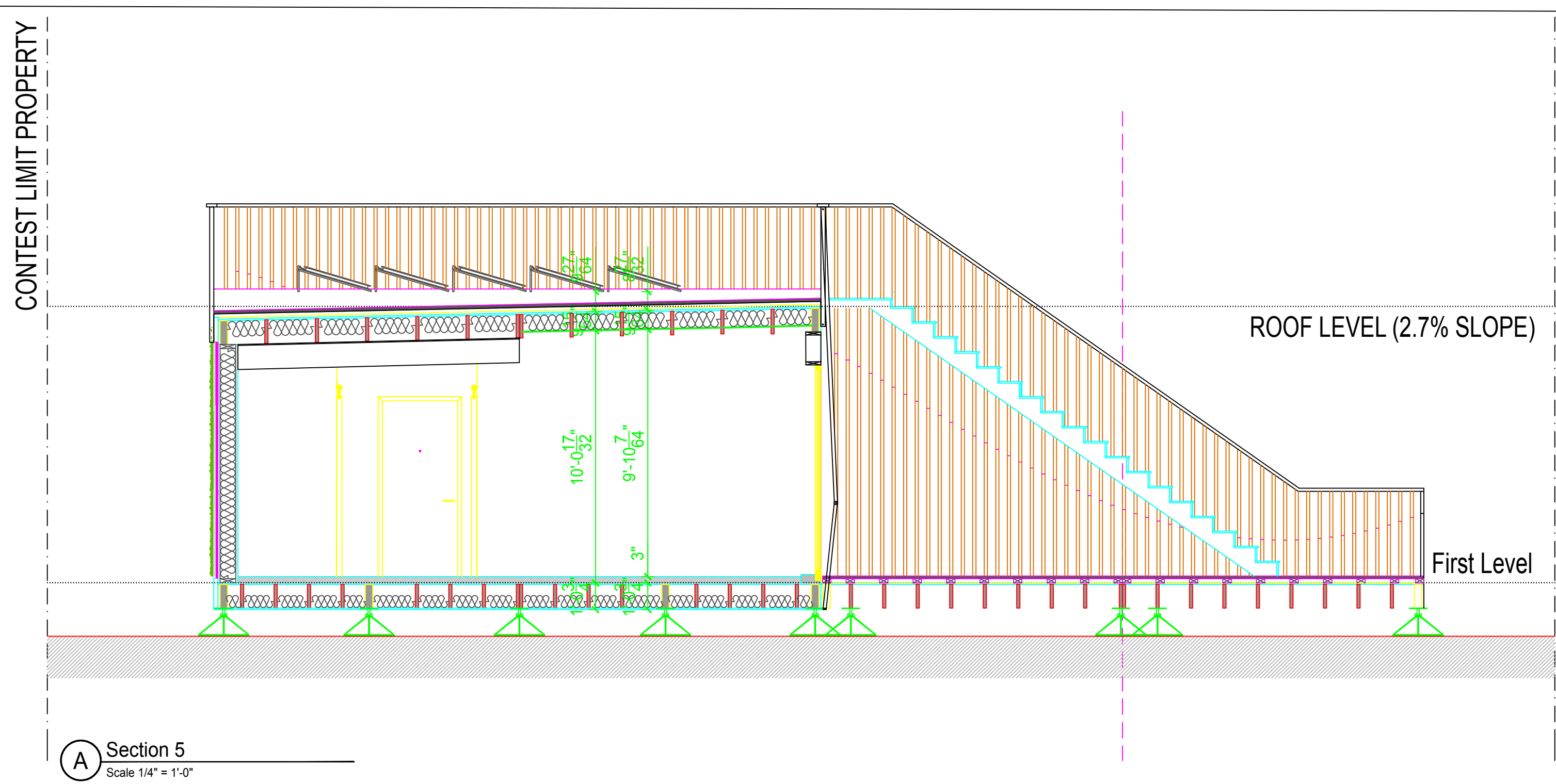
A-202



A Elevation South
Scale 1/4" = 1'-0"



A Elevation North
Scale 1/4" = 1'-0"



RISE

TEAM NAME: RISE
 ADDRESS: 390 S 34 STREET, RICHMOND, CA 94804
 CONTACT: berkeleysolardecathlon@gmail.com
 https://solardecathlon.berkeley.edu

CONSULTANTS:
 IAN KELSO
 JOHN-MICHAEL WONG
 PAUL WESTERMANN

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CROSS SECTIONS

TEAM NAME RISE
ADDRESS 390 S 34 STREET,
RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS:
IAN KELSO
JOHN-MICHAEL WONG
PAUL WESTERMANN

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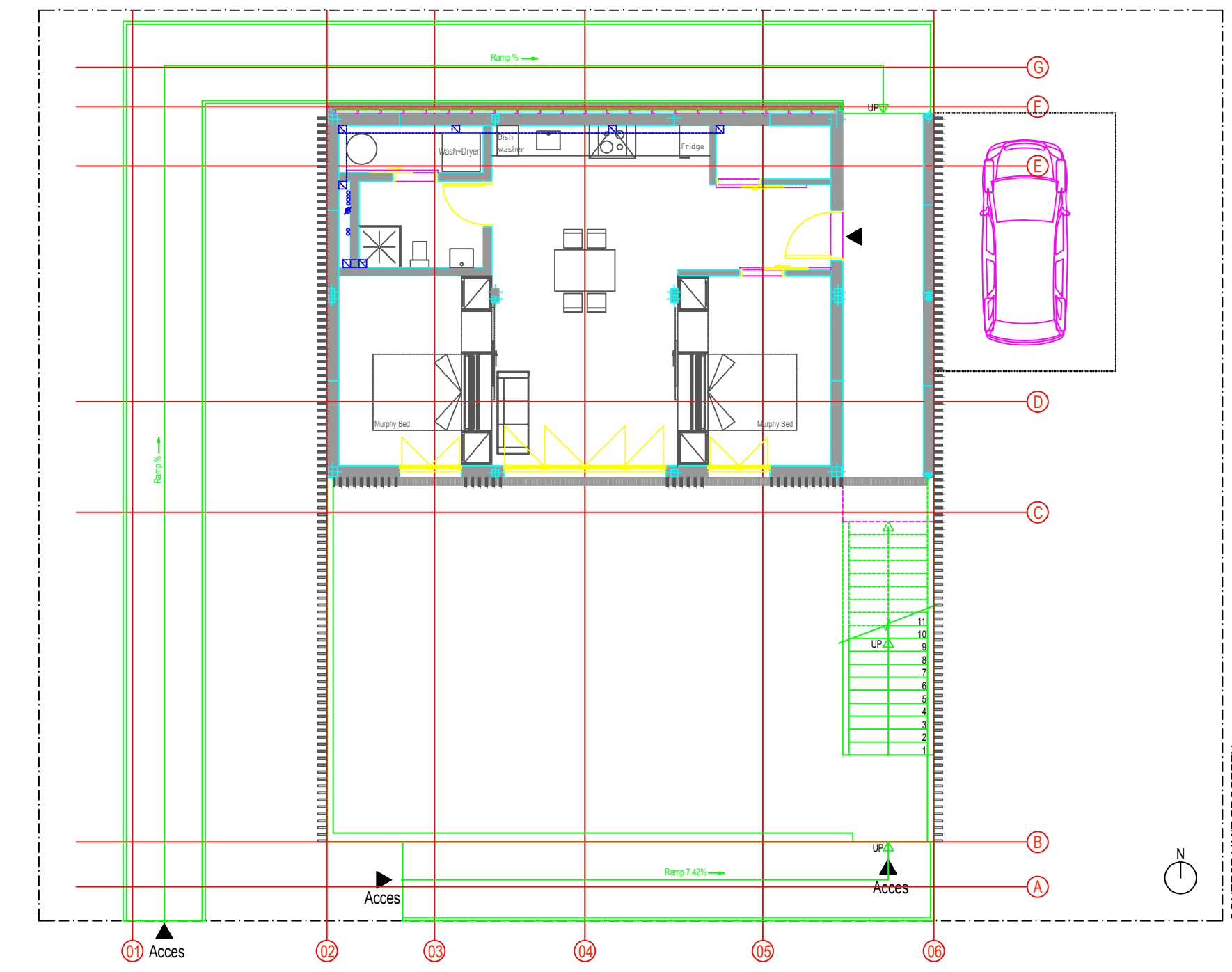
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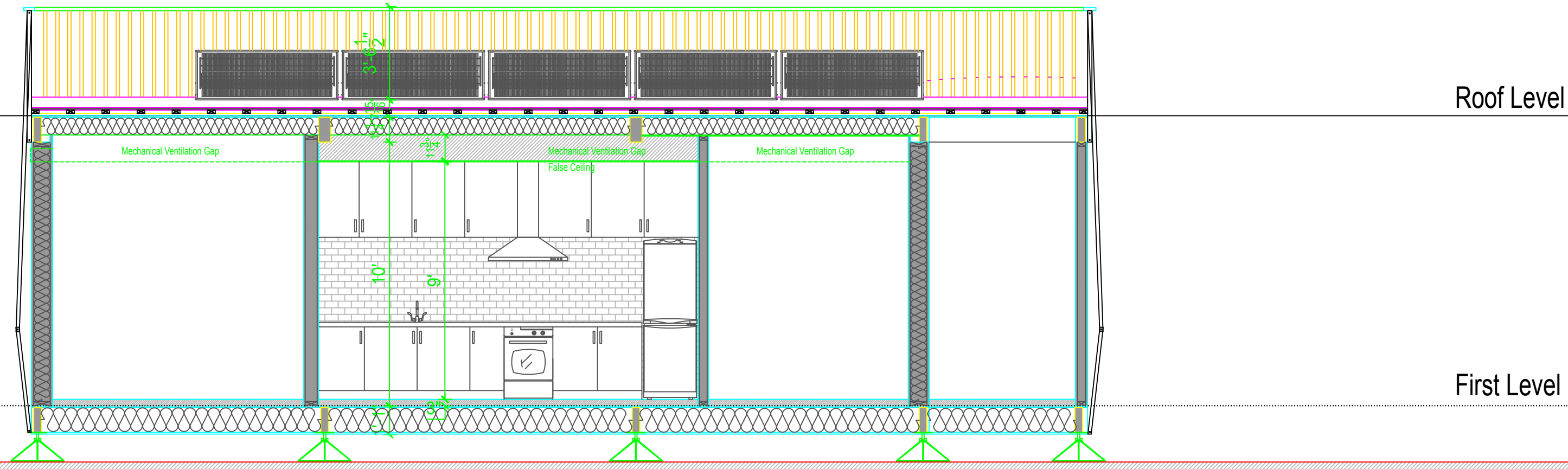
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CROSS
SECTIONS

A-205

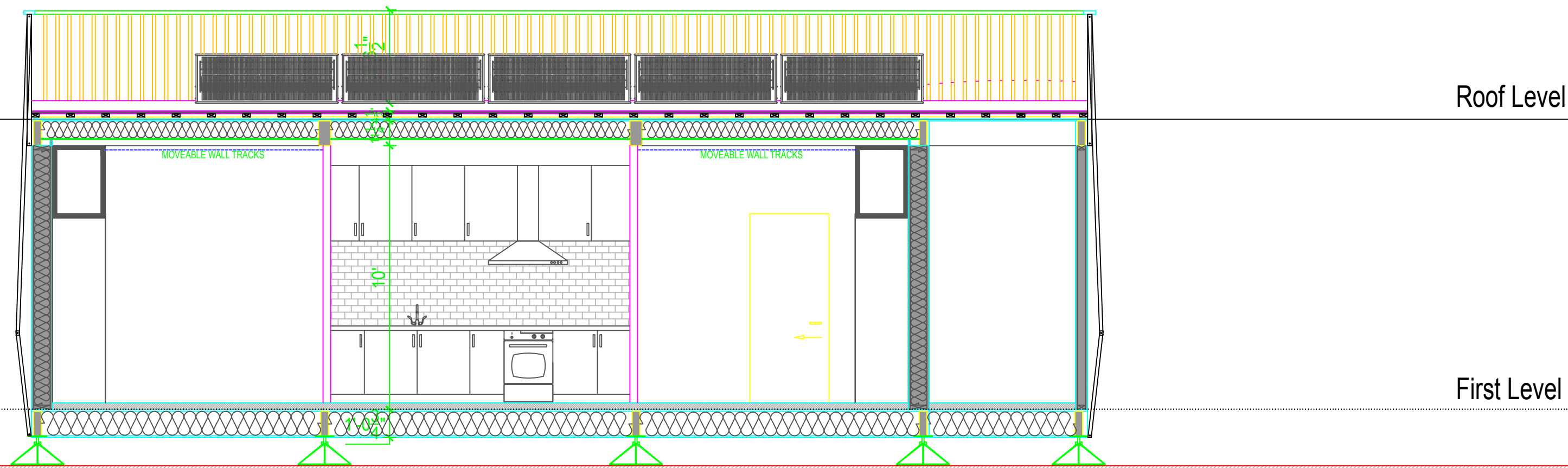


NOTE THAT VERTICAL DIMENSIONS FLOOR TO ROOF FINISH VARY 6" FROM SOUTH(HIGH) TO NORTH (LOW) DUE TO ROOF SLOPE



Section E
A Section E
Scale 1/4" = 1'-0"

NOTE THAT VERTICAL DIMENSIONS FLOOR TO ROOF FINISH VARY 6" FROM SOUTH(HIGH) TO NORTH (LOW) DUE TO ROOF SLOPE



Section D
A Section D
Scale 1/4" = 1'-0"

RISE

TEAM NAME **RISE**
ADDRESS **390 S 34 STREET,
RICHMOND, CA 94804**
CONTACT **berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu**

CONSULTANTS:
**IAN KELSO
JOHN-MICHAEL WONG
PAUL WESTERMANN**

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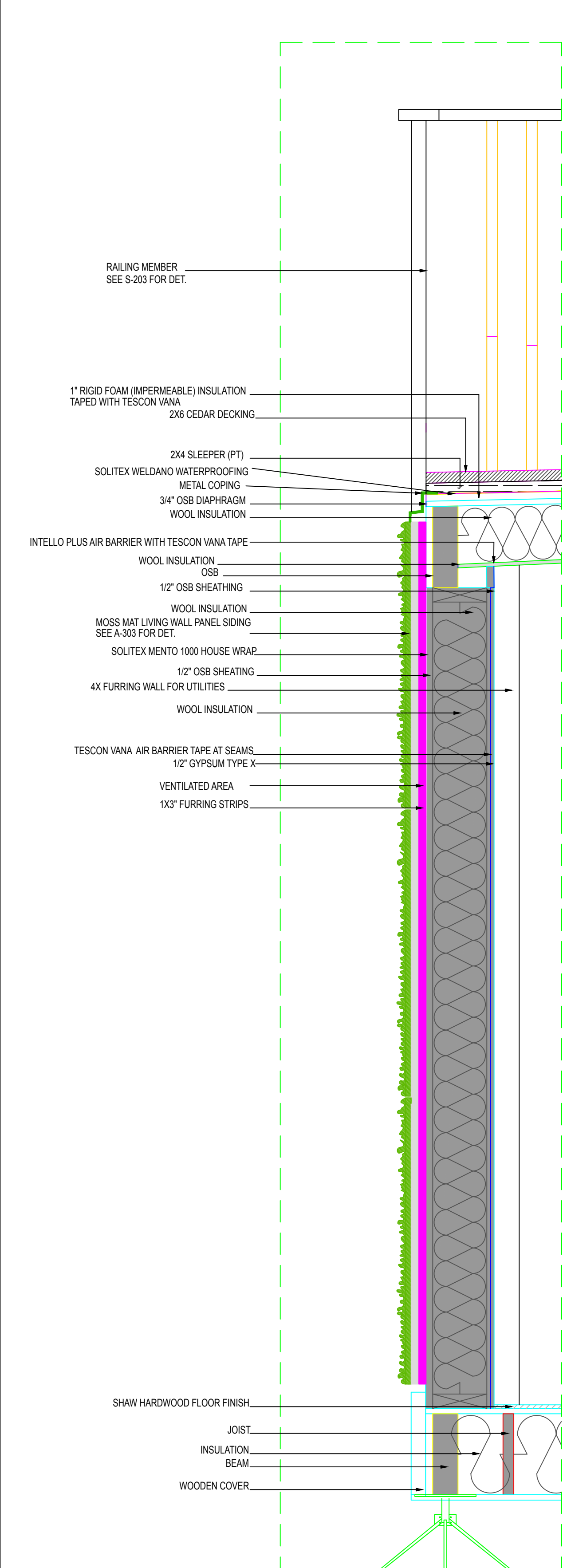
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SHEET TITLE

WALL SECTIONS

A-301



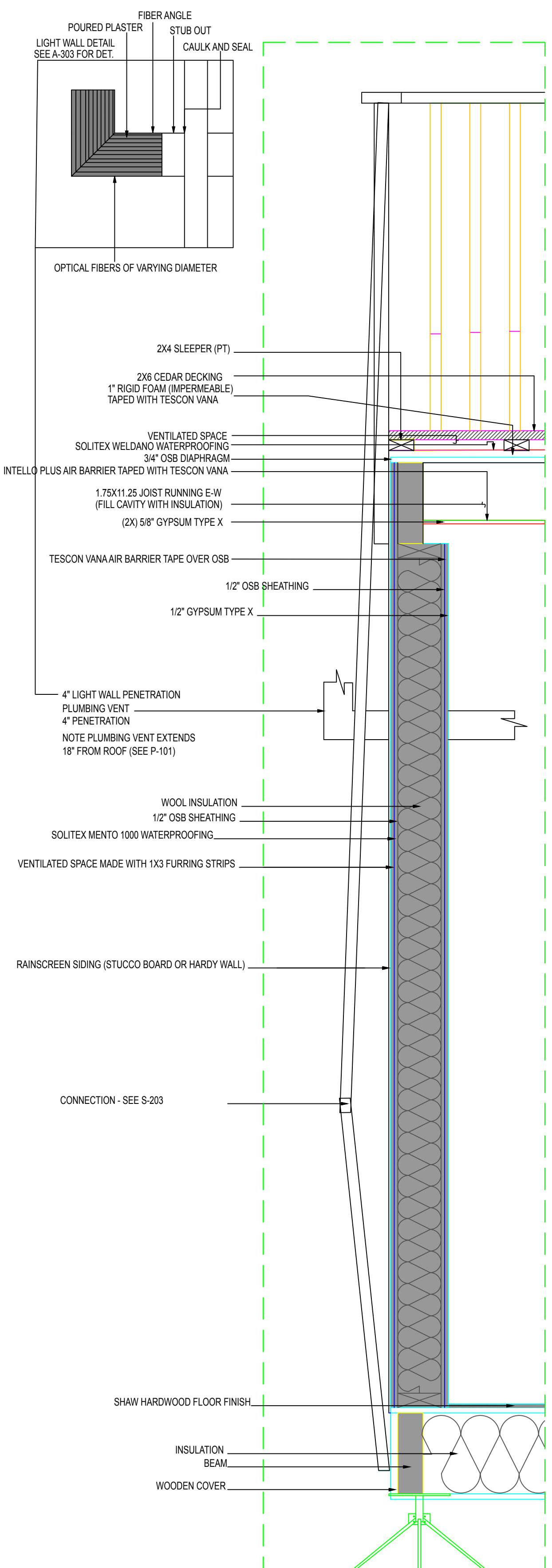
A North Wall - Vertical Section Detail
Scale 1" = 1'-0"

R VALUE PER IRC N1101.5

2X8 STUD WALL 24" O.C.
R19 WOOL BATT
R13 WOOL BATT
2X8 STUD = R10
1/2" OSB, FILM, SIDE = R2

100% STUD WALL
6% STUDS

OVERALL R31



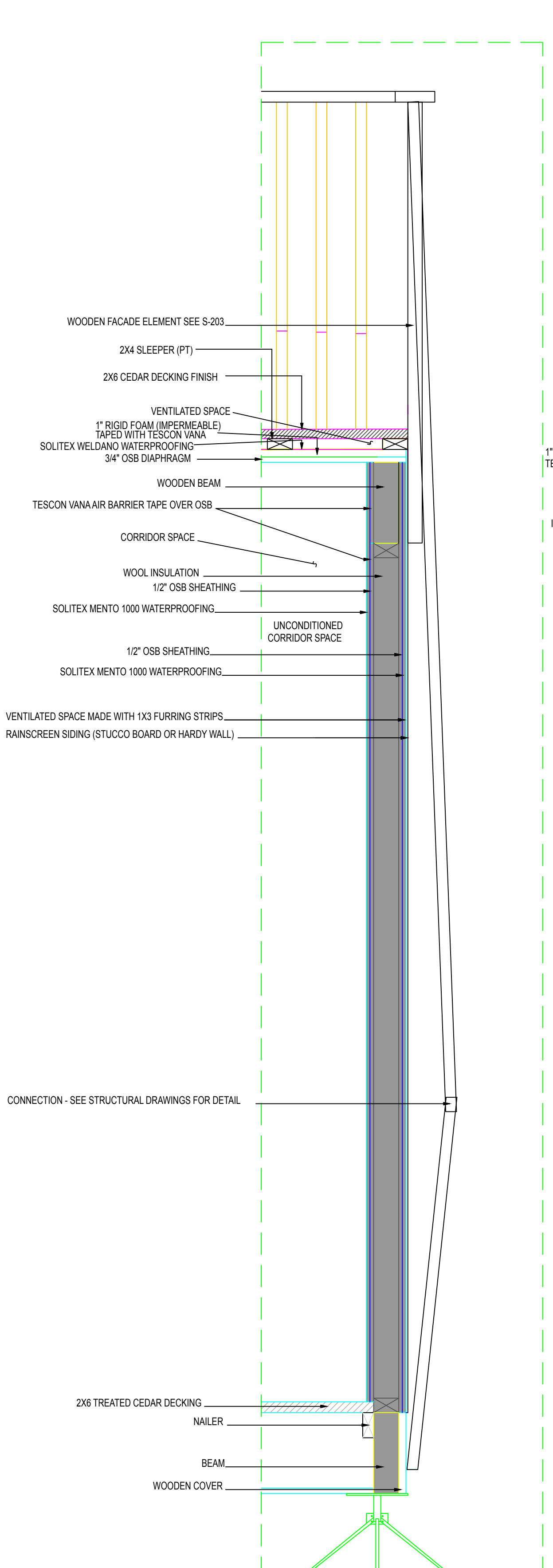
B West Wall - Vertical Section Detail
Scale 1" = 1'-0"

R VALUE PER IRC N1101.5

2X8 STUD WALL 24" O.C.
R19 WOOL BATT
R13 WOOL BATT
2X8 STUD = R10
1/2" OSB, FILM, SIDE = R2

100% STUD WALL
6% STUDS

OVERALL R31

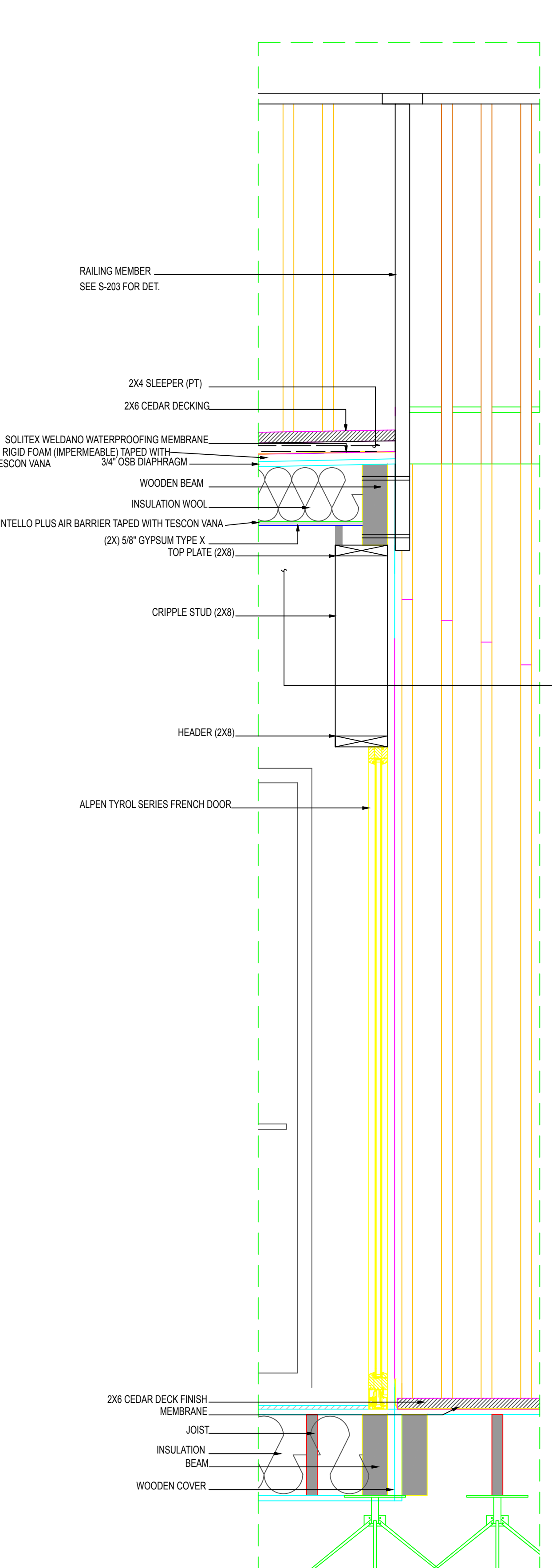


C Corridor Wall - Vertical Section Detail
Scale 1" = 1'-0"

R VALUE PER IRC N1101.5

NOT APPLICABLE TO CORRIDOR
WALL WHICH IS NOT INSULATED

SEE C* SECTION A-302 FOR
EAST WALL VALUE



D South Wall - Vertical Section Detail
Scale 1" = 1'-0"

R VALUE PER IRC N1101.5

ALPEN ZR10 WINDOW = R10
2X8 STUD WALL 24" O.C.
R19 WOOL BATT
R13 WOOL BATT
2X8 STUD = R10
1/2" OSB, FILM, SIDE = R2

41% WINDOW
59% STUD WALL (10.5% STUDS)

OVERALL R21

R VALUE PER IRC N1101.5

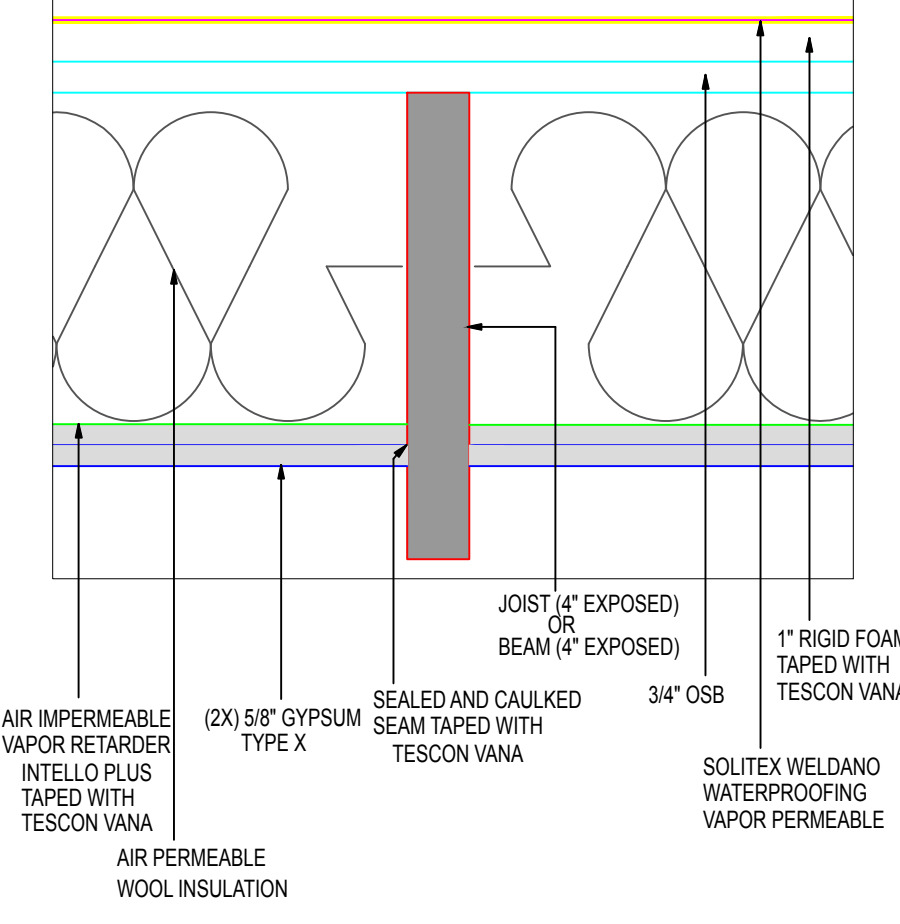
ROOF

2X8 STUD WALL 24" O.C.
R19 WOOL BATT
R13 WOOL BATT
2X12 WOOD = R16
1/2" OSB, FILM, SIDE = R2

24" O.C. JOISTS+BEAMS
7% BEAMS AND JOISTS

OVERALL R29

A* AIR IMPERMEABILITY DETAIL
Scale 1" = 1'-0"



R VALUE PER IRC N1101.5

FLOOR

2X12 FLOORL 16" O.C.
10.5" WOOL = R45
2X12 JOIST+BEAM = R16
1/2" OSB, FILM, SIDE = R2

16" O.C. JOISTS AND BEAMS
7% WOOD

OVERALL R45

RISE

TEAM NAME RISE
ADDRESS 390 S 34 STREET,
RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS:
IAN KELSO
JOHN-MICHAEL WONG
PAUL WESTERMANN

CLIENT
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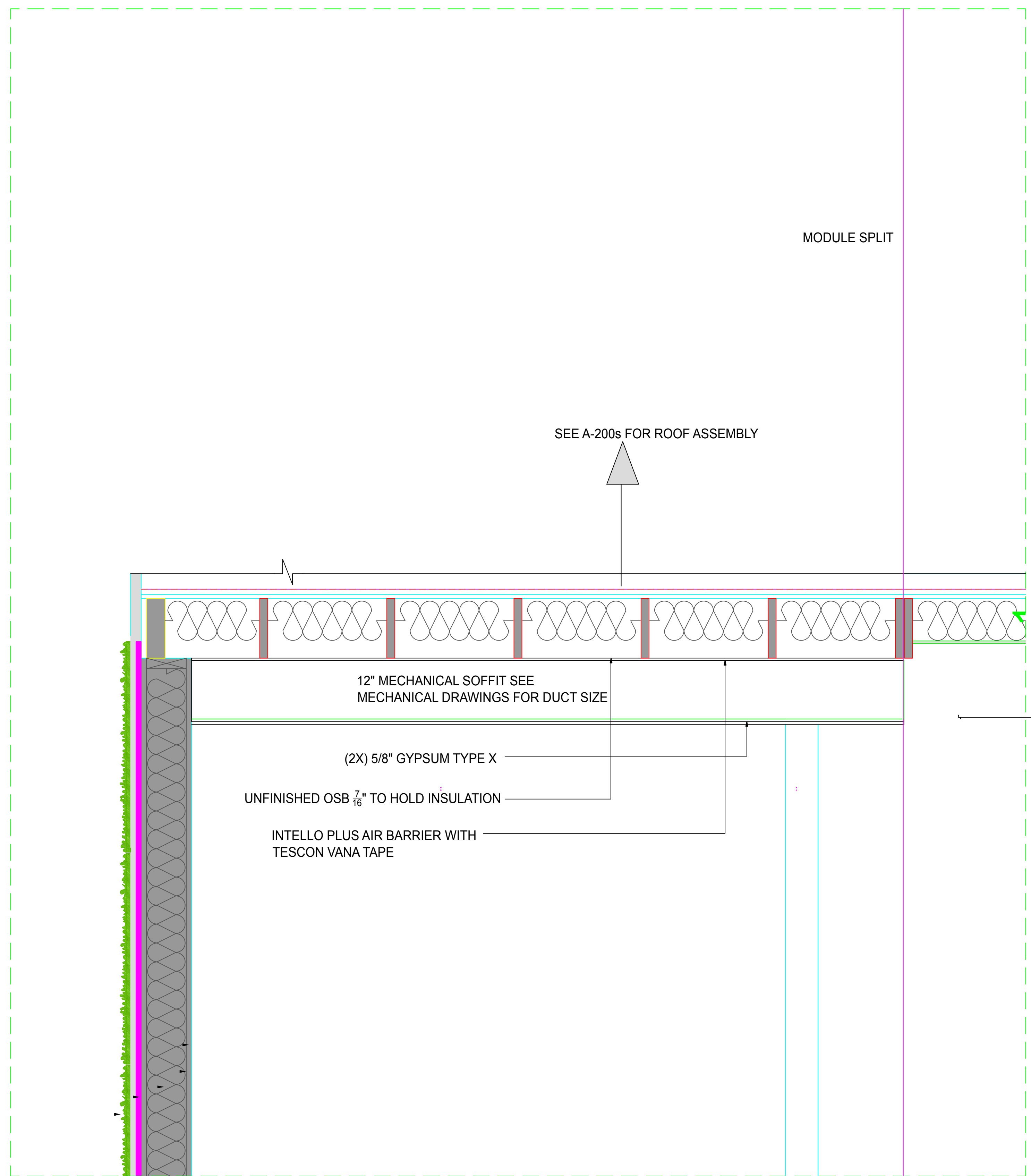
MARK	DATE	DESCRIPTION
04	8-10-2017	AS-BUILT
03	6-9-2017	DENVER PERMITS
02	2-23-2017	100% DD SET
01	11-17-2017	80% DD SET

LOT NUMBER 105
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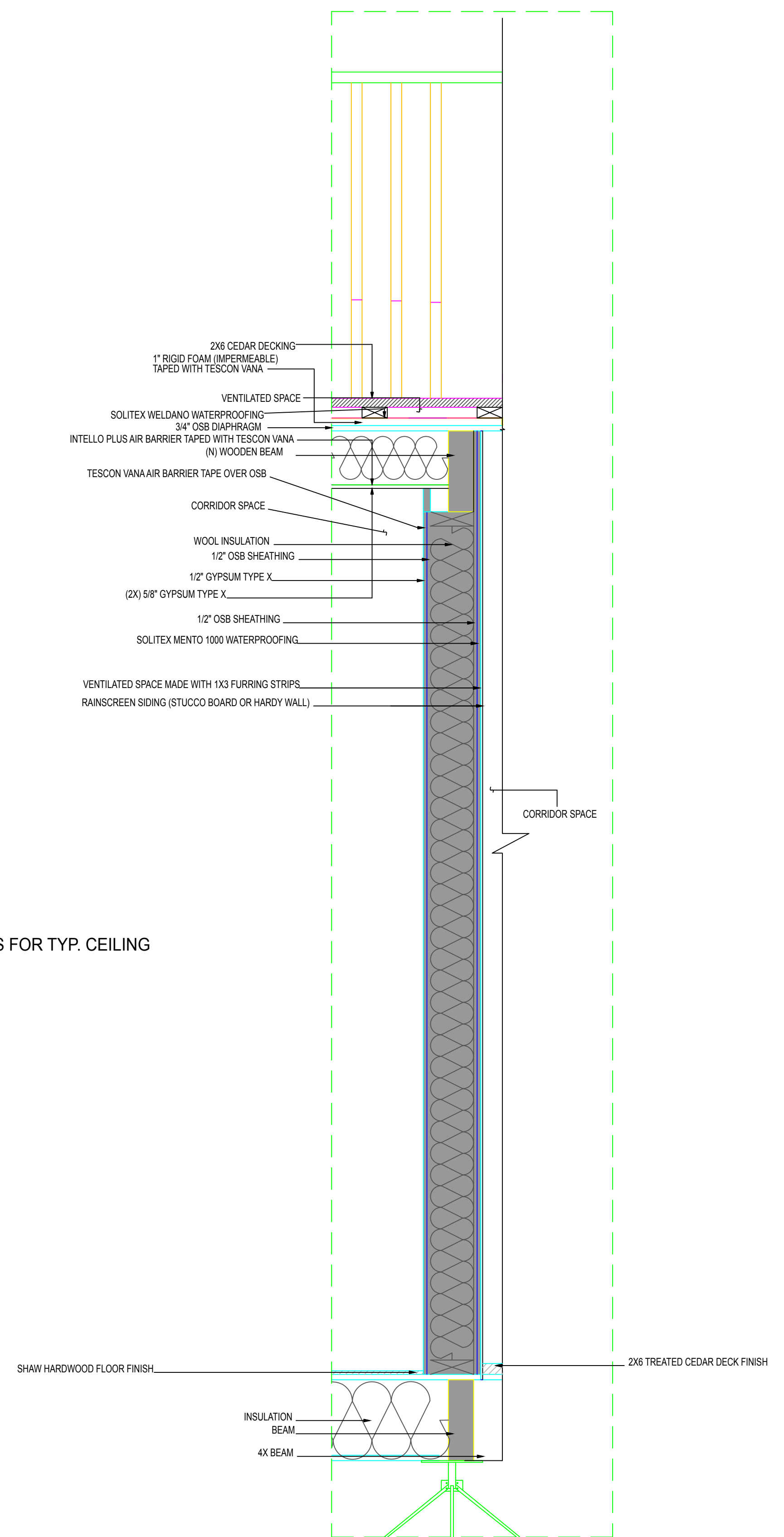
SHEET TITLE

WALL SECTIONS

A-302



R* North Wall - Vertical Section Detail
Scale 1" = 1'-0"



C* Corridor Wall - Vertical Section Detail
Scale 1" = 1'-0"

R VALUE PER IRC N1101.5

2X8 STUD WALL 24" O.C.
R19 WOOL BATT
R13 WOOL BATT
2X8 STUD = R10
1/2" OSB, FILM, SIDE = R2

7% DOORWAY R2
100% STUD WALL
6% STUDS

OVERALL R29

TEAM NAME RISE
ADDRESS 390 S 34 STREET,
RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS

CLIENT
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON 2017
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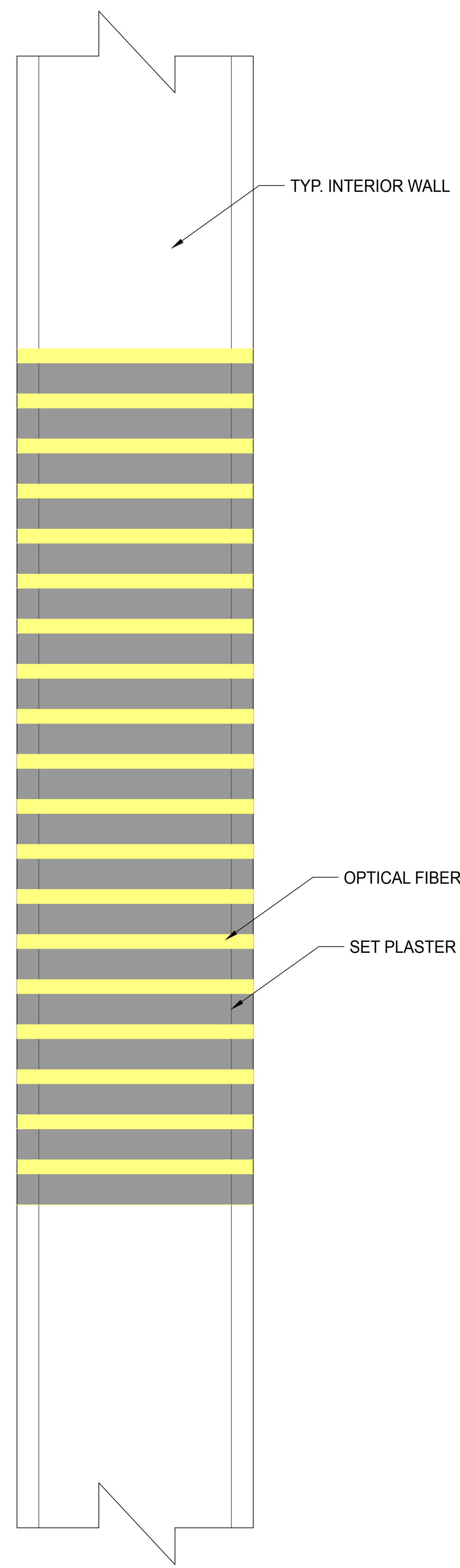


MARK	DATE	DESCRIPTION
04	8-10-2017	AS-BUILT

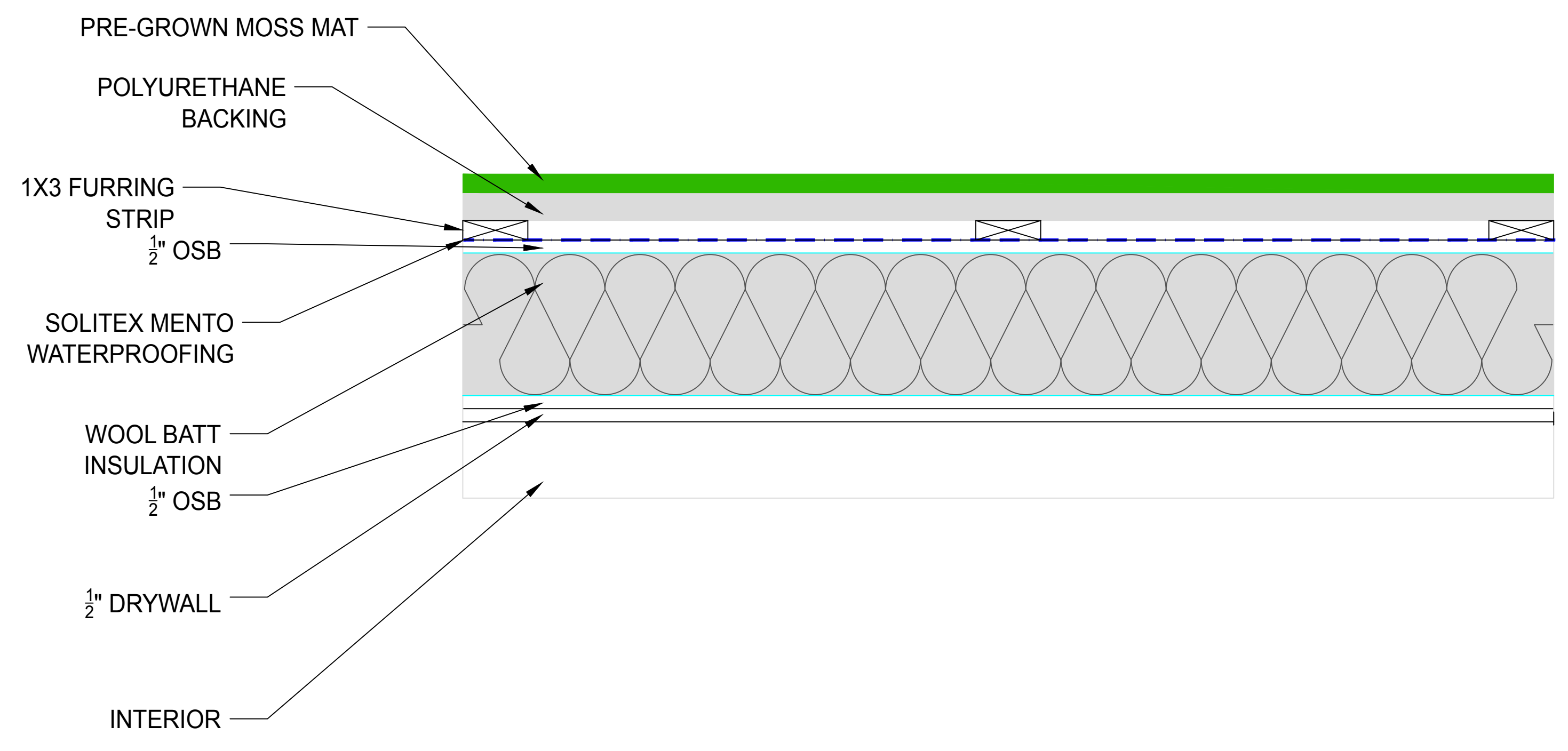
LOT NUMBER 105
DRAWN BY BRENTON KREIGER
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SHEET TITLE
SPECIAL WALLS DETAIL

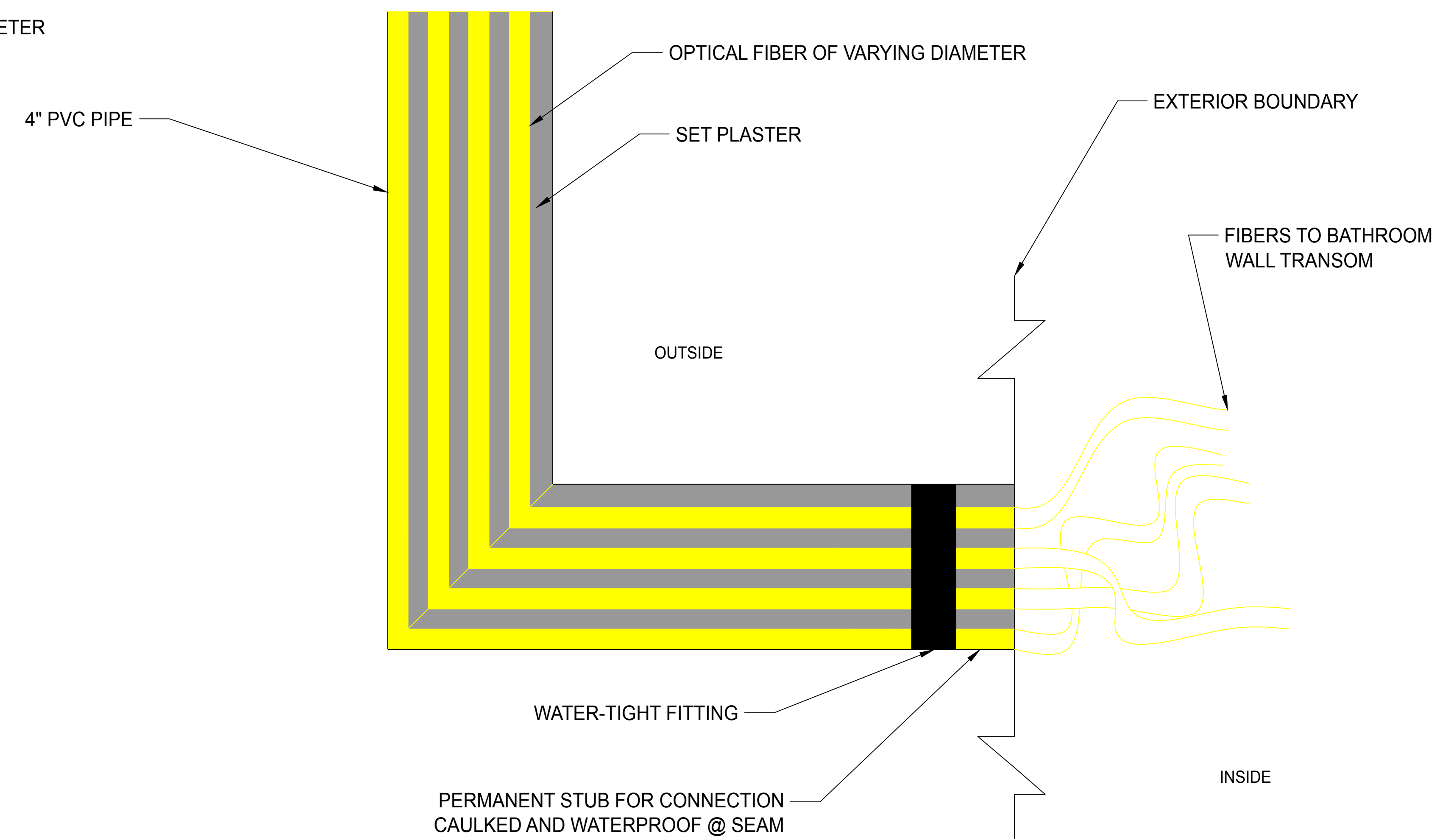
A-303



1 PARTITION LIGHT WALL DETAIL
Scale 6" = 1'-0"



2 MOSS WALL DETAIL
Scale 3" = 1'-0"



3 EXTERIOR LIGHT WALL CONNECTION
Scale 3" = 1'-0"

TEAM NAME RISE
ADDRESS 390 S 34 STREET,
RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

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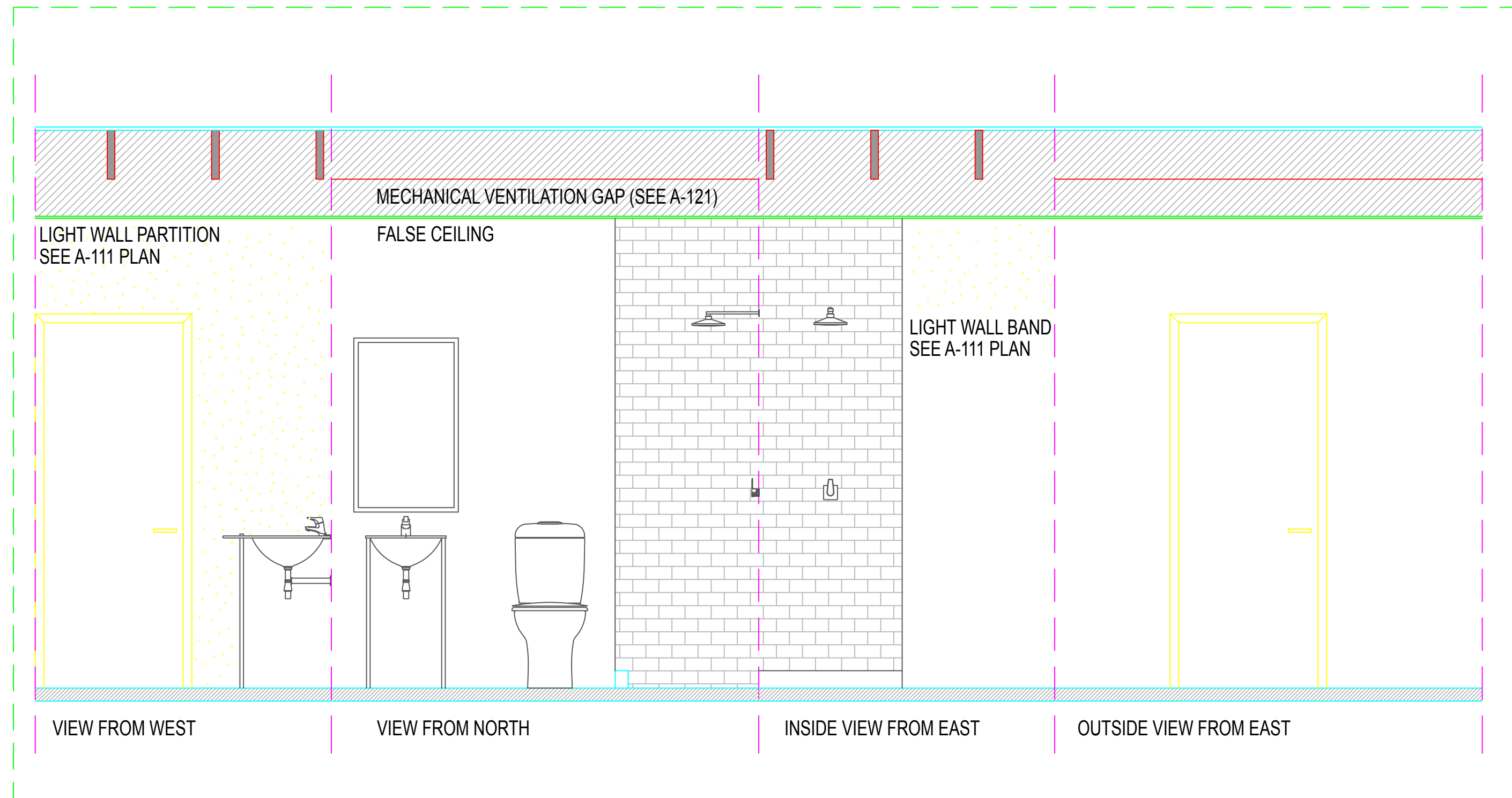
MARK	DATE	DESCRIPTION
04	8-10-2017	AS-BUILT

LOT NUMBER 105
DRAWN BY BRENTON KREIGER
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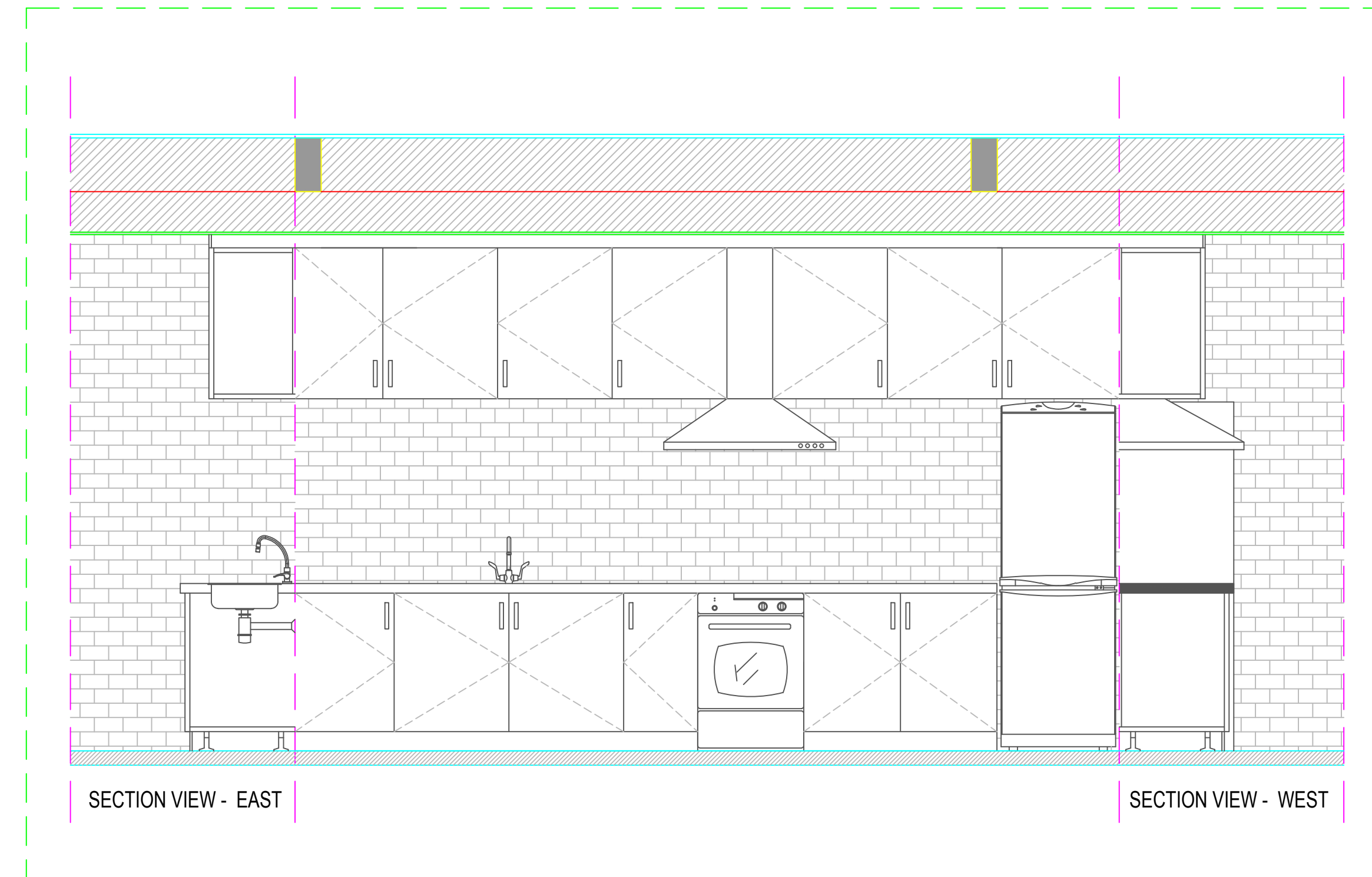
SHEET TITLE

INTERIOR
ELEVATIONS

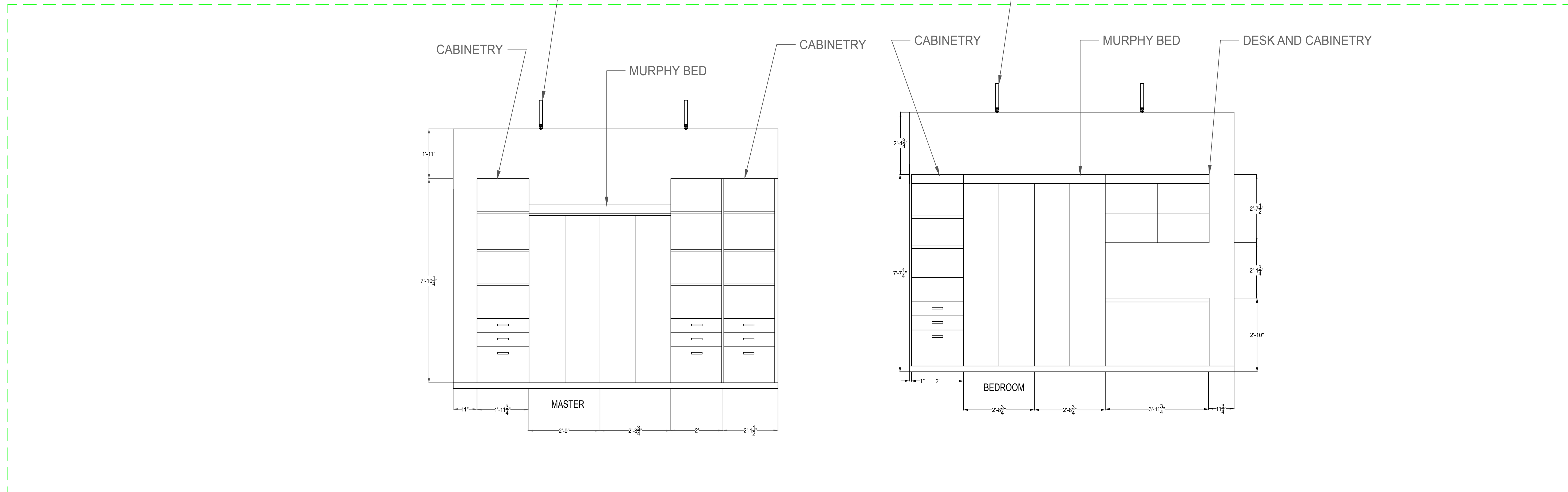
I-102



1 BATHROOM INTERIOR ELEVATION
Scale 1/2" = 1'-0"



2 KITCHEN INTERIOR ELEVATION
Scale 1/2" = 1'-0"



3 BEDROOM DETAIL
Scale 1/4" = 1'-0"

TEAM NAME RISE
 ADDRESS 390 S 34 STREET,
 RICHMOND, CA 94804
 CONTACT berkeleysolardecathlon@gmail.com
 https://solardecathlon.berkeley.edu

CONSULTANTS

CLIENT

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MARK	DATE	DESCRIPTION
04	8-10-2017	AS-BUILT

LOT NUMBER 105
 DRAWN BY ALANI AGUERRE
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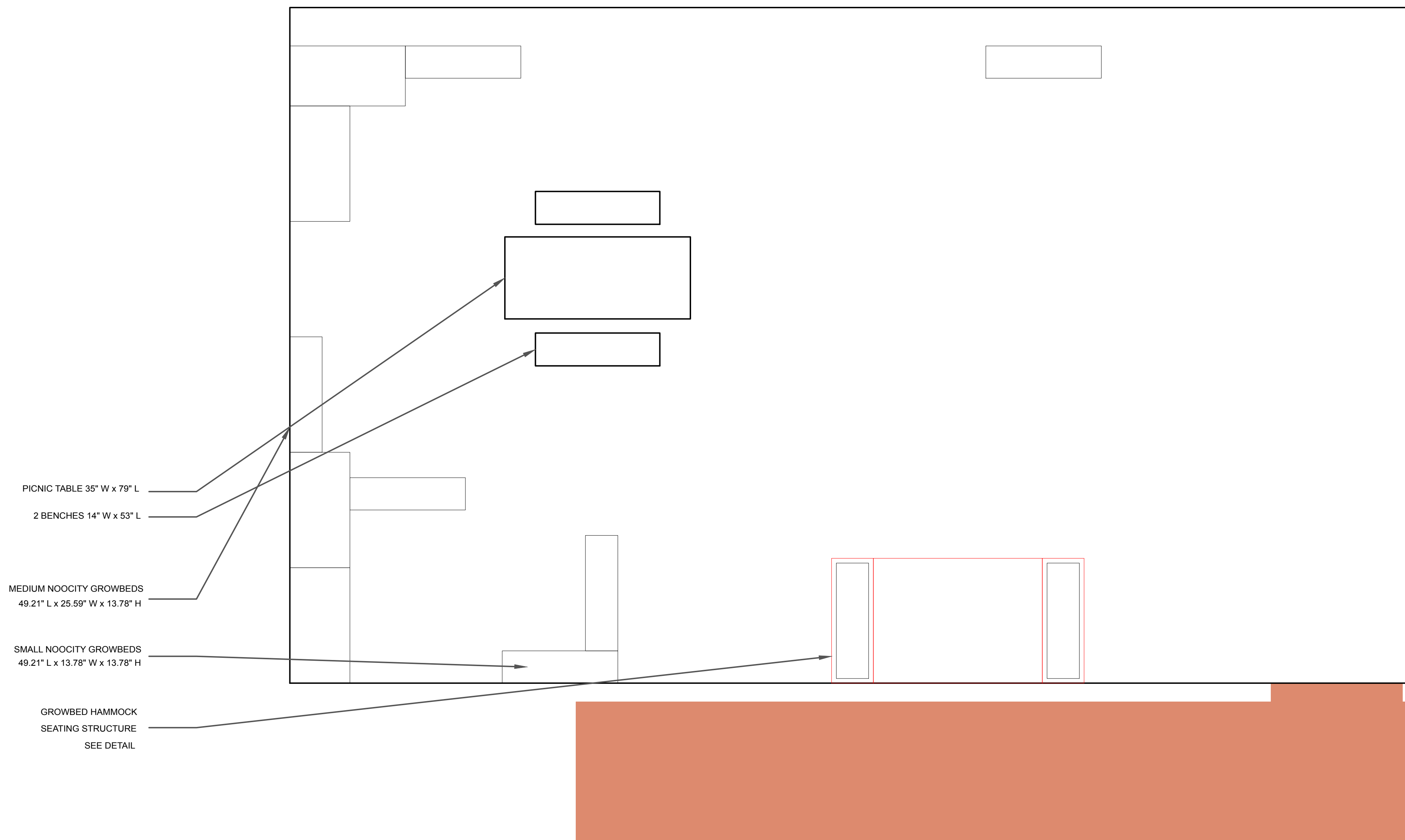
SHEET TITLE

Landscape Plan

L-100

HOUSE

STAIRS



PICNIC TABLE 35" W x 79" L

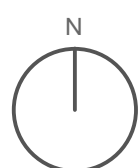
2 BENCHES 14" W x 53" L

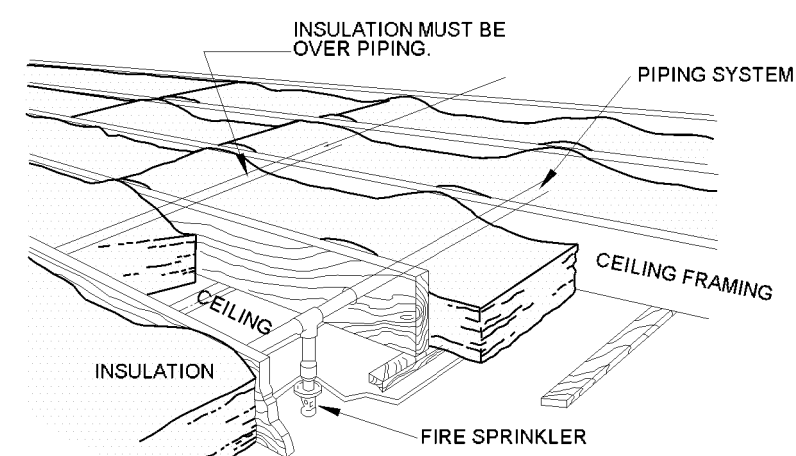
MEDIUM NOOCITY GROWBEDS
 49.21" L x 25.59" W x 13.78" H

SMALL NOOCITY GROWBEDS
 49.21" L x 13.78" W x 13.78" H

GROWBED HAMMOCK
 SEATING STRUCTURE
 SEE DETAIL

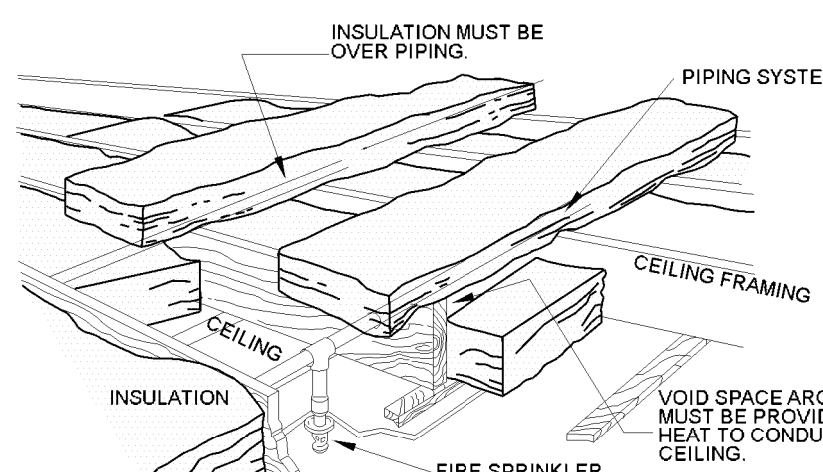
2 DECK GENERAL PLAN
 Scale 1:30





CAUTION: IT IS IMPORTANT THAT THE INSULATION BE INSTALLED TIGHT TO THE JOISTS. IN UNHEATED AREAS, ANY SPACES OR VOIDS BETWEEN THE INSULATION AND THE JOISTS CAUSES THE WATER IN THE FIRE SPRINKLER PIPING TO FREEZE.

INSULATION DETAIL #1



CAUTION: IT IS IMPORTANT THAT THE INSULATION BE INSTALLED TIGHT TO THE JOISTS. IN UNHEATED AREAS, ANY SPACES OR VOIDS BETWEEN THE INSULATION AND THE JOISTS CAUSES THE WATER IN THE FIRE SPRINKLER PIPING TO FREEZE.

INSULATION DETAIL #2

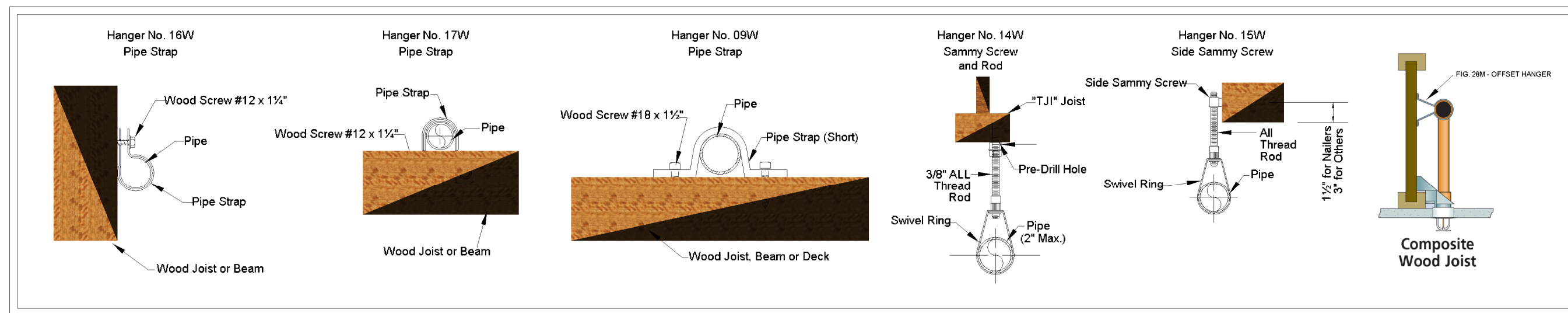
GENERAL NOTES

1. AUTOMATIC WET SPRINKLER SYSTEM TO FEED NEW RESIDENCE.
2. SYSTEM DESIGN IS PER NFPA 13D, 2013 EDITION.
3. WORK INVOLVED INCLUDES INSTALLATION OF NEW WET FIRE SPRINKLER SYSTEM w/ A FIRE PUMP & TANK SYSTEM.
4. DESIGN DENSITY: .05 GPM / SQ. FT.
5. BRANCH LINE PIPING TO BE CPVC PIPE w/ CPVC FITTINGS. EXPOSED PIPE TO BE TYPE M COPPER PIPE WITH COPPER FITTINGS.
6. NO GYP. BD. CEILINGS SHALL BE INSTALLED UNTIL HYDROSTATIC, ROUGH VISUAL INSPECTION IS COMPLETE.
7. MAXIMUM SPACING IS 16 FT. x 16 FT. FOR CONCEALED PENDENT SPRINKLERS w/ FLAT CEILINGS AND FOR SLOPE CEILINGS. MAXIMUM SPACING IS 16 FT. x 16 FT. FOR CONCEALED SIDEWALL SPRINKLERS.
8. NO SPRINKLERS REQUIRED IN BATHROOMS THAT MEET THE REQUIREMENTS OF SECTION 8.6.2 OF NFPA 13D, 2013 EDITION.
9. NO SPRINKLERS REQUIRED IN CLOSETS THAT MEET THE REQUIREMENTS OF SECTION 8.6.3 OF NFPA 13D, 2013 EDITION.
10. TENT PIPE WITH INSULATION ABOVE CEILING ON UPPER LEVEL TO PREVENT PIPE FROM FREEZING. SEE INSULATION DETAILS ON THIS SHEET.

Hydraulic Information	
Remote Area 1	
OCCUPANCY CLASSIFICATION	Residential
DENSITY	0.050gpm/ft ² for 292.27ft ² (Actual 292.27ft ²)
TOTAL HEADS FLOWING	2
K-FACTOR	4
TOTAL WATER REQUIRED	32.28
TOTAL PRESSURE REQUIRED	35.225
BASE OF RISER (gpm)	32.28
BASE OF RISER (psi)	35.225
SAFETY MARGIN (psi)	+7.184 (16.9%)

HANGER SPACING LEGEND										
NOMINAL PIPE SIZE (IN.)	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"
STEEL PIPE SCH.40, SCH.10, D.F.E.F.	N/A	12-0	12-0	15-0	15-0	15-0	15-0	15-0	15-0	15-0
THREADED LIGHTWALL	N/A	12-0	12-0	12-0	12-0	12-0	N/A	N/A	N/A	N/A
COPPER	8-0	8-0	10-0	10-0	12-0	12-0	12-0	15-0	15-0	15-0
CPVC	5-6	6-0	6-6	7-0	8-0	8-0	10-0	N/A	N/A	N/A

PER NFPA 13.9.2.2.1 (A)

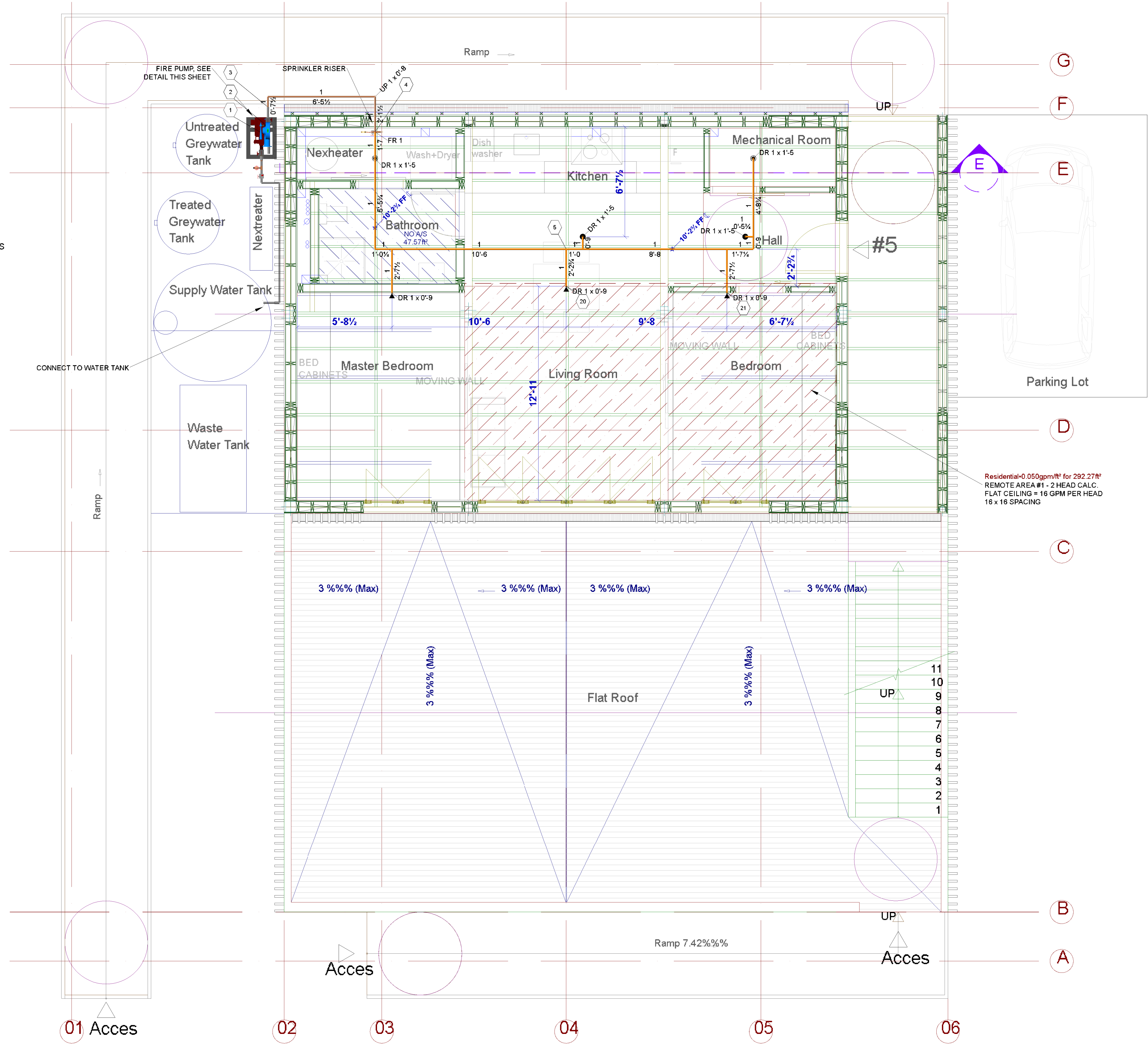
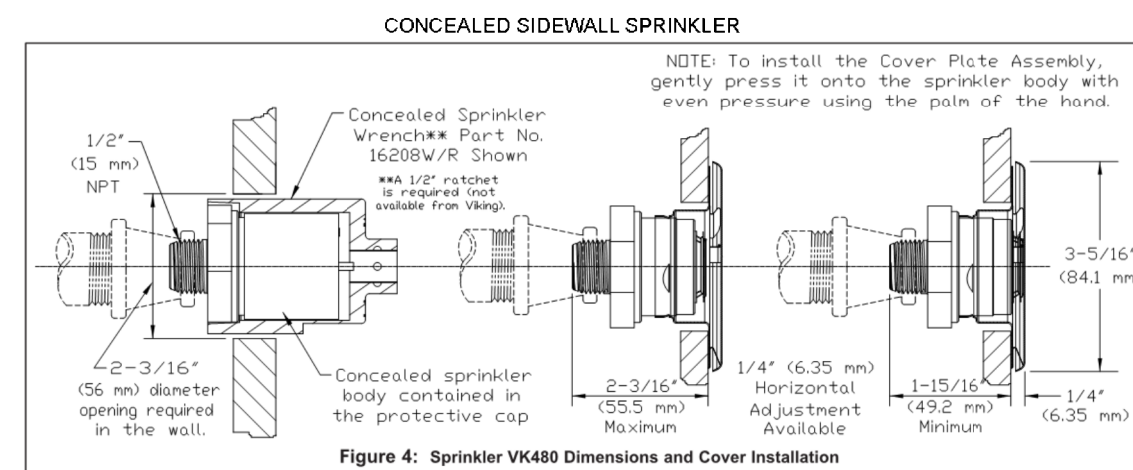
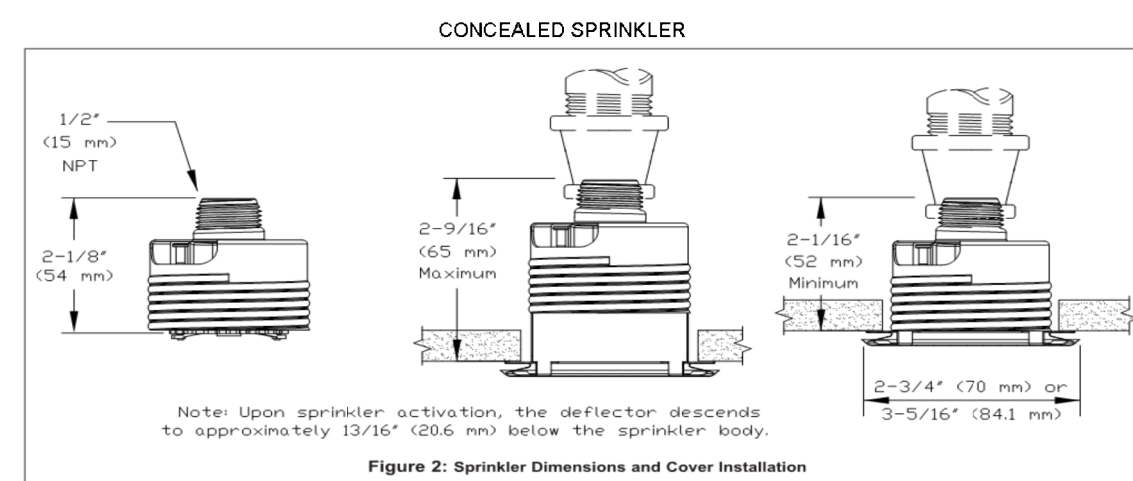


HANGER DETAILS

SCALE: N.T.S.

TYP. FIRE PUMP RISER DETAIL

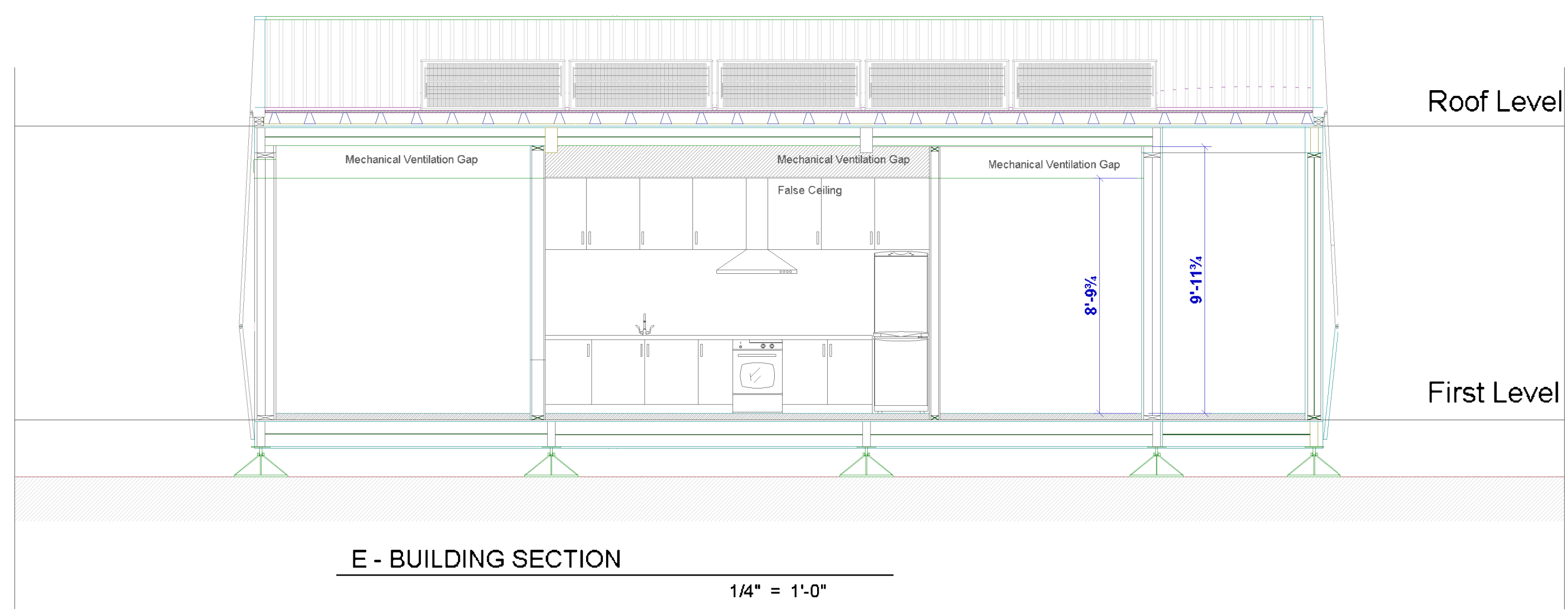
SCALE: 1/2" = 1'-0"



FIRE SPRINKLER PLAN

1/4" = 1'-0"

CONTEST LIMIT PROPERTY



E - BUILDING SECTION

1/4" = 1'-0"

Sprinkler Legend										
Symbol	Manufacturer	SIN	Model	Quantity	K-Factor	Type	Response	Orifice	Finish	Note
●	Wing	VK430	VK430	2	4.3	Pendent	1/2"	1/2"	White	175°F
●	Wing	VK457	VK457	2	4.9	Pendent	1/2"	1/2"	White	165°F
●	Wing	VK480	VK480	4	4	SideWall	1/2"	1/2"	White	165°F
									Total =	7

Extreme FIRE PROTECTION
 10465 SOUTH PROGRESS WAY, SUITE 300 - PARKER, COLORADO 80134
 PH: 303.399.9910 FAX: 303.399.9915 - COLORADO STATE REGISTRATION # 524

RISE - SOLAR DECATHLON 2017
 1803 S COLUMBINE STREET
 DENVER, COLORADO 80210
 SPRINKLER PLAN

DRAWN BY: Cameron Lewis
 SCALE: 1/4" = 1'-0"
 REVISIONS
 NO. DESCRIPTION
 FOR SUBMITTAL 7-31-17
 DATE: 08/01/17
 CONTRACT #: 001
 FILE NAME: Rise
 FLOOR / AREA
 FIRE SPRINKLER PLAN
 SHEET NUMBER
FP1.00

TEAM NAME	RISE
ADDRESS	390 S 34 STREET, RICHMOND, CA 94804
CONTACT	berkeleysolardecathlon@gmail.com https://solardecathlon.berkeley.edu

CONSULTANTS:

IAN KELSO
JOHN-MICHAEL WONG
PAUL WESTERMANN

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MARK	DATE	DESCRIPTION
04	8-10-2017	AS-BUILTS
03	6-9-2017	DENVER PERMITS
02	2-23-2017	100% DD SET
01	11-17-2017	80% DD SET

LOT NUMBER	105
DRAWN BY	BRENTON KREIGER
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SHEET TITLE

SCHEDULE, NOTES, AND SYMBOLS

S-001

MATERIAL	SIZE	COUNT	LENGTH
2.0E PARRALAM PSL	3.5X11.25	10	12'
2.0E PARRALAM PSL	3.5X11.25	2	6'
2.0E PARRALAM PSL	5.5X11.25	6	12'
1.55E TIMBERSTRAND LSL	1.75X11.25	36	12'
1.55E TIMBERSTRAND LSL	1.75X11.25	12	6'
NO.1 DF-L	2X12	102	12'
NO.1 DF-L	2X12	34	6'
NO.1 DF-L	4X12	22	12'
NO.1 DF-L	4X12	4	6'
NO.1 DF-L	4X10	6	12'
NO.1 DF-L	8X8	4	11'
NO.1 DF-L	6X6	8	10'
NO.1 DF-L	6X6	4	11'
NO.1 DF-L	4X4	4	10'
NO.1 DF-L	2X8	12	12'
EXTERIOR C-D PLYWOOD	4' BY 8' PANEL	60	48/24 RATED 3/4" THICK
EXTERIOR C-D PLYWOOD	4' BY 8' PANEL	9	24/0 RATED 1/2" THICK
EXTERIOR C-D PLYWOOD	4' BY 8' PANEL	26	48/24 RATED 3/4" THICK
NO.1 DF-L	4X16	6	16'
NO.2 DF-L	2X6	40	64"
NO.2 DF-L	1X7	20	64"
NO.1 DF-L	2X8	88	10'
STRUCTURAL I PANELS	4' BY 8' PANEL	30	48/24 RATED 15/32" THICK
10D COMMON NAILS	10D	2000	3" LONG
8D COMMON NAILS	8D	2000	2-1/2" LONG
NO.1 DF-L	2X8	2	24'
NO.1 DF-L	2X8	2	34'
STANDARD PIER SADDLE TOP	3.5" WIDE	29	N/A
STANDARD PIER WIDE SADDLE TOP	5.5" WIDE	4	N/A
STANDARD PIER WIDE TOP	7"X12" PLATE	4	N/A
SEISMIC PIER SADDLE TOP	3.5" WIDE	3	N/A
ANCHOR PIER SADDLE TOP	3.5" WIDE	9	N/A
ANCHOR PIER WIDE TOP	7"X12" PLATE	4	N/A
ANCHOR PIER CUSTOM TOP	14"X14" PLATE	12	N/A
HU11	1.75X11.25	100	N/A
16D NAILS	16D	2200	3-1/2" LONG
10DX1-1/2 NAILS	10D	600	1-1/2" LONG
LUS210	2X10	275	N/A
10D NAILS	10D	3300	3" LONG
HDU2-SDS2.5	N/A	16	N/A
BP 5/8-3" PLATE WASHERS	3"X3"	16	N/A
LAG BOLTS	5/8" DIAMETER	32	12"
WPU OFFSET LEFT	1.75X11.25	9	N/A
16D NAILS	16D	63	3-1/2" LONG
10DX1-1/2 NAILS	10D	54	1-1/2" LONG
WPU OFFSET RIGHT	1.75X11.25	9	N/A
16D NAILS	16D	63	3-1/2" LONG
10DX1-1/2 NAILS	10D	54	1-1/2" ONG
ECCQ66-SDS2.5	N/A	8	N/A
SDS SCREWS	.25" DIAMETER	240	2-1/2" LONG
ECCQ44-SDS2.5	N/A	2	N/A
SDS SCREW	.25" DIAMETER	60	2-1/2" LONG
ECOLLQ44-SDS2.5	N/A	1	N/A
SDS SCREWS	.25" DIAMETER	30	2-1/2" LONG
ECCRRQ44-SDS2.5	N/A	1	N/A
SDS SCREWS	.25" DIAMETER	30	2-1/2" LONG
SDS25600	1/4"X6"	28	N/A
SDS25800	1/4"X8"	30	N/A
NO.1 DF-L	2X6	100	5'
NO.1 DF-L	4X8	25	5'
HUC48	N/A	50	N/A
16D NAILS	16D	700	3-1/2" LONG
10D NAILS	10D	500	3" LONG
SDS25600	1/4"X6"	400	N/A
EXTERIOR C-D PLYWOOD	5X8" PANELS	16	32/16 RATING 1/2" THICK
ALUMINUM THRESHOLD RAMP	SEE PRODUCT DATA	2	17"
EZA8KIT-BZ	N/A	1	200"
LUS26	N/A	4	N/A
10D NAILS	10D	250	3"
SDS SCREWS	.25" DIAMETER	96	2-1/2" LONG
LUS26	N/A	4	N/A
ALUMINUM RAIL	STANDARD	10	14'
MIDCLAMP	ANY MODEL	30	N/A
ENDCLAMP	ANY MODEL	20	N/A
T-BOLT	1/4"-20	50	N/A
ASTM F594 SERRATED FLANGE NUT	1/4"-20	50	N/A
L-FOOT	STANDARD	70	N/A
T-BOLT	3/8"-20	70	N/A
ASTM F594 SERRATED FLANGE NUT	3/8"-20	70	N/A
HR6 STRAP	N/A	36	N/A
NO.2 DF-L	4X4	20	8'
SP4	3-9/16 X 7-1/4	18	N/A
10DX1-1/2 NAILS	.148" DIAMETER	108	1-1/2"
SDS25112	.25" DIAMETER	40	1-1/2"
BC4	N/A	18	4X4
16D NAILS	.162" DIAMETER	216	3-1/2"
LS50	5" TALL	25	N/A
A34 CLIP	N/A	100	N/A
8DX1-1/2" COMMON NAILS	N/A	800	1-1/2"
BC4	N/A	18	4X4
EZ SPIKES	N/A	10	N/A
EZ BASE	N/A	40	N/A
ANCHOR BOLTS	1/2" DIAMETER	160	N/A
SDS HEAVY DUTY SCREWS	1/4" DIAMETER	400	N/A
HGA10KT	N/A	4	N/A
SDS SCREWS 1/4"X1-1/2"	1/4" DIAMETER	16	1-1/2"
SDS SCREWS 1/4"X3"	1/4" DIAMETER	16	3"
DTT2Z DECK TIE	N/A	50	N/A

GENERAL NOTES	NOTES	LOAD SCHEDULE	ABBREVIATIONS
<p>APPLICABLE REFERENCES:</p> <ol style="list-style-type: none"> 2017 SOLAR DECATHLON BUILDING CODE 2017 SOLAR DECATHLON RULES 2015 INTERNATIONAL BUILDING CODE 2015 INTERNATIONAL RESIDENTIAL CODE ASCE 7-10 MINIMUM DESIGN CODES 2015 NDS FOR WOOD CONSTRUCTION CITY OF DENVER BUILDING CODE CITY OF RICHMOND BUILDING CODE SPACING, EDGE, AND END DISTANCES FOR SDS SCREWS FOLLOW ICC-ES ESR 2236 	<p>THE ENTIRE ABOVE GRADE STRUCTURE IS SIZED FOR A THEORETICAL CAPACITY OF A 3 STORY MULTI-FAMILY COMPLEX. HOWEVER, TEMPORARY STRUCTURAL ELEMENTS (PIERS AND TIE DOWNS INTO PIERS) ARE SIZED FOR SINGLE STORY COMPETITION LOADS.</p>	<p>LIVE LOADS 100 PSF DECK, ROOF, AND STAIR 50 PSF FLOOR DEAD LOADS 75 PSF VERTICAL STRUCTURE 25 PSF ROOF STRUCTURE</p> <p>WIND LOADS 40 PSF GENERAL</p>	<p>FND = FOUNDATION DF = DOUGLAS FIR COM = COMMON NAIL BND = BOUNDARY TYP = TYPICAL DET = DETAIL PT = PRESSURE TREAT T.O. = TOP OF</p>

2 GENERAL NOTES
NOT TO SCALE

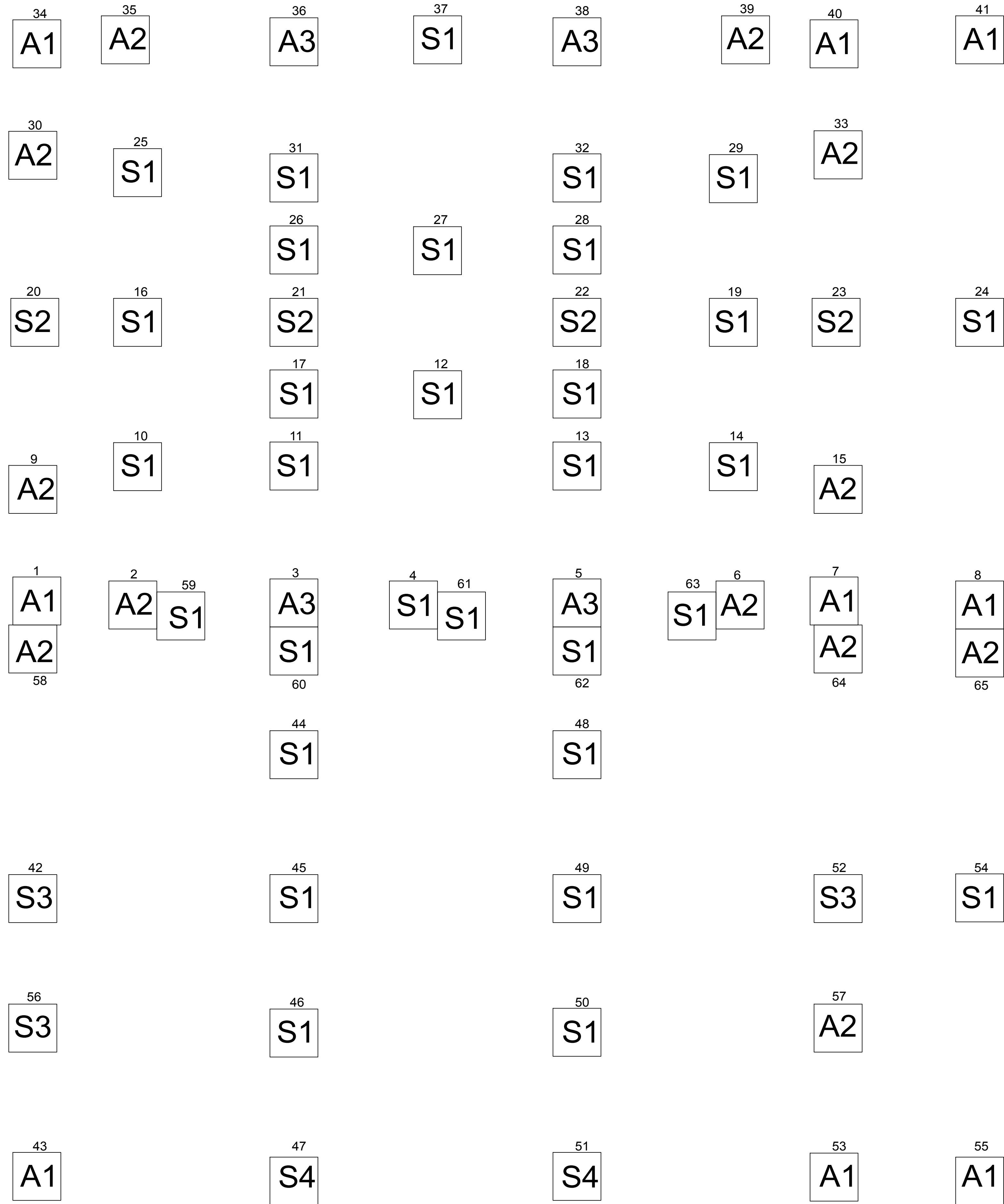
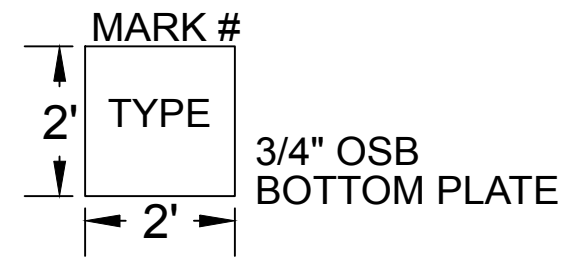
MID OR END CLAMPS			
WASHERS		S1 - STANDARD PIER SADDLE TOP (3.5")	
CONTINUE TO EXTENTS			
DIAMETER SYMBOL			
WASHERS		S2 - STANDARD PIER WIDE SADDLE TOP (5.5")	
BREAK LINE			
COM NAILS (10D TYP.)			
BOLTS (5/8" TYP.)		S3 - SEISMIC PIER SADDLE TOP (3.5")	
BOLT INTO PAGE			
NAIL INTO PAGE			
FND BEARING PLATE			
DETAIL			
ELEVATION OR SECTION		S4 - STANDARD PIER WIDE TOP (7"X12")	
CONTINUOUS WOOD FRAMING			
COLUMNS			
WOOD BLOCKING			
WOOD MEMBER		A1 - ANCHOR PIER CUSTOM TOP	
PLYWOOD			
STEEL		A2 - ANCHOR PIER SADDLE TOP (3.5")	
STEEL			
EARTH			
EARTH			
BACKGROUND MEMBER			
PLYWOOD		A3 - ANCHOR PIER WIDE TOP (7"X12")	
SOLAR PANEL			
PIER BASE		L-FOOT	
SDS SCREW		CLAMP, BOLT, AND RAIL	
SOLARMOUNT STANDARD RAIL			
PANASONIC HIT 325 SOLAR PANEL			

3 SYMBOLS
NOT TO SCALE

1 SCHEDULE
NOT TO SCALE

NOTES:
 THIS IMAGE IS FOR LABELING PURPOSES ONLY.
 SEE STRUCTURAL DRAWING S-511 FOR MORE
 INFORMATION AND DETAILS.

PIER TYPE:
 S1 - STANDARD PIER SADDLE TOP (3.5")
 S2 - STANDARD PIER WIDE SADDLE TOP (5.5")
 S3 - SEISMIC PIER SADDLE TOP (3.5")
 S4 - STANDARD PIER FLAT TOP
 A1 - ANCHOR PIER CUSTOM TOP
 A2 - ANCHOR PIER SADDLE TOP (3.5")
 A3 - ANCHOR PIER WIDE TOP (7"X12")



RISE

TEAM NAME RISE
 ADDRESS 390 S 34 STREET
 RICHMOND, CA, 94804
 CONTACT berkeleysolardecathlon@gmail.com
 https://solardecathlon.berkeley.edu

CONSULTANTS:
 IAN KELSO
 JOHN-MICHAEL WONG
 PAUL WESTERMANN

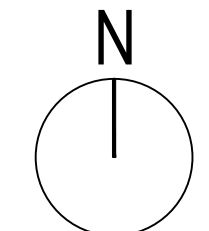
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SHEET TITLE
PIER LABEL PLAN



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TEAM NAME RISE
 ADDRESS 390 S 34 STREET
 RICHMOND, CA, 94804
 CONTACT berkeleySolarDecathlon@gmail.com
 https://solardecathlon.berkeley.edu

CONSULTANTS:
 IAN KELSO
 JOHN-MICHAEL WONG
 PAUL WESTERMANN

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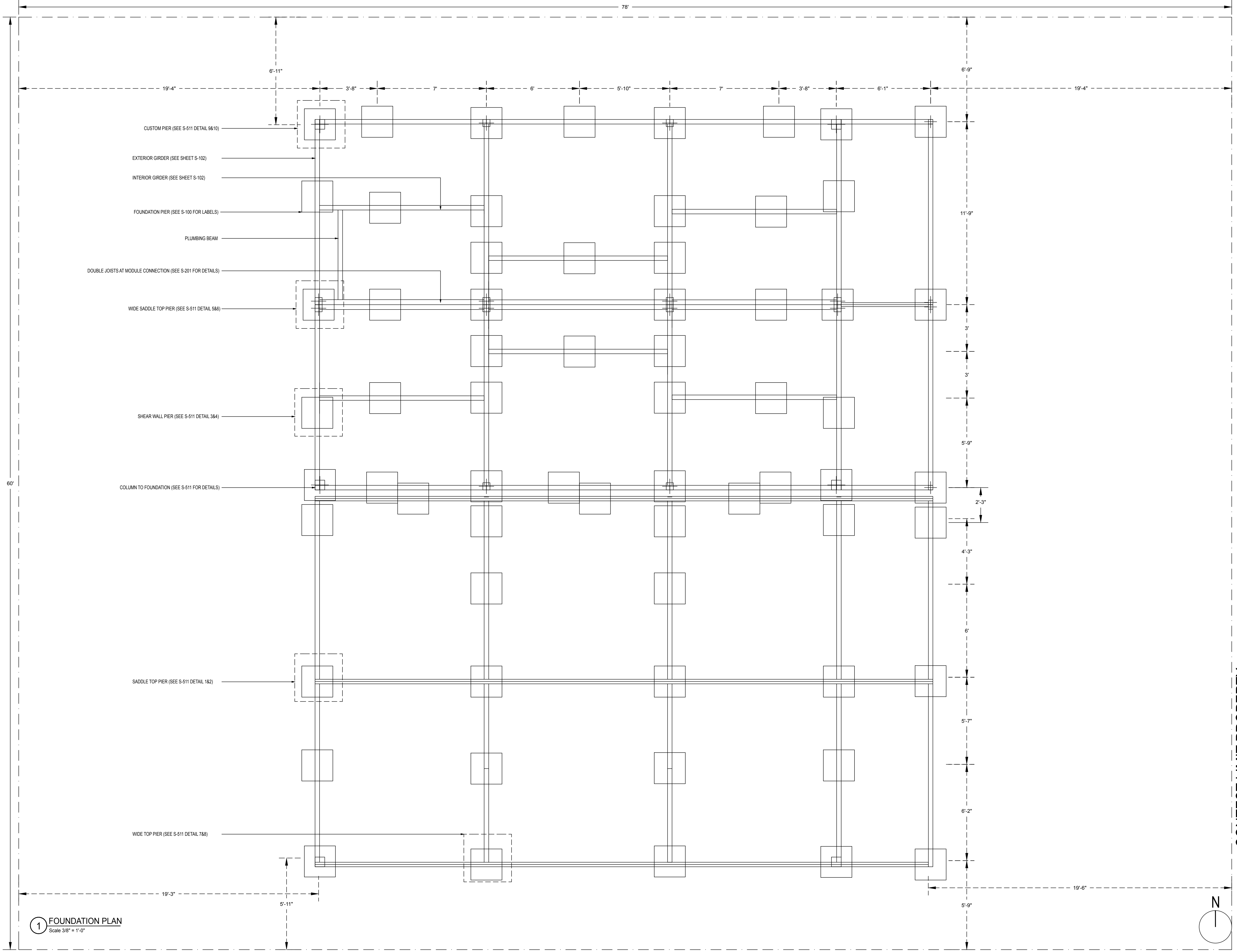


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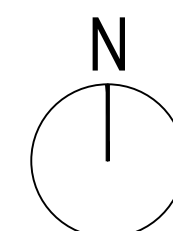
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SHEET TITLE
FOUNDATION PLAN

S-101



CONTEST LIMIT PROPERTY



1 FOUNDATION PLAN
 Scale 3/8" = 1'-0"

TEAM NAME RISE
ADDRESS 390 S 34 STREET RICHMOND, CA, 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS:
IAN KELSO
JOHN-MICHAEL WONG
PAUL WESTERMANN

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SHEET TITLE

FLOOR AND DECK FRAMING PLAN

S-102

CONTEST LIMIT PROPERTY

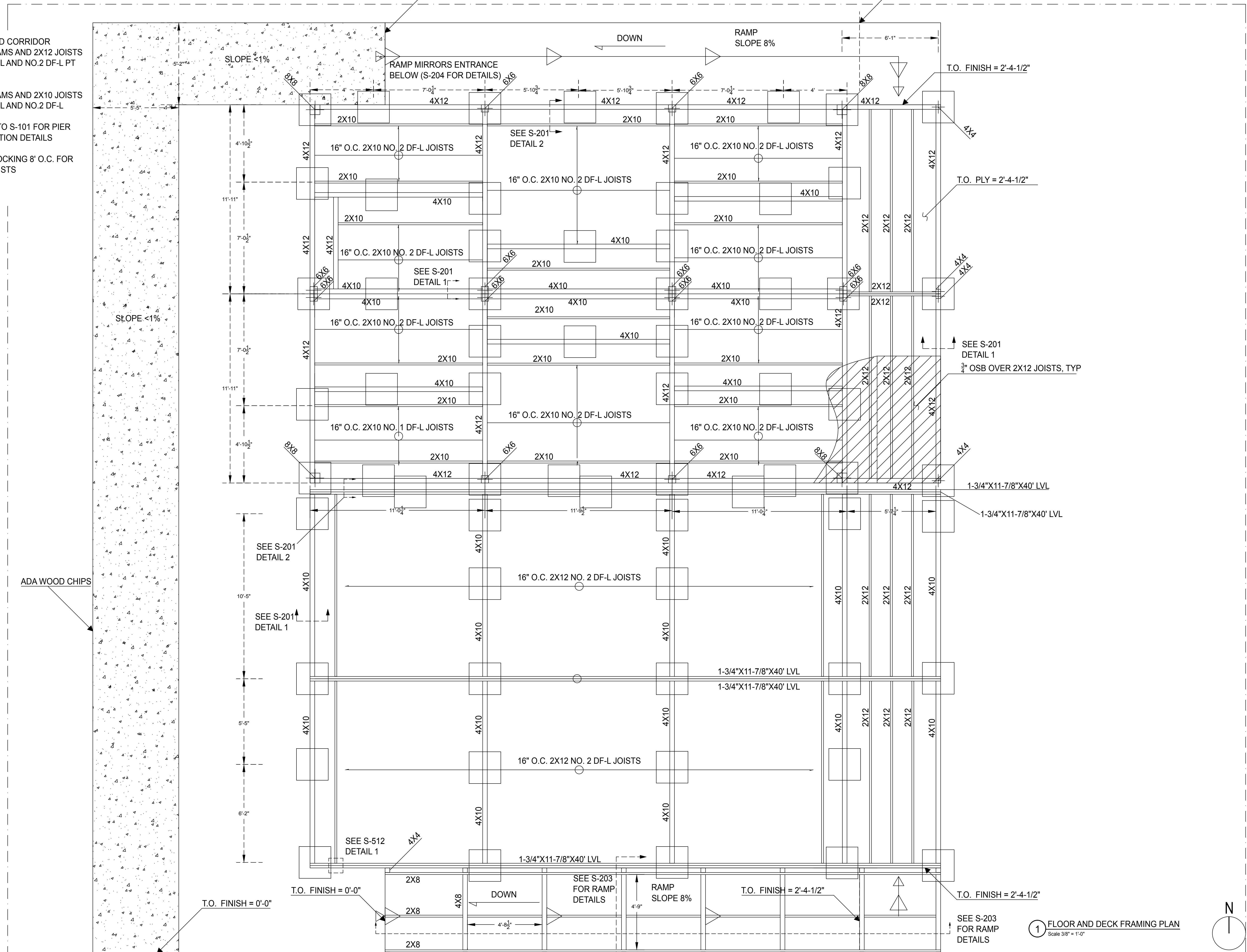
NOTES:

DECK AND CORRIDOR
4X12 BEAMS AND 2X12 JOISTS
NO. 1 DF-L AND NO.2 DF-L PT

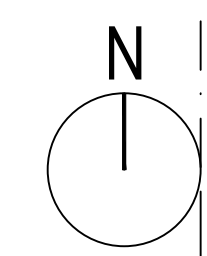
FLOOR
4X10 BEAMS AND 2X10 JOISTS
NO. 1 DF-L AND NO.2 DF-L

*REFER TO S-101 FOR PIER CONNECTION DETAILS

*ADD BLOCKING 8" O.C. FOR DECK JOISTS



1 FLOOR AND DECK FRAMING PLAN
Scale 3/8" = 1'-0"



RISE

TEAM NAME RISE
ADDRESS 390 S 34 STREET, RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS:
IAN KELSO
JOHN-MICHAEL WONG
PAUL WESTERMANN

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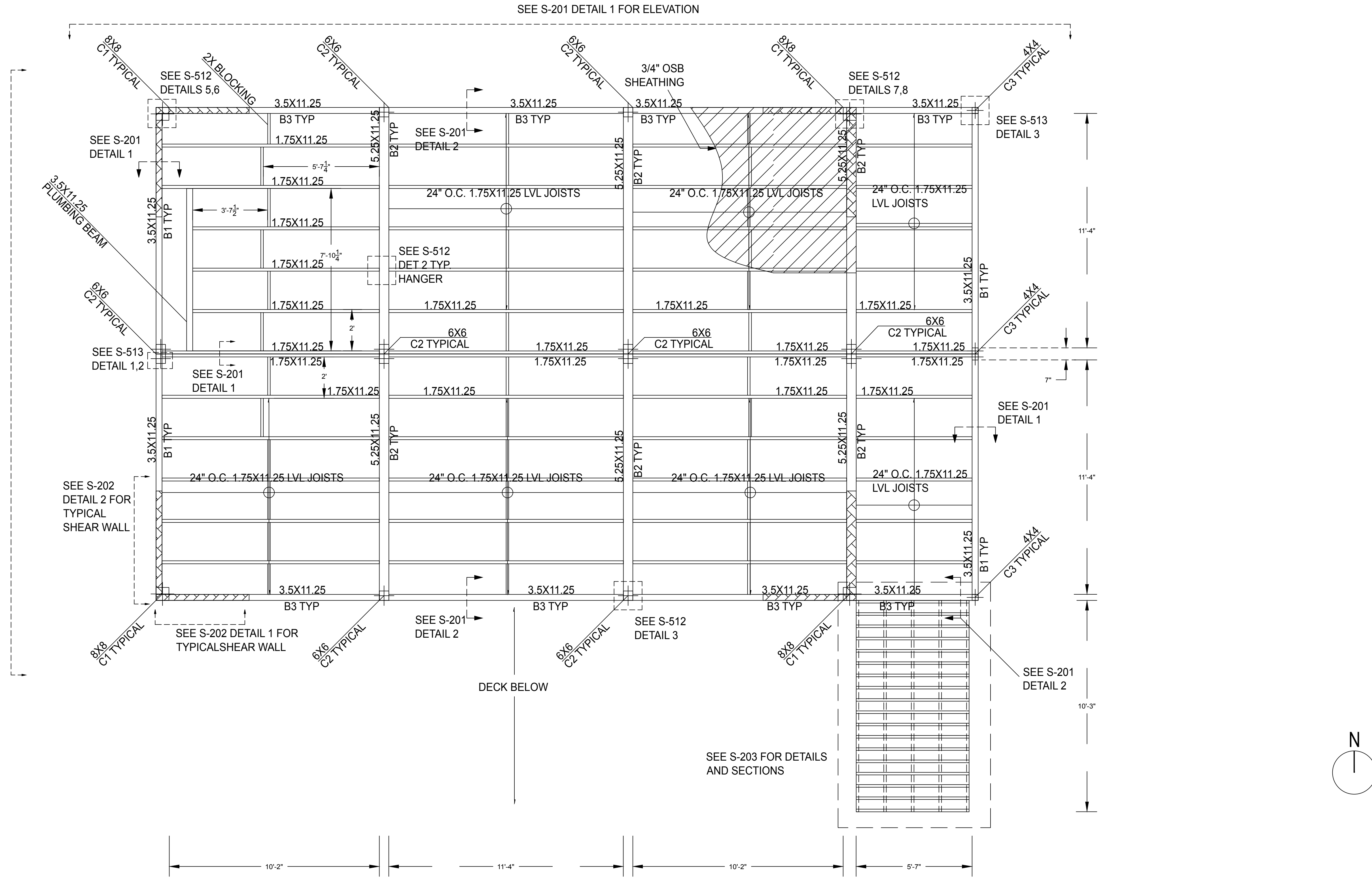
SHEET TITLE

ROOF FRAMING PLAN

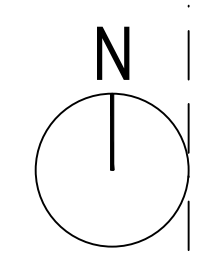
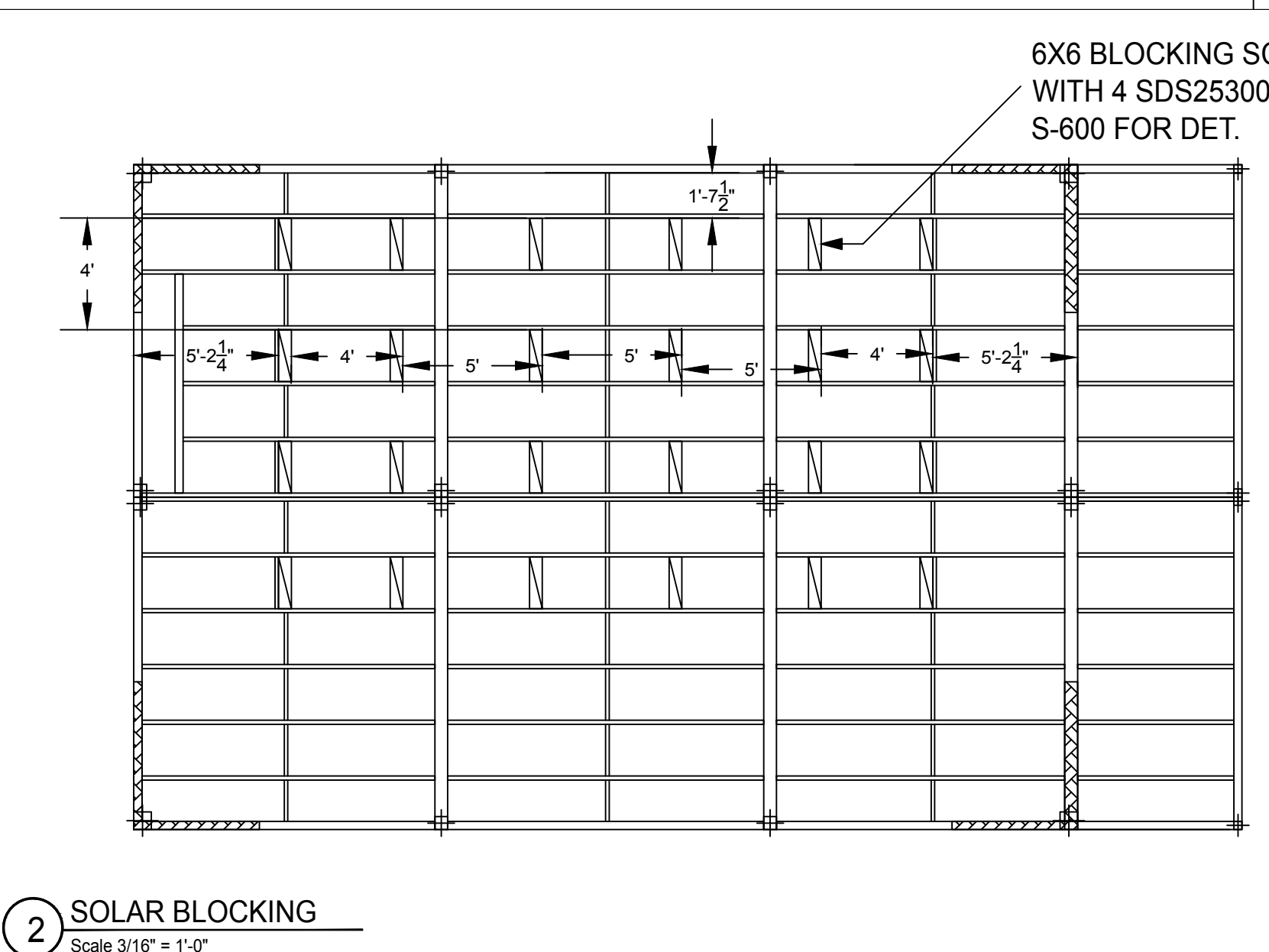
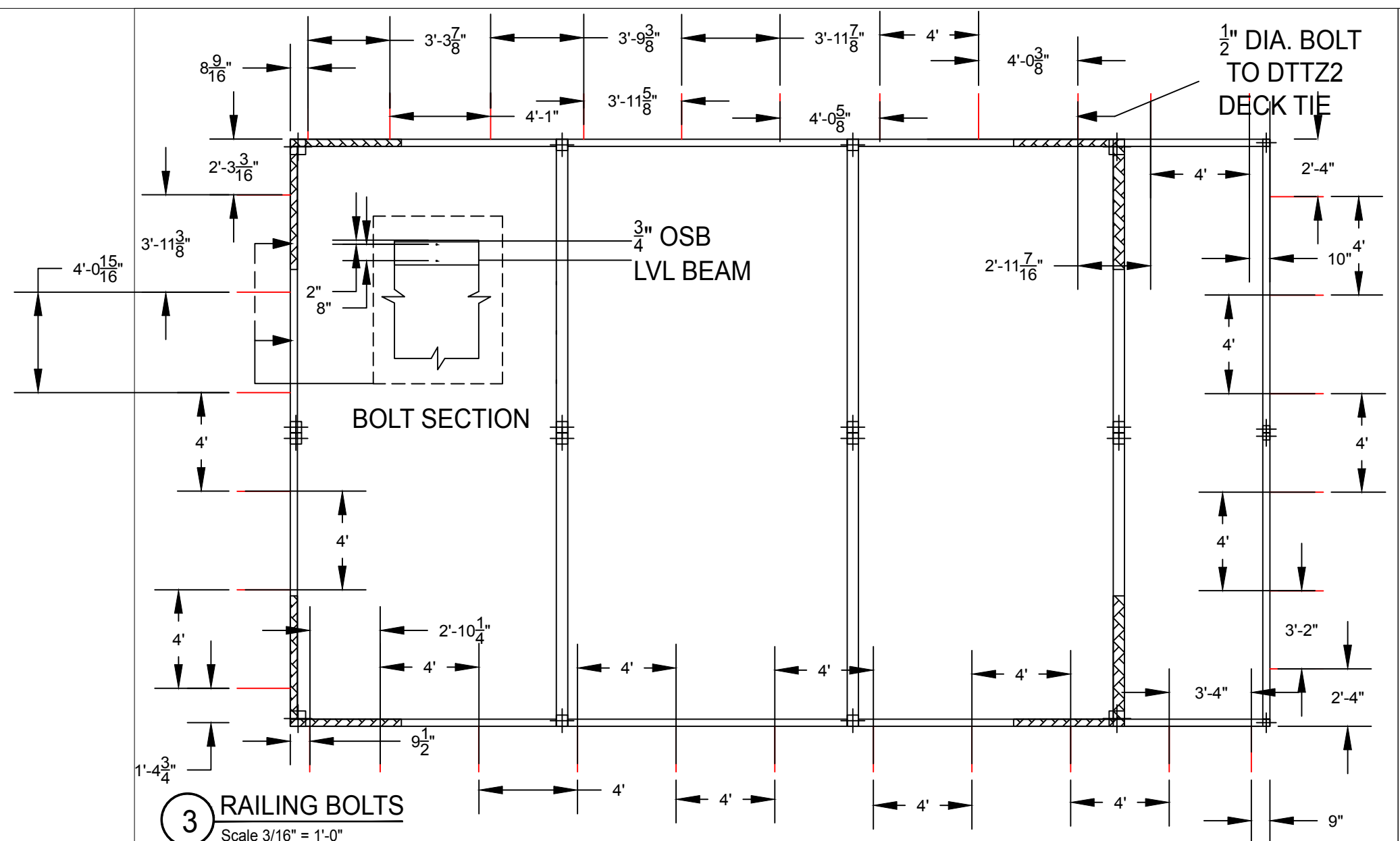
S-103

- NOTES:
- ADD BLOCKING AS SPECIFIED BY S-600 FOR SOLAR RACKING
 - CROSS-HATCHING REFERS TO SHEAR WALL LOCATIONS
 - 1.75X11.25
2.0E LVL JOISTS
 - B1 TYPICAL
3.5X11.25
2.0E LVL BEAMS
 - B2 TYPICAL
5.25X11.25
2.0E LVL BEAMS
 - B3 TYPICAL
3.5X11.25
2.0E LVL BEAMS
 - PLUMBING BEAM
3.5X11.25
2.0E LVL BEAM
 - C1 TYPICAL
8X8 COLUMN
NO.1 DF-L
 - C2 TYPICAL
6X6 COLUMN
NO.1 DF-L
 - C3 TYPICAL
4X4 COLUMN
NO.1 DF-L

SEE S-201
DETAIL 2 FOR
ELEVATION



1 ROOF FRAMING PLAN
Scale 3/8" = 1'-0"



RISE

TEAM NAME: RISE
 ADDRESS: 390 S 34 STREET, RICHMOND, CA 94804
 CONTACT: berkeleysolardecathlon@gmail.com
 https://solardecathlon.berkeley.edu

CONSULTANTS:
 IAN KELSO
 JOHN-MICHAEL WONG
 PAUL WESTERMANN

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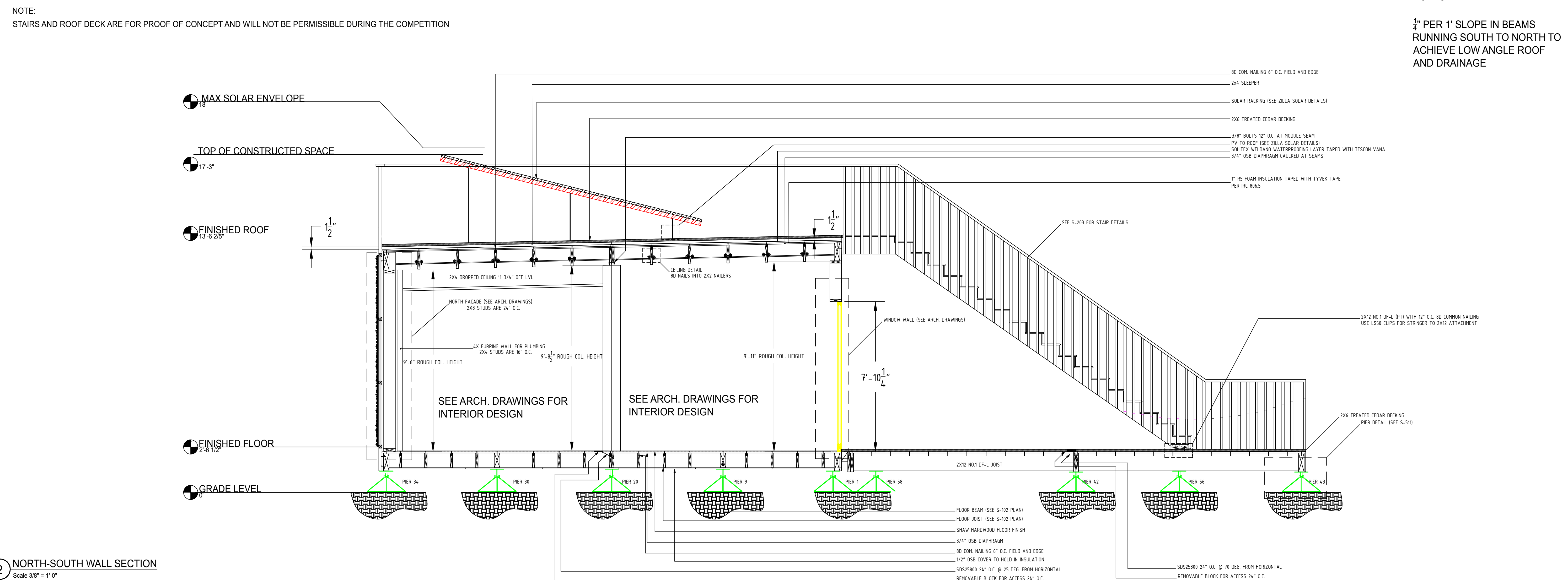
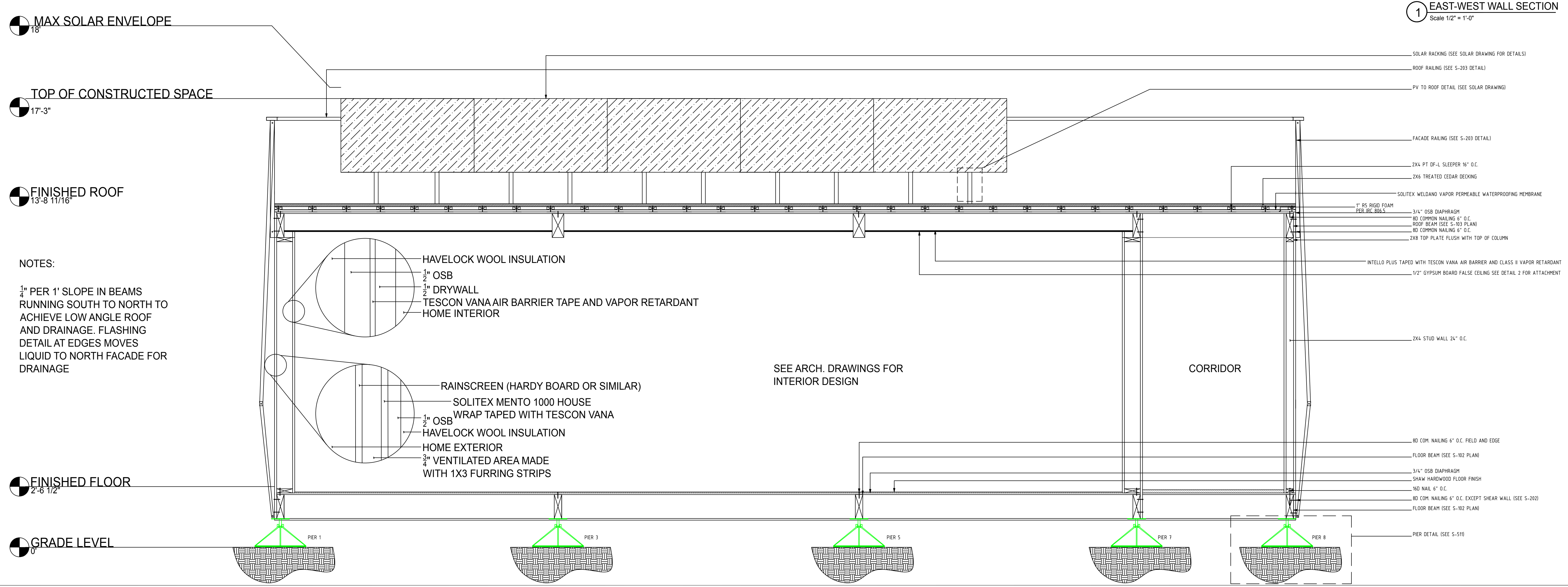


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WALL SECTIONS

S-201



RISE

TEAM NAME RISE
ADDRESS 390 S 34 STREET
RICHMOND, CA, 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS:
IAN KELSO
JOHN-MICHAEL WONG
PAUL WESTERMANN

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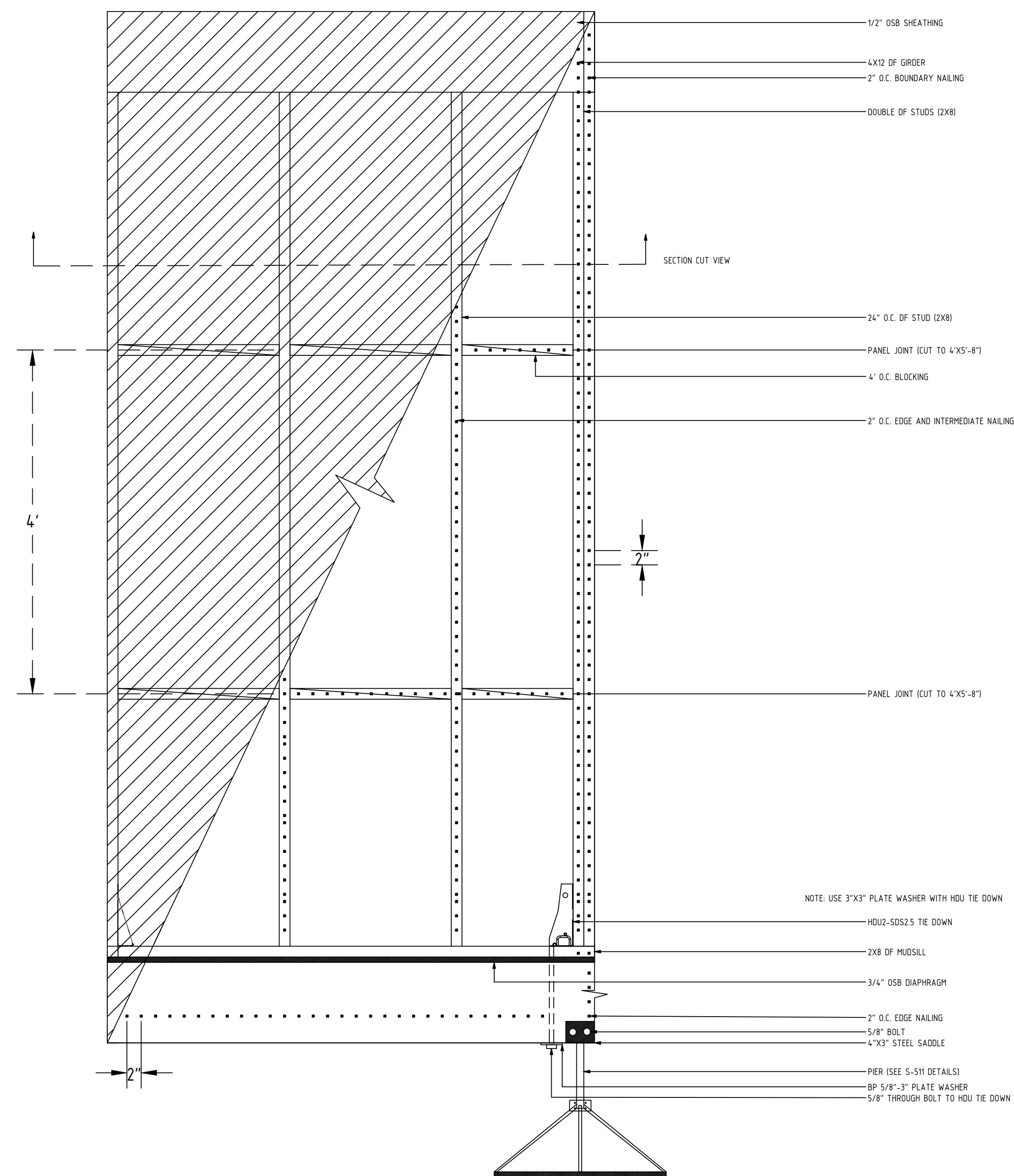
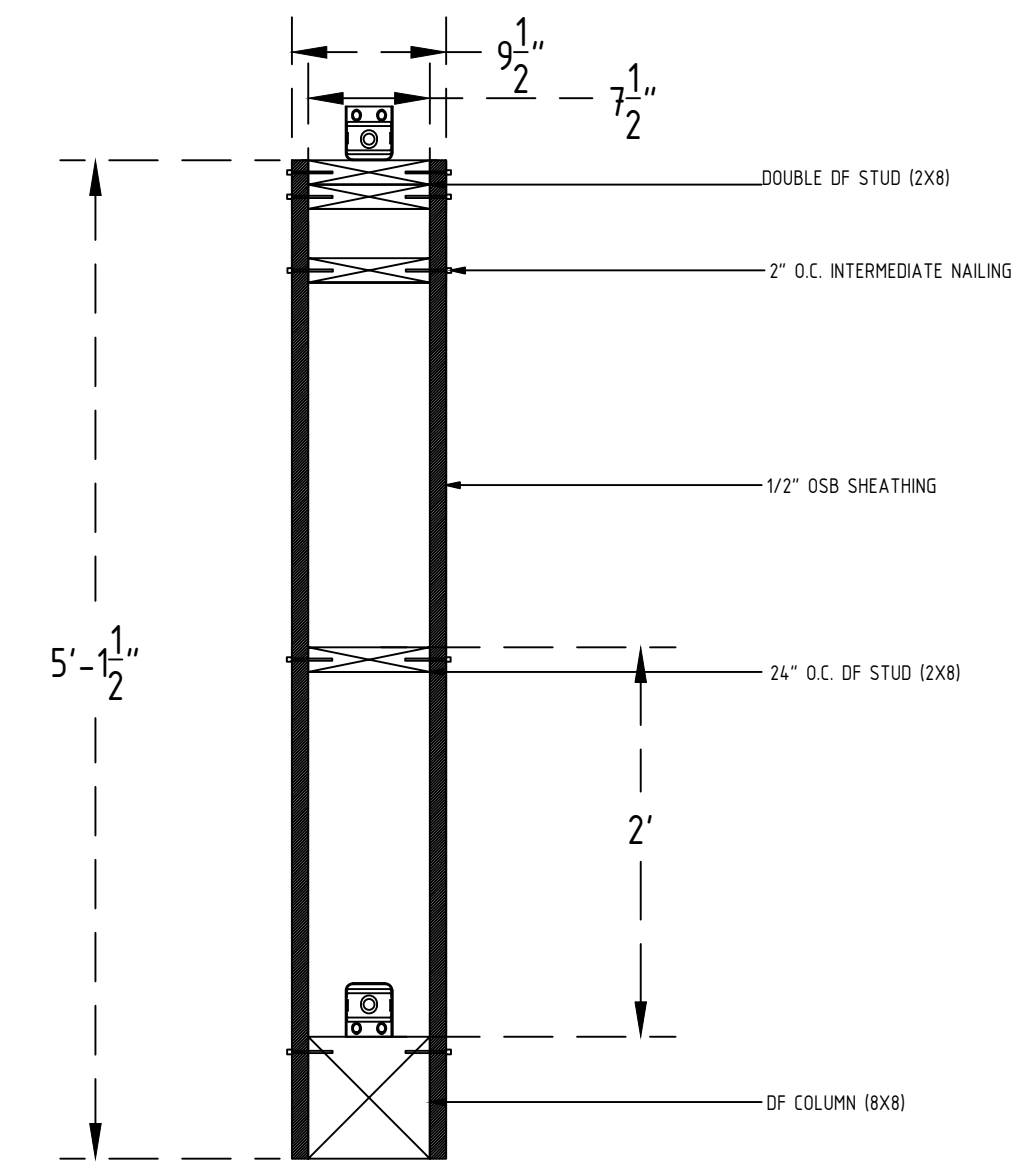
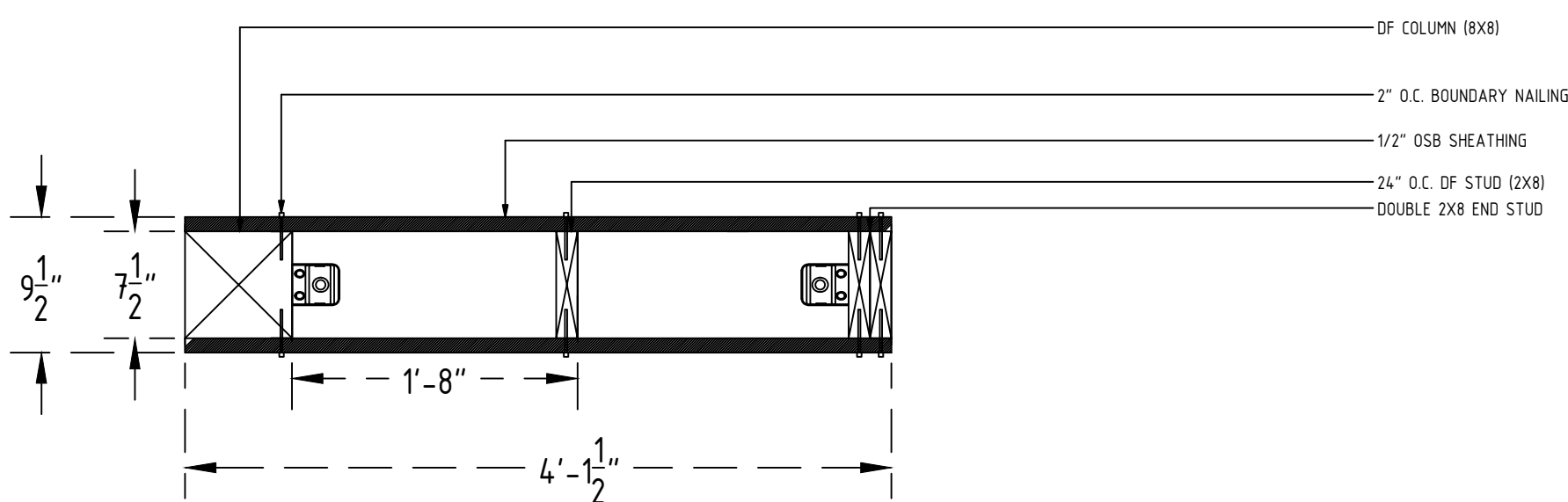
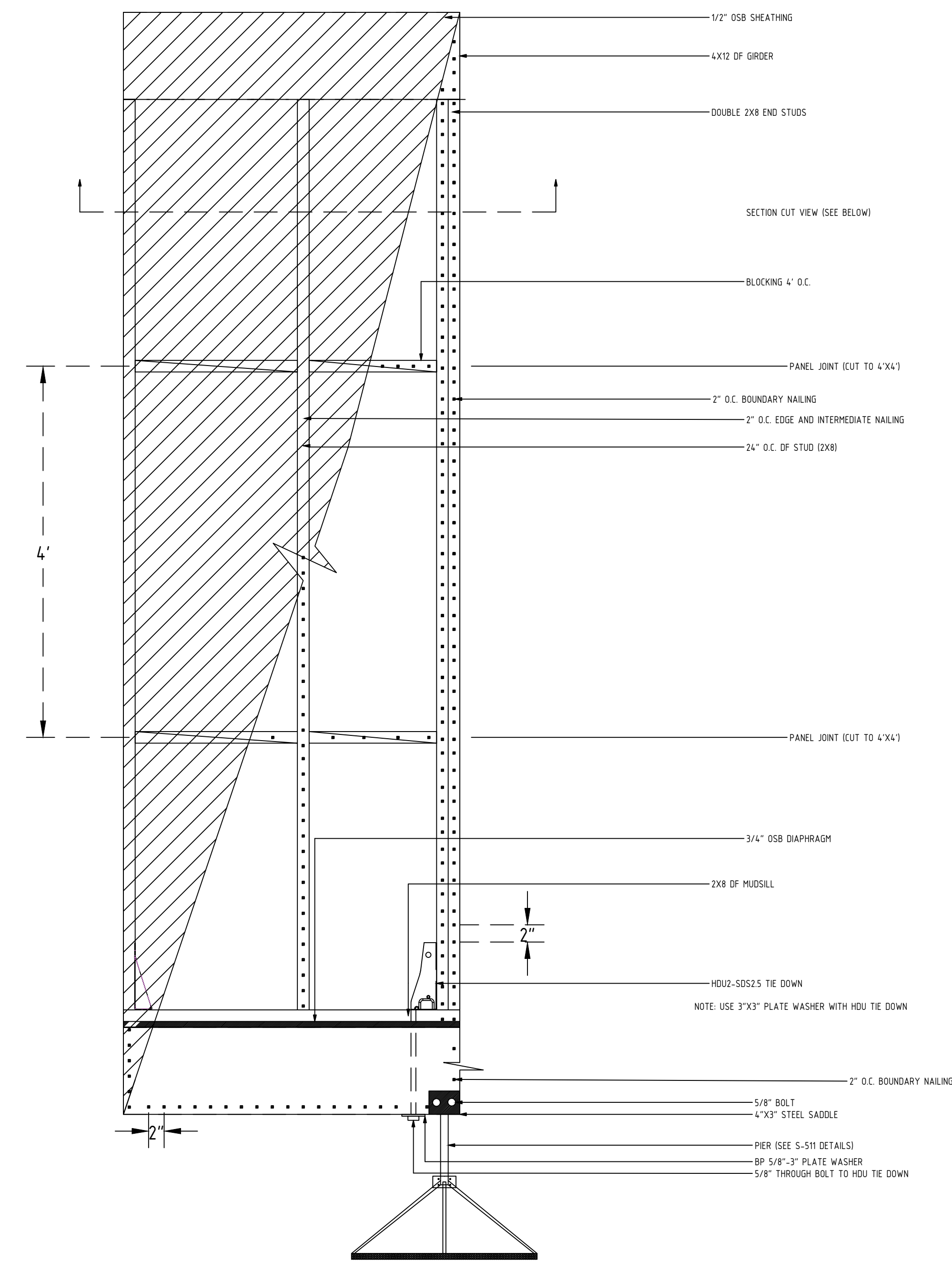
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SHEET TITLE

SHEAR WALL DETAIL

S-202

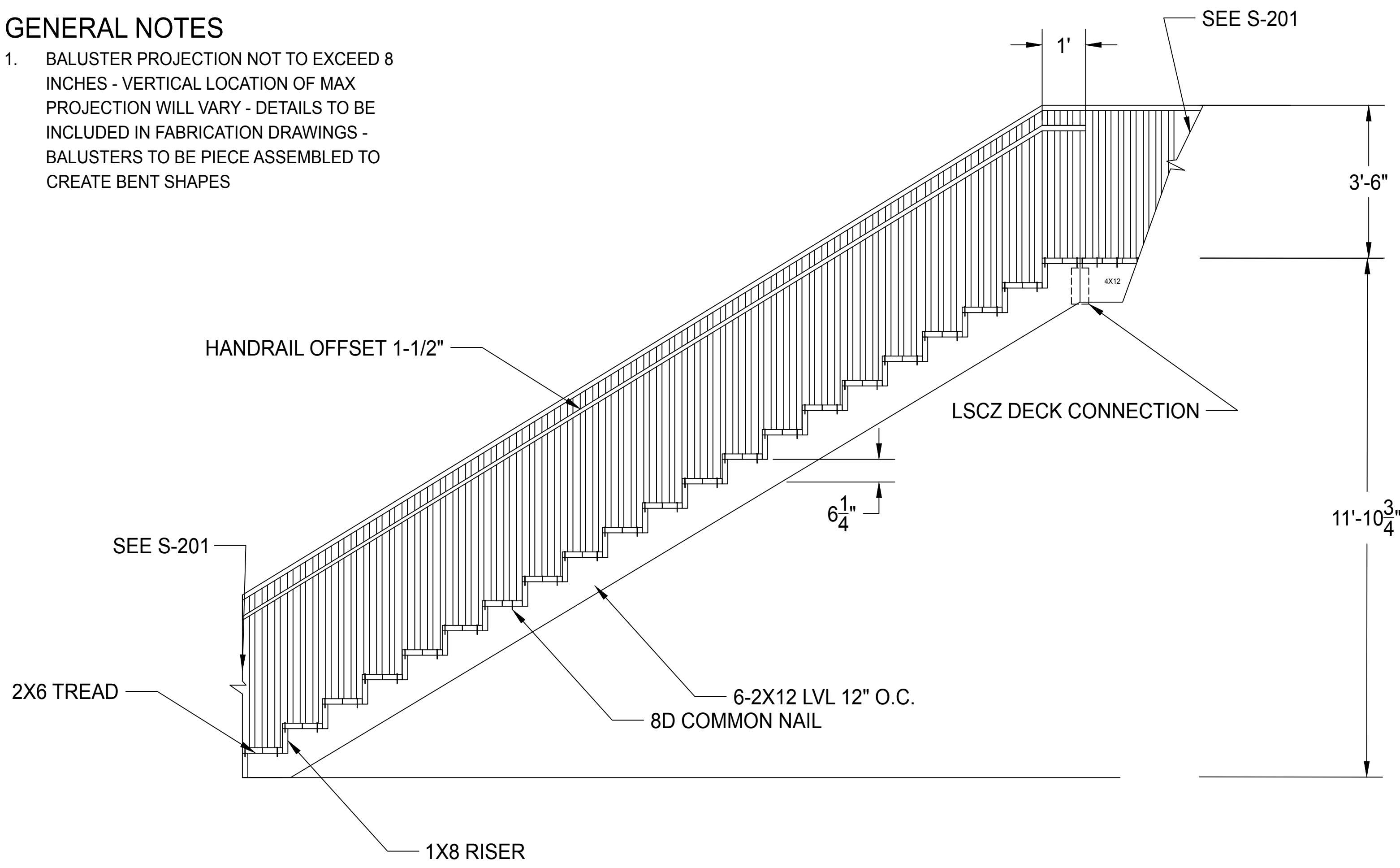


1 EAST-WEST SHEAR WALL DETAIL
Scale 1" = 1'-0"

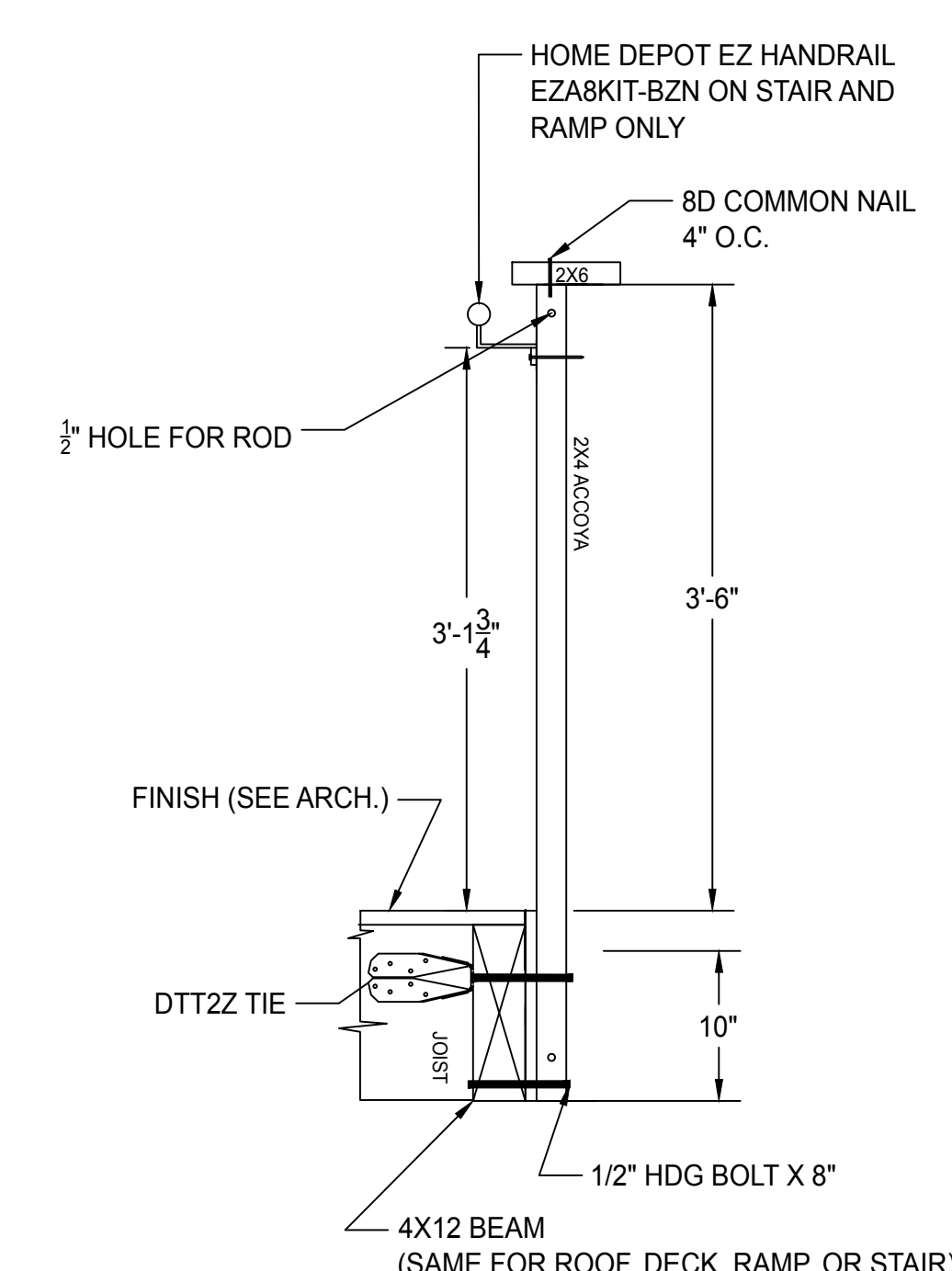
2 NORTH-SOUTH SHEAR WALL DETAIL
Scale 1" = 1'-0"

GENERAL NOTES

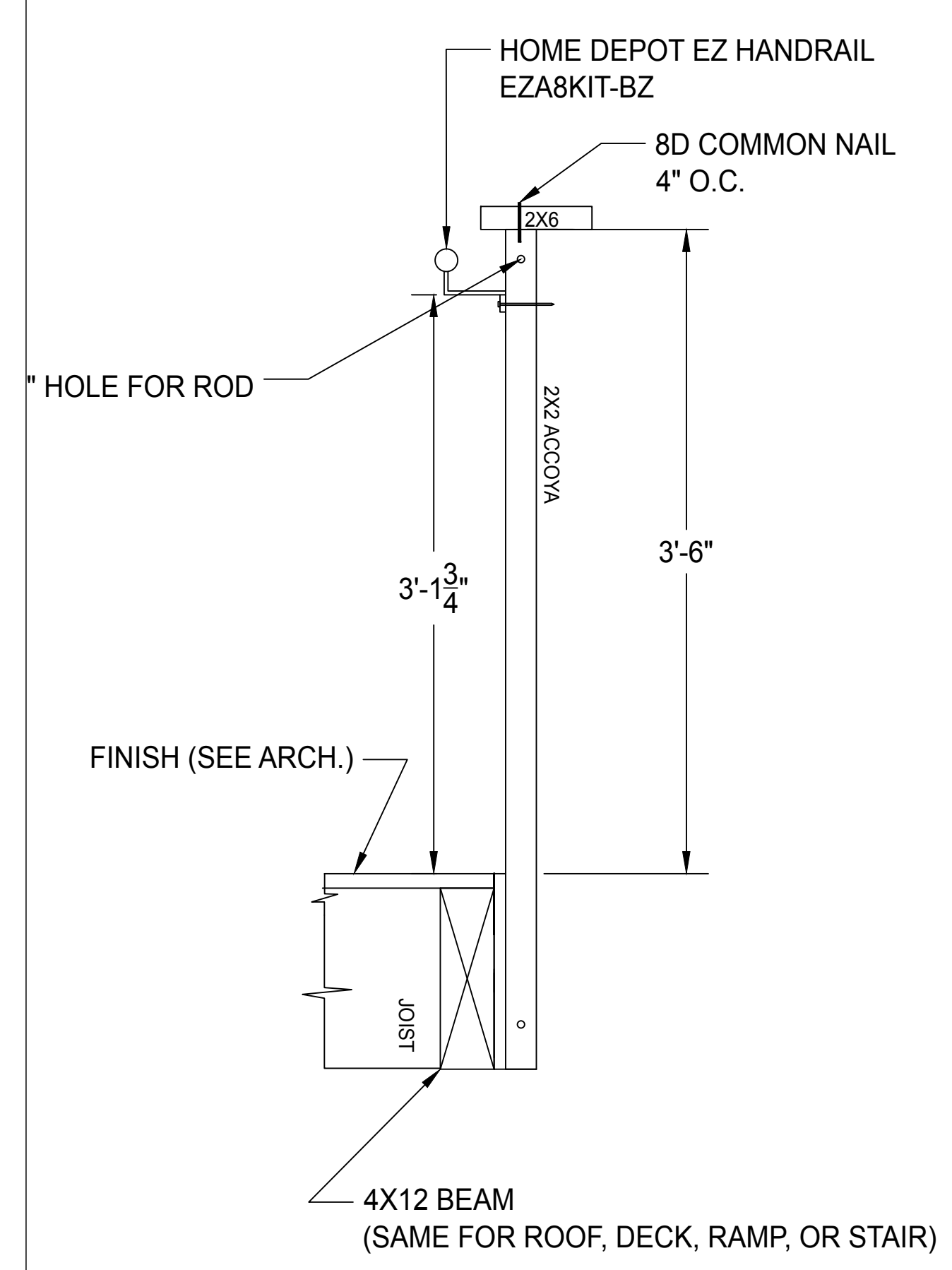
- BALUSTER PROJECTION NOT TO EXCEED 8 INCHES - VERTICAL LOCATION OF MAX PROJECTION WILL VARY - DETAILS TO BE INCLUDED IN FABRICATION DRAWINGS - BALUSTERS TO BE PIECE ASSEMBLED TO CREATE BENT SHAPES



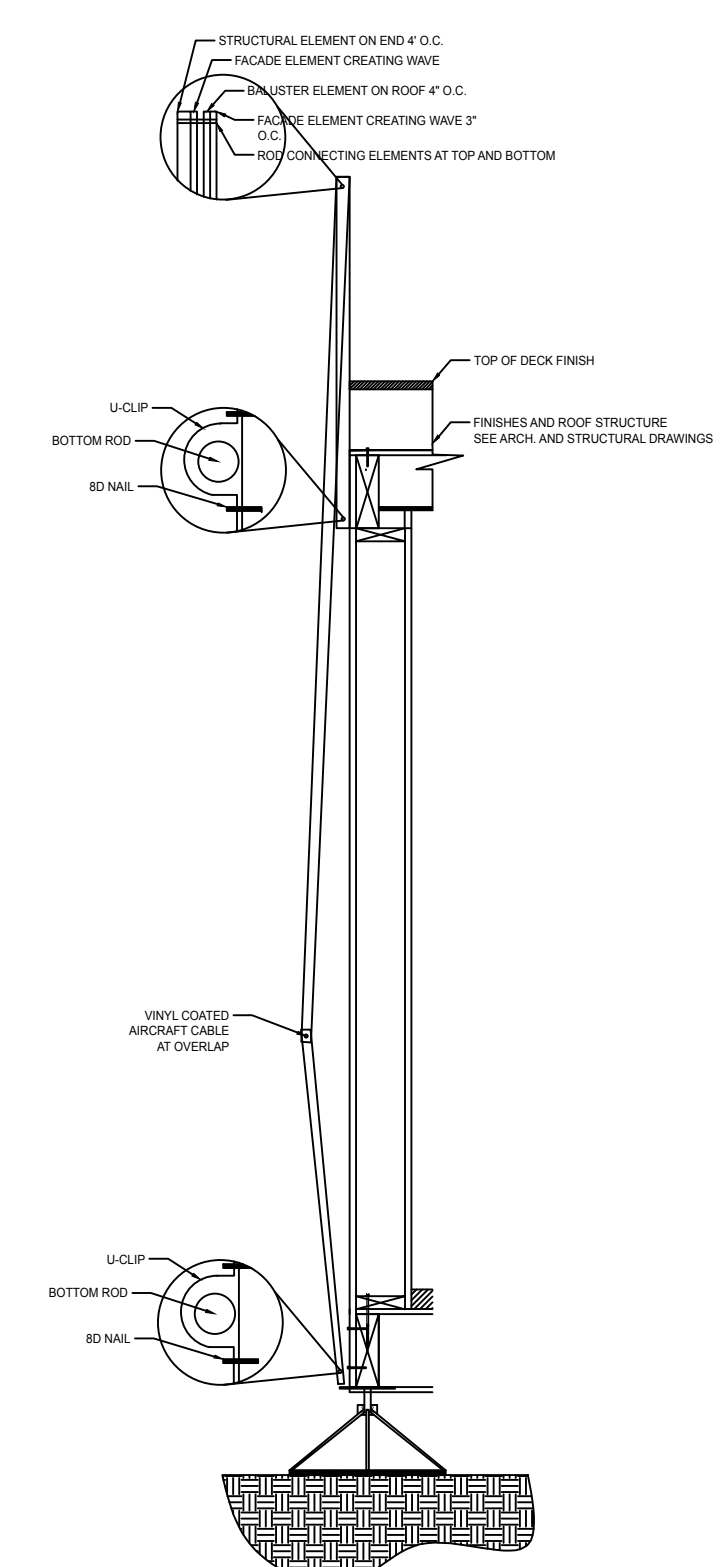
1 STAIR ELEVATION
Scale 1/2" = 1'-0"



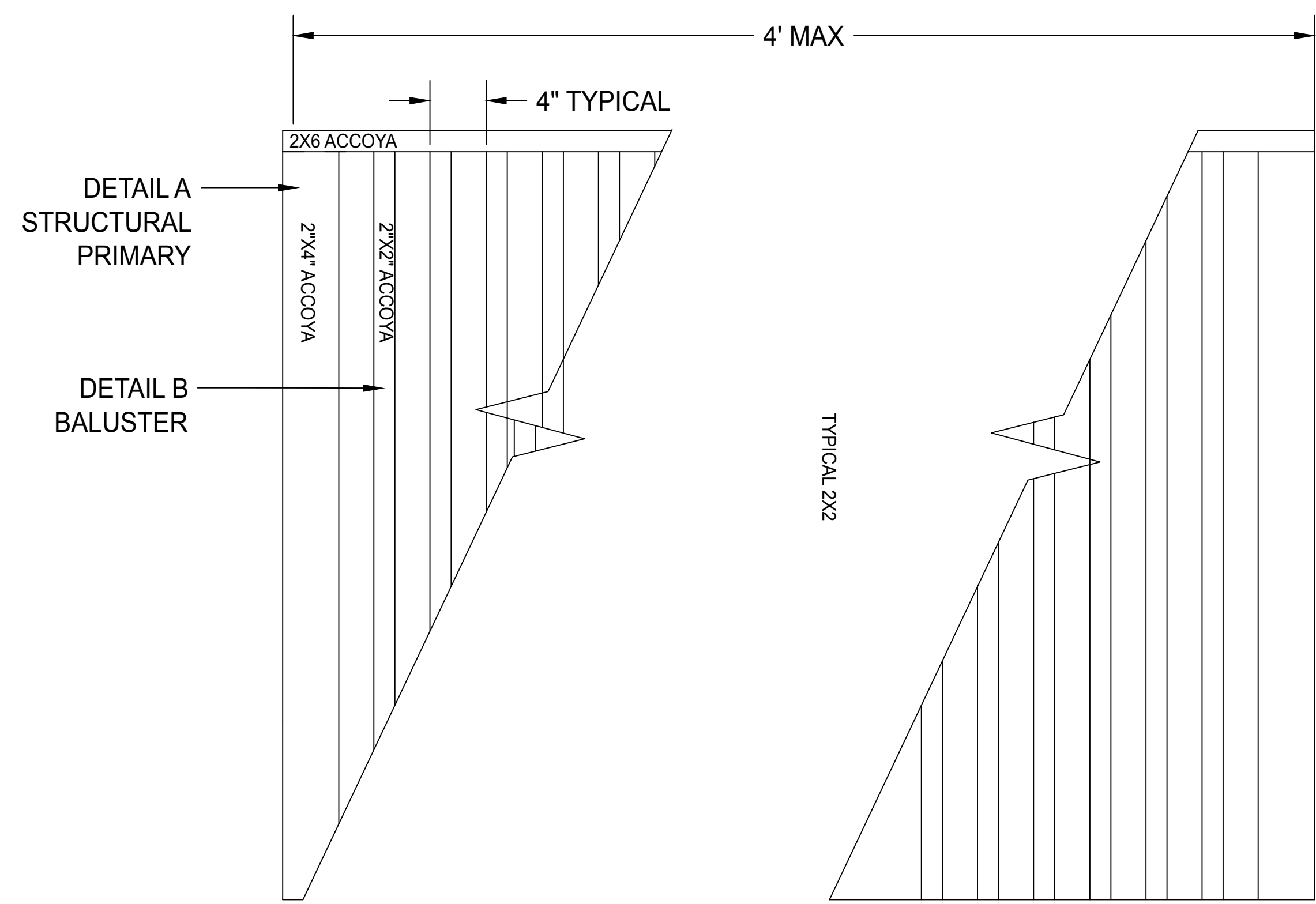
A STRUCTURAL PRIMARY
Scale 3/4" = 1'-0"



B BALUSTER
Scale 3/4" = 1'-0"



2 FACADE SECTION
Scale 1/2" = 1'-0"



3 FRONT RAIL ELEVATION
Scale 1" = 1'-0"

TEAM NAME	RISE
ADDRESS	390 S 34 STREET, RICHMOND, CA 94804
CONTACT	berkeleysolardecathlon@gmail.com https://solardecathlon.berkeley.edu

CONSULTANTS

CLIENT
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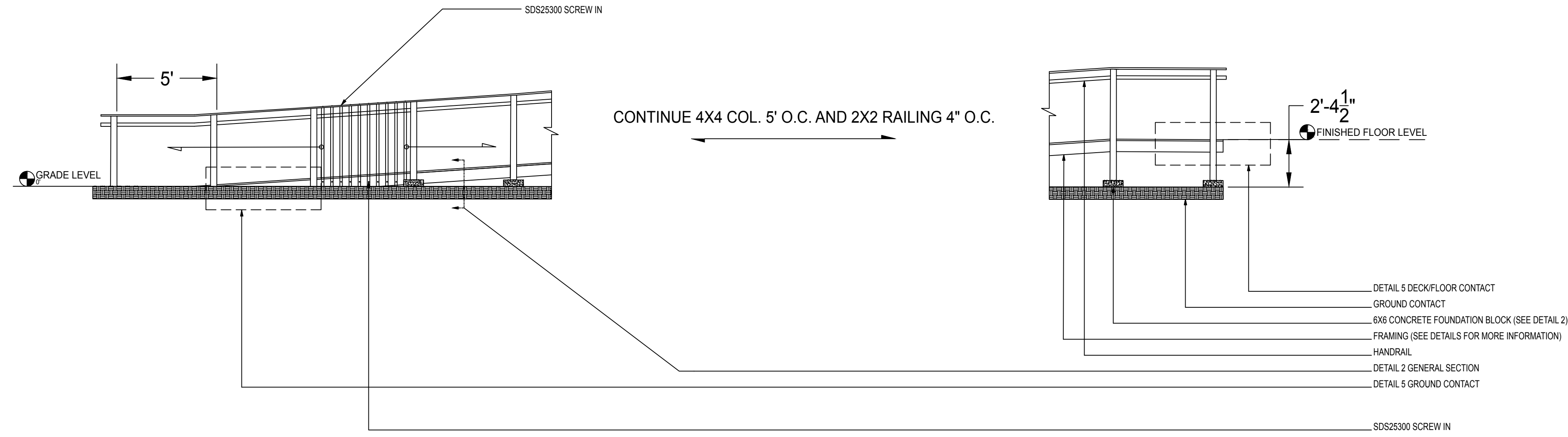
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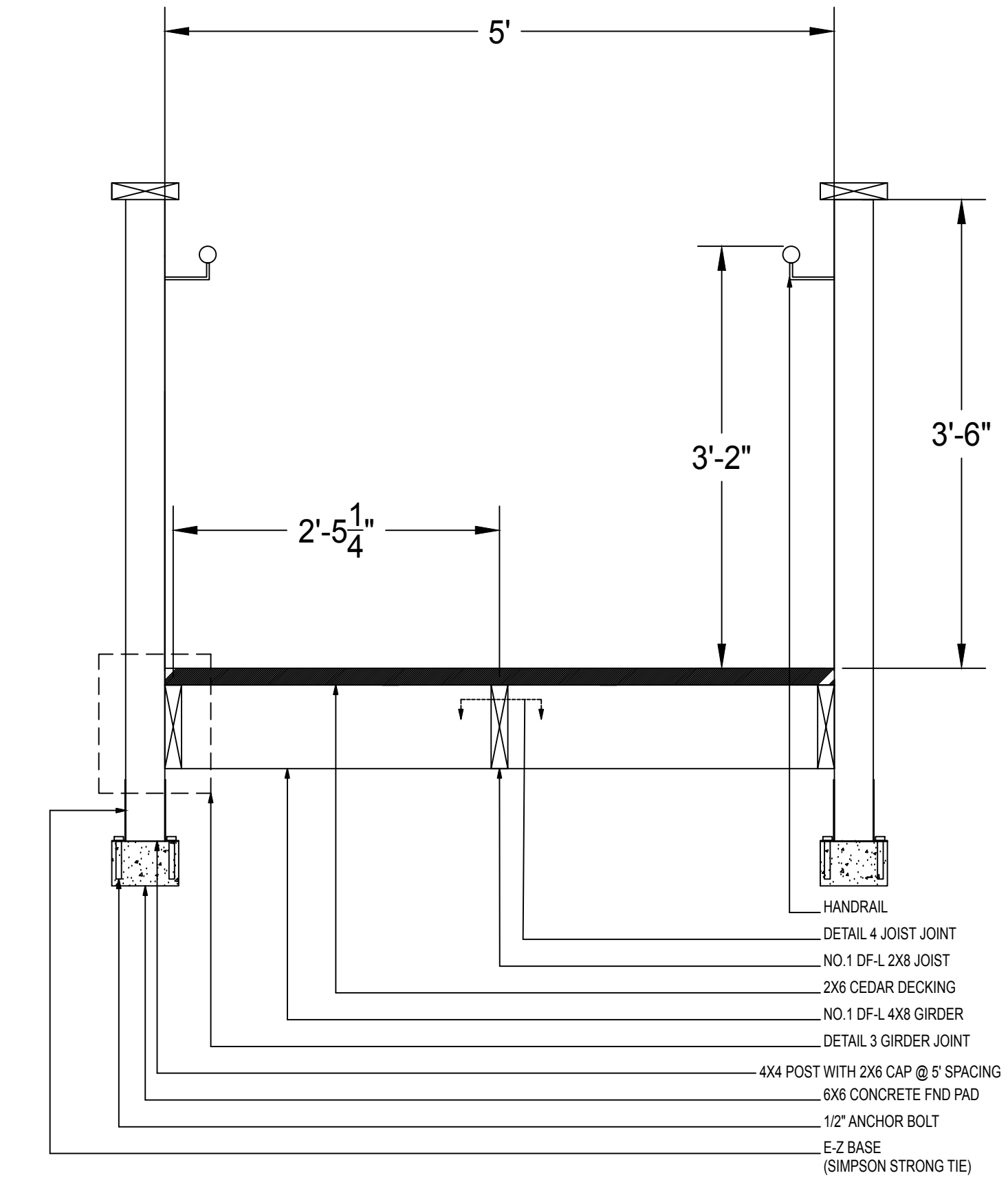
SHEET TITLE

**STAIR AND RAILING
DETAILS**

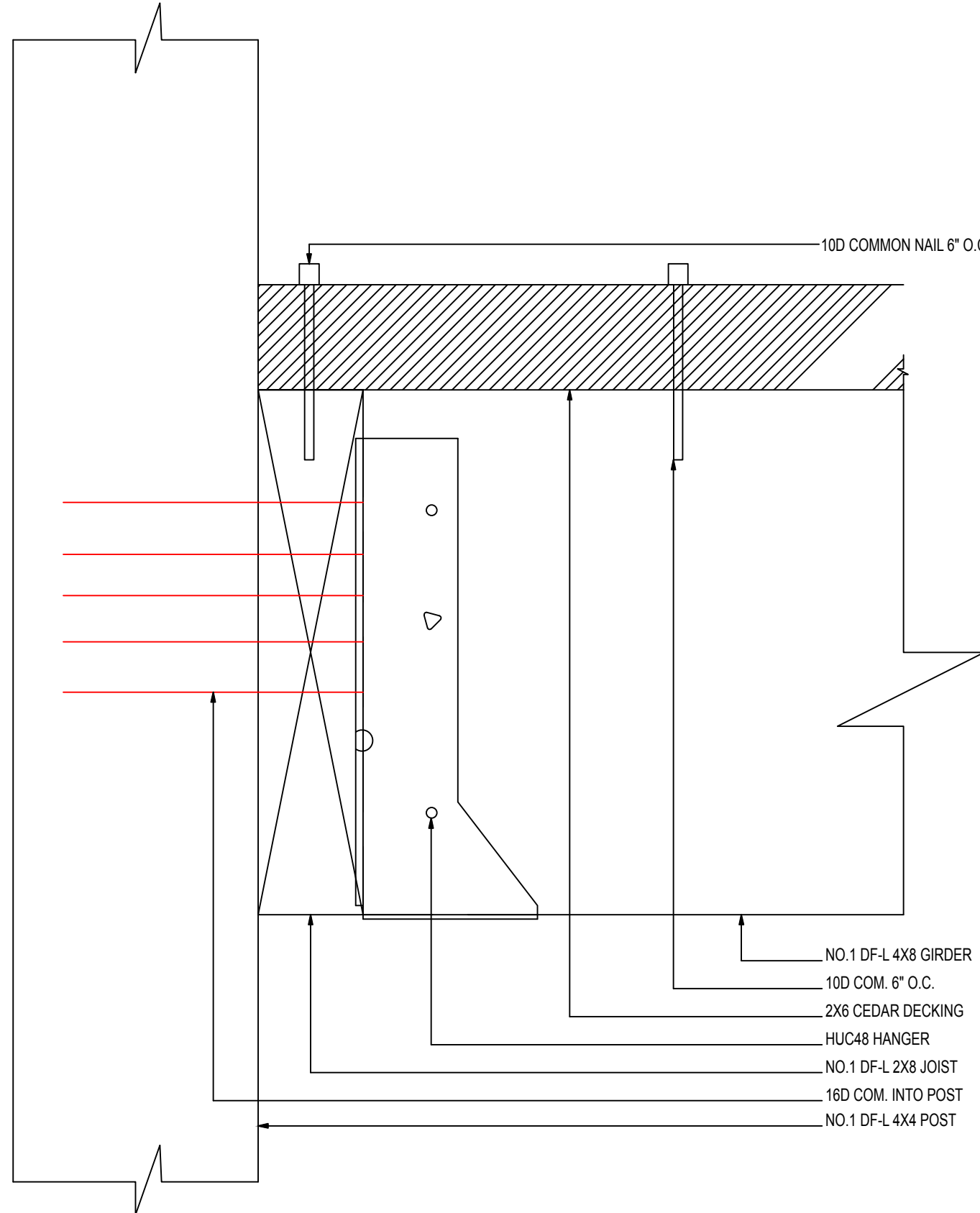
NOTE:
 SEE DETAILS ON SHEET S-203 FOR RAILINGS
 SEE PLAN VIEW SHEET S-100 FOR RAMP SLOPE PERCENTAGES
 RAMP SLOPES MAXIMUM 8%



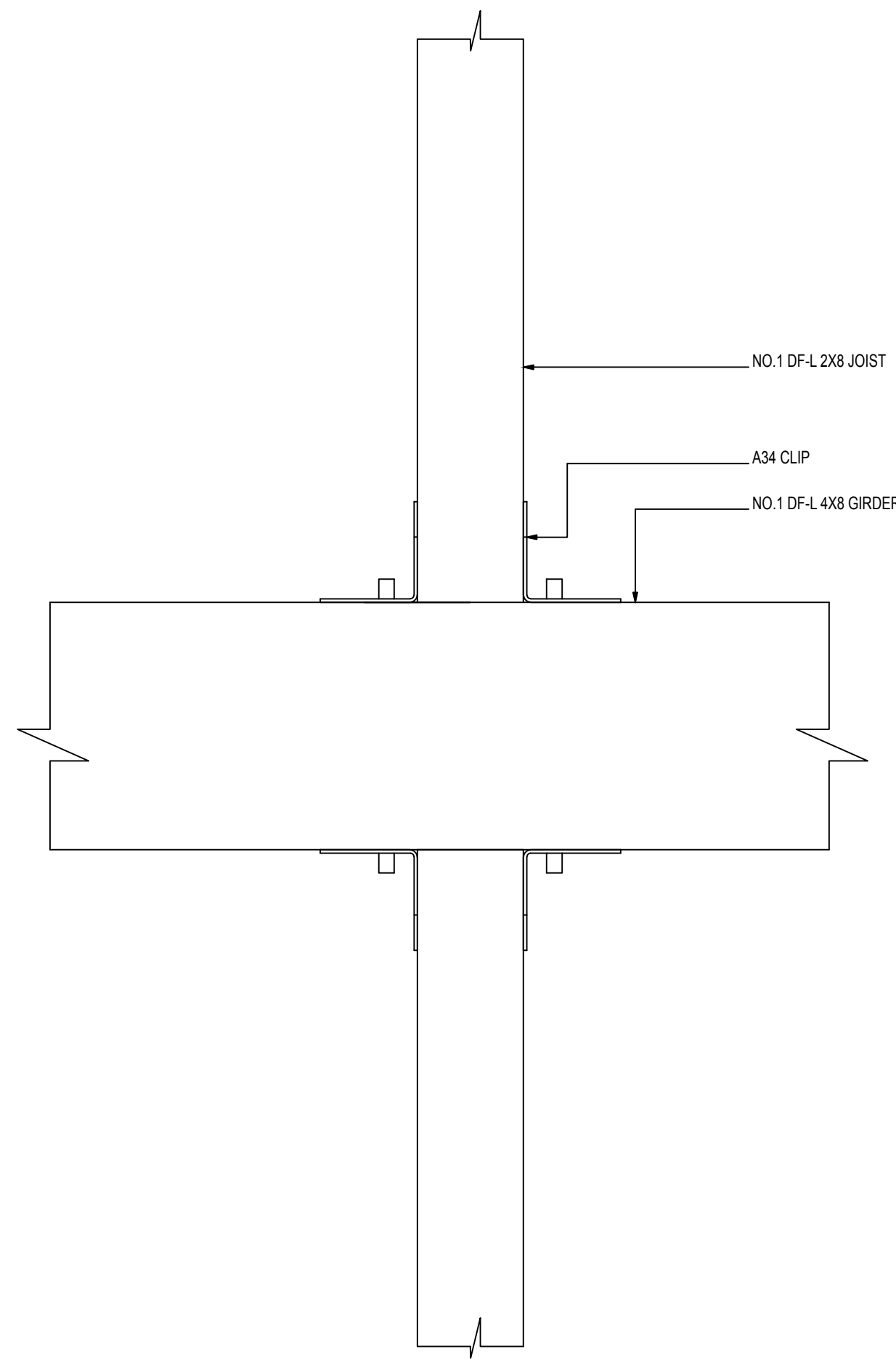
1 RAMP ELEVATION GENERAL
 Scale 1/4" = 1'-0"



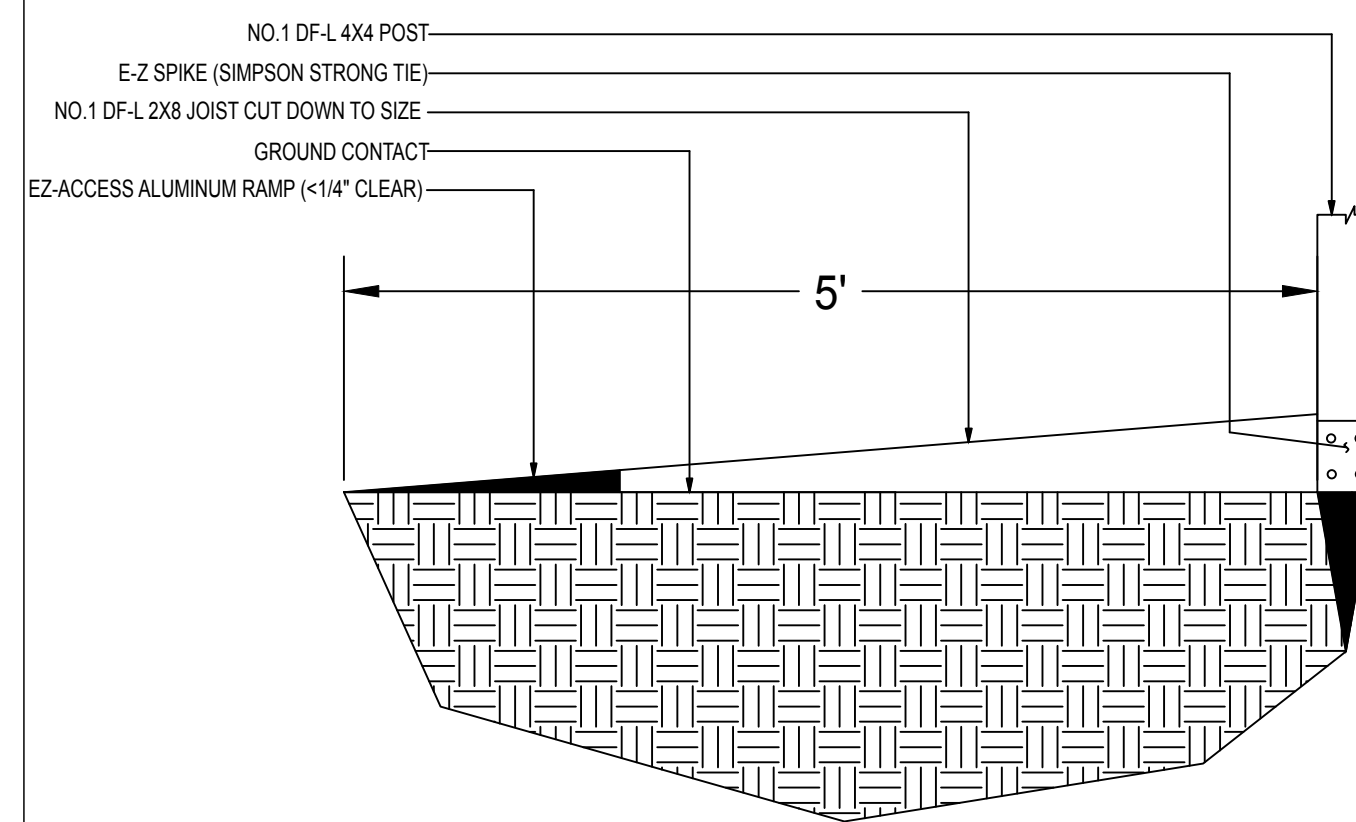
2 RAMP SECTION (GENERAL)
 Scale 1" = 1'-0"



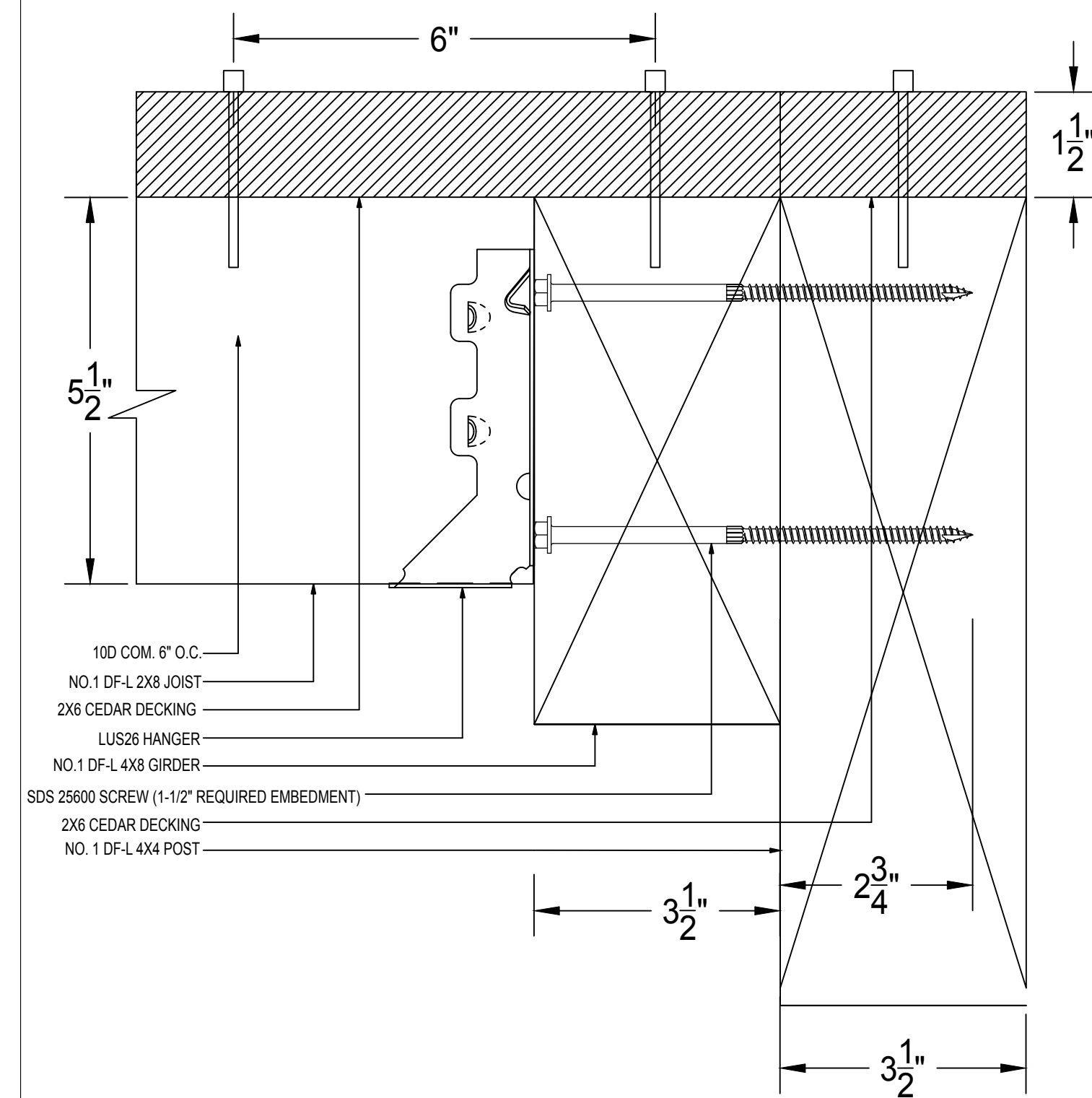
3 GIRDER JOINT
 Scale 6" = 1'-0"



4 JOIST JOINT
 Scale 6" = 1'-0"



5 GROUND CONTACT
 Scale 1" = 1'-0"



6 DECK/FLOOR CONTACT
 Scale 6" = 1'-0"

RISE

TEAM NAME RISE
 ADDRESS 390 S 34 STREET,
 RICHMOND, CA 94804
 CONTACT berkeleysolardecathlon@gmail.com
 https://solardecathlon.berkeley.edu

CONSULTANTS:
 IAN KELSO
 JOHN-MICHAEL WONG
 PAUL WESTERMANN

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RAMP DETAILS

RISE

TEAM NAME: RISE
ADDRESS: 390 S 34 STREET, RICHMOND, CA, 94804
CONTACT: berkeleysolardecathlon@gmail.com, https://solardecathlon.berkeley.edu

CONSULTANTS:
IAN KELSO
JOHN-MICHAEL WONG
PAUL WESTERMANN

CLIENT:
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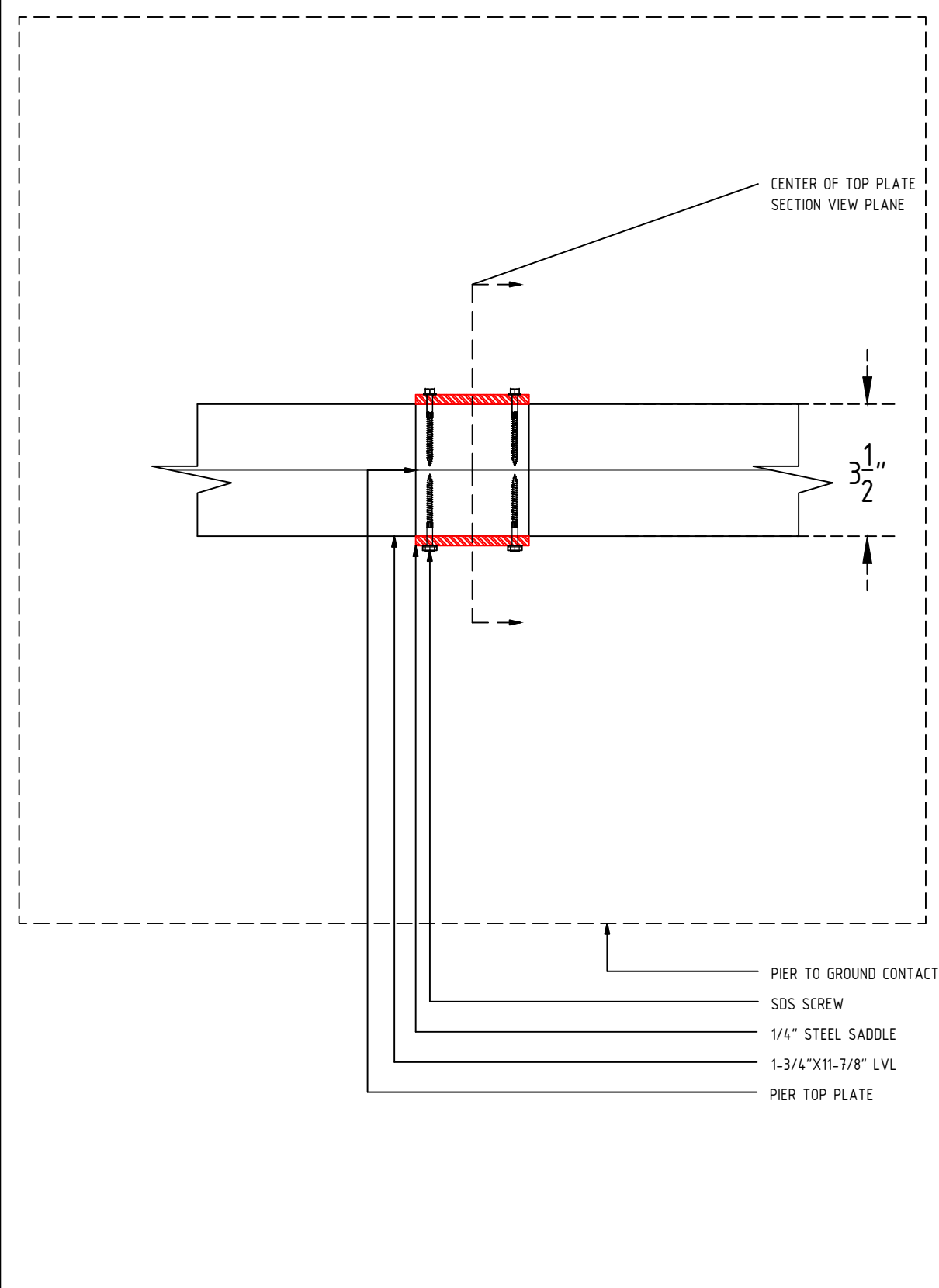
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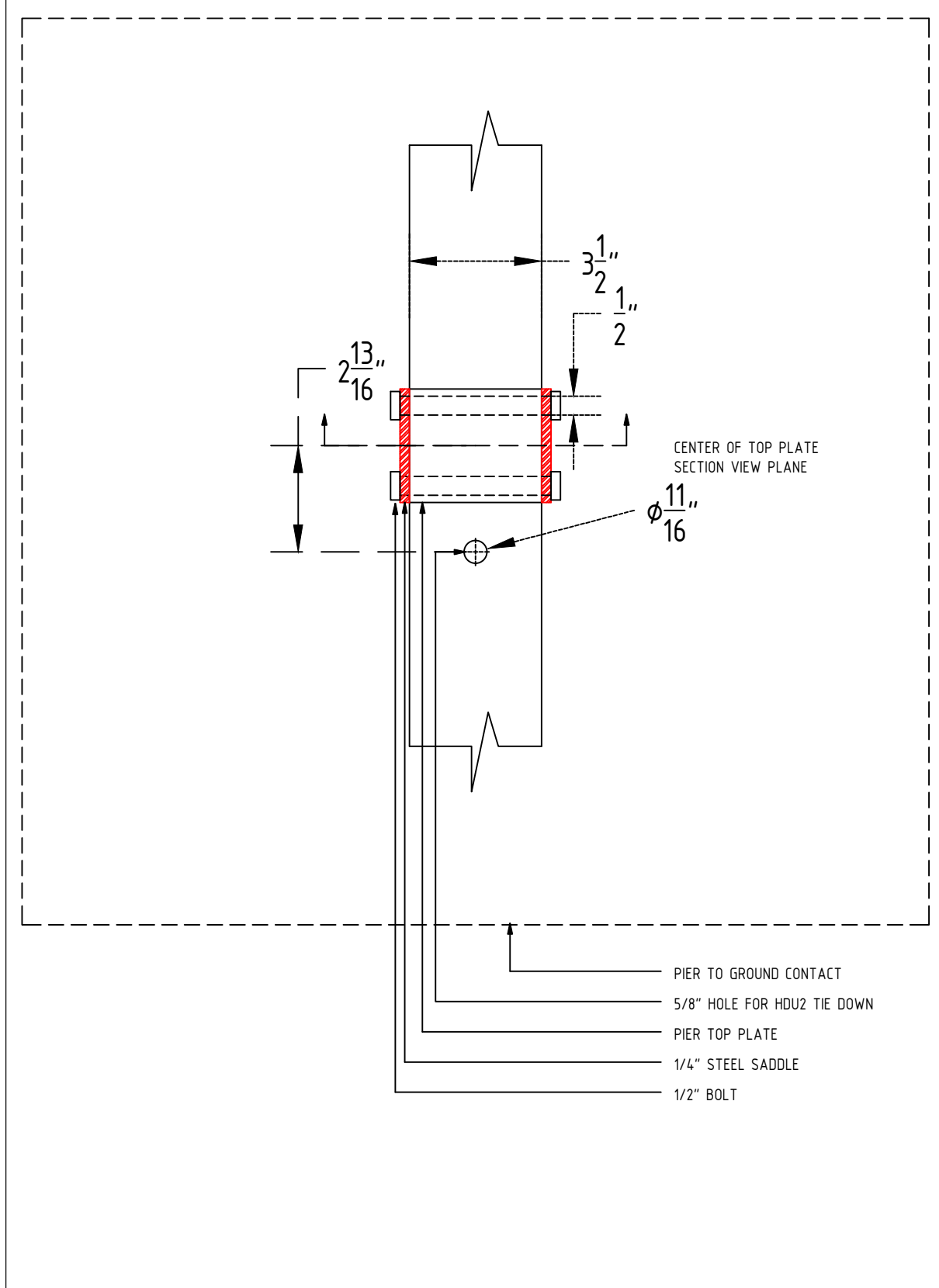
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PIER DETAILS

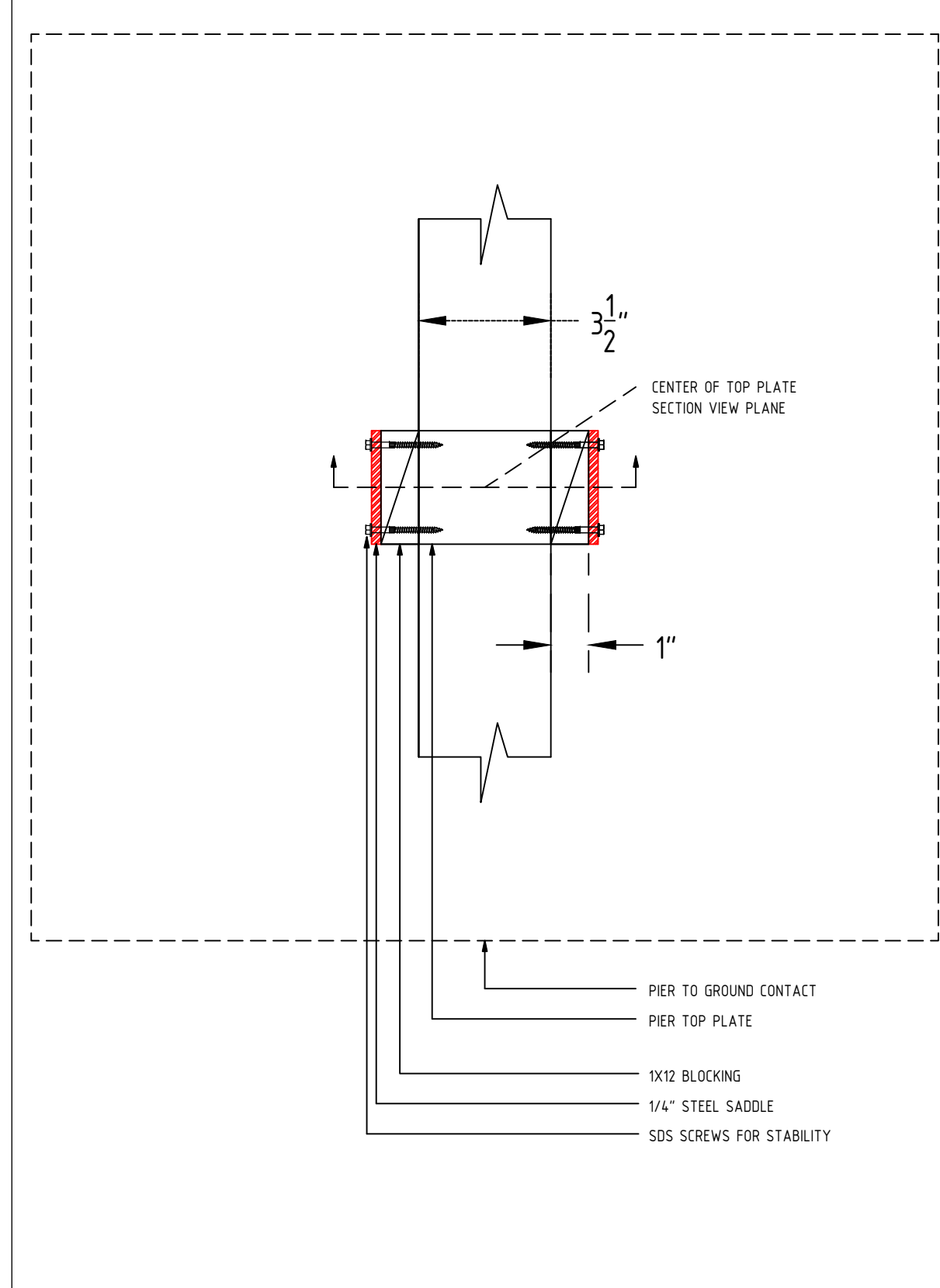
S-511



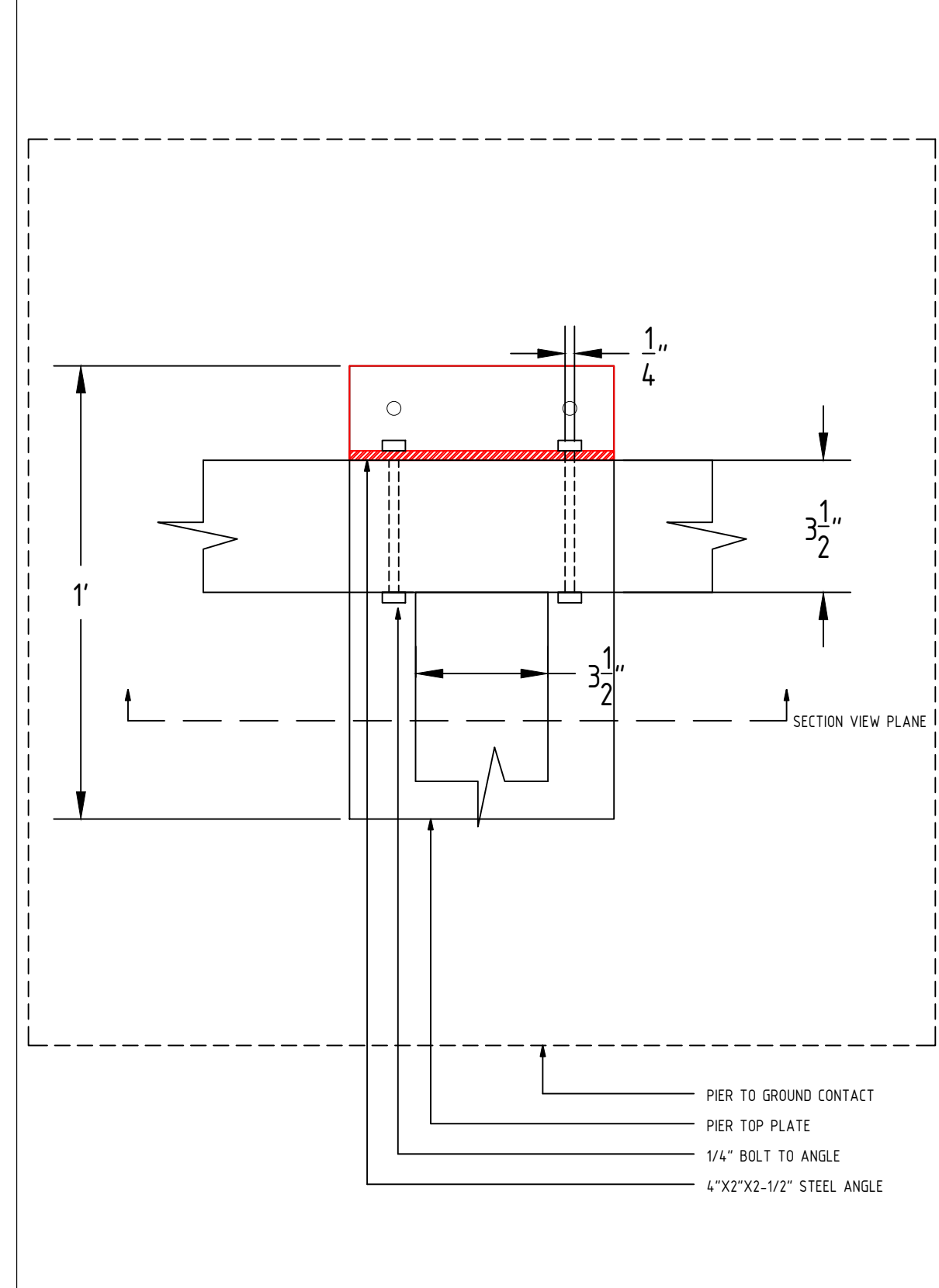
1 SADDLE TOP PIER DETAIL (PLAN)
Scale 3" = 1'-0"



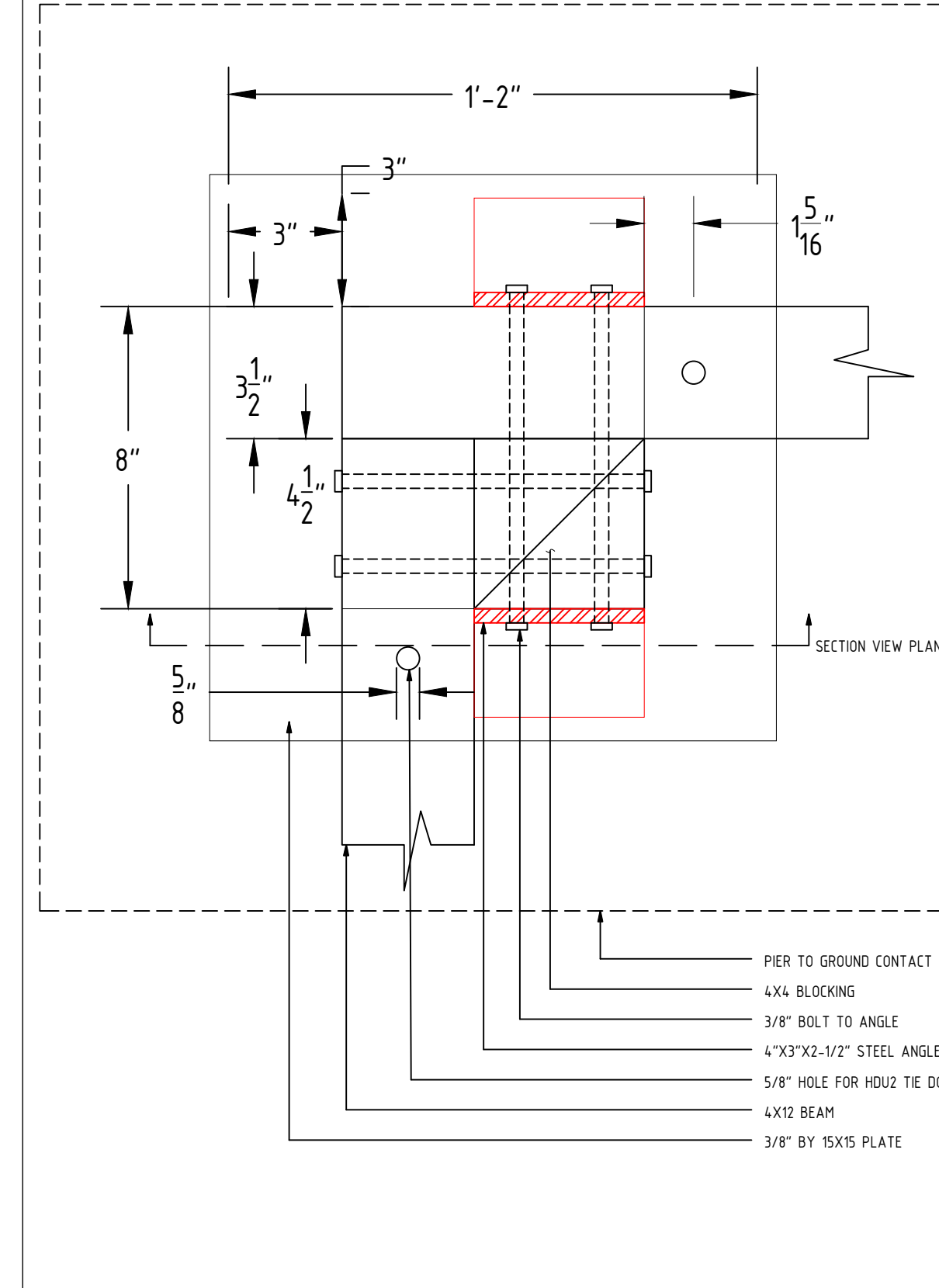
3 SHEAR WALL PIER DETAIL (PLAN)
Scale 3" = 1'-0"



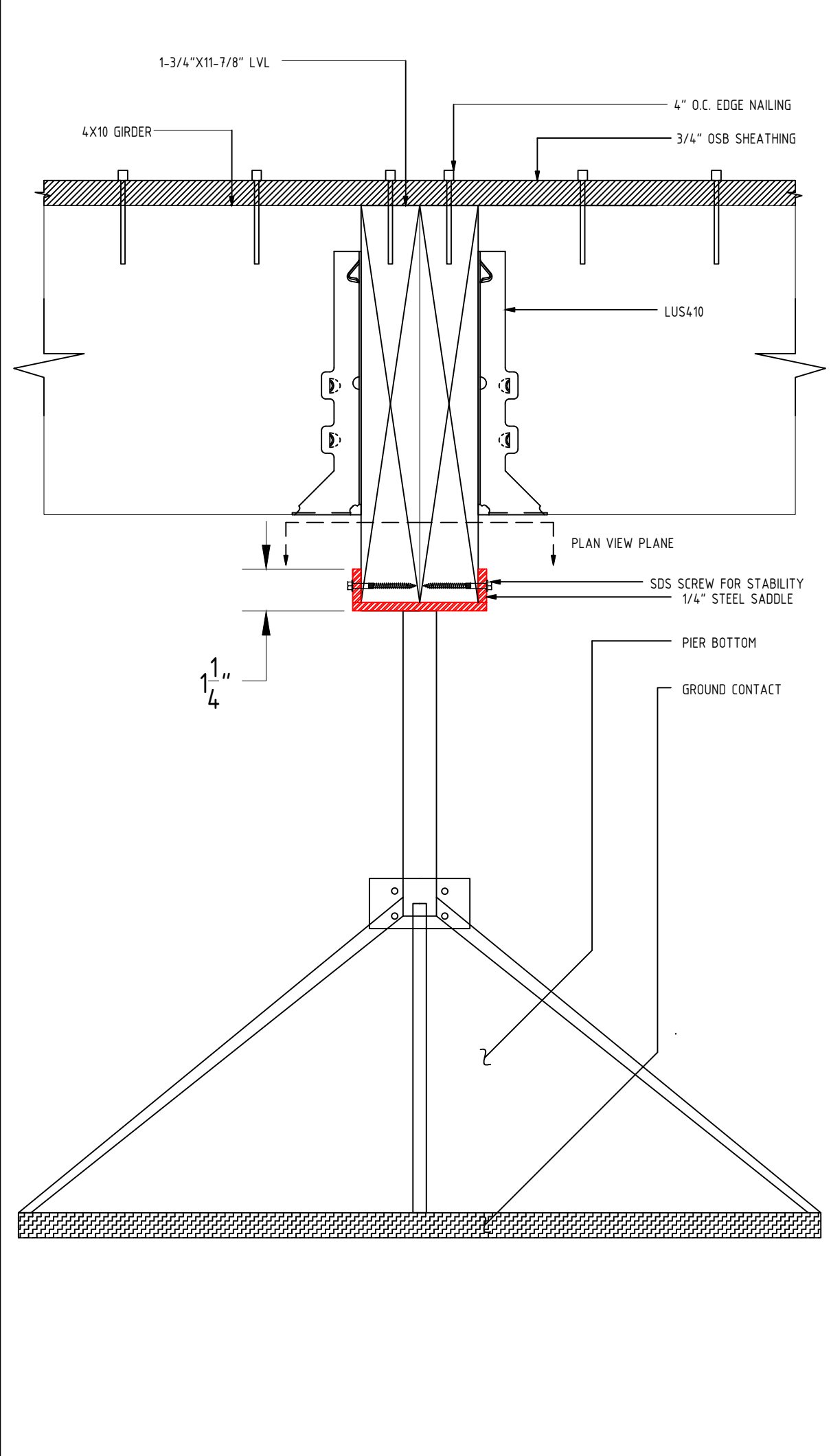
5 WIDE SADDLE TOP PIER (PLAN)
Scale 3" = 1'-0"



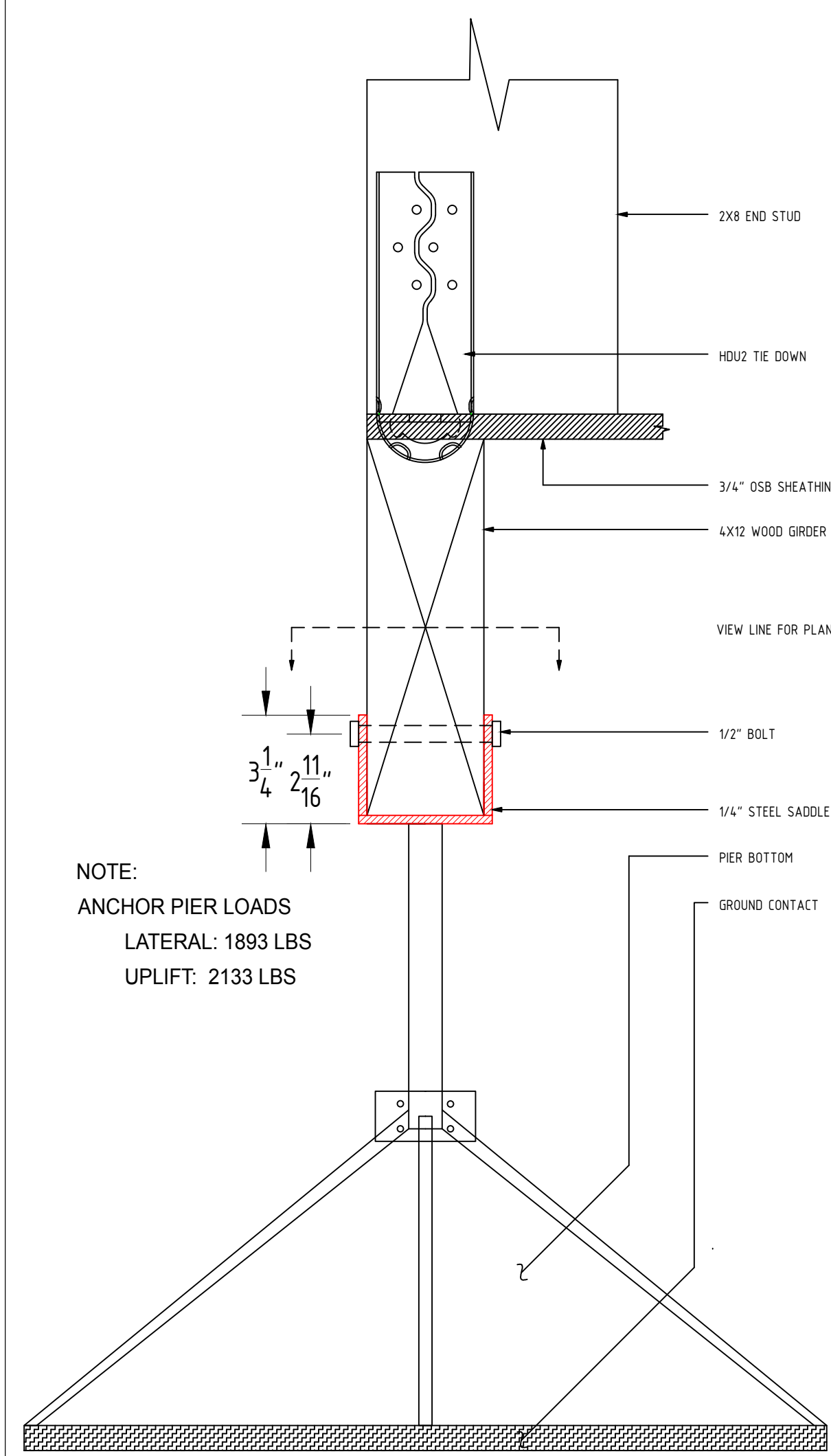
7 WIDE TOP PIER (PLAN)
Scale 3" = 1'-0"



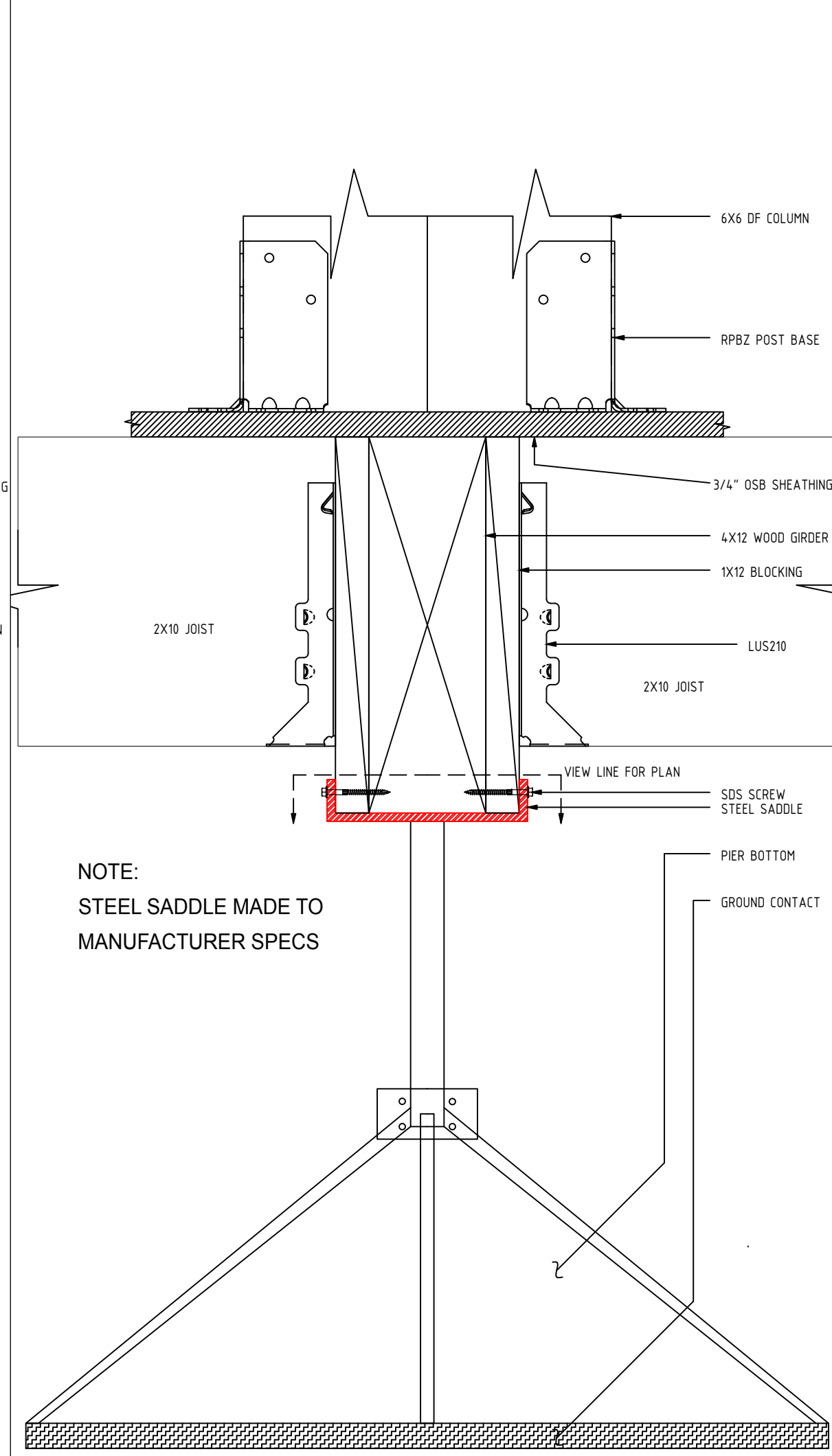
9 CUSTOM PIER (PLAN)
Scale 3" = 1'-0"



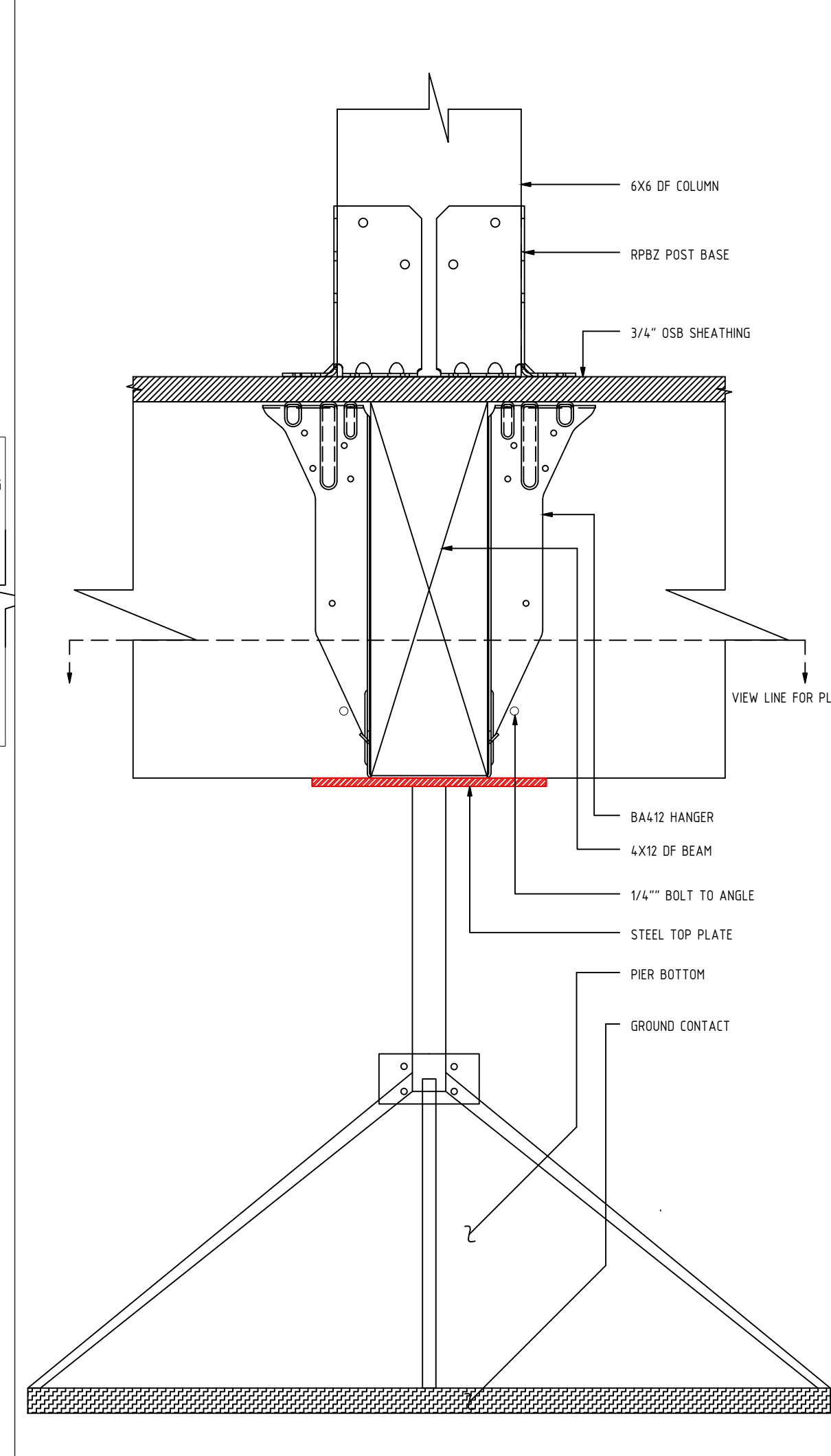
2 SADDLE TOP PIER DETAIL (SECTION)
Scale 3" = 1'-0"



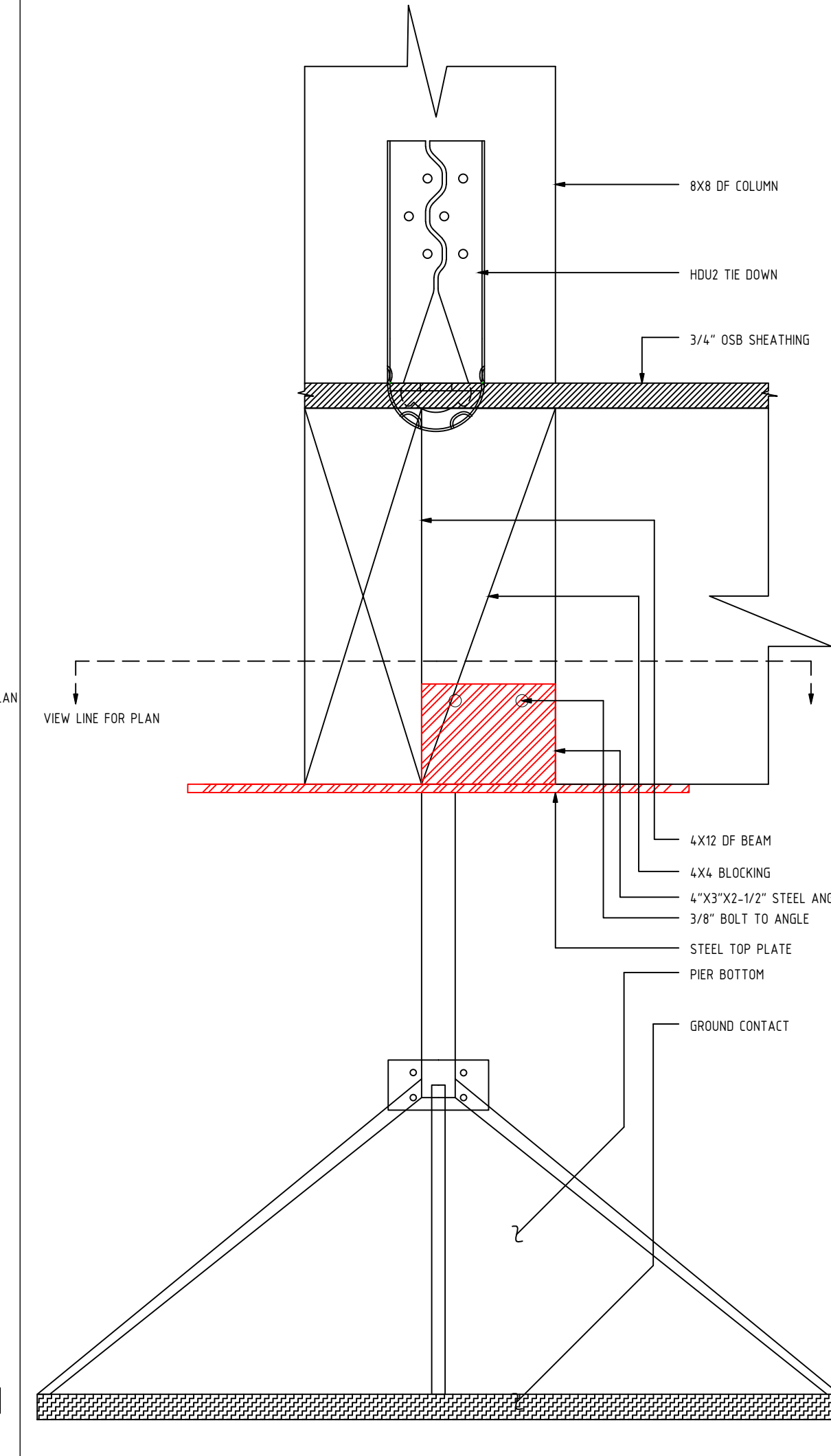
4 SHEAR WALL PIER DETAIL (SECTION)
Scale 3" = 1'-0"



6 WIDE SADDLE TOP PIER (SECTION)
Scale 3" = 1'-0"



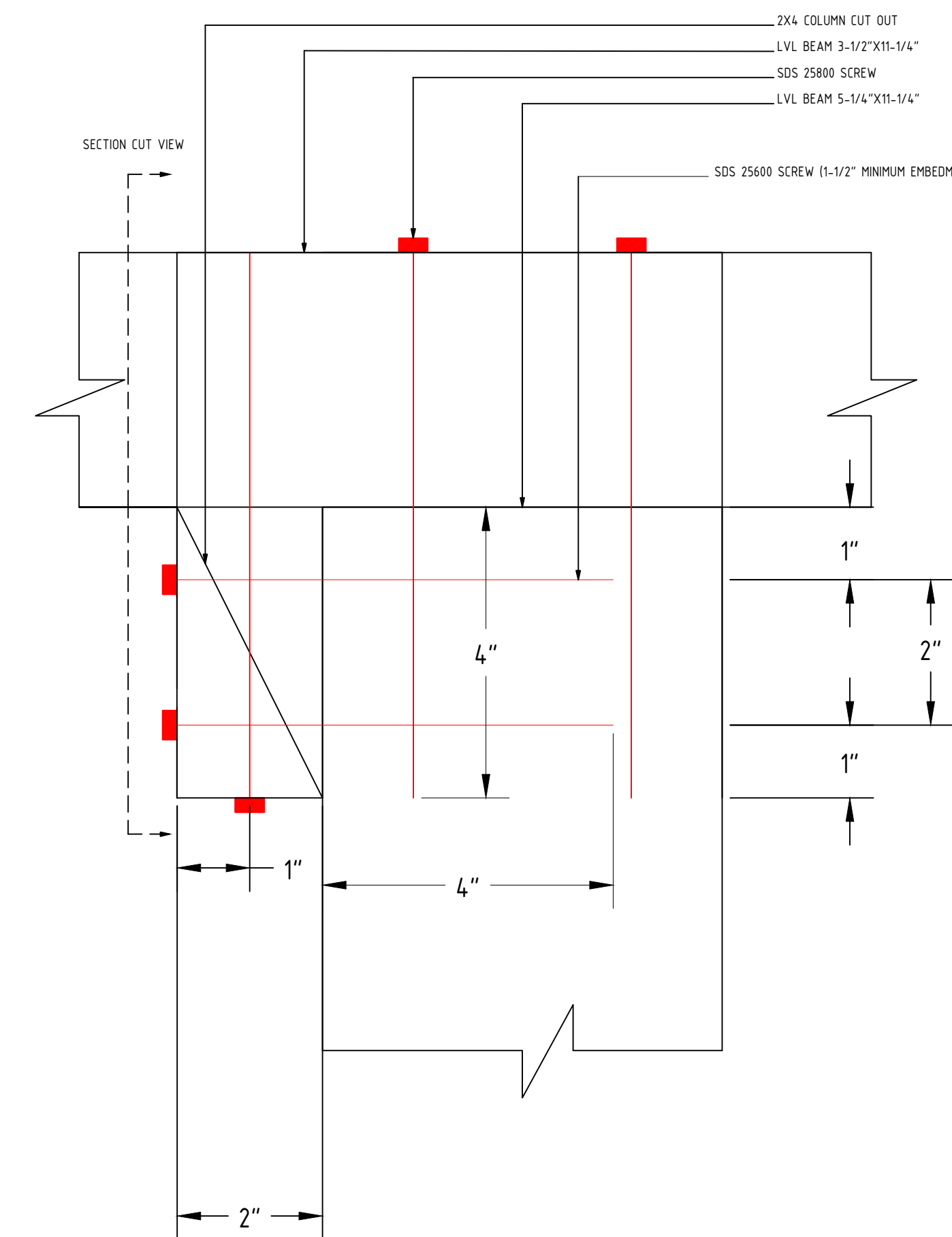
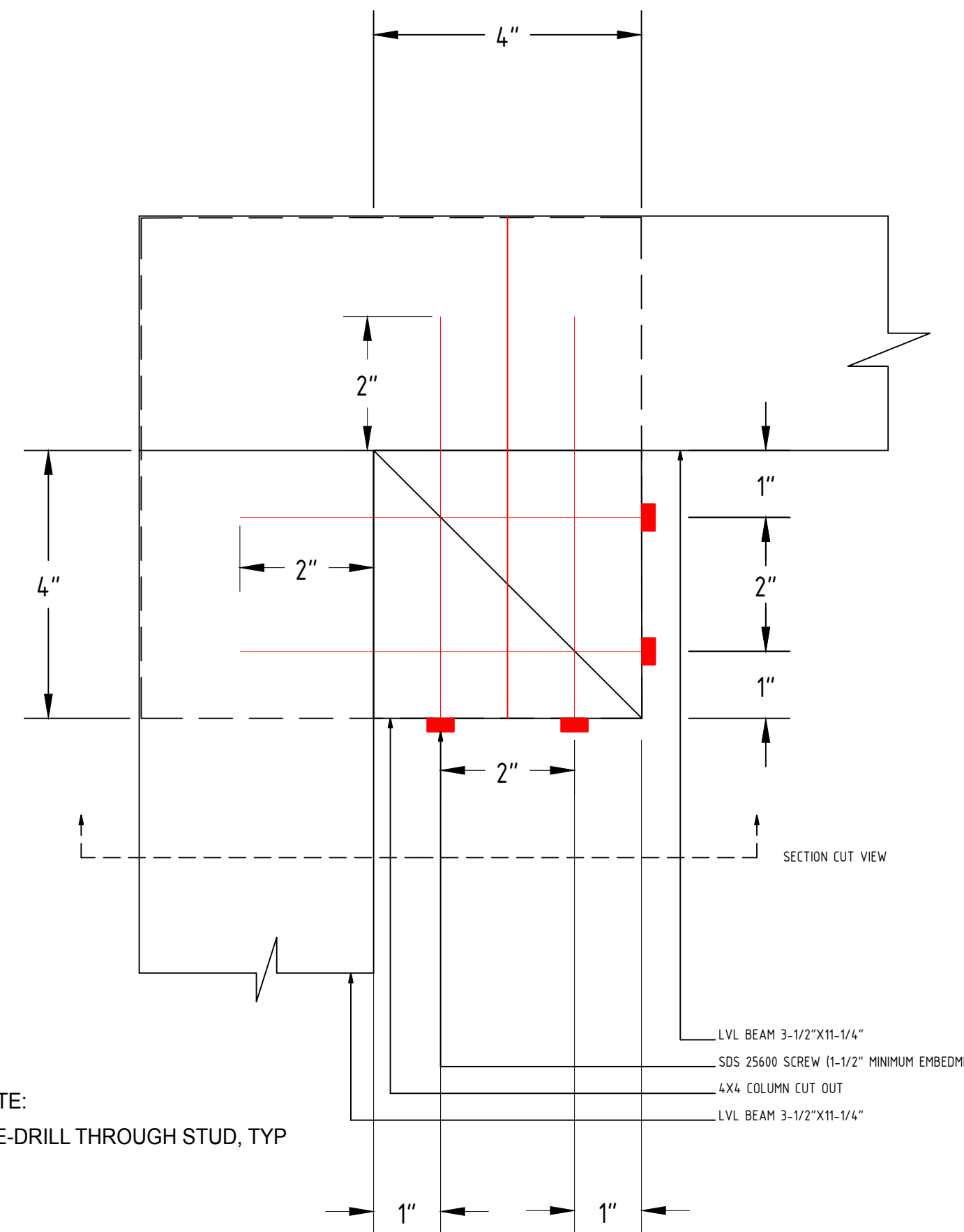
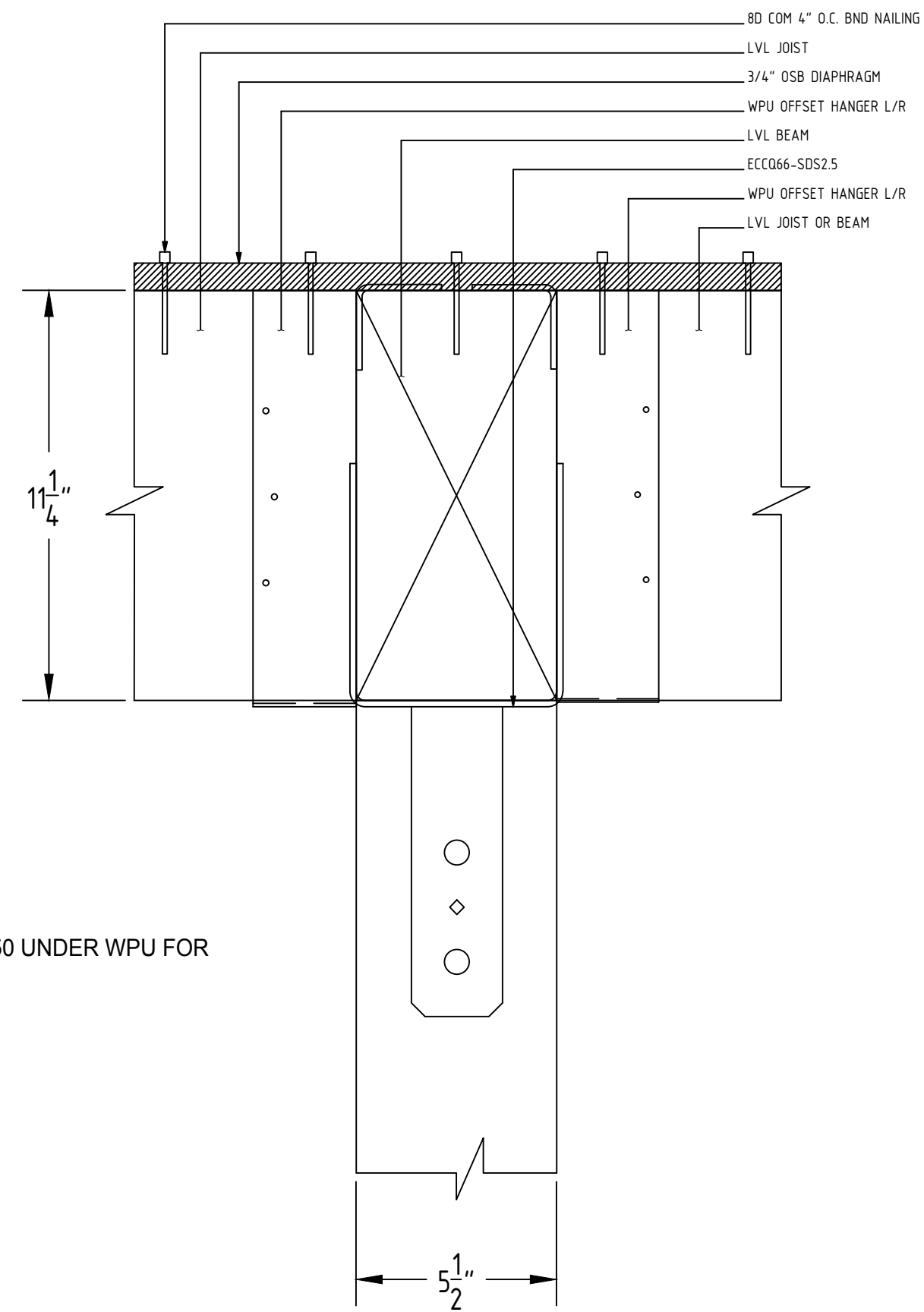
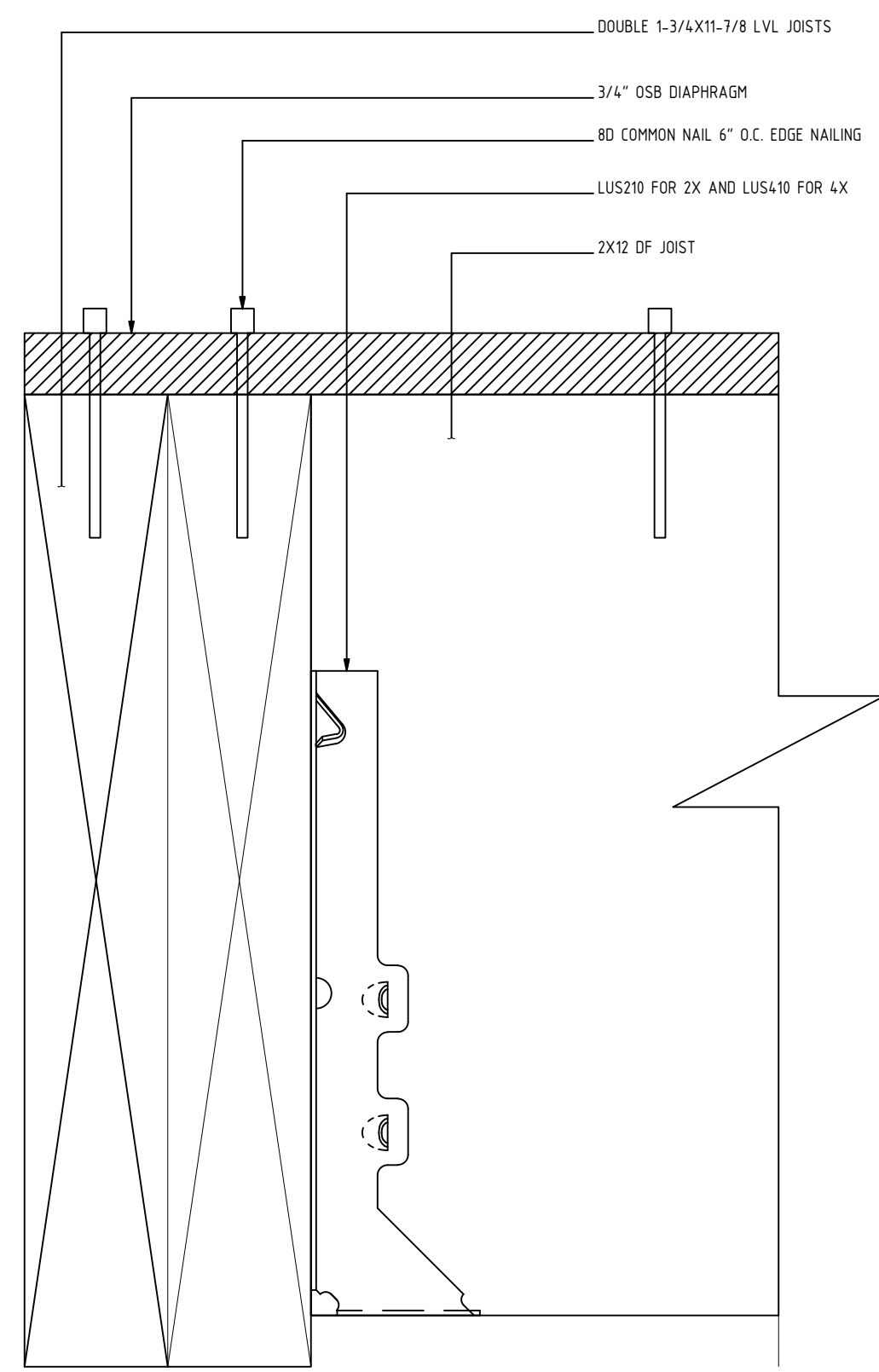
8 WIDE TOP PIER (SECTION)
Scale 3" = 1'-0"



10 CUSTOM PIER (SECTION)
Scale 3" = 1'-0"

NOTE:
ANCHOR PIER LOADS
LATERAL: 1893 LBS
UPLIFT: 2133 LBS

NOTE:
STEEL SADDLE MADE TO
MANUFACTURER SPECS

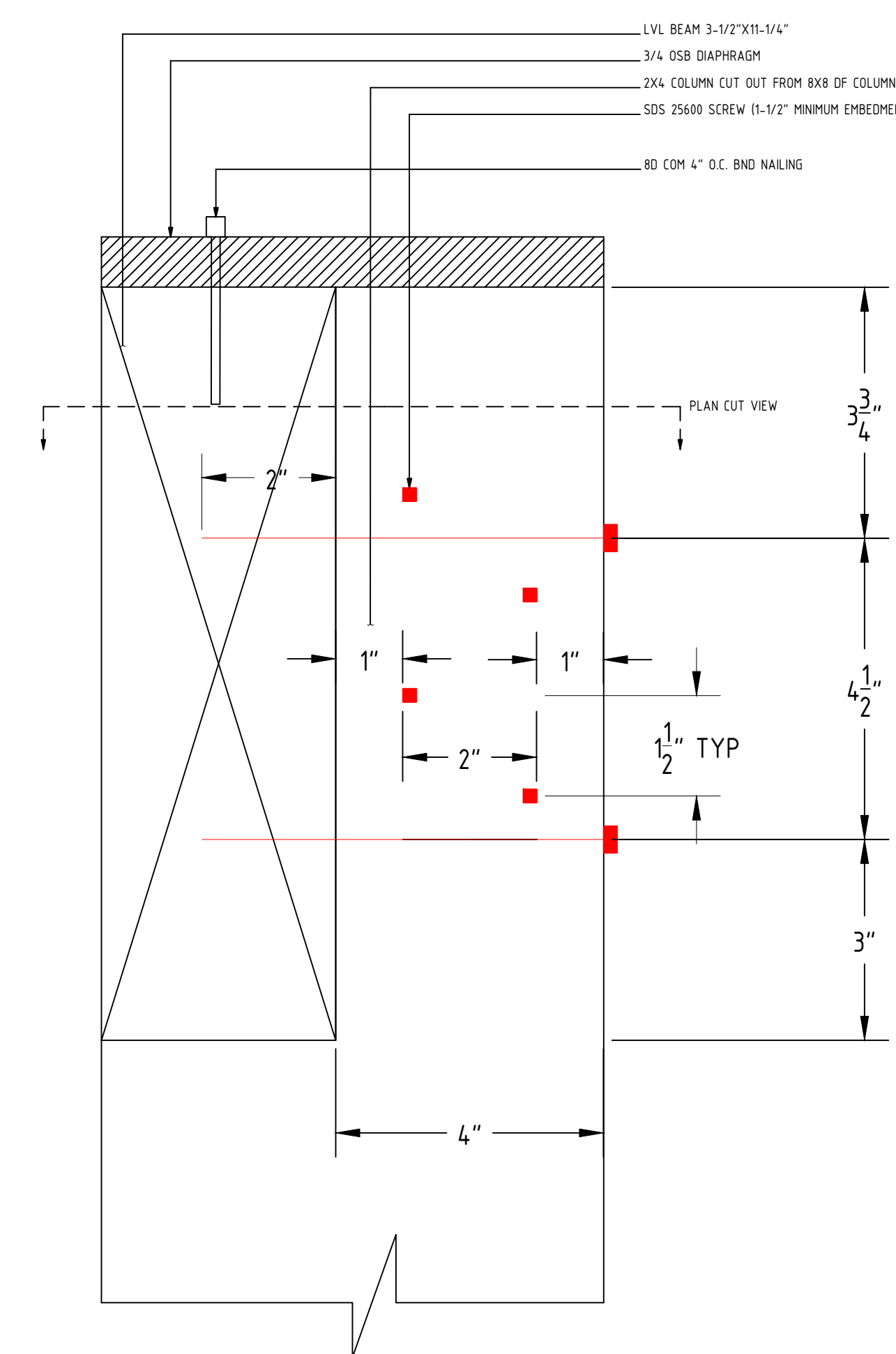
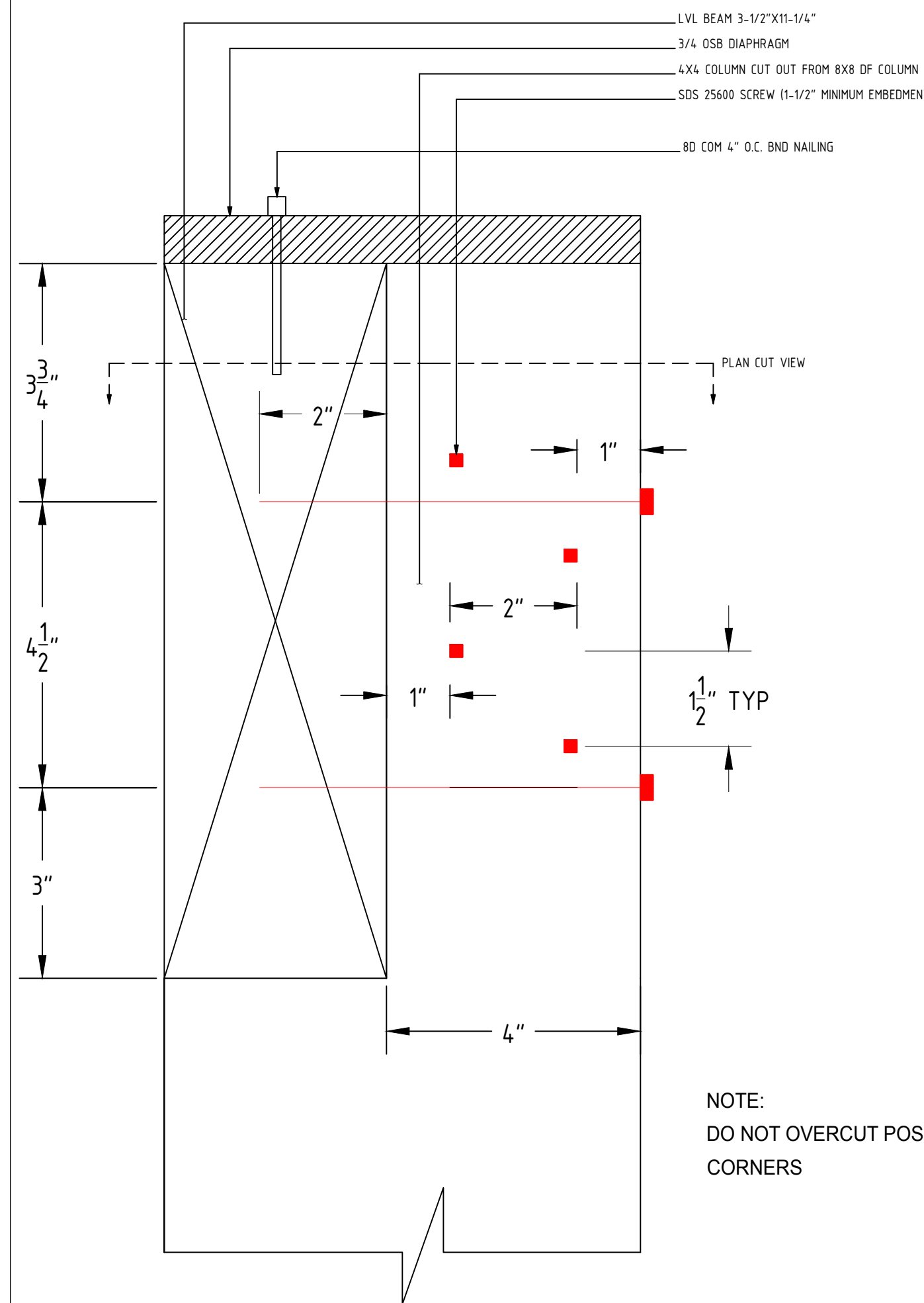
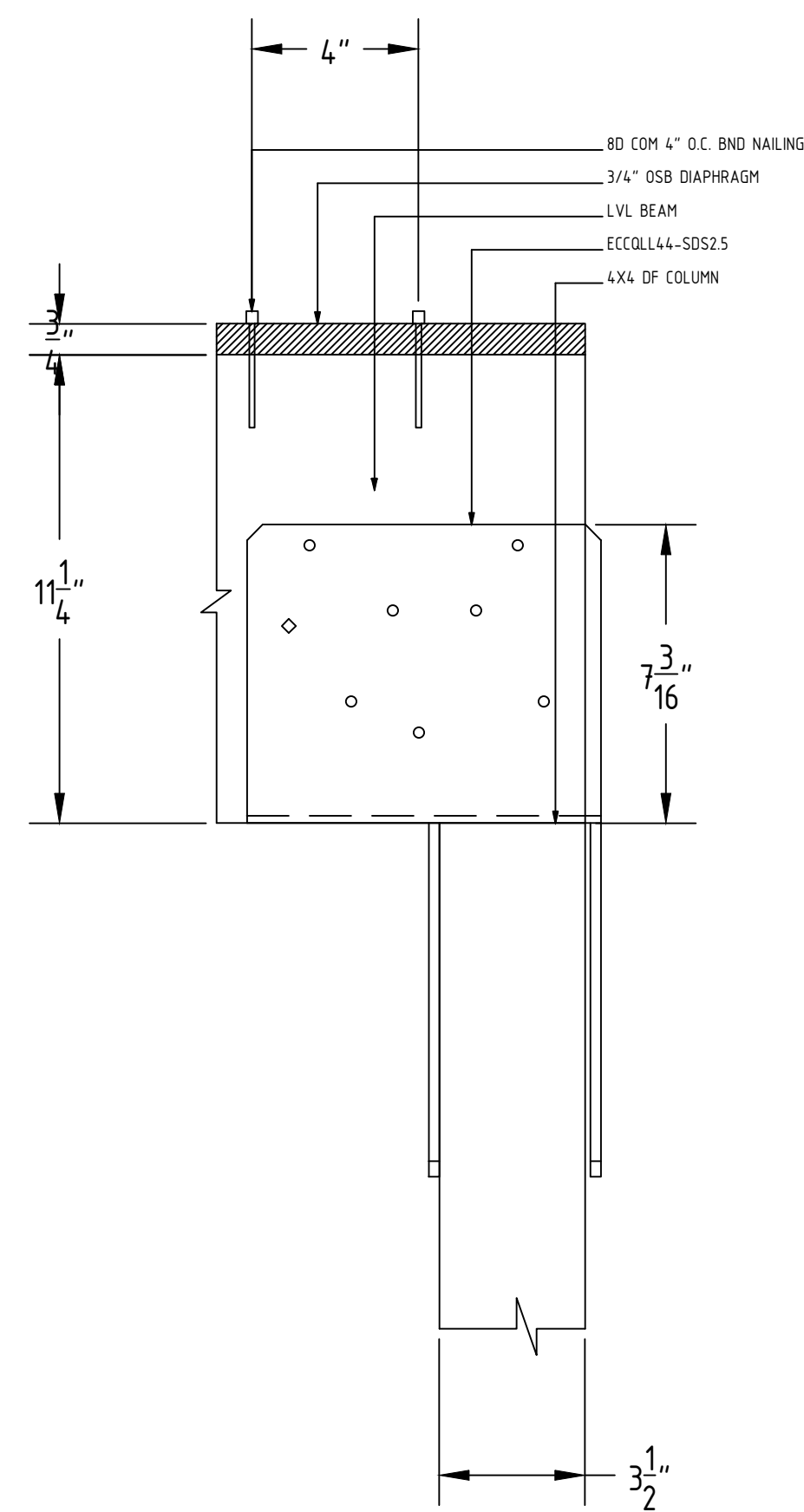
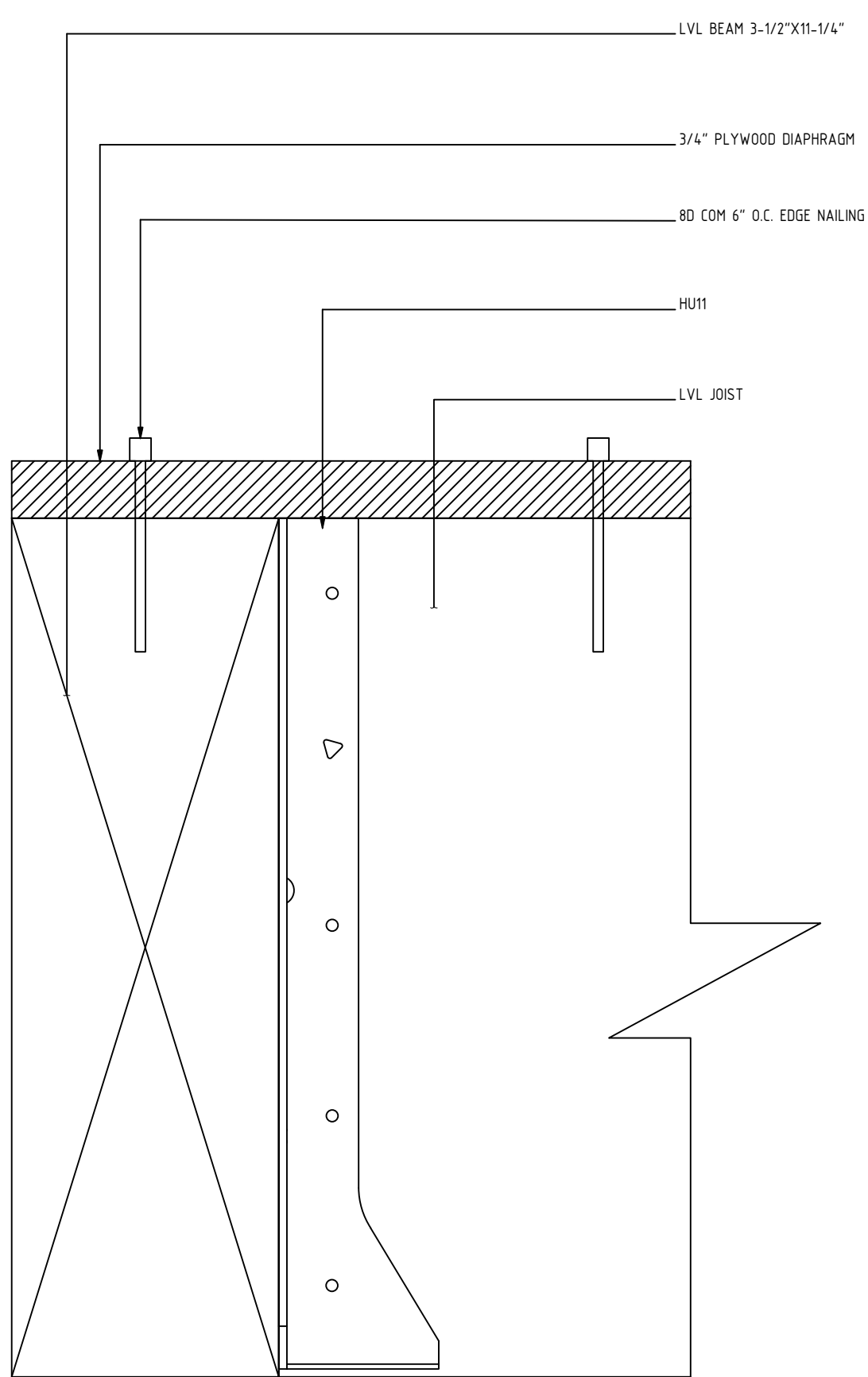


1 FLOOR/DECK JOIST FLUSH FRAMING
Scale 6" = 1'-0"

3 EXTERIOR COLUMN CONNECTION
Scale 3" = 1'-0"

5 CORNER COLUMN PLAN
Scale 6" = 1'-0"

7 TRANSITION CORNER PLAN
Scale 3" = 1'-0"



2 ROOF/CORRIDOR JOIST FLUSH FRAMING
Scale 6" = 1'-0"

4 CORRIDOR POST CAP
Scale 3" = 1'-0"

6 CORNER COLUMN SECTION
Scale 3" = 1'-0"

8 TRANSITION CORNER SECTION
Scale 3" = 1'-0"

TEAM NAME RISE
ADDRESS 390 S 34 STREET
RICHMOND, CA, 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

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SHEET TITLE

CONNECTION DETAILS

S-512

TEAM NAME RISE
 ADDRESS 390 S 34 STREET
 RICHMOND, CA, 94804
 CONTACT berkeleysolardecathlon@gmail.com
 https://solardecathlon.berkeley.edu

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02	2-23-2017	100% DD SET
01	11-17-2017	80% DD SET

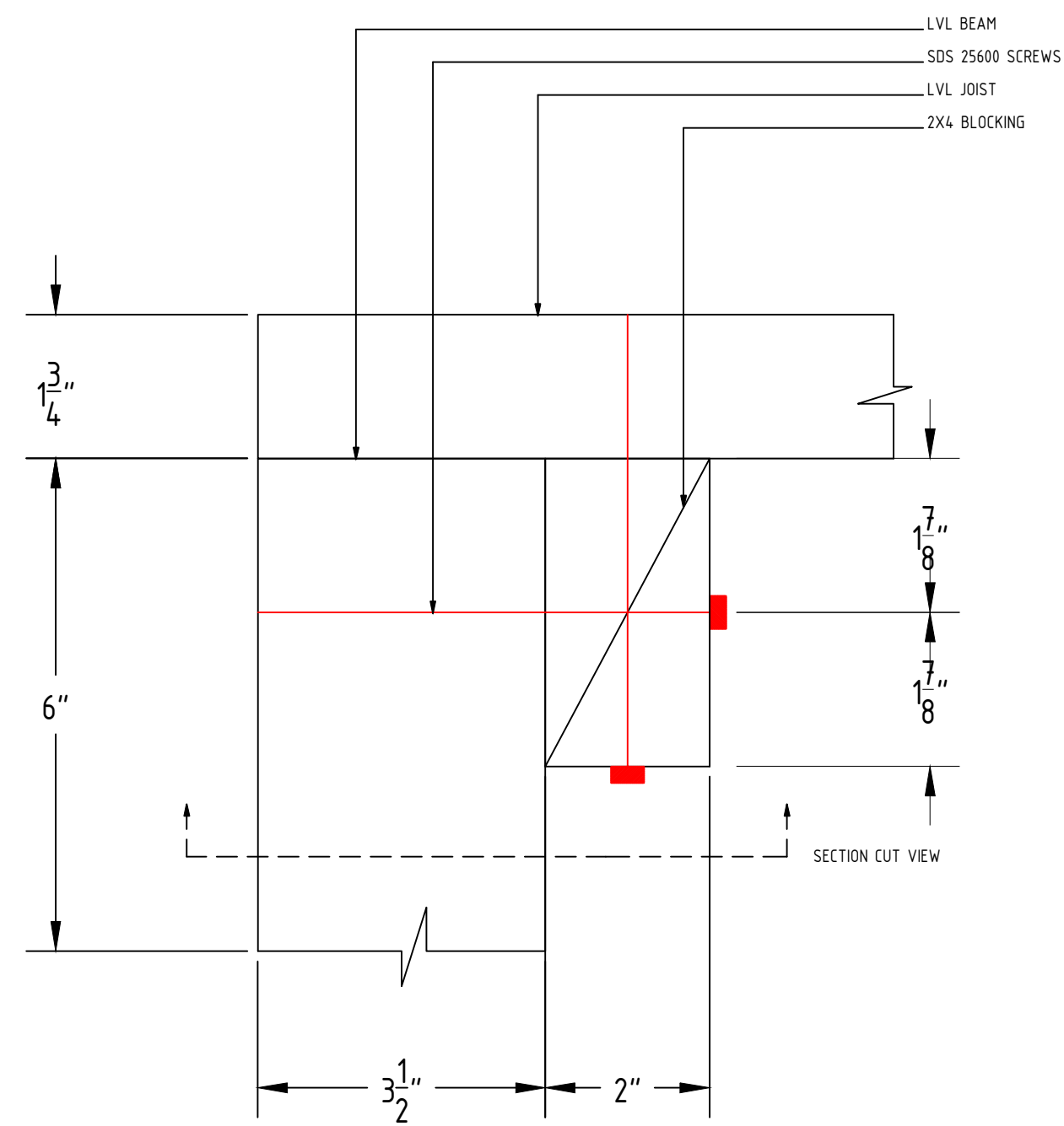
LOT NUMBER 105
 DRAWN BY BRENTON KREIGER
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SHEET TITLE

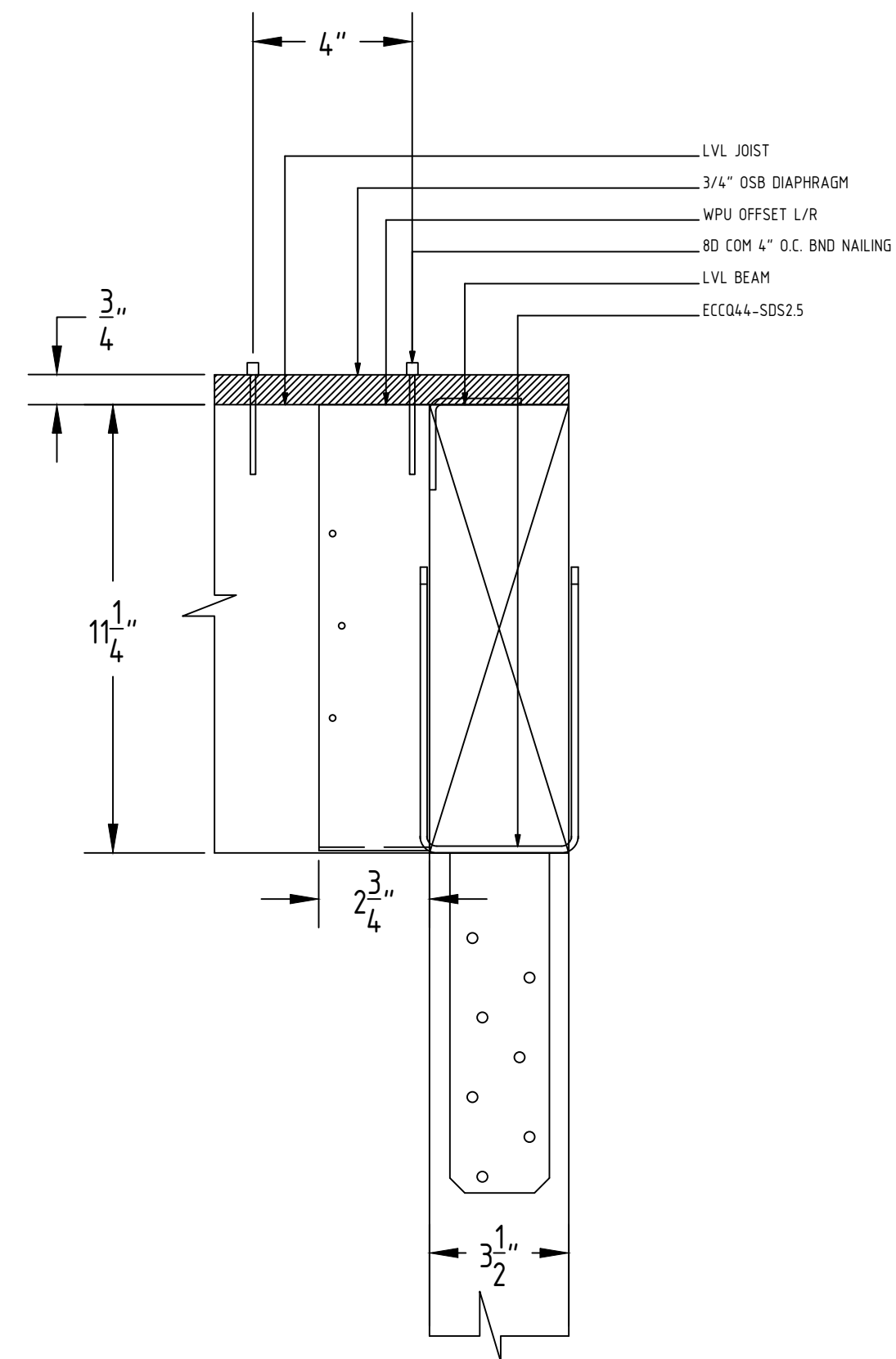
CONNECTION DETAILS

S-513

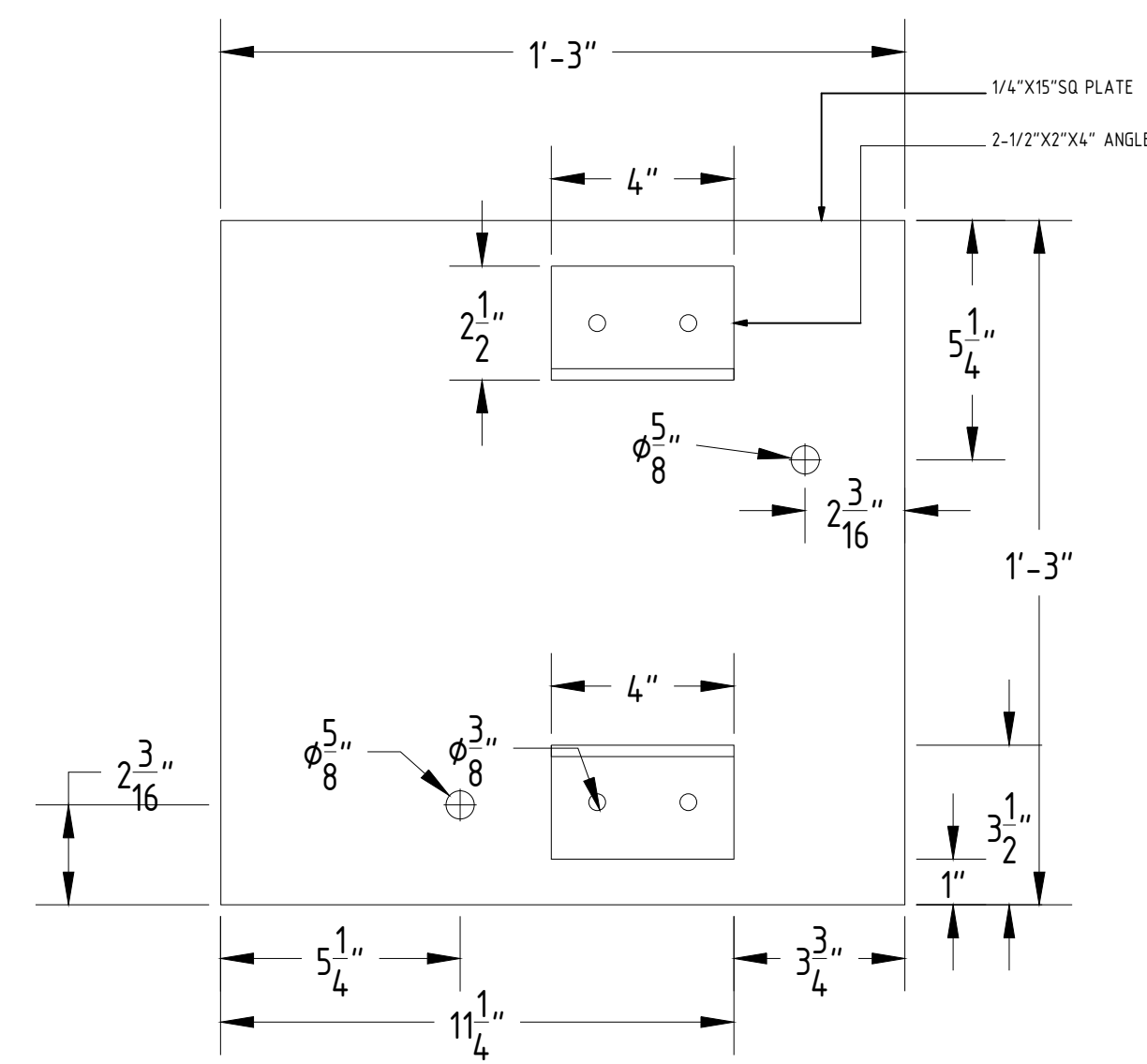
NOTE:
 USE SAME GEOMETRY
 AND MIRROR FOR BOTH MODULES



1 INTERIOR CORNER CONNECTION PLAN
 Scale 6" = 1'-0"

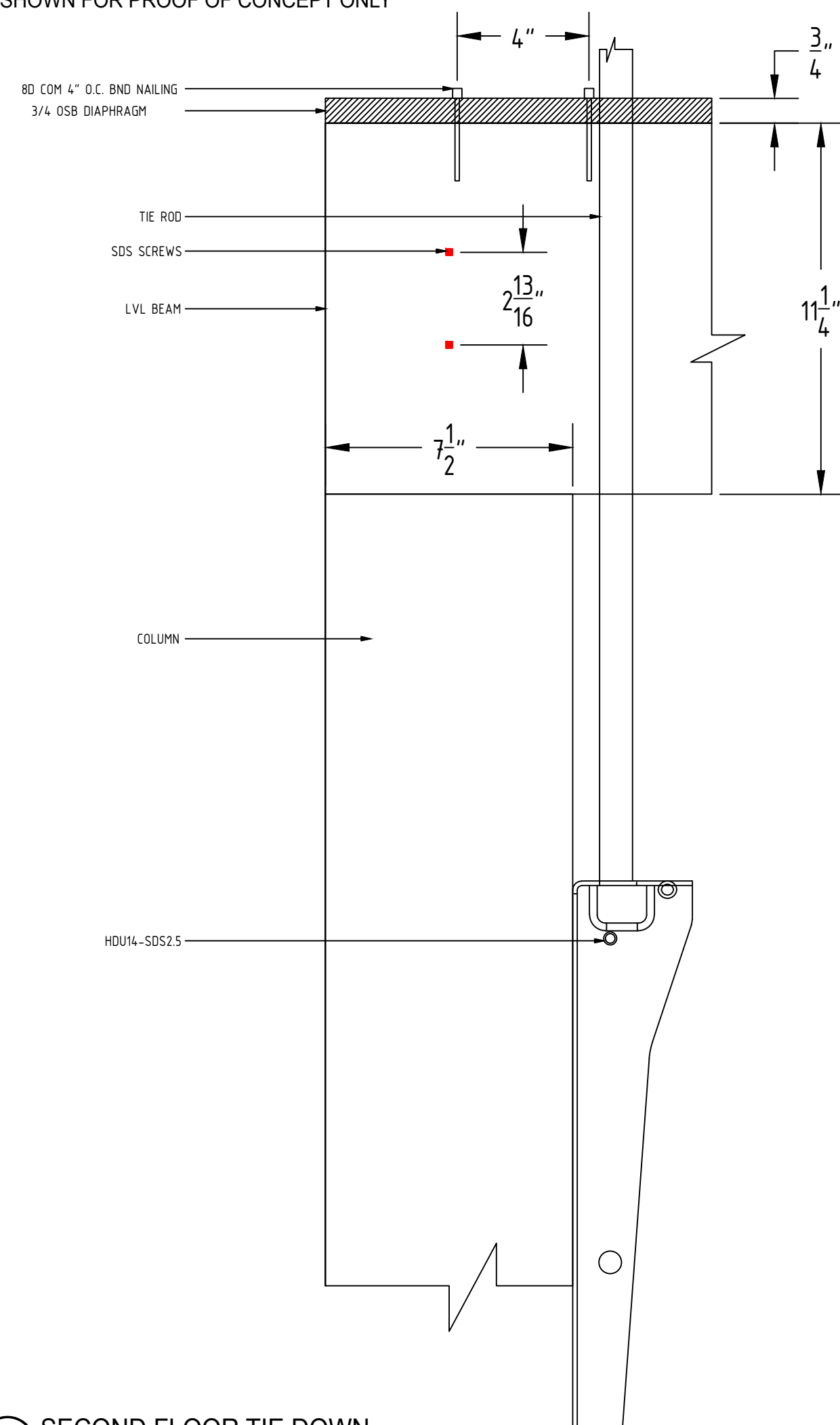


3 CORRIDOR CORNER FRAMING
 Scale 3" = 1'-0"

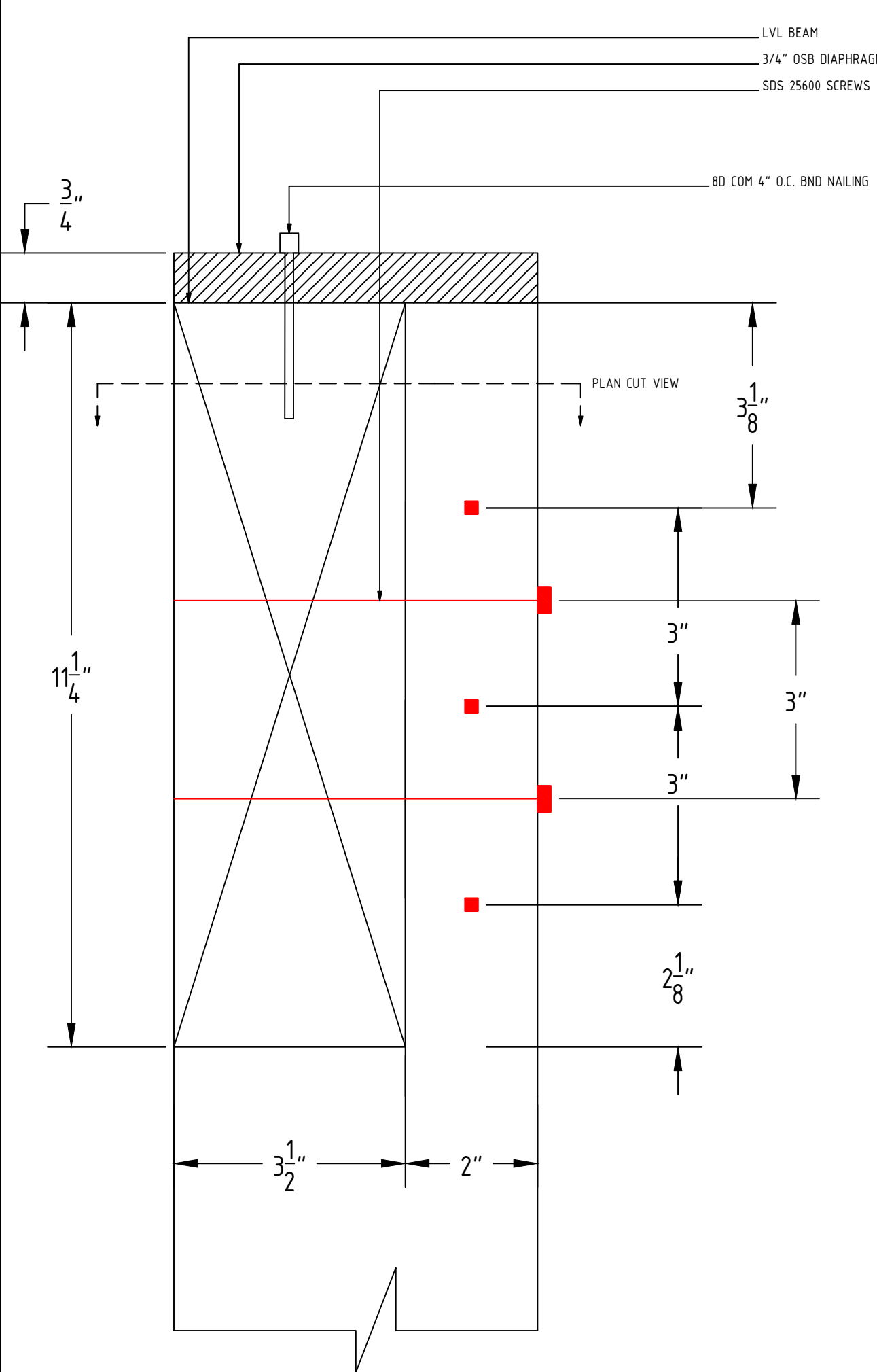


5 CUSTOM PIER TOP HOLES
 Scale 3" = 1'-0"

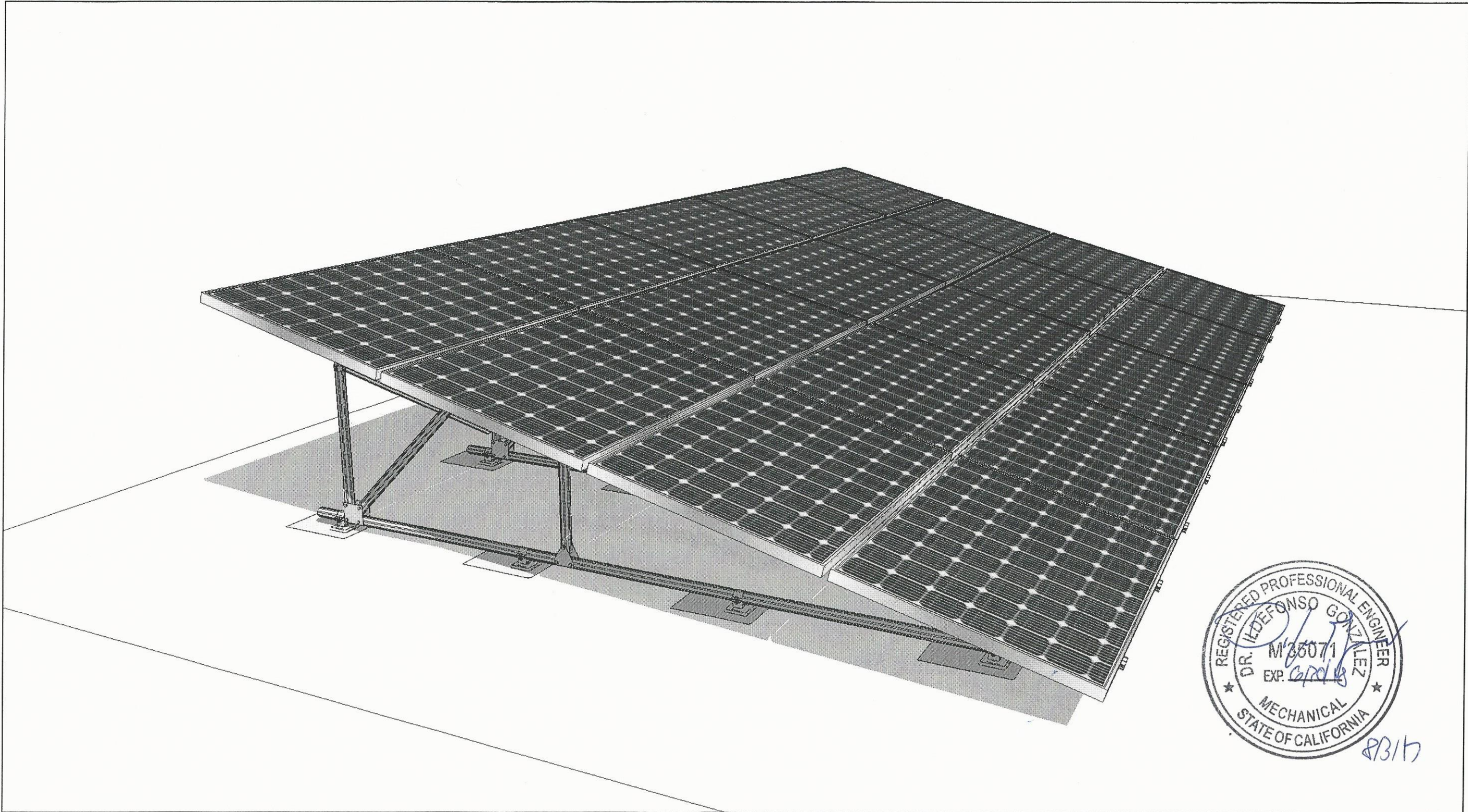
NOTE:
 SHOWN FOR PROOF OF CONCEPT ONLY



4 SECOND FLOOR TIE DOWN
 Scale 6" = 1'-0"



2 INTERIOR CORNER CONNECTION SECTION
 Scale 6" = 1'-0"

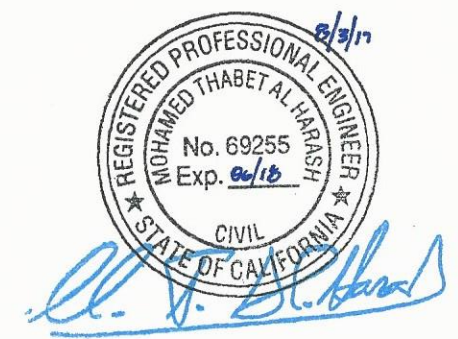


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 TEAM NAME : RISE
 ADDRESS: 2017, Barrett Ave
 Richmond, CA, 94801

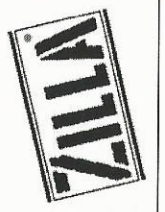
CLIENT:
 U.S. Department of Energy
 Solar Decathlon 2017
 www.solardecathlon.gov

System Locations:
 Competition Address:
 17452 E 61st Ave. Denver CO, 80249

Post Competition Address:
 390 S 34th St. Richmond CA, 94804



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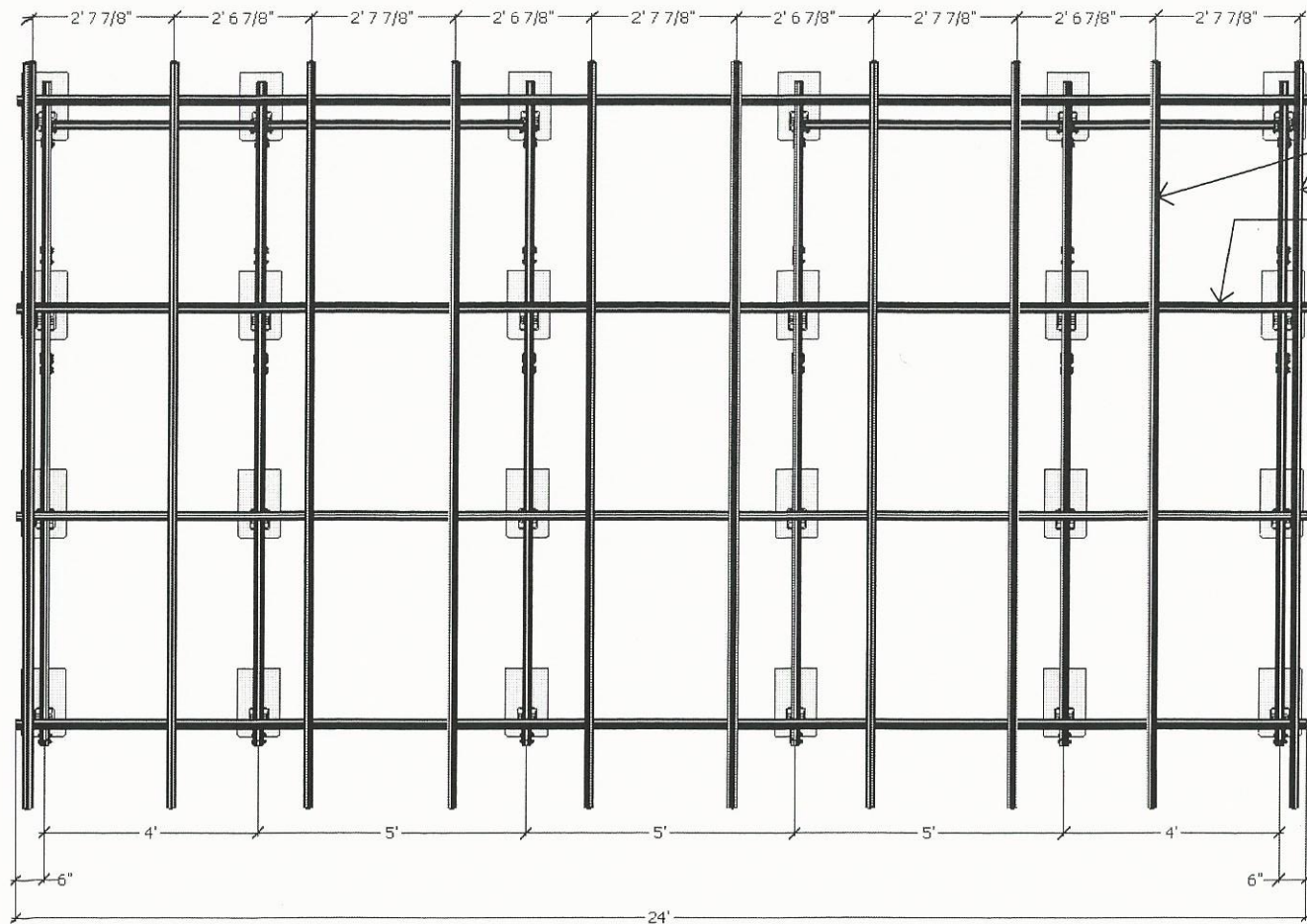


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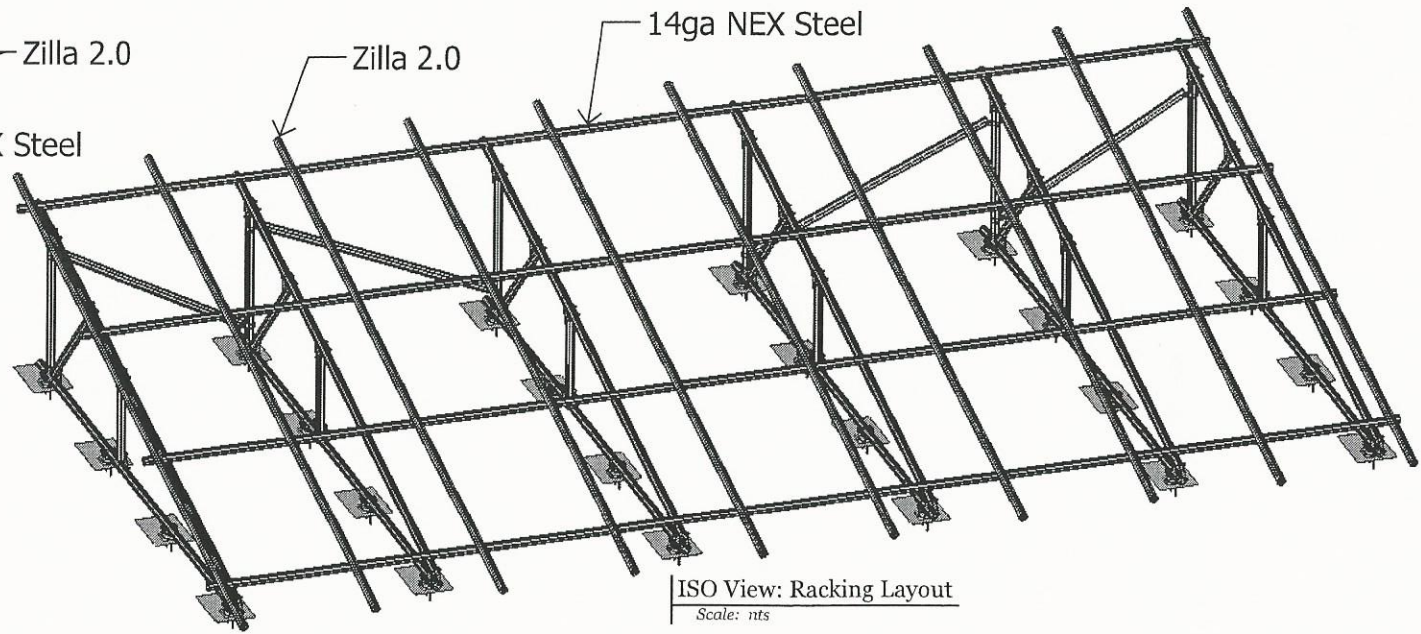
Project: Solar Decathlon 2017- UC Berkeley
 Description: 20 Panasonic modules mounted in Landscape Orientation on a Custom Zilla Roof Mount System
 Checked By: JB
 Drawn By: JB
 Date: July 24, 2017

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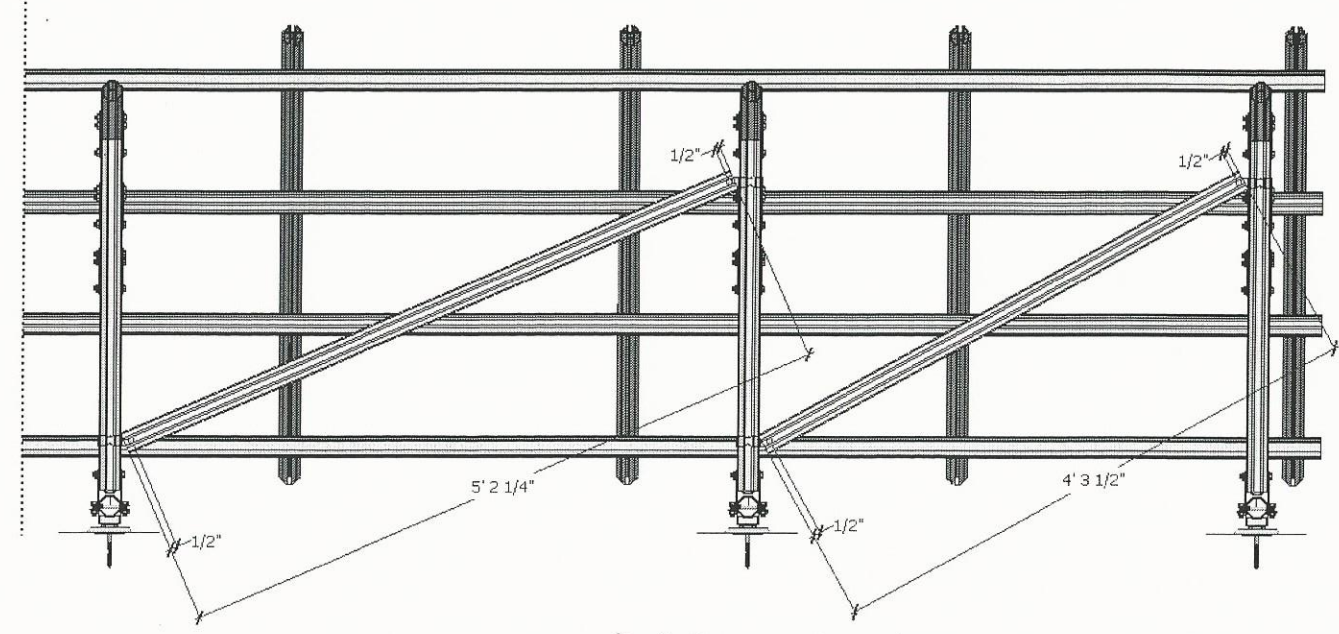
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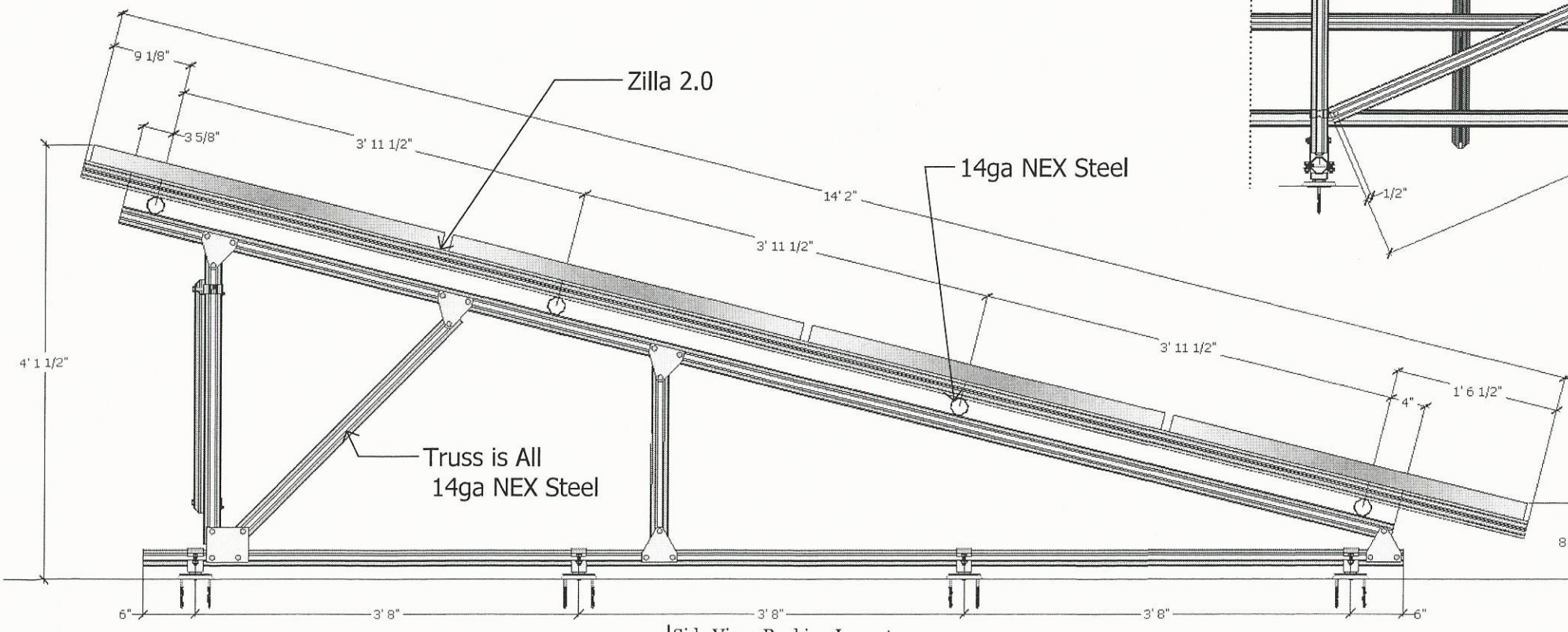
Top View: Racking Layout
Scale: nts



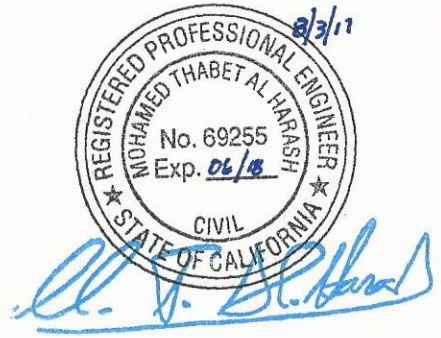
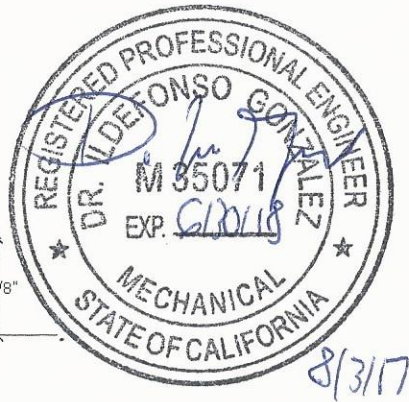
ISO View: Racking Layout
Scale: nts



Back View: Brace Connection
Scale: nts



Side View: Racking Layout
Scale: nts

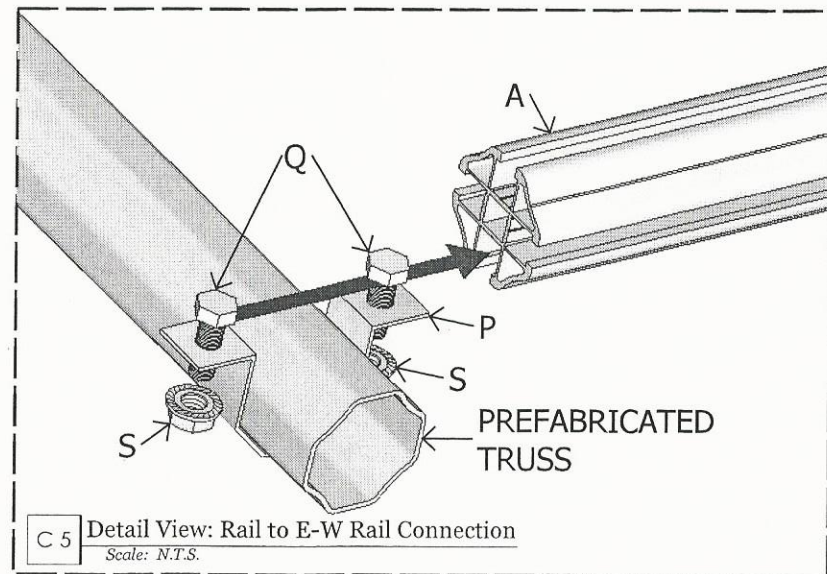
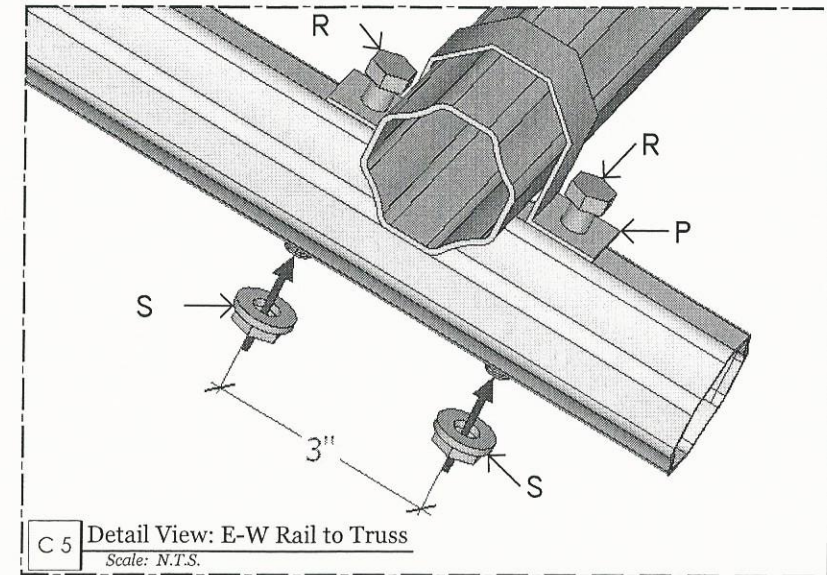
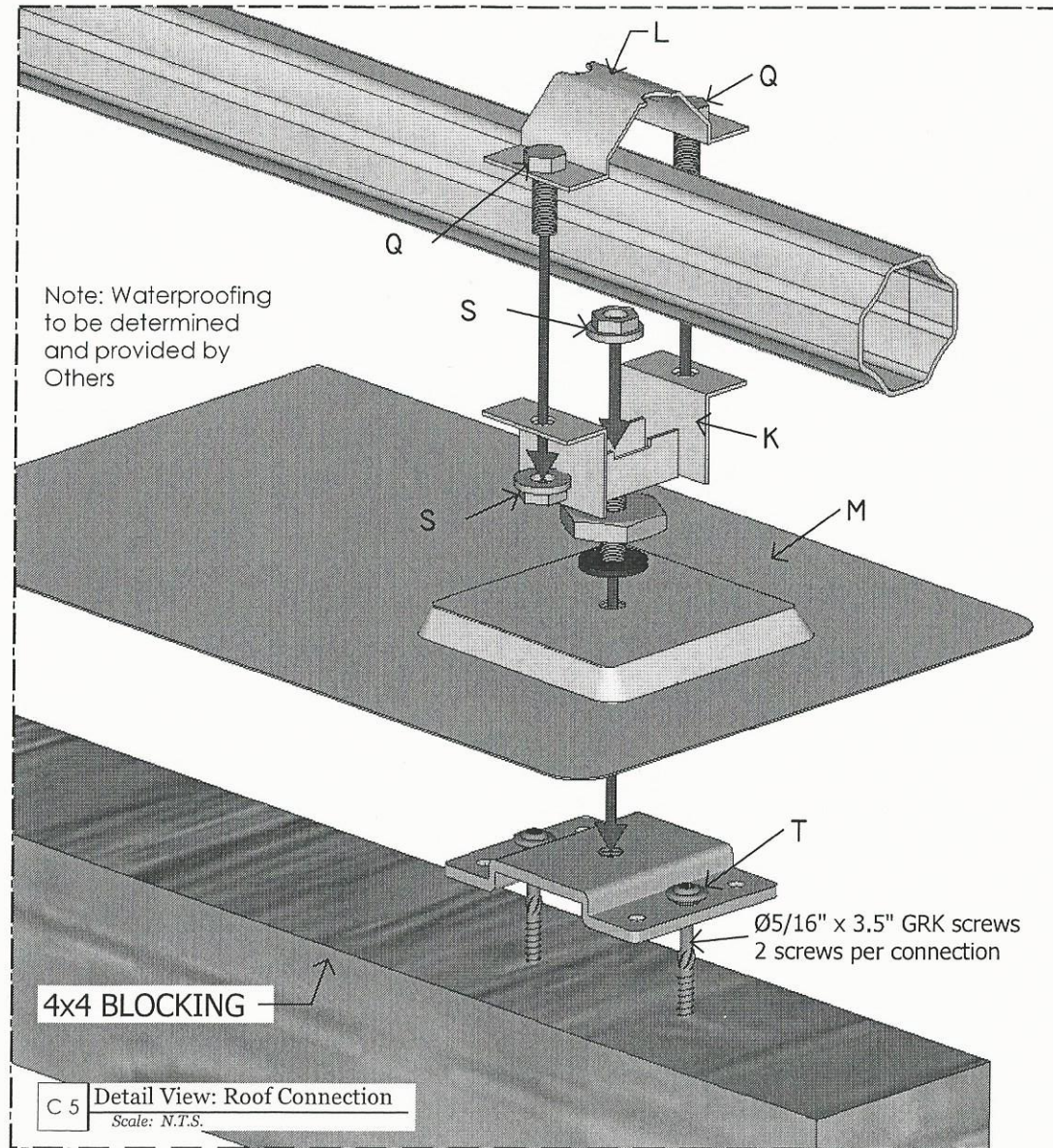
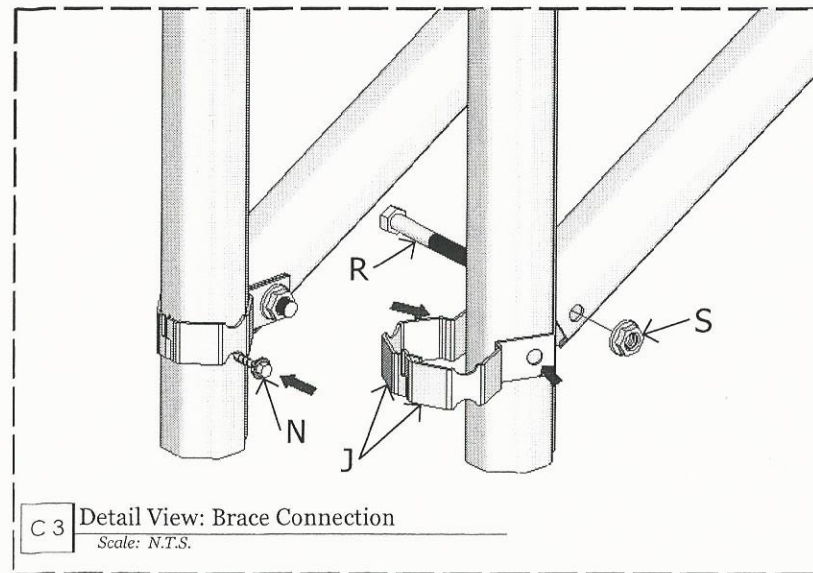
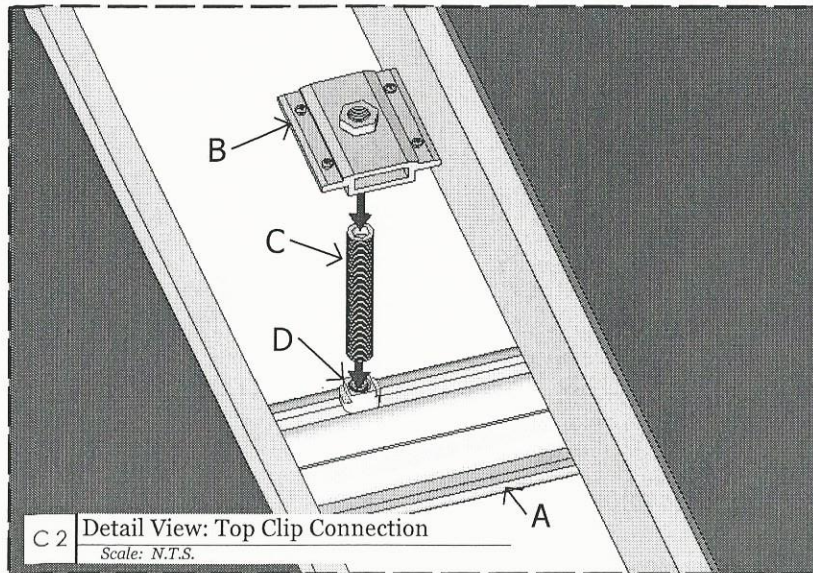
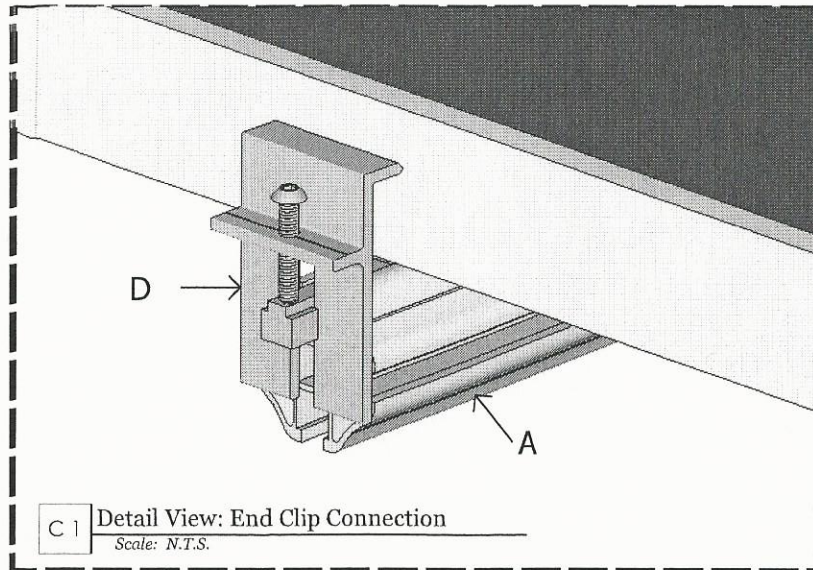


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Notes:

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Checked By: JB
Drawn By: JB
Date: July 24, 2017



ITEM	PART NUMBER	DESCRIPTION
	Module	Panasonic
A	ZR20-21MF	Zilla Rac 2.0-21' Mill Finish
B	ZTC-AL_02	Zilla Top Clip with Extended Bushing
C	SB0516-0200 SS	Bolt Ø 5/16"-18x2.0" Set Socket Head Stainless Steel
D	NUT0516 SQR SS	Nut Ø 5/16"-18 Square, Stainless Steel
E	ZEC-A XL MF	Zilla® End Clip XL Assembly - Mill
F	ZTGS-11G GS	Gusset Plate Triangular 11G Galvanized Steel
G	ZTGB-11G GS	Gusset Plate Rectangular 11G Galvanized Steel
H	N20-14G20GS	NEX 2" x 20' 14ga Steel Plain galvanized signpost - US PAT D415,847
J	NSM20-GS	NEX 200 Side Mount Galvanized Steel
K	NFMB20-GS	NEX Bracket Front Mount Base for 2" Galvanized Steel
L	NFMT20-GS	NEX Bracket Front Mount Top for 2" Galvanized Steel
M	ZDSFA-15 AL BLK	Zilla Double Stud Flashing Assembly 15"
N	TKS100ZSHDBW	Screw #14 x 1.00" Self Tapping Zinc Plated Steel with Bonding Washer
P	ZUB-GS	Zilla U-Bracket Galvanized Steel
Q	HB0380-0100 ZP	Bolt Ø 3/8"-16x1.00" Hex Zinc
R	HB0380-0275 ZP	Bolt Ø 3/8"-16x2.75" Hex Zinc
S	NUT0380 ZP SFL	Nut Ø 3/8"-16 Serrated Flange Lock Zinc
T	SS0516-0350 ZS	Ø5/16-3.5" GRK Screw

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Photovoltaic Module HIT[®] N330, N325 | VBHN330SA16, VBHN325SA16

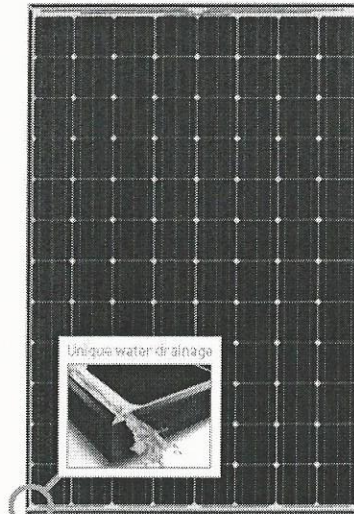
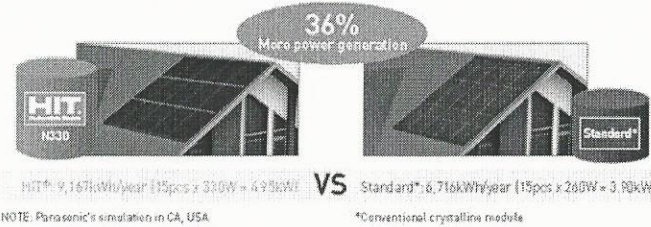
Panasonic solar technology

Panasonic photovoltaic modules HIT[®] feature an innovative hetero-junction cell structure made of mono-crystalline and amorphous silicon layers. Ultra-thin amorphous silicon layers prevent recombinations of electrons, keeping carrier loss to an absolute minimum. As a result, HIT[®] conversion efficiency ratings are among the highest available today.

19.7% module efficiency

Employing 96 cells in the same size footprint, N330 and N325 HIT[®] produce up to 36% more free electricity compared to conventional 60-cell panels.

- More solar power output per square foot
- Fewer panels to install, faster installations
- Ideal for small roof areas
- Greater cost savings for homeowners over a 25-year lifecycle

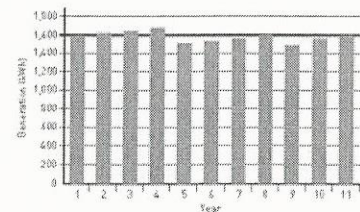


Quality you can trust

100% Panasonic HIT[®]
Starting over 40 years ago with the research and development of photovoltaic cells in 1975, Panasonic has been a solar pioneer since the beginning of the green revolution. In 1997, the HIT[®] set the industry standard for high conversion efficiency. Satisfied customers worldwide have come to trust and rely on Panasonic quality ever since.

- Panasonic manufactured and guaranteed
- 25-year power output warranty and 15-year workmanship warranty
 - Vertically integrated in-house manufacturing of wafer, cell, and module
 - State-of-the-art production facilities and manufacturing processes
 - Industry's most stringent independent testing and quality control standards
 - IEC and 20+ internal tests

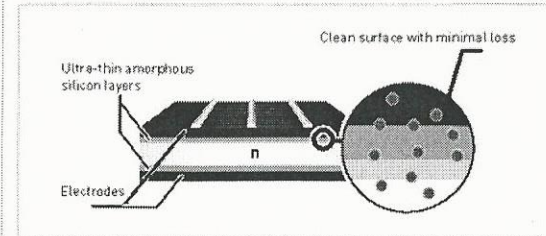
Minimal field degradation
Actual recorded data proves reliable, stable performance over 11 years.



Simply powerful



Cell structure of HIT[®]



Electrical Specifications (TENTATIVE)

Model	VBHN330SA16	VBHN325SA16
Rated Power (P _{max}) [*]	330W	325W
Maximum Power Voltage (V _{pm})	58.0V	57.6V
Maximum Power Current (I _{pm})	5.70A	5.65A
Open Circuit Voltage (V _{oc})	69.7V	69.6V
Short Circuit Current (I _{sc})	6.07A	6.03A
Temperature Coefficient (P _{max})	-0.30%/°C	-0.30%/°C
Temperature Coefficient (V _{oc})	-0.174%/°C	-0.174%/°C
Temperature Coefficient (I _{sc})	1.02mA/°C	1.02mA/°C
NOCT	44.0°C	44.0°C
CEC P _{TS} Rating	305.9W	301.2W
Cell Efficiency	22.0%	21.76%
Module Efficiency	19.7%	19.4%
Watts per Ft. ²	18.3W	18.0W
Maximum System Voltage	600V	600V
Series Fuse Rating	15A	15A
Warranted Tolerance (-/+)	+10%/0%	+10%/0%

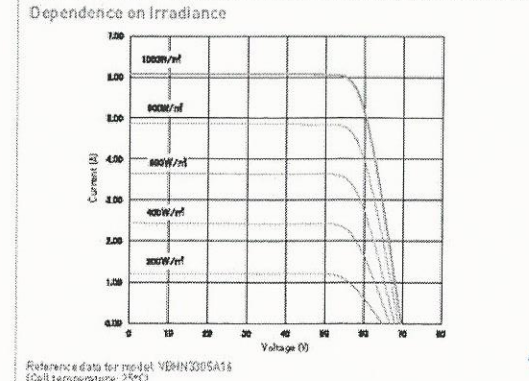
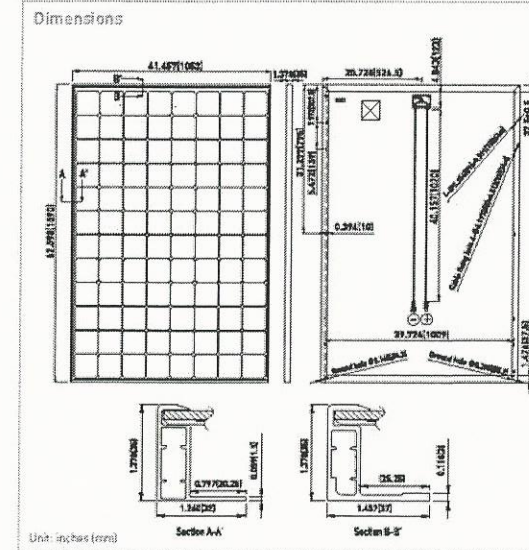
Mechanical Specifications (TENTATIVE)

Model	VBHN330SA16, VBHN325SA16
Internal Bypass Diodes	4 Bypass Diodes
Module Area	10.02 Ft. ² (1.67m ²)
Weight	40.81 Lbs. (18.5kg)
Dimensions LxWxH	62.6x41.5x1.4 in. (1590x1053x35 mm)
Cable Length (Male/Female)	40.2/40.2 in. (1020/1020 mm)
Cable Size / Type	No. 12 AWG / PV Cable
Connector Type ²	Multi-Contact [®] Type IV (MC4 [™])
Static Wind / Snow Load	50 PSF (2400 Pal)
Pallet Dimensions LxWxH	43.7x42.2x5.5 in. (1116x1071x140 mm)
Quantity per Pallet / Pallet Weight	40 pcs. / 1719 Lbs. (780 kg)
Quantity per 40' Container	560 pcs
Quantity per 20' Container	240 pcs

Operating Conditions & Safety Ratings (TENTATIVE)

Model	VBHN330SA16, VBHN325SA16
Operating Temperature	-40°F to 185°F (-40°C to 85°C)
Hail Safety Impact Velocity	1" hailstone (25mm) at 52 mph (23m/s)
Safety & Rating Certifications	UL 1703, cUL, CEC
UL 1703 Fire Classification	Type 2
Limited Warranty	15 Years Workmanship, 25 Years Power Output

Note: Standard Test Conditions: Air mass 1.5; Irradiance = 1000W/m²; cell temp. 25°C
^{*}Maximum power at delivery. For guarantee conditions, please check our guarantee document.
¹STC: Cell temp. 25°C, 24x1.5, 1000W/m²
²Safety locking clip (PV-SS14) is not supplied with the module.
 Note: Specifications and information above may change without notice.



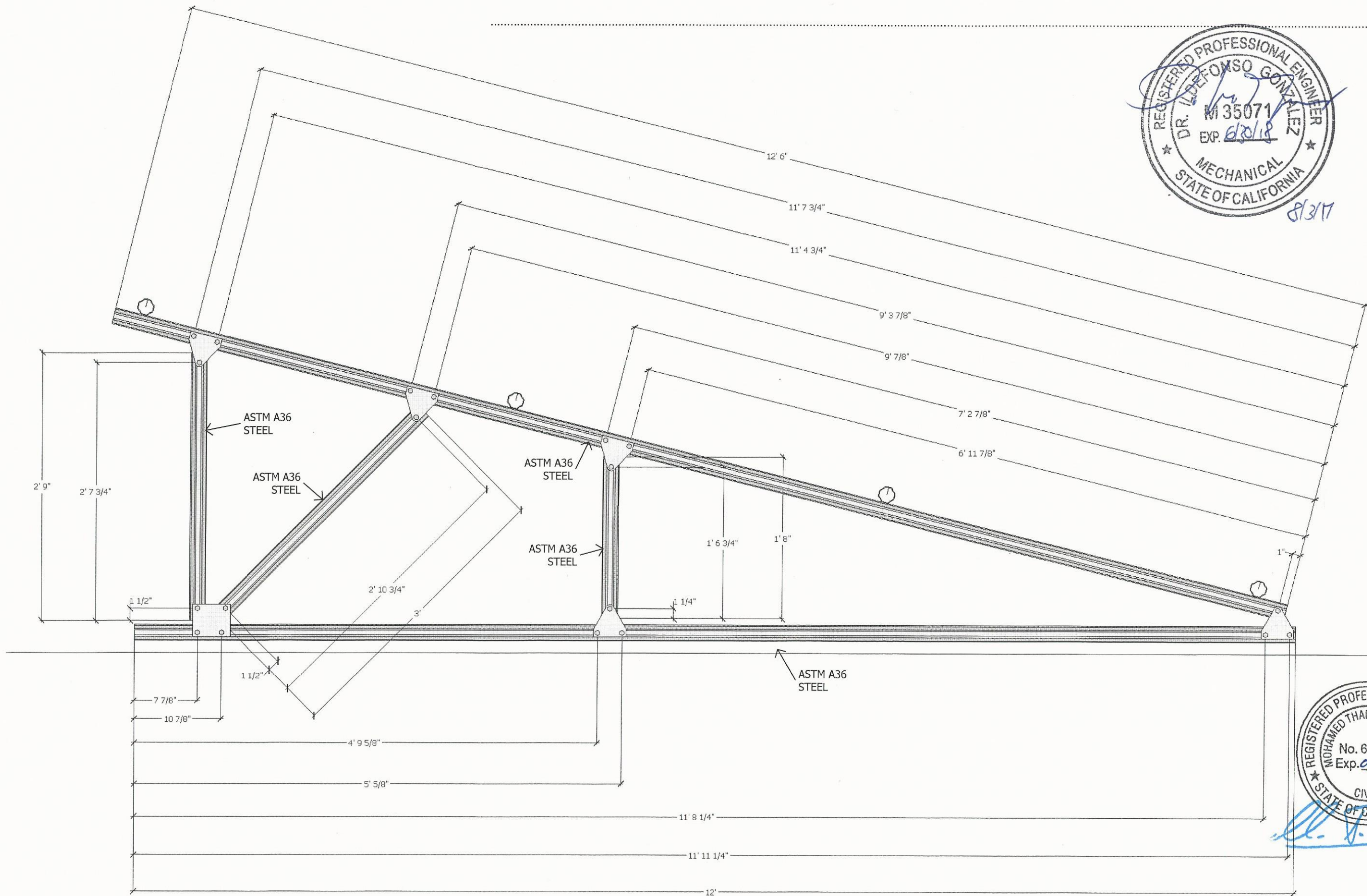
CAUTION! Please read the installation manual carefully before using the products.
 Used electrical and electronic products must not be mixed with general household waste. For proper treatment, recovery and recycling of old products, please take them to applicable collection points in accordance with your national legislation.

Panasonic Eco Solutions of North America
 1300 Riverfront Plaza, 5th Floor, Newark, NJ 07102
 panasonicHIT@us.panasonic.com
 business.panasonic.com/solarpanels

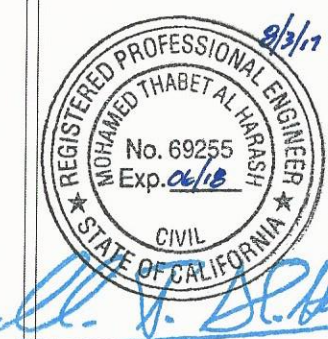
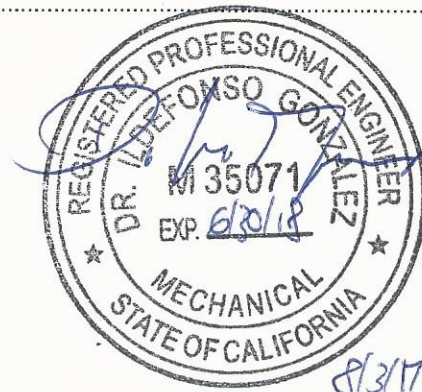


Project: Solar Decathlon 2017 - UC Berkeley
 Description: 20 Panasonic modules mounted in Landscape Orientation on a Custom Zilla Roof Mount System
 Checked By: JB
 Drawn By: JB
 Date: July 24, 2017





Detail: Truss Manufacturing
Scale: NTS



Notes:

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RISE

TEAM NAME RISE
 ADDRESS 390 S 34 STREET, RICHMOND, CA 94804
 CONTACT berkeleysolardecathlon@gmail.com
 https://solardecathlon.berkeley.edu

CONSULTANTS:
 OLSON PLUMBING

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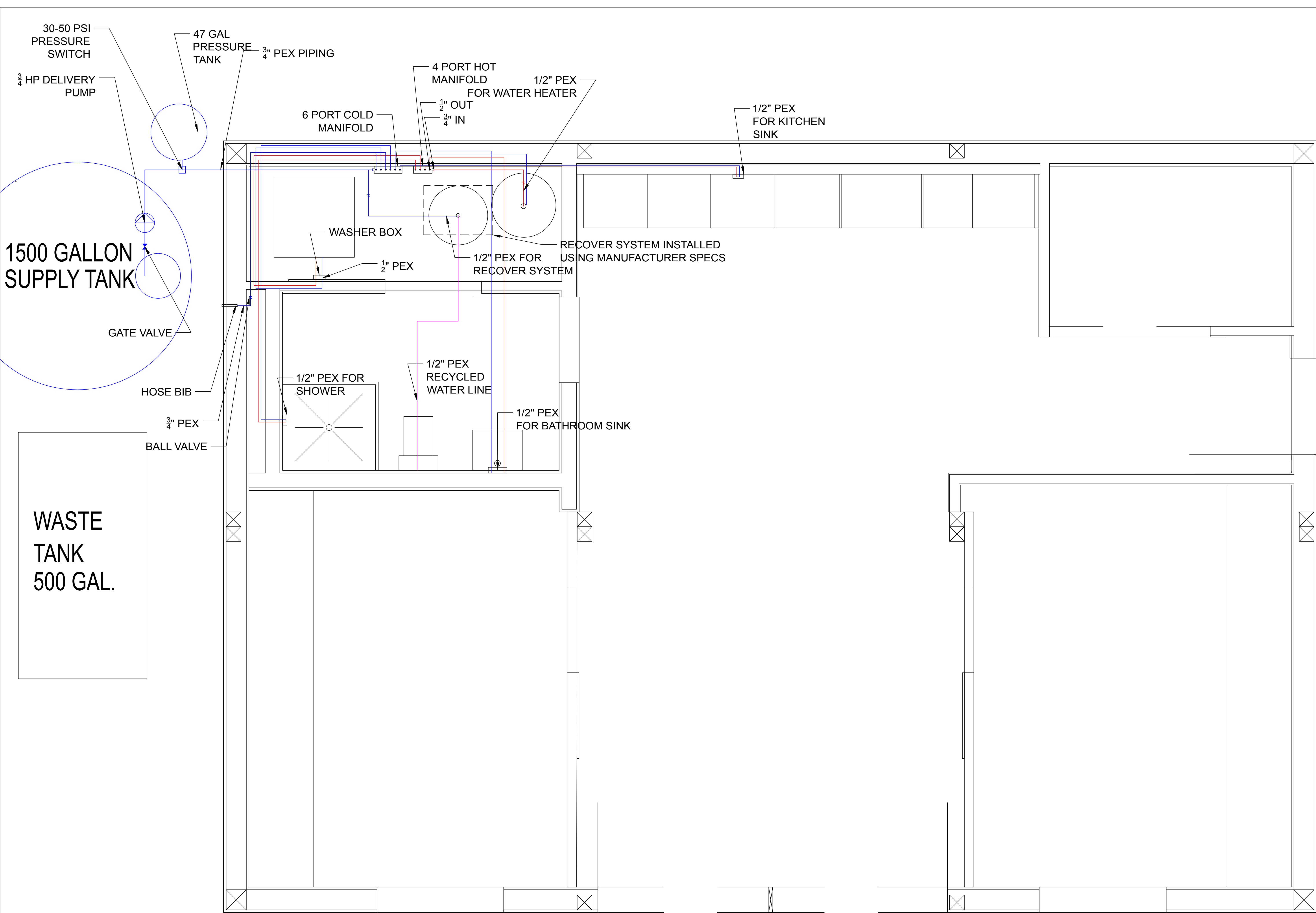
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03	6-9-2017	DENVER PERMITS
02	2-23-2017	100% DD SET
01	11-17-2017	80% DD SET

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SUPPLY PLAN

P-101

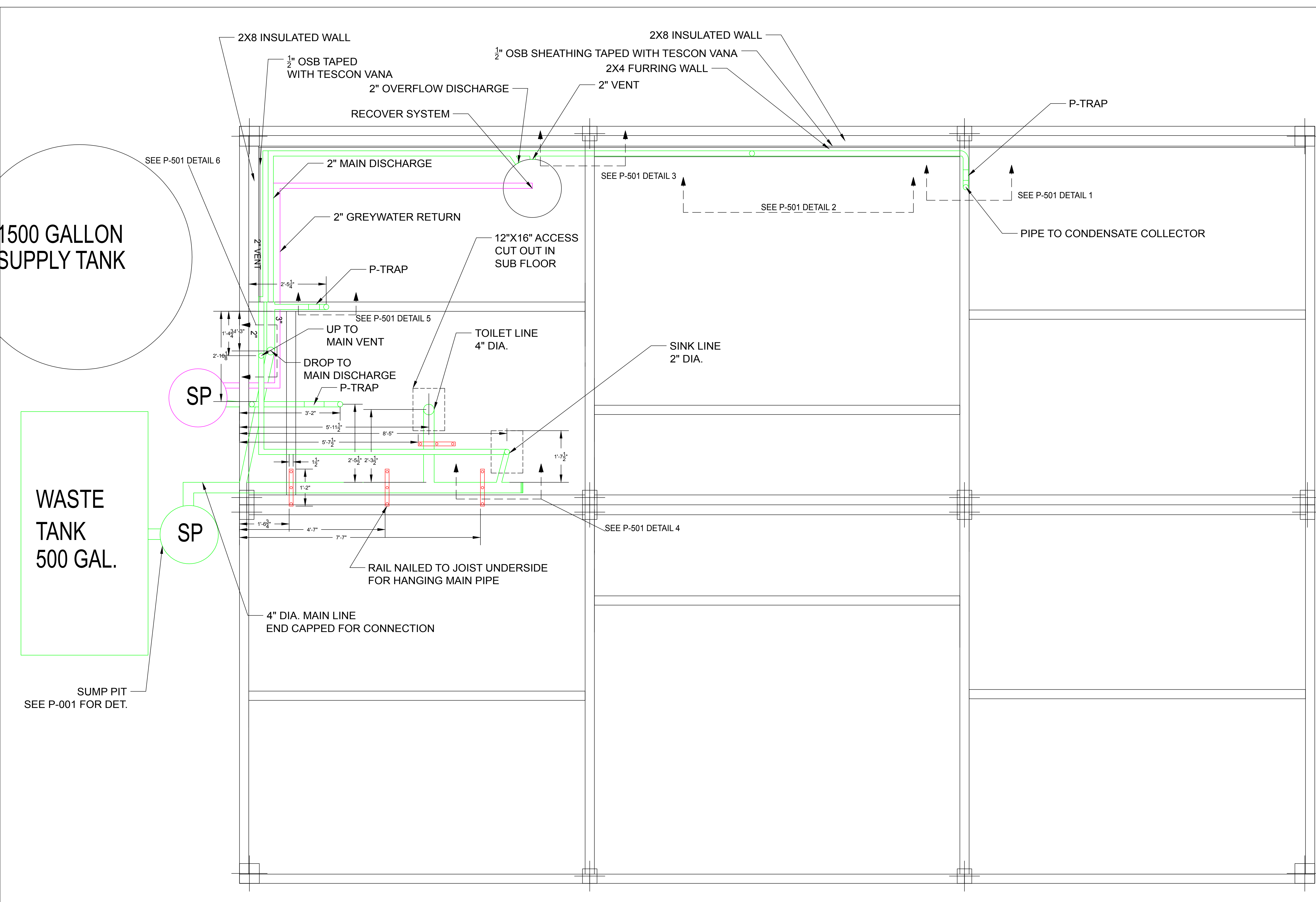


MARK	DATE	DESCRIPTION
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03	6-9-2017	DENVER PERMITS
02	2-23-2017	100% DD SET
01	11-17-2017	80% DD SET

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VENTS AND DISCHARGE PLAN



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TEAM NAME RISE
ADDRESS 390 S 34 STREET, RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

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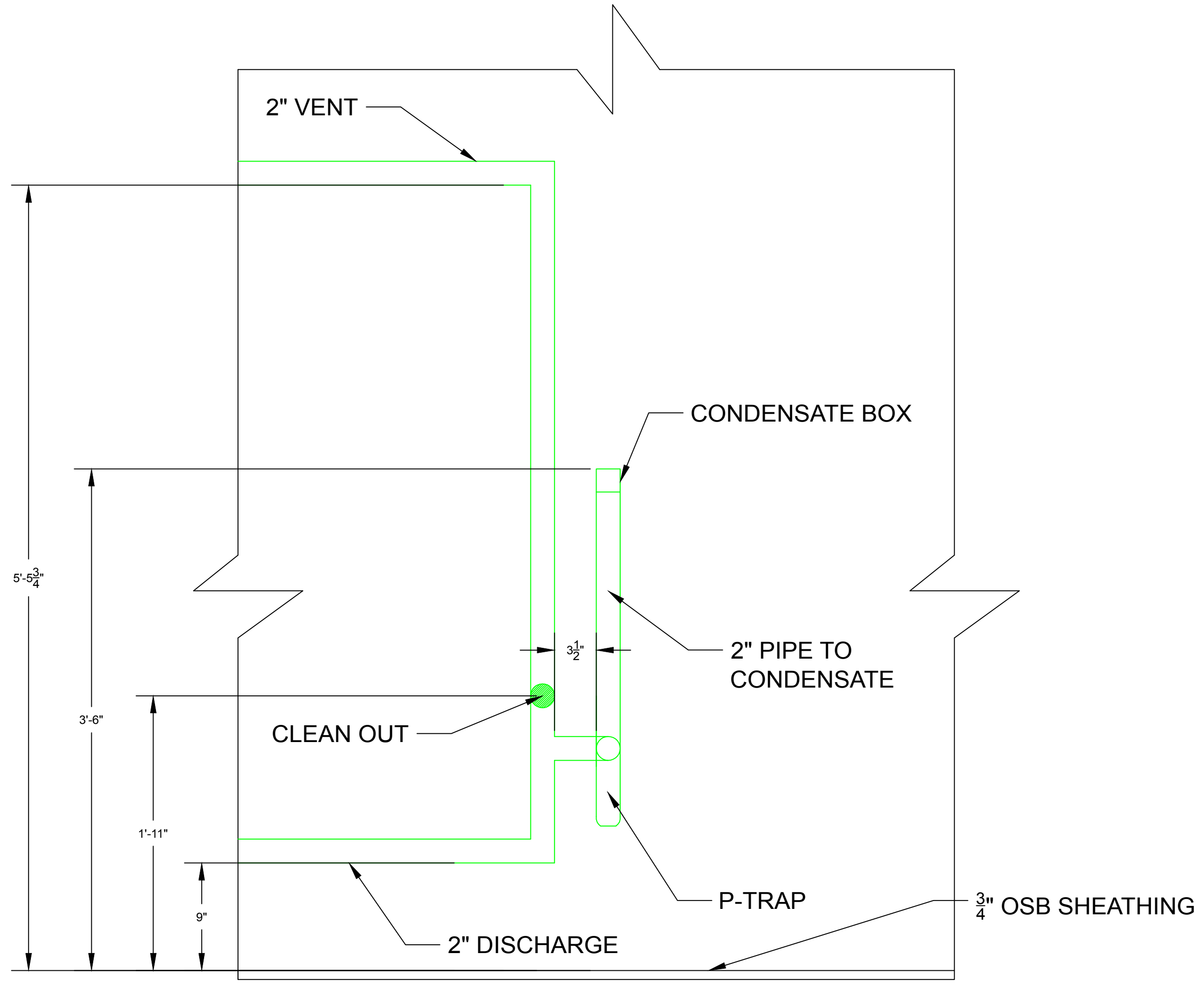
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03	6-9-2017	DENVER PERMITS
02	2-23-2017	100% DD SET
01	11-17-2017	80% DD SET

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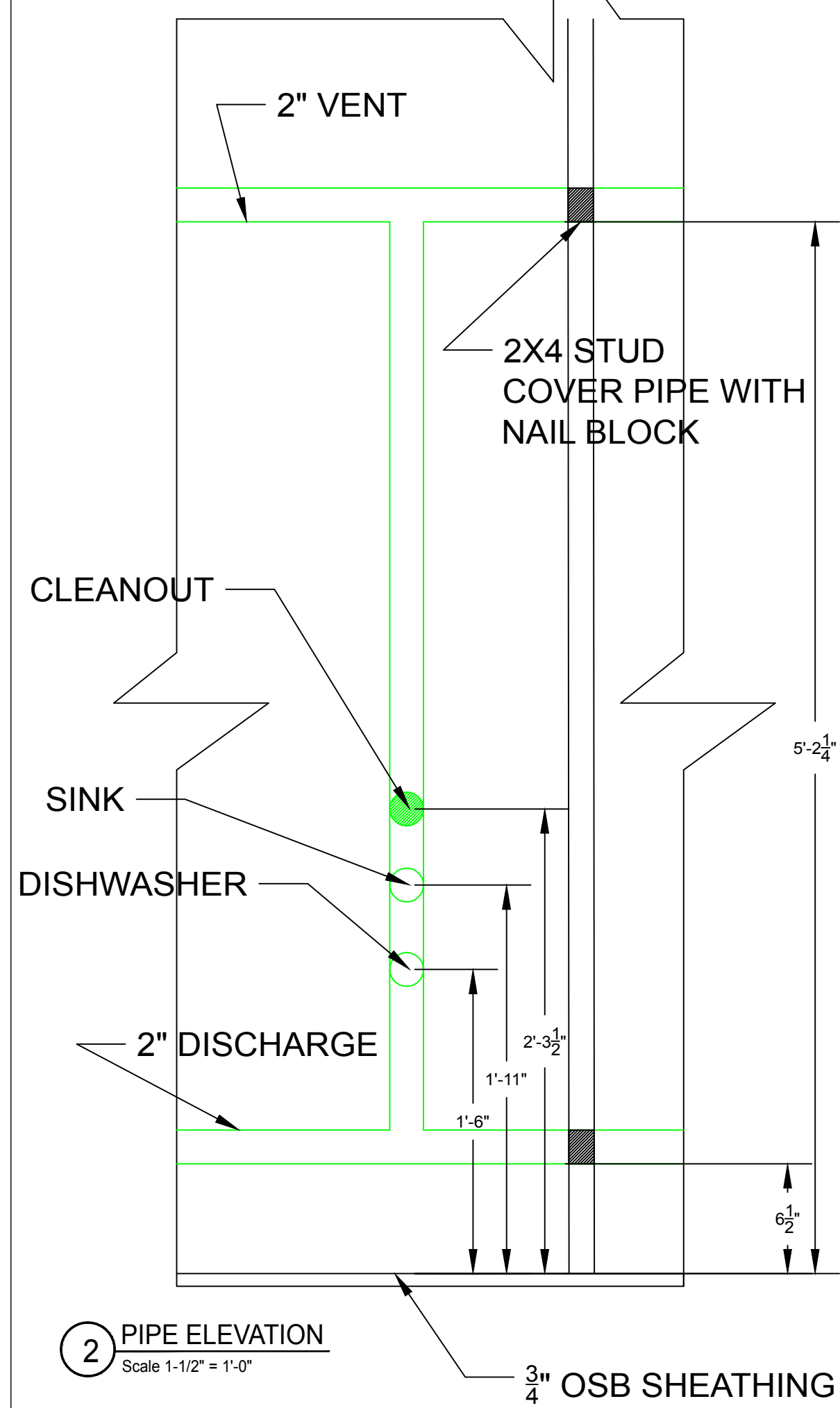
SHEET TITLE
VENT AND DISCHARGE SECTIONS

P-501

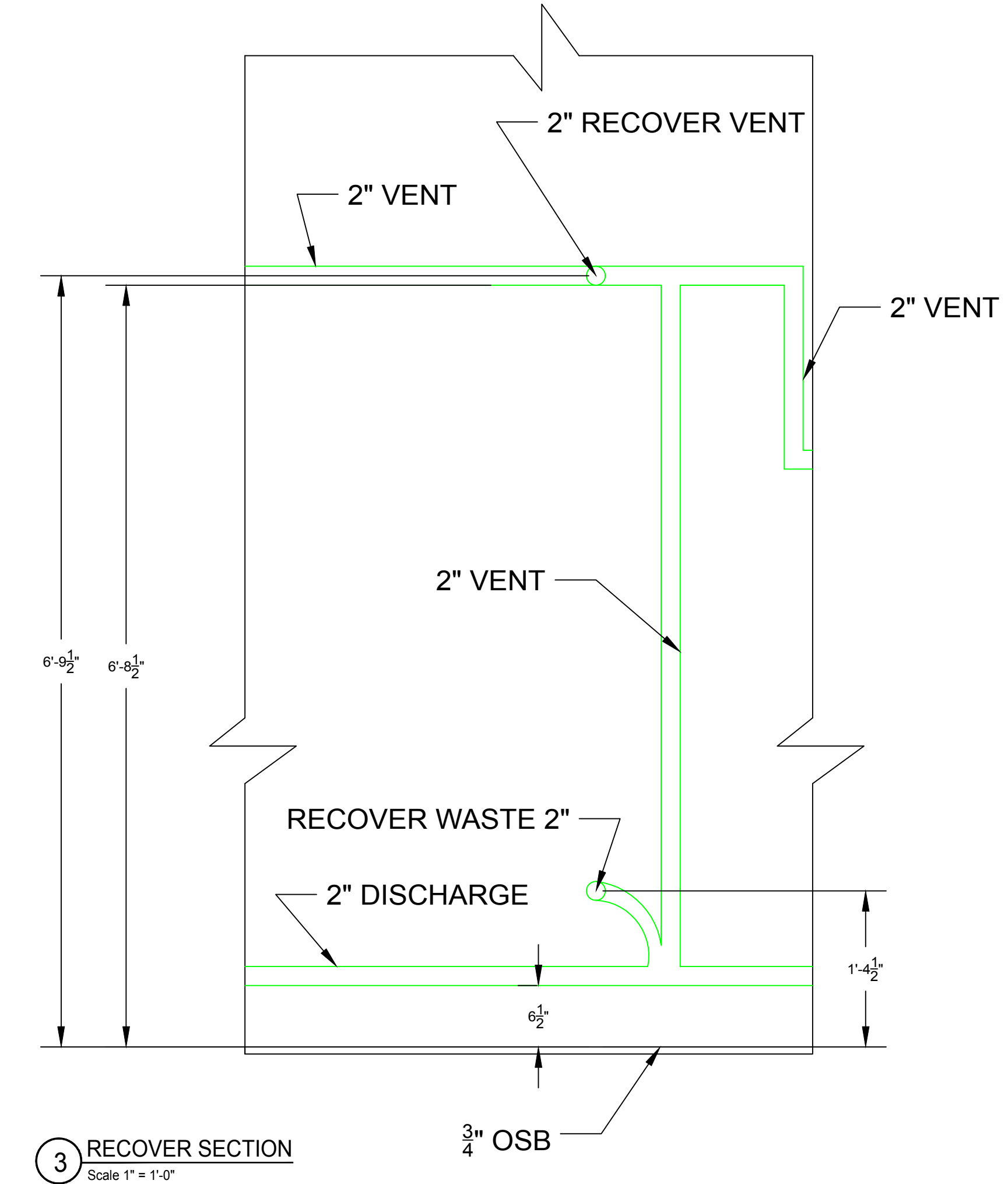
NOTE PIPES SLOPE 1/4" PER 1'
VENT SLOPES UPWARD EAST TO WEST
DISCHARGE DOWNWARD EAST TO WEST



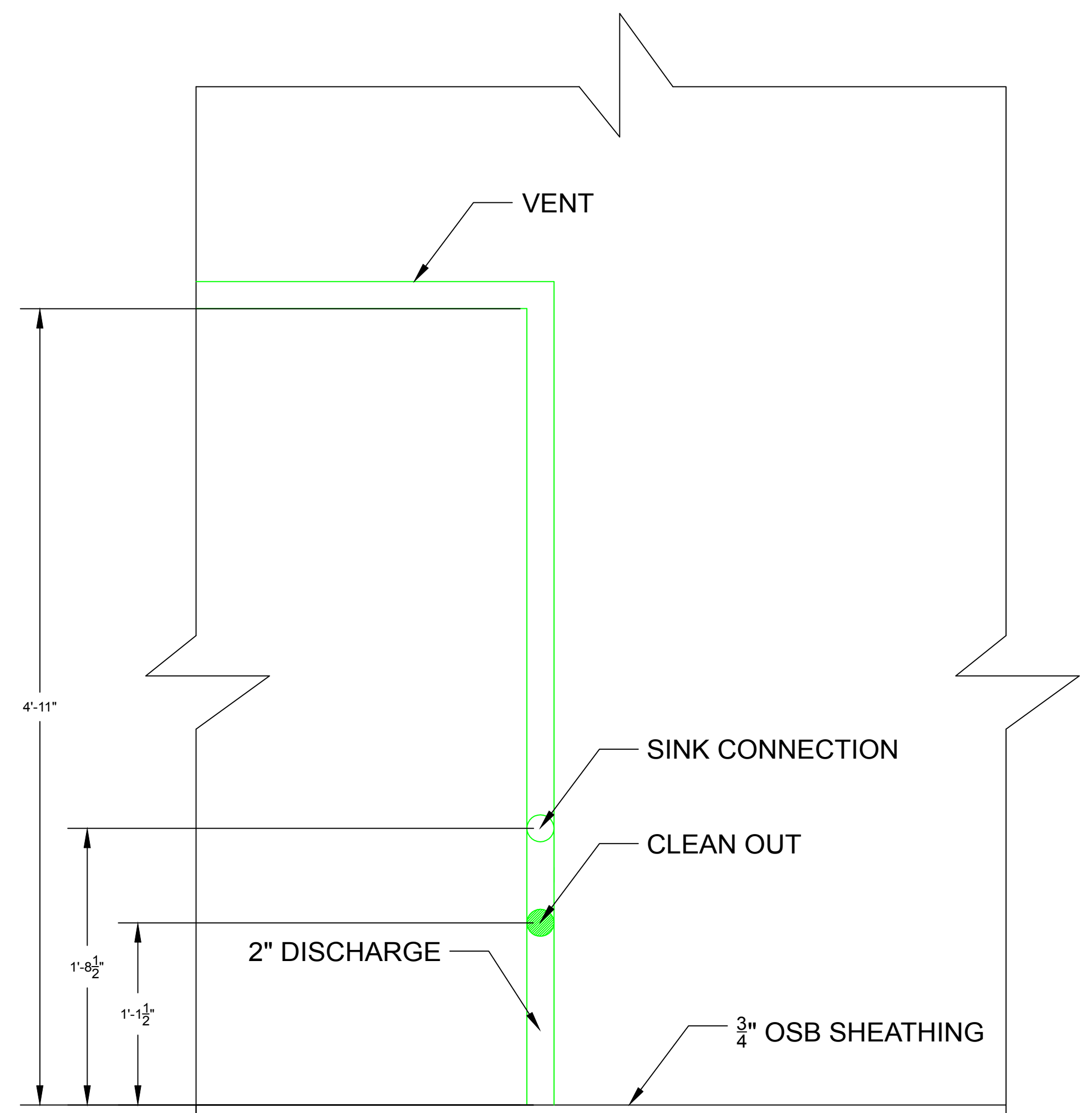
1 CONDENSATE PIPING
Scale 1-1/2" = 1'-0"



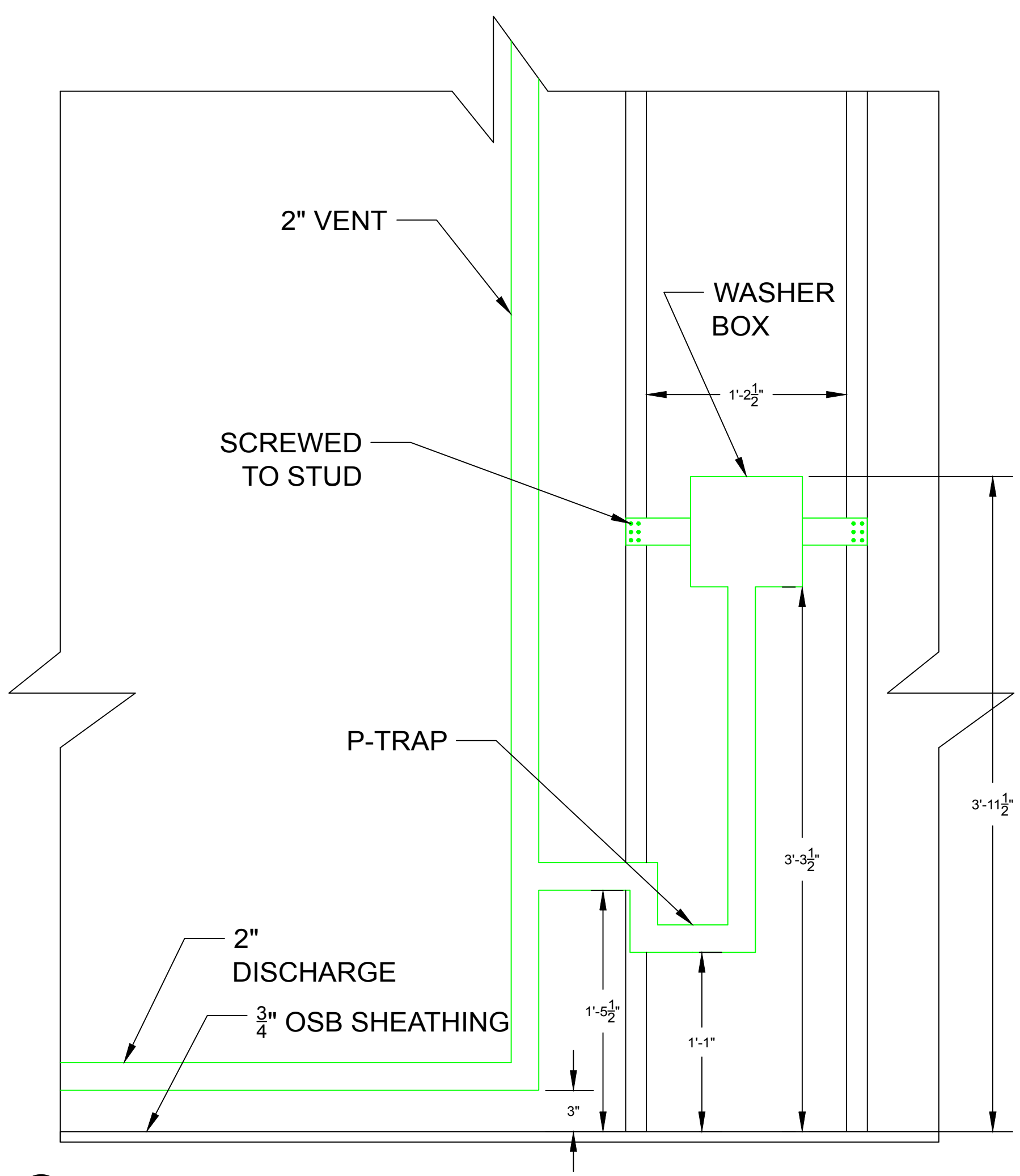
2 PIPE ELEVATION
Scale 1-1/2" = 1'-0"



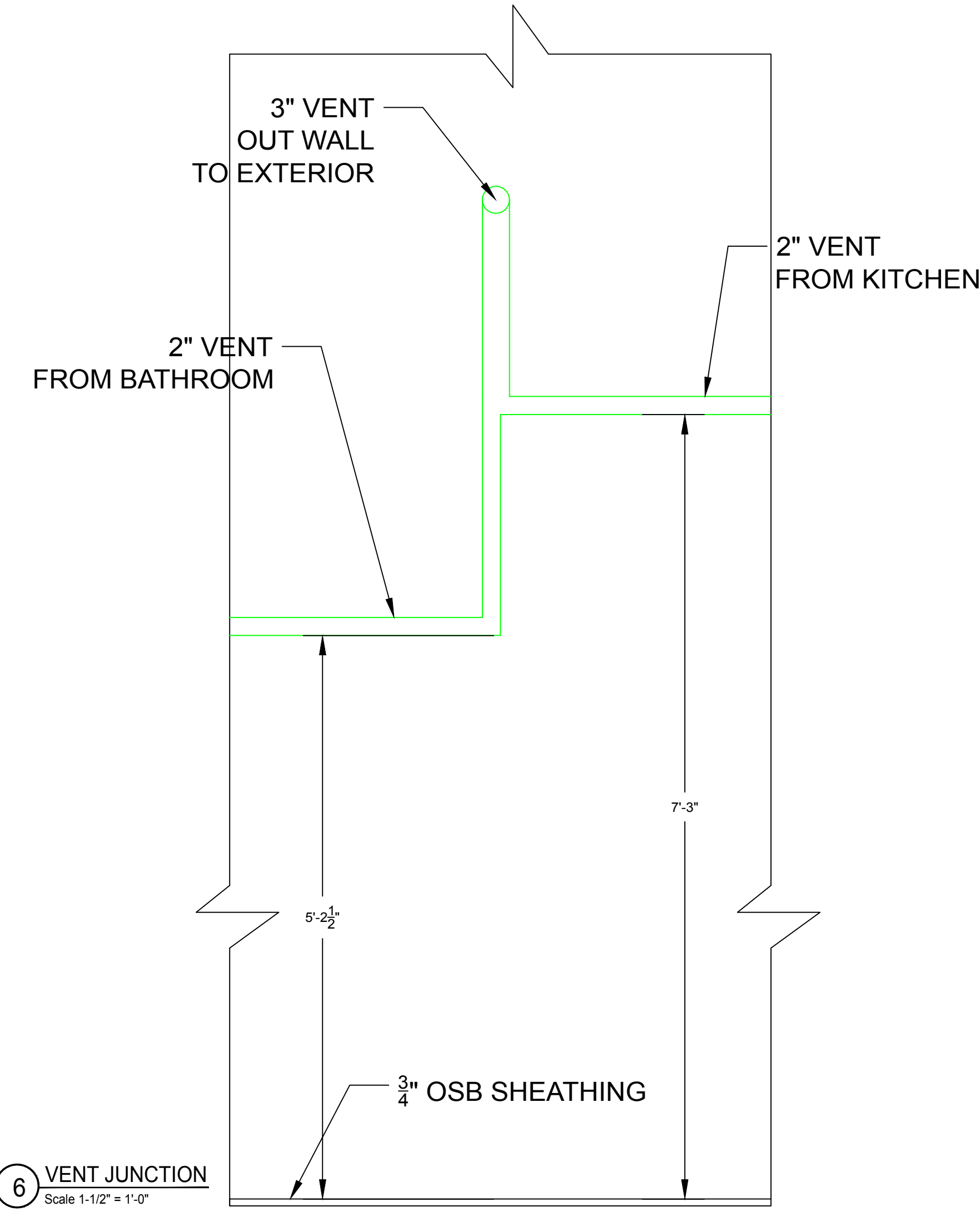
3 RECOVER SECTION
Scale 1" = 1'-0"



4 BATHROOM SINK CONNECTION
Scale 1-1/2" = 1'-0"



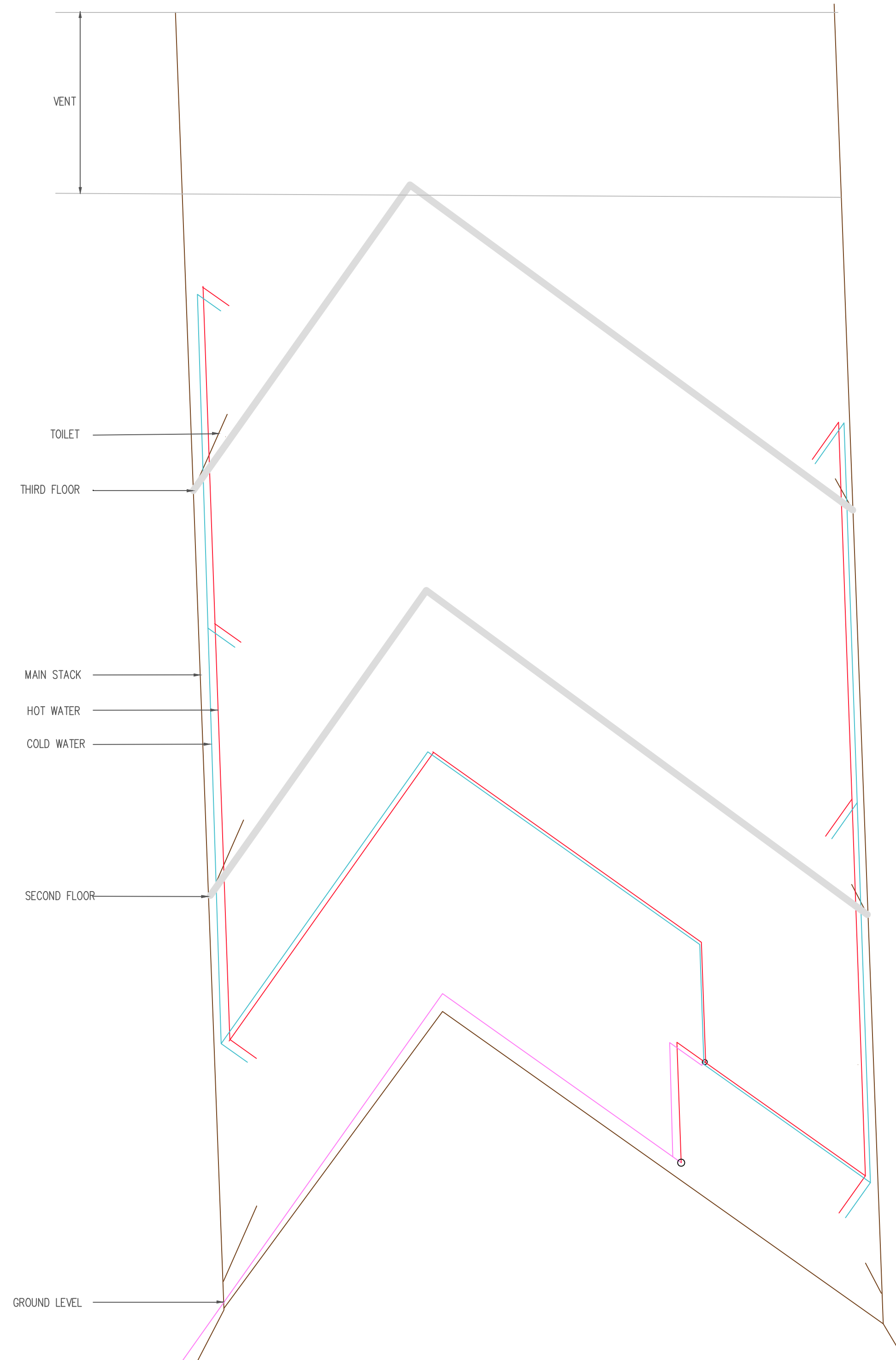
5 W/D CONNECTION
Scale 1-1/2" = 1'-0"



6 VENT JUNCTION
Scale 1-1/2" = 1'-0"

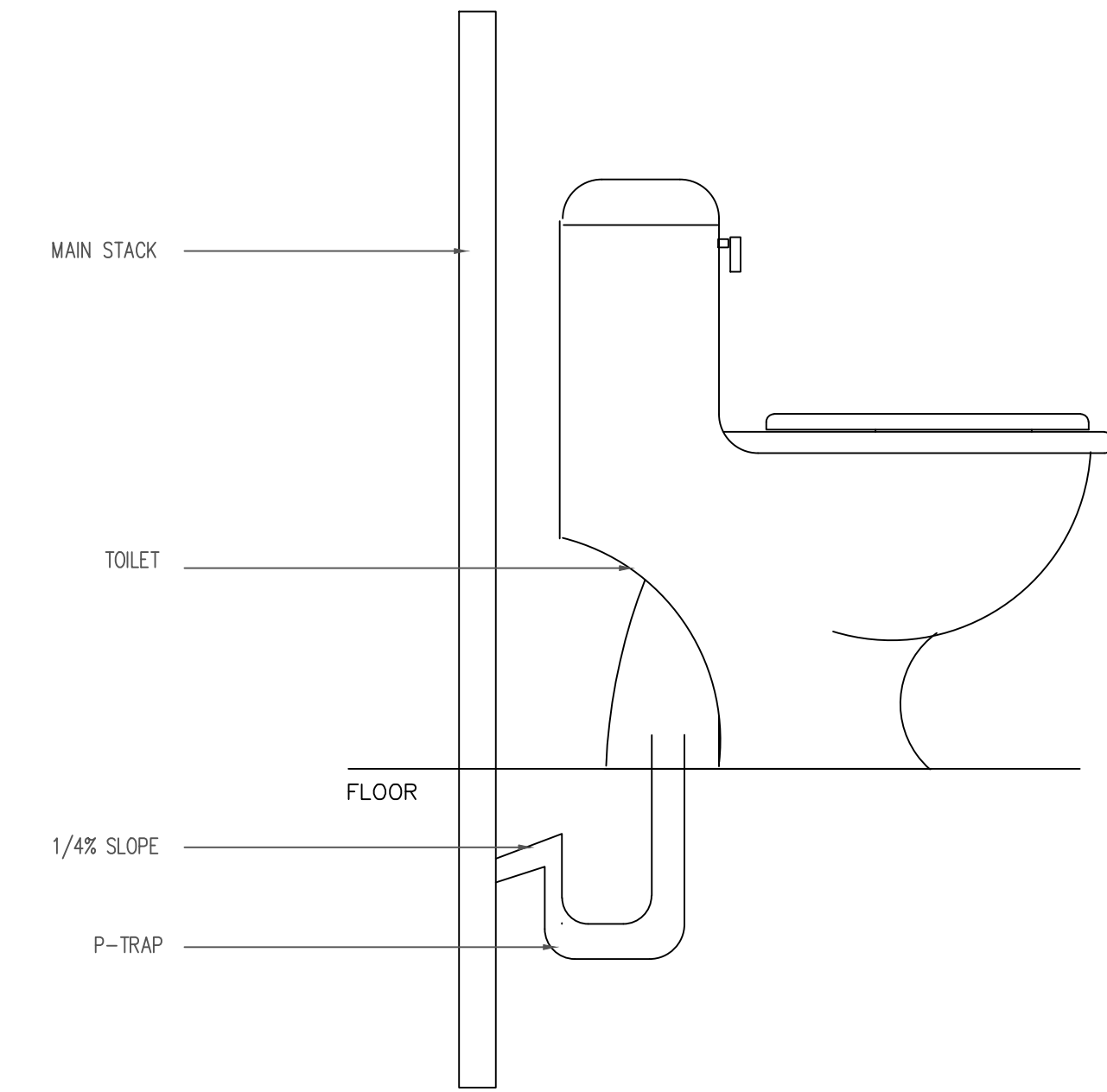
DRAWING NOTES

1. DEPICTION OF SOLUTION FOR STACKED PLUMBING IN ULTIMATE VISION FOR THE SETTING OF OUR SINGLE UNIT. THIS WILL NOT BE BUILT OUT FOR THE COMPETITION MODEL.
2. P-1 SHOWS GENERAL LOCATION OF WASTE, HOT AND COLD WATER LINES. WASTE, HOT AND COLD WATER LINES ARE LOCATED IN THE NORTHWEST WALL PLANE.
3. CLOSE UP OF WASTE CONNECTION TO MAIN STACK IN P-2.
4. LOCATION OF MAIN STACK AND HOT AND COLD WATER LINES SHOWN IN AERIAL LAYOUT P-1. THIS AREA IS CALLED "VERTICAL CIRCULATION".

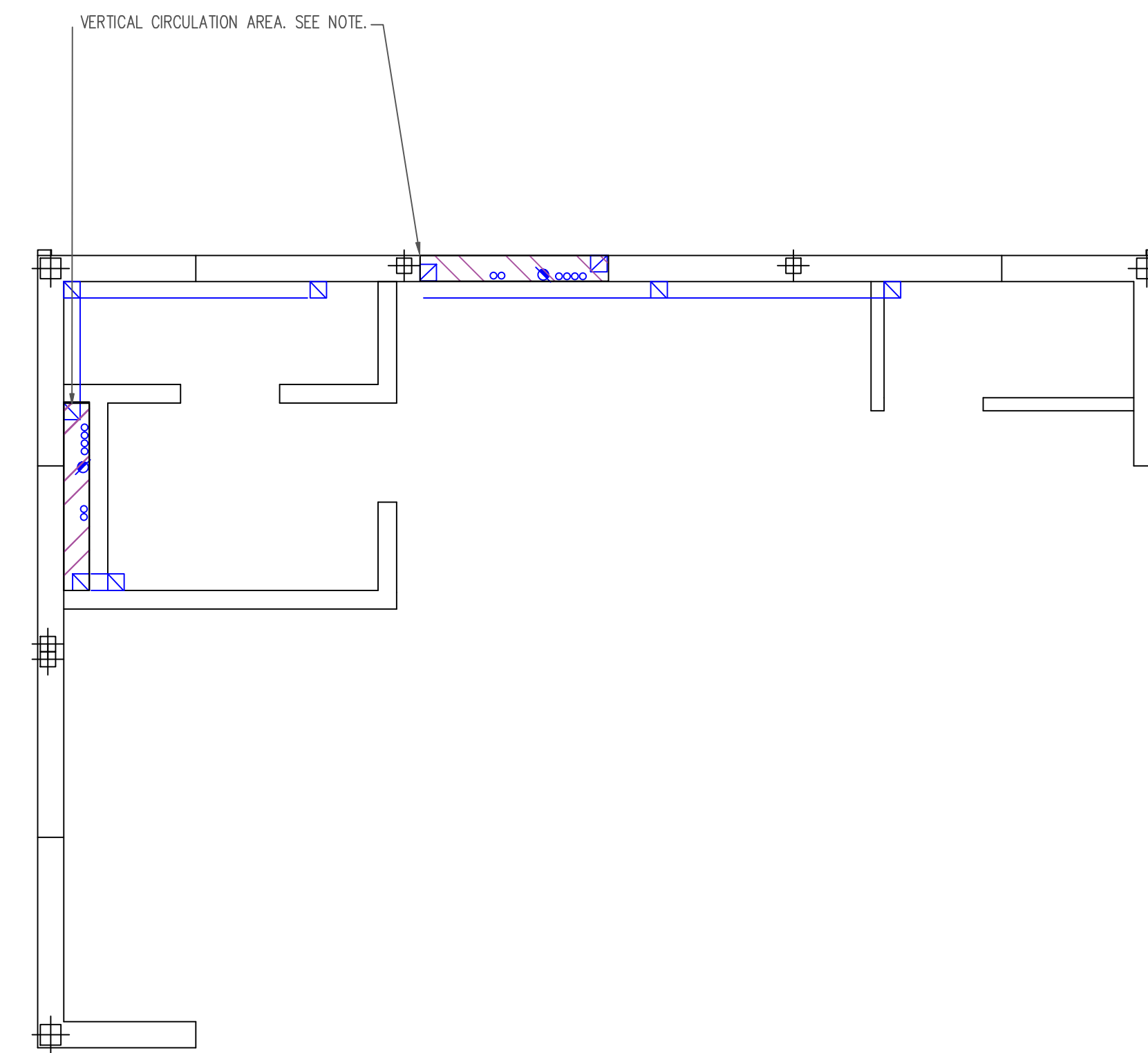


FOR LOCATION RELATIVE TO FLOORPLAN
SEE NOTE 4 AND REFERENCE 3

1 STACKED PLUMBING ISOMETRIC
NOT TO SCALE



2 WASTE CONNECTION DETAIL
NOT TO SCALE



3 STACKED PLUMBING PLAN VIEW
NOT TO SCALE

TEAM NAME RISE
ADDRESS 390 S 34 STREET,
RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS
Tom Petersen, ATP Plumbing

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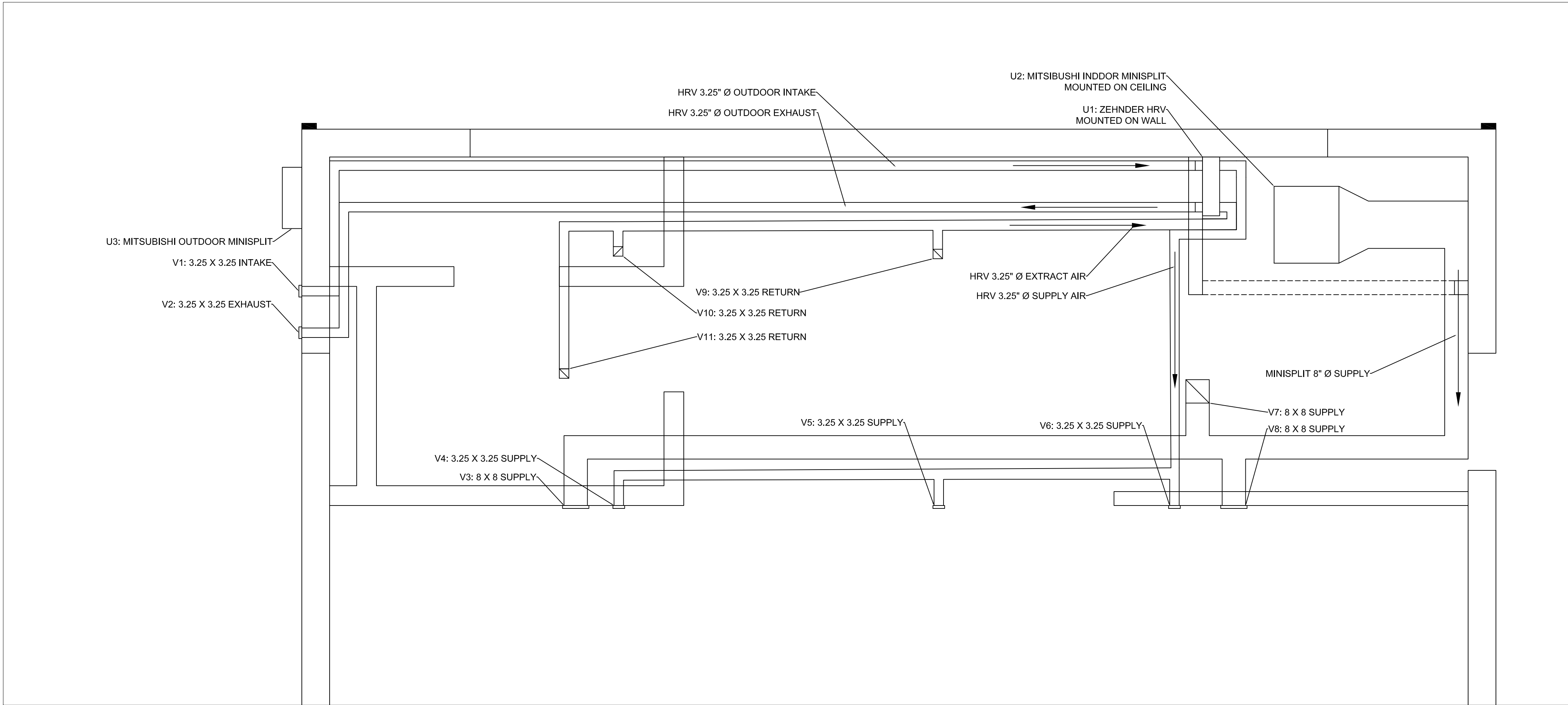


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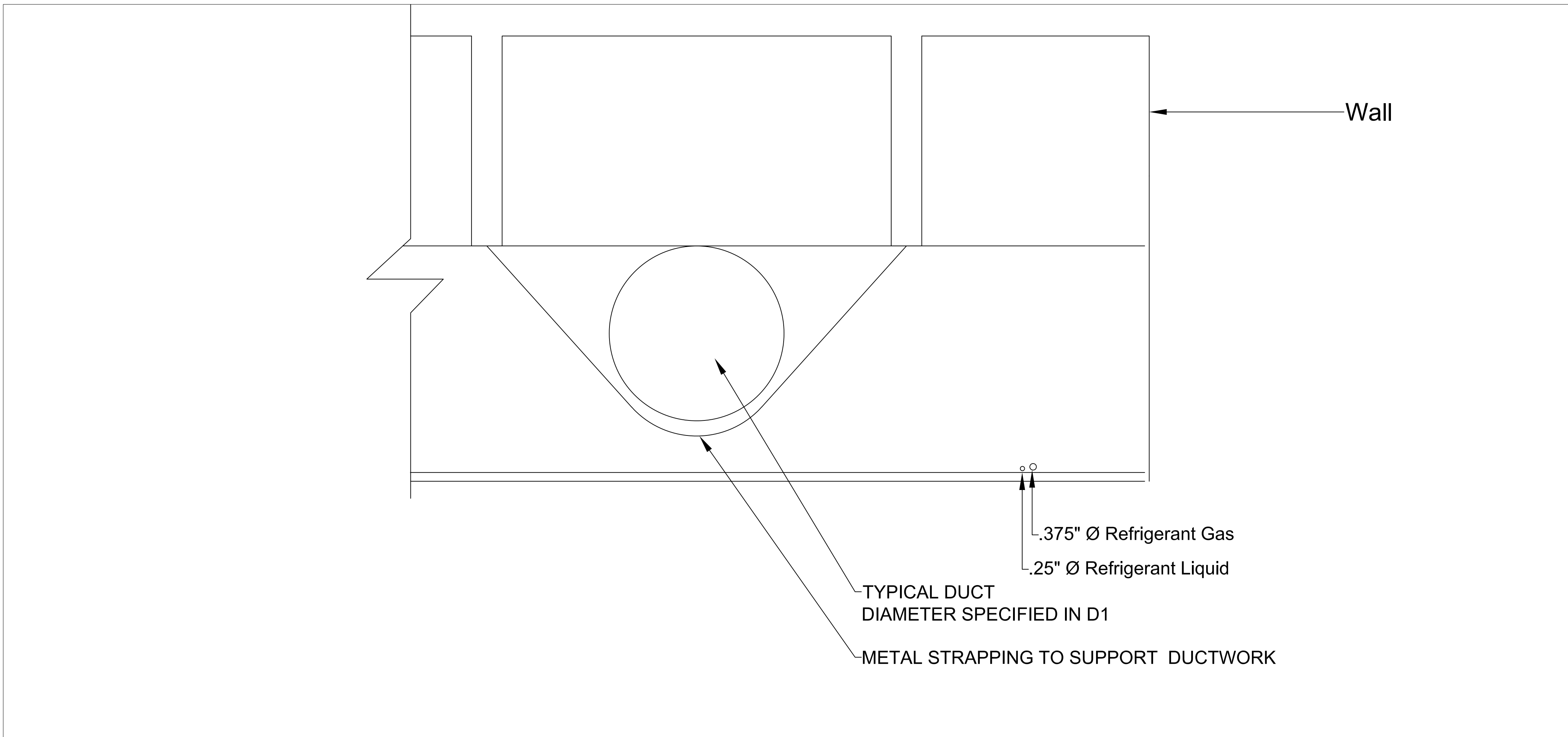
LOT NUMBER 105
DRAWN BY Hannah Chen, Michelle Margolies
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SHEET TITLE
STACKED PLUMBING CIRCULATION

D1 PROPOSED HVAC SYSTEM
Scale 1/2" = 1'-0"



D2 PIPE SECTION
Scale 3" = 1'-0"



RISE

TEAM NAME RISE
ADDRESS 390 S 34 STREET
RICHMOND, CA, 94804
CONTACT berkeleySolarDecathlon@gmail.com
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








HVAC SYSTEM

M-101

General Notes

1. ENTIRE INSTALLATION SHALL CONFORM TO THE 2014 NEC, 2014 NFC, 2015 IRC, AND 2017 SDBC.
2. MINIMUM WIRE SIZE FOR AC LOADS SHALL BE #14 AWG.
3. EXCEPT WHERE OTHERWISE INDICATED WIRE SHALL BE COPPER WITH 500 VOLT INSULATION USE TYPE "NM" CABLE WHERE ALLOWED BY CODE.
4. MAXIMUM LOAD FOR ALL BRANCH CIRCUITS IS 80%.
5. ALL INSIDE NON-LOCKING 120V 15A AND 20A RECEPTACLES SHALL BE TAMPER RESISTANT AS SPECIFIED IN NEC 406.12(A)
6. ALL INSIDE 120V 15 AND 20 AMP CIRCUITS SHALL BE PROTECTED BY AFCI CIRCUIT BREAKERS AS SPECIFIED IN NEC 210.12(A).
7. ALL BATHROOMS, OUTDOOR SPACES, CRAWLSPACES, KITCHENS, LAUNDRY ROOMS, UTILITY ROOMS, AND WET BAR SINK ROOMS WITH 120V 15 AND 20 AMP CIRCUITS SHALL HAVE GFCI PROTECTION AS SPECIFIED IN NEC 210.8(A).
8. ALL EXTERIOR SHALL BE TYPE GROUND FAULT PROTECTED, AND HAVE WATERPROOF COVERS AS SPECIFIED IN NEC 406.8.
9. IDENTIFICATION OF ALL BRANCH CIRCUITS WILL BE PROVIDED ON A TYPEWRITTEN DIRECTORY CARD IN THE PANEL DOOR.
10. A GROUNDING ELECTRODE OF MINIMUM SIZE #4 AWG, COPPER, WILL BE PROVIDED AS A CONNECTION BETWEEN THE DWELLING'S MAIN SERVICE EQUIPMENT TO THE ORGANIZERS UTILITY PANEL AS SPECIFIED IN SDBC 6-9.
11. CONDUCTORS SPECIFIED IN THE ELECTRICAL PLAN SHALL COMPLY WITH NEC TABLE 310.15(B)(16).
12. A DISCONNECTION MECHANISM WILL BE INSTALLED BETWEEN THE INVERTER AND THE SOLAR ARRAY THAT IS CAPABLE OF READY LOCKOUT/TAGOUT AS SPECIFIED IN SDBC 6-10.

ELECTRICAL SYMBOLS LEGEND

	120V DUPLEX RECEPTACLE
	DUPLEX GFCI RECEPTACLE
	WEATHERPROOF GFCI DUPLEX RECEPTACLE
	240V SINGLE RECEPTACLE
	QUADRAPLEX RECEPTACLE
	FLOOR DUPLEX RECEPTACLE
	CAR CHARGER
	HOME RUN
	SMOKE DETECTOR
	SINGLE GANG SWITCH
	THREE-WAY SINGLE GANG SWITCH
	LED RECESSED CEILING LIGHT
	LED STRIP LIGHT, UNDER CABINET
	LED PENDANT LIGHT
	LED WEATHERPROOF WALL SCONCE
	LED 3-LIGHT VANITY LIGHT
	LED WEATHERPROOF CEILING LIGHT FIXTURE
	INVERTER
	JUNCTION BOX
	HOME BATTERY BACKUP

RISE

TEAM NAME	RISE
ADDRESS	390 S 34 STREET RICHMOND, CA, 94804
CONTACT	berkeleysolardecathlon@gmail.com https://solardecathlon.berkeley.edu

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**ELECTRICAL SYMBOLS
AND NOTES**

E-001

RISE

TEAM NAME RISE
ADDRESS 390 S 34 STREET
RICHMOND, CA, 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

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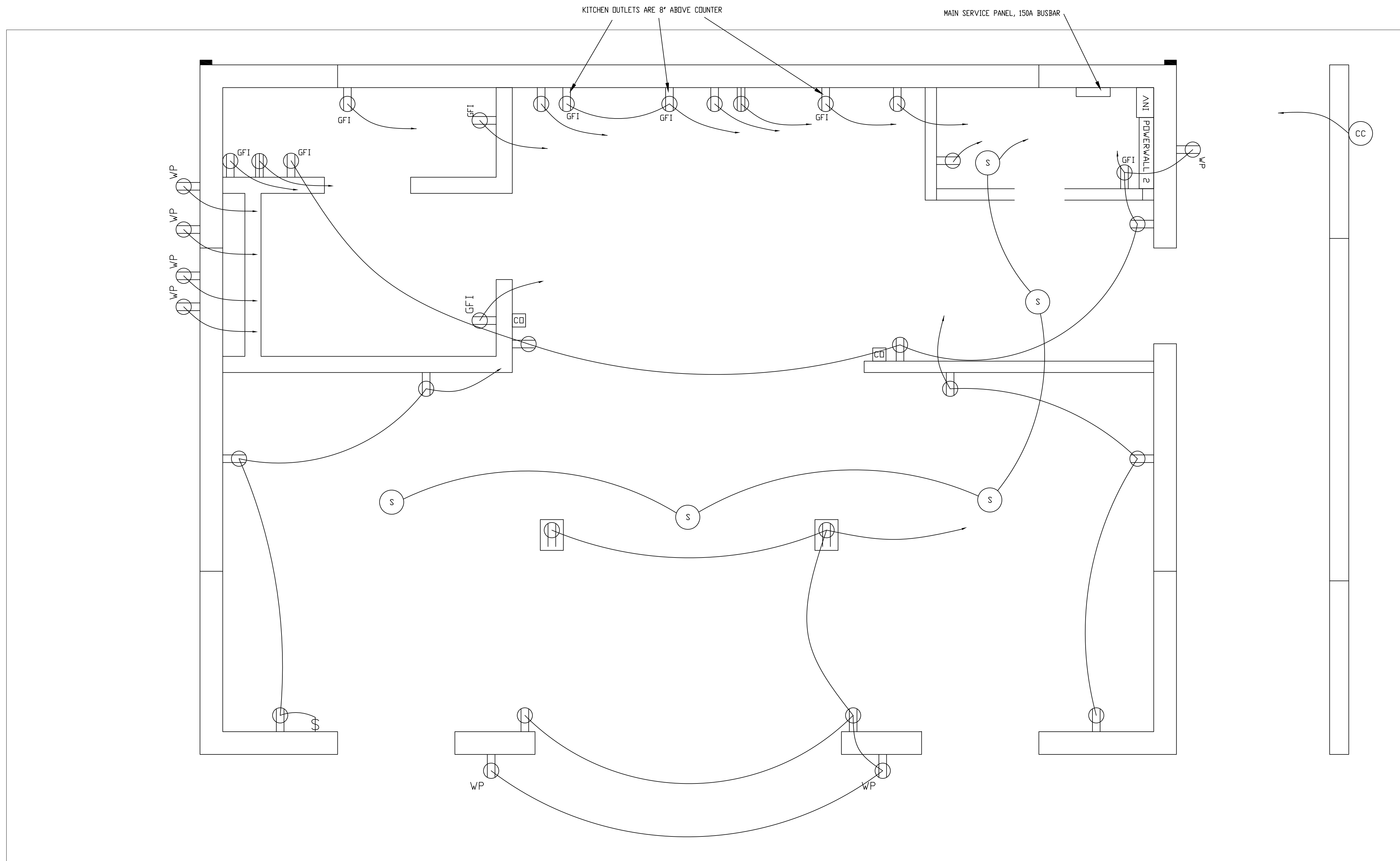


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**ELECTRICAL
DISTRIBUTION PLAN**



KEY SYMBOLS

- 120V DUPLEX RECEPTACLE
- 120V DUPLEX GFCI RECEPTACLE
- WEATHERPROOF GFCI DUPLEX RECEPTACLE
- 240V SINGLE RECEPTACLE
- HALF-SWITCHED DUPLEX RECEPTACLE
- SINGLE GANG SWITCH
- FLOOR BOX WITH DUPLEX RECEPTACLE
- CAR CHARGER
- HOME RUN
- SMOKE DETECTOR
- CARBON MONOXIDE DETECTOR

D2 ELECTRICAL DISTRIBUTION PLAN
Scale 1/2" = 1'-0"

RISE

TEAM NAME RISE
ADDRESS 390 S 34 STREET
RICHMOND, CA, 94804
CONTACT berkeleysolardecathlon@gmail.com
<https://solardecathlon.berkeley.edu>

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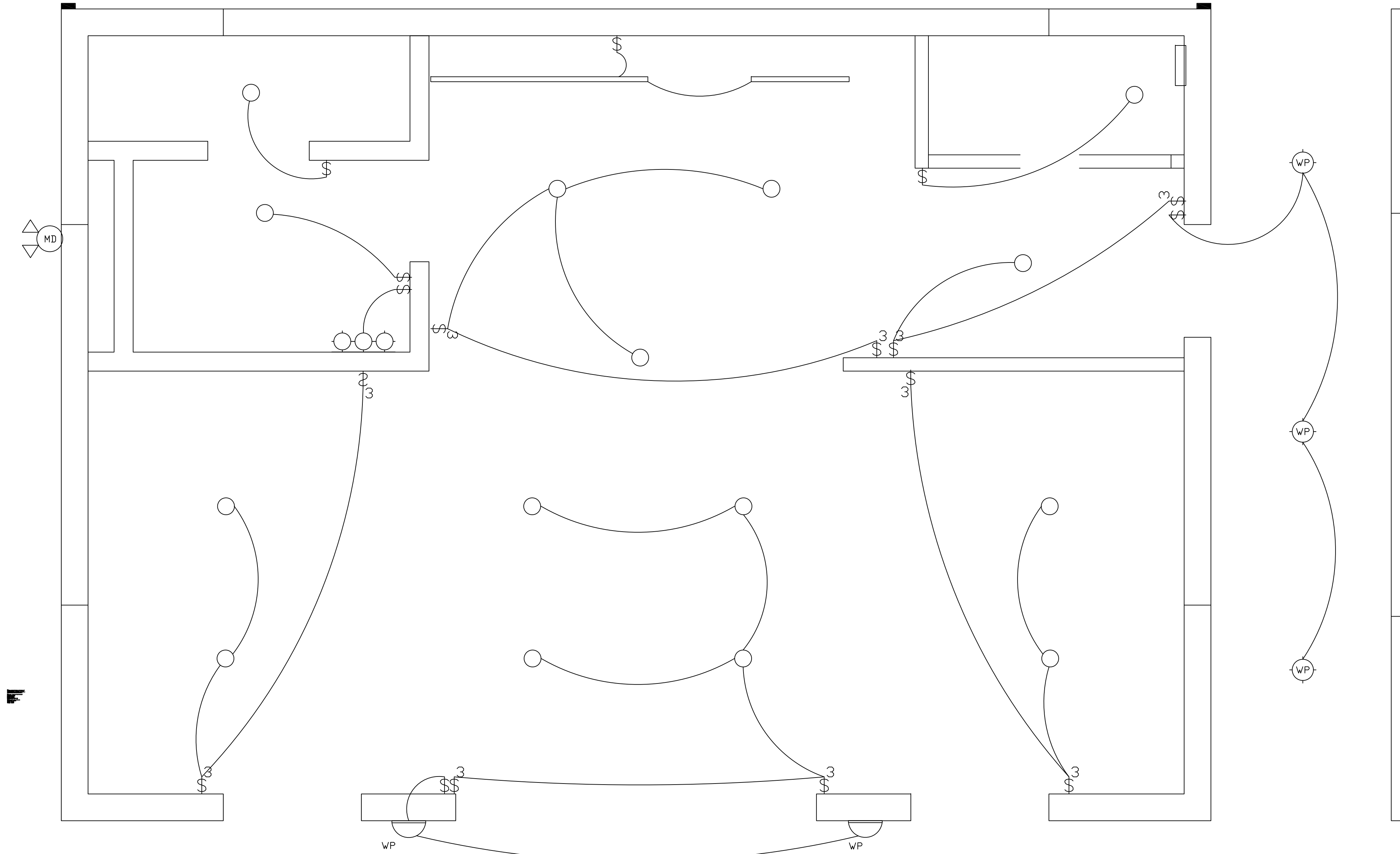
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SHEET TITLE

LIGHTING WIRING PLAN

E-102



KEY SYMBOLS

- \$ SINGLE GANG SWITCH
- \$³ THREE-WAY SINGLE GANG SWITCH
- LED RECESSED CEILING LIGHT
- ▭ LED STRIP LIGHT, UNDER CABINET
- △ MD MOTION ACTIVATED DOUBLE SPOTLIGHT
- ◐ WP LED WEATHERPROOF WALL SCONCE
- ○ ○ LED 3-LIGHT VANITY LIGHT
- WP LED WEATHERPROOF CEILING LIGHT FIXTURE

NOTE:
SEE STRUCTURAL DRAWING S-600 FOR DETAILS ON SOLAR ATTACHMENT

RISE

TEAM NAME RISE
ADDRESS 390 S 34 STREET
RICHMOND, CA, 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS

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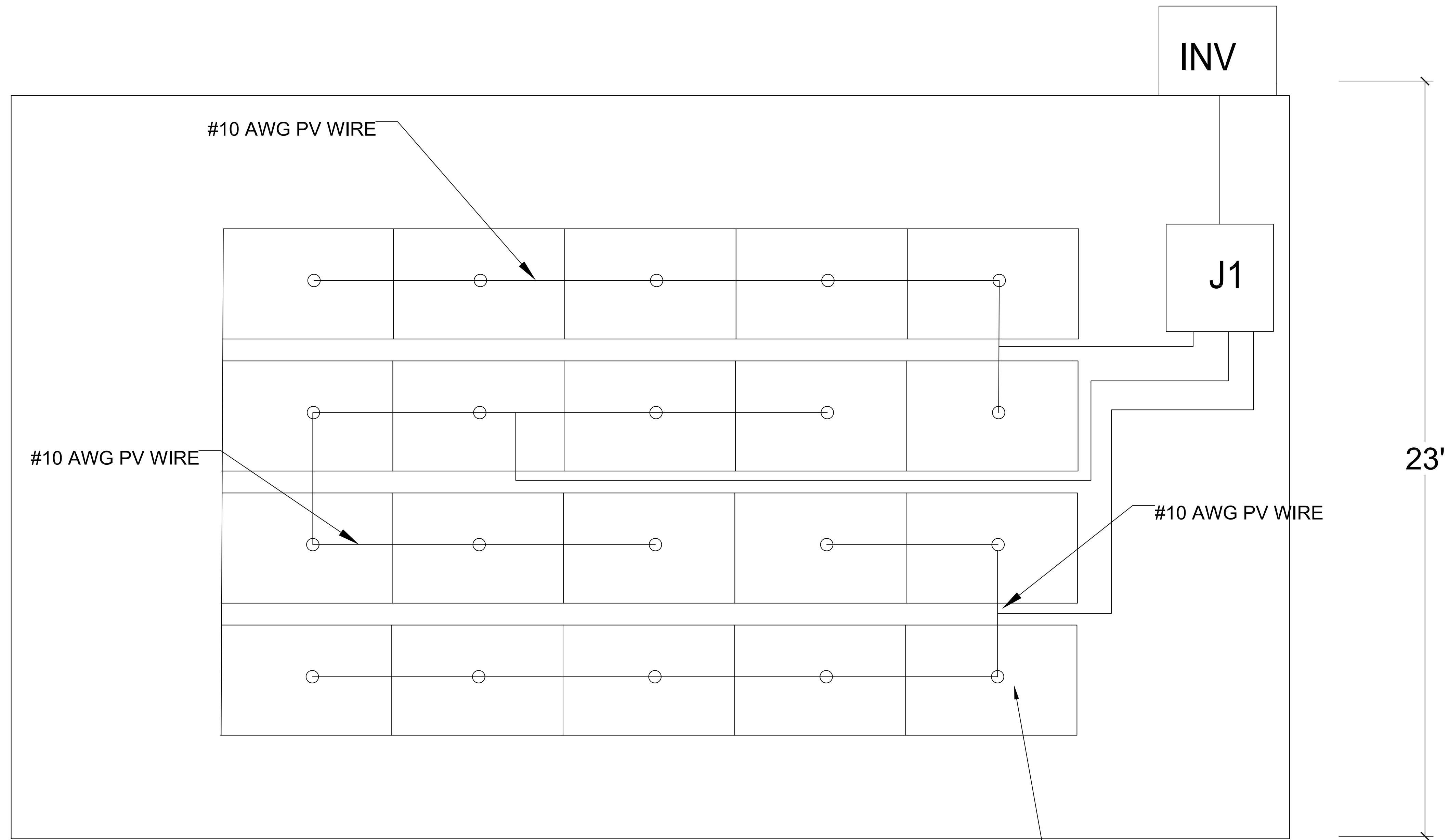


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SHEET TITLE
PV WIRING PLAN

E-103



J1 Junction Box

INV Inverter

ALL ELECTRICAL CONNECTIONS
MADE PER MANUFACTURER
LOCATIONS SHOWN NOT ACCURATE

TEAM NAME RISE
ADDRESS 390 S 34 STREET
RICHMOND, CA, 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS

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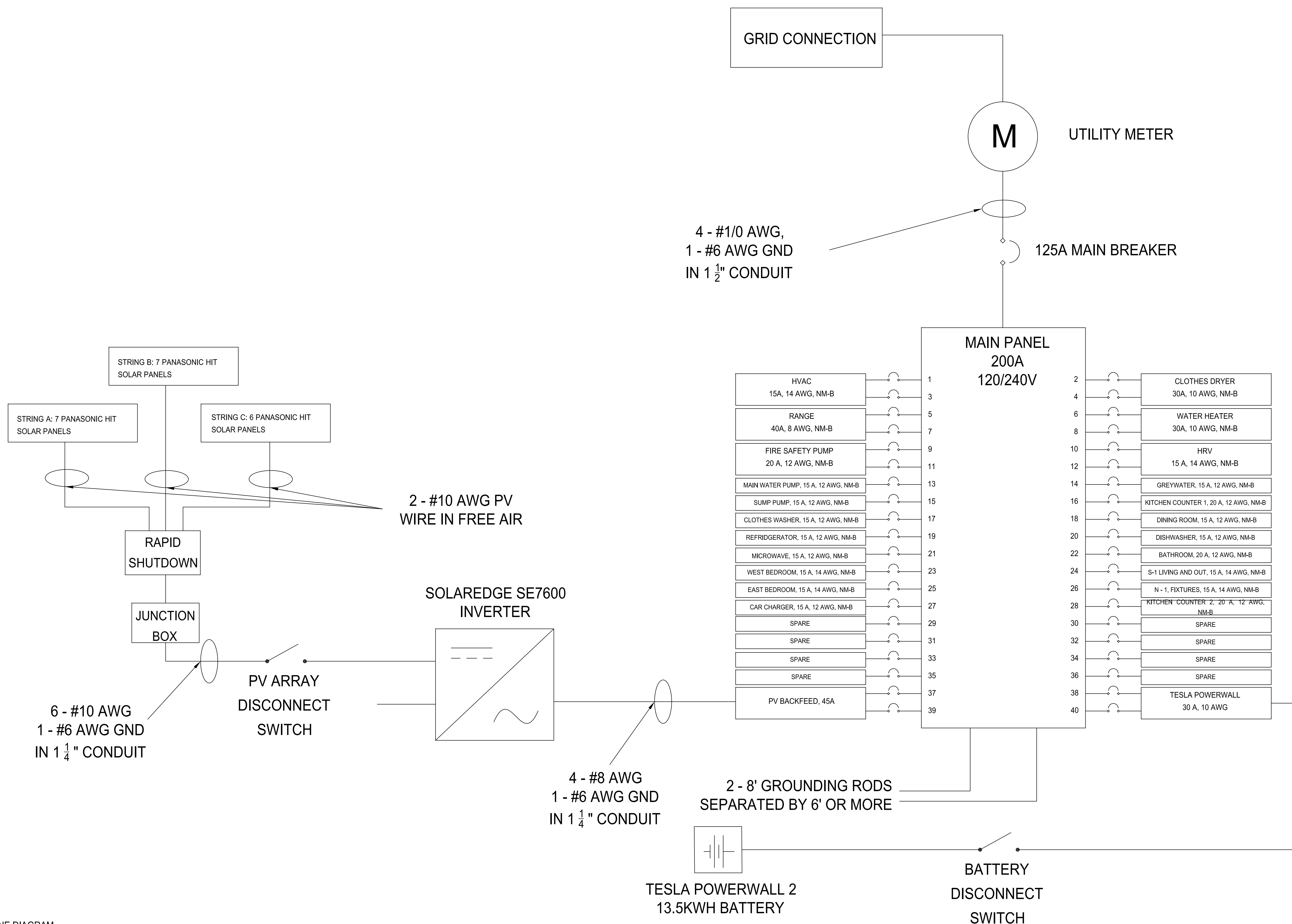
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ONE LINE DIAGRAM

E-601



TEAM NAME RISE
ADDRESS 390 S 34 STREET
RICHMOND, CA, 94804
CONTACT berkeleySolarDecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS

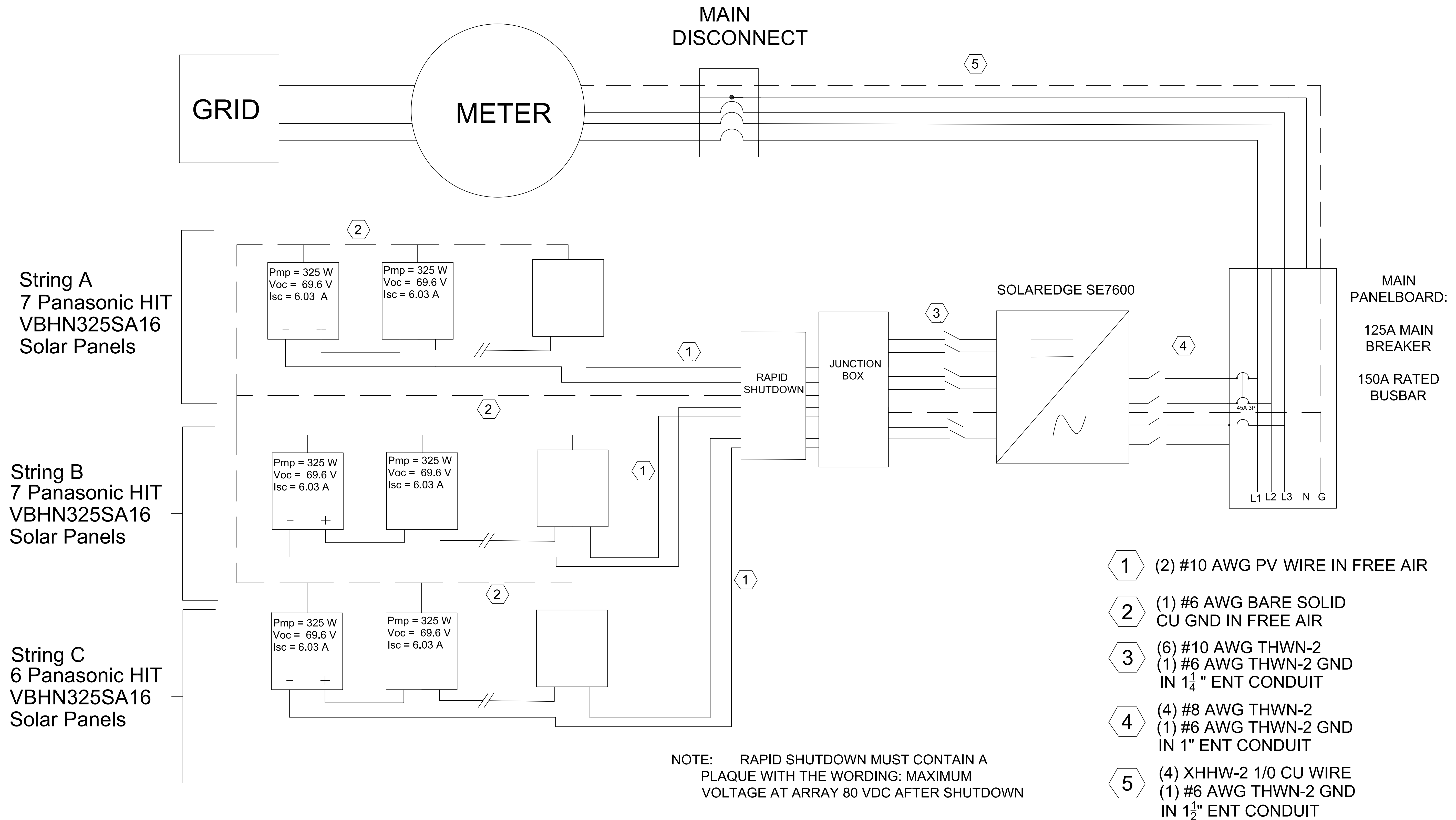
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THREE-LINE DIAGRAM



TEAM NAME	RISE
ADDRESS	390 S 34 STREET RICHMOND, CA, 94804
CONTACT	berkeleysolardecathlon@gmail.com https://solardecathlon.berkeley.edu

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SCHEDULES AND LOADS

E-603

MAIN SERVICE PANEL						
VOLTAGE AND PHASE: 120/240 V, SINGLE PHASE, 3 WIRE			PANEL AMPERAGE: 150A			
ALL 15 AND 20A BREAKERS ARE AFCI			MAIN BREAKER SIZE: 125A			
WIRE SIZE	CURRENT RATING	DESTINATION	#	#	DESTINATION	WIRE SIZE
14 AWG, NM-B	15A	HVAC	1	2	CLOTHES DRYER	10 AWG, NM-B
			3	4		
			5	6		
8 AWG, NM-B	40A	RANGE	7	8	WATER HEATER	10 AWG, NM-B
			9	10		
10 AWG, NM-B	30A	CAR CHARGER	11	12	HRV	14 AWG, NM-B
			13	14		
			15	16		
14 AWG, NM-B	15A	WATER PUMP	17	18	FIRE SAFETY PUMP	12 AWG, NM-B
			19	20		
14 AWG, NM-B	15A	CLOTHES WASHER	21	22	GREYWATER TREATMENT	15 A
14 AWG, NM-B	15A	REFRIGERATOR	23	24	KITCHEN COUNTER 1	20A
14 AWG, NM-B	15A	RANGE HOOD	25	26	KITCHEN COUNTER 2	20A
14 AWG, NM-B	15A	WEST BEDROOM OUTLETS	27	28	DISHWASHER	15A
14 AWG, NM-B	15A	EAST BEDROOM OUTLETS	29	30	MICROWAVE	15A
14 AWG, NM-B	15A	OUTDOOR 1 OUTLETS	31	32	BATHROOM OUTLET	20A
14 AWG, NM-B	15A	OUTDOOR 2 OUTLETS	33	34	ENTRYWAY OUTLETS	15A
14 AWG, NM-B	15A	LIGHTS NORTH MODULE	35	36	LIVING ROOM OUTLETS	15A
14 AWG, NM-B	15A	LIGHTS SOUTH MODULE	37	38	WEST MECH ROOM	20A
14 AWG, NM-B	15A	LIGHTS OUTDOOR	39	40	EAST MECH ROOM OUTLETS	20A
6 AWG	45A	PV BACKFEED			SPARE	
					SPARE	

PHOTOVOLTAIC EQUIPMENT		
PV ARRAY SUMMARY		
NUMBER OF BRANCHES	3	BRANCHES
PV MODULES PER BRANCH	7 & 7 & 6	UNITS
MAX. POWER PER BRANCH	2275 & 2275 & 1950	WATTS
MAX. CURRENT PER BRANCH	7.5375	AMPS
MAX. POWER OF SYSTEM	6500	WATTS
Panasonic Modules		
MODEL NUMBER	VBHN325SA16	
RATED POWER (P_MAX)	325	WATTS
MAX. POWER POINT VOLTAGE (V_MP) AT STC	58	VOLTS
MAX. POWER POINT CURRENT (I_MP) AT STC	5.7	AMPS
OPEN CIRCUIT VOLTAGE (V_OC) AT STC	69.7	VOLTS
SHORT CIRCUIT CURRENT (I_SC) AT STC	6.07	AMPS
MAX. SYSTEM VOLTAGE (IEC)	600	VOLTS
MAX. SERIES FUSE	15	AMPS
I_SC TEMPERATURE COEFFICIENT (ALPHA)	1.82	mA/DEGREE C
V_OC TEMPERATURE COEFFICIENT (BETA)	-0.174	V/DEGREE C
P_MAX TEMPERATURE COEFFICIENT (GAMMA)	-0.29	%/DEGREE C
STANDARD TEST CONDITION	25	DEGREE C
CERTIFICATIONS (IN PROGRESS)	IEC 61215, IEC 61730-1/-2, UL 1703, ISO 9001, IEC 62716 (AMMONIA TEST), IEC 61701 (SALT MIST CORROSION TEST)	
SolarEdge Inverter		
MODEL NUMBER	SE7600A-US	
OUTPUT DATA (AC) AT 240V_AC		
MAXIMUM OUTPUT POWER	8350	WATTS
MAX. CONTINUOUS OUTPUT CURRENT	32	AMPS
FREQUENCY	60	HZ
INPUT DATA (DC):		
RECOMMENDED INPUT POWER (STC)	6600 - 12700	WATTS
MAXIMUM INPUT VOLTAGE	500	VOLTS
NOMINAL INPUT DC VOLTAGE	350	VOLTS
MAXIMUM INPUT CURRENT	23	AMPS
MAXIMUM DC SHORT CIRCUIT CURRENT	45	AMPS
CEC WEIGHTED EFFICIENCY	97.5	%
MAXIMUM EFFICIENCY	98	%
NIGHTTIME POWER CONSUMPTION	<2.5	WATTS
COMPLIANCE		
	UL1741, UL1741 SA, UL1699B, UL1998, CSA 2.2, IEEE1547, FCC part 15 class B	
INSTALLATION SPECIFICATION:		
MINIMUM AC AWG RATING	16	AWG
MAXIMUM AC AWG RATING	6	AWG
MINIMUM DC AWG RATING	16	AWG
MAXIMUM DC AWG RATING	6	AWG
MINIMUM OPERATING TEMPERATURE	-25	DEGREES C
MAXIMUM OPERATING TEMPERATURE	60	DEGREES C

PHOTOVOLTAIC SYSTEM CALCULATIONS		
MAXIMUM PHOTOVOLTAIC SYSTEM VOLTAGE		NEC 690.7(A)
NUMBER OF MODULES CONNECTED IN SERIES	7 & 7 & 6	UNITS
HIGHEST EXPECTED AMBIENT TEMPERATURE	38.89	DEGREES C
LOWEST EXPECTED AMBIENT TEMPERATURE	-17.22	DEGREES C
(DENVER, CO)		
OPEN CIRCUIT VOLTAGE	69.7	VOLTS
STC TEMPERATURE	25	DEGREES C
CHANGE IN TEMPERATURE	-42.22	DEGREES C
V_OC TEMPERATURE COEFFICIENT (BETA)	-0.174	%/DEGREE C
OPEN CIRCUIT VOLTAGE CORRECTION FACTOR	1.18	
CORRECTED OPEN CIRCUIT VOLTAGE	74.8204	VOLTS
MAXIMUM CIRCUIT CURRENT		NEC 690.8(A)
1. PHOTOVOLTAIC SOURCE CIRCUIT CURRENTS		
SHORT CIRCUIT CURRENT (I_SC)	6.07	AMPS
CORRECTION FACTOR	125	%
MAXIMUM CURRENT PER PV MODULE	7.59	AMPS
2. CONDUCTOR AMPACITY (NEC 690.8(B))		
MAXIMUM OUTPUT FROM MODULES	6.07	AMPS
CORRECTION FACTOR	125	%
CABLE AMPACITY REQUIRED	7.59	AMPS
CONDITIONS	IN CONDUIT	
HIGHEST AMBIENT TEMPERATURE IN RICHMOND	39.44	DEGREES C
AMPACITY OF 10 AWG THWN-2 (90 C) COPPER WIRE	40	AMPS
IN CONDUIT (NEC TABLE 310.15(B)(16))		
CORRECTION FACTOR FOR 31 C AMBIENT TEMPERATURE (NEC TABLE 310.15(B)(2)(A))	0.91	
CORRECTION FACTOR FOR 4 CURRENT CARRYING	80	%
CONDUCTORS IN CONDUIT (NEC TABLE 310.15(B)(3)(A))		
ADJUSTED AMPACITY	29.12	AMPS
CONDUCTOR SIZE CHOSEN FOR STRING HOME RUN	10	AWG
2. INVERTER OUTPUT CURRENT RATING		
CONTINUOUS OUTPUT CURRENT RATING	32	AMPS
AMPACITY AND OVERCURRENT DEVICE RATINGS		
MAXIMUM OUTPUT CURRENT OF INVERTER	32	AMPS
CORRECTION FACTOR	125	%
ADJUSTED AMPACITY	40	AMPS
1. OVERCURRENT DEVICES		
PANEL BOARD OVERCURRENT DEVICE	45	AMPS
2. CONDUCTOR AMPACITY		
CABLE AMPACITY REQUIRED	40	AMPS
CONDITIONS	IN CONDUIT	
AMBIENT TEMPERATURE	39.44	DEGREES C
AMPACITY OF 8 AWG THWN-2 (90 C) COPPER WIRE	55	AMPS
IN CONDUIT (NEC TABLE 310.15(B)(16))		
CORRECTION FACTOR FOR 31 C AMBIENT TEMPERATURE (NEC TABLE 310.15(B)(2)(A))	0.91	
CORRECTION FACTOR FOR 4 CURRENT CARRYING	80	%
CONDUCTORS IN CONDUIT (NEC TABLE 310.15(B)(3)(A))		
ADJUSTED AMPACITY	40.04	AMPS
CONDUCTOR SIZE CHOSEN FOR STRING HOME RUN	8	AWG
SERVICE AND FEEDER CONDUCTOR SIZES		
SERVICE ENTRANCE CABLE TYPE (NEC 310.15(B)(16))	XHHW-2	
MAXIMUM OUTPUT RATING OF MAIN PANEL	150	AMPS
CORRECTION FACTOR (310.15(2)(B))	0.96	
CORRECTED CURRENT RATING	156.25	AMPS
CONDUCTOR SIZE BASED ON 90 C	1/0 Copper	AWG
CONDUCTOR SIZE BASED ON CONCEALMENT	1/0 Copper	AWG
GROUNDING ELECTRODE CONDUCTOR SIZE		
COPPER GROUNDING ELECTRODE SIZE	6	AWG
ELECTRODE GROUNDING CONDUCTOR SIZE		
COPPER ELECTRODE SIZE	6	AWG

CALCULATIONS FOR PTC		CALCULATIONS FOR STC	
MAXIMUM NUMBER OF SOLAR MODULES IN SERIES		MAXIMUM NUMBER OF SOLAR MODULES IN SERIES	
V_MAX = V_OC + ((T_LOW - T_REF) * TKV_OC * V_OC)		V_MAX = V_OC + ((T_LOW - T_REF) * TKV_OC * V_OC)	
RICHMOND	DENVER	RICHMOND	DENVER
V_MAX = 40.9 + ((-1.11 - 45) * -0.0028 * 40.9) = 48.181 V MAX DC VOLTAGE = 600 V_DC 600V_DC / 46.181 V_DC = 12.992 MAX # LG NEON2 320 W SOLAR MODULES = 13	V_MAX = 40.9 + ((-17.22 - 45) * -0.0028 * 40.9) = 48.025 V MAX DC VOLTAGE = 600 V_DC 600 V_DC / 48.025 V_DC = 12.493 MAX # LG NEON2 320 W SOLAR MODULES = 12	V_MAX = 40.9 + ((-1.11 - 25) * -0.0028 * 40.9) = 43.890 V MAX DC VOLTAGE = 600 V_DC 600V_DC / 43.890 V_DC = 13.670 MAX # LG NEON2 320 W SOLAR MODULES = 14	V_MAX = 40.9 + ((-17.22 - 25) * -0.0028 * 40.9) = 45.735 V MAX DC VOLTAGE = 600 V_DC 600 V_DC / 45.735 V_DC = 13.119 MAX # LG NEON2 320 W SOLAR MODULES = 13
MINIMUM NUMBER OF SOLAR MODULES IN SERIES V_MIN = (V_MP + ((T2%*H + T_RISE - T_REF) * TKV_MP * V_MP))		MINIMUM NUMBER OF SOLAR MODULES IN SERIES V_MIN = (V_MP + ((T2%*H + T_RISE - T_REF) * TKV_MP * V_MP))	
V_MIN = 32.8 + ((22 + 39.44 - 45) * -0.0028 * 32.8) = 31.290 V MIN DC VOLTAGE = 270 V_DC 270 V_DC / 31.290 V_DC = 8.629 MIN # LG NEON2 320 W SOLAR MODULES = 9	V_MIN = 38.89 + ((22 + 38.89 - 45) * -0.0028 * 32.8) = 31.341 V MIN DC VOLTAGE = 270 V_DC 270 V_DC / 31.341 V_DC = 8.615 MIN # LG NEON2 320 W SOLAR MODULES = 9	V_MIN = 32.8 + ((4.44 + 39.44 - 25) * -0.0028 * 32.8) = 29.452 V MIN DC VOLTAGE = 270 V_DC 270 V_DC / 29.452 V_DC = 9.167 MIN # LG NEON2 320 W SOLAR MODULES = 9	V_MIN = 38.89 + ((4.44 + 38.89 - 25) * -0.0028 * 32.8) = 29.503 V MIN DC VOLTAGE = 270 V_DC 270 V_DC / 29.503 V_DC = 9.151 MIN # LG NEON2 320 W SOLAR MODULES = 9
COMBINED DESIGN CONDITIONS DICTATE STRING LENGTH OF 9-13 MODULES IN SERIES			

ELECTRICAL SCHEDULE

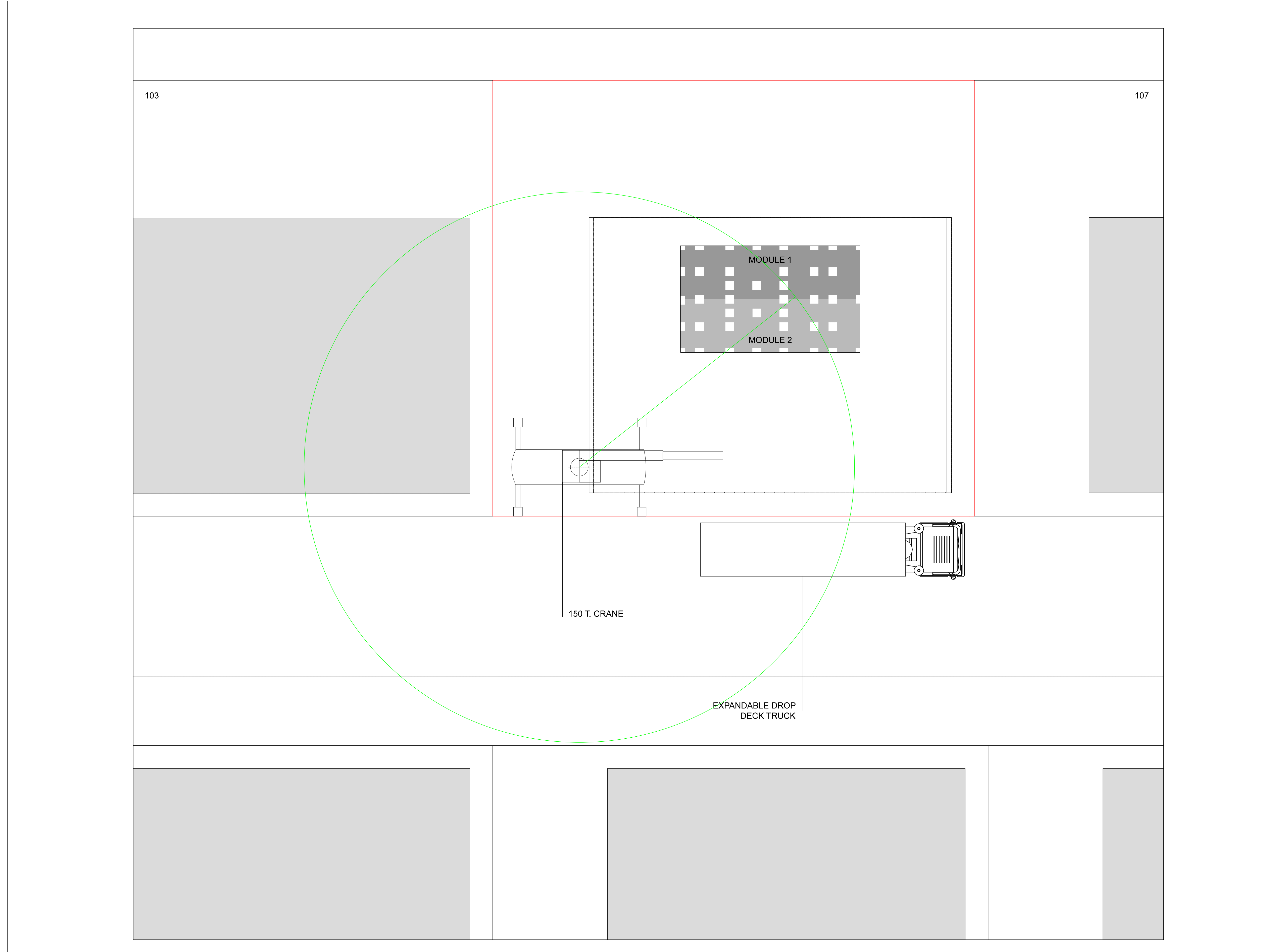
CATEGORY	COMPONENT	QTY.
RECEPTACLES		
	DUPLEX RECEPTACLE: STANDARD	11
	DUPLEX RECEPTACLE: GFCI	10
	FLOOR BOX WITH DUPLEX RECEPTACLE	2
	WEATHERPROOF RECEPTACLE: STANDARD	4
	HALF-SWITCHED DUPLEX RECEPTACLE	2
	240V SINGLE RECEPTACLE	2
BREAKERS		
	125A MAIN CIRCUIT BREAKER	1
	45A, DOUBLE-POLE BREAKER	1
	40A, DOUBLE-POLE BREAKER	1
	30A, DOUBLE-POLE BREAKER	3
	20A, DOUBLE-POLE BREAKER	1
	15A, DOUBLE-POLE BREAKER	3
	20A, SINGLE-POLE BREAKER, AFCI	5
	15A, SINGLE-POLE BREAKER, AFCI	8
	15A, SINGLE-POLE BREAKER, DF	7
LIGHTING		
	LED RECESSED LIGHTING (MODEL TBD)	14
	OUTDOOR MOTION ACTIVATED SPOTLIGHT	1
	3-LIGHT VANITY LED LIGHT (MODEL TBD)	1
	UNDER CABINET LED STRIP LIGHTING (MODEL TBD)	10 FT
	OUTDOOR WALL SCONCE (MODEL TBD)	2
	OUTDOOR LED OVERHEAD LIGHTING (MODEL TBD)	3

GENERAL HOUSE LOADS

PANEL #	RULE	CALCULATION	VALUE	UNIT
19	REFRIGERATOR	BEKO BFBF2412SS	480	VA
17	LAUNDRY CIRCUIT	1 X 1500 VA/CIRCUIT	1500	VA
2,4	CLOTHES DRYER	BEKO HPD24412W	920	VA
6,8	WATER HEATER	NEXUS EWATER NEXHEATER	6900	VA
30	TELEVISION	VIZIO E28H-C1	120	VA
22	DISHWASHER	BEKO DDT28430	1440	VA
18	GREYWATER TREATMENT	NEXUS EWATER NEXTREATER	1650	VA
1,3	HVAC	MITSUBISHI SEZ-KD12NA	3450	VA
10,12	HRV	ZEHNDER COMFOAIR 350	460	VA
5,7	RANGE	GE PROFILE PHS920SFSS	9600	VA
21	RANGE HOOD	BROAN RME5030SS	336	VA
26	MICROWAVE	BEKO MWOTR30200CSS	1800	VA
9,11	CAR CHARGER	EVR-GREEN MINI EV	7200	VA
20,22	SMALL APPLIANCE	2 X 1500 VA/CIRCUIT	3000	VA
31,33,35	LIGHTING	816 SQFT X 3 VA/SQFT	2448	VA
14,16	FIRE SAFETY PUMP	240 V X 8.6 A	2064	VA
13,15	MAIN WATER PUMP	230 V X 5.5 A	2064	VA
TOTAL			45432	VA
FIRST 10000 VA x 100%			10000	VA
REST x 40%			14172.8	VA
NET GENERAL LOAD			24172.8	VA
TOTAL CURRENT			100.72	A
MAIN SERVICE PANEL BREAKER			125	A

General Notes

1. MODULE 1 PLACED FIRST, THEN MODULE 2.
2. CRANE: GROVE RT9150E
3. MAX WEIGHT: 20,000 LBS AT 60' RADIUS
4. MAX NECESSARY RADIUS: 78 FT
5. RIGGING AND SETTING TO BE PERFORMED BY A PROFESSIONAL CREW.



RISE - UC Berkeley

TEAM NAME RISE
 ADDRESS 2017, Barrett Ave
 Richmond, CA, 94801
 CONTACT berkeleysolardecathlon@gmail.com
 https://solardecathlon.berkeley.edu

CONSULTANTS

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RISE

TEAM NAME RISE
ADDRESS 390 S 34 STREET, RICHMOND, CA 94804
CONTACT berkeleysolardecathlon@gmail.com
https://solardecathlon.berkeley.edu

CONSULTANTS:
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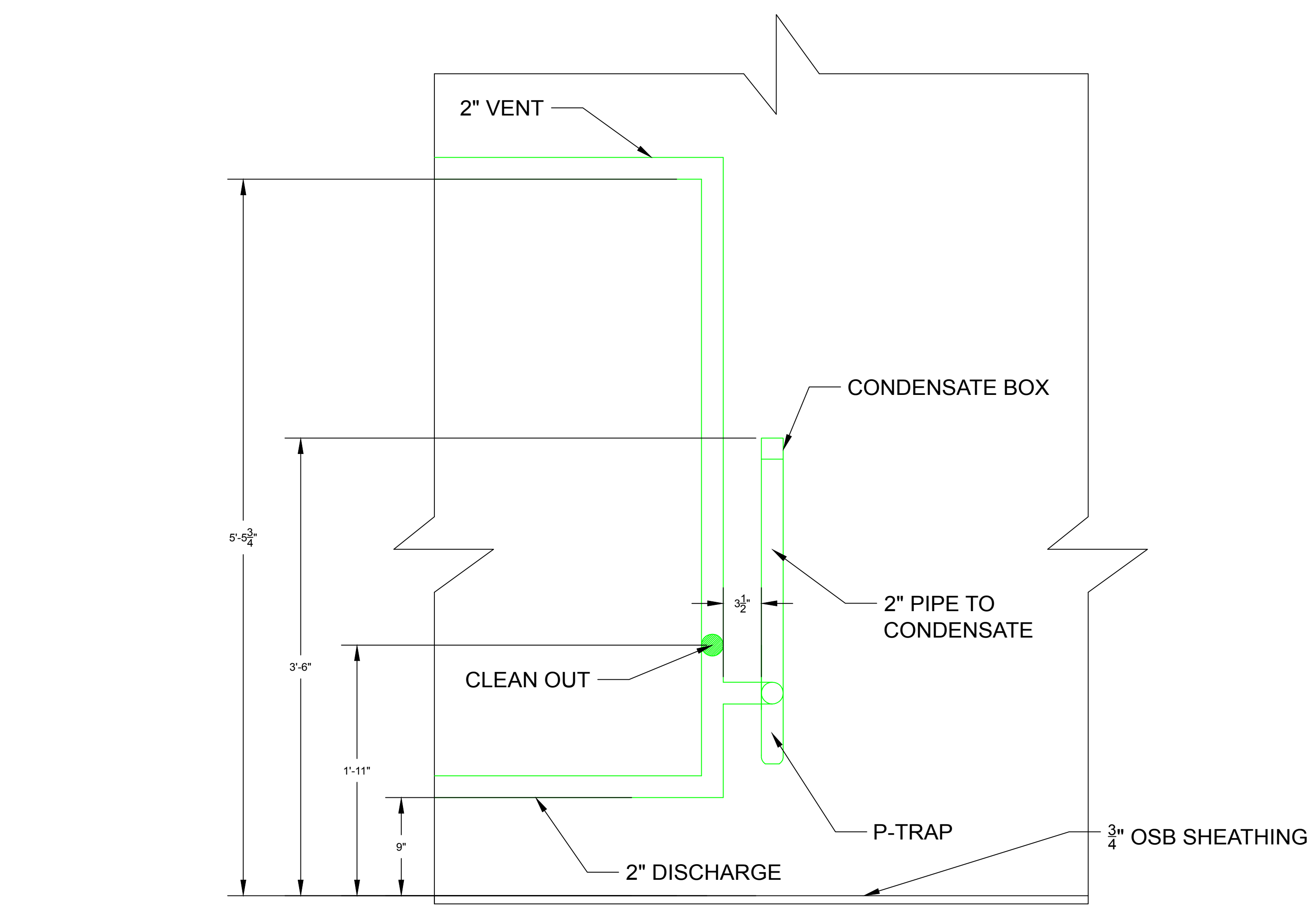
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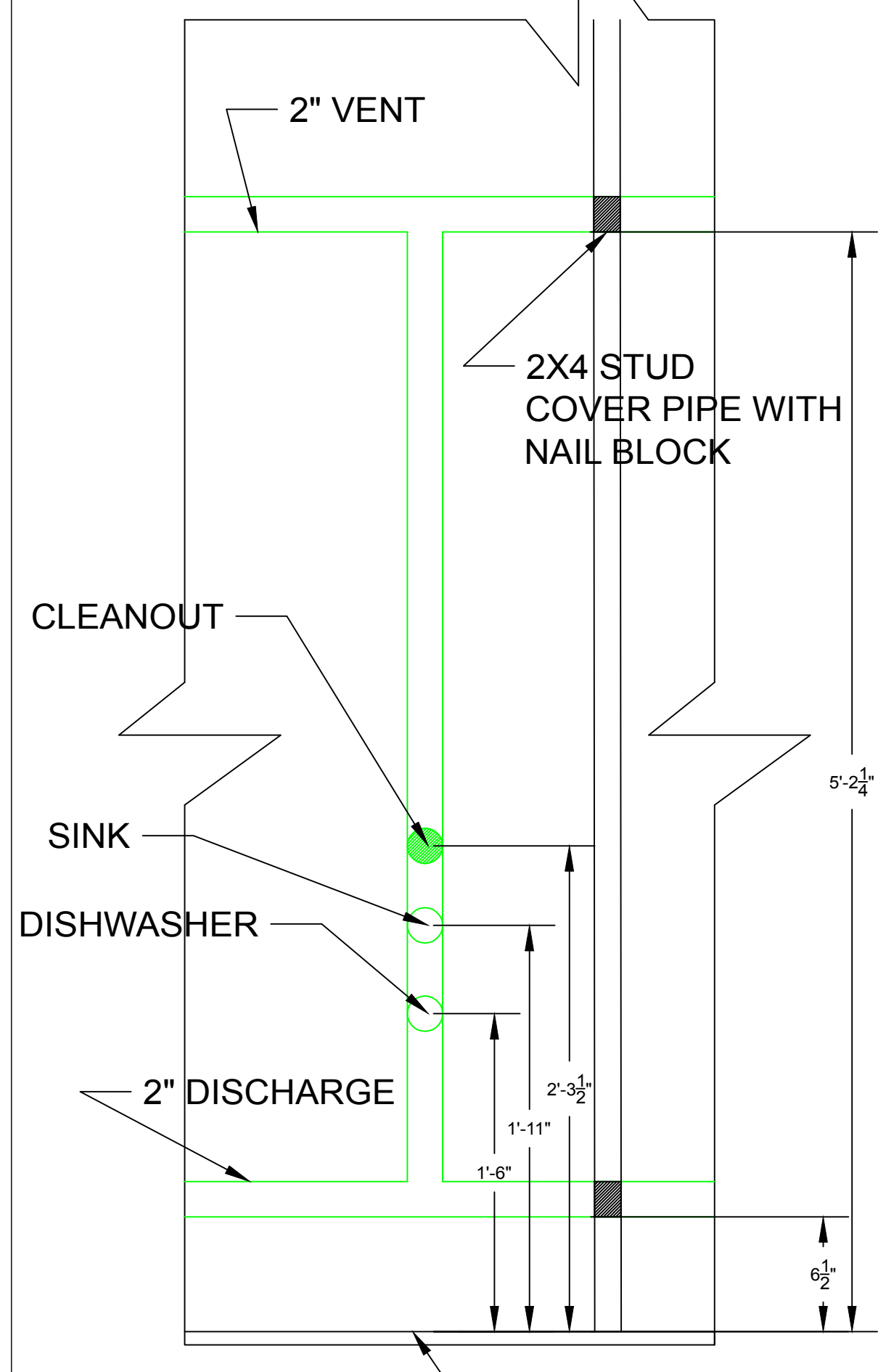
SHEET TITLE
VENT AND DISCHARGE SECTIONS

P-501

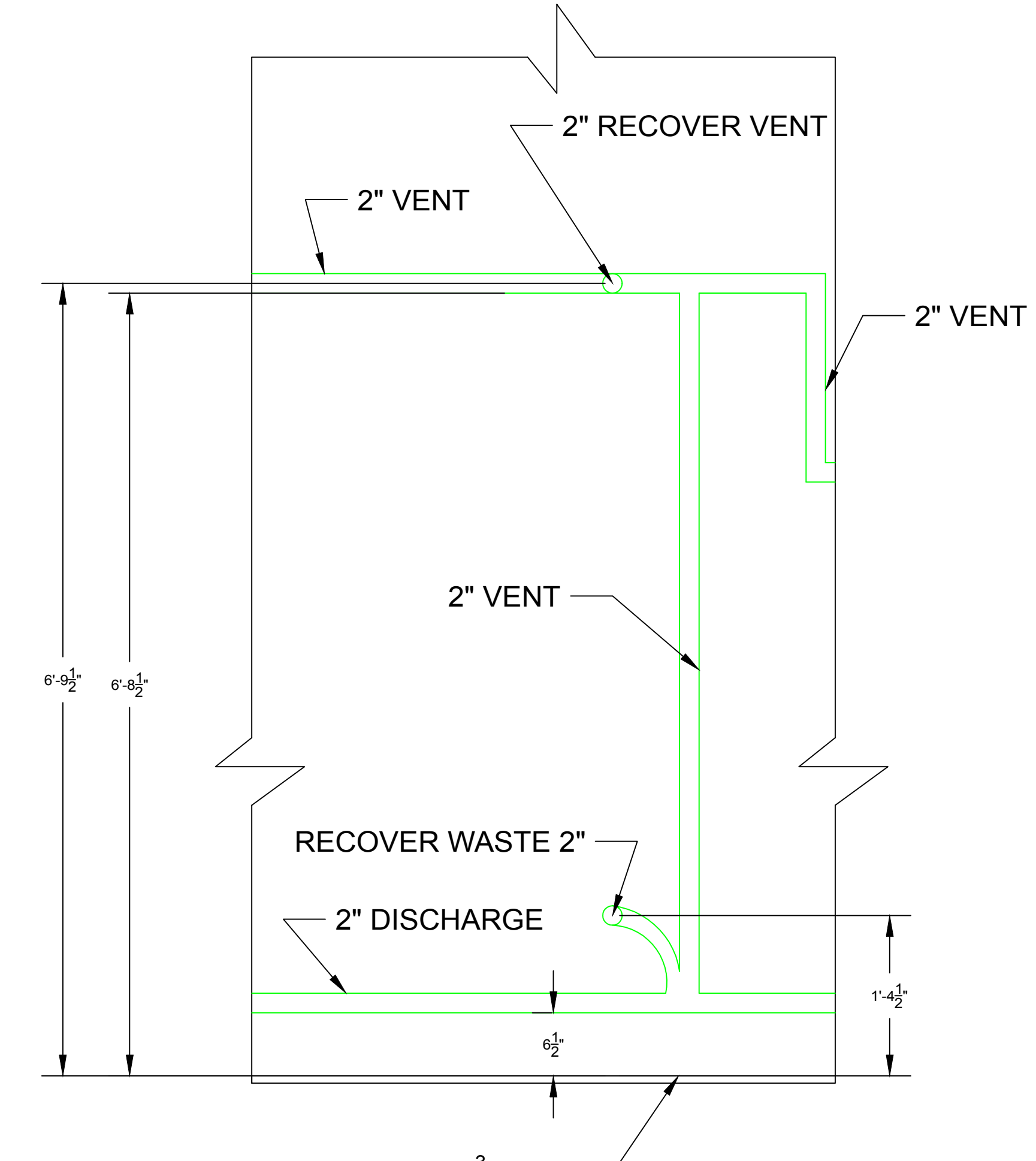
NOTE PIPES SLOPE 1/4" PER 1'
VENT SLOPES UPWARD EAST TO WEST
DISCHARGE DOWNWARD EAST TO WEST



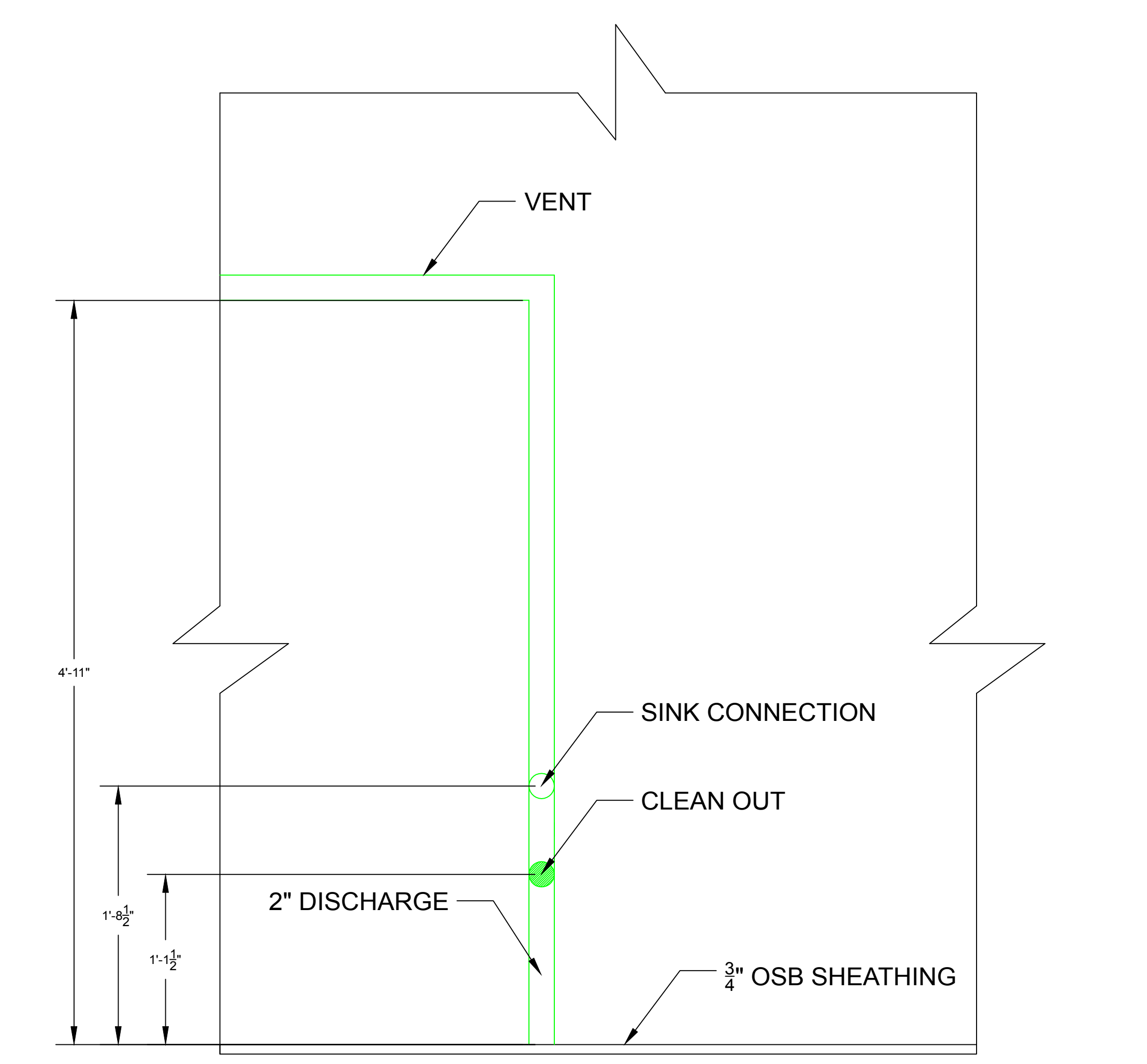
1 CONDENSATE PIPING
Scale 1-1/2" = 1'-0"



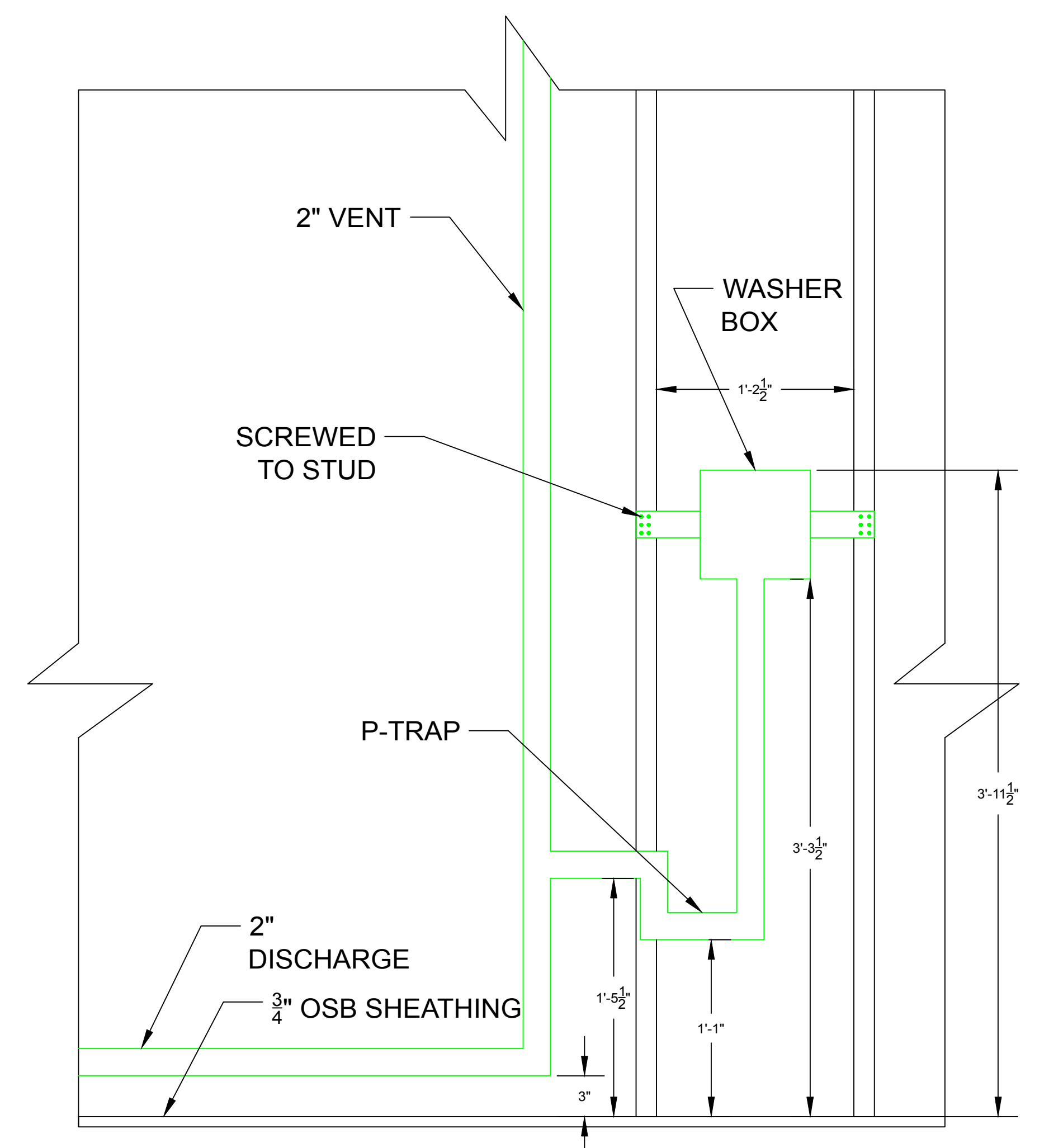
2 PIPE ELEVATION
Scale 1-1/2" = 1'-0"



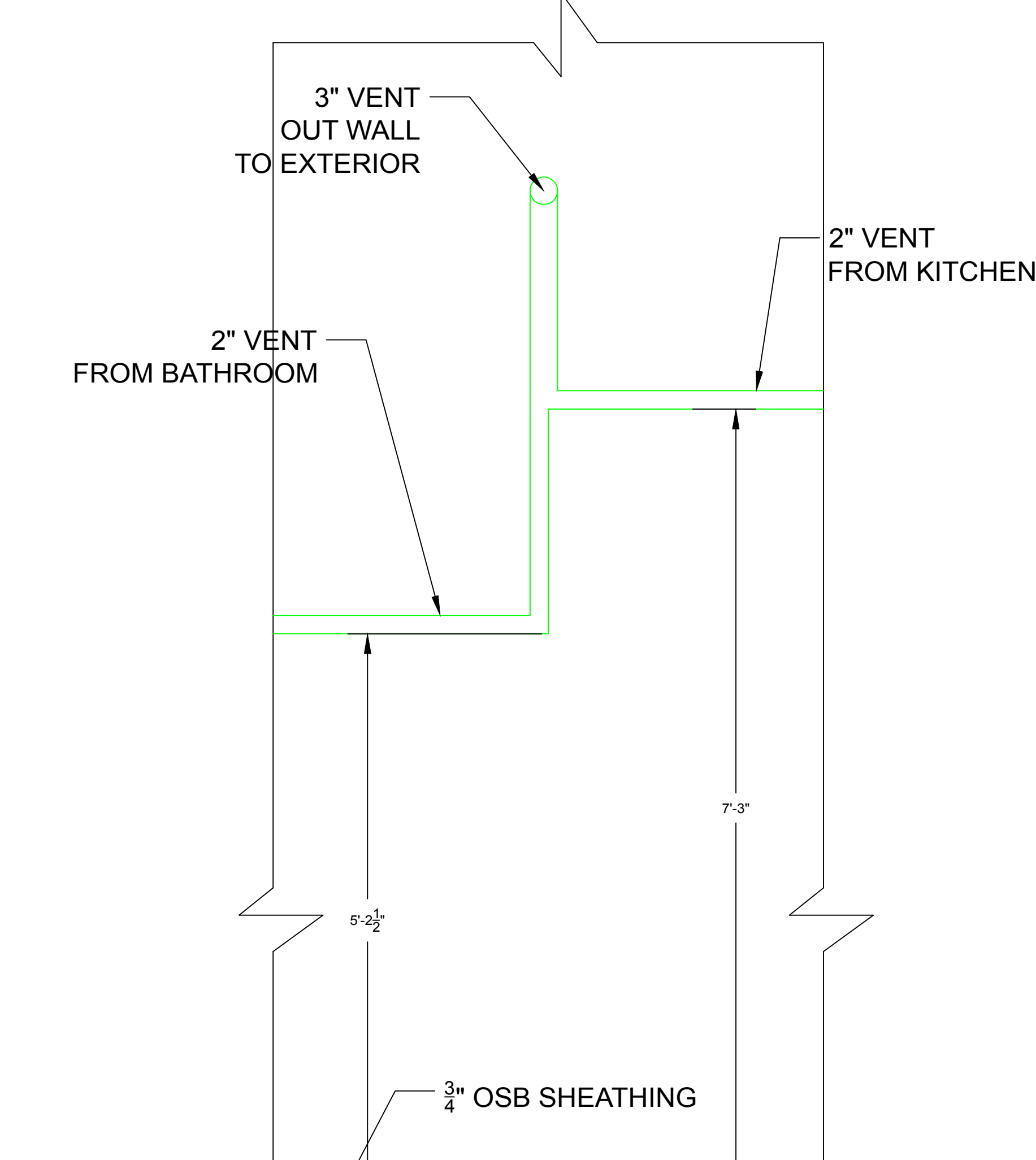
3 RECOVER SECTION
Scale 1" = 1'-0"



4 BATHROOM SINK CONNECTION
Scale 1-1/2" = 1'-0"



5 W/D CONNECTION
Scale 1-1/2" = 1'-0"



6 VENT JUNCTION
Scale 1-1/2" = 1'-0"

