





GENERAL NOTES

2022 CALIFORNIA BUILDING CODE  
2022 CALIFORNIA RESIDENTIAL CODE  
2022 CALIFORNIA GREEN BUILDING STANDARDS CODE  
2022 CALIFORNIA MECHANICAL CODE  
2022 CALIFORNIA ELECTRICAL CODE  
2022 CALIFORNIA PLUMBING CODE  
2022 CALIFORNIA FIRE CODE  
2022 CALIFORNIA ENERGY CODE  
TOWN OF DANVILLE MUNICIPAL CODE

1. All materials, workmanship and methods of construction shall conform to the requirements of the 2022 codes listed above. The Contractor is required to incorporate whatever changes or additional work these codes or regulations require without additional cost to the Owner.
2. Do not scale drawings. Written dimensions shall always take precedence over scale dimensions. Dimensions shown on floor plans are to face of stud unless otherwise noted or indicated.
3. Notify the Architect of any discrepancies in the Documents or between the Documents and the existing conditions before proceeding with any work.
4. The Contractor shall obtain all required inspections for his work and give the Owner timely notice of his intent to have inspections.
5. The Contractor and/or Subcontractor shall at all times keep the premises free of accumulations of waste materials or rubbish caused by his employees or work. At the completion of the work, he shall remove all his rubbish, all of his tools, scaffolding, and surplus materials from and about the building and shall leave his work "broom clean" or its equivalent.
6. Contractor to coordinate and verify all sizes of kitchen appliances, to be selected by the Owner, and the style of the design, materials, hardware and finish of the cabinets with the Owner and cabinet-maker prior to manufacturing.
7. The escape opening has a minimum net clear opening of 5.7 square feet; minimum net clear opening height of 24 inches; and minimum net clear opening width of 20 inches. Maximum sill height to be 44" where windows are provided as means of escape or rescue.
8. All ICC evaluation reports and manufacturer specifications for fireplaces and skylights to be provided by Contractor and approved by the TOWN OF DANVILLE prior to plan installation.
9. Contractor to verify size and clearances of selected water heater and furnace for adequacy of space shown on the drawings prior to construction. Notify Architect immediately of any conflicts with space requirements for this equipment.
11. All shower and tub/shower enclosures to be provided with smooth, hard, nonabsorbent finish backing (e.g., tile over W.R. Board to 70" above drain).
12. Handrails & Guardrails: Stairways to have handrails on open side of stairs, not less than 34" nor more than 38" above the nosing treads. They should be continuous the full length of the stairs and need not extend 12" beyond top and 12" plus tread width beyond bottom tread. Ends shall be returned or shall terminate in newel posts or safety terminals. Handgrip shall not be less than 1 ¼" or more than 2" in cross-sectional dimension w/ no sharp corners, height of 34 inches to 38 inches above nosing, extend continuously from top to bottom risers, and terminate at newel posts or return to walls; handgrip shall have a space not less than 1½" out from the wall. Open guardrail and stair railings shall have intermediate rails or an ornamental pattern such that a sphere 4" in diameter cannot pass through. All interior and exterior handrails and guardrails to conform to 2022 CRC. Guardrails shall be designed to withstand a 200-pound load applied in any direction at any point along the top rail per 2022 CRC.
13. Maximum 3.5-inch handrail projection into the required stair width. Stringers and other projections such as trim are limited to 1- ½ inches on each side.
14. Handrail(s) is required for stairways with four or more risers.
16. Batt insulation shall have maximum flame spread of 25 and smoke development of 450. .
17. The Contractor will read and conform to the Title 24 requirements for this project. A copy of Title 24 documents can be obtained from the Owner.
18. Glass & glazing to comply with 2022 CRC.
19. Discrepancies: In the event of conflict or discrepancy in contract documents, larger quantity and higher quality shall govern unless Architect approval is given in writing.

Site & Grading Notes

1. The site plan drawing is not a property survey. All information shown in regard to boundaries of property was taken from the County Assessor's maps. The Architect does not accept responsibility for the accuracy of the data presented and drawn. The Contractor is to hire and pay for a licensed surveyor to locate the property line adjacent to the addition prior to the start of construction.
2. Non-removable backflow prevention to be provided at meter and provide non-removable vacuum breaker on all hose bibbs.
3. All utilities to be field verified by contractor. William Wood Architects assume no responsibility for accuracy of utility locations, as shown on plans.
4. Restore all existing building and site improvements, including sidewalks, curb and gutters, walks, patios, fences, landscaping, sprinklers, plumbing, etc., which have been altered or damaged by reason of the contractor's operations to a new condition, to the complete satisfaction of the owner.
5. Work to comply with TOWN OF DANVILLE ordinance for setbacks and grading requirements as shown on the site plan.
6. All downspouts, site area drains and catch basins as shown on site plan shall be collected with PVC tight line rigid wall, independent of all other drainage systems.
7. All retaining walls shall have drainage with 4" perforated PVC rigid wall and collected with PVC Tight line rigid wall.
8. A positive gradient shall be provided away from the foundation in order to provide rapid removal of the surface water runoff away from the foundation to an adequate discharge point. The grade shall fall a minimum of 6" within the first 10' measured perpendicular to the face of the foundation wall per CRC R401.3.

General Construction Notes:

1. Gypsum drywall systems with fire-resistance ratings where indicated or required are to comply with governing regulations. Provide materials and installations identical with applicable assemblies that have been tested and listed by recognized authorities, including UL. Comply with FM approval Guide where applicable.

Foundation Notes:

See structural drawing for foundation notes.

Framing Notes:

See Structural Drawings for framing notes:

Plumbing Notes

1. Showerheads shall be flow control of 1.8 G.P.M. or less.
2. All lavatory faucets shall be flow control of 1.2 G.P.M. or less.
3. Kitchen faucet to be 1.8 gallons per minute, maximum.
4. Water closet to be 1.28 gallon per flush maximum. or dual flush per CPC 411.2.
5. All piping and equipment shall be supported as per section 313 in the CPC.
6. Seismic restraint requirements for all piping and equipment (including gas lines and fuel fired equipment) shall be installed per CBC 1613.1 and Chapter 13 of ASCE7-16.
6. All backflow prevention devices shall be installed per CPC 603.3.
7. All potable and non-potable (closed loop fire sprinkler system) water piping is to be clearly identified as per the requirements of CPC 601.2.
8. Hose bibs shall be protected with a nonremovable hose-bib0-type backflow preventer, a non removable hose-bib-type vacum breaker or by an atmospheric vacuum breaker installed not less than 6 inches above the highest point of usage located on the discharge side of the last valve. CPC 603.5.7.

Electrical and Mechanical Notes:

1. Electrical receptacles in bathrooms, outdoors and within 6'-0" of sink to be on ground fault protection (G.F.I.);
2. Provide 1/2-switched outlet under counter at sink for disposal.
4. Switch and duplex outlet, or multiple switches shown adjacent to each other on plan are to be under one plate.
5. New 110v smoke detector(s), with battery backup, and interconnected, which are audible in all sleeping area will be provided at the following locations: (1) all new bedrooms; (2) in hallways and immediately adjacent to new bedrooms.
6. All appliances shall conform to the standards set forth by the California Energy Commission Title 24 requirements.
7. Gas fired cooking appliances and space-heating equipment shall have intermittent ignition devices.
8. All air ducts penetrating separation wall or ceiling between garage and living area shall be 26 GA. The ducts, plenums, A/C coil boxes must be insulated to R4 minimum and be of 26 ga. sheetmetal in the garage.
9. Contractor to verify space requirements for plenums and ducts prior to start of work.
10. Mechanical ventilation shall be capable of providing five air changes per hour in lieu of the natural ventilation in bathrooms, water closet compartments and laundry rooms and vented directly to the outside. All exhaust fans and fan systems to have damper controls.
11. Gaskets to be provided at exterior receptacles and switch plates.
12. Final locations of all mechanical and electrical equipment, panel boards, meters, fixtures, flues, vents, switches etc., shall be approved by Owner prior to installation.
13. Lights: All lights shall be high efficiency.
14. HVAC equipment, water heaters, showerheads and faucets to be certified by the CEC.
15. Provide a setback thermostat on all applicable heating systems.
16. Ducts penetrating the one-hour separation between garage and the house shall be not less than 26 gauge galvanized steel.
17. The HVAC equipment shown meets the assumed efficiency requirements of this compliance, however, it is recommended that the actual system to be installed be determined by an HVAC designer. The loads shown are only one of the criteria affecting the selection of HVAC equipment. Other relevant design factors such as airflow requirements, outdoor design temperatures, coil sizing, availability of equipment, oversizing safety margin, etc., must also be considered. It is the HVAC designer's responsibility to consider all factors when selecting the HVAC equipment.
18. Fused disconnect at A/C compressor unit or approved circuit breaker to be installed.
19. Clothes dryer, vented range hoods, and bathroom vent fans must be exhausted to outside per 2022 CMC.
20. Install new receptacle outlets as specified in NEC.
21. Provide a dedicated 20-amp branch circuit to supply the laundry receptacle outlet.
22. Contractor to provide additional electrical load as necessary to equip all new & existing elect. equipment.

|   | REVISIONS | DATE |
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LICENSED ARCHITECT  
WILLIAM A. WOOD  
C 13874  
Jan. 31, 2025  
REN. DATE  
STATE OF CALIFORNIA

DANVILLE ACCESSORY  
DWELLING UNITS - STUDIO

DANVILLE CA 94526

WILLIAM WOOD  
ARCHITECTS

301 HARTZ AVENUE, SUITE 203  
DANVILLE, CALIFORNIA 94526  
(925) 820-8233

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| DRAWN<br>WJ        |
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| DATE<br>03-30-23   |
| SCALE<br>AS SHOWN  |
| JOB NO.<br>20.921R |
| SHEET              |
| GN1                |
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PLAN SET ID: S-CO-M-F



[illegible]

Y  
N/A  
RESPON. PARTY

" YES  
" NOT APPLICABLE  
" RESPONSIBLE PARTY (i.e. ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR, ETC.)

DANVILLE ACCESSORY  
DWELLING UNITS - STUDIO

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DANVILLE ACCESSORY  
DWELLING UNITS - STUDIO

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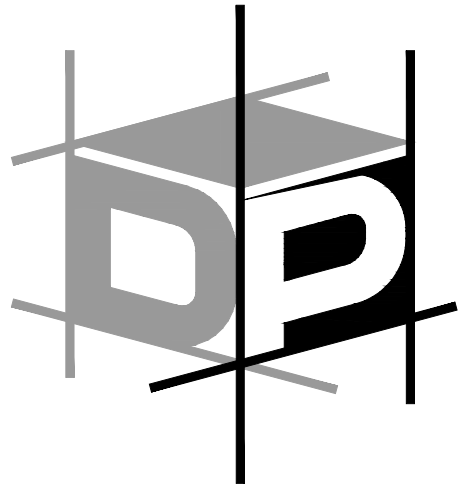
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## ADVANCED ENGINEERING

3381 Walnut Blvd. Ste. 220  
Brentwood, CA 94513  
Office: 925.516.3502  
Fax: 925.262.4662

**NOTE:** THE LOADS SHOWN ARE ONLY ONE OF THE CRITERIA AFFECTING THE SELECTION OF HVAC EQUIPMENT. OTHER RELEVANT DESIGN FACTORS SUCH AS AIRFLOW, OUTDOOR DESIGN TEMPERATURES, COIL SIZING, AVAILABILITY OF EQUIPMENT, OVERSIZING MARGINS, ETC. MUST ALSO BE CONSIDERED. IT IS THE HVAC DESIGNER'S RESPONSIBILITY TO CONSIDER ALL FACTORS WHEN SELECTING THE HVAC EQUIPMENT. MECHANICAL CONTRACTOR MUST WARRANT THE INSTALLED SYSTEM TO MEET ALL ENERGY STAR REQUIREMENTS IF APPLICABLE. THE MINIMUM SIZE OF THE RESIDENTIAL HEATING SYSTEMS IS REGULATED BY THE CALIFORNIA BUILDING CODE (CBC), SECTION 310.11. THE CBC REQUIRES THAT THE HEATING SYSTEM BE CAPABLE OF MAINTAINING A TEMPERATURE OF 70°F AT A DISTANCE THREE FEET ABOVE THE FLOOR THROUGHOUT THE CONDITIONED SPACE OF THE BUILDING. OP ADVANCED ENGINEERING, INC. DOES NOT WARRANT OR ASSUME RESPONSIBILITY FOR PERFORMANCE OR INSTALLATION OF ANY EQUIPMENT LABELED OR ALLUDED TO ON ANY CALCULATION PRODUCED BY OP ADVANCED ENGINEERING, INC. BUILDERS AND ALL SUB-CONTRACTORS WORKING ON THE PROJECT INVOLVING TITLE-24 UNDERSTAND AND ACCEPT ALL ASPECTS OF THE TITLE-24 SUBMITTED TO BUILDING DEPARTMENT PERTAINING TO THEIR WORK. ALL SUB-CONTRACTORS ARE RESPONSIBLE TO CONTACT THE BUILDER AND OP ADVANCED ENGINEERING, INC. BEFORE BEGINNING WORK IF THERE IS ANY ERROR IN ANY CALCULATION THAT WOULD PREVENT THE SUB-CONTRACTOR FROM WARRANTING THE PERFORMANCE OF HIS PRODUCT WHICH INCLUDED ANY ENERGY STAR PROCEDURES.

## TOWN OF DANVILLE ACCESSORY DWELLING UNIT

DANVILLE, CALIFORNIA



PLEASE NOTE THE REVISION NUMBER AND DATE ARE FOR ENERGY SHEETS ONLY.

Sheet Designation:  
**ENERGY CALCULATIONS**  
CONTEMPORARY  
STUDIO  
**PERFORMANCE CERTIFICATE**  
RESIDENTIAL CF-1R

Initial Issue Date: March 31, 2023

Energy Analyst: J. Bennett Ext. 26

Project Manager: J. Peek Ext. 23

Job No. W021420

Sheet No.

# EC

|                                                                       |                                                                                                                                                                     |                                  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--|--|--|--|--|--|--|
| CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD |                                                                                                                                                                     |                                  |  |  |  |  |  |  |  |
| Project Name: Danville ADU Contemporary Studio                        |                                                                                                                                                                     |                                  |  |  |  |  |  |  |  |
| Calculation Date/Time: 2023-03-30T18:32:03-07:00                      |                                                                                                                                                                     |                                  |  |  |  |  |  |  |  |
| Input File Name: Danville ADU_Contemporary_Studio.rbd22               |                                                                                                                                                                     |                                  |  |  |  |  |  |  |  |
| CF1R-PRF-01E (Page 1 of 13)                                           |                                                                                                                                                                     |                                  |  |  |  |  |  |  |  |
| GENERAL INFORMATION                                                   |                                                                                                                                                                     |                                  |  |  |  |  |  |  |  |
| 01                                                                    | Project Name                                                                                                                                                        | Danville ADU Contemporary Studio |  |  |  |  |  |  |  |
| 02                                                                    | Run Title                                                                                                                                                           | Title 24 Analysis                |  |  |  |  |  |  |  |
| 03                                                                    | Project Location                                                                                                                                                    | N/A                              |  |  |  |  |  |  |  |
| 04                                                                    | City                                                                                                                                                                | Danville, CA                     |  |  |  |  |  |  |  |
| 05                                                                    | Zip code                                                                                                                                                            | 94526                            |  |  |  |  |  |  |  |
| 06                                                                    | Climate Zone                                                                                                                                                        | 12                               |  |  |  |  |  |  |  |
| 07                                                                    | Front Orientation (deg/ Cardinal)                                                                                                                                   | All orientations                 |  |  |  |  |  |  |  |
| 08                                                                    | Building Type                                                                                                                                                       | Single Family                    |  |  |  |  |  |  |  |
| 09                                                                    | Number of Dwelling Units                                                                                                                                            | 1                                |  |  |  |  |  |  |  |
| 10                                                                    | Building Type                                                                                                                                                       | Newly Constructed                |  |  |  |  |  |  |  |
| 11                                                                    | Number of Bedrooms                                                                                                                                                  | 1                                |  |  |  |  |  |  |  |
| 12                                                                    | Number of Bathrooms                                                                                                                                                 | 1                                |  |  |  |  |  |  |  |
| 13                                                                    | Number of Stories                                                                                                                                                   | 1                                |  |  |  |  |  |  |  |
| 14                                                                    | Additional Cond. Floor Area (ft²)                                                                                                                                   | N/A                              |  |  |  |  |  |  |  |
| 15                                                                    | Penetration Average U-factor                                                                                                                                        | 0.3                              |  |  |  |  |  |  |  |
| 16                                                                    | Existing Cond. Floor Area (ft²)                                                                                                                                     | 140                              |  |  |  |  |  |  |  |
| 17                                                                    | Glassing Percentage (%)                                                                                                                                             | 17.30%                           |  |  |  |  |  |  |  |
| 18                                                                    | ADU Bedroom Count                                                                                                                                                   | N/A                              |  |  |  |  |  |  |  |
| COMPLIANCE RESULTS                                                    |                                                                                                                                                                     |                                  |  |  |  |  |  |  |  |
| 01                                                                    | Building Complies with Computer Performance                                                                                                                         |                                  |  |  |  |  |  |  |  |
| 02                                                                    | This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CIC-approved HERS provider. |                                  |  |  |  |  |  |  |  |
| 03                                                                    | This building incorporates one or more Special Features shown below                                                                                                 |                                  |  |  |  |  |  |  |  |

Registration Number: 223-P01008750A-000-000-0000000-0000  
CA Building Energy Efficiency Standards - 2022 Residential Compliance

Registration Date/Time: 2023-03-31 08:33:37  
Report Version: 2022.0.000  
Schema Version: rev 20220901

HERS Provider: CaCERTS Inc.  
Report Generated: 2023-03-30 18:32:45

|                                                                        |                              |                              |                                |                   |  |  |  |  |  |
|------------------------------------------------------------------------|------------------------------|------------------------------|--------------------------------|-------------------|--|--|--|--|--|
| CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD  |                              |                              |                                |                   |  |  |  |  |  |
| Project Name: Danville ADU Contemporary Studio                         |                              |                              |                                |                   |  |  |  |  |  |
| Calculation Date/Time: 2023-03-30T18:32:03-07:00                       |                              |                              |                                |                   |  |  |  |  |  |
| Input File Name: Danville ADU_Contemporary_Studio.rbd22                |                              |                              |                                |                   |  |  |  |  |  |
| CF1R-PRF-01E (Page 5 of 13)                                            |                              |                              |                                |                   |  |  |  |  |  |
| ENERGY USE INTENSITY                                                   |                              |                              |                                |                   |  |  |  |  |  |
|                                                                        | Standard Design (Btu/ft²·yr) | Proposed Design (Btu/ft²·yr) | Compliance Margin (Btu/ft²·yr) | Margin Percentage |  |  |  |  |  |
| North Facing                                                           |                              |                              |                                |                   |  |  |  |  |  |
| Gross EUI¹                                                             | 32.25                        | 26.59                        | 5.66                           | 17.55             |  |  |  |  |  |
| Net EUI²                                                               | 32.25                        | 26.59                        | 5.66                           | 17.55             |  |  |  |  |  |
| East Facing                                                            |                              |                              |                                |                   |  |  |  |  |  |
| Gross EUI¹                                                             | 32.25                        | 26.84                        | 5.41                           | 16.78             |  |  |  |  |  |
| Net EUI²                                                               | 32.25                        | 26.84                        | 5.41                           | 16.78             |  |  |  |  |  |
| South Facing                                                           |                              |                              |                                |                   |  |  |  |  |  |
| Gross EUI¹                                                             | 26.41                        | 5.84                         | 18.11                          |                   |  |  |  |  |  |
| Net EUI²                                                               | 26.41                        | 5.84                         | 18.11                          |                   |  |  |  |  |  |
| West Facing                                                            |                              |                              |                                |                   |  |  |  |  |  |
| Gross EUI¹                                                             | 32.25                        | 26.94                        | 5.31                           | 16.47             |  |  |  |  |  |
| Net EUI²                                                               | 32.25                        | 26.94                        | 5.31                           | 16.47             |  |  |  |  |  |
| Notes                                                                  |                              |                              |                                |                   |  |  |  |  |  |
| 1. Gross EUI is Energy Use Total (including PV) / Total Building Area. |                              |                              |                                |                   |  |  |  |  |  |
| 2. Net EUI is Energy Use Total (including PV) / Total Building Area.   |                              |                              |                                |                   |  |  |  |  |  |

Registration Number: 223-P01008750A-000-000-0000000-0000  
CA Building Energy Efficiency Standards - 2022 Residential Compliance

Registration Date/Time: 2023-03-31 08:33:37  
Report Version: 2022.0.000  
Schema Version: rev 20220901

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|-----------------------------------------------------------------------|------------------------|---------------------|--------------------------------------------|-------------------------------|----------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|-------|--------|--------|--------|
| CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD |                        |                     |                                            |                               |                                        |                   |                                                                                                                                                           |        |        |       |        |        |        |
| Project Name: Danville ADU Contemporary Studio                        |                        |                     |                                            |                               |                                        |                   |                                                                                                                                                           |        |        |       |        |        |        |
| Calculation Date/Time: 2023-03-30T18:32:03-07:00                      |                        |                     |                                            |                               |                                        |                   |                                                                                                                                                           |        |        |       |        |        |        |
| Input File Name: Danville ADU_Contemporary_Studio.rbd22               |                        |                     |                                            |                               |                                        |                   |                                                                                                                                                           |        |        |       |        |        |        |
| CF1R-PRF-01E (Page 1 of 13)                                           |                        |                     |                                            |                               |                                        |                   |                                                                                                                                                           |        |        |       |        |        |        |
| OVERHANDS AND FINIS                                                   |                        |                     |                                            |                               |                                        |                   |                                                                                                                                                           |        |        |       |        |        |        |
| 01                                                                    | 02                     | 03                  | 04                                         | 05                            | 06                                     | 07                | 08                                                                                                                                                        | 09     | 10     | 11    | 12     | 13     | 14     |
| Window                                                                | Depth                  | Dist Up             | Left Ext                                   | Right Ext                     | Flap Ht.                               | Depth             | Top Up                                                                                                                                                    | Dist L | Bot Up | Depth | Top Up | Dist R | Bot Up |
| Bedroom 3030                                                          | 1                      | 0                   | 2                                          | 2                             | 0                                      | 0                 | 0                                                                                                                                                         | 0      | 0      | 0     | 0      | 0      | 0      |
| SLAB FLOORS                                                           |                        |                     |                                            |                               |                                        |                   |                                                                                                                                                           |        |        |       |        |        |        |
| 01                                                                    | 02                     | 03                  | 04                                         | 05                            | 06                                     | 07                | 08                                                                                                                                                        |        |        |       |        |        |        |
| Name                                                                  | Zone                   | Area (ft²)          | Perimeter (ft)                             | Edge Insul. R-value and Depth | Edge Insul. R-value and Depth          | Carpeted Fraction | Heated                                                                                                                                                    |        |        |       |        |        |        |
| Sub. On Grade                                                         | Accessory Unit         | 640                 | 104                                        | none                          | 0                                      | 80%               | No                                                                                                                                                        |        |        |       |        |        |        |
| OPAQUE SURFACE CONSTRUCTIONS                                          |                        |                     |                                            |                               |                                        |                   |                                                                                                                                                           |        |        |       |        |        |        |
| 01                                                                    | 02                     | 03                  | 04                                         | 05                            | 06                                     | 07                | 08                                                                                                                                                        |        |        |       |        |        |        |
| Construction Name                                                     | Surface Type           | Construction Type   | Framing                                    | Total Cavity R-value          | Interior / Exterior Continuous R-value | U-factor          | Assembly Layers                                                                                                                                           |        |        |       |        |        |        |
| Exterior 2nd Wall R-21                                                | Exterior Walls         | Wood Framed Wall    | 2x6 @ 16 in. O. C.                         | R-21                          | None / None                            | 0.065             | Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Sheathing / Insulation: Wood Siding/Insulating/Decking Exterior Finish: 3 Coat Stucco              |        |        |       |        |        |        |
| Attic Roof                                                            | Attic Roofs            | Wood Framed Ceiling | 2x4 Top Chord of Roof Truss @ 24 in. O. C. | R-13                          | None / None                            | 0.078             | Roofing: Light Roof (Asphalt Shingles) Roof Deck: Wood Siding/Insulating/Decking Cavity / Frame: R-13.07 / 2x4 Top Chord Around Roof Joists: R-0.0 Insul. |        |        |       |        |        |        |
| R-38 Attic Ceiling                                                    | Ceilings (below attic) | Wood Framed Ceiling | 2x4 Bottom Chord of Truss @ 24 in. O. C.   | R-38                          | None / None                            | 0.025             | Over Ceiling Joists: R-38 9 Insul. Cavity / Frame: R-31 / 2x4 Attic Chord Inside Finish: Gypsum Board                                                     |        |        |       |        |        |        |

Registration Number: 223-P01008750A-000-000-0000000-0000  
CA Building Energy Efficiency Standards - 2022 Residential Compliance

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HERS Provider: CaCERTS Inc.  
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| CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD                                                                                                                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |
| Project Name: Danville ADU Contemporary Studio                                                                                                                                                                                                                                                                                         |  |  |  |  |  |  |  |  |  |
| Calculation Date/Time: 2023-03-30T18:32:03-07:00                                                                                                                                                                                                                                                                                       |  |  |  |  |  |  |  |  |  |
| Input File Name: Danville ADU_Contemporary_Studio.rbd22                                                                                                                                                                                                                                                                                |  |  |  |  |  |  |  |  |  |
| CF1R-PRF-01E (Page 13 of 13)                                                                                                                                                                                                                                                                                                           |  |  |  |  |  |  |  |  |  |
| DOCUMENTATION AUTHOR'S DECLARATION STATEMENT                                                                                                                                                                                                                                                                                           |  |  |  |  |  |  |  |  |  |
| I, certify that this Certificate of Compliance documentation is accurate and complete.                                                                                                                                                                                                                                                 |  |  |  |  |  |  |  |  |  |
| Documentation Author Name: Jason E Bennett                                                                                                                                                                                                                                                                                             |  |  |  |  |  |  |  |  |  |
| Signature Date: 2023-03-30 19:18:04                                                                                                                                                                                                                                                                                                    |  |  |  |  |  |  |  |  |  |
| City/State/Zip: 3381 Walnut Blvd. Ste. 220 Brentwood, CA 94513                                                                                                                                                                                                                                                                         |  |  |  |  |  |  |  |  |  |
| Phone: 925-516-3502                                                                                                                                                                                                                                                                                                                    |  |  |  |  |  |  |  |  |  |
| RESPONSIBLE PROVIDER'S DECLARATION STATEMENT                                                                                                                                                                                                                                                                                           |  |  |  |  |  |  |  |  |  |
| I certify the following under penalty of perjury, under the laws of the State of California:                                                                                                                                                                                                                                           |  |  |  |  |  |  |  |  |  |
| 1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.                                                                                                                                                                  |  |  |  |  |  |  |  |  |  |
| 2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.                                                                                                                    |  |  |  |  |  |  |  |  |  |
| 3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the information services maintained by this building permit application. |  |  |  |  |  |  |  |  |  |
| Responsible Designer Name: William Wood                                                                                                                                                                                                                                                                                                |  |  |  |  |  |  |  |  |  |
| Signature Date: 2023-03-31 08:33:37                                                                                                                                                                                                                                                                                                    |  |  |  |  |  |  |  |  |  |
| City/State/Zip: 3011 Hazlett Ave #203 Danville, CA 94526                                                                                                                                                                                                                                                                               |  |  |  |  |  |  |  |  |  |
| Phone: 925-820-8233                                                                                                                                                                                                                                                                                                                    |  |  |  |  |  |  |  |  |  |

Digitally signed by CaCERTS. This digital signature is provided in order to secure the content of this registered document, and in no way implies Registration Provider responsibility for the accuracy of the information.

Registration Number: 223-P01008750A-000-000-0000000-0000  
CA Building Energy Efficiency Standards - 2022 Residential Compliance

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------|------------------------|----------------------|----------------------------------|------------------------|--|--|--|
| CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD                                                                                         |                      |                                  |                        |                      |                                  |                        |  |  |  |
| Project Name: Danville ADU Contemporary Studio                                                                                                                |                      |                                  |                        |                      |                                  |                        |  |  |  |
| Calculation Date/Time: 2023-03-30T18:32:03-07:00                                                                                                              |                      |                                  |                        |                      |                                  |                        |  |  |  |
| Input File Name: Danville ADU_Contemporary_Studio.rbd22                                                                                                       |                      |                                  |                        |                      |                                  |                        |  |  |  |
| CF1R-PRF-01E (Page 2 of 13)                                                                                                                                   |                      |                                  |                        |                      |                                  |                        |  |  |  |
| ENERGY DESIGN RATINGS                                                                                                                                         |                      |                                  |                        |                      |                                  |                        |  |  |  |
|                                                                                                                                                               | Source Energy (EOR1) | Efficiency¹ EDR (EDR2Efficiency) | Total² EDR (EDR2Total) | Source Energy (EOR1) | Efficiency¹ EDR (EDR2Efficiency) | Total² EDR (EDR2Total) |  |  |  |
| Standard Design                                                                                                                                               | 41                   | 44.1                             | 58.6                   |                      |                                  |                        |  |  |  |
| Proposed Design                                                                                                                                               |                      |                                  |                        |                      |                                  |                        |  |  |  |
| North Facing                                                                                                                                                  | 33.8                 | 40.4                             | 56.4                   | 7.2                  | 3.7                              | 2.2                    |  |  |  |
| East Facing                                                                                                                                                   | 34                   | 41.4                             | 57                     | 7                    | 2.7                              | 1.6                    |  |  |  |
| South Facing                                                                                                                                                  | 33.5                 | 39.6                             | 55.9                   | 7.5                  | 4.5                              | 2.7                    |  |  |  |
| West Facing                                                                                                                                                   | 34.1                 | 43                               | 57.9                   | 6.9                  | 1.1                              | 0.7                    |  |  |  |
| RESULT: PASS                                                                                                                                                  |                      |                                  |                        |                      |                                  |                        |  |  |  |
| ¹Efficiency EDR includes improvements like a better Building envelope and more efficient equipment.                                                           |                      |                                  |                        |                      |                                  |                        |  |  |  |
| ²Total EDR includes efficiency and demand response measures such as plugloadable (PV) system and demand response.                                             |                      |                                  |                        |                      |                                  |                        |  |  |  |
| ³Building complies when source energy, efficiency and total compliance margins are greater than or equal to zero and unmet load hour limits are not exceeded. |                      |                                  |                        |                      |                                  |                        |  |  |  |
| • Standard Design PV Capacity: 0.00 kWdc                                                                                                                      |                      |                                  |                        |                      |                                  |                        |  |  |  |
| • Proposed PV Capacity Scaling: North (0.00 kWdc) East (0.00 kWdc) South (0.00 kWdc) West (0.00 kWdc)                                                         |                      |                                  |                        |                      |                                  |                        |  |  |  |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|------------|-------------------|------|---------------|------------|-------------------|-----------------|-------------------|-------------------------|
| CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD                                                                                                                                                                                                                                                          |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| Project Name: Danville ADU Contemporary Studio                                                                                                                                                                                                                                                                                 |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| Calculation Date/Time: 2023-03-30T18:32:03-07:00                                                                                                                                                                                                                                                                               |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| Input File Name: Danville ADU_Contemporary_Studio.rbd22                                                                                                                                                                                                                                                                        |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| CF1R-PRF-01E (Page 6 of 13)                                                                                                                                                                                                                                                                                                    |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| REQUIRED PV SYSTEMS                                                                                                                                                                                                                                                                                                            |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| 01                                                                                                                                                                                                                                                                                                                             | 02        | 03                | 04         | 05                | 06   | 07            | 08         | 09                | 10              | 11                | 12                      |
| DC System Size (kWdc)                                                                                                                                                                                                                                                                                                          | Exception | Module Type       | Array Type | Power Electronics | CFI  | Azimuth (deg) | Tilt Input | Array Angle (deg) | Tilt: (x in 12) | Inverter Eff. (%) | Annual Solar Access (%) |
| 0                                                                                                                                                                                                                                                                                                                              |           | Standard (14-17%) | Fixed      | none              | true | N/A           | N/A        | N/A               | N/A             | N/A               | N/A                     |
| REQUIRED SPECIAL FEATURES                                                                                                                                                                                                                                                                                                      |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.                                                                                                                                                                                          |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • PV exception 2: No PV required when minimum PV size (Section 150.1(1)(4) < 1.8 kWdc (0 kW))                                                                                                                                                                                                                                  |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Indoor air quality balanced fan                                                                                                                                                                                                                                                                                              |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • IAQ Ventilation System Heat Recovery: minimum 67 SRE and 73 ASH                                                                                                                                                                                                                                                              |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • IAQ Ventilation System: supply outside air, HE, filter, and N/ERV vents accessible per RACH Reference Manual                                                                                                                                                                                                                 |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • IAQ Ventilation System: fresh indoor display                                                                                                                                                                                                                                                                                 |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Insulation below roof deck                                                                                                                                                                                                                                                                                                   |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Window overhangs and/or fins                                                                                                                                                                                                                                                                                                 |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Northward Energy Efficiency Analysis (NEEA) rated heat pump water heater, specific ENERGY STAR model, or equivalent, must be installed                                                                                                                                                                                       |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| HERS FEATURE SUMMARY                                                                                                                                                                                                                                                                                                           |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| The following is a summary of the features that must be field verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional details is provided in the building tables below. Registered CDRs and CDRs are required to be completed in the HERS Registry |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Indoor air quality ventilation                                                                                                                                                                                                                                                                                               |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Kitchen range hood                                                                                                                                                                                                                                                                                                           |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Minimum Airflow                                                                                                                                                                                                                                                                                                              |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Verified SERS/SEER2                                                                                                                                                                                                                                                                                                          |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Verified Refrigerant Charge                                                                                                                                                                                                                                                                                                  |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Fan Efficiency Watts/CFM                                                                                                                                                                                                                                                                                                     |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Verified nEF                                                                                                                                                                                                                                                                                                                 |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Verified heat pump rated heating capacity                                                                                                                                                                                                                                                                                    |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
| • Duct leakage testing                                                                                                                                                                                                                                                                                                         |           |                   |            |                   |      |               |            |                   |                 |                   |                         |

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|-----------------------------------------------------------------------|------------------------------------|-------------------------------|----------------------|---------------------------|-----------------------|----------------------------------|------------------------|-----------------------|----|----|----|----|----|
| CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD |                                    |                               |                      |                           |                       |                                  |                        |                       |    |    |    |    |    |
| Project Name: Danville ADU Contemporary Studio                        |                                    |                               |                      |                           |                       |                                  |                        |                       |    |    |    |    |    |
| Calculation Date/Time: 2023-03-30T18:32:03-07:00                      |                                    |                               |                      |                           |                       |                                  |                        |                       |    |    |    |    |    |
| Input File Name: Danville ADU_Contemporary_Studio.rbd22               |                                    |                               |                      |                           |                       |                                  |                        |                       |    |    |    |    |    |
| CF1R-PRF-01E (Page 10 of 13)                                          |                                    |                               |                      |                           |                       |                                  |                        |                       |    |    |    |    |    |
| BUILDING ENVELOPE - HERS VERIFICATION                                 |                                    |                               |                      |                           |                       |                                  |                        |                       |    |    |    |    |    |
| 01                                                                    | 02                                 | 03                            | 04                   | 05                        | 06                    | 07                               | 08                     | 09                    | 10 | 11 | 12 | 13 | 14 |
| Quality Insulation Installation (QII)                                 | High R-value Spray Foam Insulation | Building Envelope Air Leakage | CFM50                | CFM50                     |                       |                                  |                        |                       |    |    |    |    |    |
| Not Required                                                          | Not Required                       | N/A                           | N/A                  | N/A                       |                       |                                  |                        |                       |    |    |    |    |    |
| WATER HEATING SYSTEMS                                                 |                                    |                               |                      |                           |                       |                                  |                        |                       |    |    |    |    |    |
| 01                                                                    | 02                                 | 03                            | 04                   | 05                        | 06                    | 07                               | 08                     | 09                    | 10 | 11 | 12 | 13 | 14 |
| Name                                                                  | System Type                        | Distribution Type             | Water Heater Name    | Number of Units           | Solar Heating System  | Compact Distribution             | HERS Verification      | Water Heater Name (H) |    |    |    |    |    |
| DHW System 1                                                          | Domestic Hot Water (DHW)           | Standard                      | Heat Pump WH         | 1                         | N/A                   | None                             | N/A                    | Heat Pump WH (1)      |    |    |    |    |    |
| WATER HEATERS - NEEA HEAT PUMP                                        |                                    |                               |                      |                           |                       |                                  |                        |                       |    |    |    |    |    |
| 01                                                                    | 02                                 | 03                            | 04                   | 05                        | 06                    | 07                               | 08                     | 09                    | 10 | 11 | 12 | 13 | 14 |
| Name                                                                  | # of Units                         | Tank Vol. (gal)               | NEEA Heat Pump Brand | NEEA Heat Pump Model      | Tank Location         | Dust Inlet Air Source            | Dust Outlet Air Source |                       |    |    |    |    |    |
| Heat Pump WH                                                          | 1                                  | 40                            | Rheem                | PEC-HPWH1072R/H3715       | Outside               | Outside                          | Outside                |                       |    |    |    |    |    |
| WATER HEATING - HERS VERIFICATION                                     |                                    |                               |                      |                           |                       |                                  |                        |                       |    |    |    |    |    |
| 01                                                                    | 02                                 | 03                            | 04                   | 05                        | 06                    | 07                               | 08                     | 09                    | 10 | 11 | 12 | 13 | 14 |
| Name                                                                  | Pipe Insulation                    | Parallel Piping               | Compact Distribution | Compact Distribution Type | Recirculation Control | Shower Drain Water Heat Recovery |                        |                       |    |    |    |    |    |
| DHW System 1 - U/I                                                    | Not Required                       | Not Required                  | Not Required         | None                      | Not Required          | Not Required                     |                        |                       |    |    |    |    |    |

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|-----------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|----------------------------------------------------|-------------------------------------------------|--------------------------|--------------------------|--|--|--|
| CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD |                                                    |                                                 |                                                    |                                                 |                          |                          |  |  |  |
| Project Name: Danville ADU Contemporary Studio                        |                                                    |                                                 |                                                    |                                                 |                          |                          |  |  |  |
| Calculation Date/Time: 2023-03-30T18:32:03-07:00                      |                                                    |                                                 |                                                    |                                                 |                          |                          |  |  |  |
| Input File Name: Danville ADU_Contemporary_Studio.rbd22               |                                                    |                                                 |                                                    |                                                 |                          |                          |  |  |  |
| CF1R-PRF-01E (Page 3 of 13)                                           |                                                    |                                                 |                                                    |                                                 |                          |                          |  |  |  |
| ENERGY USE SUMMARY                                                    |                                                    |                                                 |                                                    |                                                 |                          |                          |  |  |  |
| Energy Use                                                            | Standard Design Source Energy (EOR1) (kBtu/ft²·yr) | Standard Design TDV Energy (EDR2) (kBtu/ft²·yr) | Proposed Design Source Energy (EOR1) (kBtu/ft²·yr) | Proposed Design TDV Energy (EDR2) (kBtu/ft²·yr) | Compliance Margin (EOR1) | Compliance Margin (EDR2) |  |  |  |
| Space Heating                                                         | 7.13                                               | 31.36                                           | 3.26                                               | 24.98                                           | 3.87                     | 6.38                     |  |  |  |
| Space Cooling                                                         | 1.06                                               | 31.57                                           | 0.99                                               | 33.34                                           | 0.07                     | -1.77                    |  |  |  |
| IAQ Ventilation                                                       | 0.87                                               | 9.28                                            | 1.38                                               | 14.79                                           | -0.51                    | -5.51                    |  |  |  |
| Water Heating                                                         | 3.59                                               | 37.82                                           | 2.64                                               | 27.67                                           | 0.95                     | 10.15                    |  |  |  |
| Self Utilization/Health Credit                                        |                                                    |                                                 | 0                                                  |                                                 |                          | 0                        |  |  |  |
| North Facing Efficiency Compliance Total                              | 12.65                                              | 118.03                                          | 8.27                                               | 100.78                                          | 4.18                     | 9.25                     |  |  |  |
| Space Heating                                                         | 7.13                                               | 31.36                                           | 3.24                                               | 24.69                                           | 3.89                     | 6.73                     |  |  |  |
| Space Cooling                                                         | 1.06                                               | 31.57                                           | 1.14                                               | 36.21                                           | -0.08                    | -4.64                    |  |  |  |
| IAQ Ventilation                                                       | 0.87                                               | 9.28                                            | 14.79                                              | -0.51                                           | -5.51                    |                          |  |  |  |
| Water Heating                                                         | 3.59                                               | 37.82                                           | 2.64                                               | 27.67                                           | 0.95                     | 10.15                    |  |  |  |
| Self Utilization/Health Credit                                        |                                                    |                                                 | 0                                                  |                                                 |                          | 0                        |  |  |  |
| East Facing Efficiency Compliance Total                               | 12.65                                              | 118.03                                          | 8.6                                                | 103.3                                           | 6.25                     | 6.73                     |  |  |  |

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|-----------------------------------------------------------------------|------------------------------|--------------------------|-----------------------|---------------------|---------------------------------------|---------------------------------|------------|----|----|----|----|----|----|
| CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD |                              |                          |                       |                     |                                       |                                 |            |    |    |    |    |    |    |
| Project Name: Danville ADU Contemporary Studio                        |                              |                          |                       |                     |                                       |                                 |            |    |    |    |    |    |    |
| Calculation Date/Time: 2023-03-30T18:32:03-07:00                      |                              |                          |                       |                     |                                       |                                 |            |    |    |    |    |    |    |
| Input File Name: Danville ADU_Contemporary_Studio.rbd22               |                              |                          |                       |                     |                                       |                                 |            |    |    |    |    |    |    |
| CF1R-PRF-01E (Page 7 of 13)                                           |                              |                          |                       |                     |                                       |                                 |            |    |    |    |    |    |    |
| BUILDING - FEATURES INFORMATION                                       |                              |                          |                       |                     |                                       |                                 |            |    |    |    |    |    |    |
| 01                                                                    | 02                           | 03                       | 04                    | 05                  | 06                                    | 07                              | 08         | 09 | 10 | 11 | 12 | 13 | 14 |
| Project Name                                                          | Conditioned Floor Area (ft²) | Number of Dwelling Units | Number of Bedrooms    | Number of Zones     | Number of Ventilation Cooling Systems | Number of Water Heating Systems |            |    |    |    |    |    |    |
| Danville ADU Contemporary Studio                                      | 640                          | 1                        | 1                     | 2                   | 0                                     | 1                               |            |    |    |    |    |    |    |
| ZONE INFORMATION                                                      |                              |                          |                       |                     |                                       |                                 |            |    |    |    |    |    |    |
| 01                                                                    | 02                           | 03                       | 04                    | 05                  | 06                                    | 07                              |            |    |    |    |    |    |    |
| Zone Name                                                             | Zone Type                    | HVAC System Name         | Zone Floor Area (ft²) | Avg. Ceiling Height | Water Heating System                  | Status                          |            |    |    |    |    |    |    |
| Accessory Unit                                                        | Conditioned                  | HVAC System 1            | 640                   | 10                  | DHW System 1                          | New                             |            |    |    |    |    |    |    |
| OPAQUE SURFACES                                                       |                              |                          |                       |                     |                                       |                                 |            |    |    |    |    |    |    |
| 01                                                                    | 02                           | 03                       | 04                    | 05                  | 06                                    | 07                              | 08         | 09 | 10 | 11 | 12 | 13 | 14 |
| Name                                                                  | Zone                         | Construction             | Azimuth               | Orientation         | Gross Area (ft²)                      | Window and Door Area (ft²)      | Tilt (deg) |    |    |    |    |    |    |
| Front Wall                                                            | Accessory Unit               | Exterior 2nd Wall R-21   | 0                     | Front               | 320                                   | 74                              | 90         |    |    |    |    |    |    |
| Left Wall                                                             | Accessory Unit               | Exterior 2nd Wall R-21   | 90                    | Left                | 200                                   | 9                               | 90         |    |    |    |    |    |    |
| Back Wall                                                             | Accessory Unit               | Exterior 2nd Wall R-21   | 180                   | Back                | 320                                   | 19                              | 90         |    |    |    |    |    |    |
| Right Wall                                                            | Accessory Unit               | Exterior 2nd Wall R-21   | 270                   | Right               | 200                                   | 9                               | 90         |    |    |    |    |    |    |
| Ceiling Below Attic                                                   | Accessory Unit               | R-38 Attic Ceiling       | N/A                   | N/A                 | 640                                   | N/A                             | N/A        |    |    |    |    |    |    |
| ATTIC                                                                 |                              |                          |                       |                     |                                       |                                 |            |    |    |    |    |    |    |
| 01                                                                    | 02                           | 03                       | 04                    | 05                  | 06                                    | 07                              | 08         |    |    |    |    |    |    |
| Name                                                                  | Construction                 | Type                     | Roof Rise (x in 12)   | Roof Reflectance    | Roof Emittance                        | Radiant Barrier                 | Cool Roof  |    |    |    |    |    |    |
| Attic                                                                 | Attic Roof                   | Ventilated               | 4                     | 0.1                 | 0.85                                  | No                              | No         |    |    |    |    |    |    |

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2022 Single-Family Residential Mandatory Requirements Summary

NOTE: Single-family residential buildings subject to the Energy Codes must comply with all applicable mandatory measures, regardless of the compliance approach used. Review the respective section for more information. (04/2022)

Building Envelope:

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| § 110.6(a):  | <b>Air Leakage.</b> Manufactured fenestration, exterior doors, and exterior pet doors must limit air leakage to 0.3 CFM per square foot or less when tested per NFRC-400, ASTM E283, or AAMA/WDMA/CSA 1011.5.2/A440-2011. *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| § 110.6(a)5: | <b>Labeling.</b> Fenestration products and exterior doors must have a label meeting the requirements of § 10-111(a).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| § 110.6(b):  | <b>Field fabricated exterior doors and fenestration products</b> must use U-factors and solar heat gain coefficient (SHGC) values from Tables 110.6.A, 110.6.B, or J44.5 for exterior doors. They must be caulked and/or weather-stripped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| § 110.7:     | <b>Air Leakage.</b> All joints, penetrations, and other openings in the building envelope that are potential sources of air leakage must be caulked, gasketed, or weather stripped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| § 110.8(a):  | <b>Insulation Certification by Manufacturers.</b> Insulation must be certified by the Department of Consumer Affairs, Bureau of Household Goods and Services (BHGS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| § 110.8(g):  | <b>Insulation Requirements for Heated Slab Floors.</b> Heated slab floors must be insulated per the requirements of § 110.8(g).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| § 110.8(j):  | <b>Roofing Products Solar Reflectance and Thermal Emission.</b> The thermal emission and aged solar reflectance values of the roofing material must meet the requirements of § 110.8(j) and be labeled per § 10-113 when the installation of a cool roof is specified on the CFIR.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| § 110.8(j):  | <b>Radiant Barrier.</b> When required, radiant barriers must have an emittance of 0.05 or less and be certified to the Department of Consumer Affairs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| § 150.0(a):  | <b>Roof Deck, Ceiling and Rafter Roof Insulation.</b> Roof decks in newly constructed attics in climate zones 4 and 8-16 area-weighted average U-factor not exceeding U-0.184. Ceiling and rafter roofs minimum R-22 insulation in wood-frame ceiling; or area-weighted average U-factor must not exceed 0.043. Rafter roof alterations minimum R-19 or area-weighted average U-factor of 0.054 or less. All attic access doors must have permanently attached insulation using adhesive or mechanical fasteners. The attic access must be gasketed to prevent air leakage. Insulation must be installed in direct contact with the roof or ceiling which is sealed to limit infiltration and exfiltration, as specified in § 110.7, including but not limited to placing insulation either above or below the roof deck or on top of a drywall ceiling. * |
| § 150.0(b):  | <b>Loose-fill Insulation.</b> Loose fill insulation must meet the manufacturer's required density for the labeled R-value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| § 150.0(c):  | <b>Wall Insulation.</b> Minimum R-13 insulation in 2x4 inch wood framing wall or have a U-factor of 0.102 or less, or R-20 in 2x6 inch wood framing or have a U-factor of 0.071 or less. Opaque non-framed assemblies must have an overall assembly U-factor not exceeding 0.102. Masonry walls must meet Tables 150.1-A or B. *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| § 150.0(d):  | <b>Raised-floor Insulation.</b> Minimum R-19 insulation in raised wood framed floor or 0.037 minimum U-factor. *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| § 150.0(f):  | <b>Slab Edge Insulation.</b> Slab edge insulation must meet all of the following: have a water absorption rate, for the insulation material alone without facings, no greater than 0.3 percent; have a water vapor permeance no greater than 2.0 perm per inch; be protected from physical damage and UV light deterioration; and, when installed as part of a heated slab floor, meet the requirements of § 110.8(g).                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| § 150.0(g)1: | <b>Vapor Retarder.</b> In climate zones 1 through 16, the earth floor of unvented crawl space must be covered with a Class I or Class II vapor retarder. This requirement also applies to controlled ventilation crawl space for buildings complying with the exception to § 150.0(d).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| § 150.0(g)2: | <b>Vapor Retarder.</b> In climate zones 14 and 16, a Class I or Class II vapor retarder must be installed on the conditioned space side of all insulation in all exterior walls, vented attics, and unvented attics with air-permeable insulation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| § 150.0(q):  | <b>Fenestration Products.</b> Fenestration, including skylights, separating conditioned space from unconditioned space or outdoors must have a maximum U-factor of 0.45; or area-weighted average U-factor of all fenestration must not exceed 0.45. *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Fireplaces, Decorative Gas Appliances, and Gas Log:

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| § 110.5(e)   | <b>Pilot Light.</b> Continuously burning pilot lights are not allowed for indoor and outdoor fireplaces.                                                                                                                                                             |
| § 150.0(e)1: | <b>Closable Doors.</b> Masonry or factory-built fireplaces must have a closable metal or glass door covering the entire opening of the firebox.                                                                                                                      |
| § 150.0(e)2: | <b>Combustion Intake.</b> Masonry or factory-built fireplaces must have a combustion outside air intake, which is at least six square inches in area and is equipped with a readily accessible, operable, and tight-fitting damper or combustion-air control device. |
| § 150.0(e)3: | <b>Flue Damper.</b> Masonry or factory-built fireplaces must have a flue damper with a readily accessible control. *                                                                                                                                                 |

Space Conditioning, Water Heating, and Plumbing System:

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| § 110.0-§ 110.3: | <b>Certification.</b> Heating, ventilation, and air conditioning (HVAC) equipment, water heaters, showerheads, faucets, and all other regulated appliances must be certified by the manufacturer to the California Energy Commission.                                                                                                                                                                                                                                                                               |
| § 110.2(a):      | <b>HVAC Efficiency.</b> Equipment must meet the applicable efficiency requirements in Table 110.2-A through Table 110.2-N. *                                                                                                                                                                                                                                                                                                                                                                                        |
| § 110.2(b):      | <b>Controls for Heat Pumps with Supplementary Electric Resistance Heaters.</b> Heat pumps with supplementary electric resistance heaters must have controls that prevent supplementary heater operation when the heating load can be met by the heat pump alone; and in which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating, and the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating. |
| § 110.2(c):      | <b>Thermostats.</b> All heating or cooling systems not controlled by a central energy management control system (EMCS) must have a setback thermostat. *                                                                                                                                                                                                                                                                                                                                                            |
| § 110.3(c)3:     | <b>Insulation.</b> Unfired service water heater storage tanks and solar water-heating backup tanks must have adequate insulation, or tank surface heat loss rating.                                                                                                                                                                                                                                                                                                                                                 |
| § 110.3(c)6:     | <b>Isolation Valves.</b> Instantaneous water heaters with an input rating greater than 6.8 kBtu per hour (2 kW) must have isolation valves with hose bibbs or other fittings on both cold and hot water lines to allow for flushing the water heater when the valves are closed.                                                                                                                                                                                                                                    |

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| § 150.0(k)1G: | <b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JA8. *                                                                                                                                                                                                                                                                                                                                                                           |
| § 150.0(k)1H: | <b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JA8 elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.                                                                                                                                                                                                                                   |
| § 150.0(k)1I: | <b>Light Sources in Drawers, Cabinets, and Linen Closets.</b> Light sources internal to drawers, cabinetry or linen closets are not required to comply with Table 150.0-A or be controlled by vacancy sensors provided that they are rated to consume no more than 5 watts of power, emit no more than 150 lumens, and are equipped with controls that automatically turn the lighting off when the drawer, cabinet or linen closet is closed.                                                      |
| § 150.0(k)2A: | <b>Interior Switches and Controls.</b> All forward phase cut dimmers used with LED light sources must comply with NEMA SSL 7A.                                                                                                                                                                                                                                                                                                                                                                      |
| § 150.0(k)2B: | <b>Interior Switches and Controls.</b> Exhaust fans must be controlled separately from lighting systems. *                                                                                                                                                                                                                                                                                                                                                                                          |
| § 150.0(k)2A: | <b>Accessible Controls.</b> Lighting must have readily accessible wall-mounted controls that allow the lighting to be manually turned on and off. *                                                                                                                                                                                                                                                                                                                                                 |
| § 150.0(k)2B: | <b>Multiple Controls.</b> Controls must not bypass a dimmer, occupant sensor, or vacancy sensor function if the dimmer or sensor is installed to comply with § 150.0(k).                                                                                                                                                                                                                                                                                                                            |
| § 150.0(k)2C: | <b>Mandatory Requirements.</b> Lighting controls must comply with the applicable requirements of § 110.9.                                                                                                                                                                                                                                                                                                                                                                                           |
| § 150.0(k)2D: | <b>Energy Management Control Systems.</b> An energy management control system (EMCS) may be used to comply with dimming, occupancy, and control requirements if it provides the functionality of the specified control per § 110.9 and the physical controls specified in § 150.0(k)2A.                                                                                                                                                                                                             |
| § 150.0(k)2E: | <b>Automatic Shutoff Controls.</b> In bathrooms, garages, laundry rooms, utility rooms and walk-in closets, at least one installed luminaire must be controlled by an occupancy or vacancy sensor providing automatic-off functionality. Lighting inside drawers and cabinets with opaque fronts or doors must have controls that turn the light off when the drawer or door is closed.                                                                                                             |
| § 150.0(k)2F: | <b>Dimmers.</b> Lighting in habitable spaces (e.g., living rooms, dining rooms, kitchens, and bedrooms) must have readily accessible wall-mounted dimming controls that allow the lighting to be manually adjusted up and down. Forward phase cut dimmers controlling LED light sources in these spaces must comply with NEMA SSL 7A.                                                                                                                                                               |
| § 150.0(k)2K: | <b>Independent controls.</b> Integrated lighting of exhaust fans shall be controlled independently from the fans. Lighting under cabinets or shelves, lighting in display cabinets, and switched outlets must be controlled separately from ceiling-installed lighting.                                                                                                                                                                                                                             |
| § 150.0(k)3A: | <b>Residential Outdoor Lighting.</b> For single-family residential buildings, outdoor lighting permanently mounted to a residential building, or to other buildings on the same lot, must have a manual on/off switch and either a photocell and motion sensor or automatic time switch control) or an astronomical time clock. An energy management control system that provides the specified control functionality and meets all applicable requirements may be used to meet these requirements. |
| § 150.0(k)4:  | <b>Internally illuminated address signs.</b> Internally illuminated address signs must either comply with § 140.8 or consume no more than 5 watts of power.                                                                                                                                                                                                                                                                                                                                         |
| § 150.0(k)5:  | <b>Residential Garages for Eight or More Vehicles.</b> Lighting for residential parking garages for eight or more vehicles must comply with the applicable requirements for nonresidential garages in §§ 110.9, 130.0, 130.1, 130.4, 140.6, and 141.0.                                                                                                                                                                                                                                              |

Solar Readiness:

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| § 110.10(a)1:  | <b>Single-family Residences.</b> Single-family residences located in subdivisions with 10 or more single-family residences and where the application for a tentative subdivision map for the residences has been deemed complete and approved by the enforcement agency, which do not have a photovoltaic system installed, must comply with the requirements of § 110.10(b)-(e).                                                                                                                                                                                                                                                                                                                                                                                                            |
| § 110.10(b)1A: | <b>Minimum Solar Zone Area.</b> The solar zone must have a minimum total area as described below. The solar zone must comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other parts of Title 24 or in any requirements adopted by a local jurisdiction. The solar zone total area must be comprised of areas that have no dimension less than 5 feet and are no less than 80 square feet each for buildings with roof areas less than or equal to 10,000 square feet or no less than 160 square feet each for buildings with roof areas greater than 10,000 square feet. For single-family residences, the solar zone must be located on the roof or overhang of the building and have a total area no less than 250 square feet. |
| § 110.10(b)2:  | <b>Azimuth.</b> All sections of the solar zone located on steep-sloped roofs must have an azimuth between 90-300° of true north.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| § 110.10(b)3A: | <b>Shading.</b> The solar zone must not contain any obstructions, including but not limited to: vents, chimneys, architectural features, and roof mounted equipment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| § 110.10(b)3B: | <b>Shading.</b> Any obstruction located on the roof or any other part of the building that projects above a solar zone must be located at least twice the horizontal distance of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane. *                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| § 110.10(b)4:  | <b>Structural Design Loads on Construction Documents.</b> For areas of the roof designated as a solar zone, the structural design loads for roof dead load and roof live load must be clearly indicated on the construction documents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| § 110.10(c):   | <b>Interconnection Pathways.</b> The construction documents must indicate: a location reserved for inverters and metering equipment and a pathway reserved for routing of conduit from the solar zone to the point of interconnection with the electrical service; and for single-family residences and central water-heating systems, a pathway reserved for routing plumbing from the solar zone to the water-heating system.                                                                                                                                                                                                                                                                                                                                                              |
| § 110.10(d):   | <b>Documentation.</b> A copy of the construction documents or a comparable document indicating the information from § 110.10(b)-(c) must be provided to the occupant.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| § 110.10(e)1:  | <b>Main Electrical Service Panel.</b> The main electrical service panel must have a minimum busbar rating of 200 amps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| § 110.10(e)2:  | <b>Main Electrical Service Panel.</b> The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future solar electric installation. The reserved space must be permanently marked as "For Future Solar Electric."                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

Electric and Energy Storage Ready:

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| § 110.5:      | <b>Pilot Lights.</b> Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces; household cooking appliances (except appliances without an electrical supply voltage connection with pilot lights that consume less than 150 Btu per hour); and pool and spa heaters. *                                                                                                                                                                                                                                                                                 |
| § 150.0(h)1:  | <b>Building Cooling and Heating Loads.</b> Heating and/or cooling loads are calculated in accordance with the ASHRAE Handbook, Equipment Volume, Applications Volume, and Fundamentals Volume; the SMACNA Residential Comfort System Installation Standards Manual; or the ACCA Manual J using design conditions specified in § 150.0(h)2.                                                                                                                                                                                                                                                |
| § 150.0(h)3A: | <b>Clearances.</b> Air conditioner and heat pump outdoor condensing units must have a clearance of at least five feet from the outlet of any dryer.                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| § 150.0(h)3B: | <b>Liquid Line Drier.</b> Air conditioners and heat pump systems must be equipped with liquid line filter driers if required, as specified by the manufacturer's instructions.                                                                                                                                                                                                                                                                                                                                                                                                            |
| § 150.0(j)1:  | <b>Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation.</b> All domestic hot water piping must be insulated as specified in § 609.11 of the California Plumbing Code. *                                                                                                                                                                                                                                                                                                                                                                        |
| § 150.0(j)2:  | <b>Insulation Protection.</b> Piping insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind as required by § 120.3(b). Insulation exposed to weather must be water resistant and protected from UV light (no adhesive tapes). Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space must include, or be protected by, a Class I or Class II vapor retarder. Pipe insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve. |
| § 150.0(n)1:  | <b>Gas or Propane Water Heating Systems.</b> Systems using gas or propane water heaters to serve individual dwelling units must designate a space at least 2.5' x 2.5' x 7' suitable for the future installation of a heat pump water heater, and meet electrical and plumbing requirements, based on the distance between this designated space and the water heater location; and a condensate drain no more than 2' higher than the base of the water heater.                                                                                                                          |
| § 150.0(n)3:  | <b>Solar Water-heating Systems.</b> Solar water-heating systems and collectors must be certified and rated by the Solar Rating and Certification Corporation (SRCC), the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO R&T), or by a listing agency that is approved by the executive director.                                                                                                                                                                                                                                             |

Ducts and Fans:

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| § 110.8(d)3:  | <b>Ducts.</b> Insulation installed on an existing space-conditioning duct must comply with § 604.0 of the California Mechanical Code (CMC). If a contractor installs the insulation, the contractor must certify to the customer, in writing, that the insulation meets this requirement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| § 150.0(m)1:  | <b>CMC Compliance.</b> All air-distribution system ducts and plenums must meet CMC §§ 601.0-605.0 and ANSI/SMACNA-006-2006 HVAC Duct Construction Standards Metal and Flexible 3rd Edition. Portions of supply-air and return-air ducts and plenums must be installed to R-6.0 or higher; ducts located entirely in conditioned space as confirmed through field verification and diagnostic testing (RA3.1.4.3.8) do not require insulation. Connections of metal ducts and inner core of flexible ducts must be mechanically fastened. Openings must be sealed with mastic, tape, or other duct-closure system that meets the applicable UL requirements, or aerosol sealant that meets UL 723. The combination of mastic and either mesh or tape must be used to seal openings greater than 1/2". If mastic or tape is used, Building cavities, air handler support platforms, and plenums designed or constructed with materials other than sealed sheet metal, duct board or flexible duct must not be used to convey conditioned air. Building cavities and support platforms may contain ducts; ducts installed in these spaces must not be compressed. * |
| § 150.0(m)2:  | <b>Factory-Fabricated Duct Systems.</b> Factory-fabricated duct systems must comply with applicable requirements for duct construction, connections, and closures; joints and seams of duct systems and their components must not be sealed with cloth backer rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| § 150.0(m)3:  | <b>Field-Fabricated Duct Systems.</b> Field-fabricated duct systems must comply with applicable requirements for: pressure-sensitive tapes, mastics, sealants, and other requirements specified for duct construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| § 150.0(m)7:  | <b>Backdraft Damper.</b> Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| § 150.0(m)8:  | <b>Gravity Ventilation Dampers.</b> Gravity ventilating systems serving conditioned space must have either automatic or readily accessible, manually operated dampers in all openings to the outside, except combustion inlet and outlet air openings and elevator shaft vents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| § 150.0(m)9:  | <b>Protection of Insulation.</b> Insulation must be protected from damage due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather must be suitable for outdoor service (e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover). Cellular foam insulation must be protected as above or painted with a water retardant and solar radiation-resistant coating.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| § 150.0(m)10: | <b>Porous Inner Core Flex Duct.</b> Porous inner cores of flex ducts must have a non-porous layer or air barrier between the inner core and outer vapor barrier.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| § 150.0(m)11: | <b>Duct System Sealing and Leakage Test.</b> When space conditioning systems use forced air duct systems to supply conditioned air to an occupiable space, the ducts must be sealed and duct leakage tested, as confirmed through field verification and diagnostic testing, in accordance with Reference Residential Appendix RA3.1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| § 150.0(m)12: | <b>Air Filtration.</b> Space conditioning systems with ducts exceeding 10 feet and the supply side of ventilation systems must have MERV 13 or equivalent filters. Filters for space conditioning systems must have a two inch depth or can be one inch if sized per Equation 160.0-A. Clean-filter pressure drop and labeling must meet the requirements in § 150.0(m)12. Filters must be accessible for regular service. Filter racks or grilles must use gaskets, sealing, or other means to close gaps around the inserted filters to and prevents air from bypassing the filter. *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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| § 150.0(s) | <b>Energy Storage System (ESS) Ready.</b> All single-family residences must meet all of the following: Either ESS-ready interconnection equipment with backed up capacity of 80 amps or more and four or more ESS-supplied branch circuits; or a dedicated raceway from the main service to a subpanel that supplies the branch circuits in § 150.0(s); at least four branch circuits must be identified and have their service collocated at a single panelboard suitable to be supplied by the ESS, with one circuit supplying the refrigerator, one lighting circuit near the primary exit, and one circuit supplying a sleeping room receptacle outlet; main panelboard must have a minimum busbar rating of 225 amps; sufficient space must be reserved to allow future installation of a system isolation equipment/transfer switch within 3' of the main panelboard; with raceways installed between the panelboard and the switch location to allow the connection of backup power source. |
| § 150.0(t) | <b>Heat Pump Space Heater Ready.</b> Systems using gas or propane furnaces to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the furnace with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready;" and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| § 150.0(u) | <b>Electric Cooktop Ready.</b> Systems using gas or propane cooktop to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the cooktop with circuit conductors rated at least 50 amps with the blank cover identified as "240V ready;" and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| § 150.0(v) | <b>Electric Clothes Dryer Ready.</b> Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include: A dedicated unobstructed 240V branch circuit wiring installed within 3' of the dryer location with circuit conductors rated at least 30 amps with the blank cover identified as "240V ready;" and a reserved main electrical service panel space to allow for the installation of a double pole circuit breaker permanently marked as "For Future 240V use."                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

\*Exceptions may apply.

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| § 150.0(m)13: | <b>Space Conditioning System Airflow Rate and Fan Efficacy.</b> Space conditioning systems that use ducts to supply cooling must have a hole for the placement of a static pressure probe, or a permanently installed static pressure probe in the supply plenum. Airflow must be ≥ 350 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.45 watts per CFM for gas furnace air handlers and ≤ 0.58 watts per CFM for oil or others. Small duct high velocity systems must provide an airflow ≥ 250 CFM per ton of nominal cooling capacity, and an air-handling unit fan efficacy ≥ 0.62 watts per CFM. Field verification testing is required in accordance with Reference Residential Appendix RA3.3. * |
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Ventilation and Indoor Air Quality:

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| § 150.0(o)1:    | <b>Requirements for Ventilation and Indoor Air Quality.</b> All dwelling units must meet the requirements of ASHRAE Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings subject to the amendments specified in § 150.0(o)1. *                                                                                                                                                                                                                                                                                                                            |
| § 150.0(o)1B:   | <b>Central Fan Integrated (CFI) Ventilation Systems.</b> Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per § 150.0(o)1C. A motorized damper(s) must be installed on the ventilation duct(s) that prevents all airflow through the space conditioning duct system when the damper(s) is closed and uncontrolled per § 150.0(o)1Biii&i. CFI ventilation systems must have controls that track outdoor air ventilation run time, and either open or close the motorized damper(s) for compliance with § 150.0(o)1C. |
| § 150.0(o)1C:   | <b>Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and townhouses.</b> Single-family detached dwelling units, and attached dwelling units not sharing ceilings of floors with other dwelling units, occupiable spaces, public garages, or commercial spaces must have mechanical ventilation airflow specified in § 150.0(o)1C-iii.                                                                                                                                                                                                                                  |
| § 150.0(o)1G:   | <b>Local Mechanical Exhaust.</b> Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of § 150.0(o)1Giii enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting § 150.0(o)1Giii-iv. Airflow must be measured by the installer per § 150.0(o)1Gv, and rated for sound per § 150.0(o)1Gvi. *                                                                                                                                                                     |
| § 150.0(o)1H&I: | <b>Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems.</b> The airflow required per § 150.0(o)1C must be measured by using a flow hood, flow and/or other airflow measuring device at the fan's inlet or outlet terminals/grilles per Reference Residential Appendix RA3.7. Whole-Dwelling unit ventilation systems must be rated for sound per ASHRAE 62.2 §7.2 at no less than the minimum airflow rate required by § 150.0(o)1C.                                                                                                                          |
| § 150.0(o)2:    | <b>Field Verification and Diagnostic Testing.</b> Whole-Dwelling unit ventilation airflow, vented range hood airflow and sound rating, and HRV and ERV fan efficacy must be verified in accordance with Reference Residential Appendix RA3.7. Vented range hoods must be verified per Reference Residential Appendix RA3.7.4.3 to confirm if it is rated by HVI or AHAM to comply with the airflow rates and sound requirements per § 150.0(o)1G.                                                                                                                                          |

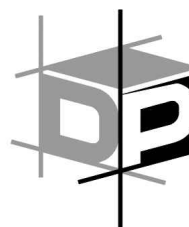
Pool and Spa Systems and Equipment:

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| § 110.4(a):  | <b>Certification by Manufacturers.</b> Any pool or spa heating system or equipment must be certified to have all of the following: compliance with the Appliance Efficiency Regulations and listing in MAEDbS; an on-off switch mounted outside of the heater that allows shutting off the heater without adjusting the thermostat setting; a permanent weatherproof plate or card with operating instructions; and must not use electric resistance heating. * |
| § 110.4(b)1: | <b>Piping.</b> Any pool or spa heating system or equipment must be installed with at least 3/8 inches of pipe between the filter and the heater, or dedicated suction and return lines, or built-in or built-up connections to allow for future solar heating.                                                                                                                                                                                                  |
| § 110.4(b)2: | <b>Covers.</b> Outdoor pools or spas that have a heat pump or gas heater must have a cover.                                                                                                                                                                                                                                                                                                                                                                     |
| § 110.4(b)3: | <b>Directional Inlets and Time Switches for Pools.</b> Pools must have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.                                                                                                                                                                                                          |
| § 110.5:     | <b>Pilot Light.</b> Natural gas pool and spa heaters must not have a continuously burning pilot light.                                                                                                                                                                                                                                                                                                                                                          |
| § 150.0(p):  | <b>Pool Systems and Equipment Installation.</b> Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves.                                                                                                                                                                                                                                                                             |

Lighting:

|               |                                                                                                                                                                                                                                                                                                                                                                     |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| § 110.9:      | <b>Lighting Controls and Components.</b> All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *                                                                                                                                                                                                     |
| § 150.0(k)1A: | <b>Luminaire Efficacy.</b> All installed luminaires must meet the requirements in Table 150.0-A, except lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors, and garage door openers; navigation lighting less than 5 watts; and lighting integral to drawers, cabinets, and linen closets with an efficacy of at least 45 lumens per watt. |
| § 150.0(k)1B: | <b>Screw based luminaires.</b> Screw based luminaires must contain lamps that comply with Reference Joint Appendix JA8. *                                                                                                                                                                                                                                           |
| § 150.0(k)1C: | <b>Recessed Downlight Luminaires in Ceilings.</b> Luminaires recessed into ceilings must not contain screw based sockets, must be airtight, and must be sealed with a gasket or caulk. California Electrical Code § 410.116 must also be met.                                                                                                                       |
| § 150.0(k)1D: | <b>Light Sources in Enclosed or Recessed Luminaires.</b> Lamps and other separable light sources that are not compliant with the JA8 elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.                                                                                                   |
| § 150.0(k)1E: | <b>Blank Electrical Boxes.</b> The number of electrical boxes that are more than five feet above the finished floor and do not contain a luminaire or other device shall be no more than the number of bedrooms. These boxes must be served by a dimmer, vacancy sensor control, low voltage wiring, or fan speed control.                                          |
| § 150.0(k)1F: | <b>Lighting Integral to Exhaust Fans.</b> Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0(k).                                                                                                                                                               |

5/6/22



ADVANCED ENGINEERING  
STRUCTURAL ENGINEERING SOLUTIONS

TITLE 24 SUMMARY OF FEATURES

PROJECT: TOWN OF DANVILLE ADU DATE: 3-31-2023  
JOB NO: W021420 ANALYST: J. BENNETT

ENVELOPE INSULATION

EXTERIOR WALLS:  
R-21 1N 2x6  
FOUNDATION:  
SLAB: NOT INSULATED  
ROOF OVER LIVING SPACE:  
R-38 BETWEEN CEILING JOISTS  
R-13 BETWEEN RAFTERS

WINDOW PERFORMANCE

MAXIMUM WINDOW PERFORMANCE VALUES (U-FACTOR / SHGC)  
WINDOWS: .30/.23  
FRENCH DOORS: .32/.16

DOMESTIC HOT WATER

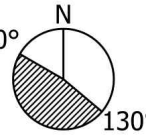
RHEEM 40-GALLON HEAT PUMP WATER HEATER OR EQUIV.

SOLAR (STUDIO)

(NOT REQUIRED; CALCULATED SIZE IS <1.8 KW)

SOLAR (1 BEDROOM)

2.0 KW MINIMUM  
ACCEPTABLE ORIENTATION:  
(DEGREES EAST OF TRUE NORTH)



HERS VERIFICATIONS

- INDOOR AIR QUALITY VENTILATION
- KITCHEN RANGE HOOD
- MINIMUM AIRFLOW [350 CFM/TON]
- VERIFIED SEER [19.6]
- VERIFIED REFRIGERANT CHARGE
- FAN EFFICACY WATTS/CFM [0.45]
- VERIFIED HSPF [10.8]
- VERIFIED HEAT PUMP RATED HEATING CAPACITY
- DUCT LEAKAGE TESTING [5%]

SPACE HEATING & COOLING

HEAT PUMP [10.2 HSPF, 19.6 SEER, 11.7 EER]  
MITSUBISHI PEAD-A24AA7 + PUZ-A24NH47  
AHRI # 201754661

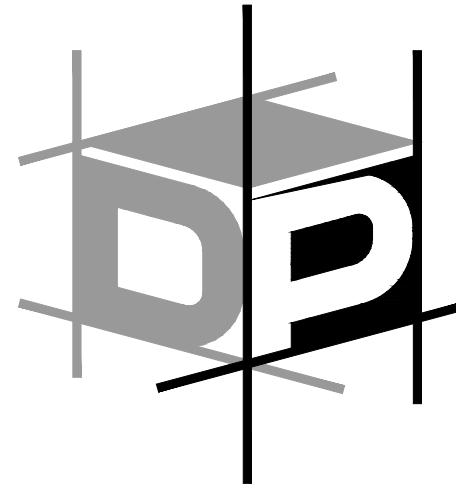
DUCTS

SUPPLY AIR DUCTS IN ATTIC  
DUCTS IN UNCONDITIONED SPACE TO HAVE R-6 INSULATION

INDOOR AIR QUALITY

BROAN ERV100S ENERGY RECOVERY VENTILATOR OR EQUIV.

3381 Walnut Blvd. Ste.220 Brentwood, CA 94513 PH: 925.516.3502 FX: 925.262.4662 W: WWW.ADVANCEENGINEERINGINC.COM



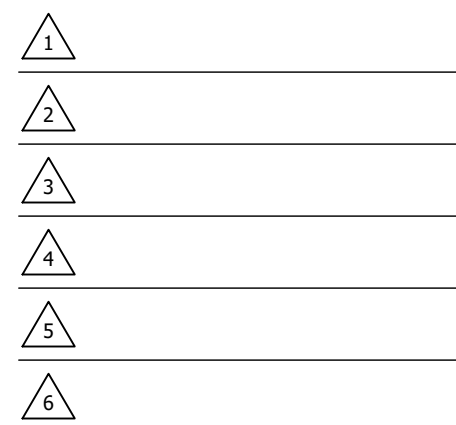
ADVANCED ENGINEERING

3381 Walnut Blvd. Ste. 220  
Brentwood, CA 94513  
Office: 925.516.3502  
Fax: 925.262.4662

NOTE: THE LOADS SHOWN ARE ONLY ONE OF THE CRITERIA AFFECTING THE SELECTION OF HVAC EQUIPMENT. OTHER RELEVANT DESIGN FACTORS SUCH AS AIRFLOW, OUTDOOR DESIGN TEMPERATURES, COIL SIZING, AVAILABILITY OF EQUIPMENT, OVERSIZING, MAINTENANCE, ETC. MUST ALSO BE CONSIDERED. IT IS THE HVAC DESIGNER'S RESPONSIBILITY TO CONSIDER ALL FACTORS WHEN SELECTING THE HVAC EQUIPMENT. MECHANICAL CONTRACTOR MUST WARRANT THE INSTALLED SYSTEM TO MEET ALL ENERGY STAR REQUIREMENTS IF APPLICABLE. THE MINIMUM SIZE OF THE RESIDENTIAL HEATING SYSTEMS IS REGULATED BY THE CALIFORNIA BUILDING CODE (CBC), SECTION 310.11. THE CBC REQUIRES THAT THE HEATING SYSTEM BE CAPABLE OF MAINTAINING A TEMPERATURE OF 70°F AT A DISTANCE THREE FEET ABOVE THE FLOOR THROUGHOUT THE CONDITIONED SPACE OF THE BUILDING. (P. ADVANCED ENGINEERING, INC. DOES NOT WARRANT OR ASSUME RESPONSIBILITY FOR PERFORMANCE OR INSTALLATION OF ANY EQUIPMENT LABELED OR ALLUDED TO ON ANY CALCULATION PRODUCED BY DP ADVANCED ENGINEERING, INC. BUILDERS AND ALL SUB-CONTRACTORS WORKING ON THE PROJECT INVOLVING TITLE-24 UNDERSTAND AND ACCEPT ALL ASPECTS OF THE TITLE-24 SUBMITTED TO BUILDING DEPARTMENT PERTAINING TO THEIR WORK. ALL SUB-CONTRACTORS ARE RESPONSIBLE TO CONTACT THE BUILDER AND DP ADVANCED ENGINEERING, INC. BEFORE BEGINNING WORK IF THERE IS ANY ERROR IN ANY CALCULATION THAT WOULD PREVENT THE SUB-CONTRACTOR FROM WARRANTING THE PERFORMANCE OF HIS PRODUCT WHICH INCLUDED ANY ENERGY STAR PROCEDURES.

TOWN OF DANVILLE  
ACCESSORY DWELLING UNIT

DANVILLE, CALIFORNIA



PLEASE NOTE THE REVISION NUMBER AND DATE ARE FOR ENERGY SHEETS ONLY.

Sheet Description:

ENERGY CALCULATIONS

2022 SINGLE FAMILY RESIDENTIAL  
MANDATORY MEASURES SUMMARY  
AND SUMMARY SHEET

Initial Issue Date: March 31, 2023

Energy Analyst: J. Bennett Ext. 26

Project Manager: J. Peek Ext. 23

Job No. W021420

Sheet No.

ECM



**BROAN**

**BROAN ERV100**  
Part no. **ERV100S**  
Low speed: 50 CFM (0.2 in. w.g.), selectable 65 CFM  
High speed: 100 CFM (0.4 in. w.g.), selectable 85 CFM



#### CONSTRUCTION

- 22 ga. galvanized steel housing and door
- One-piece molded insulation shell, expanded polystyrene (UL 94 HF-1 certified)
- Galvanized steel 5" diameter ports\*
- Steel door hinges and latches
- Cold side ports with plastic ring; allow vapor barrier sealing
- No drain required
- Included installation brackets

\*All units ports were created to be connected to ducts having a minimum of 5" diameter, but if need be, they can be connected to bigger sized ducts by using an appropriate transition (e.g. 5" diameter to 6" diameter transition).

#### MOTORS

- Two high reliability, external rotor PSC motors, totally enclosed and thermally protected
- Backward blowers, can support high static pressure environment

#### FILTERS

- Two washable 20 gpi reticulated polyester urethane foam filters, UL 900 class 2 certified
- Optional MERV 8 filter kit, part no. V21030 (additional 0.1 in. w.g. static pressure to be considered) (sold separately)

#### ERV CORE

- Crossflow aluminum-polymerized paper core, UL723 certified
- Hydroscopic polymer exchange water by direct vapor transfer using molecular transport without the need of condensation
- Constructed of alternate layers of corrugated aluminum material and polymeric bactericide desiccant impregnated media; will not promote growth of mold or bacteria
- Unique rectangular flute design to provide very low pressure drop values

## ENERGY RECOVERY VENTILATOR

### Controls

- Integrated push-button control for Low or High speed operation.
- For a complete list of optional main and auxiliary controls available, refer to the **Wall Control Compatibility Chart** on last pages of wall controls specification sheet, available at [www.broan.com](http://www.broan.com).
- For more details about controls, refer to the **Main and auxiliary wall controls** user guide, also available at [www.broan.com](http://www.broan.com).
- Removable terminal block included for quicker low voltage control connections
- LED indicator shows operating modes and error codes.
- Unit must be permanently energized, no control should be installed on power supply of unit.

### Air Flow

- Pressure taps and balancing chart to allow easier balancing of the unit
- Integrated balancing/backdraft dampers in cold supply and cold exhaust ports

### Defrost Cycles

- Choice of regular or extended defrost cycles, according to climatic conditions
- To set extended defrost cycles, refer to unit installation manual

| Regular Defrost Cycles |                |                                              |            |
|------------------------|----------------|----------------------------------------------|------------|
| Outdoor Temperature*   |                | Defrost in Minutes / Air Exchange in Minutes |            |
| °C                     | °F             | Low Speed                                    | High Speed |
| Warmer than -10        | Warmer than 14 | No DEFROST                                   | No DEFROST |
| FROM -10 to -15        | FROM 14 to 5   | 6/40                                         | 9/40       |
| FROM -15 to -27        | FROM 5 to -17  | 6/20                                         | 9/20       |
| -27 AND LESS           | -17 AND LESS   | 8/12                                         | 11/12      |

\* Outdoor temperature is read by a thermostat located inside the unit, next to fresh air from outdoor port.

### Warranty

The Broan ERV100 is protected by a 5-year warranty on parts only, with the original proof of purchase.

### Requirements and standards

#### • HVI certified

- Complies with the UL 1812 requirements regulating the installation of Energy Recovery Ventilators
- Complies with the CSA C22.2 no. 113 Standard applicable to ventilators
- Complies with CSA C444 requirements regulating the installation of Energy Recovery Ventilators

## Professional Prestige® ProTerra™ Hybrid Electric with LeakGuard™ is the most efficient water heater available

### Efficiency

- Up to 4.0 UEF reduces operating cost
- ENERGY STAR® rated

### Performance

- Delivers hot water faster than most standard electric water heaters
- Ambient operating range: 37°-145° F is widest in class, offering more days of HP operation annually; designed to meet Northern Climate Spec (Tier 4)

### Easy Installation

- Easy access side connections
- Quick access to electrical junction box
- Easily replaces a standard electric water heater

### Integration

- LED Screen with built-in water sensor alert with audible alarm!
- Integrated EcoNet® WiFi-connected technology and free mobile app gives users control over water heater, allowing for customizable temperature, vacation settings, energy savings and system monitoring at home or away. Visit [Theem.com/hybridolutions](http://Theem.com/hybridolutions)

### LEAKGUARD™ WATER SHUT-OFF VALVE

- Integrated leak detection and prevention system with factory installed auto water shut-off valve limits leaks to no more than 20 ounces of water! \*

\*Units meet or exceed ANSI requirements and have been tested according to D.O.E. procedures. Units meet or exceed the energy efficiency requirements of NAECA, ASHRAE standard 90, ICC Code and all state energy efficiency performance criteria.

- LeakSense™ Built-in Leak Detection System detects any leak large or small, internal or external! \*

### Operation Modes

- Energy Saver
- Heat Pump
- High Demand
- Electric
- Vacation/Away: 2-28 days (or placed on hold indefinitely)

### Plus...

- Premium grade anode rod with resistor extends the life of the tank
- 3/4" NPT water inlet and outlet; 3/4" condensate drain connections
- Incoloy stainless steel resistor elements
- Dry-fire protection
- Easy access, top mounted washable air filter
- 2" Non-CFC foam insulation
- Enhanced flow brass drain valve
- Temperature and pressure relief valve installed
- Design certified to NSF/ANSI 372 (Lead Content)

### Warranty

- 10-Year limited tank and parts warranty
- Includes Residential Warranty Certificate for complete information

Units meet or exceed ANSI requirements and have been tested according to D.O.E. procedures. Units meet or exceed the energy efficiency requirements of NAECA, ASHRAE standard 90, ICC Code and all state energy efficiency performance criteria.

- LeakSense™ Built-in Leak Detection System detects any leak large or small, internal or external! \*

\*Available with select models. 100% broadband internet connection required. \*Source: Rheem Leak-Sensing Data; testing under a vacuum (not using 50 gallon tank, no expansion tank, average tank pressure of 40 psi, assuming no additional faucets are opened. \*Water leaks from the heater only, no tested across scenarios including a minimum of 5.5x10.6 volume tank size, using most common installation scenarios.

See specifications chart on next page.

**PEAD-A24AA7 & PUZ-A24NHA7-(BS)**  
MID STATIC HORIZONTAL-DUCTED INDOOR UNIT  
24,000 BTU/H HEAT PUMP UNIVERSAL OUTDOOR

Job Name: \_\_\_\_\_ Date: \_\_\_\_\_  
System Reference: \_\_\_\_\_

Indoor Unit: PEAD-A24AA7  
Outdoor Unit: PUZ-A24NHA7  
Standard Model: PUZ-A24NHA7  
Seacoast Model: PUZ-A24NHA7-BS

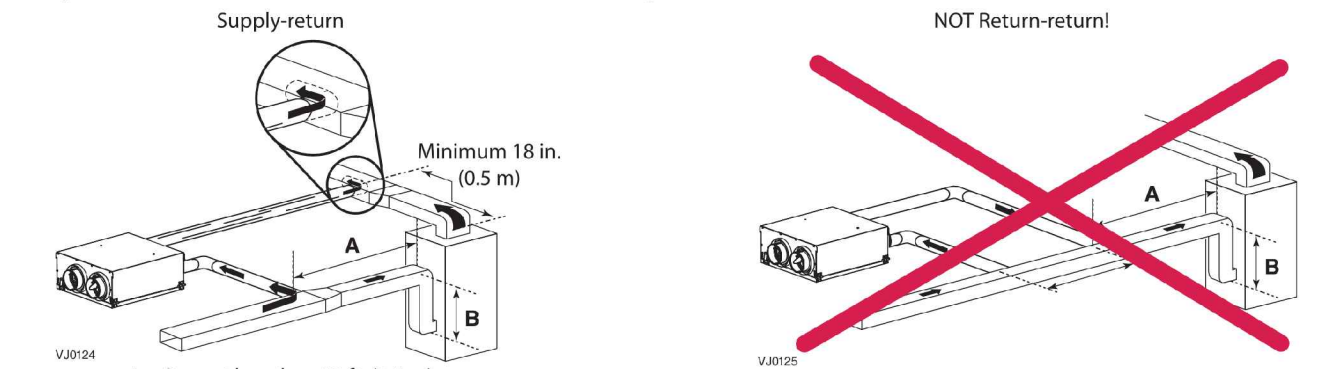
#### INDOOR UNIT FEATURES

- Unobtrusive ceiling-concealed design for short-run ductwork
- Wide ranging external static pressure (0.14-0.60 in. WG)
- Built-in condensate lift mechanism (up to 27-9'10")
- Auto fan speed mode
- Optional FB Series filter boxes for easy access and service
- Ideal for residential homes, retail shopping centers, larger classrooms, office complexes, conference rooms, ballrooms, fitness centers, and more
- Multiple control options available:
  - Kurmo cloud® smart device app for remote access
  - Third-party interface options
  - Wired or wireless controllers

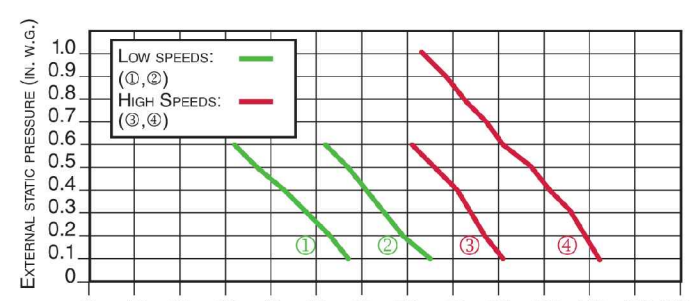
#### OUTDOOR UNIT FEATURES

- Variable speed INVERTER-driven compressor
- Power receiver pre-charged with refrigerant volume for piping length up to 70 ft
- Low ambient cooling down to 0°F providing 100% capacity
- 24-hour continuous operation (cooling mode)
- High pressure protection
- Fast restart
- Superior energy and operational efficiency

### Simplified Installation (connection to a forced air system)



### VENTILATION PERFORMANCE



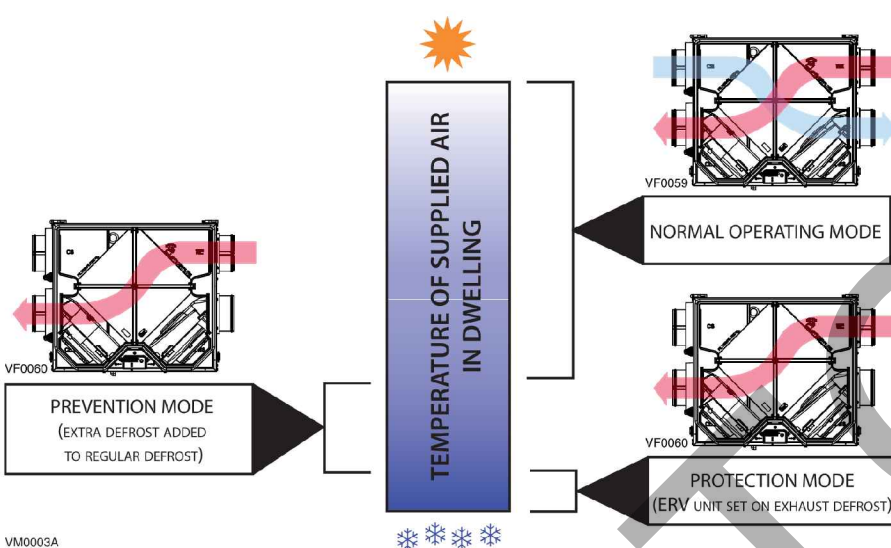
NOTE: Low speed ① and high speed ② are factory set, low speed ③ and high speed ④ are selectable.

### Acoustic Noise Power Chart (dBA)

| Airflow                 | Fresh air to building port | Exhaust air from building port |
|-------------------------|----------------------------|--------------------------------|
| 100 CFM at 0.4 in. w.g. | 67.8 dBA                   | 58.3 dBA                       |
| 55 CFM at 0.1 in. w.g.  | 58.0 dBA                   | 49.4 dBA                       |

### Coldshield™ Protection

#### ERV UNIT MODES BASED ON AIR DISTRIBUTION TEMPERATURE

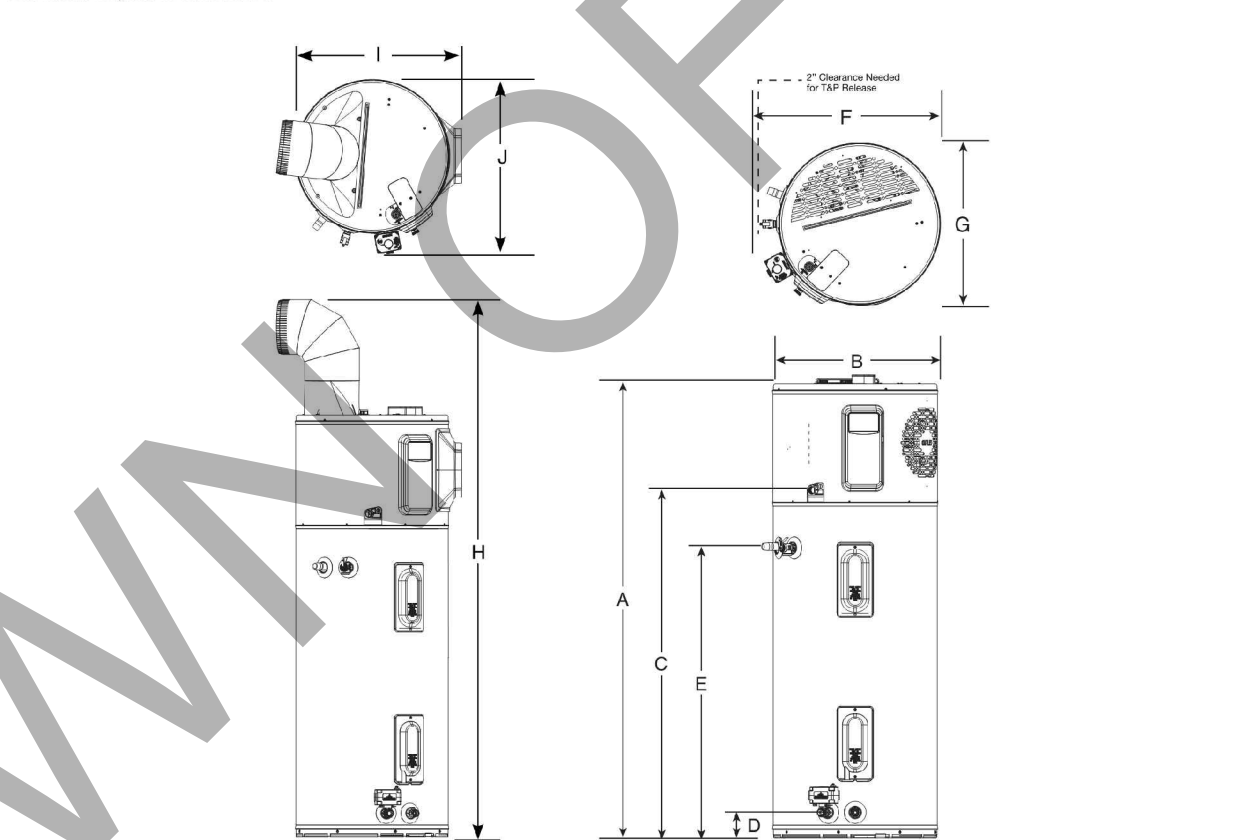


- ERV unit is equipped with an electronic supplemental protection to stop air distribution in dwelling if air distribution temperature drops below freezing point, due to abnormal conditions.

### Professional Prestige® ProTerra Hybrid Specifications

| DESCRIPTION                        |                       |                      | ENERGY INFO |       |       |       | FEATURES |       |       |       | WEIGHTS |        |        |        |        |
|------------------------------------|-----------------------|----------------------|-------------|-------|-------|-------|----------|-------|-------|-------|---------|--------|--------|--------|--------|
| NOMINAL INDOOR CAPACITY            | RATED INDOOR CAPACITY | MODEL NUMBER         | SEER        | SEER2 | SEER3 | SEER4 | SEER5    | SEER6 | SEER7 | SEER8 | SEER9   | SEER10 | SEER11 | SEER12 | SEER13 |
| ProTerra with LeakGuard™           |                       |                      |             |       |       |       |          |       |       |       |         |        |        |        |        |
| 40                                 | 36                    | PROPH40 T2 RH-075-15 | 700944      | 30    | 3.75  | \$104 | 4,200    | 49    | 50    | 28    | 4,500   | 5,000  | 21     | 157    | 174    |
| 50                                 | 45                    | PROPH50 T2 RH-075-15 | 700943      | 30    | 3.75  | \$104 | 4,200    | 49    | 50    | 27    | 4,500   | 5,000  | 21     | 178    | 218    |
| 65                                 | 59                    | PROPH65 T2 RH-075-15 | 700944      | 30    | 3.85  | \$155 | 4,200    | 49    | 75    | 27    | 4,500   | 5,000  | 21     | 225    | 282    |
| 80                                 | 72                    | PROPH80 T2 RH-075-15 | 700945      | 30    | 4.00  | \$146 | 4,200    | 49    | 87    | 27    | 4,500   | 5,000  | 21     | 244    | 281    |
| ProTerra 30 Amp without LeakGuard™ |                       |                      |             |       |       |       |          |       |       |       |         |        |        |        |        |
| 40                                 | 36                    | PROPH40 T2 RH-075-30 | 700947      | 30    | 3.75  | \$104 | 4,200    | 49    | 50    | 27    | 4,500   | 5,000  | 21     | 157    | 174    |
| 50                                 | 45                    | PROPH50 T2 RH-075-30 | 700947      | 30    | 3.75  | \$104 | 4,200    | 49    | 50    | 27    | 4,500   | 5,000  | 21     | 178    | 218    |
| 65                                 | 59                    | PROPH65 T2 RH-075-30 | 700948      | 30    | 3.85  | \$155 | 4,200    | 49    | 75    | 27    | 4,500   | 5,000  | 21     | 225    | 282    |
| 80                                 | 72                    | PROPH80 T2 RH-075-30 | 700949      | 30    | 4.00  | \$146 | 4,200    | 49    | 87    | 27    | 4,500   | 5,000  | 21     | 244    | 281    |
| ProTerra 15 Amp without LeakGuard™ |                       |                      |             |       |       |       |          |       |       |       |         |        |        |        |        |
| 40                                 | 36                    | PROPH40 T2 RH-075-15 | 700947      | 15    | 3.45  | \$78  | 4,200    | 49    | 46    | 16    | 3,250   | 2,750  | 12     | 157    | 174    |
| 50                                 | 45                    | PROPH50 T2 RH-075-15 | 700948      | 15    | 3.75  | \$104 | 4,200    | 49    | 50    | 16    | 3,250   | 2,750  | 12     | 178    | 218    |
| 65                                 | 59                    | PROPH65 T2 RH-075-15 | 700949      | 15    | 3.55  | \$110 | 4,200    | 49    | 54    | 16    | 3,250   | 2,750  | 12     | 225    | 282    |
| 80                                 | 72                    | PROPH80 T2 RH-075-15 | 700948      | 15    | 3.70  | \$105 | 4,200    | 49    | 67    | 16    | 3,250   | 2,750  | 12     | 244    | 281    |

Estimated energy cost based on a national average electricity cost of \$0.12/kWh, Uniform Energy Factor and rated gallon capacity based on Department of Energy (DOE) requirements. All units have integrated WiFi control option.



| DESCRIPTION         |                 | DIMENSIONS (SHOWN IN INCHES) |        |    |                      |        |        |        |        |        |         |
|---------------------|-----------------|------------------------------|--------|----|----------------------|--------|--------|--------|--------|--------|---------|
| NOMINAL<br>CAPACITY | MODEL<br>NUMBER | A                            | B      | C  | D<br>SAFETY<br>CATCH | E      | F      | G      | H      | I      | J       |
| 40                  | PROPH40         | 62-5/16                      | 20-1/4 | 47 | 3-5/8                | 39-5/8 | 23-3/8 | 20-1/2 | 78-7/8 | 22-3/8 | 23-1/4  |
| 50                  | PROPH50         | 61-3/4                       | 22-1/4 | 47 | 3-5/8                | 39-5/8 | 25-3/8 | 22-1/2 | 78-5/8 | 24-3/8 | 25-9/16 |
| 65                  | PROPH65         | 64-3/16                      | 24-1/4 | 49 | 3-7/8                | 42-3/8 | 27-1/2 | 24-5/8 | 81-1/8 | 25-1/2 | 27-3/8  |
| 80                  | PROPH80         | 74-3/16                      | 24-1/4 | 50 | 3-7/8                | 42-3/8 | 27-1/2 | 24-5/8 | 81     | 25-1/2 | 27-3/8  |

2

Specifications are subject to change without notice.

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**AHRI CERTIFIED**  
www.ahridirectory.org

## Certificate of Product Ratings

AHRI Certified Reference Number : 201754461 Date : 03-30-2020 Model Status : Active

AHRI Type : HRCU-A-CB (Mini-Split System): Heat Pump with Outdoor Unit-Air-Source, Ducted)

Series Name : P-Series

Outdoor Unit Brand Name : Mitsubishi Electric

Outdoor Unit Model Number : PUZ-A24NHA7\*\*\*

Indoor Type : Mini-Splits (Ducted)

Outdoor Model Number(s) : PEAD-A24AA\*

Rated as follows in accordance with the latest edition of AHRI 210/240 - 2017 with Addendum 1, Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment and subject to rating accuracy by AHRI-sponsored, independent, third party testing:

Cooling Capacity (A2) - Single or High Stage (95F), btuh : 24000

SEER : 19.60

EER (A2) - Single or High Stage (95F) : 11.70

Heating Capacity (H12) - Single or High Stage (47F) : 26000

HSPF (Region IV) : 10.80

Rated as follows in accordance with the latest edition of AHRI 210/240 - 2020, Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment and subject to rating accuracy by AHRI-sponsored, independent, third party testing:

Cooling Capacity (A1a) - Single or High Stage (95F), btuh : 24000

SEER2 : 19.20

EER2 (A1a) - Single or High Stage (95F) : 12.00

Heating Capacity (H1a) - Single or High Stage (47F), btuh : 26000

HSPF2 (Region IV) : 9.10

Sold In : USA, Canada

\*Active Model Status are those that an AHRI Certification Program Participant is currently producing AND selling or offering for sale; OR new models that are being marketed but are not yet being produced. "Production Stopped" Model Status are those that an AHRI Certification Program Participant is no longer producing BUT is still selling or offering for sale.

Ratings that are accompanied by WAS indicate an involuntary re-rate. The new published rating is shown along with the previous (i.e. WAS) rating.

The Department of Energy has published updated energy efficiency metrics for central air conditioners and heat pumps. This publication reflects both the 1987 metric (SEER) and the 2023 metric (SEER2). Efficiency requirements are published at 10 C.F.R. 430.32(g). Please refer to [www.AHRInet.org](http://www.AHRInet.org) for more information about updated energy efficiency metrics.

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## ADVANCED ENGINEERING

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**NOTE:** THE LOADS SHOWN ARE ONLY ONE OF THE CRITERIA AFFECTING THE SELECTION OF HVAC EQUIPMENT. OTHER RELEVANT DESIGN FACTORS SUCH AS AIRFLOW, OUTDOOR DESIGN TEMPERATURES, COIL SIZING, AVAILABILITY OF EQUIPMENT, OVERSIZING, MARGIN, ETC. MUST ALSO BE CONSIDERED. IT IS THE HVAC DESIGNER'S RESPONSIBILITY TO CONSIDER ALL FACTORS WHEN SELECTING THE HVAC EQUIPMENT. MECHANICAL CONTRACTOR MUST WARRANT THE INSTALLED SYSTEM TO MEET ALL ENERGY STAR REQUIREMENTS IF APPLICABLE. THE MINIMUM SIZE OF THE RESIDENTIAL HEATING SYSTEMS IS REGULATED BY THE CALIFORNIA BUILDING CODE (CBC), SECTION 310.11. THE CBC REQUIRES THAT THE HEATING SYSTEM BE CAPABLE OF MAINTAINING A TEMPERATURE OF 70°F AT A DISTANCE THREE FEET ABOVE THE FLOOR THROUGHOUT THE CONDITIONED SPACE OF THE BUILDING. **OP** ADVANCED ENGINEERING, INC. DOES NOT WARRANT OR ASSUME RESPONSIBILITY FOR PERFORMANCE OR INSTALLATION OF ANY EQUIPMENT LABELED OR ALLOWED TO ON ANY CALCULATION PRODUCED BY **OP** ADVANCED ENGINEERING, INC. BUILDERS AND ALL SUB-CONTRACTORS WORKING ON THE PROJECT INVOLVING TITLE-24 UNDERSTAND AND ACCEPT ALL ASPECTS OF THE TITLE-24 SUBMITTED TO BUILDING DEPARTMENT PERTAINING TO THEIR WORK. ALL SUB-CONTRACTORS ARE RESPONSIBLE TO CONTACT THE BUILDER AND **OP** ADVANCED ENGINEERING, INC. BEFORE BEGINNING WORK IF THERE IS ANY ERROR IN ANY CALCULATION THAT WOULD PREVENT THE SUB-CONTRACTOR FROM WARRANTING THE PERFORMANCE OF HIS PRODUCT WHICH INCLUDED ANY ENERGY STAR PROCEDURES.

## TOWN OF DANVILLE ACCESSORY DWELLING UNIT

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PLEASE NOTE THE REVISION NUMBER AND DATE ARE FOR ENERGY SHEETS ONLY.

Sheet Description:

### ENERGY CALCULATIONS

#### SUBMITTAL SHEETS FOR EQUIPMENT

Initial Issue Date: March 31, 2023

Energy Analyst: J. Bennett Ext. 26

Project Manager: J. Peek Ext. 23

Job No. W021420

Sheet No.

**ECS**



GENERAL NOTES

1. ALL MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE 2022 EDITION OF THE CALIFORNIA BUILDING CODE (CBC); THE MOST RECENT VERSIONS OF THE CMC, CPC AND CEC; ALL APPLICABLE LOCAL CODES AND ORDINANCES; AND LOCALLY ACCEPTED STANDARDS OF PRACTICE.
2. THESE DRAWINGS AND SPECIFICATIONS HAVE BEEN PREPARED EXCLUSIVELY FOR USE ON THIS PROJECT ONLY. THE DRAWINGS AND SPECIFICATIONS, OR PORTIONS THEREOF, SHALL NOT BE USED ON OTHER PROJECTS OR ADDITIONS TO THIS PROJECT EXCEPT BY AGREEMENT IN WRITING AND WITH APPROPRIATE COMPENSATION OF THE ENGINEER.
3. WRITTEN INFORMATION AND DIMENSIONS SHALL TAKE PRECEDENCE OVER GRAPHIC INFORMATION.
4. STRUCTURAL DRAWINGS SHOW ONLY THE BASIC STRUCTURAL SYSTEMS. REFER TO THE ARCHITECTURAL, MECHANICAL, ELECTRICAL AND CIVIL DRAWINGS FOR ITEMS WHICH REQUIRE SPECIAL PROVISIONS DURING CONSTRUCTION.
5. SEE DRAWINGS OTHER THAN STRUCTURAL FOR: TYPES OF FINISH MATERIALS AND THEIR LOCATIONS, FOR DEPRESSIONS IN FLOOR SLABS, FOR OPENINGS IN WALLS AND FLOORS REQUIRED BY ARCHITECTURAL AND MECHANICAL FEATURES, FOR STAIRS, CURBS, ETC.
6. ALL DETAIL REFERENCES SHALL BE CONSIDERED "TYPICAL". THE INTENT OF TYPICAL DETAILS SHALL BE APPLIED TO SIMILAR CONDITIONS ELSEWHERE IN THE PROJECT. WHEN DETAILS LABELED "SIMILAR" ARE GIVEN ON DRAWINGS, THE CONTRACTOR SHALL APPLY THE GENERAL INTENT OF THE DETAIL TO THE REFERENCED CONDITION.
7. **THE CONTRACTOR SHALL REVIEW ALL DRAWINGS IMMEDIATELY UPON RECEIPT AND SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES.**
8. STRUCTURAL DRAWINGS AND SPECIFICATIONS FOR THIS WORK HAVE BEEN PREPARED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING STANDARDS OF PRACTICE TO MEET THE MINIMUM REQUIREMENTS OF THE APPLICABLE EDITION OF THE CBC. ANY OMISSIONS OR DISCREPANCIES ON THE PLANS OR ANY DEVIATIONS FROM THE PLANS THAT ARE NECESSITATED BY FIELD CONDITIONS OR ANY CONDITION DIFFERENT FROM THOSE INDICATED ON THE PLANS SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO CONTINUING CONSTRUCTION. ALL WORK SHALL BE COORDINATED SO COOPERATION BETWEEN THE TRADES IS ACCOMPLISHED.
9. CONNECTIONS AND IMPLIED CONSTRUCTION ASSEMBLIES THAT ARE NOT SPECIFICALLY DESCRIBED OR DETAILED SHALL BE CONSTRUCTED USING STANDARD CONSTRUCTION PRACTICES IN COMPLIANCE WITH THE GOVERNING CODES AND LOCAL ORDINANCES.
10. THE STRUCTURAL SYSTEMS HAVE BEEN DESIGNED TO CARRY THE SUPERIMPOSED LIVE LOADS AS PRESCRIBED BY THE CALIFORNIA BUILDING CODE AND IN ACCORDANCE WITH STANDARD ENGINEERING PRACTICES, WITH NO SPECIAL PROVISIONS TO CARRY CONCENTRATED LOADS FROM STORAGE AND HANDLING OF CONSTRUCTION MATERIALS OR FROM OPERATION OF CONSTRUCTION EQUIPMENT.
11. DRAWINGS AND SPECIFICATIONS REPRESENT FINISHED STRUCTURE. CONTRACTOR SHALL BE RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO SHORING AND TEMPORARY BRACING. THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURE TO INSURE SAFETY OF ALL PERSONS AND STRUCTURES AT THE SITE AND ADJACENT TO THE SITE. OBSERVATION VISITS TO THE SITE BY THE ARCHITECT, ENGINEER OR CONSTRUCTION MANAGER SHALL NOT RELIEVE THE CONTRACTOR OF SUCH RESPONSIBILITY.
12. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL MAINTAIN THE INTEGRITY OF ALL SCAFFOLDING, BRACING, AND SHORING SYSTEMS AS REQUIRED FOR INSTALLATION, STABILITY AND SAFETY OF NEW WORK AND EXISTING STRUCTURES, PIPING, AND FOUNDATION SYSTEMS. CONTRACTOR SHALL ALSO PROVIDE FOR THE SAFETY OF PEDESTRIANS AND JOB SITE PERSONNEL. AT ALL TIMES, THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITION OF THE JOB SITE, INCLUDING SAFETY OF PERSONS AND PROPERTY. THE CONTRACTOR SHALL PROTECT NEW AND EXISTING CONSTRUCTION FROM INCLMENT WEATHER AND PHYSICAL DAMAGE.
13. CONTRACTOR SHALL COORDINATE WITH THE CITY TO ENSURE ALL INSPECTIONS (INCLUDING SPECIAL INSPECTIONS) ARE COMPLETED PER THE LOCAL BUILDING DEPARTMENT REQUIREMENTS. APPROVALS BY BUILDING INSPECTORS SHALL NOT CONSTITUTE AUTHORITY TO DEVIATE FROM THE PLANS AND SPECIFICATIONS.
14. IF PROVIDED, OBSERVATION OF THE CONSTRUCTION BY THE ENGINEER IS INTENDED TO IMPROVE THE PROBABILITY THAT THE WORK IS COMPLETED IN GENERAL CONFORMANCE WITH THE ENGINEERING INTENT OF THE DESIGN. OBSERVATION OF THE CONSTRUCTION BY THE ENGINEER DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR COMPLETING THE CONSTRUCTION IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS, GENERALLY ACCEPTED STANDARDS OF PRACTICE, AND CITY/COUNTY REQUIRED INSPECTIONS.
15. ALL FRAMING HARDWARE SHALL BE MANUFACTURED BY SIMPSON STRONGTIE, OR EQUAL. ALTERNATE FRAMING HARDWARE MANUFACTURERS SHALL NOT BE PROVIDED UNLESS SPECIFICALLY AUTHORIZED BY THE ENGINEER AND THE BUILDING OWNER. IF ALTERNATE HARDWARE SYSTEMS ARE AUTHORIZED, THE CONTRACTOR SHALL FORWARD COMPLETE SHOP DRAWINGS FOR REVIEW AND APPROVAL.

FOUNDATION NOTES

1. FOOTING DEPTH DIMENSION ARE INTO UNDISTURBED SOIL OR ENGINEERED FILL APPROVED BY THE GEOTECHNICAL ENGINEER, IF APPLICABLE. FINAL FOOTING DEPTH SHALL BE MEASURED FROM LOWEST ADJACENT GRADE OR BOTTOM OF UNAPPROVED FILL.
2. REMOVE LOOSE SOIL AND STANDING WATER FROM FOUNDATION EXCAVATIONS PRIOR TO PLACING CONCRETE. THE GEOTECHNICAL ENGINEER (IF APPLICABLE) SHALL INSPECT AND APPROVE ALL EXCAVATIONS, SOIL COMPACTION WORK PRIOR TO PLACEMENT OF ANY REBAR OR CONCRETE, SHORING INSTALLATIONS, BACKFILL MATERIALS AND BACK FILLING PROCEDURES.
3. MINIMUM CLEARANCE OF 8" SHALL BE PROVIDED BETWEEN EARTH AND WOOD IN ALL LOCATIONS PER CBC 2304.12
4. **DRAINAGE AND SURFACE RUNOFF:**  
PERIMETER GRADES SHOULD BE POSITIVELY SLOPED AT ALL TIMES TO PROVIDE FOR RAPID REMOVAL OF SURFACE WATER RUNOFF AWAY FROM THE FOUNDATION SYSTEMS AND TO PREVENT PONDING OF WATER UNDER FOUNDATIONS OR SEEPAGE TOWARD THE FOUNDATION SYSTEMS AT ANY TIME DURING OR AFTER CONSTRUCTION. PONDED WATER MAY CAUSE UNDESIRABLE SOIL SWELL OR LOSS OF STRENGTH.  
A. AS A MINIMUM REQUIREMENT, FINISHED GRADES SHOULD HAVE SLOPES OF AT LEAST 5 PERCENT WITHIN 10 FEET FROM THE EXTERIOR WALLS AND AT RIGHT ANGLES TO ALLOW SURFACE WATER TO DRAIN POSITIVELY AWAY FROM THE STRUCTURE. FOR PAVED AREAS, THE SLOPE GRADIENT CAN BE REDUCED TO 2 PERCENT.
- B. ALL SURFACE WATER SHOULD BE COLLECTED AND DISCHARGED INTO APPROVED DRAINAGE FACILITIES. APPROVED DRAINAGE FACILITIES SHALL BE PACIFIED BY THE THE CIVIL ENGINEER, IF APPLICABLE.
- C. ALL ROOF STORMWATER SHOULD BE COLLECTED AND DIRECTED TO DOWNSPOUTS. STORMWATER FROM ROOF DOWNSPOUTS SHOULD NOT BE ALLOWED TO DISCHARGE DIRECTLY ONTO THE GROUND SURFACE IN CLOSE PROXIMITY TO THE FOUNDATION SYSTEM. RATHER, STORMWATER FROM ROOF DOWNSPOUTS SHOULD BE DIRECTED BY AN IMPERMEABLE SURFACE INTO THE STREET OR TO AN APPROVED DRAINAGE FACILITY. IF THIS IS NOT ACCEPTABLE, WE RECOMMEND DOWNSPOUTS DISCHARGE AT LEAST 5 FEET AWAY FROM FOUNDATIONS.
5. **OVER-OPTIMUM SOIL MOISTURE CONDITIONS:**  
THE CONTRACTOR SHOULD ANTICIPATE ENCOUNTERING EXCESSIVELY OVER-OPTIMUM (WET) SOIL MOISTURE CONDITIONS DURING WINTER OR SPRING GRADING, OR DURING OR FOLLOWING PERIODS OF RAIN. IN ADDITION, WET SOIL CONDITIONS MAY BE ENCOUNTERED NEAR THE BOTTOM OF EXCAVATIONS. WET SOIL CAN MAKE PROPER COMPACTION DIFFICULT OR IMPOSSIBLE. WET SOIL CONDITIONS SHALL BE MITIGATED BY APPROVED MEANS.
6. **OVER-OPTIMUM SOIL MOISTURE CONDITIONS:**  
WHERE MOISTURE VAPOR TRANSMISSION IS A CONCERN, CONSULT A WATERPROOFING EXPERT. MOISTURE TRANSITION IS OUTSIDE THE SCOPE OF THESE PLANS.  
A. A TIGHT, WATER VAPOR RETARDING MEMBRANE SHOULD BE INSTALLED BELOW ALL SLAB FOUNDATIONS SYSTEMS TO REDUCE MOISTURE CONDENSATION UNDER FLOOR COVERINGS. THE VAPOR RETARDER SHOULD MEET ASTM E 1745 CLASS A REQUIREMENTS FOR WATER VAPOR PERMEANCE, TENSILE STRENGTH, AND PUNCTURE RESISTANCE. VAPOR TRANSMISSION THROUGH THE SLAB FOUNDATIONS CAN ALSO BE REDUCED BY USING HIGH STRENGTH CONCRETE WITH A LOW WATER-CEMENT RATIO.
7. DEEPEN PERIMETER FOOTINGS AS REQUIRED WHERE FOOTING, OR EDGE OF SLAB, IS WITHIN 3'-0" OF EDGE OF BIO-SWALE, BIO-RETENTION FACILITIES, TRENCHES, ETC. DEEPEN FOOTING SUCH THAT A 1:1 PLANE IS MAINTAINED BETWEEN BOTTOM OF FOOTING AND BOTTOM OF ADJACENT EXCAVATION. SEE DTL. 207 FOR MORE INFORMATION.
8. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND PROTECT EXISTING UTILITIES TO REMAIN DURING AND/OR AFTER CONSTRUCTION.
9. CONTRACTOR TO REMOVE ABANDONED FOOTINGS, UTILITIES, ETC. WHICH INTERFERE WITH NEW CONSTRUCTION, UNLESS OTHERWISE INDICATED. NOTIFY THE OWNER'S REPRESENTATIVE IF ANY BURIED STRUCTURES NOT INDICATED, SUCH AS CESSPOOLS, CISTERNS, FOUNDATIONS, ETC., ARE FOUND.
10. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR EXCAVATION PROCEDURES INCLUDING LAGGING, SHORING, UNDERPINNING AND PROTECTION OF EXISTING CONSTRUCTION.
11. PLACE BACKFILL BEHIND RETAINING WALLS AFTER CONCRETE OR MASONRY HAS ATTAINED FULL DESIGN STRENGTH. BRACE BUILDING AND PIT WALLS BELOW GRADE FROM LATERAL LOADS UNTIL ATTACHED FLOORS AND SLABS ON GRADE ARE COMPLETE AND HAVE ATTAINED FULL DESIGN STRENGTH.

SYMBOLS LEGEND

- NOT ALL SYMBOLS USED IN THE DRAWING ARE LISTED BELOW. REFER TO AMERICAN WELDING SOCIETY PUBLICATIONS FOR WELDING SYMBOLS.
- (LENGTH)  
SW-# INDICATES SHEARWALL NUMBER AND MINIMUM DESIGN LENGTH. SHEARWALLS SHALL BE AS NOTED IN THE SHEARWALL SCHEDULE
- SD INDICATES HOLDOWN TYPE AS MANUFACTURED BY THE "SIMPSON STRONGTIE COMPANY." HOLDOWNS SHALL BE AS NOTED IN THE HOLDOWN SCHEDULE, PER
- INDICATES INTERIOR BEARING WALL BELOW

SHEARWALL NOTES

1. WHERE A STRUCTURAL SHEARWALL IS INDICATED ON PLANS THE ASSEMBLY SHALL RUN HORIZONTALLY AND CONTINUOUSLY TO THE NEAREST WALL OPENING OR END OF THE WALL; THE ASSEMBLY SHALL RUN VERTICALLY CONTINUOUSLY FROM THE BOTTOM OF THE NEAREST SOLE OR BOTTOM PLATE UP TO THE TOP OF THE NEAREST DOUBLE TOP PLATE (OR BEAM). ALL PLYWOOD PANEL EDGES SHALL BE BLOCKED AND EDGE NAILED.
2. WHERE HOLDOWN POSTS OR STUDS ARE INDICATED AT THE END OF A SHEARWALL, THE SHEAR PLYWOOD SHALL BE EDGE NAILED AND THE POST SHALL RUN CONTINUOUSLY FROM THE SOLE PLATE TO THE DOUBLE TOP PLATE. HOLDOWNS SHALL BE ATTACHED TO POSTS AT THE ENDS OF SHEARWALLS AND SHALL EXTEND TO EITHER FRAMING BELOW OR TO FOUNDATION AS SHOWN ON PLANS.
3. SEE SHEARWALL SCHEDULE ON PLANS FOR REQUIRED SHEARWALL NAILING, ANCHOR BOLTS, SILL NAILS, AND OTHER SHEAR TRANSFER HARDWARE.
4. SHEARWALL PLYWOOD SHALL NOT BE CUT FOR PIPE, DUCTS, SLEEVES, ETC., U.N.O. OR DETAILED.
5. UNLESS OTHERWISE DETAILED, ALL INTERIOR SHEARWALLS SHALL BE CONTINUOUS TO THE ROOF OR FLOOR PLYWOOD IN ACCORDANCE WITH THE TYPICAL SHEAR TRANSFER DETAILS
6. PLYWOOD SHEETS LOCATED AT SHEARWALL EDGES SHALL BE AT LEAST 12" WIDE. PLYWOOD EDGES SHALL BE EDGE NAILED TO ALL SHEARWALL FRAMING MEMBERS. SEE SHEARWALL SCHEDULE FOR FIELD NAILING REQUIREMENTS.
7. SEE SHEARWALL SCHEDULE FOR SHEARWALLS THAT REQUIRE 3x MUDDSILLS AND 3x FRAMING AT ADJOINING PLYWOOD PANEL EDGES. SILL PLATES, TOP PLATES AND MEMBERS IN THE FIELD OF INDIVIDUAL PLYWOOD PANELS DO NOT TYPICALLY BACK ADJOINING PANEL EDGES AND THUS MAY BE 2x.

OBSERVATION OF CONSTRUCTION

1. IN ADDITION TO OBSERVATIONS BY THE SOILS ENGINEER(IF APPLICABLE), AND CITY INSPECTOR, OBSERVATION OF THE CONSTRUCTION BY THE PROJECT ENGINEER IS RECOMMENDED FOR THIS PROJECT. THE CONTRACTOR SHALL PHASE THE PROJECT AND COORDINATE WITH THE ENGINEER TO ENSURE THAT THE PRIMARY STRUCTURAL ELEMENTS OF THE CONSTRUCTION ARE OBSERVED PRIOR TO COVERING WITH FINISHES OR OTHER MATERIALS. AS A MINIMUM, OBSERVATION BY THE ENGINEER IS RECOMMENDED AS FOLLOWS:
- A. REINF. STEEL AND HARDWARE EMBEDDED IN THE FNDTION SHALL BE OBSERVED PRIOR TO CONCRETE PLACEMENT  
B. SHEARWALLS AND FRAMING ELEMENTS SHALL BE OBSERVED PRIOR TO INSTALLATION OF FINISHES.
2. OBSERVATION OF THE CONSTRUCTION BY THE ENGINEER DOES NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY TO COMPLETE THE CONSTRUCTION IN CONFORMANCE WITH THE PROJECT DOCUMENTS AND GENERALLY ACCEPTED STANDARDS OF PRACTICE. THE PURPOSE OF OUR VISITS WILL BE TO BECOME GENERALLY FAMILIAR WITH THE PROGRESS AND QUALITY OF THE CONTRACTOR'S WORK AND DETERMINE IF THE WORK IS PROGRESSING IN GENERAL CONFORMANCE WITH OUR DESIGN INTENT. DURING OUR VISITS, ADVANCED ENGINEERING WILL NOT BE MAKING DETAILED INSPECTIONS, OR VERIFYING DIMENSIONS. THE CONTRACTOR IS RESPONSIBLE FOR FOLLOWING APPLICABLE CODES AND THE APPROVED CONSTRUCTION DOCUMENTS.

SPECIAL INSPECTIONS PER 2022 CBC 1701

1. IN ADDITION TO OBSERVATIONS BY THE CITY INSPECTOR AND THE PROJECT ENGINEER, SPECIAL INSPECTIONS BY AN ICC CERTIFIED SPECIAL INSPECTOR IS REQUIRED AS FOLLOWS:
- A. EPOXY ANCHORS INSTALLED IN CONCRETE SHALL HAVE SPECIAL INSPECTION OF HOLE DEPTH & DIAMETER, MATERIALS, CLEANING PROCEDURES, AND INSTALLATION PER ICC-REPORT ICC-ES/ESR-2508 SECTION 4.4.3.  
B. TITEN HD ANCHORS INSTALLED IN CONCRETE SHALL HAVE SPECIAL INSPECTION OF DRILLING AND INSTALLATION PER ICC-REPORT ICC-ES/ESR-2713 SECTION 4.4.  
C. PERIODIC SPECIAL INSPECTION IS REQUIRED FOR NAILING, BOLTING, ANCHORING, AND OTHER FASTENING OF COMPONENTS WITHIN THE SEISMIC-FORCE-RESISTING SYSTEM, INCLUDING WOOD SHEAR WALLS, WOOD DIAPHRAGMS, DRAG STRUTS, BRACES, SHEAR PANELS AND HOLDOWNS PER SECTION 1705.12.2 OF THE CURRENT EDITION OF THE C.B.C.  
D. CONTINUOUS INSPECTIONS OF CAST-IN-PLACE DEEP FOUNDATION (PIERS) OR DRILLING OPERATIONS. COMPLETE AND ACCURATE RECORDS FOR EACH ELEMENT SHALL BE PROVIDED PER SECTION 1705.8 OF THE CURRENT EDITION OF THE C.B.C.  
E. CONTINUOUS INSPECTIONS OF CAST-IN-PLACE DEEP FOUNDATION (PIERS) TO VERIFY: PLACEMENT LOCATIONS AND PLUMBNESS, CONFIRM ELEMENT DIAMETERS, LENGTHS, AND EMBEDMENTS PER SECTION 1705.8 OF THE CURRENT EDITION OF THE C.B.C.
2. THE CONTRACTOR SHALL COORDINATE WITH THE CITY TO ENSURE SPECIAL INSPECTION IS PROVIDED PER CITY REQUIREMENTS. THE SPECIAL INSPECTOR SHALL BE EMPLOYED BY THE OWNER AND MUST DEMONSTRATE HIS QUALIFICATIONS TO THE ARCHITECT/ENGINEER OF RECORD AND THE BUILDING OFFICIAL.

FASTENING SCHEDULE (C.B.C. TABLE 2304.10.2)

| ITEM | DESCRIPTION OF CONNECTION                                                                       | FASTENING (NOTE 1, 4, 8) |                             |                            |
|------|-------------------------------------------------------------------------------------------------|--------------------------|-----------------------------|----------------------------|
|      |                                                                                                 | COMMON / BOX             | SMOOTH SHANK                | STAPLES                    |
| 1    | JOIST TO SILL OR GIRDER, TOE-NAIL                                                               | (3) 8d                   | (3) 3" x 0.131"             | (3) 3"-14 GA.              |
| 2    | BRIDGING TO JOIST, TOE-NAIL EA. END                                                             | (2) 8d                   | (2) 3" x 0.131"             | (2) 3"-14 GA.              |
| 3    | 1" x 6" SUBFLOOR OR LESS, TO EACH JOIST, FACE NAIL                                              | (2) 8d                   | N.A.                        | N.A.                       |
| 4    | WIDER THAN 1" x 6" SUBFLOOR TO EACH JOIST, FACE NAIL                                            | (3) 8d                   | N.A.                        | N.A.                       |
| 5    | 2" SUBFLOOR TO JOIST OR GIRDER, BLIND AND FACE NAIL                                             | (2) 16d                  | N.A.                        | N.A.                       |
| 6    | SOLE PLATE TO JOIST OR BLOCKING, TYPICAL FACE NAIL                                              | 16d AT 16"               | 3" x 0.131" AT 8" O.C.      | 3"-14 GA. AT 12" O.C.      |
|      | SOLE PLATE TO JOIST OR BLOCKING, AT BRACED WALL PANELS                                          | (3) 16d AT 16"           | (4) 3" x 0.131" AT 16" O.C. | (4) 3"-14 GA. PER 16" O.C. |
| 7    | TOP PLATE TO STUD, END NAIL                                                                     | (2) 16d                  | (3) 3" x 0.131"             | (3) 3"-14 GA.              |
| 8    | STUD TO SOLE PLATE, END NAIL                                                                    | (2) 16d                  | (3) 3" x 0.131"             | (3) 3"-14 GA.              |
|      | STUD TO SOLE PLATE, TOE-NAIL                                                                    | (4) 8d                   | (4) 3" x 0.131"             | (3) 3"-14 GA.              |
| 9    | DOUBLE STUDS, FACE NAIL                                                                         | 16d AT 24"               | 3" x 0.131" AT 8" O.C.      | 3"-14 GA. AT 8" O.C.       |
| 10   | DOUBLED TOP PLATES, TYP. FACE NAIL                                                              | 16d AT 16"               | 3" x 0.131" AT 12" O.C.     | 3"-14 GA. AT 12" O.C.      |
|      | DOUBLED TOP PLATES, LAP SPLICE                                                                  | (8) 16d                  | (12) 3" x 0.131"            | (12) 3"-14 GA.             |
| 11   | BLOCKING BETWEEN JOISTS OR RAFTERS, TO TOP PLATE, TOE-NAIL                                      | (3) 8d                   | (3) 3" x 0.131"             | (3) 3"-14 GA.              |
| 12   | RIM JOIST TO TOP PLATE, TOE-NAIL                                                                | 8d AT 6"                 | 3" x 0.131" AT 6" O.C.      | 3"-14 GA. AT 6" O.C.       |
| 13   | TOP PLATES, LAPS AND INTERSECTIONS, FACE NAIL                                                   | (2) 16d                  | (3) 3" x 0.131"             | (3) 3"-14 GA.              |
| 14   | CONTINUOUS HEADER, TWO PIECES                                                                   | 16d AT 16" ALONG EDGE    | N.A.                        | N.A.                       |
| 15   | CEILING JOIST TO PLATE, TOE-NAIL                                                                | (3) 8d                   | (5) 3" x 0.131"             | (5) 3"-14 GA.              |
| 16   | CONTINUOUS HEADER TO STUD, TOE-NAIL                                                             | (4) 8d                   | N.A.                        | N.A.                       |
| 17   | CEILING JOISTS: LAPS OVER PARTITIONS, FACE NAIL (SEE C.B.C. TABLE 2308.7.3.1)                   | (3) 16d MIN.             | (4) 3" x 0.131"             | (4) 3"-14 GA.              |
| 18   | CEILING JOISTS TO PARALLEL RAFTERS, FACE NAIL (SEE C.B.C. TABLE 2308.7.3.1)                     | (3) 16d MIN.             | (4) 3" x 0.131"             | (4) 3"-14 GA.              |
| 19   | RAFTER TO PLATE, TOE-NAIL (SEE C.B.C. TABLE 2308.7.9)                                           | (3) 8d                   | (3) 3" x 0.131"             | (3) 3"-14 GA.              |
| 20   | 1" DIAGONAL BRACE TO EACH STUD AND PLATE, FACE NAIL                                             | (2) 8d                   | (2) 3" x 0.131"             | (3) 3"-14 GA.              |
| 21   | 1" x 8" SHEATHING OR LESS TO EACH BEARING, FACE NAIL                                            | (3) 8d                   | N.A.                        | N.A.                       |
| 22   | WIDER THAN 1" x 8" SHEATHING TO EACH BEARING, FACE NAIL                                         | (3) 8d                   | N.A.                        | N.A.                       |
| 23   | BUILT-UP CORNER STUDS                                                                           | 16d AT 24"               | 3" x 0.131" AT 16" O.C.     | 3"-14 GA. AT 16" O.C.      |
| 24   | BUILT-UP GIRDER AND BEAMS, FACE NAIL TOP AND BTM STAGG. ON OPP. SIDE                            | 20d AT 32"               | 3" x 0.131" AT 24" O.C.     | 3"-14 GA. AT 24" O.C.      |
|      | BUILT-UP GIRDER AND BEAMS, FACE NAIL AT ENDS AND AT EACH SPLICE                                 | (2) 20d                  | (3) 3" x 0.131"             | (3) 3"-14 GA.              |
| 25   | 2" PLANK TO EACH BEARING                                                                        | 16d                      | N.A.                        | N.A.                       |
| 26   | COLLAR TIE TO RAFTER, FACE NAIL                                                                 | (3) 10d                  | (4) 3" x 0.131"             | (4) 3"-14 GA.              |
| 27   | JACK RAFTER TO HIP, TOE-NAIL                                                                    | (3) 10d                  | (4) 3" x 0.131"             | (4) 3"-14 GA.              |
| 28   | JACK RAFTER TO HIP, FACE NAIL                                                                   | (2) 16d                  | (3) 3" x 0.131"             | (3) 3"-14 GA.              |
| 29   | JOIST TO BAND JOIST, FACE NAIL                                                                  | (3) 16d                  | (4) 3" x 0.131"             | (4) 3"-14 GA.              |
| 30   | LEDGER STRIP, FACE NAIL                                                                         | (3) 16d                  | (4) 3" x 0.131"             | (4) 3"-14 GA.              |
| 31   | WOOD STRUCTURAL PANELS AND PARTICLE BOARD (NOTE 2): SUBFLOOR, ROOF + WALL SHEATHING TO FRAMING: |                          |                             |                            |
|      | 1/2" AND LESS                                                                                   | 6d (NOTE 3, 7)           | 2.375" x 0.113" (NOTE 9)    | 1.75" x 16 GA. (NOTE 10)   |
|      | 19/32" TO 3/4"                                                                                  | 8d (NOTE 4)              | 2.375" x 0.113" (NOTE 11)   | 2" x 16 GA. (NOTE 11)      |
|      | 7/8" TO 1"                                                                                      | 8d (NOTE 3)              | N.A.                        | N.A.                       |
|      | 1-1/8" TO 1-1/4"                                                                                | 10d OR 8d (NOTE 4)       | N.A.                        | N.A.                       |
|      | SINGLE FLOOR (COMBINATION SUBFLOOR- UNDERLAYMENT TO FRAMING):                                   |                          |                             |                            |
|      | 3/4" AND LESS                                                                                   | 6d (NOTE 5)              | N.A.                        | N.A.                       |
|      | 7/8" TO 1"                                                                                      | 8d (NOTE 5)              | N.A.                        | N.A.                       |
|      | 1-1/8" TO 1-1/4"                                                                                | 10d (NOTE 4)             | N.A.                        | N.A.                       |
|      | PANEL SIDING TO FRAMING (NOTE 2):                                                               |                          |                             |                            |
| 32   | 1/2" AND LESS                                                                                   | 6d (NOTE 6)              | N.A.                        | N.A.                       |
|      | 5/8"                                                                                            | 8d (NOTE 6)              | N.A.                        | N.A.                       |

NOTES:

- FOR S1: 1 inch = 25.4 mm
1. COMMON OR BOX NAILS ARE PERMITTED TO BE USED EXCEPT WHERE OTHERWISE STATED.
2. NAILS SPACED AT 6" O.C. AT EDGES, 12" O.C. AT INTERMEDIATE SUPPORTS EXCEPT 6" O.C. AT ALL SUPPORTS WHERE SPANS ARE 4'-0" OR MORE. NAILING OF WOOD STRUCTURAL PANEL AND PARTICLEBOARD DIAPHRAGMS AND SHEAR WALLS, REFER TO C.B.C. SECTION 2305. WALL SHEATHING NAILS ARE PERMITTED TO BE COMMON, BOX OR CASING. COMMON OR DEFORMED SHANK (6d - 2" x 0.113"; 8d - 2.5" x 0.131"; 10d - 3" x 0.148")
3. COMMON (6d - 2" x 0.113"; 8d - 2.5" x 0.131"; 10d - 3" x 0.148"; 16d - 3.5" x 0.162")
4. DEFORMED SHANK (6d - 2" x 0.113"; 8d - 2.5" x 0.131"; 10d - 3" x 0.148")
5. CORROSION-RESISTANT SIDING (6d - 1.875" x 0.106"; 8d - 2.375" x 0.128") OR CASING (6d - 2" x 0.099"; 8d - 2.5" x 0.113") NAILS.
6. FOR ROOF SHEATHING APPLICATIONS, 8d NAILS (2.5" x 0.113") ARE THE MINIMUM REQUIRED FOR WOOD STRUCTURAL PANELS.
7. STAPLES SHALL HAVE A MINIMUM CROWN WIDTH OF 7/16".
8. FOR ROOF SHEATHING APPLICATIONS, FASTENERS SPACED 4" O.C. AT EDGES AND 8" O.C. AT INTERMEDIATE SUPPORTS.
9. FASTENERS SPACED 4" O.C. AT EDGES AND 8" O.C. AT INTERMEDIATE SUPPORTS FOR SUBFLOOR AND WALL SHEATHING AND 3" O.C. AT EDGES AND 6" O.C. AT INTERMEDIATE SUPPORTS FOR ROOF SHEATHING.
11. FASTENERS SPACED 4" O.C. AT EDGES AND 8" O.C. AT INTERMEDIATE SUPPORTS.

NAIL SCHEDULE

| FASTENER PER PLAN | SHANK DIA. | HEAD DIA. | MIN. LENGTH |
|-------------------|------------|-----------|-------------|
| 8d                | 0.131"     | 0.281"    | 2-1/2"      |
| 10d               | 0.148"     | 0.312"    | 3"          |
| 16d               | 0.148"     | 0.344"    | 3-1/4"      |
| 16d COMMON        | 0.162"     | 0.344"    | 3-1/2"      |
| 20d               | 0.192"     | 0.406"    | 4"          |

NOTES:

1. ALL NAILS IN MANUF. HARDWARE SHALL BE PER MANUFACTURERS SPECIFICATIONS AS NOTED TO ACHIEVE MAX HARDWARE VALUE. FASTENERS, INCLUDING NUTS AND WASHERS, IN CONTACT WITH SODIUM BORATE SBX/DOT PRESERVATIVE-TREATED WOOD IN AN INT., DRY ENVIRONMENT SHALL BE PERMITTED.
2. FASTENERS IN CONTACT WITH PRESERVATIVE-TREATED WOOD USING ALKALINE COPPER QUAT (ACQ-C, ACQ-D, ACQ-Q CARBONATE), COPPER AZOLE (CA-B & CA-C, MCA-C) OR EXPOSED TO WEATHER SHALL BE HOT DIPPED GALV. OR STAINLESS STEEL.

REFERENCE TO STRUCTURAL CALCULATIONS FOR THE BENEFIT OF THE BUILDING OFFICIAL

INDICATES REVISION NUMBER AND PLAN REVISIONS INSIDE CLOUD

REFERENCE TO STRUCTURAL CALCULATIONS FOR THE BENEFIT OF THE BUILDING OFFICIAL

INDICATES HANGER.

ABBREVIATION LEGEND

|         |                                           |          |                                   |          |                                      |
|---------|-------------------------------------------|----------|-----------------------------------|----------|--------------------------------------|
| A.B.    | ANCHOR BOLT                               | EXT.     | EXTERIOR                          | OPNG     | OPENING                              |
| ABV     | ABOVE                                     | FDN      | FOUNDATION                        | O.S.B.   | ORIENTED STRAND BOARD                |
| ACI     | AMERICAN CONCRETE                         | F.F.     | FINISH FLOOR                      | O.W.S.J. | OPEN WEB STEEL JOIST                 |
| ADDL    | ADDITIONAL                                | FIN.     | FINISH                            | O.W.J.G. | OPEN WEB JOIST GIRDER                |
| A.F.F.  | ABOVE FINISHED FLOOR                      | INST.    | INSTITUTE                         | P.A.     | POST ABOVE                           |
| AGGREG. | AGGREGATE                                 | FLR      | FLOOR                             | P.A.F.   | POWDER-ACTUATED FASTENER             |
| AISC    | AMERICAN INSTITUTE OF STEEL CONSTRUCTION  | FLG      | FLANGE                            | P.C.F.   | POUNDS PER CUBIC FOOT                |
| ATC     | AMERICAN INSTITUTE OF TIMBER CONSTRUCTION | F.N.     | FACE NAIL                         | PEN.     | PENETRATION                          |
| ALT.    | ALTERNATE                                 | F.O.B.   | FACE OF BLOCK                     | PERF.    | PERFORATED                           |
| ARCH.   | ARCHITECT(URAL)                           | F.O.C.   | FACE OF CONCRETE                  | PERP.    | PERPENDICULAR                        |
| ASTM    | AMERICAN SOCIETY FOR TESTING & MATERIALS  | F.O.S.   | FACE OF STUD                      | PL.      | PLATE                                |
| BM      | BEAM                                      | F.P.     | FIREPLACE - OR - FULL PENETRATION | PLY.     | PLYWOOD                              |
| B/      | BOTTOM OF                                 | FRMD     | FRAMED                            | PLYWD    | PLYWOOD                              |
| B.C.    | BOTTOM CHORD                              | FRMG     | FRAMING                           | PR       | PAIR                                 |
| BLDG    | BUILDING                                  | F.S.     | FAR SIDE                          | P.S.F.   | POUNDS PER SQUARE FOOT               |
| BLK     | BLOCK                                     | F.S.     | FAR SIDE                          | P.S.I.   | POUNDS PER SQUARE INCH               |
| BLKG    | BLOCKING                                  | FT       | FOOT                              | P.S.L.   | PARALLEL-STRAND LUMBER               |
| BLW     | BELOW                                     | FTG      | FOOTING                           | PST      | POST                                 |
| BN      | BOUNDARY NAILING                          | G & N    | GLUE AND NAIL                     | PT       | POINT                                |
| B.O.    | BY OTHERS - OR - BOTTOM OF                | GA.      | GAGE                              | P.T.     | PRESSURE TREATED - OR - POST-TENSION |
| B.O.C.  | BOTTOM OF CONCRETE                        | GALV.    | GALVANIZED                        | R        | RADIUS                               |
| B.O.F.  | BOTTOM OF FOOTING                         | GEN.     | GENERAL                           | REC'D    | RECOMMEND(ATION)                     |
| B.O.P.  | BOTTOM OF PLATE                           | GLB      | GLUED-LAMINATED BEAM              | REF.     | REFERENCE                            |
| BRG     | BEARING                                   | GR.      | GRADE                             | REINF.   | REINFORCED - OR - REINFORCEMENT      |
| B.S.    | BOTH SIDES                                | G.T.     | GIRDER TRUSS                      | REQD     | REQUIRED                             |
| BTM     | BOTTOM                                    | G.W.B.   | GYPUSUM WALL BOARD                | RET.     | RETAINING                            |
| BTWN    | BETWEEN                                   | HD       | HOLDDOWN                          | RETAIN.  | RETAINING                            |
| CALCS   | CALCULATIONS                              | H.D.G.   | HOT-DIP GALVANIZED                | R.J.     | ROUGH JOIST                          |
| CANT.   | CANTILEVER                                | HDR      | HEADER                            | R.O.     | ROUGH OPENING                        |
| C.B.    | CEILING BEAM                              | HGR      | HANGER                            | R.P.     | "REAL" POST                          |
| C.B.C.  | CALIFORNIA BUILDING CODE                  | H.N.H.   | HEAVY HEX NUT                     | R.S.     | ROOF RAFTER                          |
| C.C.    | CENTER TO CENTER                          | H.N.     | HEX NUT                           | R/S      | RESAWN (ROUGH-SAWN)                  |
| C.C.J.  | CRACK CONTROL JOINT                       | HORIZ.   | HORIZONTAL                        | R.T.     | ROOF TRUSS                           |
| C.C.    | CUBIC FOOT                                | H.S.B.   | HIGH STRENGTH BOLT                | R.W.     | RETAINING WALL                       |
| C.J.    | CONTROL JOINT - OR - CEILING JOIST        | HSS      | STRUCTURAL TUBE                   | RDW      | REDWOOD                              |
| CL      | CENTERLINE                                | HT       | HEIGHT                            | S.A.D.   | SEE ARCHITECTURAL DRAWINGS           |
| CLG     | CEILING                                   | INT.     | INTERIOR                          | S.B.     | SOLID BLOCK                          |
| CLR     | CLEAR                                     | INV.     | INVERT(ED)                        | S.B.T.   | SET-BACK TRUSS                       |
| C.M.U.  | CONCRETE MASONRY UNIT                     | JNT      | JOINT                             | SCHED.   | SCHEDULE                             |
| COL.    | COLUMN                                    | JST      | JOIST                             | SEP.     | SEPARATION                           |
| COLL.   | COLLECTOR                                 | J.T.     | JACK TRUSS                        | S.G.T.   | SH-GRIDER TRUSS                      |
| CONC.   | CONCRETE                                  | K.       | KIPS                              | SHT      | SHEET                                |
| COND.   | CONDITION                                 | K.D.     | KILN-DRIED                        | SIM      | SIMILAR                              |
| CONV.   | CONNECTION                                | K.F.     | KIPS PER LINEAL FOOT              | S.M.S.   | SHEET METAL SCREW                    |
| CONSTR. | CONSTRUCTION                              | K.P.     | KING POST                         | S.J.     | SOFFIT JOIST                         |
| CONT.   | CONTINUOUS                                | lbs      | POUNDS                            | SQ.      | SQUARE                               |
| CONTR.  | CONTRACTOR                                | L.B.     | LAC BOLT                          | S.S.     | SELECT STRUCTURAL                    |
| C.P.    | COMPLETE PENETRATION                      | L.F.     | LINEAL FOOT                       | S4S      | SURFACED 4 SIDES                     |
| C.S.    | COUNTERSUNK                               | LONGIT.  | LONGITUDINAL                      | STAGG.   | STAGGER - OR - STAGGERED             |
| C.T.    | COLLECTOR TRUSS                           | LG       | LONG                              | STD      | STANDARD                             |
| CTR     | CENTER                                    | L.L.     | LIVE LOAD                         | STIFF.   | STIFFENER                            |
| CTRD    | CENTERED                                  | LSL      | LAMINATED STRAND LUMBER           | STL      | STEEL                                |
| C.Y.    | CUBIC YARD                                | LTV      | LIGHTWEIGHT                       | STRUCT.  | STRUCTURAL                           |
| DBL     | DOUBLE                                    | LVL      | LAMINATED VENEER LUMBER           | SW       | SHEARWALL                            |
| DET.    | DETAIL                                    | MATL     | MATERIAL                          | SYMM.    | SYMMETRICAL                          |
| D.F.    | DOUGLAS FIR                               | MAX.     | MAXIMUM                           | T + B    | TOP AND BOTTOM                       |
| DIA.    | DIAMETER                                  | M.B.     | MACHINE BOLT                      | T + G    | TONGUE AND GROOVE                    |
| DIA.    | DIAGONAL                                  | MECH.    | MECHANICAL                        | T.C.     | TOP CHORD                            |
| DIM.    | DIMENSION                                 | MEMB.    | MEMBRANE                          | THK      | THICK                                |
| D.L.    | DEAD LOAD                                 | MID.     | MIDDLE                            | THKD     | THICKENED                            |
| D.J.    | DECK JOIST                                | MIN.     | MINIMUM                           | T.N.     | TOE NAIL                             |
| D.P.    | DRAG TRUSS                                | M.I.W.   | MALLEABLE IRON WASHER             | T.O.B.   | TOP OF BLOCK                         |
| DT      | DEEP                                      | M.O.     | MASONRY OPENING                   | T.O.C.   | TOP OF CONCRETE                      |
| DTL     | DETAIL                                    | MOIST.   | MOISTURE                          | T.O.P.   | TOP OF PLATE                         |
| DWG     | DRAWING                                   | MFR      | MANUFACTURER                      | T.O.S.   | TOP OF STEEL - OR - TOP OF SHEATHING |
| DWL     | EXISTING                                  | MTL      | METAL                             | T.O.W.   | TOP OF WALL                          |
| E.A.    | EACH                                      | (N)      | NEW                               | T/       | TOP OF                               |
| E.B.    | EXPANSION BOLT                            | N.A.     | NOT APPLICABLE                    | T.P.     | TOP PLATE                            |
| E.C.    | EACH FACE                                 | N.B.     | NON-BEARING                       | TRANSV.  | TRANSVERSE                           |
| E.F.    | EXPANSION JOINT                           | N.D.T.   | NON-DESTRUCTIVE TESTING           | TYP.     | TYPICAL                              |
| E.L.    | ELEVATION                                 | N.I.C.   | NOT IN CONTRACT                   | U.N.O.   | UNLESS NOTED OTHERWISE               |
| ELV.    | ELEVATOR                                  | NLG      | NAILING                           | VERT.    | VERTICAL                             |
| EMB.    | EMBEDMENT                                 | No.      | NUMBER                            | V.I.F.   | VERTIFY IN FIELD                     |
| EMBED.  | EMBEDMENT                                 | N.S.     | NEAR SIDE                         | W.I.     | WITH                                 |
| E.N.    | EDGE NAIL                                 | N.S.G.   | NON-SHRINK GROUT                  | WD       | WOOD                                 |
| E.O.R.  | ENGINEER OF RECORD                        | N.T.S.   | NOT TO SCALE                      | W.P.     | WORK POINT - OR - WATERPROOFING      |
| E.O.R.  | ENGINEER OF RECORD                        | O/       | OVER                              | WT       | WEIGHT                               |
| EQUIP.  | EQUIPMENT                                 | O.C.     | ON CENTER                         | W.W.F.   | WELDED WIRE FABRIC                   |
| E.S.    | EACH SIDE                                 | O.D.     | OUTSIDE DIAMETER                  | W.W.M.   | WELDED WIRE MESH                     |
| E.W.    | EACH WAY                                  | O.F.O.S. | OUTSIDE FACE OF STUD              | #        | POUNDS (PREFIX)                      |
|         |                                           | O.H.     | OVERHANG - OR - OPPOSITE HAND     | #        | NUMBER (SUFFIX)                      |



GENERAL FRAMING NOTES

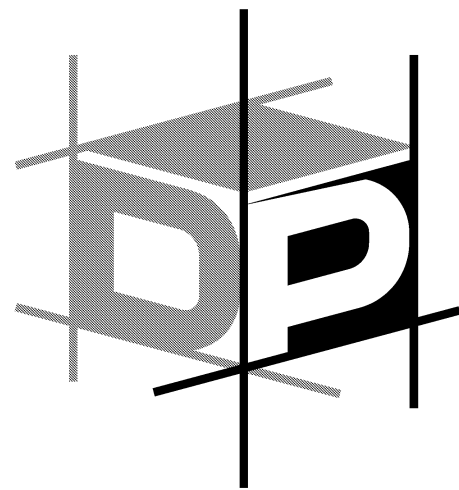
1. NO STRUCTURAL MEMBER SHALL BE CUT OR NOTCHED UNLESS SPECIFICALLY SHOWN, NOTED, OR APPROVED BY THE ENGINEER. NOTCH DETAILS, IF PROVIDED, ARE FOR GENERAL GUIDANCE ONLY. THE ENGINEER SHALL BE CONTACTED TO APPROVE LOCATIONS OF PROPOSED NOTCHES. STUDS IN EXTERIOR WALLS AND BEARING PARTITIONS MAY BE CUT OR NOTCHED TO A DEPTH NOT EXCEEDING 25% OF STUD WIDTH. CUTTING OR NOTCHING OF STUDS IN NON-BEARING PARTITIONS SHALL NOT EXCEED 40% OF THE WIDTH. SEE DETAIL 404 FOR MORE INFORMATION.
2. **TYPICAL FRAMING AND STRUCTURAL MATERIALS:**  
ALL FRAMING LUMBER SHALL BE DOUGLAS FIR, AND SHALL BE STAMPED WITH A GRADE MARK WITH THE FOLLOWING GRADES. FRAMING LUMBER SHALL CONFORM TO GRADING RULES OF WVPA AND COMPLIES WITH DOC PS 20.  
**MAXIMUM MOISTURE CONTENT SHALL NOT EXCEED 19% AT THE TIME OF CONSTRUCTION.**
- | FRAMING MATERIAL                   | GRADE                  | FRAMING MATERIAL                       | GRADE                |
|------------------------------------|------------------------|----------------------------------------|----------------------|
| TYPICAL WALL STUDS                 | PER NOTE 6 BELOW       | RAFTERS (2x DIMENSIONAL)               | D.F. #2, MIN. U.N.O. |
| SOLE PLATES (2x MIN.) <sup>1</sup> | STUD GRADE, MINIMUM    | BUILT UP HEADERS (2-2x)                | D.F. #2, MIN. U.N.O. |
| MUDSILLS (2x MIN.) <sup>2</sup>    | P.T. D.F. STD & BETTER | 4x POSTS/BEAMS/RAFTERS                 | D.F. #2, MIN. U.N.O. |
| TOP PLATES (2x MIN.) <sup>3</sup>  | D.F. #2, MIN. U.N.O.   | 6x POSTS/BEAMS/RAFTERS                 | D.F. #1, MIN. U.N.O. |
| RIM JOIST (2x DIMENSIONAL)         | D.F. #2, MIN. U.N.O.   | STRUCTURAL PLYWOOD                     | APA RATED SHGT       |
| FLR JOISTS (2x DIMENSIONAL)        | D.F. #2, MIN. U.N.O.   | LUMBER EXPOSED TO WEATHER <sup>4</sup> | P.T. D.F. #2 U.N.O.  |
1. SOLE PLATES, AS NOTED ABOVE, ARE ALL INTERIOR SILL PLATES NOT IN CONTACT WITH CONCRETE. MATERIAL SHALL BE UC1 INTERIOR/DRY CATEGORY AS DEFINED BY AWPA STANDARD U1.
2. MUDSILLS, AS NOTED ABOVE, ARE ALL INTERIOR SILL PLATES IN DIRECT CONTACT WITH CONCRETE. MATERIAL SHALL BE UC2 INTERIOR/DAMP CATEGORY AS DEFINED BY AWPA STANDARD U1.
3. LUMBER EXPOSED TO WEATHER, AS NOTED ABOVE, IS ALL EXTERIOR LUMBER ABOVE GROUND AND EXPOSED TO WEATHER. MATERIAL SHALL BE UC3B ABOVE GROUND EXPOSED CATEGORY AS DEFINED BY AWPA STANDARD U1.
3. **PRESERVATIVE TREATED OR NATURALLY DURABLE MATERIALS:**  
LUMBER SHALL BE TREATED WITH TYPICAL WATERBORNE PRESERVATIVES: ALKALINE COPPER QUAT (ACQ-C, ACQ-D, ACQ-D CARBONATE), COPPER AZOLE (CA-B & CA-C, MCA-C) AND SODIUM BORATES (SBX/DOT). THESE TREATMENTS ARE OFTEN REFERRED TO BY "TRADE NAMES SUCH AS: WOLMANIZED NATURAL SELECT" (COPPER AZOLE), PRESERVE AND NATUREWOOD® (ACQ), MICROPRO™, SMART SENSE™ (MCQ), AND ADVANCE GUARD® (BORATE).
- A. ALL INTERIOR/DAMP CONSTRUCTION, UC2 CATEGORY, SHALL BE TREATED WITH SODIUM BORATE SBX/DOT.
1. PLAIN CARBON STEEL FASTENERS, INCLUDING NUTS AND WASHERS, IN CONTACT WITH SODIUM BORATE SBX/DOT PRESERVATIVE-TREATED WOOD IN AN INTERIOR, DRY ENVIRONMENT SHALL BE PERMITTED.
- B. ALL EXTERIOR ABOVE GROUND CONSTRUCTION (INCL. DECK FRAMING), UC3B CATEGORY, SHALL BE TREATED WITH ALKALINE COPPER QUAT (ACQ-C, ACQ-D, ACQ-D CARBONATE), OR COPPER AZOLE (CA-B & CA-C, MCA-C)
1. ALL FASTENERS AND CONNECTORS IN CONTACT WITH PRESERVATIVE-TREATED TREATED WOOD USING ALKALINE COPPER QUAT (ACQ-C, ACQ-D, ACQ-D CARBONATE), OR COPPER AZOLE (CA-B & CA-C, MCA-C) SHALL BE HOT DIPPED GALVANIZED OR STAINLESS STEEL IN ACCORDANCE WITH GOVERNING CBC SEC. 2304.10 AND SHALL BE IN ACCORDANCE WITH ASTM A 153.
- C. WOOD JOISTS OR WOOD STRUCTURAL FLOORS THAT ARE CLOSER THAN 18 INCHES OR WOOD GIRDERS THAT ARE CLOSER THAN 12 INCHES TO EXPOSED GROUND IN CRAWL SPACES OR UNEXCAVATED AREAS LOCATED WITHIN THE PERIMETER OF THE BUILDING FOUNDATION SHALL BE PRESERVATIVE-TREATED WOOD IN ACCORDANCE CBC.
4. **GLUE-LAMINATED STRUCTURAL MATERIALS:**  
STANDARD SPECIFICATIONS FOR GLUE-LAMINATED STRUCTURAL MEMBERS, ANSI/AITC A 190.1 AND ASTM D3737. GLUE-LAMINATED BEAMS SHALL BE INSPECTED AND A CERTIFICATE PROVIDED TO THE FILED INSPECTOR AT THE TIME OF FRAMING INSPECTION. FABRICATION SHALL BE PERFORMED IN ACCORDANCE WITH CBC 1705.5. ALL GLUE-LAMINATED BEAMS THAT ARE CONTINUOUS OVER SUPPORTS OR CANTILEVERED SHALL HAVE TENSION LAMINATIONS ON TOP OF BEAMS.  
**MAXIMUM MOISTURE CONTENT SHALL NOT EXCEED 16% AT THE TIME OF CONSTRUCTION.**
- A. GLULAM MEMBERS IN DRY SERVICE USE SHALL BE DOUGLAS-FIR 24F-V4 (SINGLE SPAN) OR COMBINATION 24F-V8 (MULTI-SPAN & CANTILEVER) U.N.O. BEAMS SHALL BE ARCHITECTURAL GRADE WHEN EXPOSED TO VIEW, S.A.D.
1. GLULAM MEMBERS, SEE PLAN SPECIFICATIONS FOR CAMBER WHERE OCCURS.
- | MATERIAL GRADE | E (x10 <sup>3</sup> psi) | Fb (psi) | Fv (psi) | Fc (psi) | RADIUS, U.N.O. |
|----------------|--------------------------|----------|----------|----------|----------------|
| DF/DF 24F-V4   | 1.8                      | 2400     | 265      | 650      | 3500' RADIUS   |
| DF/DF 24F-V8   | 1.8                      | 2400     | 265      | 650      | NO CAMBER      |
- B. GLULAM MEMBERS IN WET SERVICE USE SHALL BE ALASKAN CEDAR 20F-V12 (SINGLE SPAN) OR COMBINATION 20F-V13 (MULTI-SPAN & CANTILEVER) U.N.O.
1. GLULAM MEMBERS, SEE PLAN SPECIFICATIONS FOR CAMBER WHERE OCCURS.
- | MATERIAL GRADE | E (x10 <sup>3</sup> psi) | Fb (psi) | Fv (psi) | Fc (psi) | RADIUS, U.N.O. |
|----------------|--------------------------|----------|----------|----------|----------------|
| AC/AC 20F-V12  | 1.5                      | 2000     | 265      | 560      | 3500' RADIUS   |
| AC/AC 20F-V13  | 1.5                      | 2000     | 265      | 560      | NO CAMBER      |
- C. DESIGN, FABRICATION AND CONSTRUCTION OF STRUCTURAL GLULAM MEMBERS SHALL CONFORM TO THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION STANDARD, MANUAL No. 301 AND THE COMMERCIAL STANDARD FOR STRUCTURAL GLUED LAMINATED TIMBER, CS 253.
- D. STRUCTURAL PLYWOOD SHALL BE GRADED PER APA PSI-83AND SHALL BE INTERIOR TYPE SHEATHING C-D GRADE WITH EXTERIOR GLUE. EQUIVALENT O.S.B. WOOD STRUCTURAL PANEL MAY BE USED AS AN ALTERNATE TO PLYWOOD. HOWEVER, IN ACCORDANCE WITH THE TILE COUNCIL OF AMERICA RECOMMENDATIONS, O.S.B. SHALL NOT BE USED BELOW TILE MORTAR. ALL HORIZONTAL PLYWOOD SHALL BE LAID WITH FACE GRAIN PERPENDICULAR TO FRAMING MEMBERS, WITH STAGGERED JOINTS.
5. **STRUCTURAL COMPOSITE LUMBER (SCL) MATERIALS:**  
ALL STRUCTURAL COMPOSITE LUMBER (SCL) SHALL BE MANUFACTURED PER ASTM D5055 AND ASTM D5456. STRUCTURAL COMPOSITE LUMBER SHALL BE MANUFACTURED BY BOISE CASCADE, OR EQUAL. ALTERNATE MANUFACTURERS ARE PERMITTED AND CONSIDERED AN EQUIVALENT SUBSTITUTION IF THE SUBSTITUTED MATERIAL MEETS, OR EXCEEDS, ALL THE DESIGN PROPERTIES LISTED BELOW.
- | SPECIFICATION | MATERIAL         | WIDTH (in.) <sup>1,2</sup> | E (x10 <sup>3</sup> psi) | Fb (psi) | Fv (psi) | Fc <sub>1</sub> (psi) | Fc <sub>II</sub> (psi) |
|---------------|------------------|----------------------------|--------------------------|----------|----------|-----------------------|------------------------|
| RIM JOIST     | VERSA-STRAND LVL | 1-5/16                     | 1.4                      | 1800     | 225      | 525                   | 2500                   |
| LVL COLUMN    | VERSA-LAM LVL    | 3.5, 5.25, 7               | 1.7                      | 2650     | 285      | 750                   | 3000                   |
| LVL STUD      | VERSA-STUD LVL   | 1.5                        | 1.7                      | 2617     | 285      | 450                   | 3000                   |
| LVL BEAM      | VERSA-LAM 2.0E   | 1.75                       | 2.0                      | 2800     | 285      | 750                   | 3000                   |
| LVL BEAM      | VERSA-LAM 2.0E   | 3.5, 5.25, 7               | 2.0                      | 3100     | 285      | 750                   | 3000                   |
1. BEAM DEPTH IS ASSUMED TO MATCH FLOOR FRAMING DEPTH U.N.O.
2. MFR BEAM MEMBERS MAY BE BUILT UP TO ACHIEVE SPECIFIED WIDTHS PER DETAIL 609 U.N.O. ON PLANS.
6. ALL STUD WALLS SHOWN ON STRUCTURAL DRAWINGS SHALL BE FRAMED AS FOLLOWS (U.O.N.):
- EXTERIOR WALL STUD HEIGHT TABLE (L/360 DEFL.)
- | MAX. PLATE HT | STUD TYPE           | SPACING  |
|---------------|---------------------|----------|
| 21'-5"        | (2) 2x6 DOUG-FIR #1 | 12" O.C. |
| 19'-5"        | (2)-2x6 DOUG-FIR #1 | 16" O.C. |
| 15'-1"        | 2x6 DOUG-FIR #2     | 16" O.C. |
| 12'-1"        | (2)-2x4 DOUG-FIR #1 | 16" O.C. |
|               | 2x6 STUD GRADE      | 16" O.C. |
|               | 2x4 DOUG-FIR #1     | 16" O.C. |
| 10'-1"        | 2x6 STUD GRADE      | 16" O.C. |
| 9'-1"         | 2x4 DOUG-FIR #2     | 16" O.C. |
|               | 2x6 STUD GRADE      | 16" O.C. |
| 8'-1"         | 2x4 STUD GRADE      | 16" O.C. |
|               | 2x6 STUD GRADE      | 16" O.C. |
- INTERIOR WALL STUD HEIGHT TABLE (L/240 DEFL.)
- | MAX. PLATE HT | STUD TYPE      | SPACING  |
|---------------|----------------|----------|
| 21'-5"        | 2x6 STUD GRADE | 12" O.C. |
| 19'-5"        | 2x6 STUD GRADE | 16" O.C. |
| 15'-1"        | 2x6 STUD GRADE | 16" O.C. |
| 12'-1"        | 2x4 STUD GRADE | 16" O.C. |
|               | 2x6 STUD GRADE | 16" O.C. |
- NOTE:
- A. STUD HEIGHTS EXCEEDING 10'-1" SHALL BE BRACED MID-HEIGHT USING FULL DEPTH 2x BLOCKING.
7. TOP PLATES SHALL BE DOUBLED ON ALL STUD WALLS. LAP 4'-0" MINIMUM AT TOP PLATE SPLICES, WITH (12) 16d NAILS EACH SIDE OF SPLICE, U.N.O. SPLICES IN UPPER AND LOWER PLATES SHALL BE STAGGERED 4'-0" MINIMUM.
8. POSTS IN WALLS MAY BE MADE WITH MULTIPLE STUDS OF EQUIVALENT WIDTH AND DEPTH, U.O.N. SECURE MULTIPLE STUDS WITH 16d NAILS AT 8" O.C. STAGGERED.
9. PROVIDE KING STUDS AT THE ENDS OF ALL HEADERS OR OTHER BEAMS INSTALLED IN WALLS, SEE DETAIL 401 FOR MORE INFORMATION.
10. ALL MEMBERS IN BEARING SHALL BE ACCURATELY CUT AND ALIGNED SO THAT FULL BEARING IS PROVIDED WITHOUT THE USE OF SHIMS.
11. BLOCK ALL STUD WALLS AS REQUIRED FOR SHEATHING AND FINISHES. BALLOON FRAME ALL WALLS WITH SLOPING CEILING OR WITH RAISED CEILINGS.
12. INSTALL HORIZONTAL MEMBERS WITH CROWN UP. WHERE KNOTS EXIST NEAR THE TOP OR BOTTOM OF HORIZONTAL MEMBERS, INSTALL MEMBER WITH KNOTS UP. CANTILEVERED DECK JOISTS SHALL BE CAREFULLY NOTCHED AND TRIMMED (IF NECESSARY) TO PROVIDE SLOPE WITHOUT OVER-CUTTING.
13. PROVIDE FULL DEPTH BLOCKING OR CONTINUOUS RIM JOIST AT ALL FLOOR AND ROOF FRAMING SUPPORTS. FRAMING MEMBERS SHALL HAVE A MINIMUM OF 2" BEARING AT SUPPORTS. LAPPING JOISTS SHALL HAVE 6" MINIMUM OVERLAP CENTERED OVER INTERIOR SUPPORTS.
14. ALL BOLTED WOOD CONNECTIONS SHALL HAVE A WASHER UNLESS A STEEL PLATE IS SPECIFIED. HOLES SHALL BE PROPERLY ALIGNED. OVERSIZED HOLES ARE NOT ALLOWED. NUTS SHALL BE SNUG TIGHTENED. BOLT HOLES SHALL BE NOMINAL DIAMETER OF BOLT PLUS 1/16".
15. NAILED WOOD CONNECTIONS SHALL USE COMMON WIRE NAILS, U.N.O. MIN. NAILING REQUIREMENTS FOR STANDARD CONNECTIONS SHALL BE IN ACCORDANCE WITH THE GOVERNING C.B.C. FASTENING SCHEDULE (TABLE 2304.10.1).
16. ALL MANUFACTURED CONNECTION HARDWARE SHALL BE AS DESIGNATED ON DRAWINGS AND INSTALLED (WITH ALL NAIL HOLES FILLED) IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND APPLICABLE ICC APPROVALS.
17. INSTALL LAG SCREWS IN DRILLED LEAD HOLES WITH A DIA. EQUAL TO 3/4" OF THE SHANK DIAMETER. LAG SCREWS SHALL NOT BE HAMMERED IN. PROVIDE WASHERS UNDER HEADS BEARING ON WOOD. HOLES SHALL BE PROPERLY ALIGNED.

CONCRETE NOTES

- CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF THE 2022 BUILDING CODE (C.B.C.) AND THE LATEST EDITION OF THE AC1318-14, UNLESS NOTED OTHERWISE.
1. CONCRETE REQUIREMENTS: BASED ON NORMAL WEIGHT CONCRETE (UNIT WEIGHT OF 145 TO 150 pcf).
- |                          | MINIMUM COMPRESSIVE STRENGTH (psi) (AT 28 DAYS) | SLUMP (+/- 1/2") | AGGREG. SIZE | SPEC. INSP. REQD | MAXIMUM WATER TO CEMENT RATIO (NOTE 1F) | CEMENT TYPE ASTM C150 |
|--------------------------|-------------------------------------------------|------------------|--------------|------------------|-----------------------------------------|-----------------------|
| GRADE BEAMS & STEM WALLS | 3000                                            | 4"               | 3/4"         | NO **            | .55                                     | II OR V               |
| CONCRETE PIERS           | 3000                                            | 4"               | 3/4"         | NO **            | .55                                     | II OR V               |
| FOOTINGS ON GRADE        | 3000                                            | 4"               | 1"           | NO **            | .55                                     | II OR V               |
| FLOOR SLABS ON GRADE     | 3000                                            | 4"               | 1"           | NO **            | .45                                     | II OR V               |
- \*\* **SPECIAL INSPECTION IS NOT REQUIRED, DESIGN COMPRESSIVE STRENGTH IS 2500 psi, HIGHER STRENGTHS HAVE BEEN SPECIFIED FOR QUALITY CONTROL.**
- A. COARSE AGGREGATE SHALL BE HARD, DURABLE CRUSHED STONE OR GRAVEL GRADED PER ASTM C33. MAXIMUM SIZE OF AGGREGATE SHALL BE AS NOTED IN SCHEDULE ABOVE AND DEFINED BELOW. SAND SHALL BE CLEAN, HARD, DURABLE, WASHED FREE FROM SILT, LOAM OR CLAY.
1. GRADE BEAMS, STEM WALLS, RETAINING WALLS AND OTHER CONCRETE FRAMEWORK LESS THAN 10" WIDE SHALL USE 3/4" AGGREGATE CONFORMING TO ASTM C33 WITH 100% PASSING 1" SIEVE AND 90% (MINIMUM) PASSING 3/4" SIEVE. TO ENSURE PROPER CONCRETE COVER AND CONSOLIDATION.
2. FOOTING AND SLABS ON GRADE, INCLUDING POST-TENSION AND MAT SLABS, SHALL USE 1" AGGREGATE CONFORMING TO ASTM C33 WITH 95% (MINIMUM) PASSING 1" SIEVE.
- B. MIXING WATER SHALL BE CLEAN AND FREE FROM INJURIOUS AMOUNTS OF OIL, ACIDS, ALKALIES, ORGANIC MATERIALS OR OTHER DELETERIOUS SUBSTANCES.
- C. CONCRETE EXPOSED TO SULFATE SHALL USE TYPE V CEMENT WITH POZZOLAN.
- D. FLY ASH OR POZZOLANS, IF USED, SHALL CONFORM WITH ASTM C618, COAL FLY ASH AND RAW OR CALCINED NATURAL POZZOLAN FOR USE AS A MINERAL ADMIXTURE IN CONCRETE. USAGE SHALL NOT EXCEED 25 PERCENT, BY WEIGHT OF THE TOTAL CEMENTITIOUS MATERIALS. WHEN POZZOLANS ARE USED TO MITIGATE THE EFFECT OF SULFATE CONTAINING SOILS THEY SHALL BE OF A TYPE THAT HAS DEMONSTRATED SUCH ABILITY BY TEST OR SERVICE RECORD.
- E. ADMIXTURES CONTAINING CALCIUM CHLORIDE SHALL NOT BE USED.
- F. CEMENT SHALL CONFORM WITH ASTM C150 & C 595, PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENTS
- G. TRANSIT MIX SHALL BE PER ASTM C-94.
- H. MIX DESIGN SHALL MEET THE RECOMMENDED SPECIFICATION UNLESS AN ALTERNATE MIX IS SUBMITTED AND REVIEWED BY THE ENGINEER.
2. SPECIAL INSPECTION OF CONCRETE WORK IS REQD WHERE NOTED ABOVE. WHEN REQD, SPECIAL INSPECTION SHALL INCLUDE THE INSPECTION OF THE PLACEMENT OF REINFORCEMENT, AND THE INSPECTION OF THE CONCRETE PLACEMENT OPERATIONS AS WELL AS CONCRETE CYLINDER TESTS, PER C.B.C. SECTION 1705.3. THE FOLLOWING THREE CRITERIA ESTABLISH THE REQD MINIMUM SAMPLING FREQUENCY FOR EACH CLASS OF CONCRETE:
- A. ONE EACH DAY A GIVEN CLASS IS PLACED, NOR LESS THAN
- B. ONCE FOR EACH 150 yd OF EACH CLASS PLACED EACH DAY, NOR LESS THAN
- C. ONCE FOR EACH 5000 ft OF SLAB OR WALL SURFACE AREA PLACED EACH DAY.
3. SPLICES OF CONTINUOUS REINFORCEMENT SHALL HAVE A MINIMUM LAP PER DETAILS 202 AND 203 UNLESS NOTED OTHERWISE. ALL REINFORCING STEEL SHALL BE SECURELY WIRED AND PROPERLY SUPPORTED ABOVE GROUND, AND AWAY FROM FORMS. REINFORCING BAR FABRICATION, LAPS AND PLACEMENT SHALL CONFORM TO THE MANUAL OF STANDARD PRACTICE OF THE CONCRETE REINFORCING STEEL INSTITUTE.
4. REINFORCING SHALL BE NEW STOCK, DEFORMED BARS, NO. 3 AND SMALLER: GRADE 40 CONFORMING TO ASTM A-615 AS FOLLOWS (U.N.O.): NO. 4 AND LARGER: GRADE 60
- A. ALL BARS TO BE WELDED SHALL MEET THE REQUIREMENTS OF ASTM A706, GRADE 60.
- B. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A-185, FLAT SHEETS ONLY. LAP FABRIC 6" MINIMUM.
- C. REINFORCEMENT PLACEMENT SHALL CONFORM TO DETAIL 201 AND 203
- D. ANCHOR BOLTS SHALL BE ASTM A307, U.N.O. AND SHALL CONFORM TO DETAIL SD2
5. REINFORCEMENT COVER: ALL DIMENSIONS SHOWING THE LOCATIONS OF REINFORCEMENT STEEL NOT NOTED AS "CLEAR", ARE TO THE CENTER OF THE STEEL. MINIMUM CLEAR COVERAGE OF REINFORCEMENT SHALL BE AS FOLLOWS:
- A. CONCRETE CAST AGAINST EARTH, EXCEPT SLABS ON GRADE: 3" SLABS ON GRADE: 1-1/2" U.N.O.
- B. CONCRETE CAST IN FORMS, BUT EXPOSED TO EARTH OR WEATHER: No. 5 REINFORCING AND SMALLER: 1-1/2" No. 6 REINFORCING AND LARGER: 2"
- C. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH THE GROUND: SLABS, WALLS AND JOISTS: 3/4" BEAMS AND COLUMNS: 1-1/2"
6. UNFORMED CONCRETE SURFACE CURING:
- A. CURE FOR ONE TO SEVEN DAYS BY MAINTAINING TEMPERATURE ABOVE 50 DEGREES FAHRENHEIT, AND IN A MOIST CONDITION.
- B. APPLY MEMBRANE-FORMING CURING COMPOUND TO DAMP CONCRETE IMMEDIATELY AFTER COMPLETION OF THE MOIST-CURING PERIOD.
7. THE CONTRACTOR SHALL INFORM THE ENGINEER AT LEAST TWO DAYS PRIOR TO POURING ANY STRUCTURAL CONCRETE SO THAT OBSERVATION OF THE WORK MAY BE PERFORMED AS REQUIRED BY THE ENGINEER'S CONTRACT OR THE CODE.
8. FOOTING/GRADE BEAM CONSTRUCTION JOINTS SHALL CONFORM TO DETAIL 204 AND 205A
9. CRACK CONTROL JOINTS SHALL BE PLACED IN CONCRETE SLABS ON GRADE AT A SPACING OF 12'-0" MAX. O.C. EACH WAY (U.N.O. ON PLAN) PER DETAIL 202
- LOCATION OF SLAB ON GRADE CONSTRUCTION JOINTS SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION. SLAB ON GRADE CONSTRUCTION JOINTS SHALL CONFORM TO 205B
10. ALL PIPES AND DUCTS THROUGH CONCRETE SHALL BE SLEEVED. VERIFY OPENINGS WITH PLUMBER AND ELECTRICIAN. SEE DETAIL 206 AND 207
11. IF SPECIFIED, WELDED WIRE FABRIC SHALL BE 6x6-W1.4xW1.4. WIRE FABRIC SHALL BE ELECTRICALLY WELDED STEEL PER ASTM A185. LAP 6" MINIMUM AT ALL EDGES AND TIE AT THREE PLACES TO REINFORCING DOWELS (WHERE OCCUR) EXCEPT LOCATIONS WHERE SLAB IS INDEPENDENT OF FOUNDATION. CONTRACTOR SHALL PROVIDE SUPPORT CHAIRS TO ENSURE FABRIC IS LOCATED IN THE CENTER OF THE SLAB.
12. WELDING OF REINFORCING BARS SHALL CONFORM TO AWS D1.4 USING ASTM A706 REINFORCING BAR SPECIFICATIONS.

STRUCTURAL STEEL NOTES

1. THE FOLLOWING SECTION APPLIES TO ALL STRUCTURAL STEEL 1/8" THICK OR LARGER.
2. ALL WORK SHALL BE IN ACCORDANCE WITH THE CBC CHAPTER 22, AISC 15th EDITION, AND THE 2015 A.W.S. D1.1.
3. STEEL MATERIALS SHALL CONFORM TO THE FOLLOWING:
- A. PLATES AND SHAPES, U.N.O. ASTM A992 (fy = 50 ksi), OR ASTM A572, GRADE 50
- B. STRUCTURAL TUBE COLUMNS AND BEAMS: ASTM A500, GRADE B.
- C. PIPE COLUMNS: ASTM A53, TYPE E OR S, GRADE B
- D. ROD ASTM A36 (fy = 36 ksi)
4. FASTENERS SHALL CONFORM TO THE FOLLOWING:
- A. ANCHOR BOLTS: ASTM A307, U.N.O.
- B. STEEL TO WOOD CONNECTIONS: ASTM A307, U.N.O. USE CUT WASHERS (IF CONCEALED) AND MALLEABLE IRON WASHERS (IF EXPOSED)
5. WELDING ELECTRODES SHALL CONFORM TO 2015 A.W.S. D1.1 AND SHALL BE LOW HYDROGEN MATCHING FILLER METAL.
6. SURFACES OF STEEL TO BE FIELD WELDED SHALL BE FREE AND CLEAR OF ALL PAINT, DIRT, GREASE, OR OTHER DELETERIOUS COATINGS.
7. STEEL FRAMING, EXCEPT THOSE PORTIONS TO BE EMBEDDED IN CONCRETE, CONCEALED IN FRAMING, FIELD WELDED, OR HIGH STRENGTH BOLTED SHALL BE SHOP-PAINTED PER THE SPECIFICATIONS.
8. FIELD PAINT ALL EXPOSED STEEL SURFACES AFTER INSTALLATION, PER THE SPECIFICATIONS.
9. ALL WELDERS SHALL BE QUALIFIED BY A.W.S. PROCEDURES FOR THE REQUIRED WELDING.
10. SUBMIT CERTIFICATION OF COMPLIANCE FOR ALL STEEL MATERIALS.

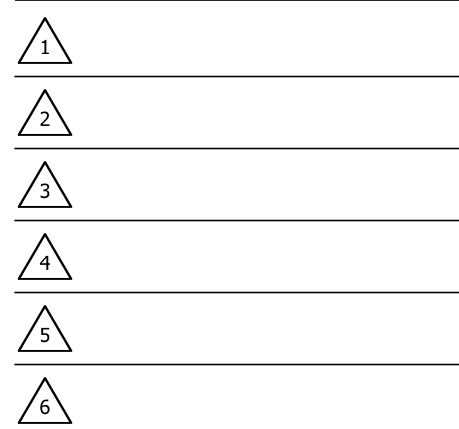


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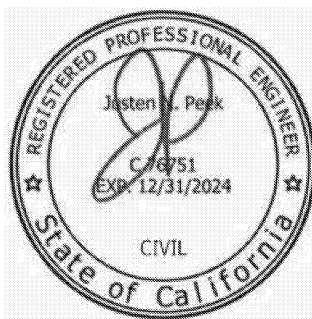
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GENERAL STRUCTURAL SPECIFICATIONS AND NOTES

No Scale

Initial Issue Date: March 24, 2023

Drawn By: E. Bennett

Project Designer: J. Peek

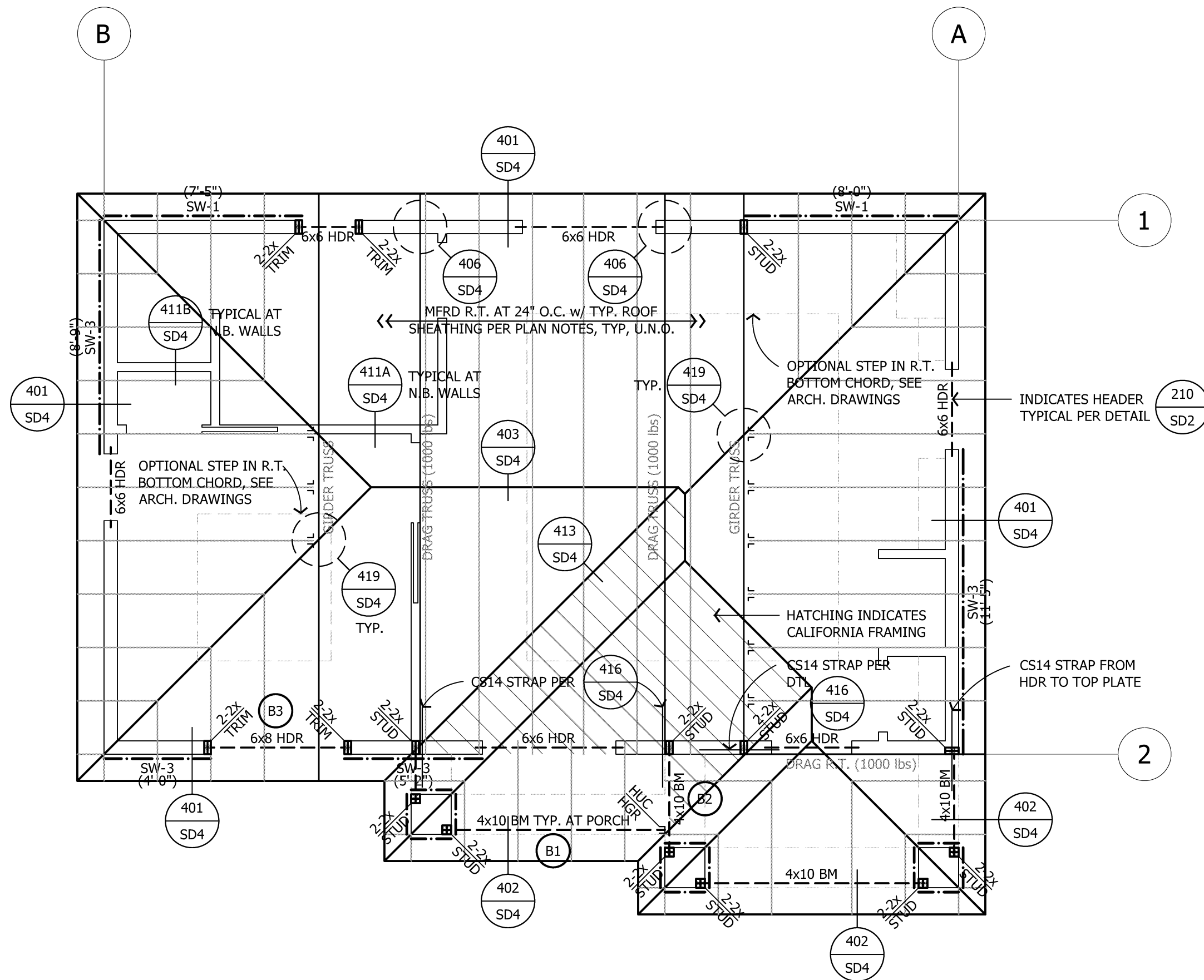
Project Manager: J. Peek Ext. 23

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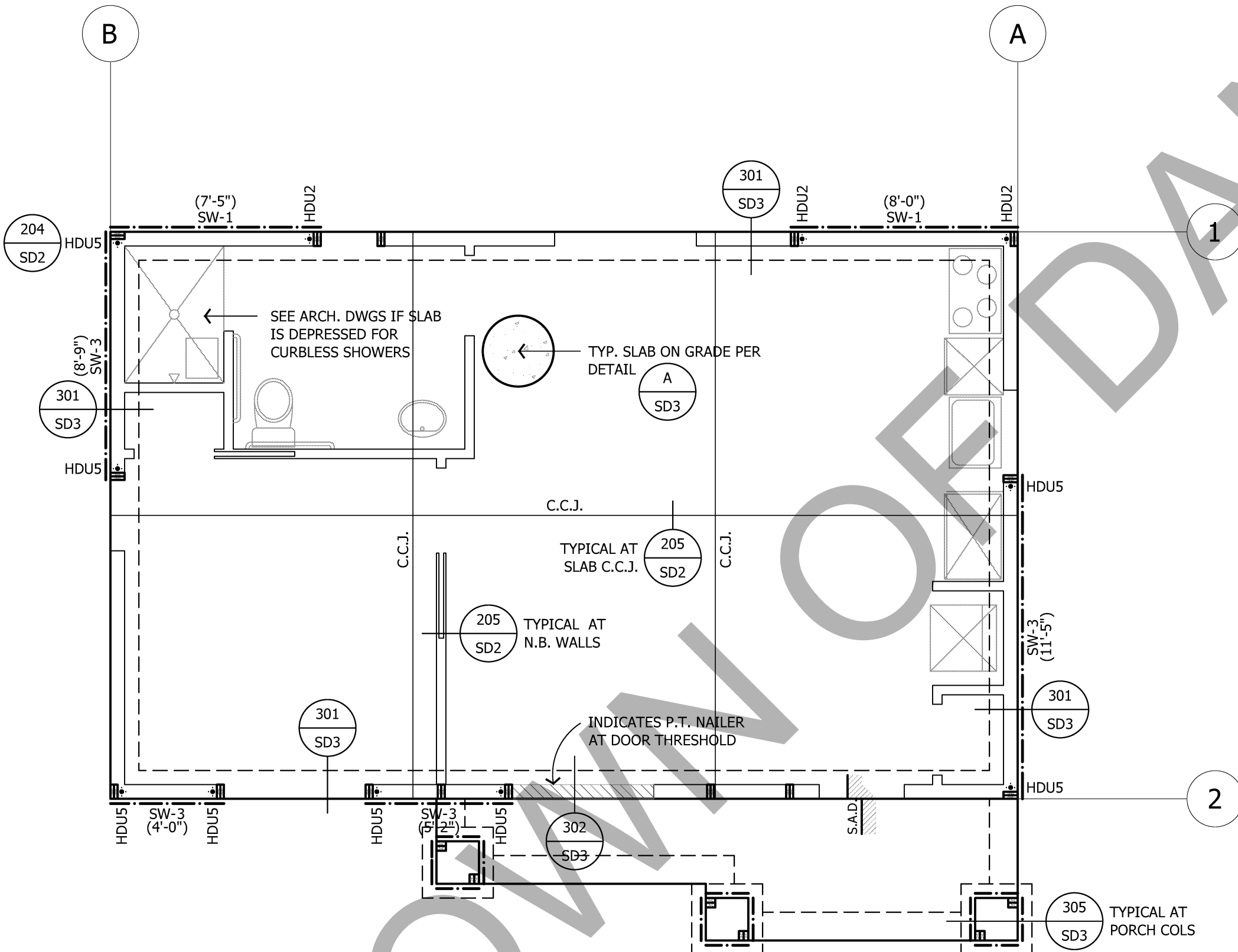
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A ROOF FRAMING PLAN - CONTEMPORARY



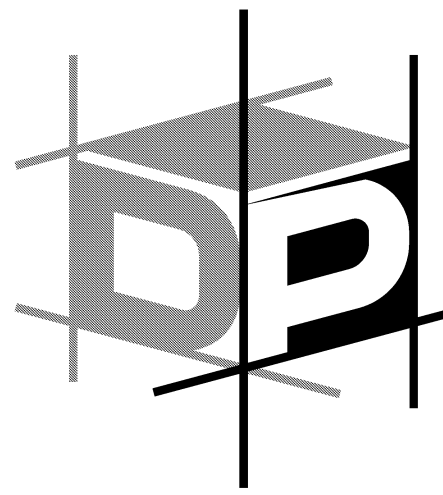
B FOUNDATION PLAN - CONTEMPORARY - CONCRETE SLAB

## FOUNDATION NOTES

- SEE ARCHITECTURAL DRAWINGS FOR STUD SIZES AND OTHER REQUIREMENTS.
- SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, ELEVATIONS, ETC. THE PROJECT ARCHITECT IS RESPONSIBLE FOR SPECIFYING DIMENSIONS TO ALL PROJECT ELEMENTS. THE DIMENSIONS SHOWN ON THE FOUNDATION PLANS SHALL NOT BE USED FOR CONSTRUCTION. THE FOUNDATION SHALL BE CONSTRUCTED USING THE DIMENSIONS SHOWN ON THE ARCHITECTURAL PLANS.
- DETAIL KEYS AND OTHER INFORMATION ARE TYPICAL.
- THE FOUNDATION SHALL CONSIST OF A UNIFORM THICKNESS REINFORCED CONCRETE STRUCTURAL SLAB PER DETAIL (A SD3)
  - STEP FOUNDATION AS REQUIRED FOR FLOOR ELEVATION CHANGES AND COMPLIANCE WITH DETAILS. THE CONTRACTOR SHALL GRADE THE SITE TO PROVIDE PROPER SURFACE DRAINAGE AWAY FROM THE FOUNDATION AT ALL LOCATIONS. ROOF GUTTER DOWNSPOUTS SHALL NOT DISCHARGE NEAR THE FOUNDATION.
- CONCRETE TIE BEAMS SHALL BE 12" x 18" AND SHALL BE REINFORCED WITH (2) #4 HORIZ. REINFORCING, TOP AND BOTTOM. THE BEAM REINFORCEMENT SHALL CONTINUE THROUGH FOUNDATION ELEMENTS OR SHALL BE PROPERLY TIED TO FOUNDATION REINFORCING.
- LANDSCAPE SLABS SHALL BE INDEPENDENT OF THE FOUNDATION. THE CONTRACTOR SHALL INSTALL ASPHALT-IMPREGNATED EXPANSIVE JOINT MATERIAL BETWEEN SLABS AND THE FOUNDATION.
- HOLDOWNS:** HOLDOWNS NOTED OCCUR AT THE LEVEL OF FRAMING SHOWN FOR CONNECTION OF WALLS ABOVE TO FOOTING.
  - ALL HOLDOWN MEMBERS IN CONTACT WITH P.T. MATERIAL SHALL BE HOT-DIP GALVANIZED. USE HOT-DIPPED GALVANIZED ANCHOR BOLTS WITH 3" x 3" x 1/4" PLATE WASHERS. PLAIN CARBON STEEL FASTENERS IN SBX/DOT AND ZINC BORATE PRESERVATIVE-TREATED WOOD SHALL BE PERMITTED.
  - ALL HOLDOWNS SHALL BE INSTALLED WITH ANCHORS PER DETAIL (112 SD1)
  - CONTRACTOR SHALL REVIEW HOLDOWN ANCHOR REQUIREMENTS FOR EMBEDMENT CONDITIONS THAT REQUIRE DEEPEENED STEM WALL. REFER TO FOR REQUIREMENTS.
  - PROVIDE POSTS AT ALL HOLDOWNS AS SHOWN IN DETAIL WHERE DOUBLE 2x POSTS ARE USED. SISTER WITH 16d FACE NAILS AT SILL NAILING PER SHEARWALL SCHEDULE. WHERE 3x MEMBERS AT PANEL EDGES ARE REQUIRED, USE 4x MINIMUM POST FOR HOLDOWN PER FRAMER SHALL CONFIRM LAYOUT BEFORE CONCRETE IS POURED. NOTIFY ENGINEER OF CONFLICTS PRIOR TO PROCEEDING.
- CONTRACTOR SHALL REVIEW HOLDOWN ANCHOR REQUIREMENTS FOR EMBEDMENT CONDITIONS THAT REQUIRE DEEPEENED FTG. REFER TO FOR REQUIREMENTS.
- REFER TO THE PROJECT SOILS REPORT IF APPLICABLE, FOR ADDITIONAL FOUNDATION AND SITE CONSTRUCTION REQUIREMENTS. ALL FOUNDATION ELEMENTS SHALL COMPLY WITH ALL CONDITIONS CONTAINED WITHIN APPROPRIATE SOILS REPORT AND REQUIREMENTS OF 2016 CBC CHAPTER 18. THE RESPONSIBLE SOILS ENGINEER IF APPLICABLE, SHALL OBSERVE ALL SLAB AND FOUNDATION SUBGRADES PRIOR TO PLACING CONCRETE. SEE SOILS REPORT FOR SPECIFIC INSPECTION REQUIREMENTS.
- ALL FOUNDATION PLATES AND MUDSILLS SHALL BE PRESSURE-TREATED DOUGLAS FIR MARKED OR BRANDED BY AN APPROVED AGENCY. SEE SHEARWALL SCHEDULE FOR SHEARWALL LOCATIONS THAT REQUIRE 3x MINIMUM MUDSILLS. FOUNDATION PLATES AND MUDSILLS SHALL BE BOLTED TO THE FOUNDATION WITH NOT LESS THAN 5/8" DIA. HOT-DIPPED GALVANIZED ANCHOR BOLTS WITH 3" x 3" x 1/4" PLATE WASHERS. PLAIN CARBON STEEL FASTENERS IN SBX/DOT AND ZINC BORATE PRESERVATIVE-TREATED WOOD SHALL BE PERMITTED. EMBED ANCHOR BOLTS 7" INTO CONCRETE FOUNDATION, WALL OR 12" INTO GROUTED MASONRY, AND SPACE NOT MORE THAN 4'-0" APART, UNLESS NOTED OTHERWISE ON THE SHEARWALL SCHEDULE. THERE SHALL BE A MINIMUM OF TWO BOLTS PER BOARD WITH ONE BOLT LOCATED 12" MAXIMUM AND 4-3/8" MINIMUM OF EACH END. FOR ADDITIONAL INFORMATION SEE DETAIL (201 SD2)
- SEE GENERAL NOTES FOR ADDITIONAL REQUIREMENTS. ALL DETAIL CALLOUTS SHALL BE CONSIDERED TYPICAL. CONTRACTOR SHALL REVIEW THE DETAIL SHEETS FOR DETAILS NOT SPECIFICALLY REFERENCED.
- SHEARWALLS:** LENGTHS OF SHEARWALLS ARE SHOWN ABOVE OR BELOW SHEARWALL NUMBER (SEE PLAN). THE NUMBERS INDICATE THE MINIMUM DESIGN LENGTH OF THE SHEARWALL. SEE DETAIL (103 SD1)

## ROOF FRAMING NOTES

- WALLS SHOWN AS SOLID ARE BELOW FRAMING. SEE ARCHITECTURAL DRAWINGS FOR STUD SIZES AND OTHER REQUIREMENTS.
- SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, ELEVATIONS, ETC. THE PROJECT ARCHITECT IS RESPONSIBLE FOR SPECIFYING DIMENSIONS TO ALL PROJECT ELEMENTS.
- DETAIL KEYS AND OTHER INFORMATION ARE TYPICAL.
- ROOF FRAMING TERMS:** ALL BEAMS SHALL BE CONSIDERED FLUSH, (TOP OF BEAM EQUAL TO TOP OF ROOF FRAMING AND BOTTOM OF ROOF FRAMING) UNLESS NOTED OTHERWISE ON PLANS AS ONE OF THE FOLLOWING:
  - DROPPED:** BEAM IS SET BELOW ROOF FRAMING WITH TOP OF BEAM SET AT BOTTOM OF ROOF FRAMING.
  - DOWNSSET:** BEAM IS DEEPER THAN THE ROOF FRAMING AND SET WITH TOP OF BEAM EQUAL TO TOP OF ROOF FRAMING. BOTTOM OF BEAM EXTENDS BELOW ROOF FRAMING.
  - UPSET:** BEAM IS DEEPER THAN THE ROOF FRAMING AND SET WITH BOTTOM OF BEAM EQUAL TO BOTTOM OF ROOF FRAMING. TOP OF BEAM EXTENDS ABOVE ROOF FRAMING.
  - "HDR":** BOTTOM OF HEADER IS SET AT ROUGH OPENING (R.O.). SEE ARCH. FOR HEIGHT. IF HEADER BREAKS TOP PLATES INSTALL CS14 x 36" STRAP FROM FACE OF PLATE TO FACE OF HEADER, TYPICAL AT EACH END OF HEADER.
- ROOF FRAMING:** ROOF SHALL BE FRAMED WITH PRE-MANUFACTURED ROOF TRUSSES AT 24" O.C. INSTALLED PER APPROVED ROOF TRUSS SHOP DRAWINGS. ROOF TRUSS MANUFACTURER SHALL DESIGN THE ROOF TRUSSES AS SPECIFIED IN THE GENERAL NOTES (SHEET SN-2, U.N.O.). SEE ROOF TRUSS DETAILS DETAILS ON SHEET SD4 FOR TYPICAL DETAILING.
  - ROOF TRUSSES WITH FLAT BOTTOM CHORDS SHALL BE SECURED TO END BEARING POINTS WITH "H1" CLIP TO TOP PLATE. ROOF TRUSSES WITH SLOPED BOTTOM CHORDS SHALL BE SECURED TO BEARING POINTS WITH SIMPSON "TC" CLIPS OR EQUIVALENT CONNECTORS THAT ALLOW HORIZONTAL MOVEMENT IN ACCORDANCE WITH THE ROOF TRUSS DESIGNER'S REQUIREMENTS.
  - PROVIDE 2x BLOCKING BELOW ALL HIPs, VALLEYS, AND RIDGES. CONTRACTOR SHALL INSTALL STRONGBACKS, CROSS BRIDGING, AND/OR BRACING AS SPECIFIED BY THE ROOF TRUSS SHOP DRAWINGS.
- MANUFACTURED BEAM FRAMING:** ALL MANUFACTURED WOOD BEAMS SHALL BE MANUFACTURED BY "TRUSS JOIST" WEYERHAUSER. REFER TO "GENERAL FRAMING NOTES" ON SHEET SN1 FOR MATERIAL SPECIFICATIONS.
- ROOF SHEATHING:** TYPICAL ROOF SHEATHING SHALL BE 15/32" THICK (24/0 OR 32/16) CDX GRADE PLYWOOD (OR EQUIVALENT-RATED ORIENTED STRAND BOARD (O.S.B.) WITH GAP PER MANUFACTURER. ROOF SHEATHING SHALL BE NAILED WITH 8d AT 6" O.C. (EDGES) AND 8d AT 12" O.C. (FIELD), UNLESS NOTED OTHERWISE ON THE PLAN. ORIENT SHEATHING WITH FACE GRAIN PERPENDICULAR TO FRAMING MEMBERS, AND STAGGER END JOINTS.
  - PLYWOOD SHEETS LOCATED AT ROOF EDGES OR CHANGES IN FRAMING SHALL BE AT LEAST 24 INCHES WIDE OR SHALL BE EDGE BLOCKED AND NAILED. EDGE NAIL PLYWOOD TO ALL GABLE AND SHEAR TRUSSES (TRUSSES WITH DRAG LOADS).
  - EDGE NAIL ROOF PLYWOOD TO ALL DRAG MEMBERS (RAFTERS OR BEAMS w/ HORIZ. STRAPS).
- SUPPORT OF BEAMS, HIPs, GIRDERS, ETC.:** INSTALL POSTS (POST SIZE TO MATCH BEAM AND WALL SIZE), MINIMUM BELOW ALL ROOF BEAMS AND GIRDERS. CONTRACTOR SHALL VERIFY FRAMING LAYOUT TO ENSURE CONTINUOUS AND SOLID BLOCKING UNDER ALL CONCENTRATED LOADS.
- CRICKETS AND/OR CALIFORNIA (BUILT-UP FRAMING):** CRICKETS AND/OR CALIFORNIA FRAMING SHALL BE CONSTRUCTED WITH 2x6 MEMBERS AT 24" O.C. SUPPORTED TO THE ROOF BELOW AT 48 INCHES ON CENTER. ROOF PLY SHALL CONTINUE BELOW CRICKETS AND/OR CALIFORNIA FRAMING.
- HEADERS:** WINDOW AND DOOR HEADERS SHALL CONFORM TO THE HEADER SCHEDULE, U.N.O. ON THE PLAN (210 SD2)
- TOP PLATE SPLICES:** TOP PLATE SPLICES OF ALL WALLS SHALL CONFORM TO DETAIL (209 SD2) INSTALL CS14 x 3'-0" LONG STRAPS AT TOP PLATE SLOPE CHANGES AND OTHER DISCONTINUOUS TOP PLATE CONDITIONS.
- TOP CONNECTORS SHALL BE INSTALLED AT EXTERIOR WALL TOP PLATES AT 4'-0" O.C. MINIMUM WHERE SHEAR IS NOT NOTED ON PLANS.**
  - SEE GENERAL NOTES FOR ADDITIONAL REQUIREMENTS. ALL DETAIL CALLOUTS SHALL BE CONSIDERED TYPICAL. THE CONTRACTOR SHALL REVIEW THE DETAIL SHEETS FOR DETAILS NOT SPECIFICALLY REFERENCED.
  - SHEARWALLS AT OPENING TRIMMERS:** WHERE SHEARWALL LENGTH SPECIFIED ON PLANS REQUIRES EDGE NAILING TO WINDOW AND/OR DOOR TRIMMERS, REFER TO DETAIL (108 SD1)
  - SHEARWALLS:** LENGTHS OF SHEARWALLS ARE SHOWN ABOVE OR BELOW SHEARWALL NUMBER (SEE PLAN). THE NUMBERS INDICATE THE MIN. DESIGN LENGTH OF THE SHEARWALL. SEE (103 SD1)
  - HOLDOWN STRAPS** WHERE HOLDOWN STRAPS ARE SPECIFIED ON PLANS, INSTALL PER DETAIL (112 SD1) (113 SD1)
    - ALL NAIL HOLES SHALL BE FILLED ON HOLDOWN STRAPS**



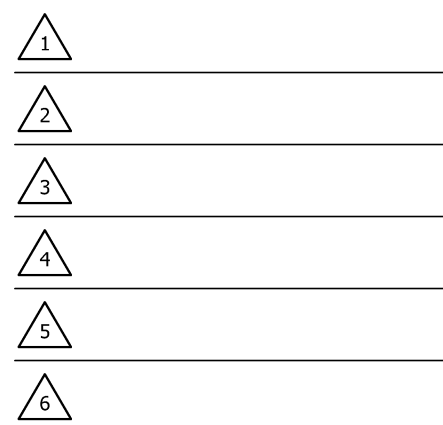
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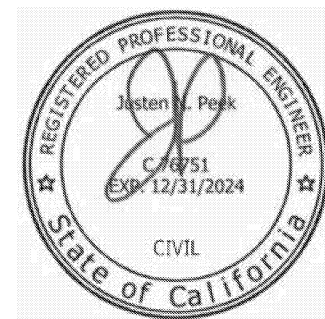
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## TOWN OF DANVILLE ACCESSORY DWELLING UNIT CONTEMPORARY

DANVILLE, CALIFORNIA



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Engineering Seal:



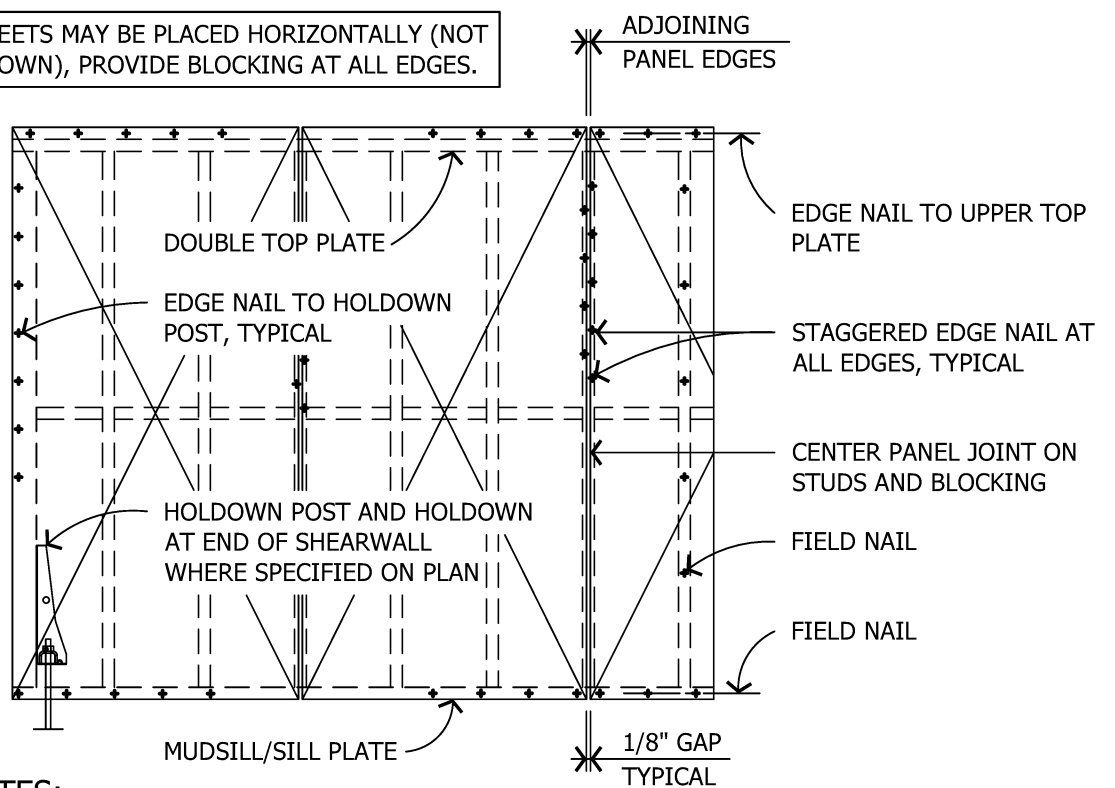
Sheet Description: **STUDIO  
MIRRORED PLAN  
STRUCTURAL ROOF FRAMING  
PLAN AND FOUNDATION PLAN**

Scale: 1/4" = 1'-0"  
Initial Issue Date: March 24, 2023  
Drawn By: E. Bennett  
Project Designer: J. Peek  
Project Manager: J. Peek Ext. 23  
Job No. W021420

Sheet No.  
**S1**



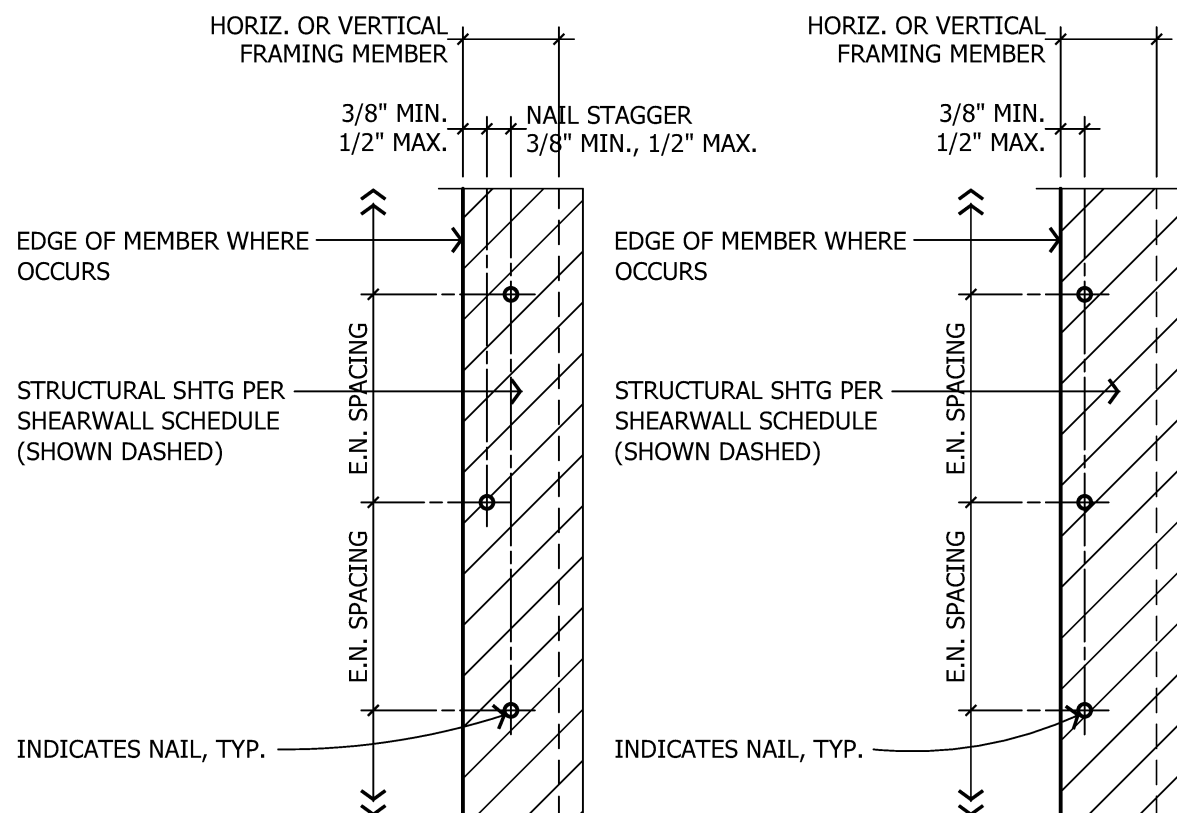
SHEETS MAY BE PLACED HORIZONTALLY (NOT SHOWN), PROVIDE BLOCKING AT ALL EDGES.



NOTES:

- SEE SHEARWALL SCHEDULE FOR REQUIRED SHEATHING, NAILING, AND SILL CONNECTIONS.
- FOR LOCATION OF TIEDOWNS AND TD POSTS, SEE TYPICAL DETAILS ON SHEET SD2.

101 TYP. SHEARWALL ELEVATION



104A STAGGERED NAILING AT SPACING OF 3" OR LESS

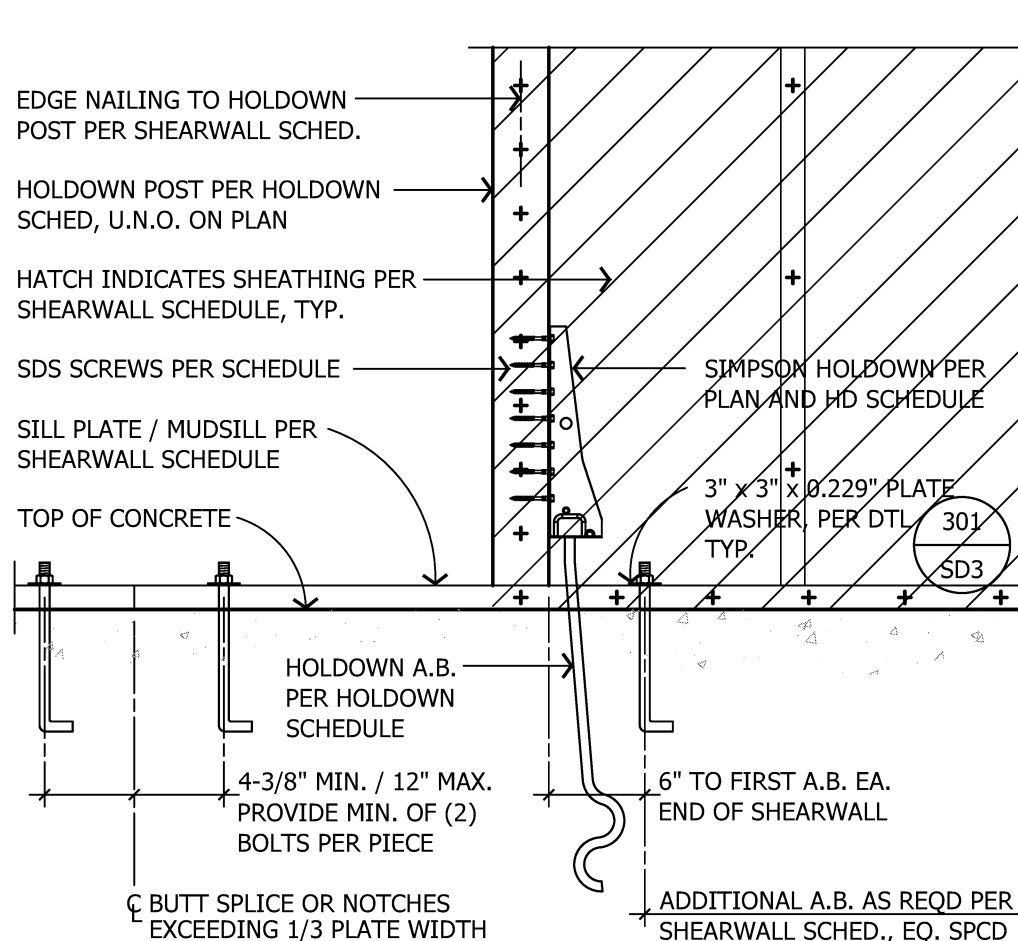
104B STANDARD NAILING AT SPACE OF 4" OR GREATER

104 TYP. SHEARWALL EDGE NAIL PATTERN

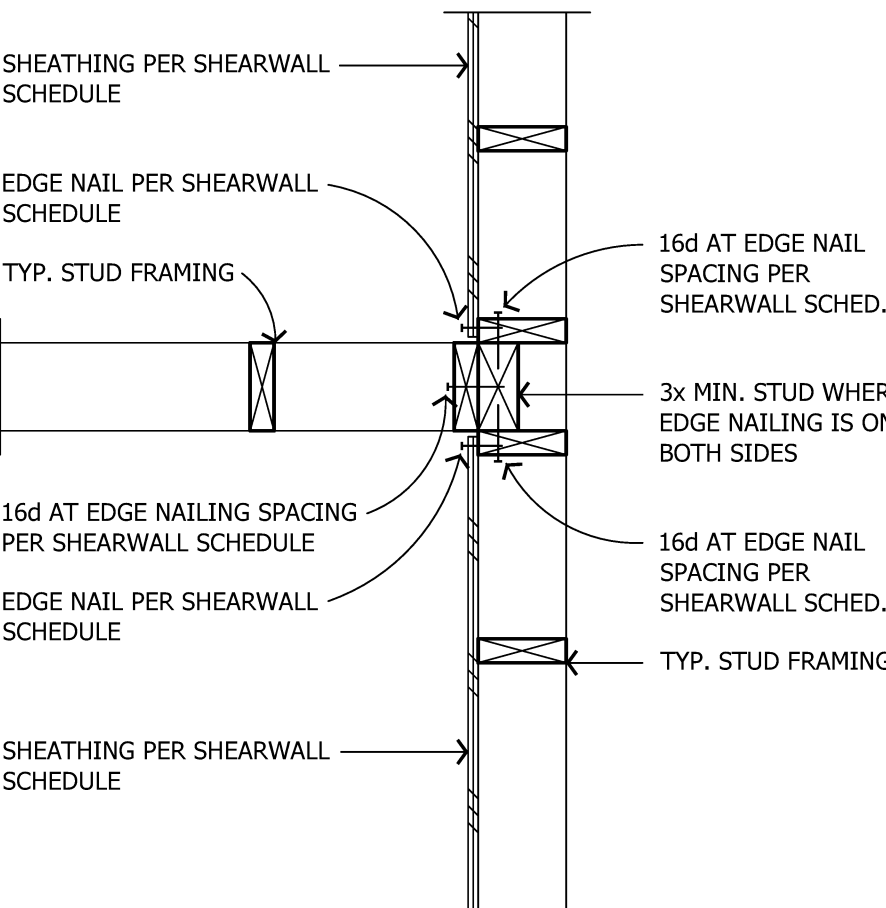
| ALTERNATIVE MUDSILL ANCHORAGE                                                                                                          |                           |                             |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------|--|--|
| THE FOLLOWING ALTERNATIVE ANCHORAGE MAY BE INSTALLED IN LIEU OF 5/8" DIA. ANCHOR BOLTS NOTED IN THE SHEARWALL SCHEDULE AND PLAN NOTES. |                           |                             |  |  |
| SHEARWALL DESIGNATION                                                                                                                  | "MASA" (NOTE 1.)          | "TITEN HD" (NOTE 2.)        |  |  |
| X"-X" SW-1                                                                                                                             | 32" O.C.                  | 48" O.C.                    |  |  |
| X"-X" SW-2                                                                                                                             | 22" O.C.                  | 36" O.C.                    |  |  |
| X"-X" SW-3                                                                                                                             | 16" O.C.                  | 28" O.C.                    |  |  |
| X"-X" SW-4                                                                                                                             | 10" O.C. 3x SILL REQUIRED | 24" O.C.                    |  |  |
| X"-X" SW-5                                                                                                                             | 9" O.C. 3x SILL REQUIRED  | 24" O.C.                    |  |  |
| X"-X" SW-6                                                                                                                             | 8" O.C. 3x SILL REQUIRED  | 24" O.C. 3/4" DIA. TITEN HD |  |  |
| X"-X" SW-7 & SW-8                                                                                                                      | NOT ALLOWED               | 16" O.C. 3/4" DIA. TITEN HD |  |  |

- SIMPSON "MASA" ANCHORS SHALL BE INSTALLED PER ICC REPORT No. ESR-2555.
- SIMPSON TITEN HD ANCHORS SHALL BE INSTALLED PER ICC REPORT No. ESR-2713.

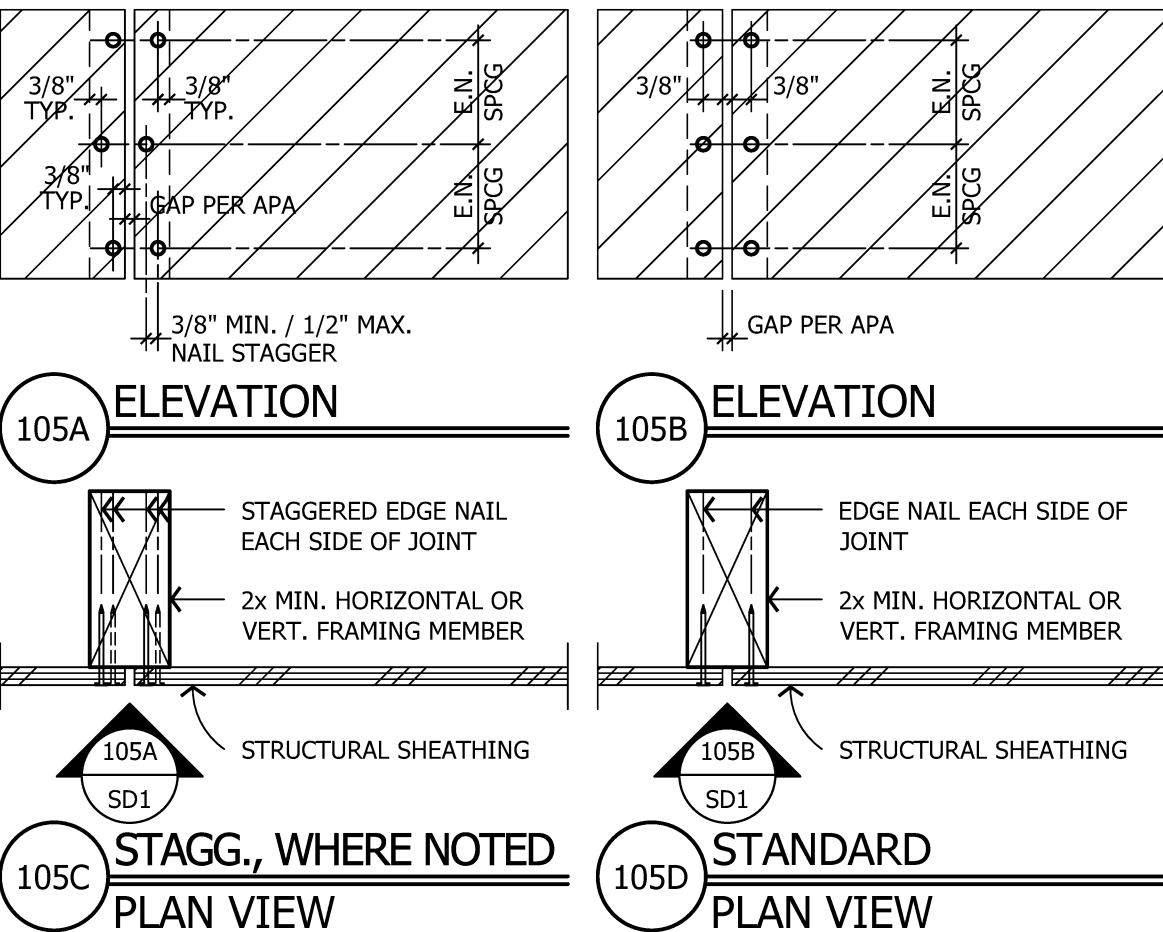
109 ALTERNATIVE MUDSILL ANCHORAGE



113 TYPICAL HOLDOWN AND HOLDOWN ANCHOR BOLT INSTALLATION



102 SHEARWALL INTERSECTION PLAN

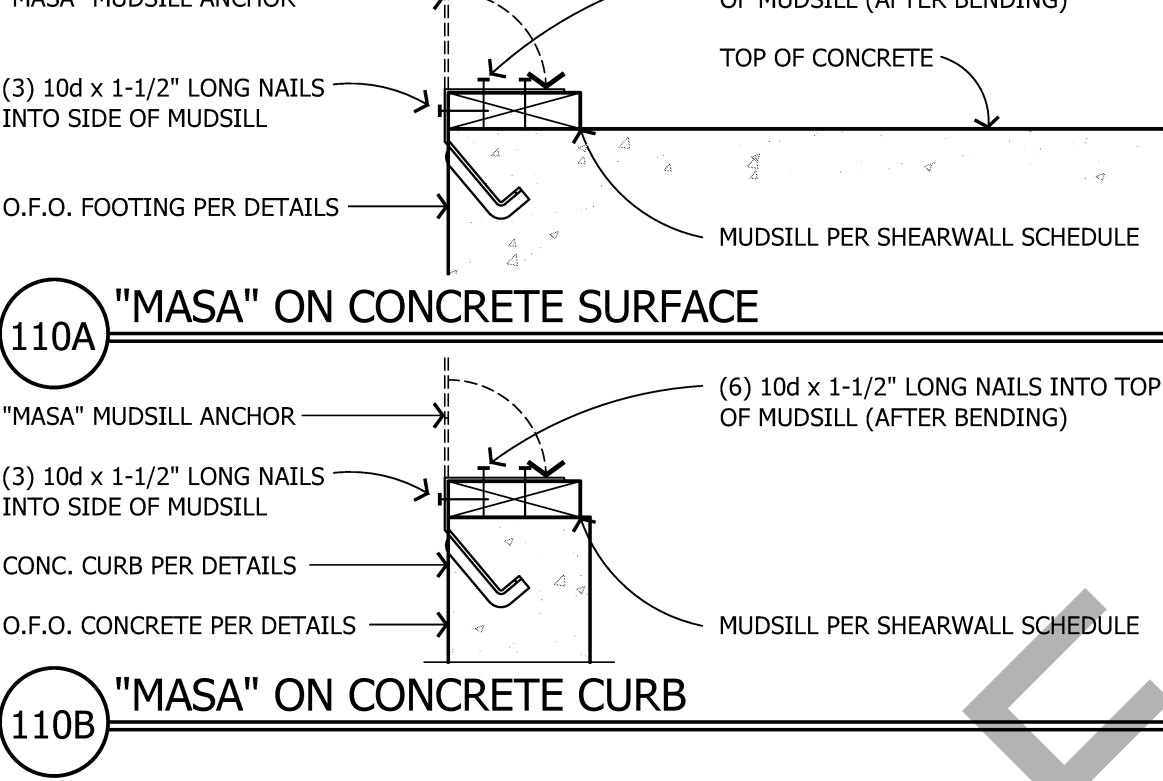


105A ELEVATION

105B ELEVATION

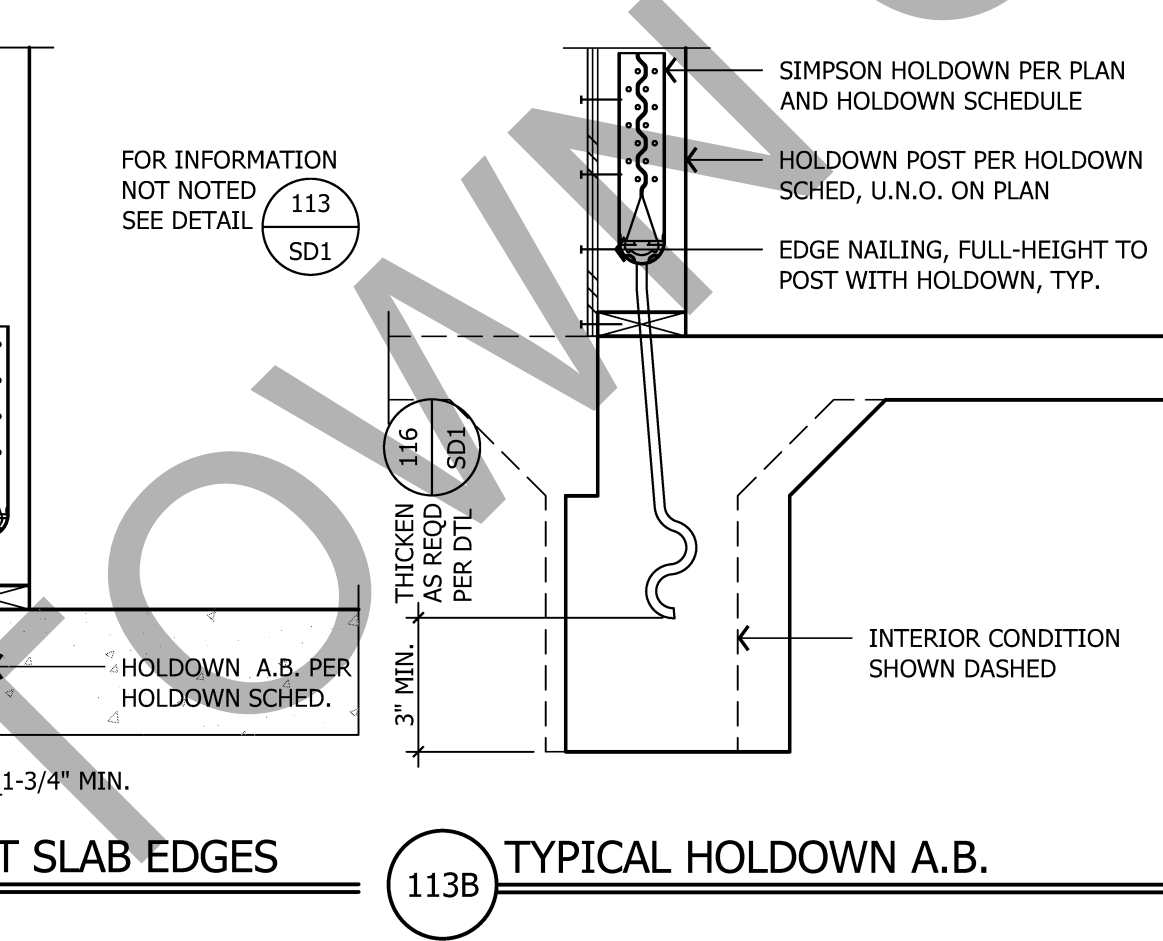
105C STAGG., WHERE NOTED PLAN VIEW

105D STANDARD PLAN VIEW



- FULL LOADS APPLY FOR SPALLS UP TO A MAX OF 1-1/4" AND A MAX DEPTH OF 7/8". ANY EXPOSED PORTION OF THE "MASA" MUST BE PROTECTED AGAINST POSSIBLE CORROSION.
- MINIMUM "MASA" END DISTANCE IS 4" AND MINIMUM CENTER-TO-CENTER SPACING IS 8"

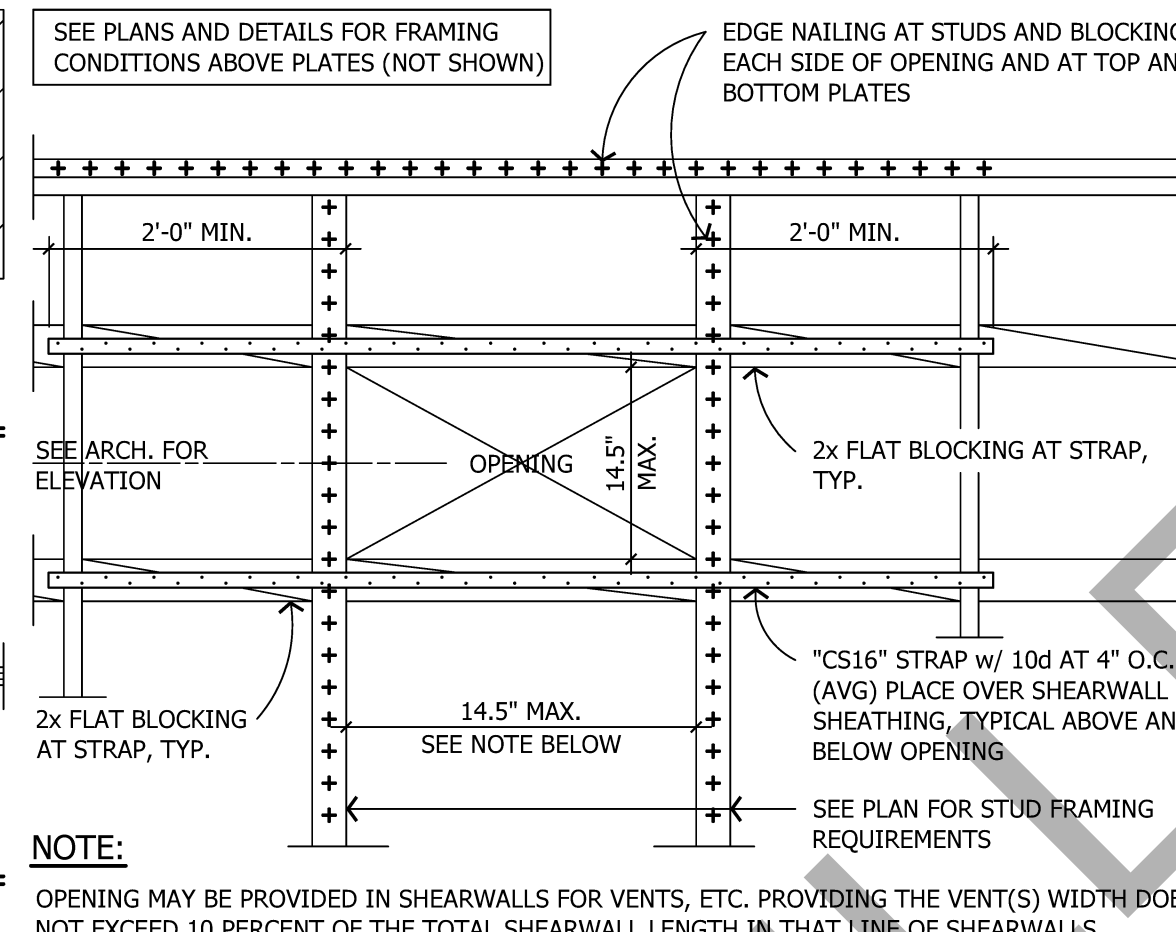
110 MASA ANCHORAGES



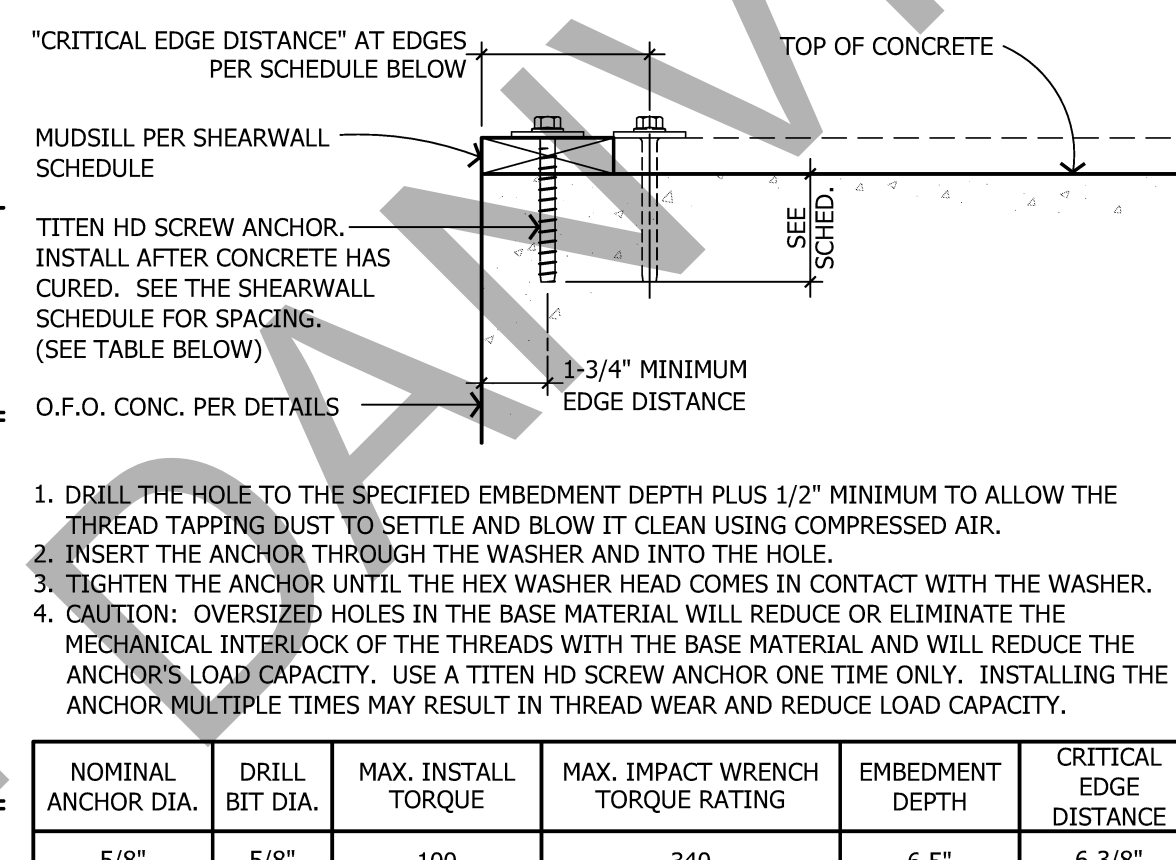
113A AT SLAB EDGES

| 1/2" SHEATHING (ONE FACE) | SHEARWALL LENGTH: SHEATHING DESIGNATION:                              | X"-X" SW-1                                   | X"-X" SW-2                                   | X"-X" SW-3                                  | X"-X" SW-4                                | X"-X" SW-5                                |
|---------------------------|-----------------------------------------------------------------------|----------------------------------------------|----------------------------------------------|---------------------------------------------|-------------------------------------------|-------------------------------------------|
|                           | PLYWOOD OR O.S.B. SHEATHING THICKNESS:                                | 15/32"                                       | 15/32"                                       | 15/32"                                      | 15/32"                                    | 15/32" STR. 1                             |
|                           | 10d EDGE NAIL (0.148 DIA.):                                           | 10d @ 6" O.C.                                | 10d @ 4" O.C.                                | 10d @ 3" O.C.                               | 10d @ 2" O.C.                             | 10d @ 2" O.C.                             |
|                           | 10d FIELD NAIL (0.148 DIA.):                                          | 10d @ 12" O.C.                               | 10d @ 12" O.C.                               | 10d @ 12" O.C.                              | 10d @ 12" O.C.                            | 10d @ 12" O.C.                            |
|                           | FRAMING MEMBER AT ADJOINING PANEL EDGES:                              | SINGLE 2x                                    | SINGLE 3x, 4x OR 2-2x w/ 10d @ 4" O.C.       | SINGLE 3x, 4x OR 2-2x w/ 10d @ 3" O.C.      | SINGLE 3x OR 4x                           | SINGLE 3x OR 4x                           |
|                           | 3x SILL REQ. (NOTE 6):                                                | NO                                           | NO                                           | NO                                          | YES                                       | YES                                       |
| 1/2" SHEATHING (EA. FACE) | SHEARWALL LENGTH: SHEATHING DESIGNATION:                              | X"-X" SW-6                                   | X"-X" SW-7                                   | X"-X" SW-8                                  |                                           |                                           |
|                           | PLYWOOD OR O.S.B. SHEATHING THICKNESS:                                | 15/32" STR. 1 EACH FACE                      | 15/32" STR. 1 EACH FACE                      | 15/32" STR. 1 EACH FACE                     |                                           |                                           |
|                           | 10d EDGE NAIL (0.148 DIA.):                                           | 10d @ 4" O.C.                                | 10d @ 3" O.C.                                | 10d @ 2" O.C.                               |                                           |                                           |
|                           | 10d FIELD NAIL (0.148 DIA.):                                          | 10d @ 12" O.C.                               | 10d @ 12" O.C.                               | 10d @ 12" O.C.                              |                                           |                                           |
|                           | FRAMING MEMBER AT ADJOINING PANEL EDGES:                              | SINGLE 3x OR 4x                              | SINGLE 3x OR 4x                              | SINGLE 3x OR 4x                             |                                           |                                           |
|                           | 3x SILL REQ. (NOTE 6):                                                | YES                                          | YES                                          | YES                                         |                                           |                                           |
|                           | SILL CONNECTION: LAG SCREW (1/2" DIA.x7.5"): SDS SCREW (SDS25600):    | LAG @ 7" O.C. SDS @ 5" O.C.                  | LAG @ 5" O.C. SDS @ 4" O.C.                  | LAG @ 4" O.C. SDS @ 3" O.C.                 |                                           |                                           |
|                           | 5/8" DIA. MUDSILL A.B.: WITH 2x SILL                                  | @ 48" O.C. MAX                               | @ 38" O.C. MAX                               | @ 29" O.C. MAX                              | @ 28" O.C. MAX                            | @ 26" O.C. MAX                            |
|                           | TOP CONNECTION - "RBC" TOP CONNECTION - "LTP4" TOP CONNECTION - "A35" | @ 16" O.C. MAX @ 23" O.C. MAX @ 24" O.C. MAX | @ 10" O.C. MAX @ 15" O.C. MAX @ 18" O.C. MAX | @ 8" O.C. MAX @ 12" O.C. MAX @ 13" O.C. MAX | @ 6" O.C. MAX @ 8" O.C. MAX @ 8" O.C. MAX | @ 6" O.C. MAX @ 8" O.C. MAX @ 8" O.C. MAX |
|                           | ALLOWABLE SHEAR                                                       | 310                                          | 460                                          | 600                                         | 770                                       | 870                                       |

103 SHEARWALL SCHEDULE

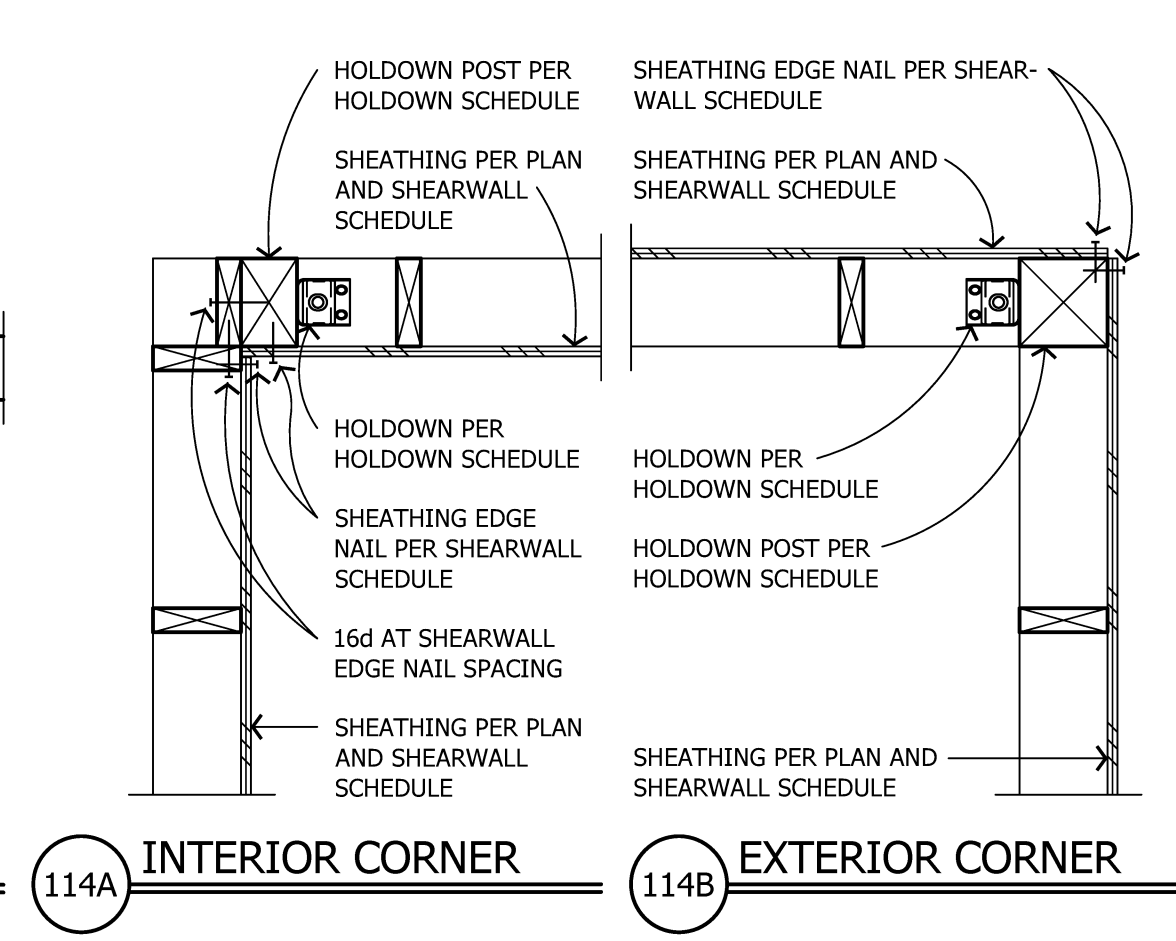


106 SMALL OPENING IN SHEARWALL

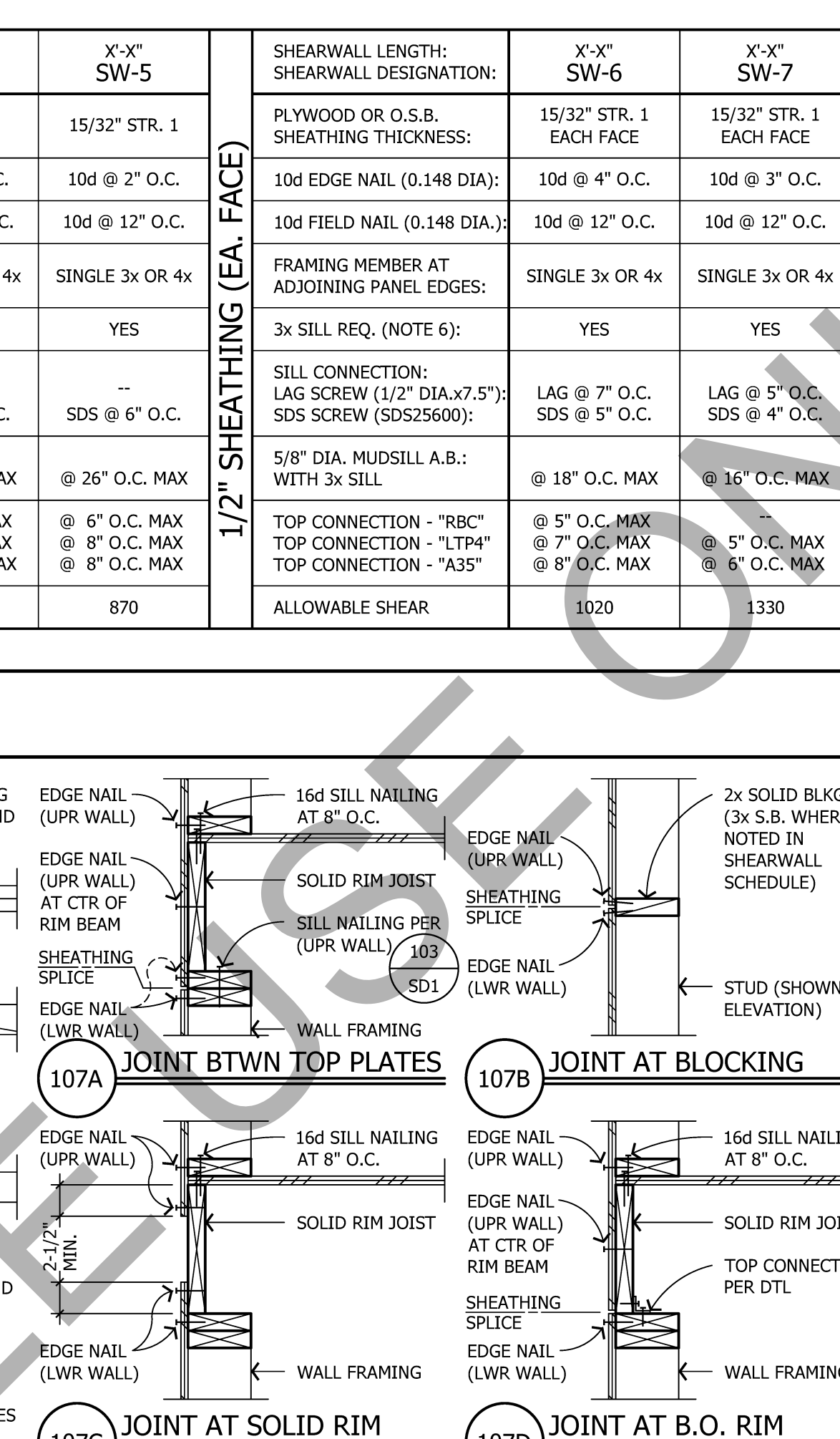


- DRILL THE HOLE TO THE SPECIFIED EMBEDMENT DEPTH PLUS 1/2" MINIMUM TO ALLOW THE THREAD TAPPING MUST SETTLE AND BLOW IT CLEAN USING COMPRESSED AIR.
- INSERT THE ANCHOR THROUGH THE WASHER AND INTO THE HOLE.
- TIGHTEN THE ANCHOR UNTIL THE HEX WASHER HEAD COMES IN CONTACT WITH THE WASHER.
- CAUTION: OVERSIZED HOLES IN THE BASE MATERIAL WILL REDUCE OR ELIMINATE THE MECHANICAL INTERLOCK OF THE THREADS WITH THE BASE MATERIAL AND WILL REDUCE THE ANCHOR'S LOAD CAPACITY. USE A TITEN HD SCREW ANCHOR ONE TIME ONLY. INSTALLING THE ANCHOR MULTIPLE TIMES MAY RESULT IN THREAD WEAR AND REDUCE LOAD CAPACITY.

111 "TITEN HD" ANCHORAGE & NOTES



114 HOLDOWN AT SHEARWALL CORNER (PLAN)



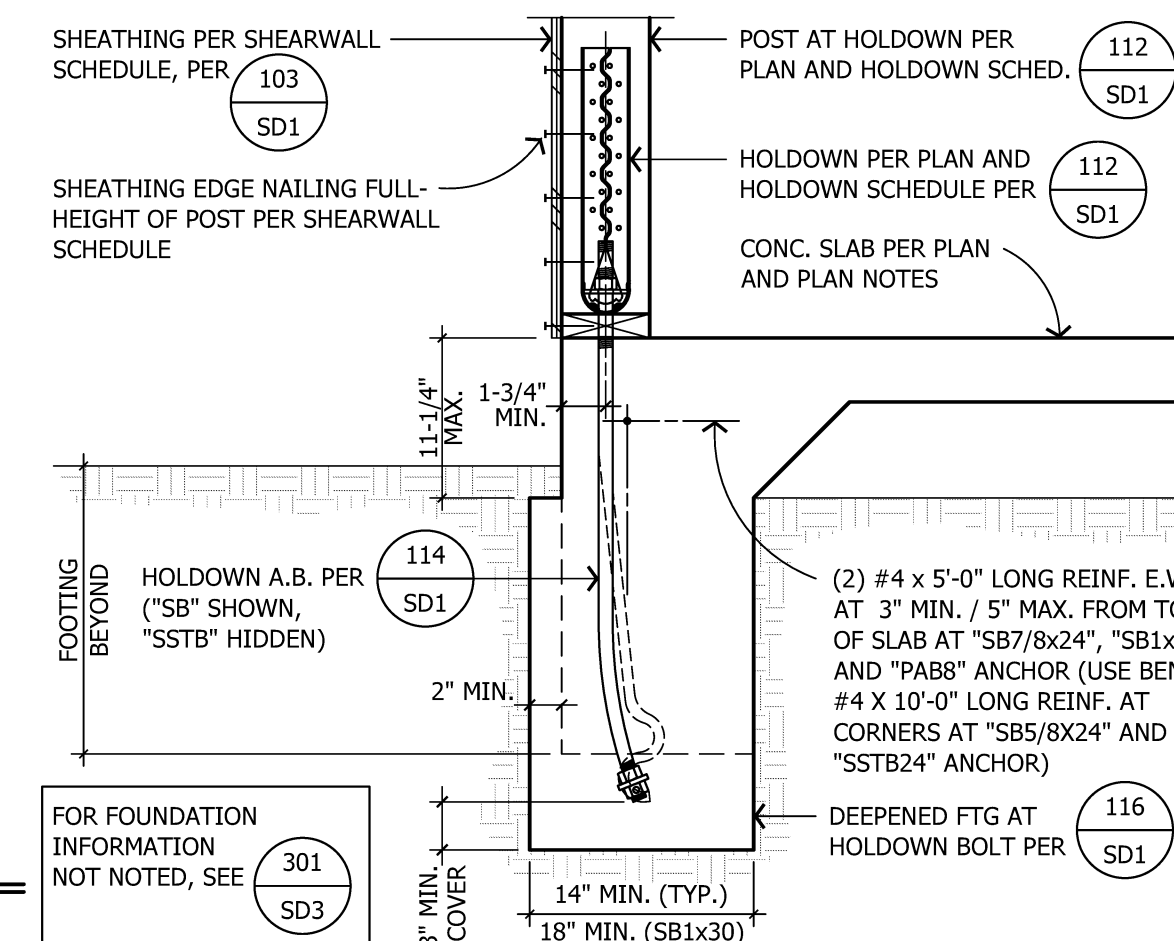
107C JOINT AT SOLID RIM

| STRAP HOLDOWN SCHEDULE |            |                                           |                |                |
|------------------------|------------|-------------------------------------------|----------------|----------------|
| STRAP                  | END LENGTH | FASTENERS EA. END                         | MIN. POST SIZE | ALLOWABLE LOAD |
| "CS14"                 | 15"        | (13) 10d (0.148 DIA. x 2-1/2")            | (2) 2x         | 2490 lbs       |
| (2) "CS14"             | 15"        | (13) 10d (0.148 DIA. x 2-1/2") EACH STRAP | 4x4 / (2) 2x6  | 4980 lbs       |
| "CMST14"               | 30"        | (33) 10d (0.148 DIA. x 2-1/2")            | 4x6 / 6x6      | 6490 lbs       |
| "CMST12"               | 39"        | (43) 10d (0.148 DIA. x 2-1/2")            | 4x8 / 6x6      | 9215 lbs       |

- FILL ALL NAIL HOLES PER MANUFACTURER'S REQUIREMENTS.
- STRAPS SHALL BE INSTALLED OVER PLYWOOD SHEATHING.
- STRAPS MUST BE INSTALLED FLAT TO THE FACE OF THE POST. NO BENDS, NICKS OR SLACK OF ANY KIND ARE ALLOWED. STRAPS INSTALLED WITH ANY BENDS, NICKS OR SLACK SHALL BE CONSIDERED AS INADEQUATE AND MUST BE RE-INSTALLED.
- STRAPS MUST BE INSTALLED VERTICALLY WHEN USED AS A HOLDOWN. STRAPS INSTALLED ON A SLOPE OR AT AN ANGLE SHALL BE CONSIDERED AS INADEQUATE AND MUST BE RE-INSTALLED.
- LOADS INCLUDE A 60% LOAD DURATION INCREASE ON THE FASTENERS FOR WIND OR SEISMIC.
- CMST STRAPS ONLY - USE EVERY OTHER ROUND HOLE IF THE WOOD TENDS TO SPLIT. INCREASE STRAP LENGTH AS REQUIRED TO ACHIEVE MINIMUM NUMBER OF FASTENERS LISTED IN TABLE ABOVE.
- PRE-DRILL HOLES TO PREVENT WOOD SPLITTING AS REQUIRED.

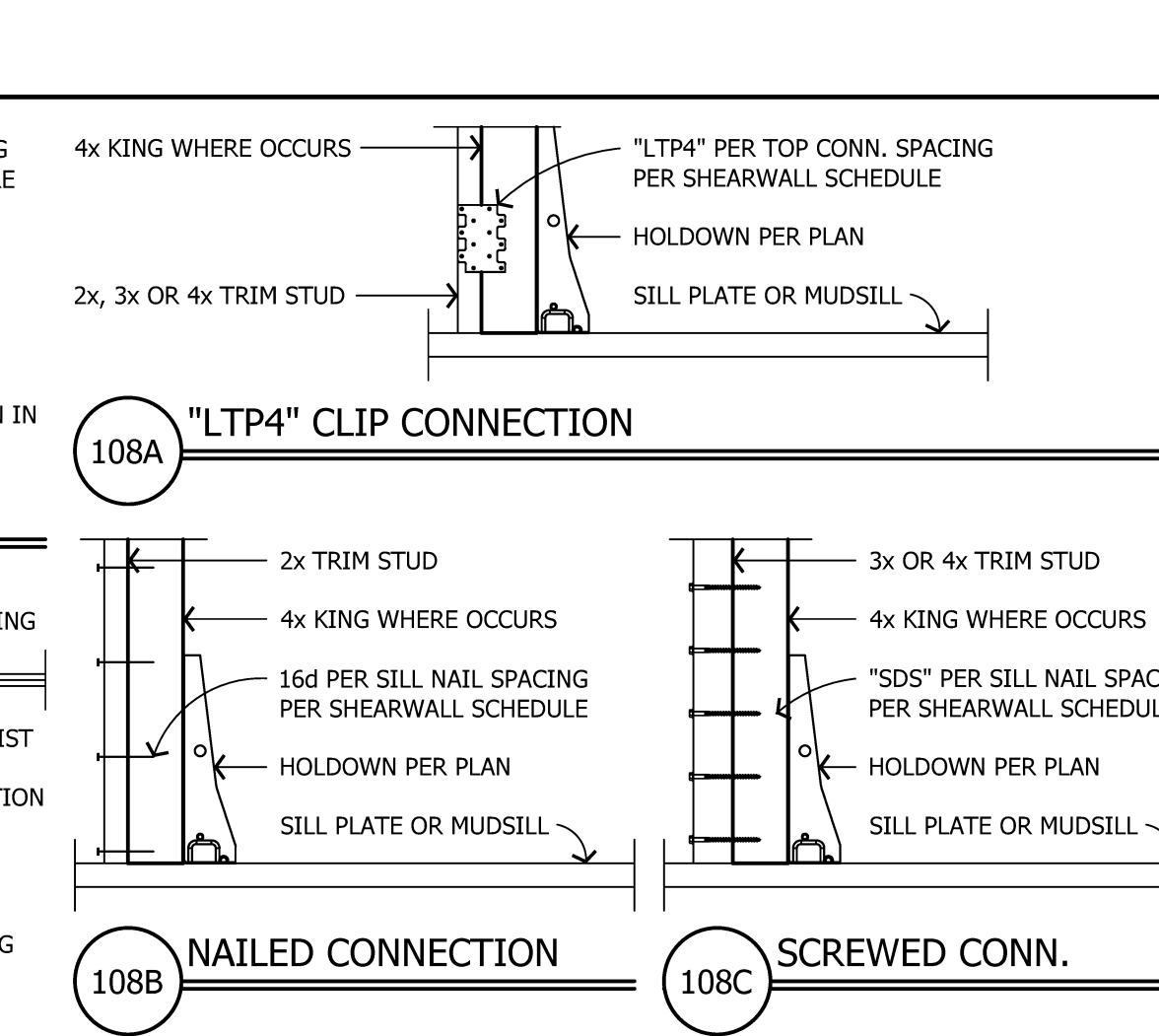
NOTE: A. WHERE NOTED, SB1x30 REQUIRES FOOTING WIDTH TO BE 18" WIDE.

112 SLAB HOLDOWN SCHEDULES



115 HOLDOWN A.B. TO EXTERIOR FOOTING

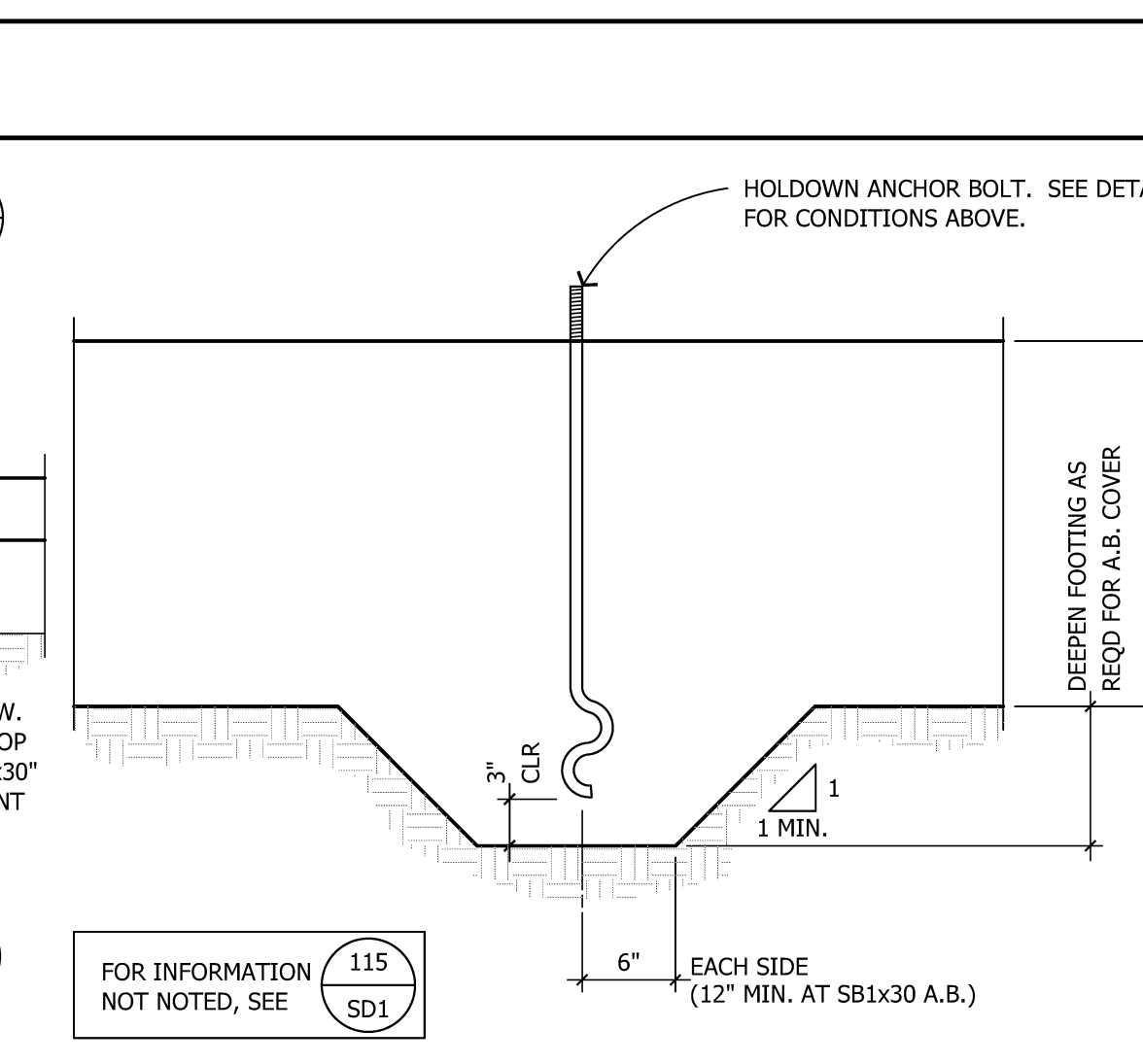
- ALL NAILS SHALL HAVE MINIMUM SHANK DIAMETER AS SPECIFIED IN SCHED.
- A. GALVANIZED NAILS SHALL BE HOT DIPPED OR TUMBLED.
- B. ALL FASTENERS THAT ARE INSTALLED INTO OR IN CONTACT WITH PRESSURE TREATED LUMBER ARE TO BE HOT DIPPED GALVANIZED
- PLYWOOD AND OSB SHALL BE TYPE CDX GRADE OR BETTER (EXCEPT WHERE STRUCTURAL 1 GRADE IS NOTED).
- A. STR. 1 = STRUCTURAL 1 GRADE PLYWOOD / O.S.B.
- WHEN FASTENERS ARE SPACED LESS THAN 4" ON CENTER, NAILING AT PANEL EDGES SHOULD BE STAGGERED PER DETAIL
- ALL DOUBLE SIDED WALLS REQUIRE 3x SILL, MIN.
- PREDRILL SILL CONNECTIONS WHERE NEEDED TO AVOID WOOD SPLITTING. USE DRILL BIT SIZE = 0.75 x NAIL (OR SCREW) DIAMETER.
- 3x SILL PLATES MAY BE OMITTED WHEN ALTERNATE SHEATHING JOINT AT RIM OR BLOCKING IS PROVIDED PER DETAIL
- INSTALL OBL 2x POST MIN. AT END OF SHEARWALLS. IF 3x FRAMING MEMBERS ARE REQUIRED USE 4x POST MINIMUM.
- ALL ANCHOR BOLTS MUST BE INSTALLED WITH 3"x30x0.229" GALVANIZED PLATE WASHERS PER THE CURRENT CBC.
- WHERE SHEAR MATERIAL IS APPLIED ON BOTH FACES OF A SHEARWALL, AND NAIL SPACING IS LESS THAN 6" O.C. ALL THE FOLLOWING REQ. SHALL BE MET:
  - USE 3x SILLS AND 3x TOP PLATES.
  - THE VERTICAL SHEAR PANEL JOINTS ON OPPOSITE FACES SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS, UNLESS SUCH FRAMING MEMBERS ARE 4x OR THICKER.
  - INSTALL 4x RIM / BLOCKING MINIMUM BELOW ALL DOUBLE SIDED SHEARWALLS.
- FOR ALTERNATE MUDSILL ANCHORAGE, SEE DETAIL



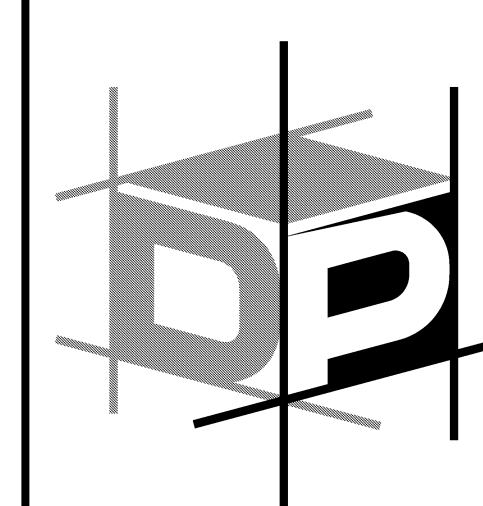
108 TRIM STUD TO HOLDOWN POST

| SCREWED / BOLTED HOLDOWN SCHEDULE |                        |                       |           |             |
|-----------------------------------|------------------------|-----------------------|-----------|-------------|
| ANCHOR                            | POST CONNECTORS        | HOLDOWN ANCHOR        | MIN. POST | ALLOW. LOAD |
| "HDU2"                            | (6) SDS25212 SCREWS    | SSTB24 OR SB5/8x24    | (2) 2x    | 2940 lbs    |
| "HDU4"                            | (10) SDS25212 SCREWS   | SSTB24 OR SB5/8x24    | (2) 2x    | 3815 lbs    |
| "HDU5"                            | (14) SDS25212 SCREWS   | SSTB24 OR SB5/8x24    | (2) 2x    | 5645 lbs    |
| "HDU8"                            | (20) SDS25212 SCREWS   | SSTB28 OR SB7/8x24    | 4x6 / 6x6 | 7855 lbs    |
| "HDU11"                           | (30) SDS25212 SCREWS   | SB1x30 <sup>(A)</sup> | 4x8 / 6x6 | 11175 lbs   |
| "HDU14"                           | (36) SDS25212 SCREWS   | PAB8 (OR EQUIV.)      | 4x8 / 6x6 | 14390 lbs   |
| "HD19"                            | (5) 1" DIA. A307 BOLTS | PAB10 (OR EQUIV.)     | 4x8 / 6x6 | 19070 lbs   |

- RE-TIGHTEN ALL BOLTS PRIOR TO SHEARWALL CLOSE-IN.
- DOUBLE 2x HOLDOWN POSTS SHALL BE SISTERED TOGETHER PER SILL NAILING REQUIREMENTS FOR SHEARWALL TYPE. SEE DETAIL FOR MORE INFORMATION.
- CONTRACTOR'S OPTION TO SUBSTITUTE "STHD" TYPE HOLDOWNS:



116 DEEPENED FOUNDATION (FOR A.B.)

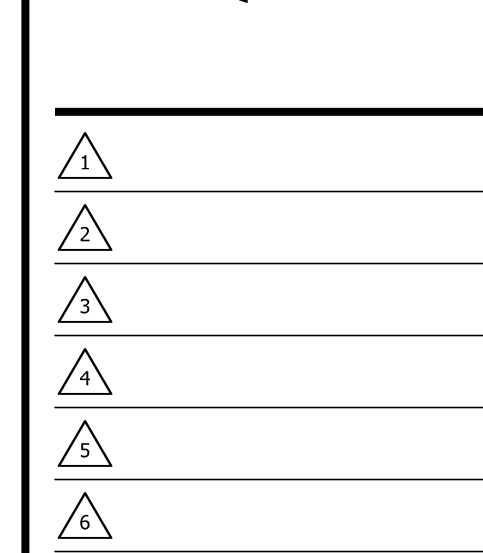


ADVANCED ENGINEERING

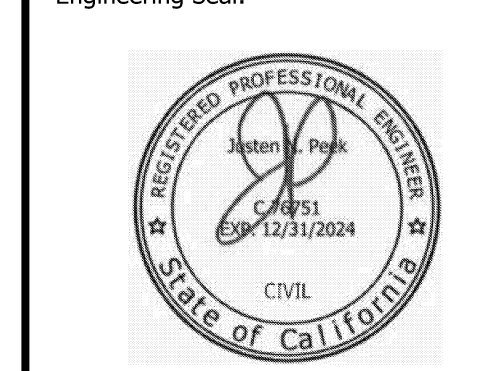
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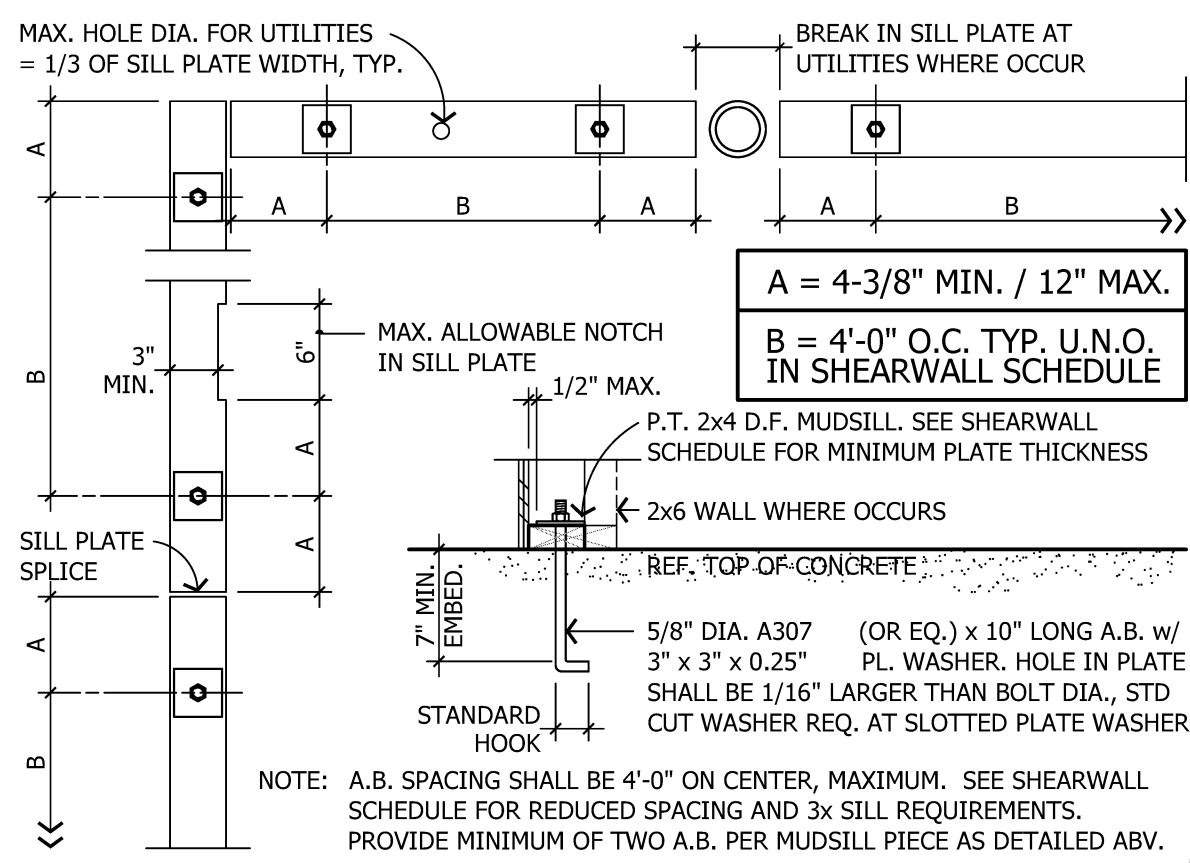
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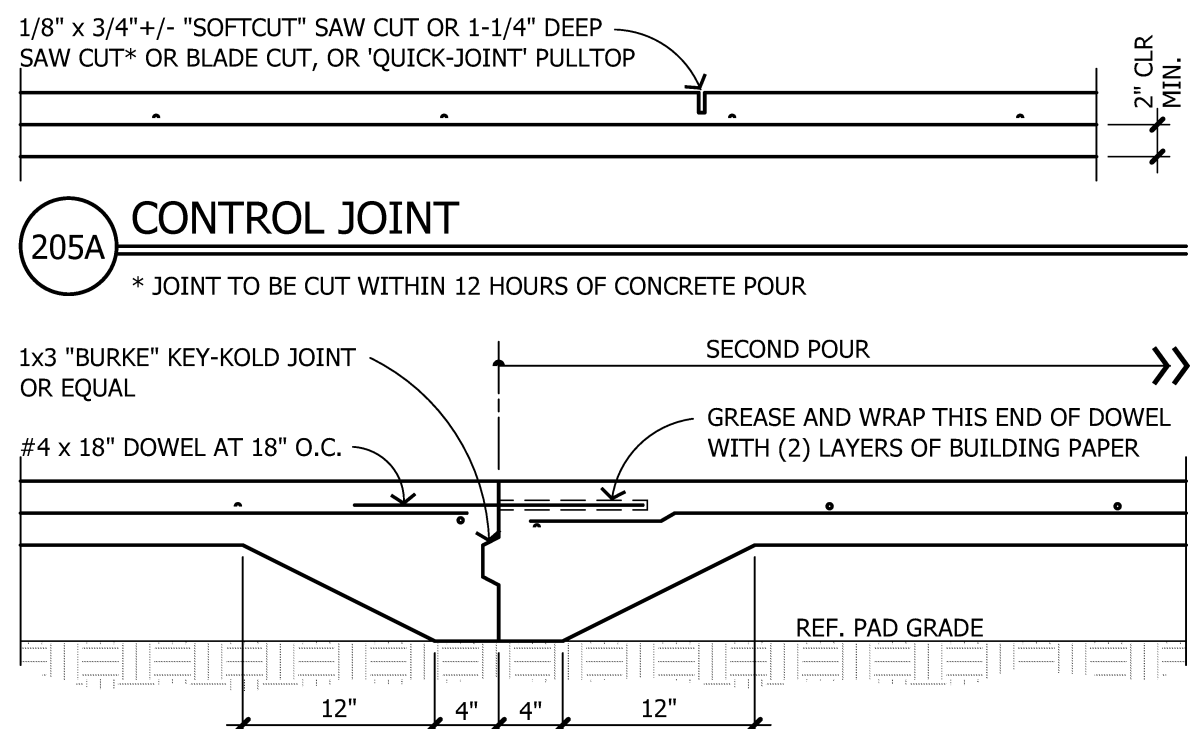
|                                                             |                 |
|-------------------------------------------------------------|-----------------|
| Sheet Description:                                          |                 |
| SHEARWALL SCHEDULE AND HOLDOWN SCHEDULE AND TYPICAL DETAILS |                 |
| No Scale                                                    |                 |
| Initial Issue Date:                                         | March 24, 2023  |
| Drawn By:                                                   | E. Bennett      |
| Project Designer:                                           | J. Peek         |
| Project Manager:                                            | J. Peek Ext. 23 |
| Job No.                                                     | W021420         |
| Sheet No.                                                   |                 |

SD1



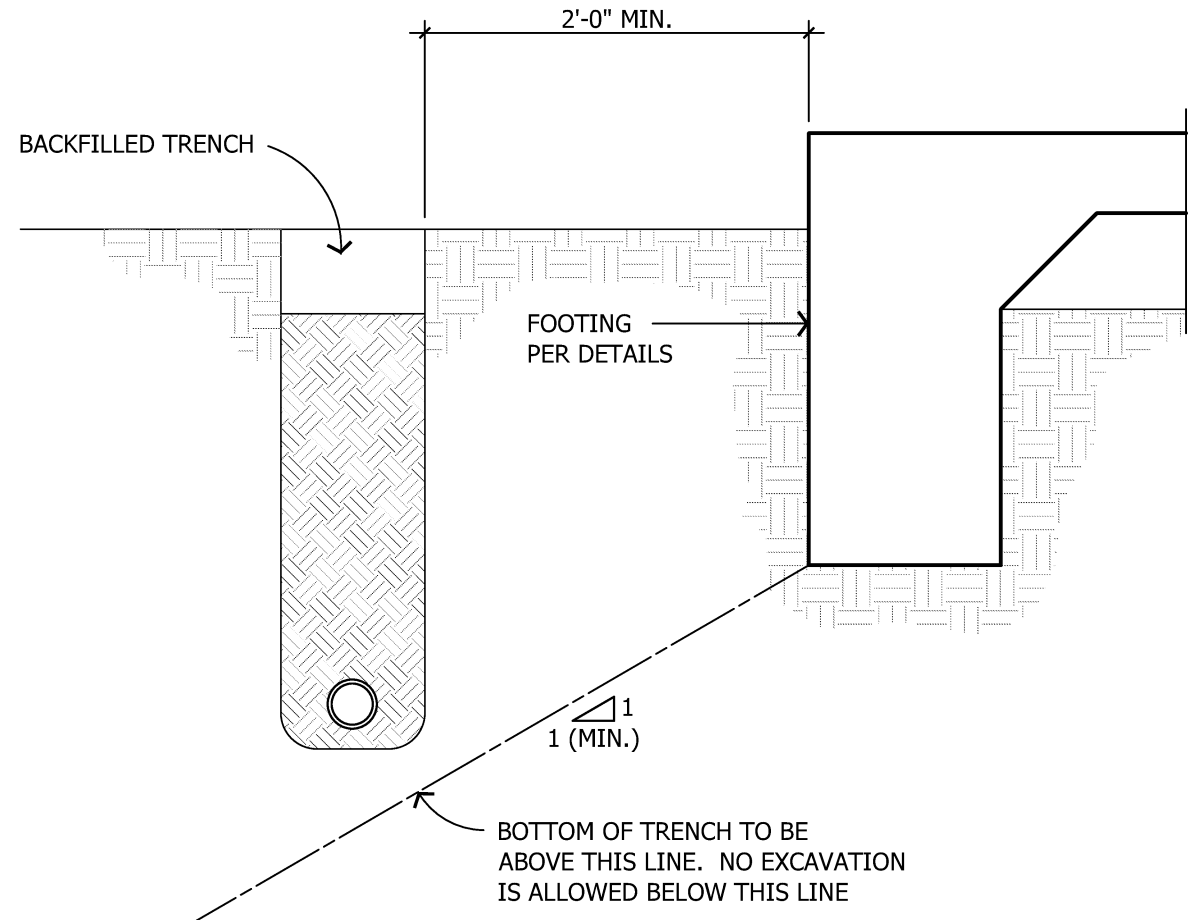


201 TYPICAL ANCHOR BOLT AND SHOT PIN PLACEMENT

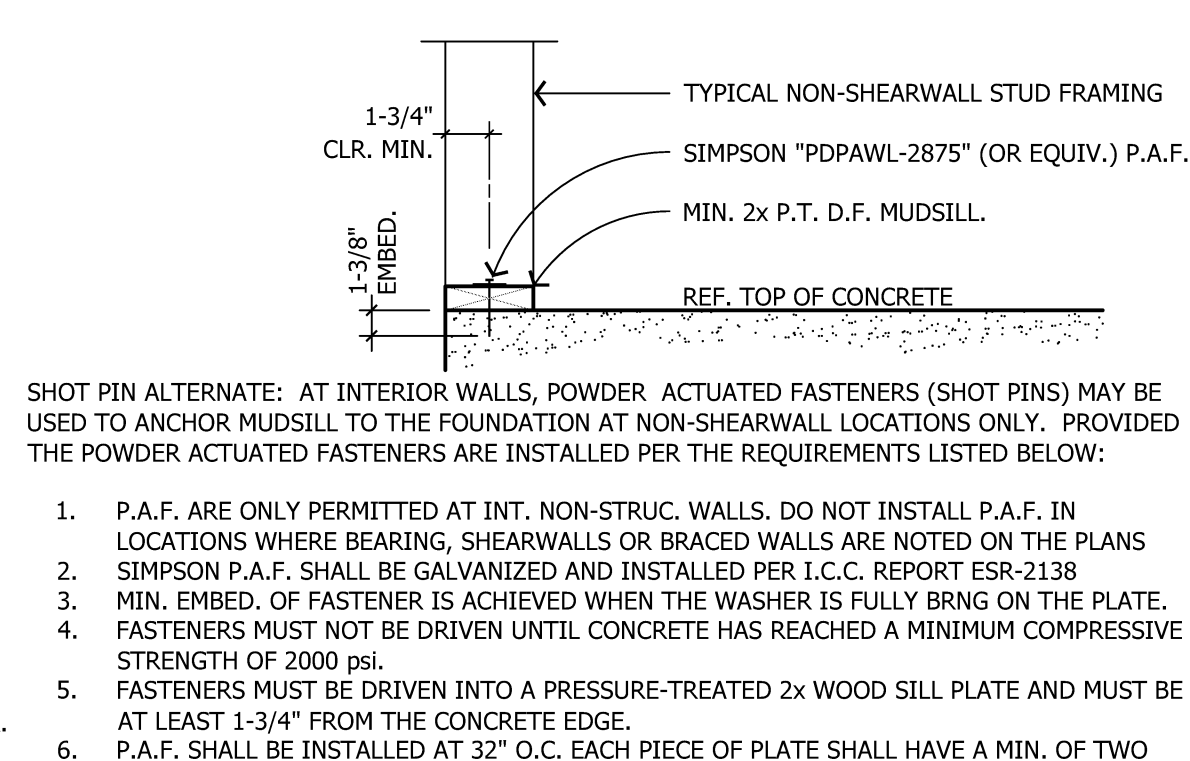


205B CONSTRUCTION JOINT

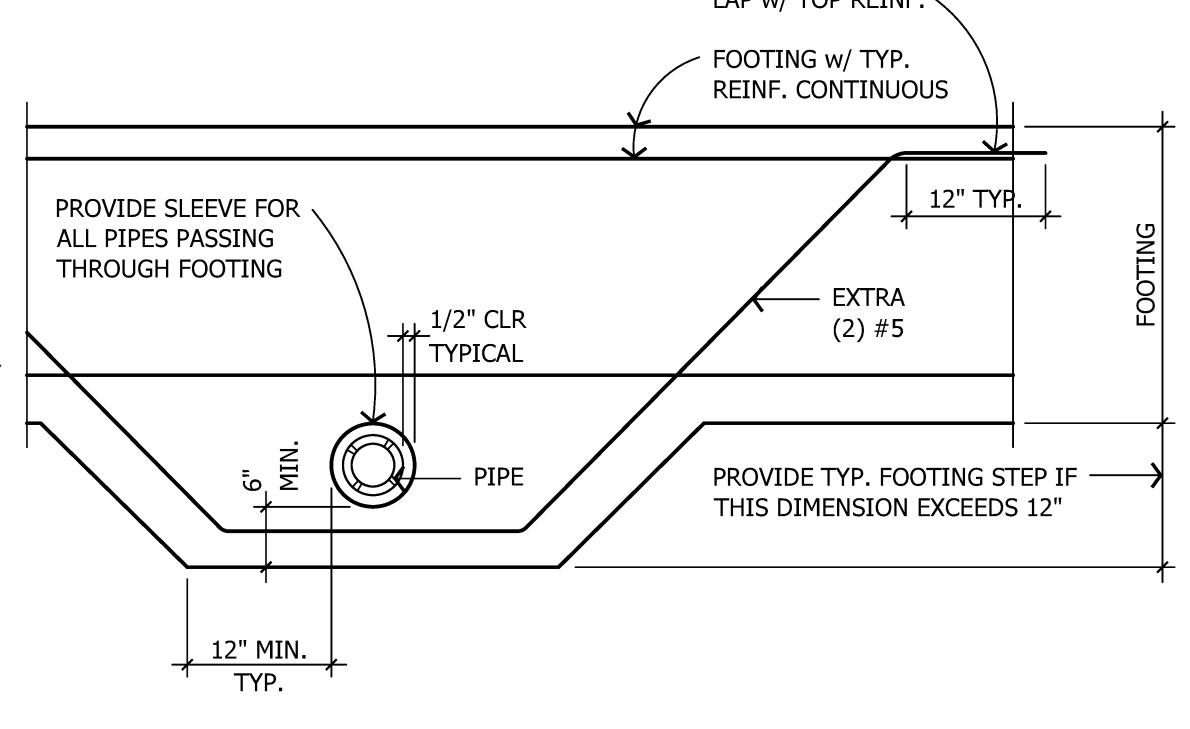
205 CRACK CONTROL JOINTS (SLAB-ON-GRADE)



207 PIPE / TRENCH PARALLEL TO FOOTING

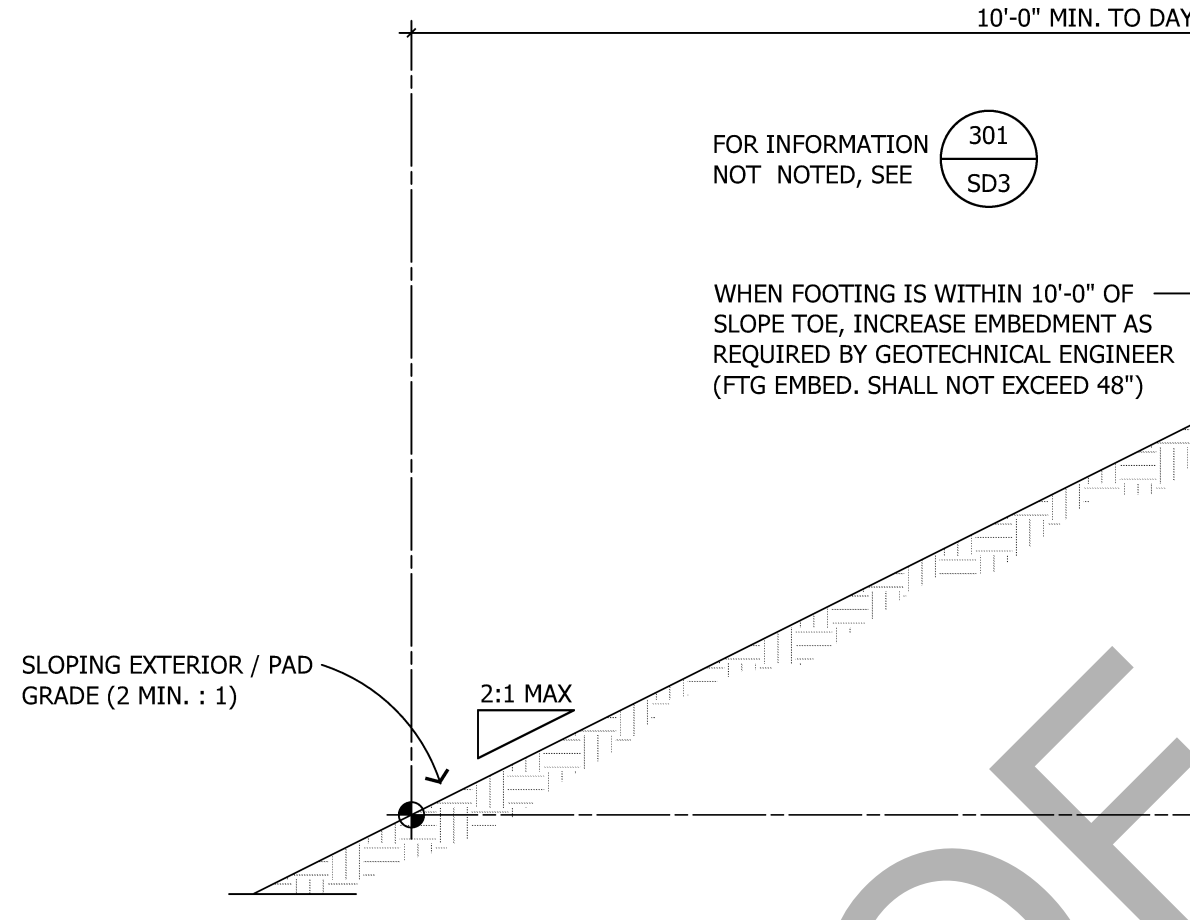


202 TYP. REINFORCING HOOKS AND LAPS

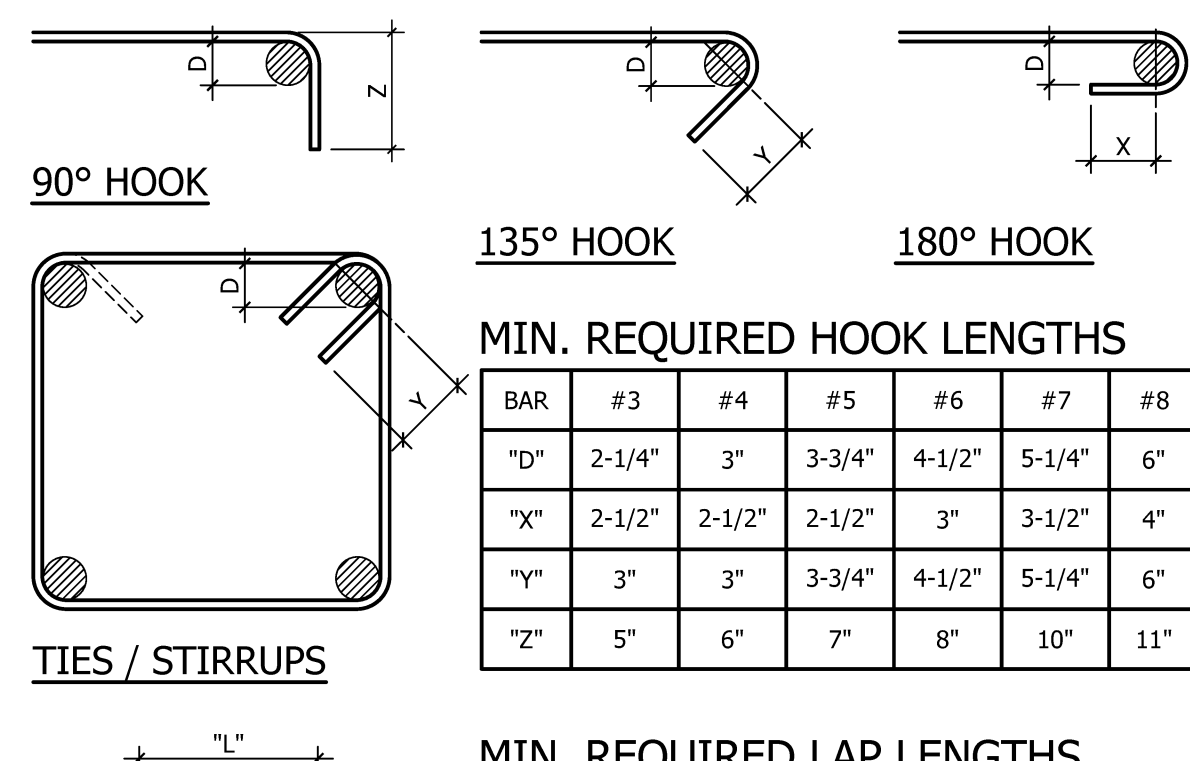


206A PIPE BELOW FOOTING

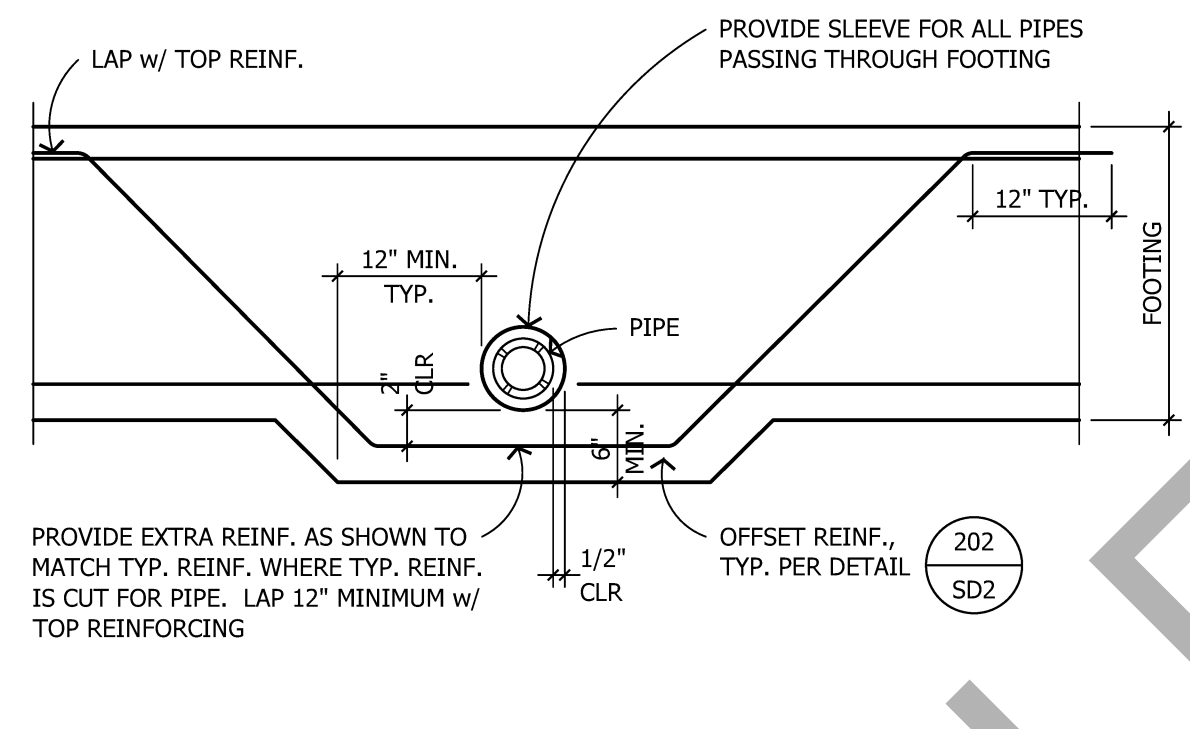
206 PIPE PERPENDICULAR TO FOOTING



208 INCREASED FOOTING DEPTH BY SLOPE

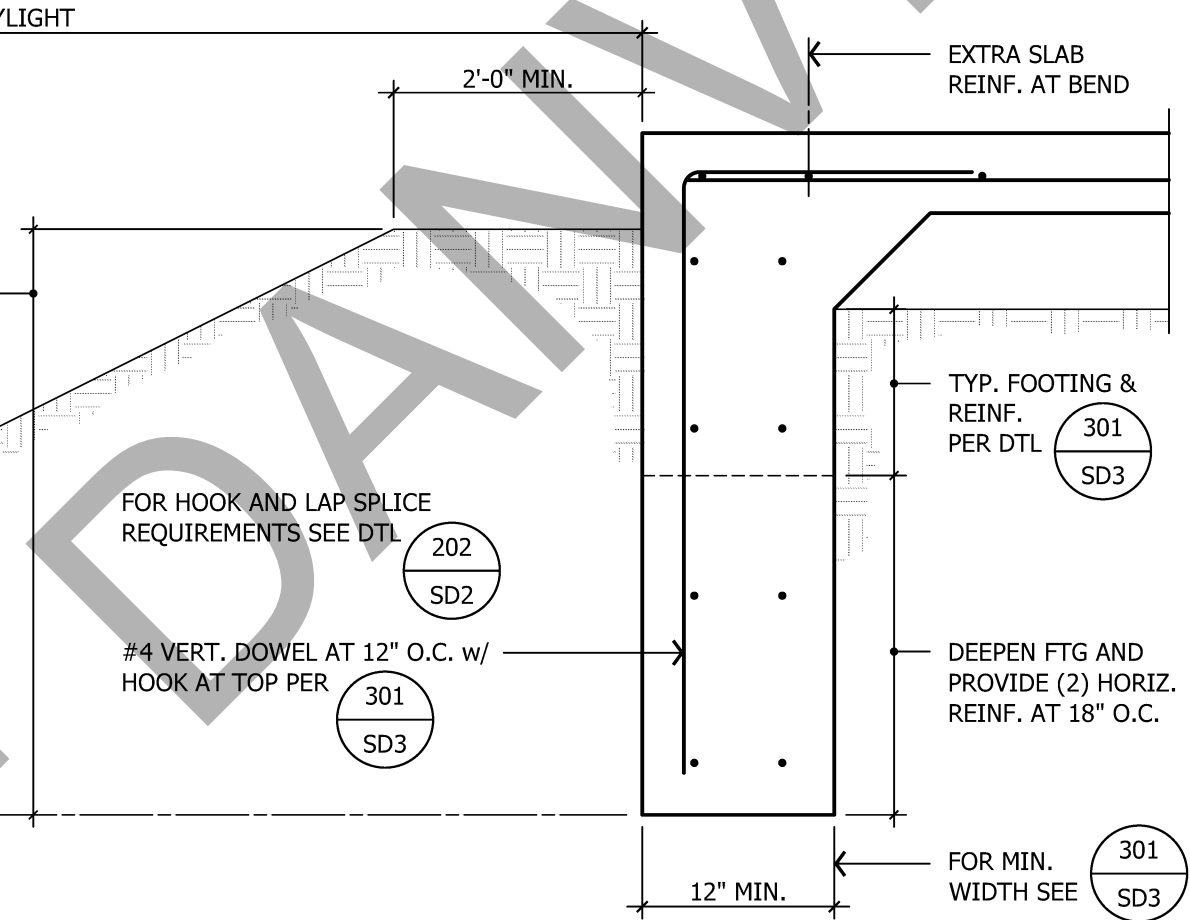


203 STD REINF. HOOKS - DOUBLE ROW

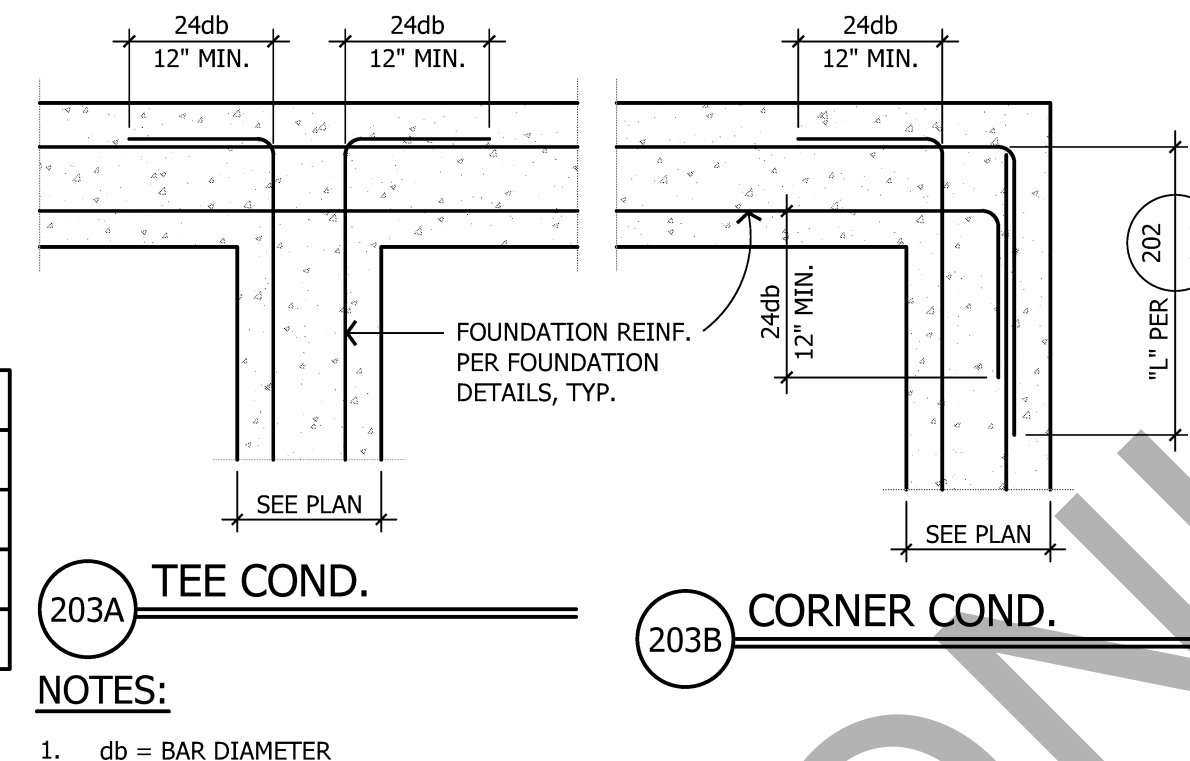


206B PIPE THROUGH FOOTING

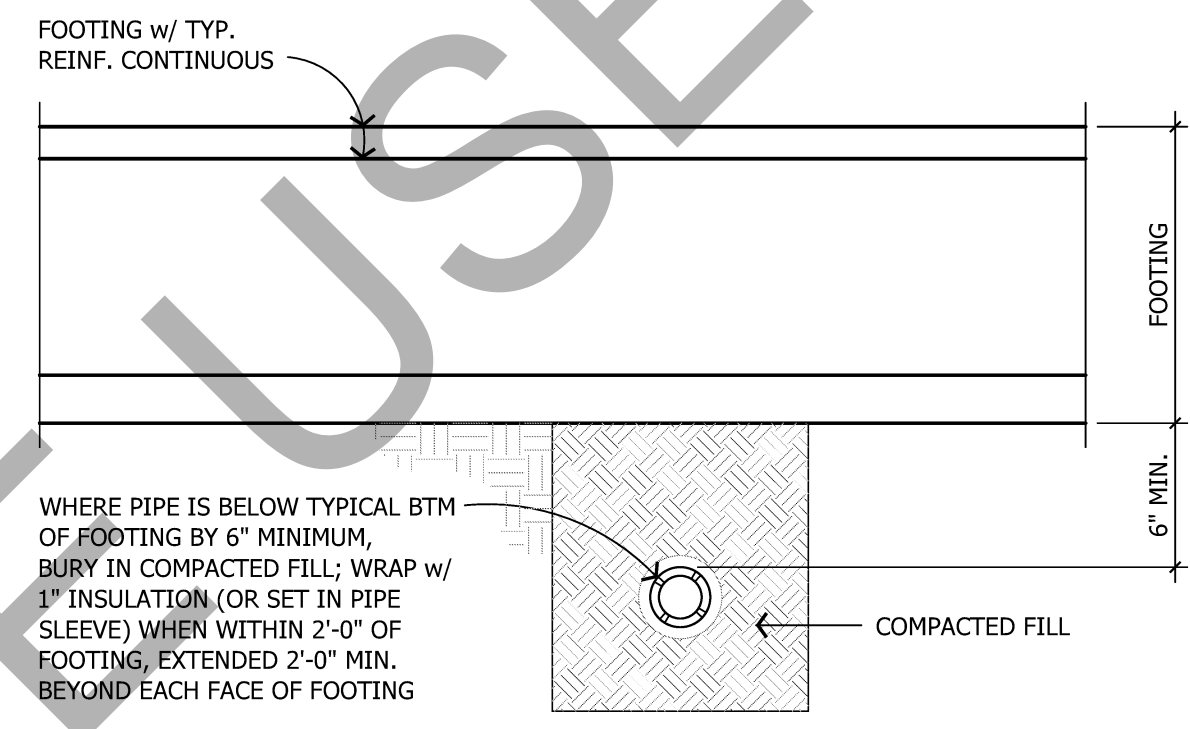
206 PIPE BELOW FOOTING



209 TOP PLATE SPLICES, BREAKS AND PENETRATIONS

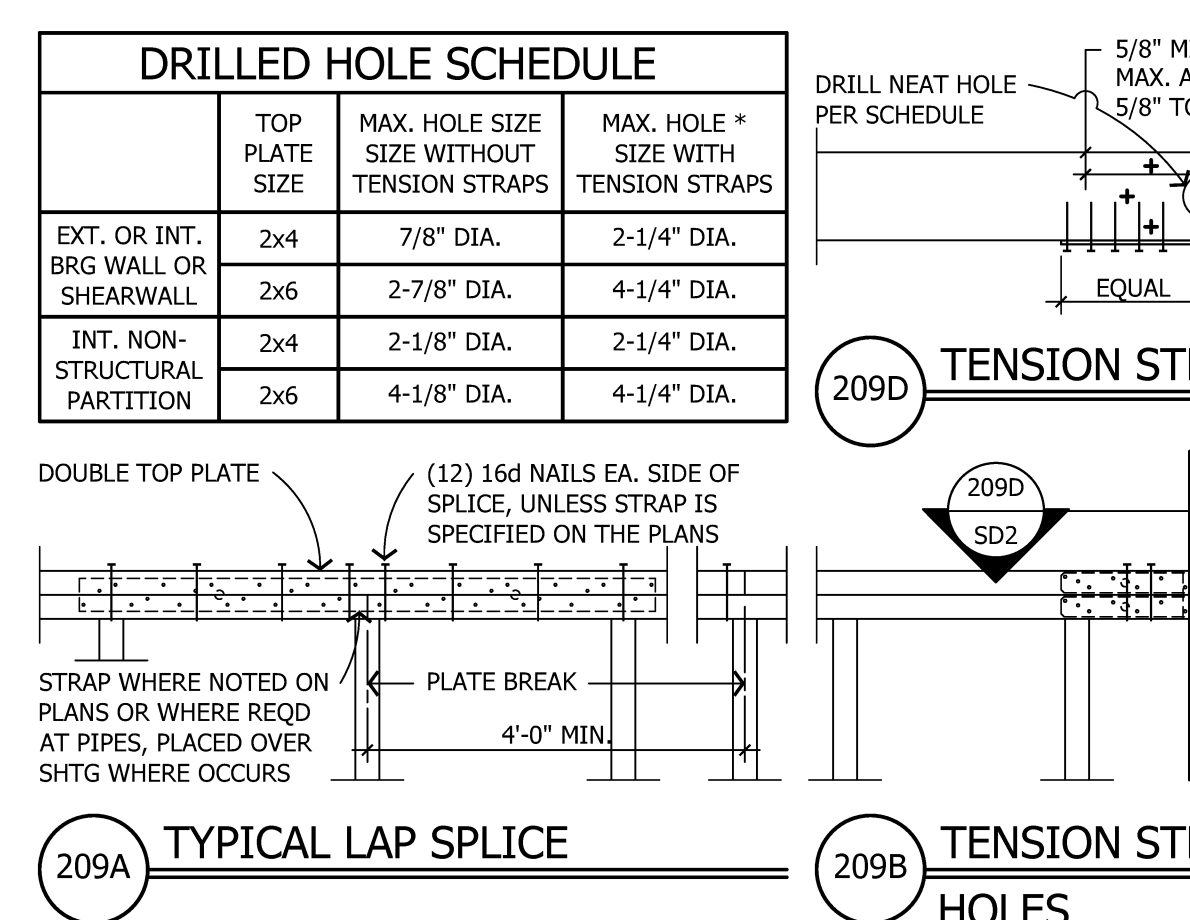


203A TEE COND. 203B CORNER COND.

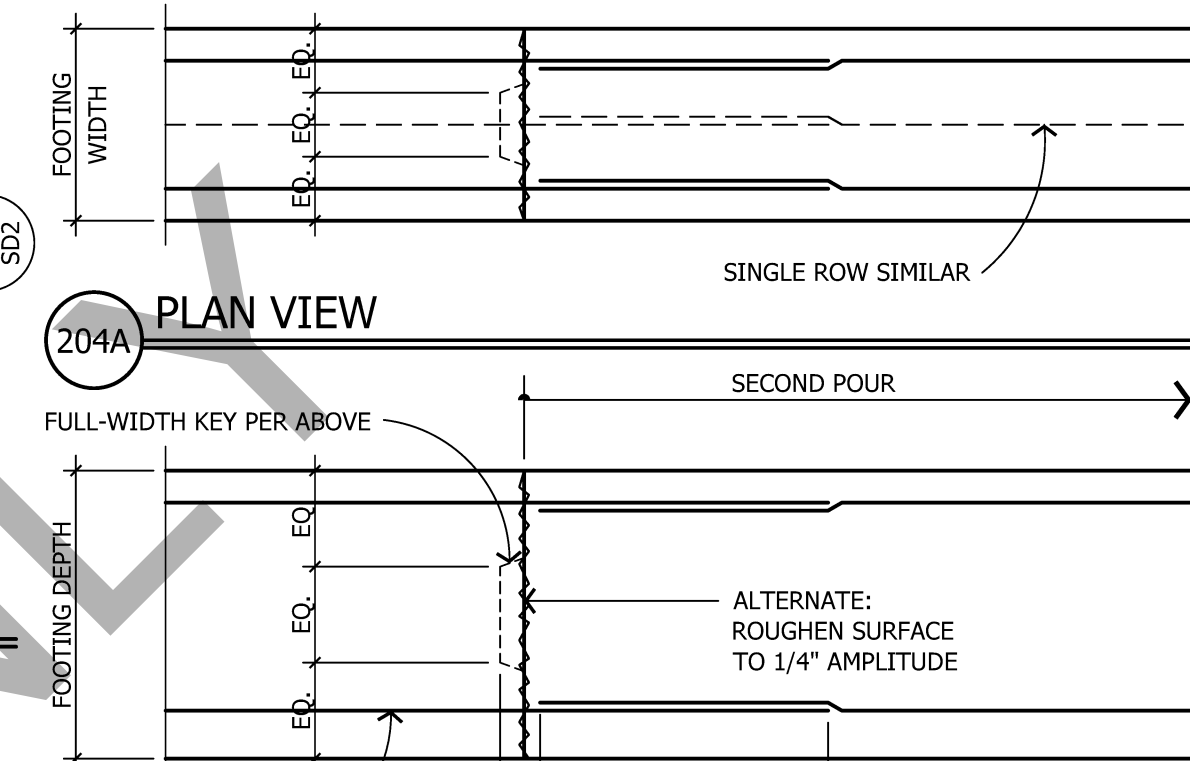


206C PIPE BELOW FOOTING

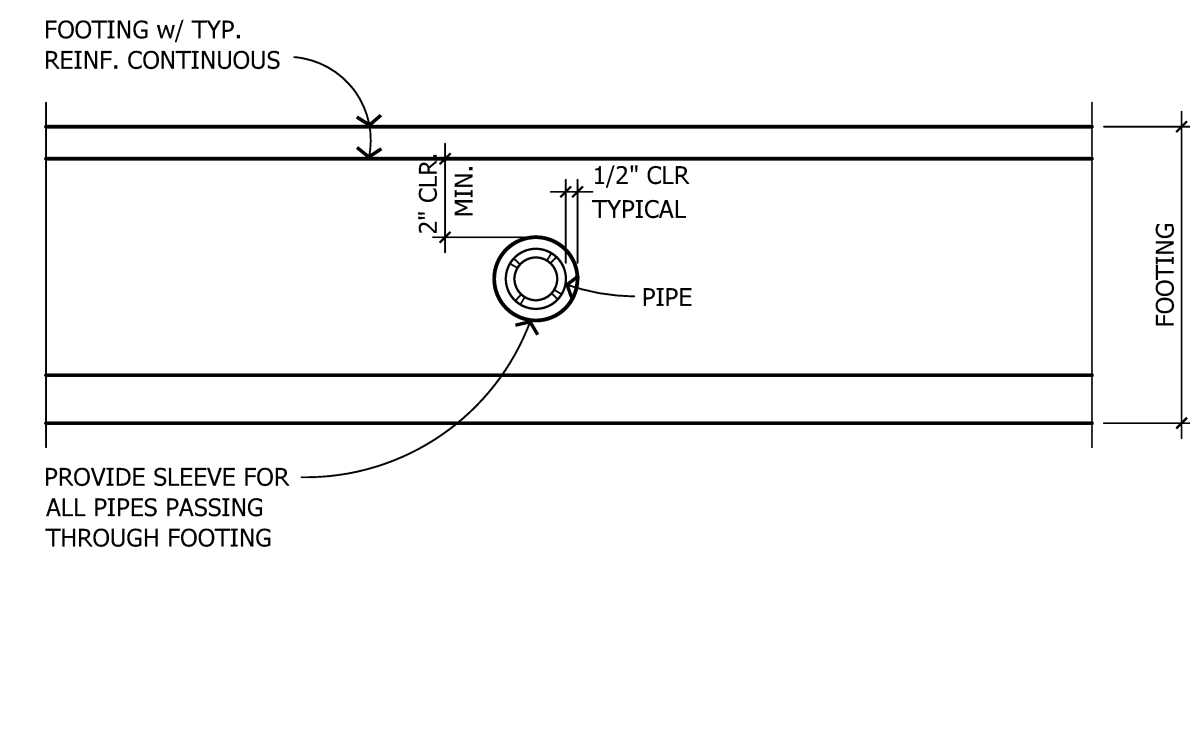
206C PIPE BETWEEN BARS



209A TYPICAL LAP SPLICE

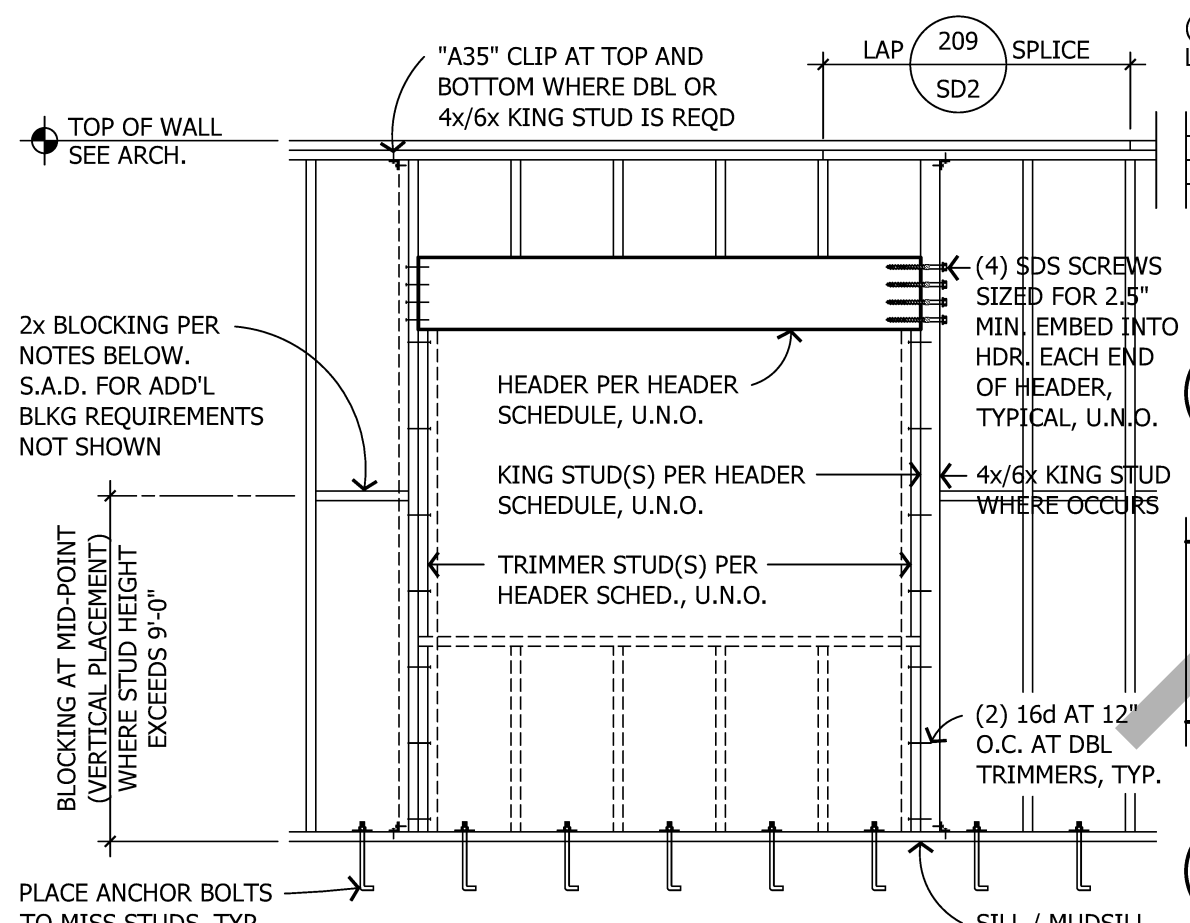


204 FOOTING CONSTRUCTION JOINT

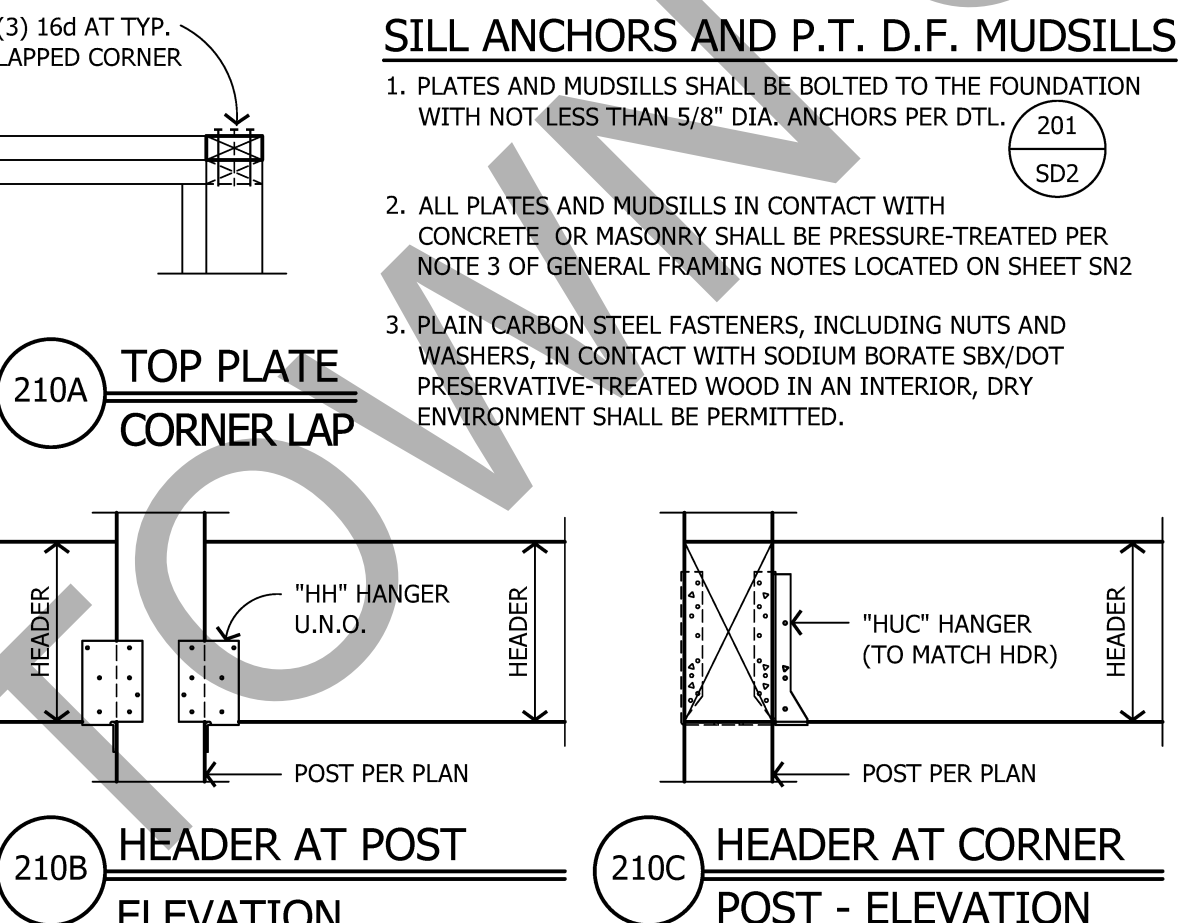


206D PIPE BETWEEN BARS

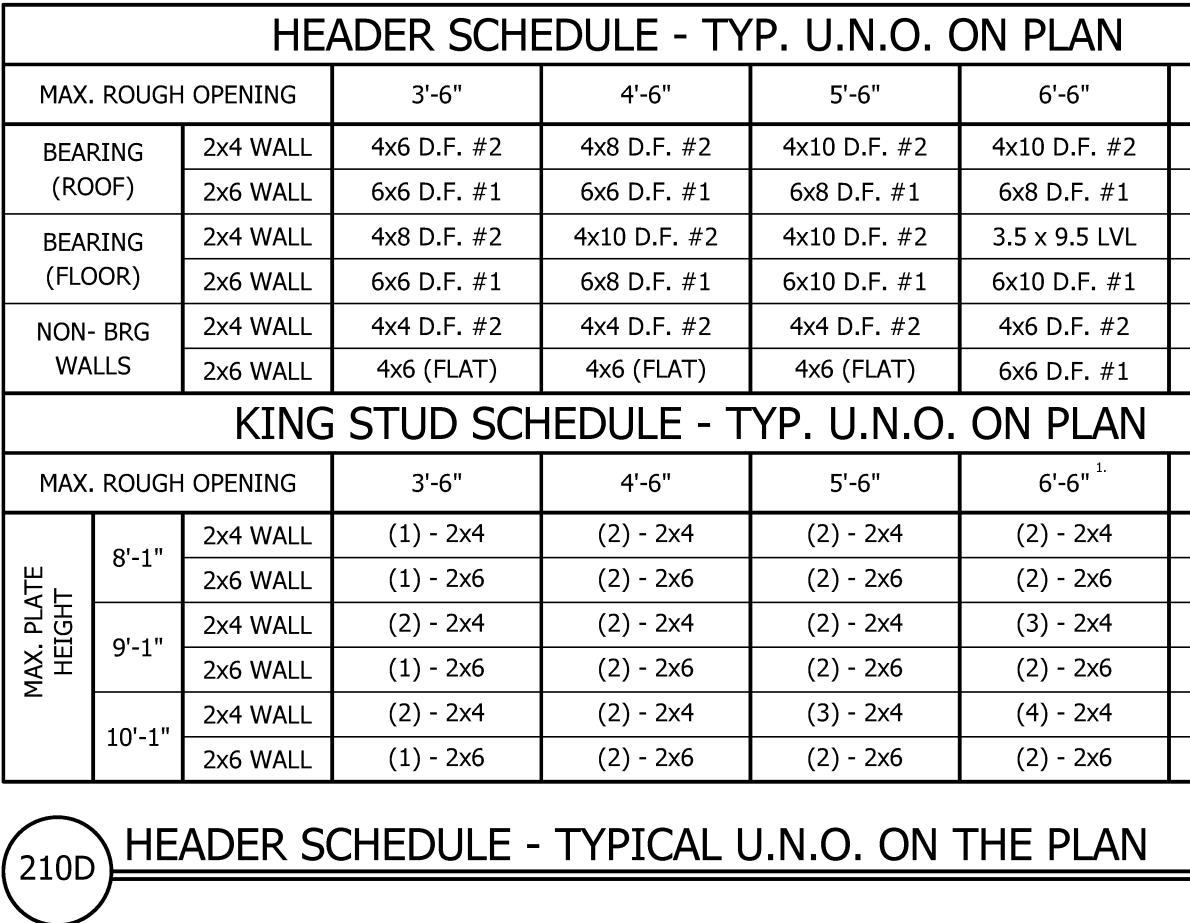
206D PIPE BETWEEN BARS



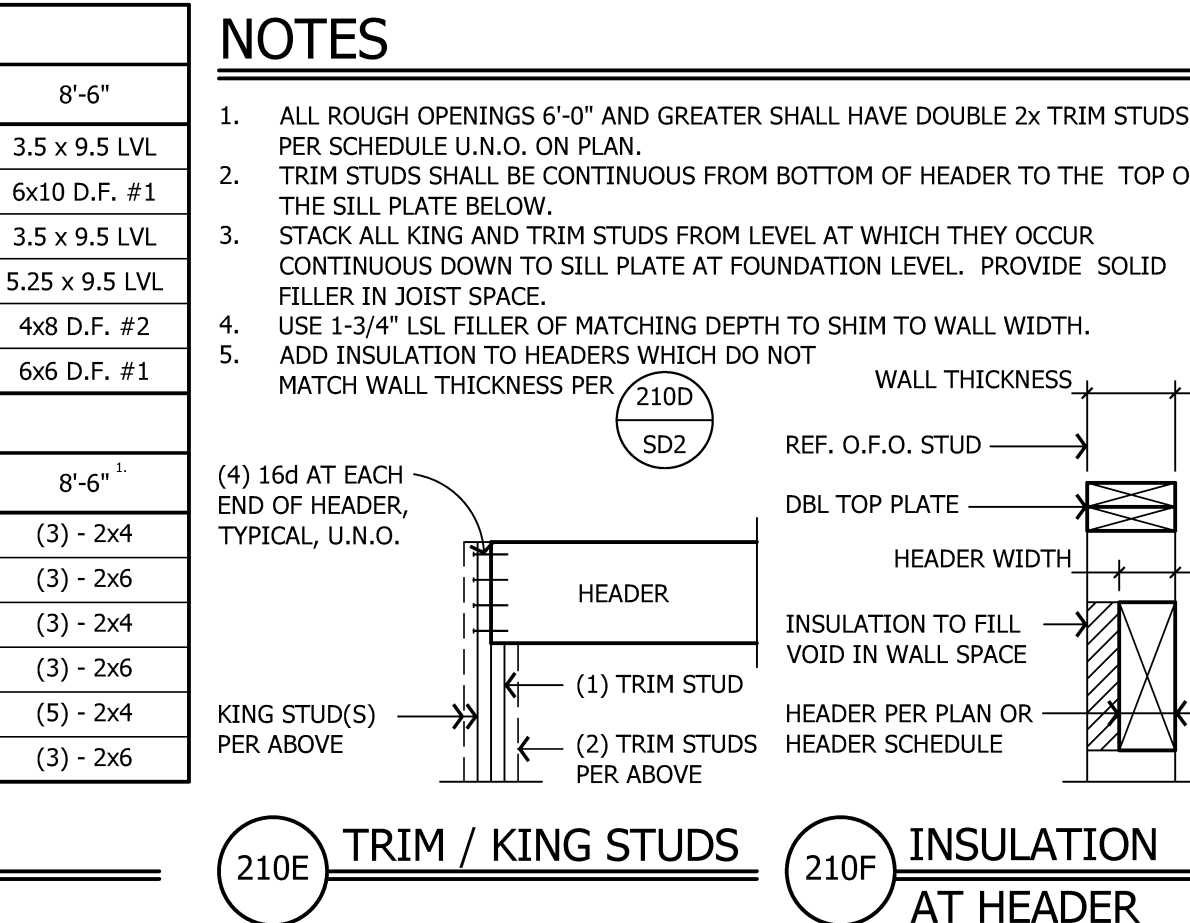
210 TYPICAL FRAMED WALL OPENING AND HEADER SCHEDULE



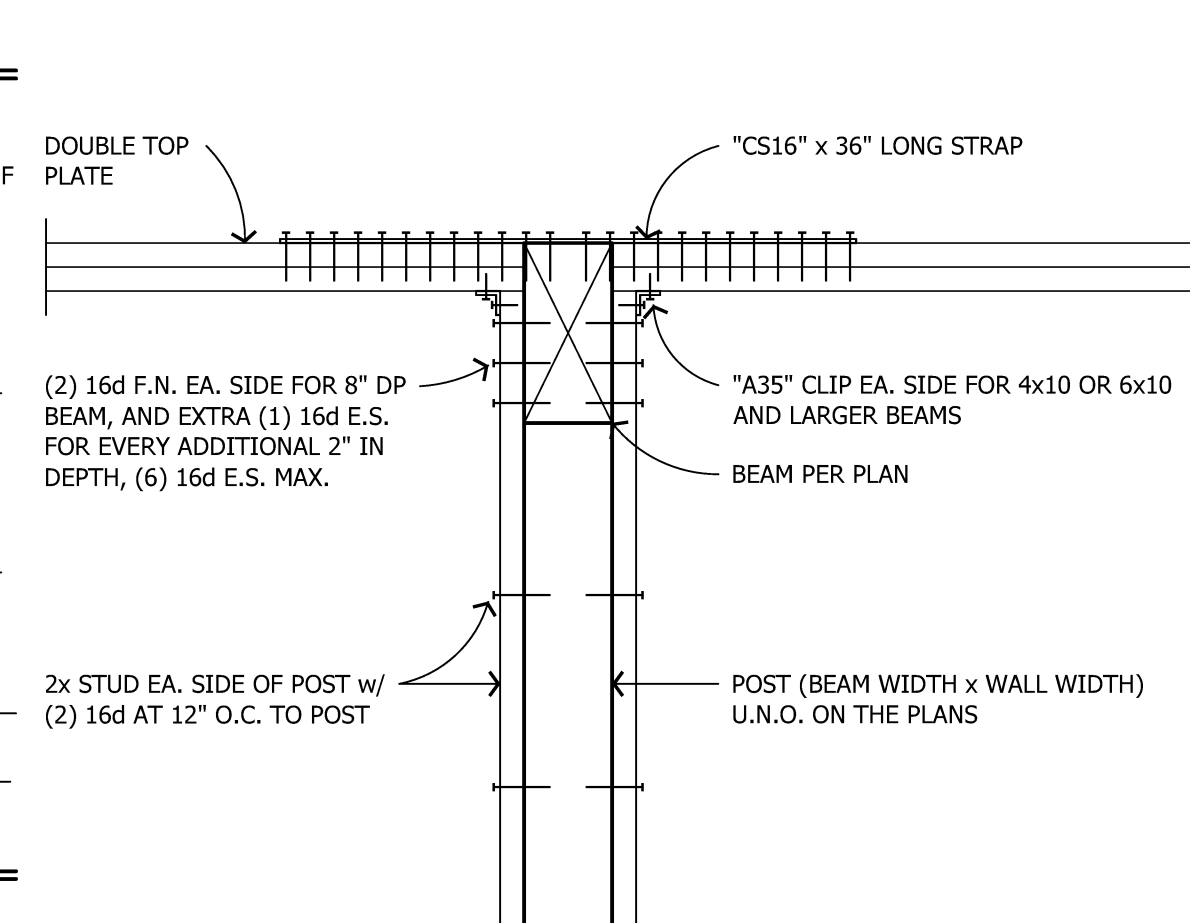
210A TOP PLATE CORNER LAP 210B HEADER AT POST ELEVATION



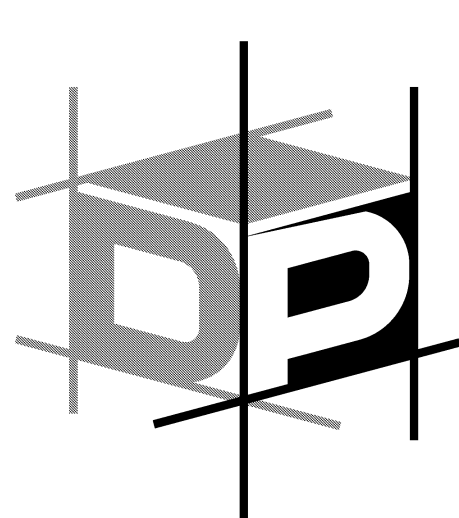
210C HEADER AT CORNER POST - ELEVATION 210D HEADER SCHEDULE - TYPICAL U.N.O. ON THE PLAN



210E TRIM / KING STUDS 210F INSULATION AT HEADER



211 TYPICAL BEAM SUPPORT IN WALL



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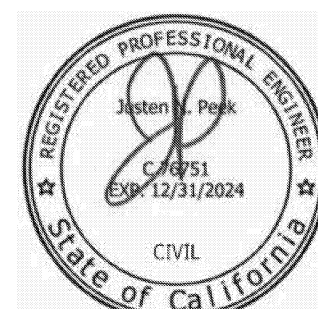
3381 Walnut Blvd. Ste. 220  
Brentwood, CA 94513  
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Sheet Description:  
TYPICAL CONCRETE AND  
CARPENTRY DETAILS

No Scale

Initial Issue Date: March 24, 2023

Drawn By: E. Bennett

Project Designer: J. Peek

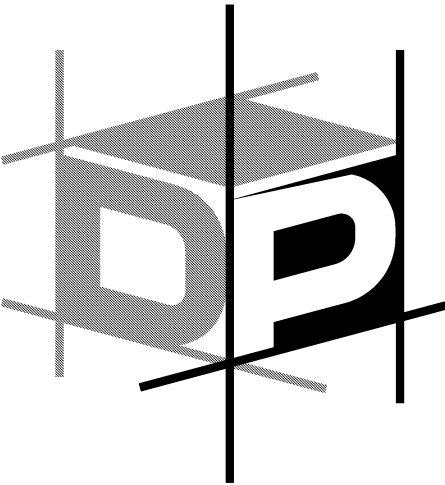
Project Manager: J. Peek Ext. 23

Job No. W021420

Sheet No.

SD2

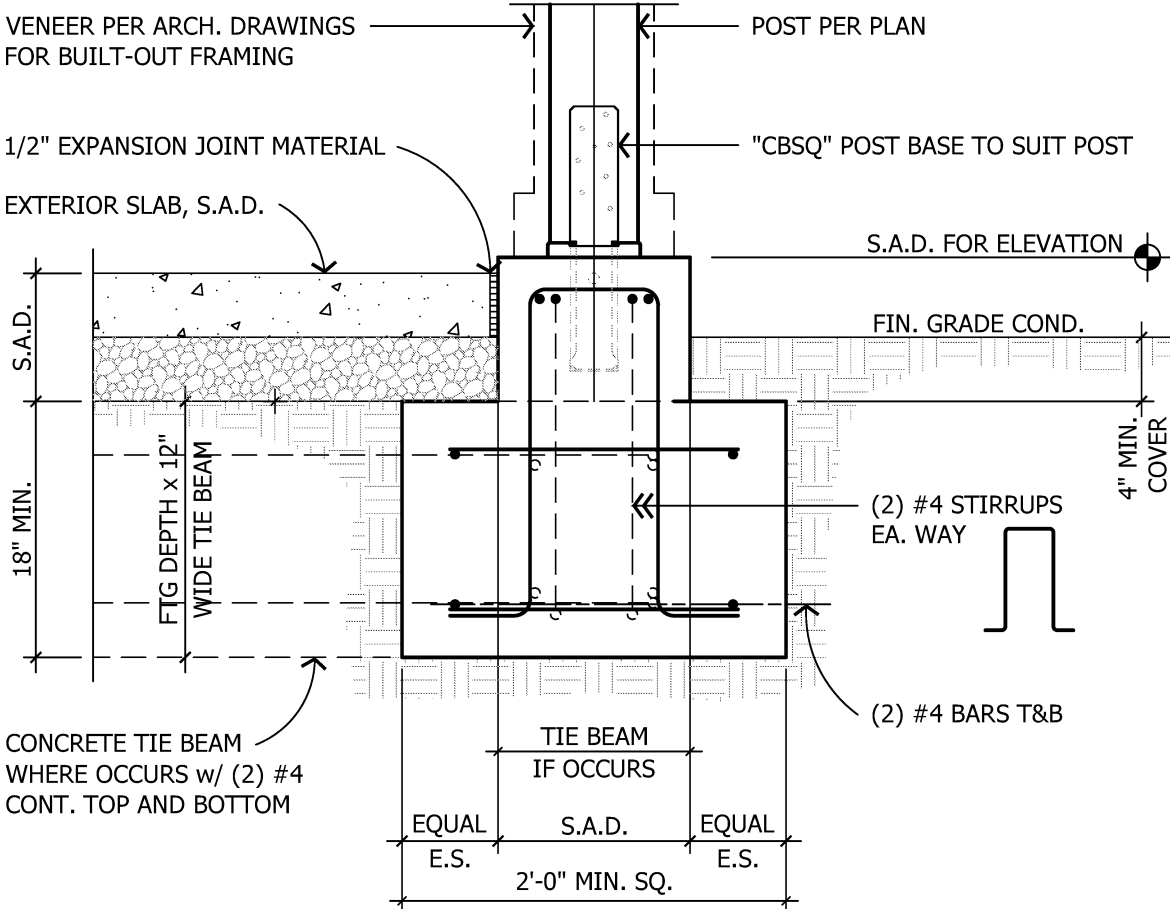




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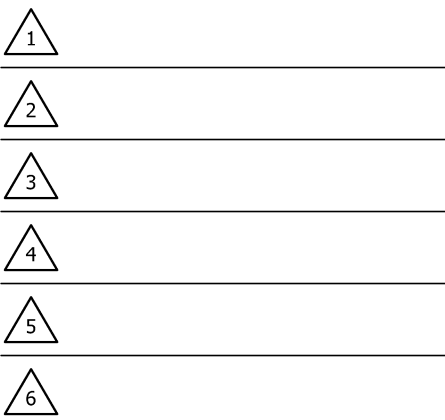
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THE CONTRACT DOCUMENTS FOR REUSE ON ANOTHER  
PROJECT IS NOT AUTHORIZED.

(302) THRESHOLD EMBEDDED NAILER AT DOOR



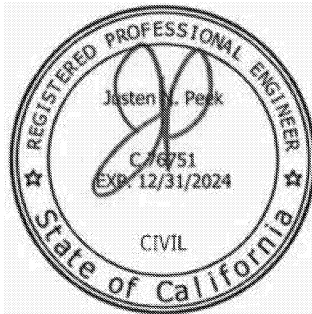
(307) PORCH STUD COLUMN AND FOOTING

DANVILLE, CALIFORNIA



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DATE ARE FOR STRUCTURAL SHEETS ONLY

Engineering Seal:

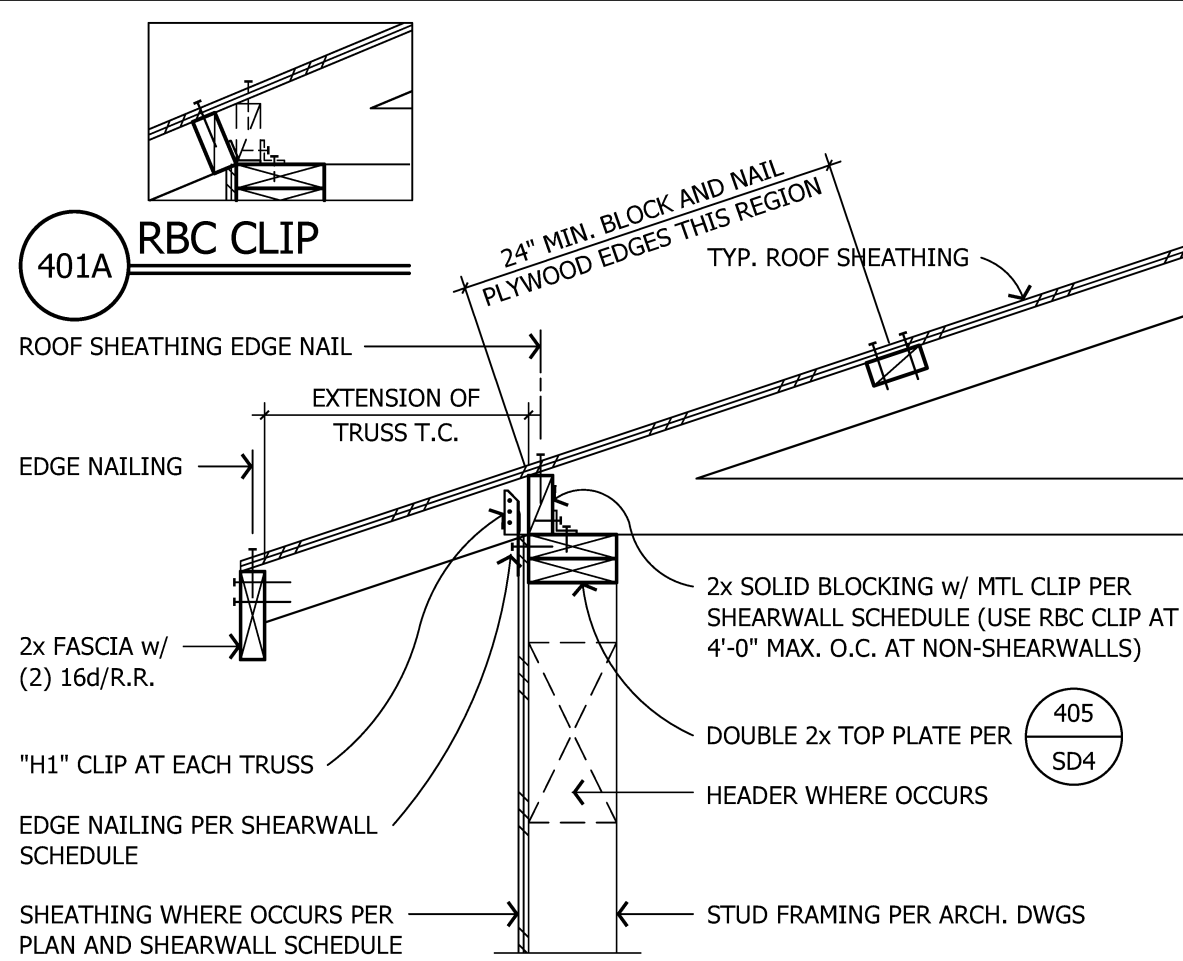


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|---------------------|-----------------|
| Scale: 1" = 1'-0"   |                 |
| Initial Issue Date: | March 24, 2023  |
| Drawn By:           | E. Bennett      |
| Project Designer:   | J. Peek         |
| Project Manager:    | J. Peek Ext. 23 |
| Job No.             | W021420         |

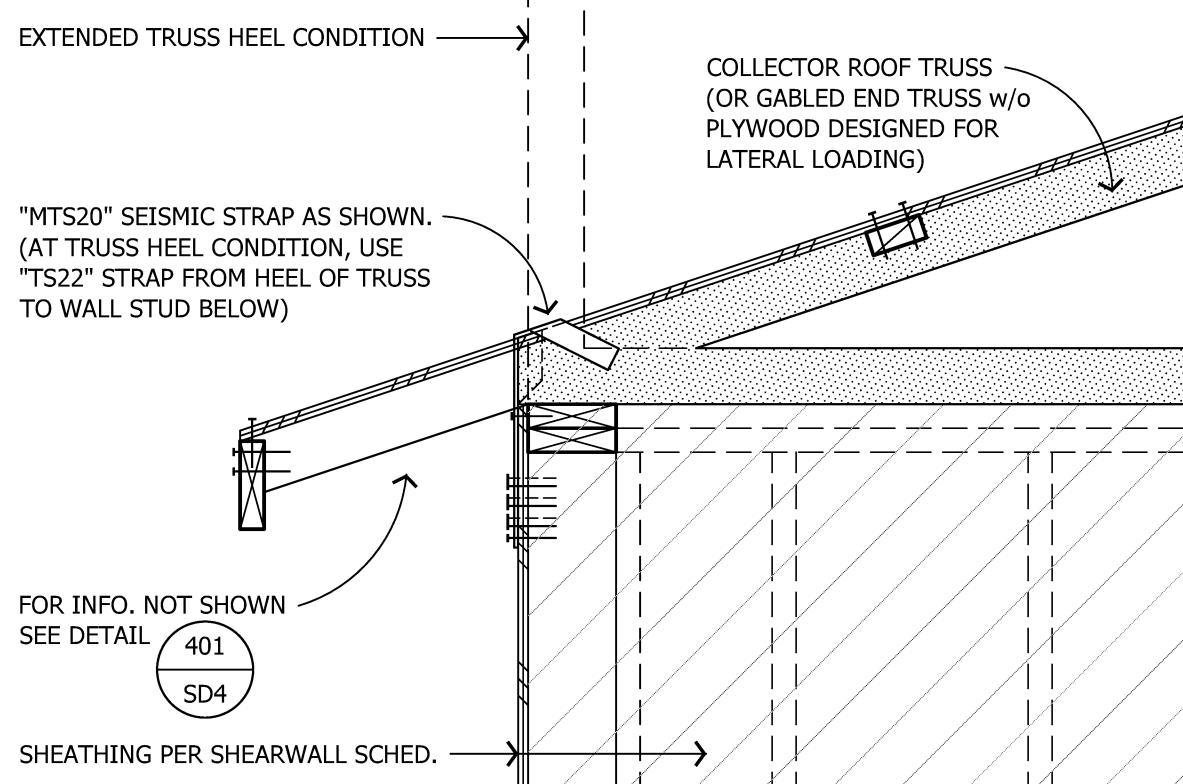
Sheet No.

SD3



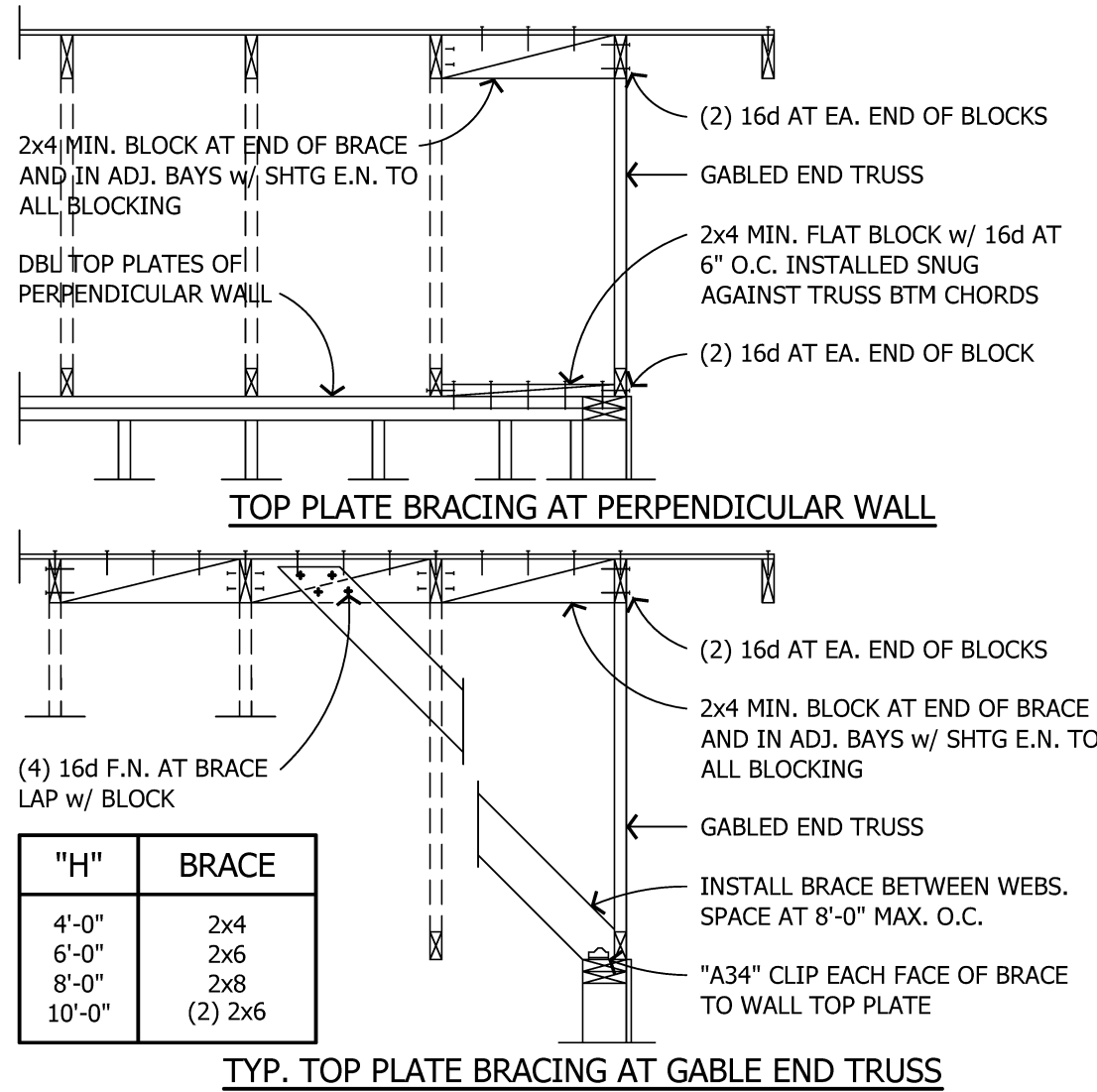


**401 TRUSS PERPEND. TO EXTERIOR WALL**

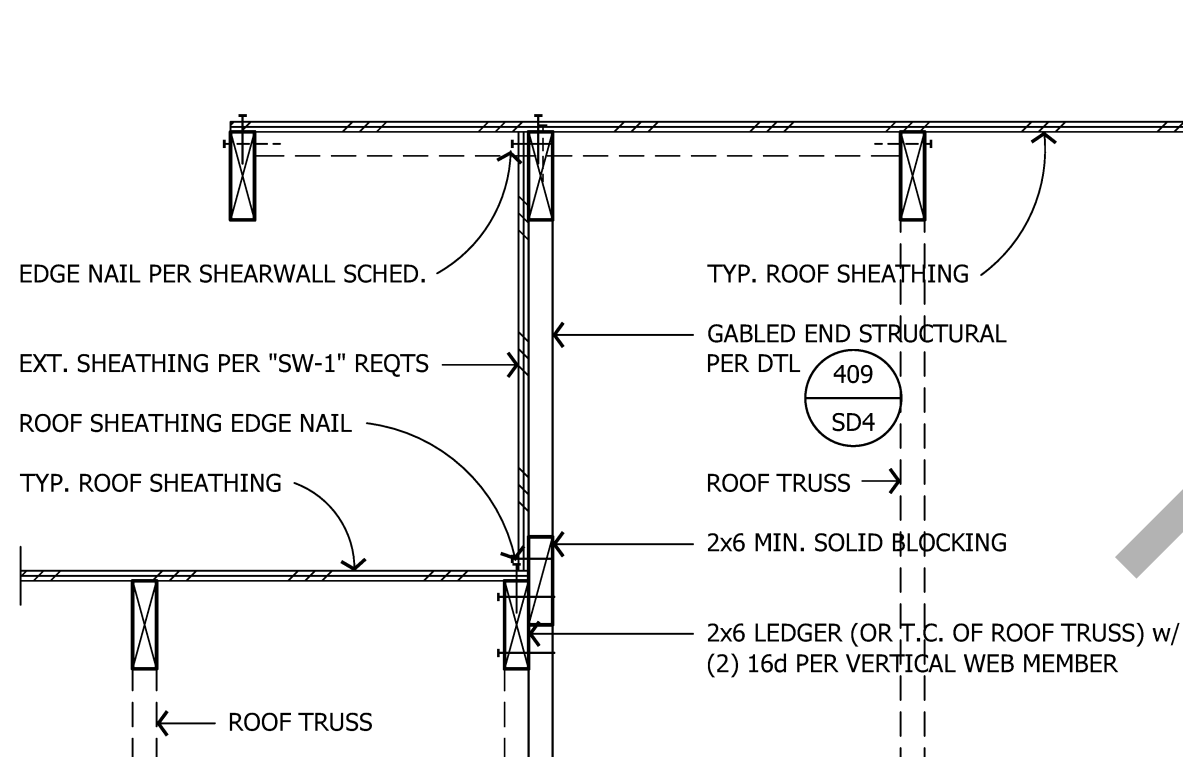


TYPICAL AT ENDS OF COLLECTOR AND GABLED END TRUSSES WHERE SHEARWALL SHEATHING DOES NOT EXTEND UP TO TOP CHORD.

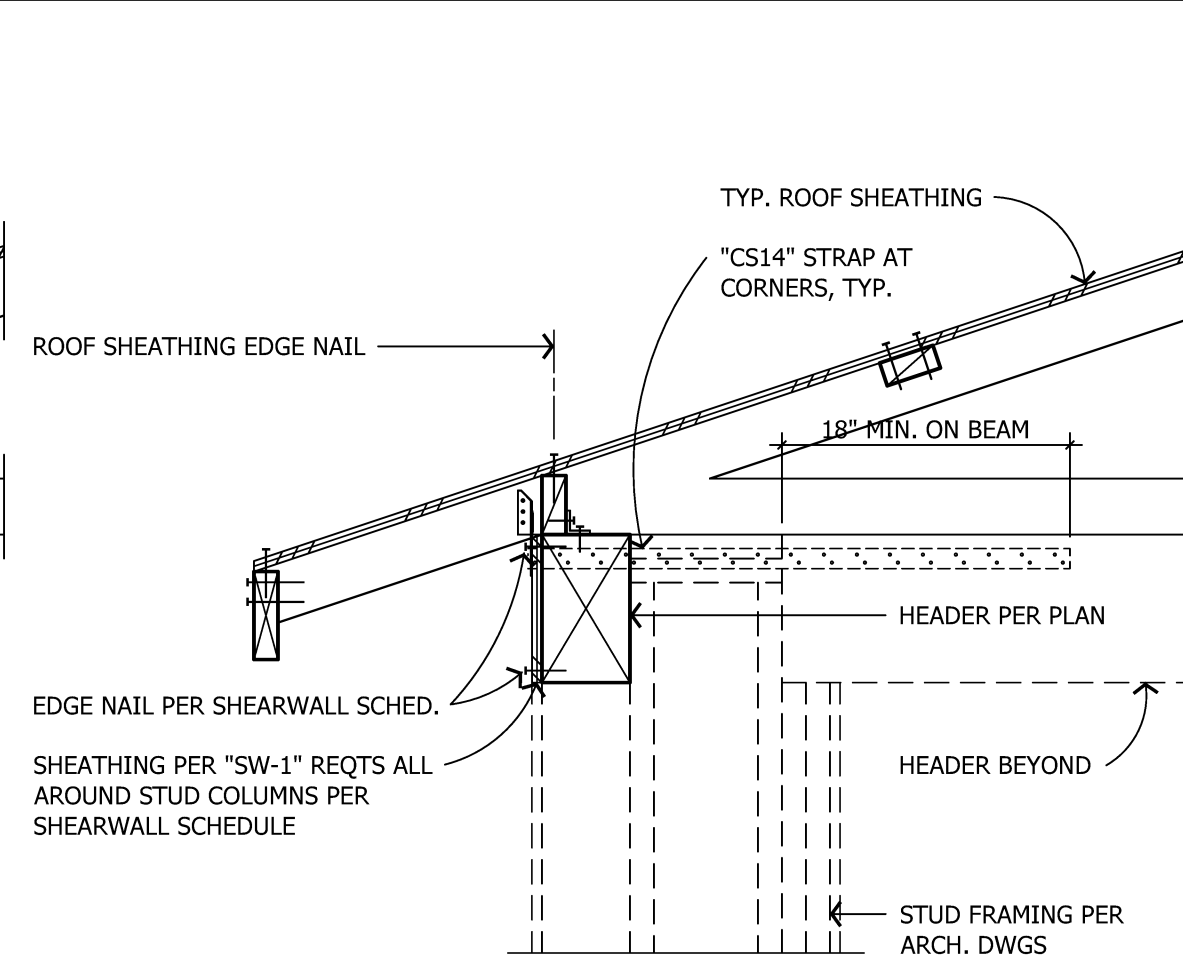
**406 COLLECTOR TRUSS UPLIFT ANCHORAGE**



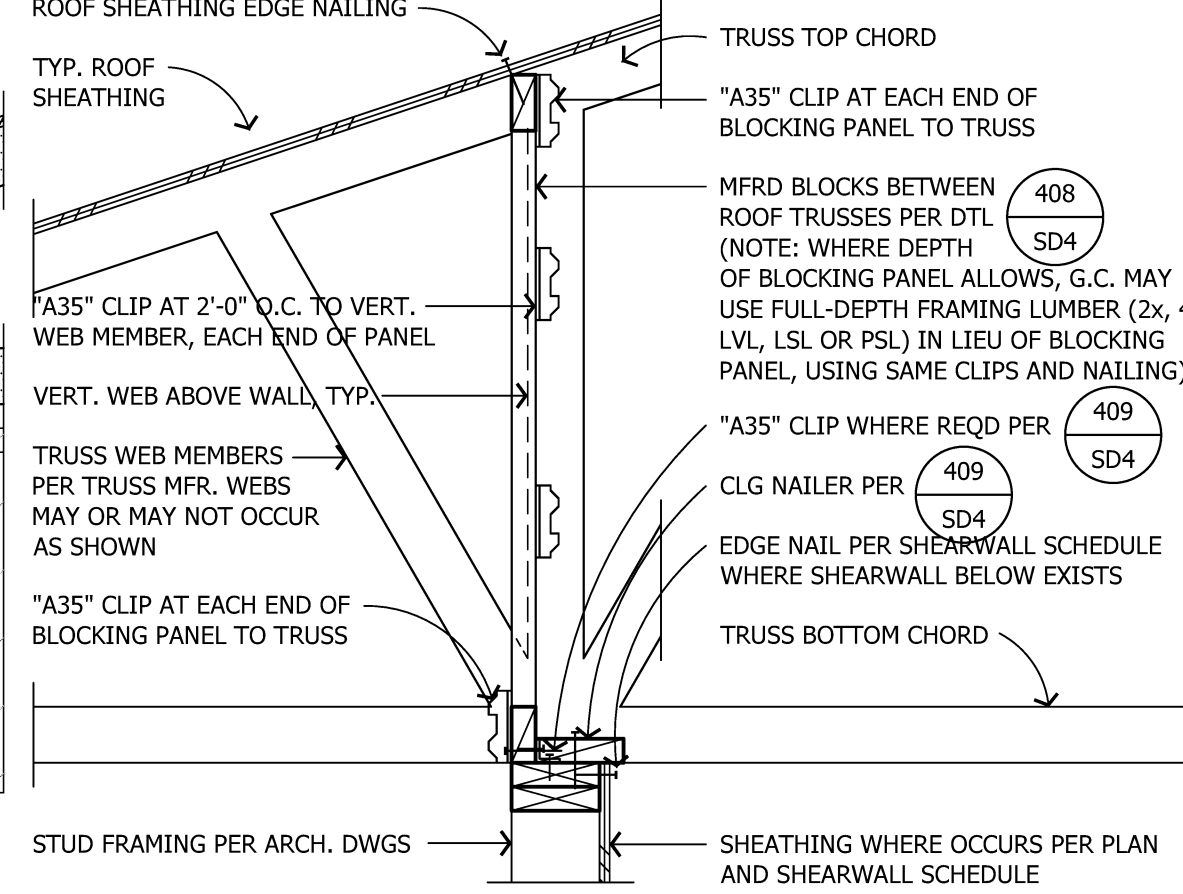
**410 GABLE END TRUSS BRACING**



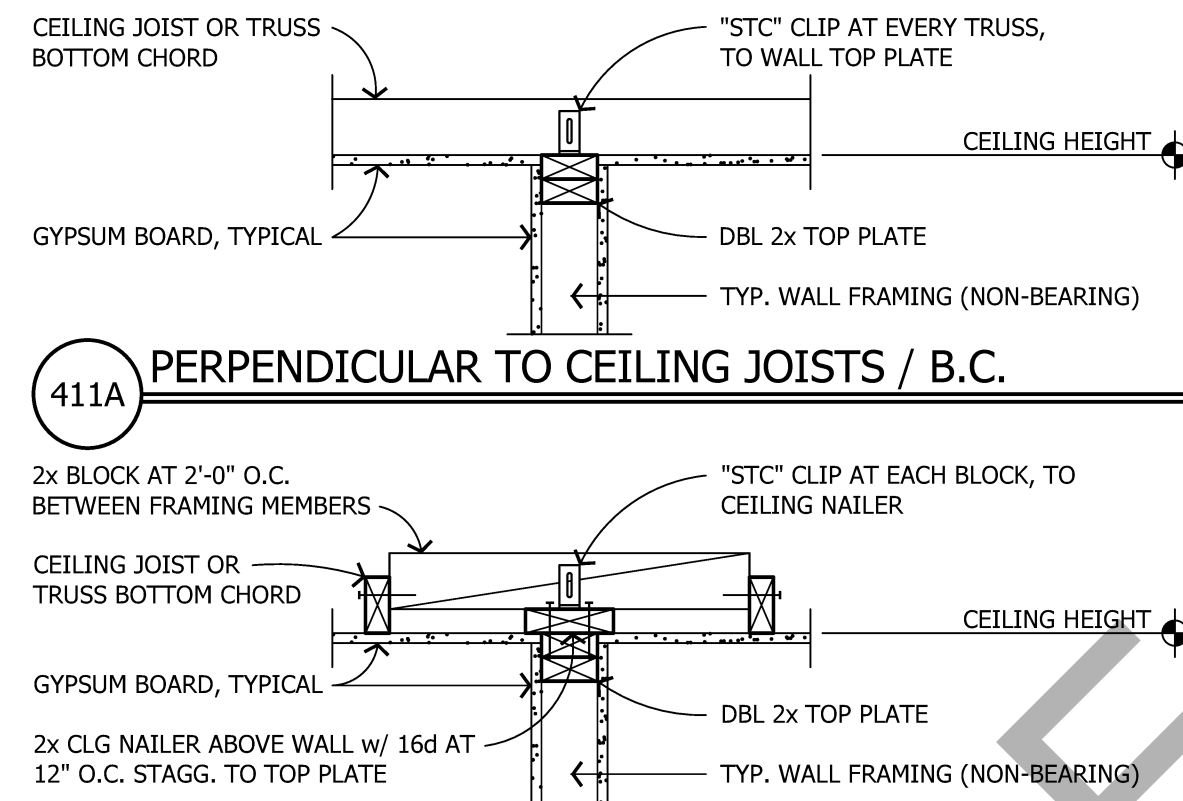
**415 ROOF STEP**



**402 TRUSS PERPEND. TO PORCH BEAM**

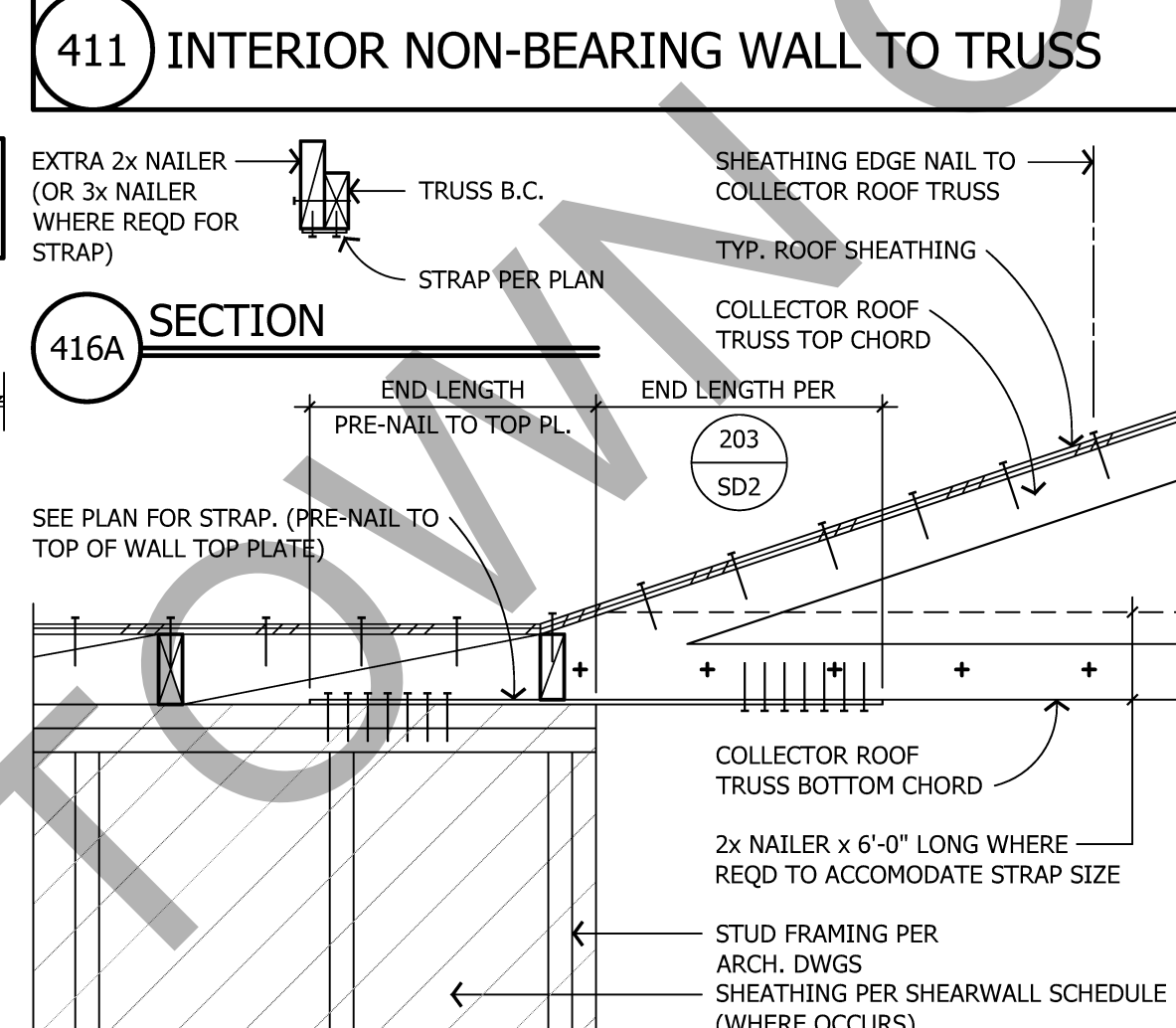


**407 TRUSS TO INTERIOR SHEAR WALL**

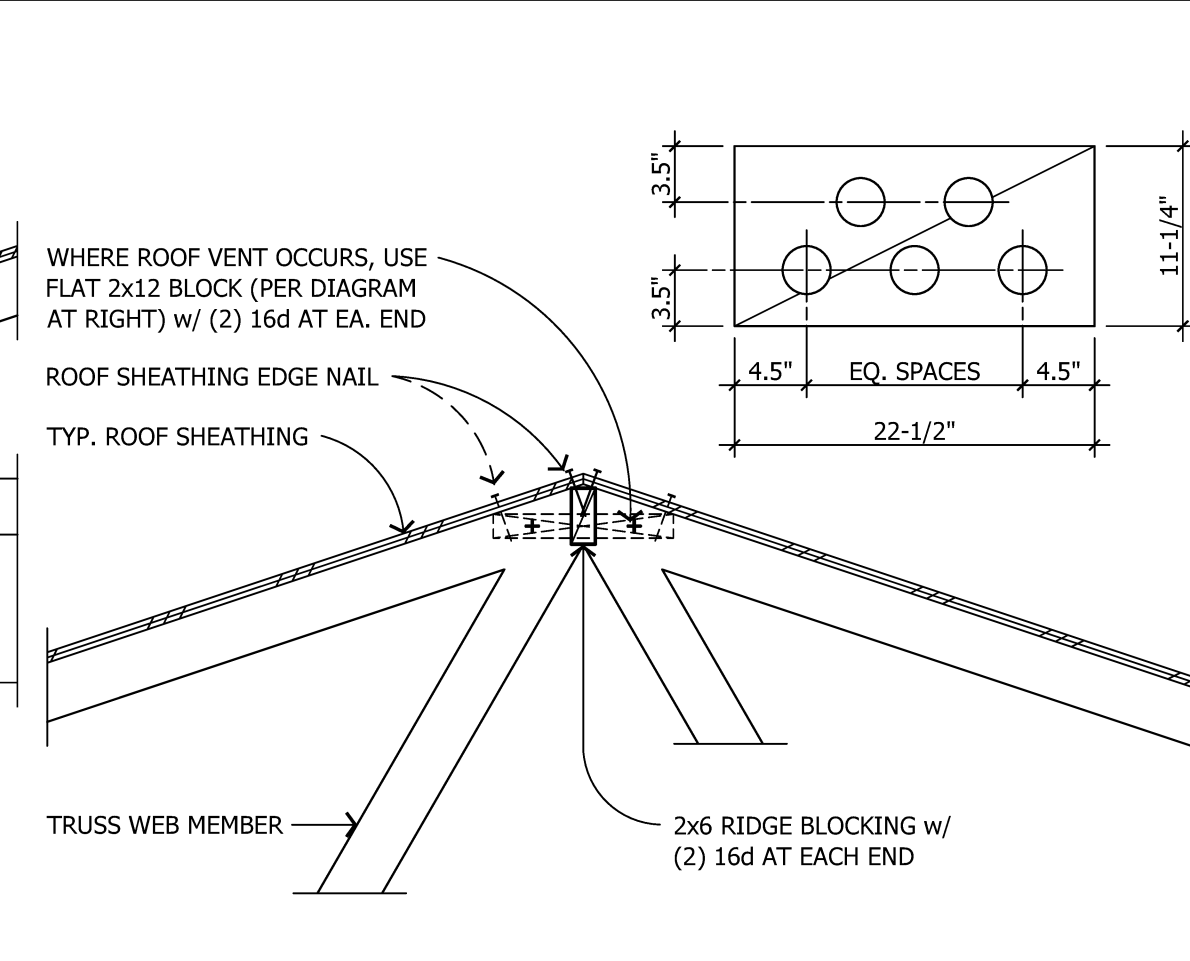


**411A PERPENDICULAR TO CEILING JOISTS / B.C.**

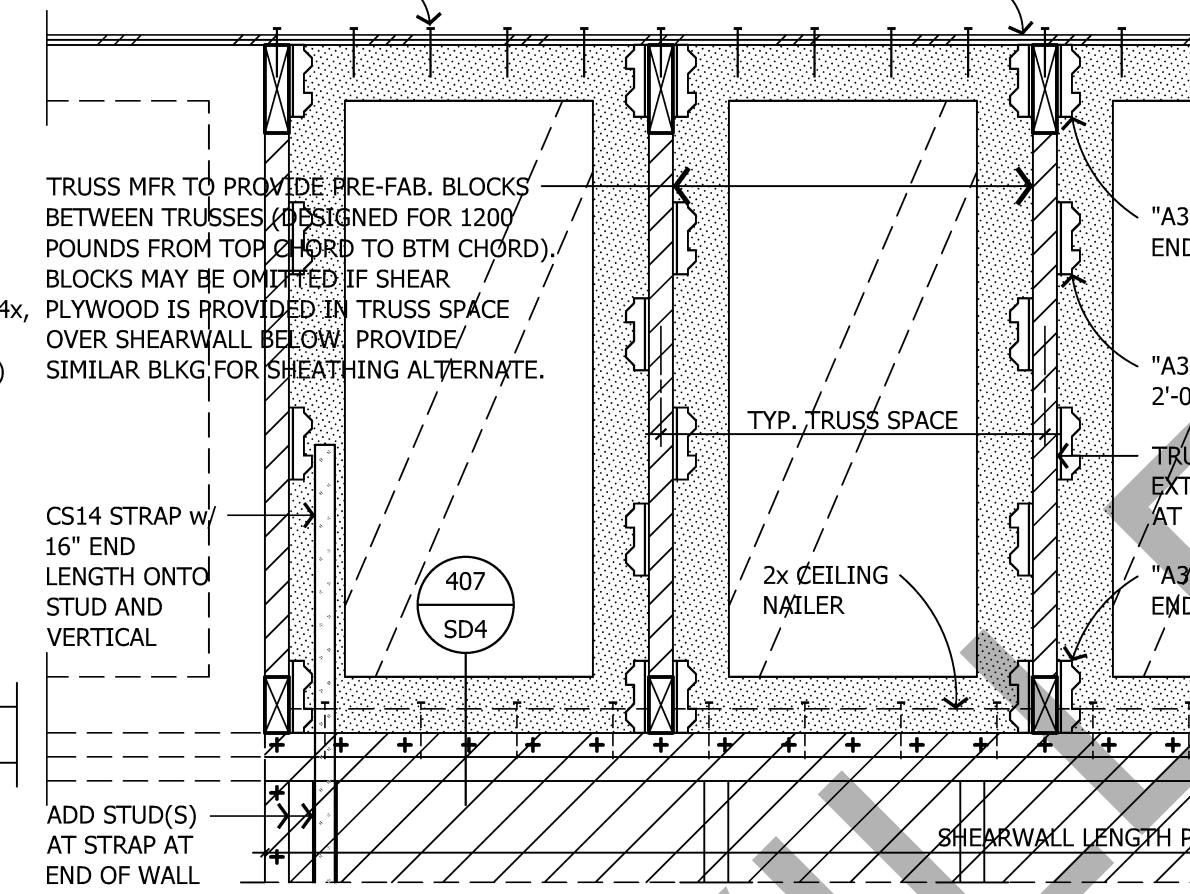
**411B PARALLEL TO CEILING JOISTS / B.C.**



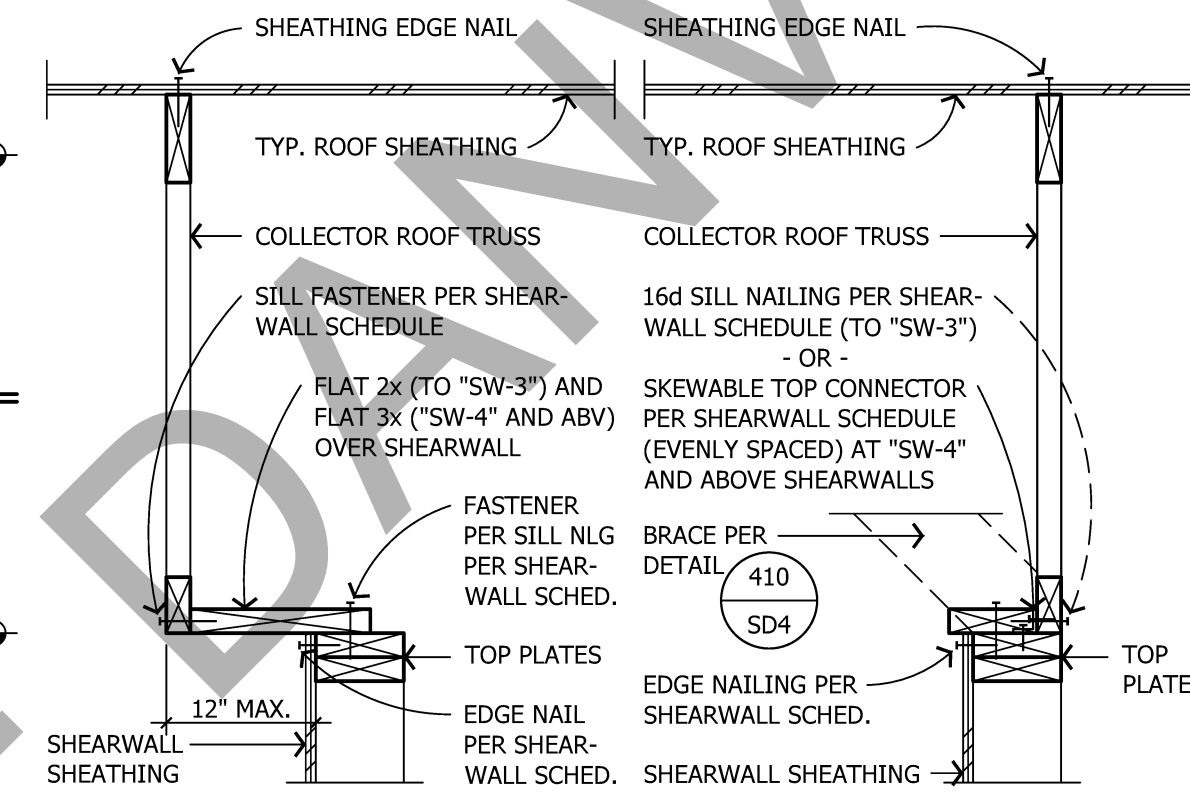
**416 HORIZONTAL STRAP TO WALL TOP PLATE**



**403 RIDGE BLOCKING AT ROOF TRUSSES**

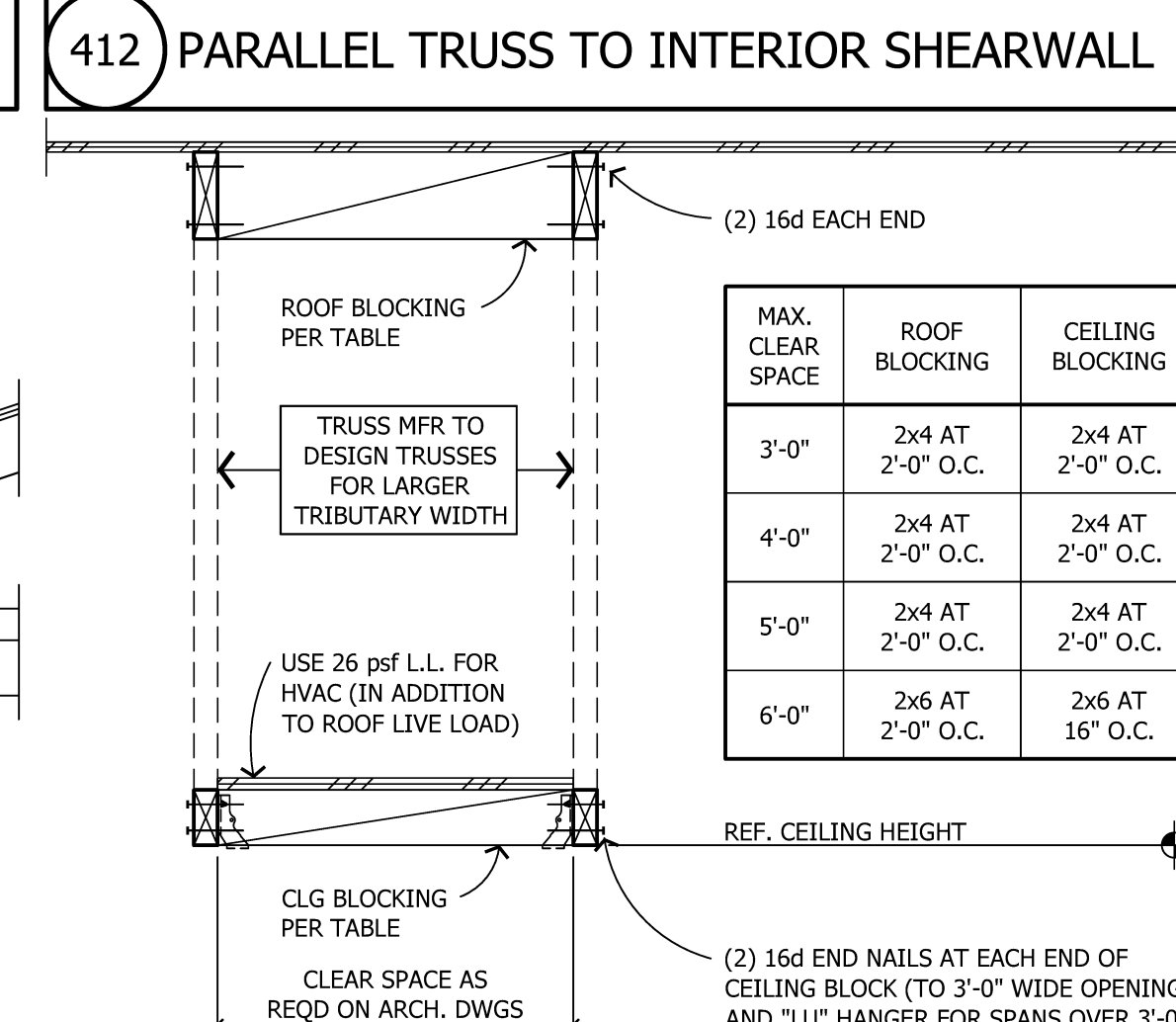


**408 FABRICATED TRUSS BLOCKING PANEL ELEVATION ABOVE SHEARWALL**

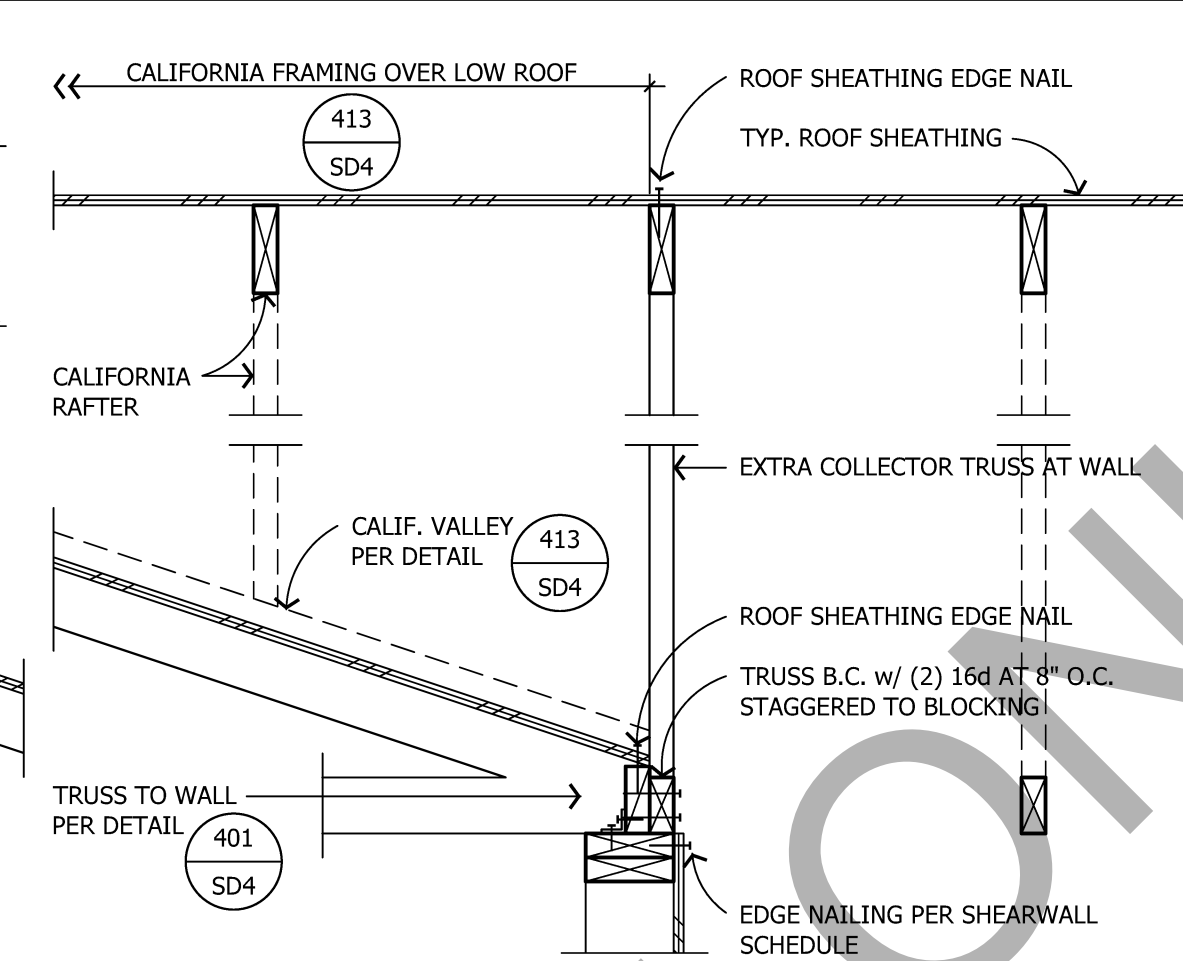


**412A OFFSET SHEARWALL**

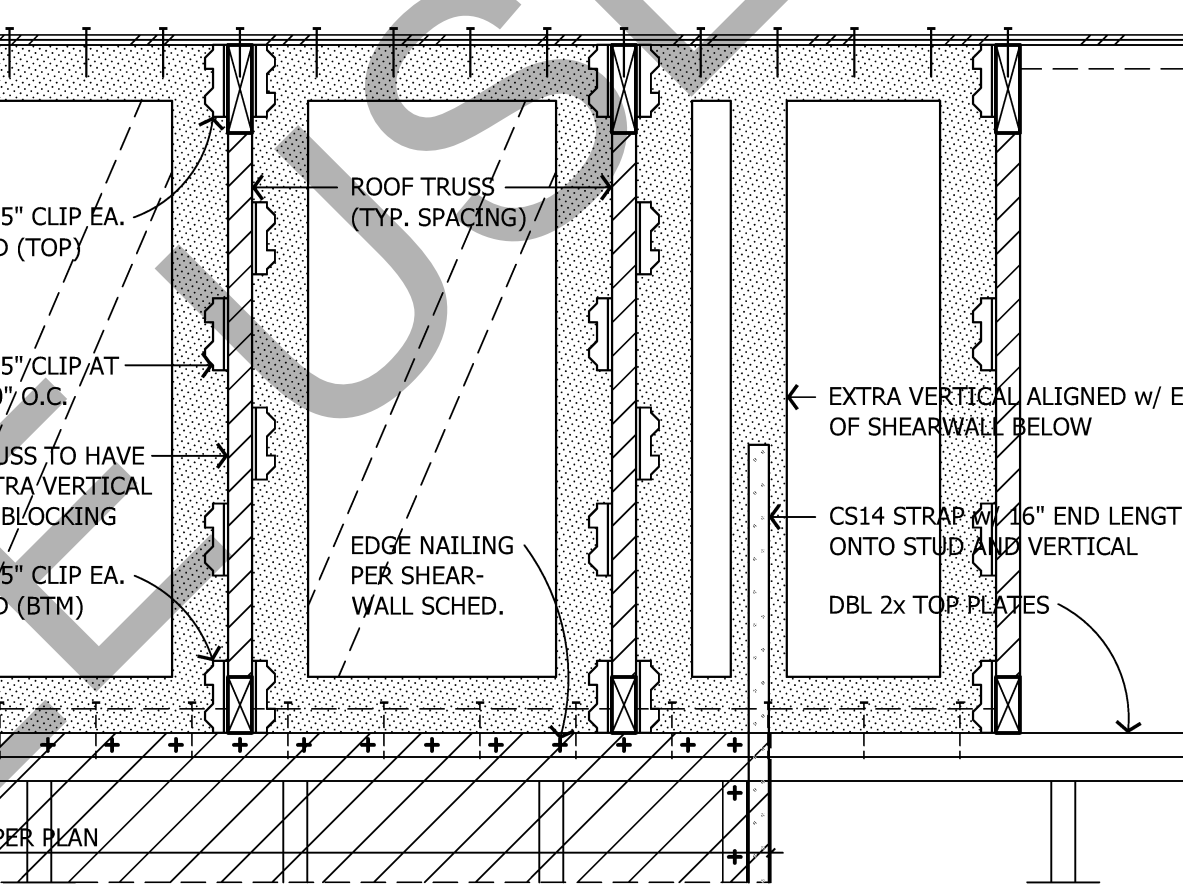
**412B ALIGNED SHEARWALL**



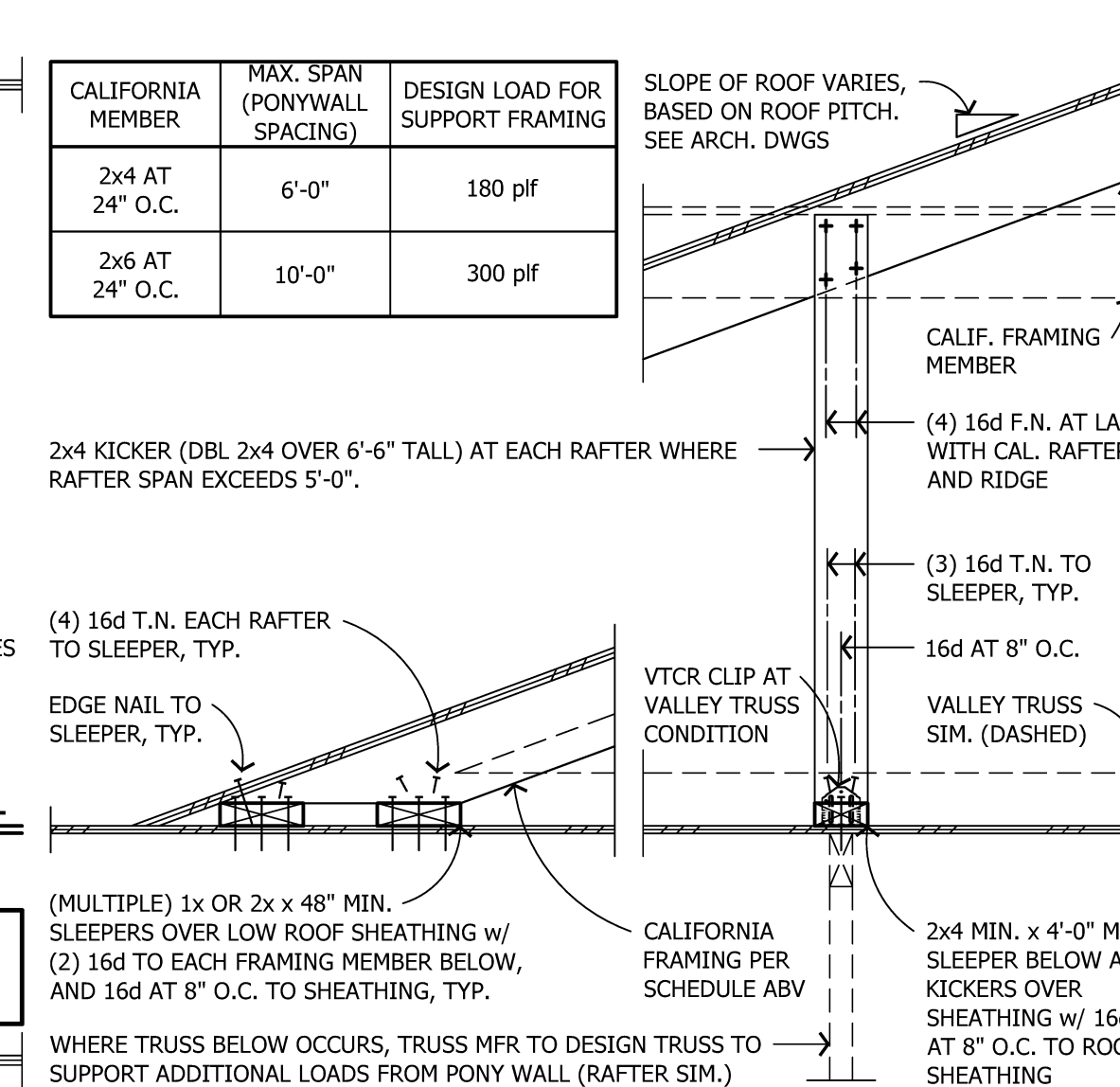
**417 ROOF TRUSSES AT HVAC / ATTIC ACCESS**



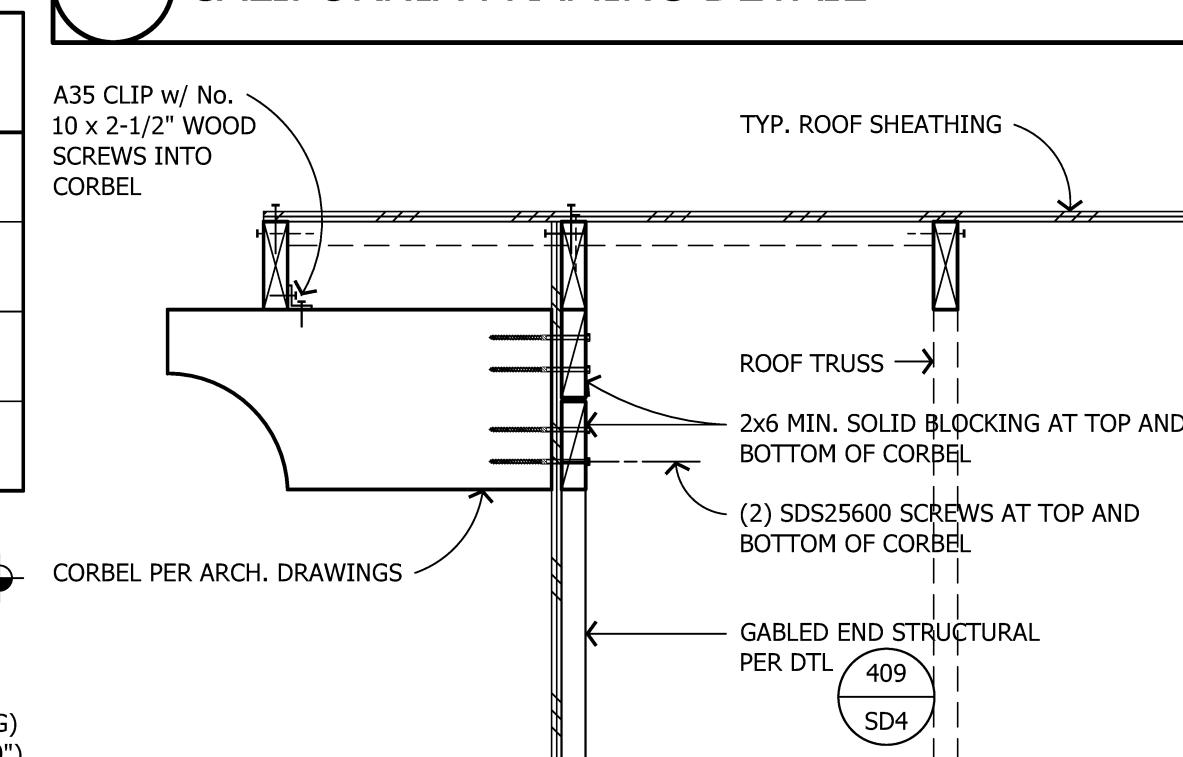
**404 TRUSS TO INTERIOR BEARING WALL**



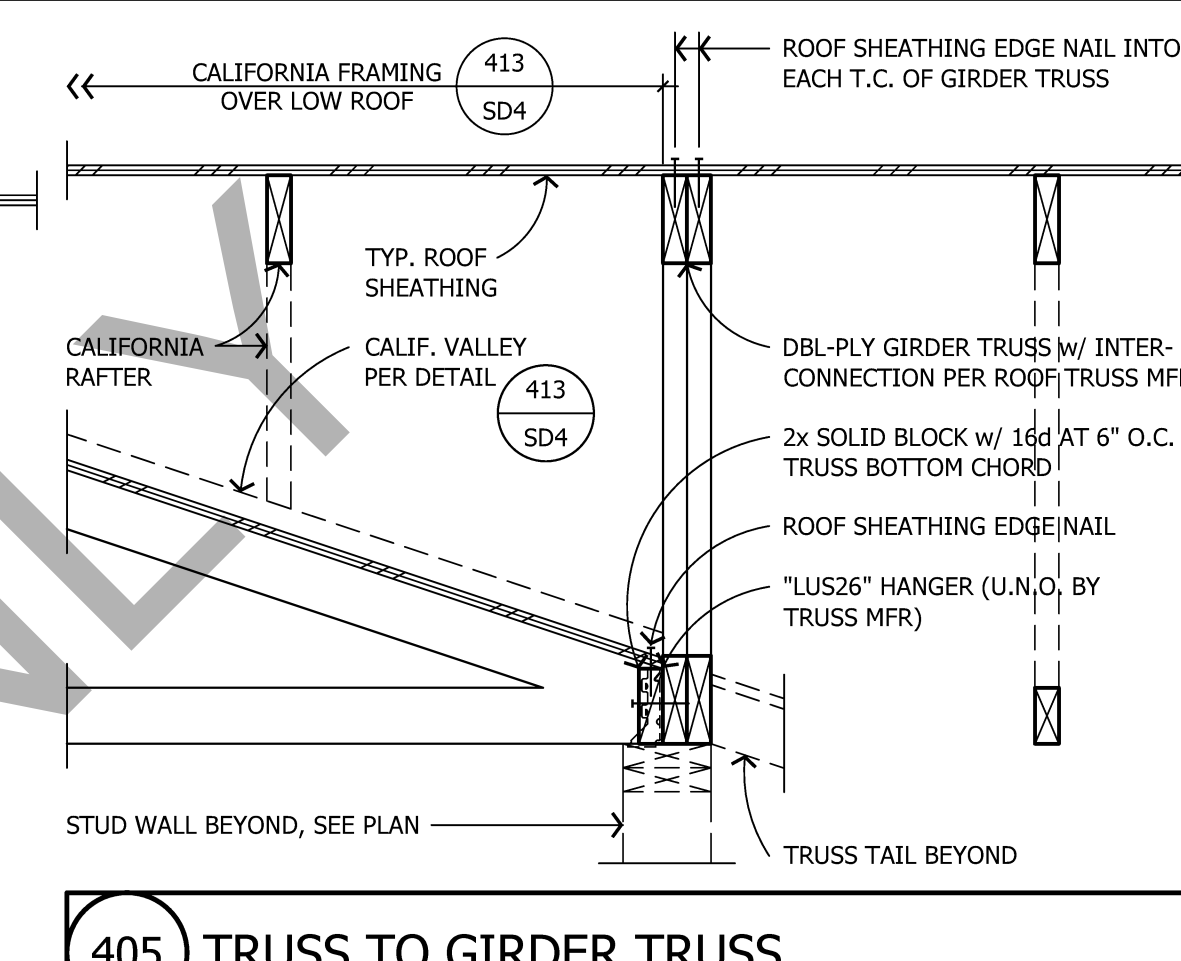
**408 FABRICATED TRUSS BLOCKING PANEL ELEVATION ABOVE SHEARWALL**



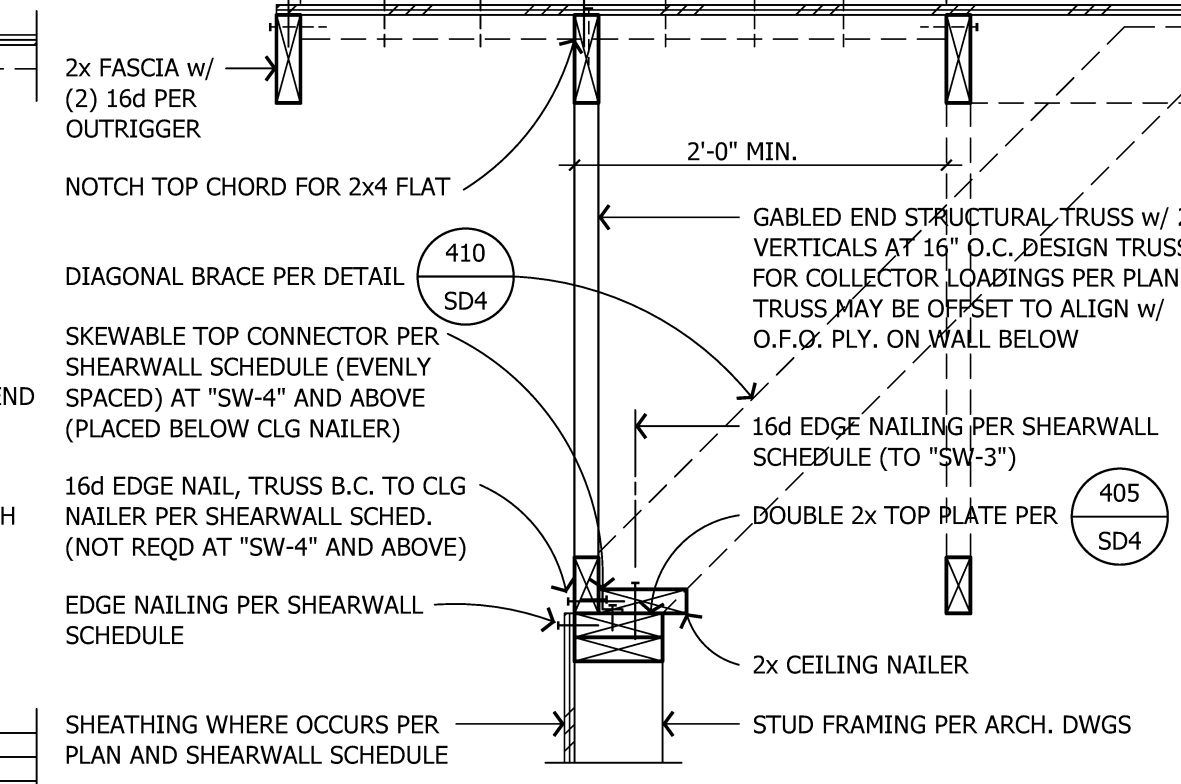
**413 CALIFORNIA FRAMING DETAIL**



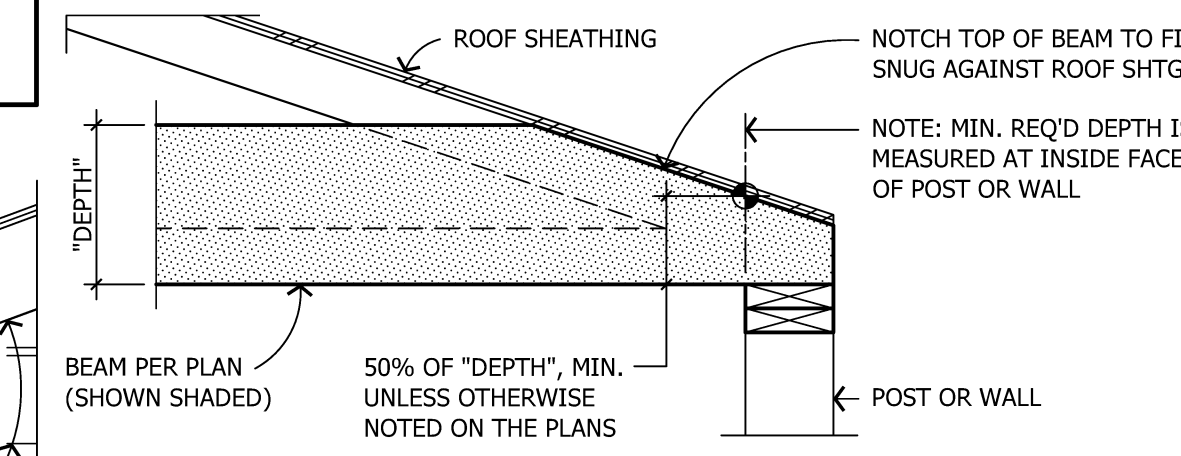
**418 CORBEL BEAM AT GABLED END TRUSS**



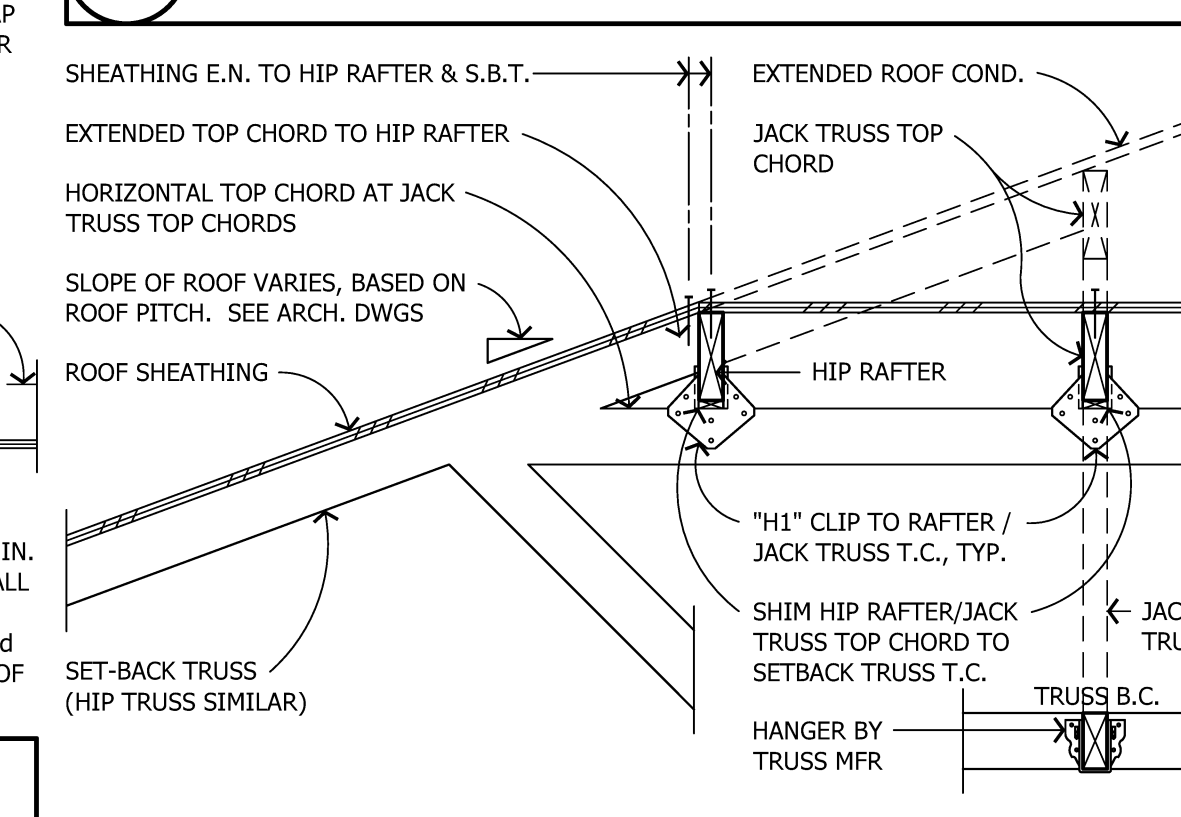
**405 TRUSS TO GIRDER TRUSS**



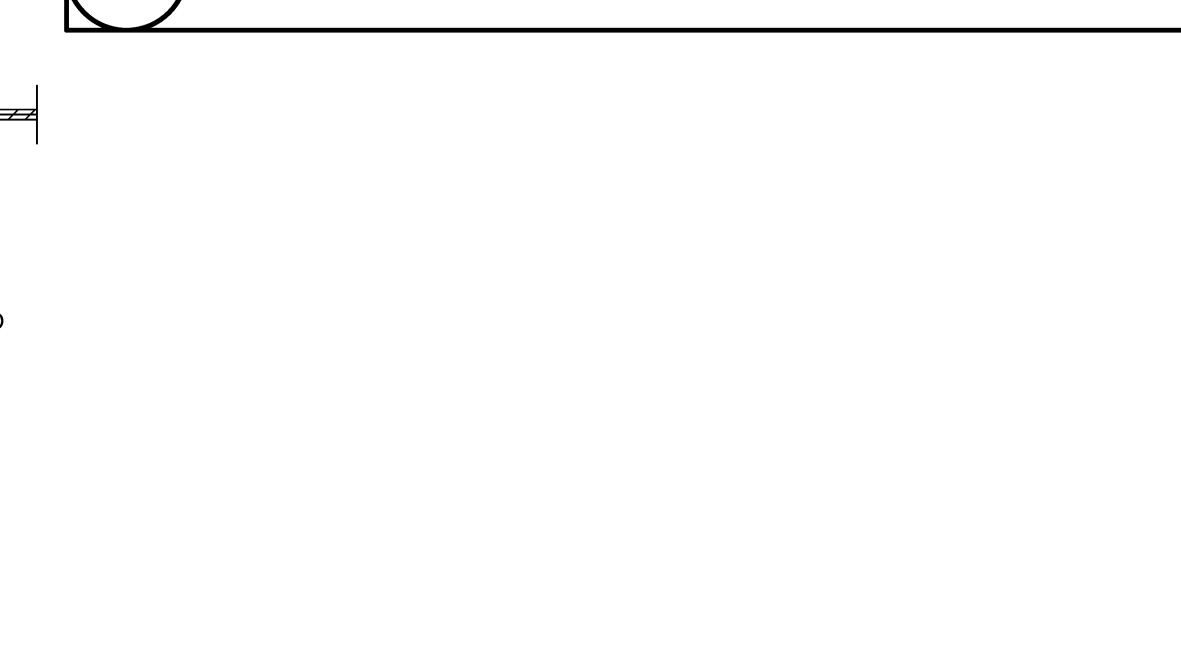
**409 GABLED END TRUSS**



**414 SHAPED TOP OF BEAM AT EAVE**



**419 CONNECTION AT SET-BACK TRUSS**



**418 CORBEL BEAM AT GABLED END TRUSS**

**ADVANCED ENGINEERING**

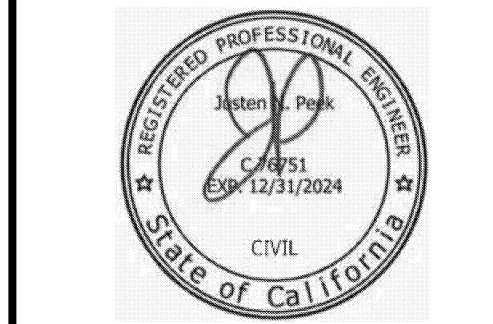
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**ROOF FRAMING DETAILS**

Scale: 1" = 1'-0"

Initial Issue Date: March 24, 2023

Drawn By: E. Bennett

Project Designer: J. Peek

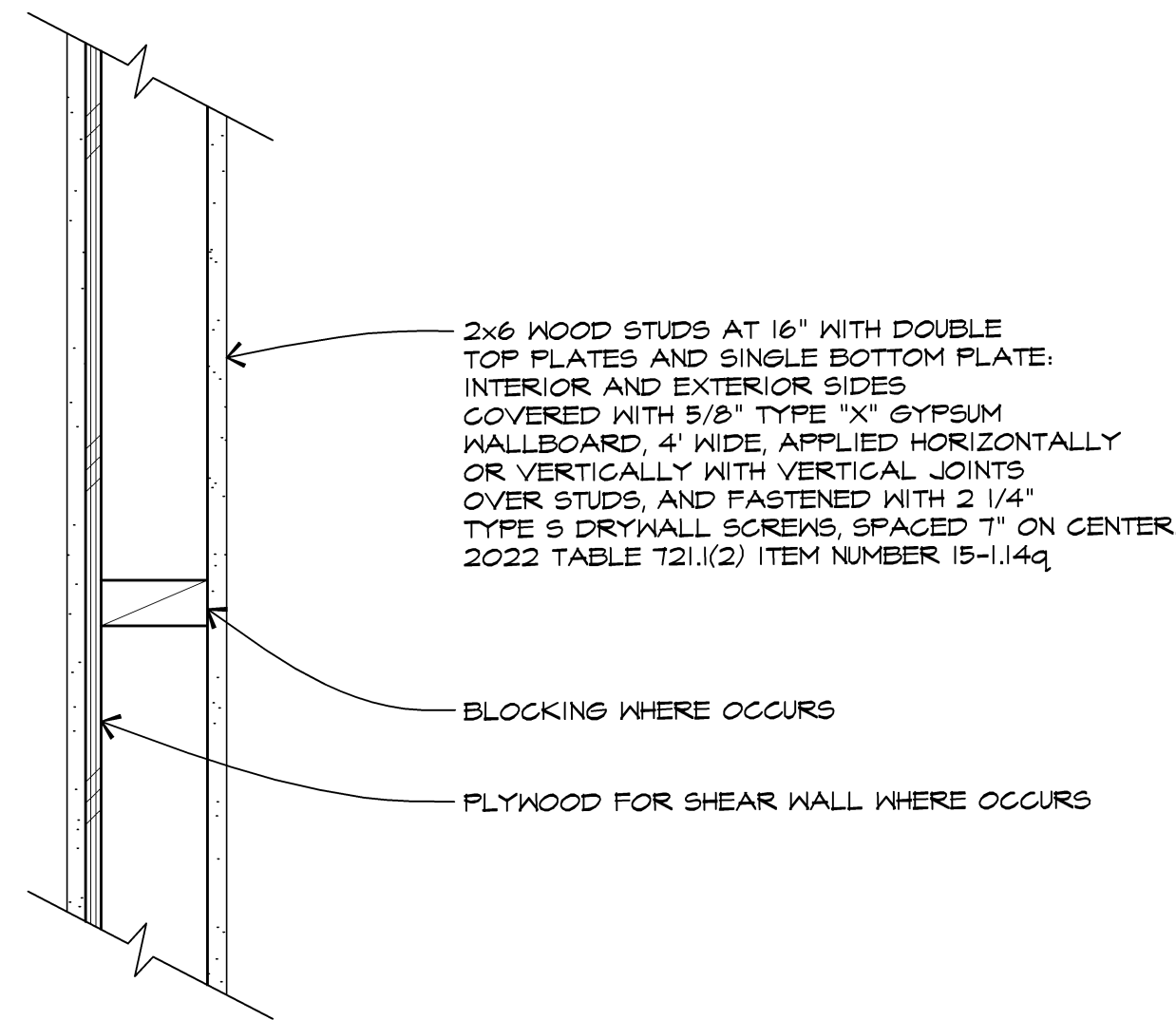
Project Manager: J. Peek Ext. 23

Job No. W021420

Sheet No.

**SD4**



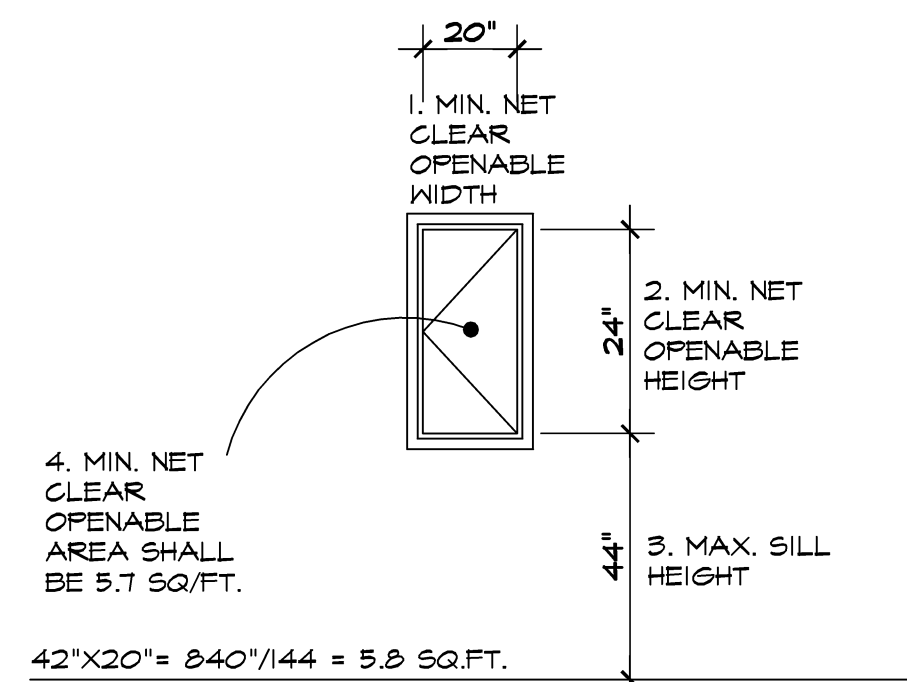


1 1 HOUR FIRE RATED WALL DETAIL  
A1

- NOTES:
- 1) ALL NEW EXTERIOR WALLS TO BE 2x6 FRAMED STUD WALLS.
  - 2) WINDOWS MARKED W/ (T) SHALL BE TEMPERED SAFETY GLASS.
  - 3) ALL WINDOW HEAD HTS. SHALL BE 8'-0" TYP., U.N.O.
  - 4) ALL WINDOWS MARKED "EGRESS" SHALL MEET MIN. EMERGENCY EGRESS WINDOW STANDARDS OF MIN. NET CLEAR OPENING OF 5.7 SQ. FT., 4 MIN. NET CLEAR HEIGHT OF 24" & MIN. NET CLEAR WIDTH OF 34" CONTRACTOR SHALL VERIFY W/ WINDOW MANUFACTURE.
  - 5) THERE MUST BE AT LEAST 15" INCHES BETWEEN THE CENTER OF PLUMBING FIXTURES SUCH AS WATER CLOSETS OR SINKS AND THE NEAREST WALL OR OBJECT.
  - 6) CONTRACTOR SHALL VERIFY LOCATION & NUMBER OF A/C UNITS W/ OWNER. PROVIDE 4" CONC. SLAB W/ #10 WRM. ALL NECESSARY PLUMBING & ELECTRICAL.
  - 7) MINIMUM OF 36-INCH DEEP LANDING IS REQUIRED IN DIRECTION OF TRAVEL. MAXIMUM RISE OF STEP IS 7.75-INCH.
  - 8) BATHTUB AND SHOWER FLOORS AND WALLS ABOVE BATHTUBS WITH INSTALLED SHOWER HEADS AND IN SHOWER COMPARTMENTS SHALL BE FINISHED WITH NONABSORBENT SURFACE. SUCH WALL SURFACES SHALL EXTEND TO A HEIGHT OF NOT LESS THAN 6 FEET ABOVE THE FLOOR. CRC R307.2.
  - 9) GYPSUM BOARD SHALL NOT BE USED WHERE THERE WILL BE DIRECT EXPOSURE TO WATER, OR IN AREAS SUBJECT TO CONTINUOUS HIGH HUMIDITY. CRC T023.7.

\* EGRESS WINDOW DETAIL

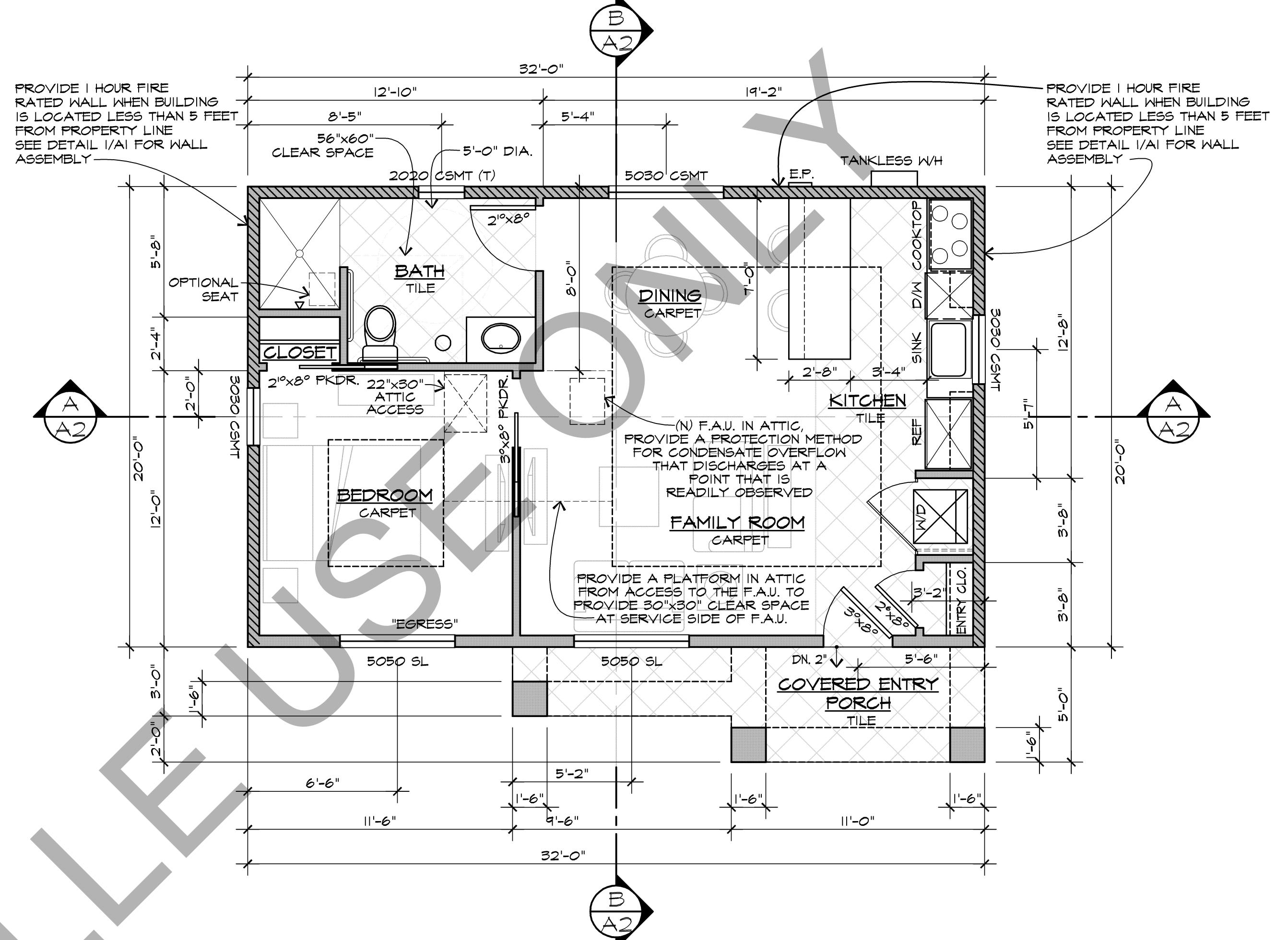
EGRESS WINDOWS SHALL COMPLY W/ ALL 4 CONDITIONS ILLUSTRATED BELOW.



ESCAPE OR RESCUE WINDOWS SHALL HAVE A MINIMUM NET CLEAR OPENABLE AREA OF 5.7 SQ. FT. (0.53 M<sup>2</sup>). (EXCEPTION: THE MINIMUM NET CLEAR OPENING FOR EMERGENCY ESCAPE AND RESCUE GRADE-FLOOR OPENINGS SHALL BE 5 SQUARE FEET (0.46M<sup>2</sup>). THE MINIMUM NET CLEAR OPENABLE HEIGHT DIMENSION SHALL BE 24 INCHES (610 MM). THE MINIMUM NET CLEAR OPENABLE WIDTH DIMENSION SHALL BE 20 INCHES (508 MM). THE NET CLEAR OPENINGS DIMENSIONS SHALL BE THE RESULT OF NORMAL OPERATION OF THE OPENING.

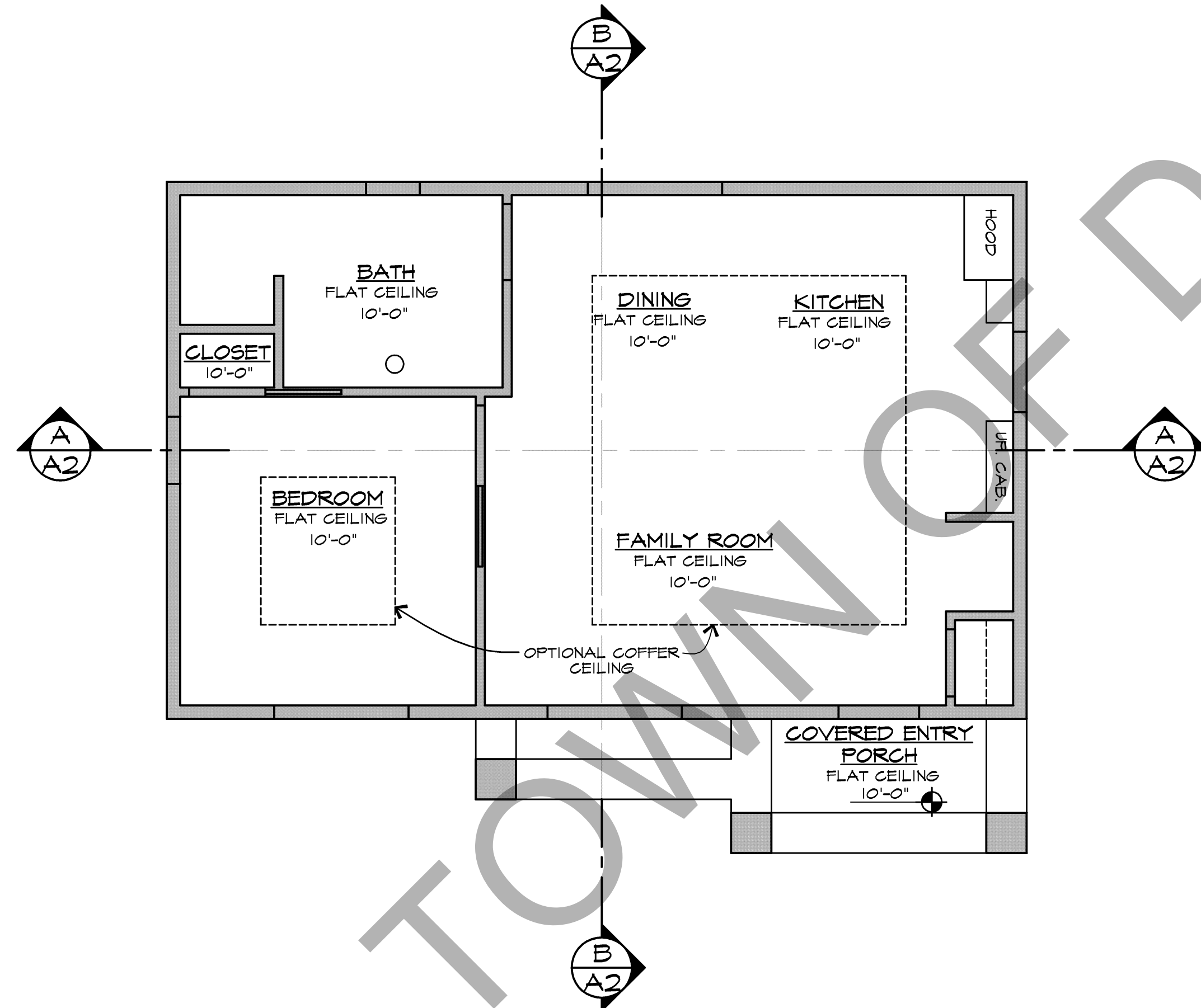
WHEN WINDOWS ARE PROVIDED AS A MEANS OF ESCAPE OR RESCUE, THEY SHALL HAVE A FINISHED SILL HEIGHT NOT MORE THAN 44 INCHES (1118 MM) ABOVE THE FLOOR. CRC SECTION R310.1, R310.1.1, R310.1.2, R310.1.3, AND R310.1.4.

CONTRACTOR NOTE: CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL EGRESS REQUIREMENTS.



FLOOR PLAN (STUDIO) (CONTEMPORARY STYLE)

SCALE: 1/4" = 1'-0"

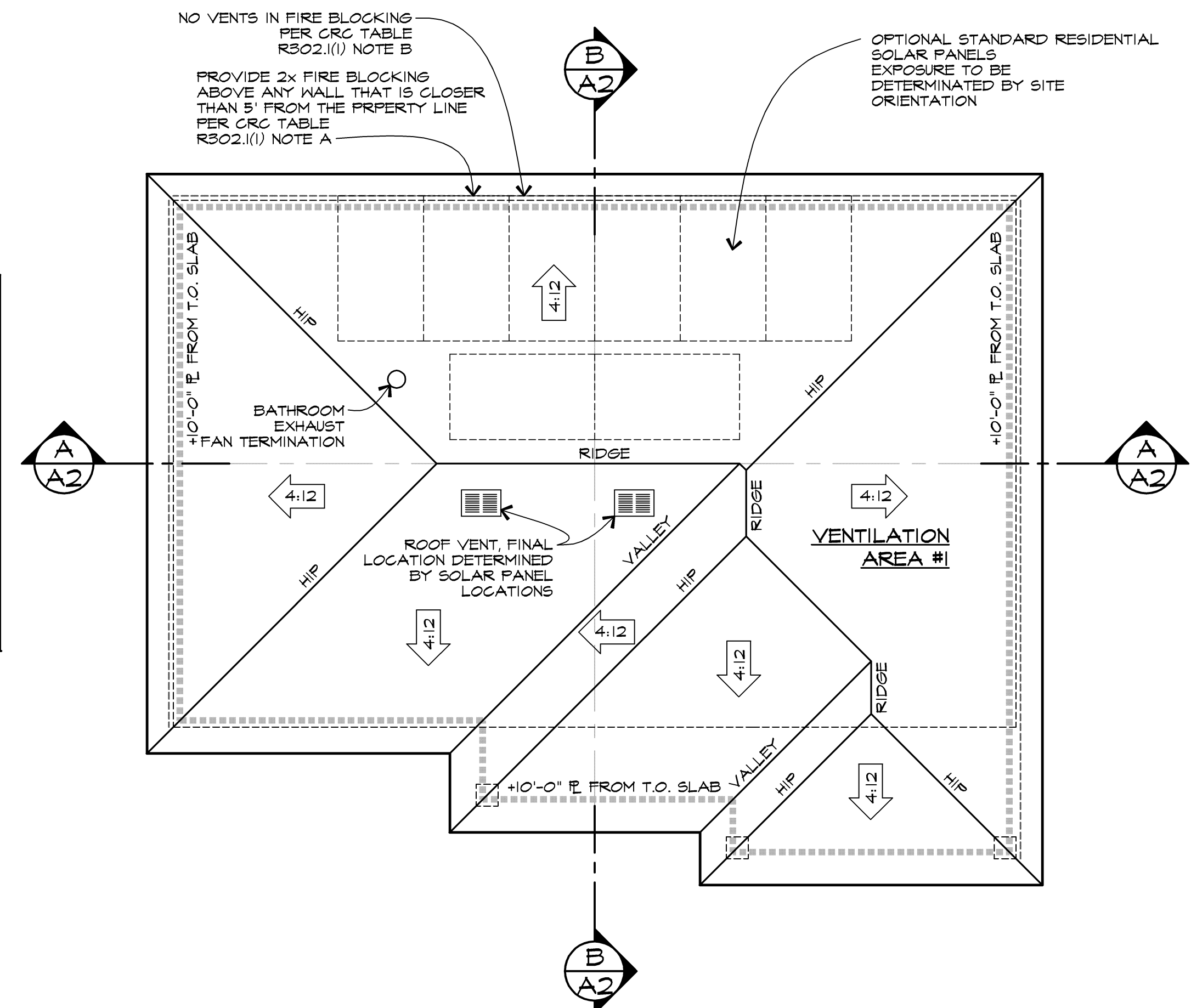


REFLECTED CEILING PLAN

SCALE: 1/4" = 1'-0"

VENTILATION CALCULATIONS

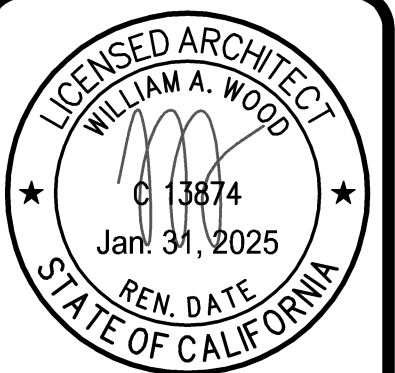
- AREA |
- \* ATTIC AREA: 724 SQ. FT.
  - \* REQUIRED AREA: 347.5 SQ. IN. (CONVERTED TO INCHES @ 1/300)
  - \* UPPER AREA: 173.75 SQ. IN. (50% REQUIRED IN UPPER 1/3)
  - \* PROVIDE 173.75 SQ. IN. IN UPPER 1/3 OFF ROOF WITH CHAGINS "FLAT" VENT (98.75 SQ. IN. FREE AREA) \* 2 VENTS REQUIRED
  - \* LOWER AREA: 173.75 SQ. IN. (50% REQUIRED IN LOWER 1/3)
  - \* TO BE PROVIDED BY 25 VENTED FRIEZE BLOCKS MIN. (7 SQ. IN. FREE VENTING PER BLOCK VIA 3-2" DIA. HOLES)



ROOF PLAN

SCALE: 1/4" = 1'-0"

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DANVILLE ACCESSORY  
DWELLING UNITS - STUDIO

DANVILLE CA 94526

WILLIAM WOOD  
ARCHITECTS

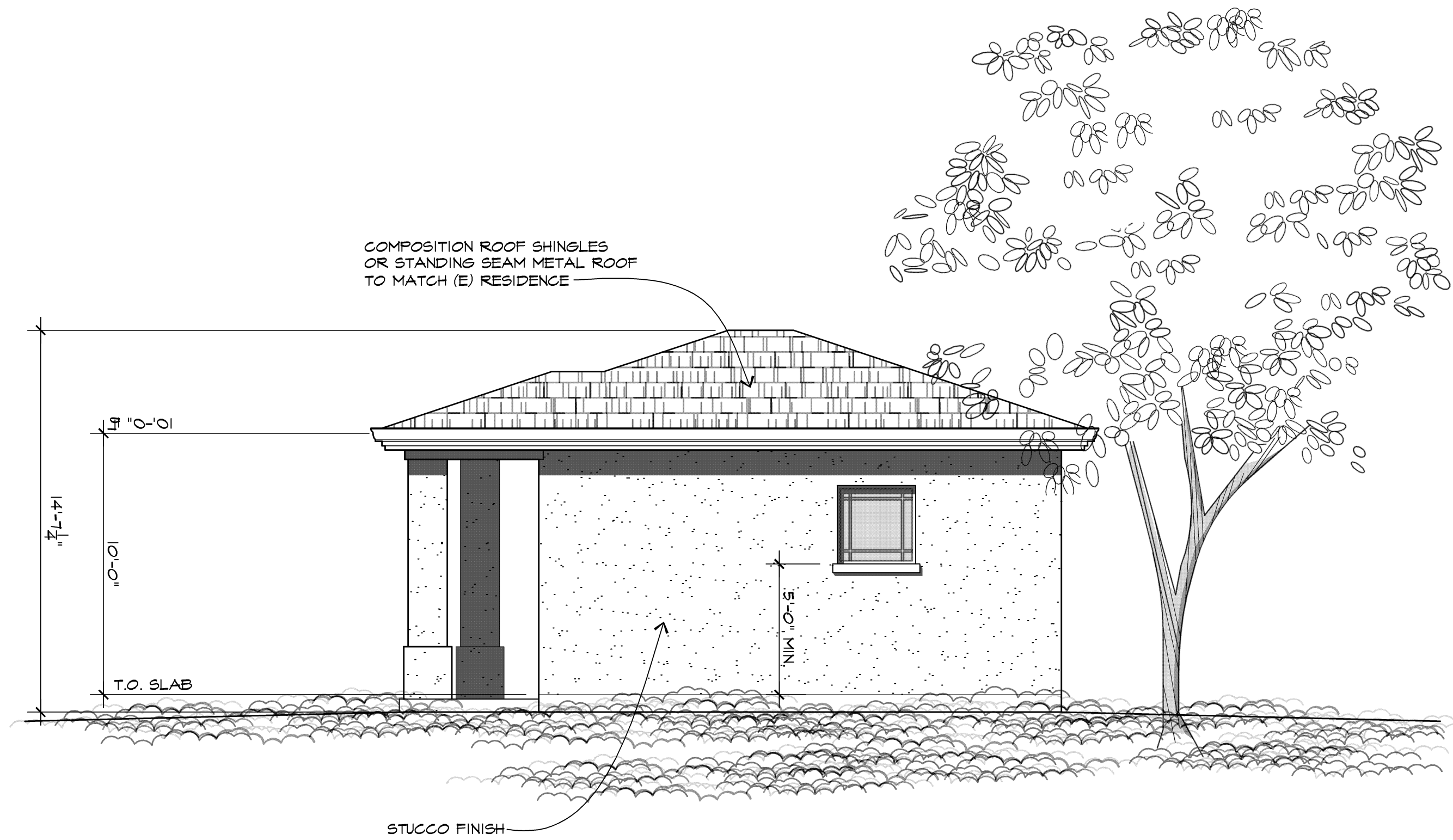
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| DRAWN<br>JJ        |
| CHECKED<br>WW      |
| DATE<br>03-30-23   |
| SCALE<br>AS SHOWN  |
| JOB NO.<br>20.921R |
| SHEET<br>A2        |
| OF SHEETS          |

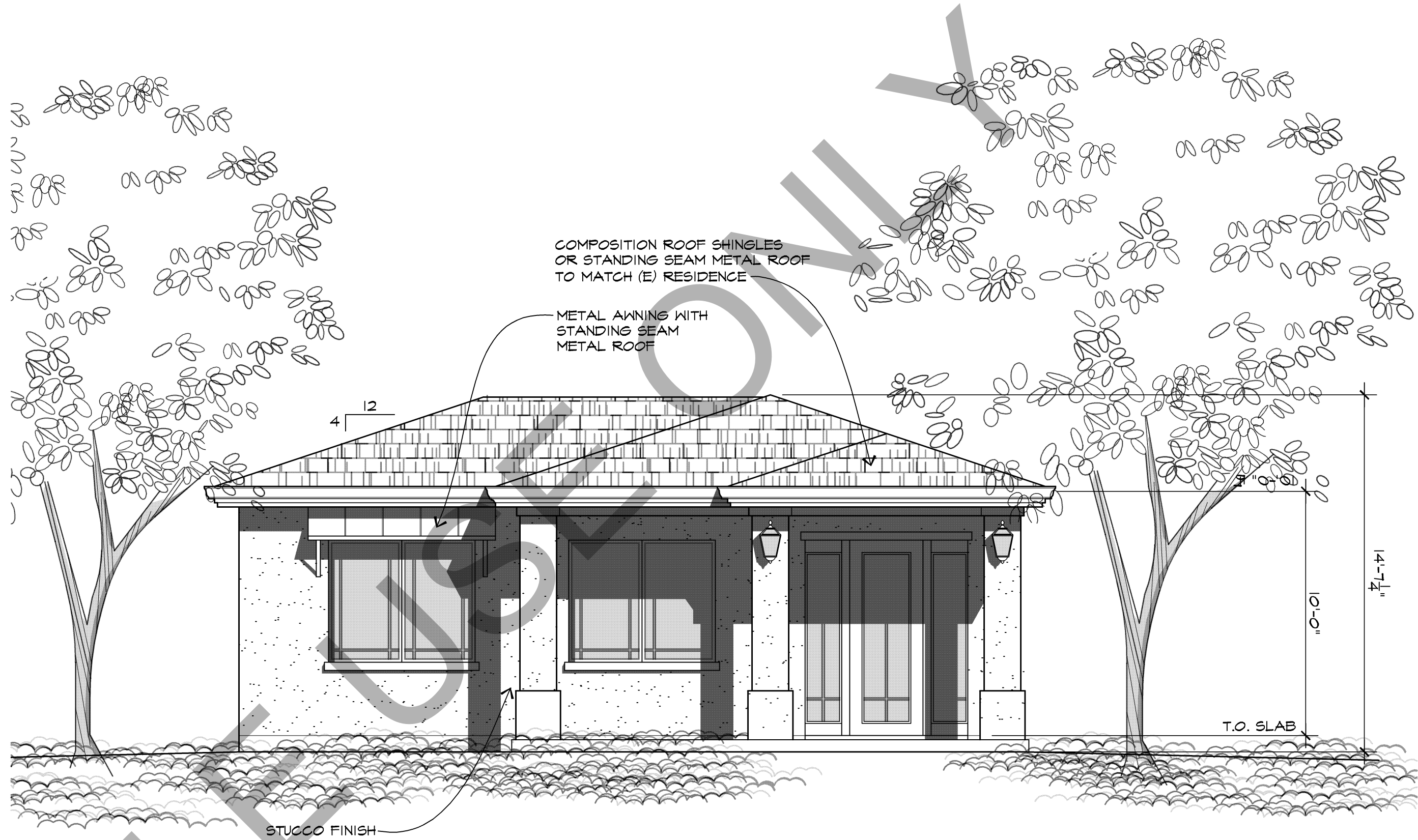
Apr 26, 2025 - 3:44pm A2 Studio Contemporary style.dwg





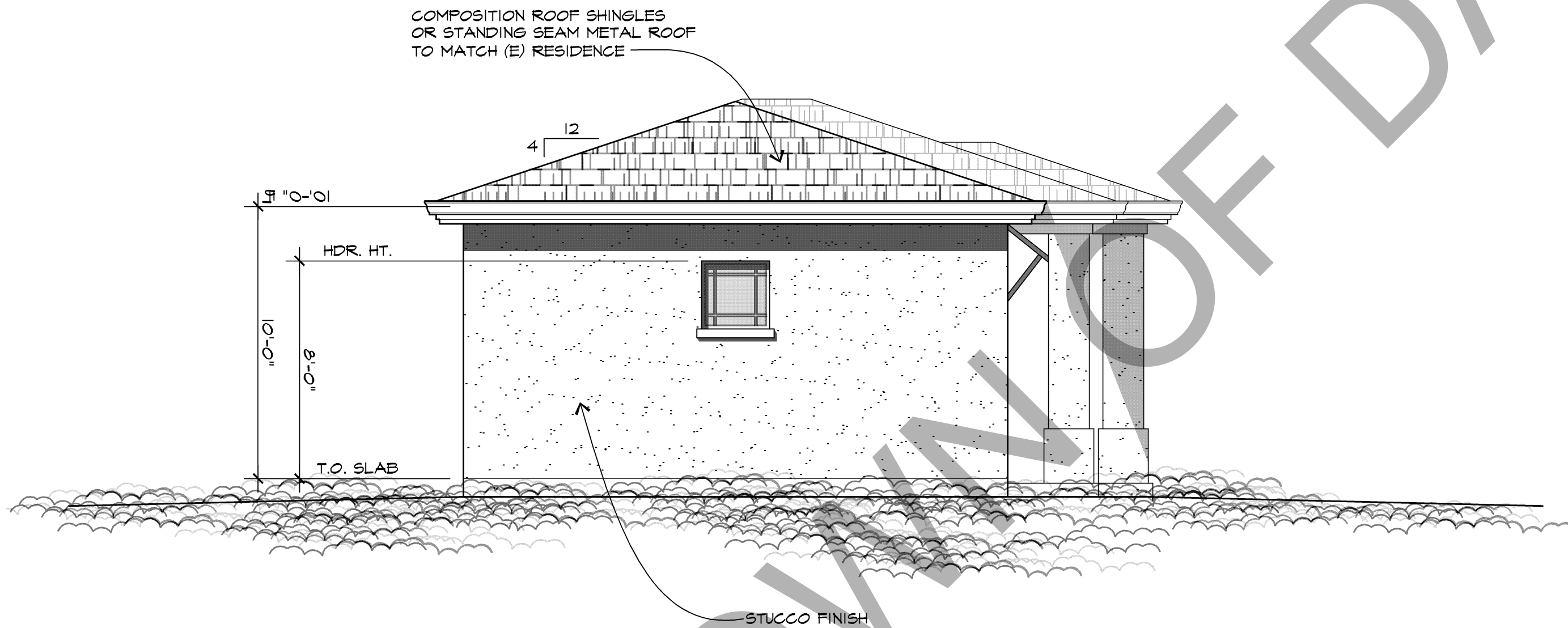
RIGHT ELEVATION (CONTEMPORARY STYLE)

SCALE: 1/4" = 1'-0"



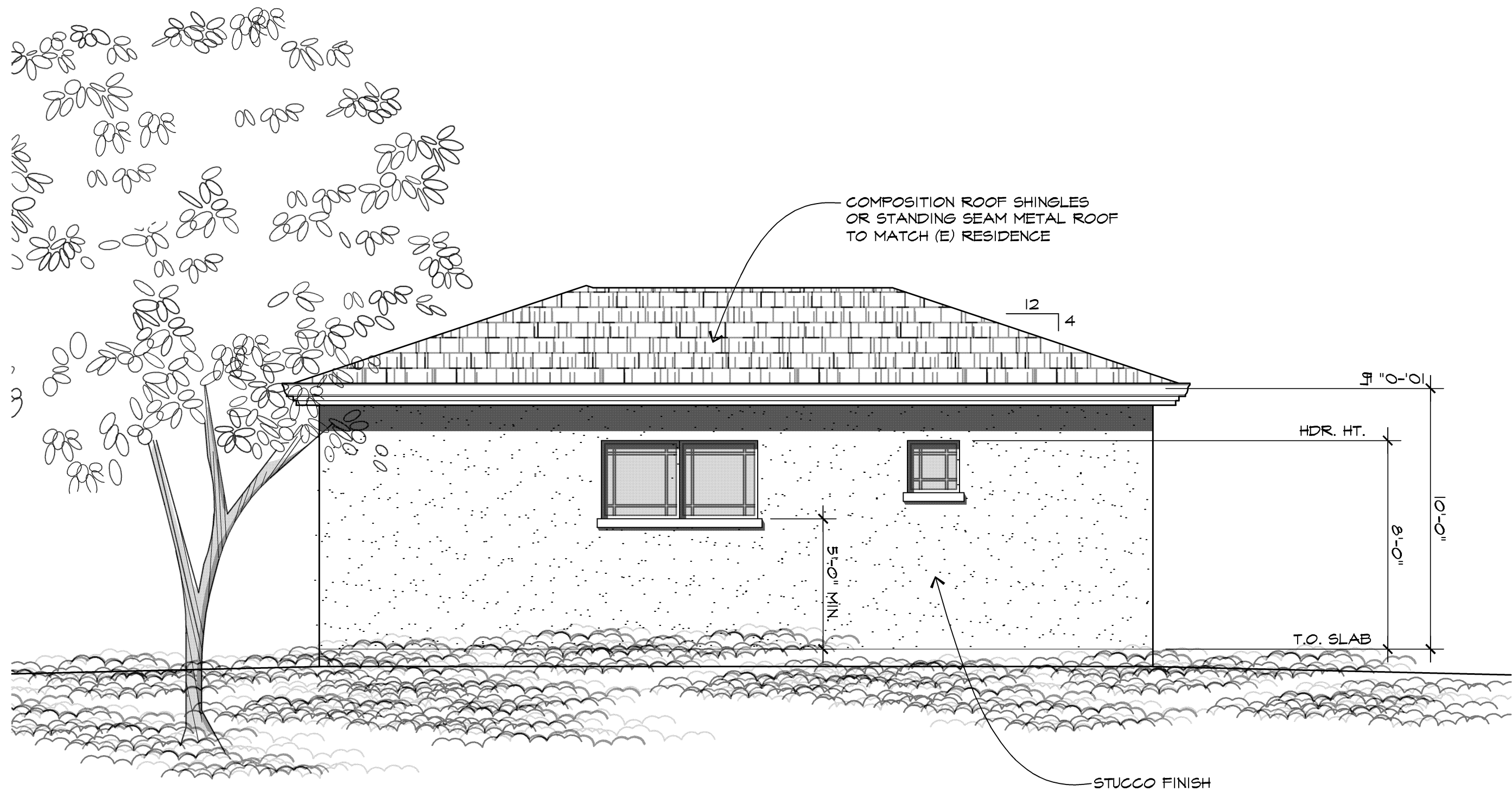
FRONT ELEVATION (CONTEMPORARY STYLE)

SCALE: 1/4" = 1'-0"



LEFT ELEVATION (CONTEMPORARY STYLE)

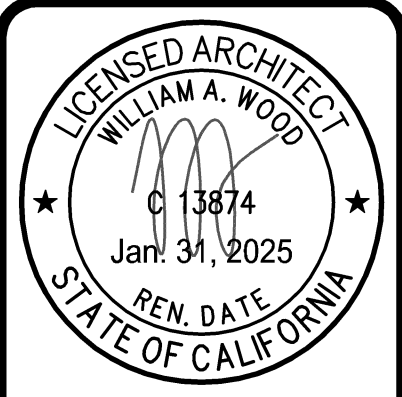
SCALE: 1/4" = 1'-0"



REAR ELEVATION (CONTEMPORARY STYLE)

SCALE: 1/4" = 1'-0"

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DANVILLE ACCESSORY  
DWELLING UNITS - STUDIO

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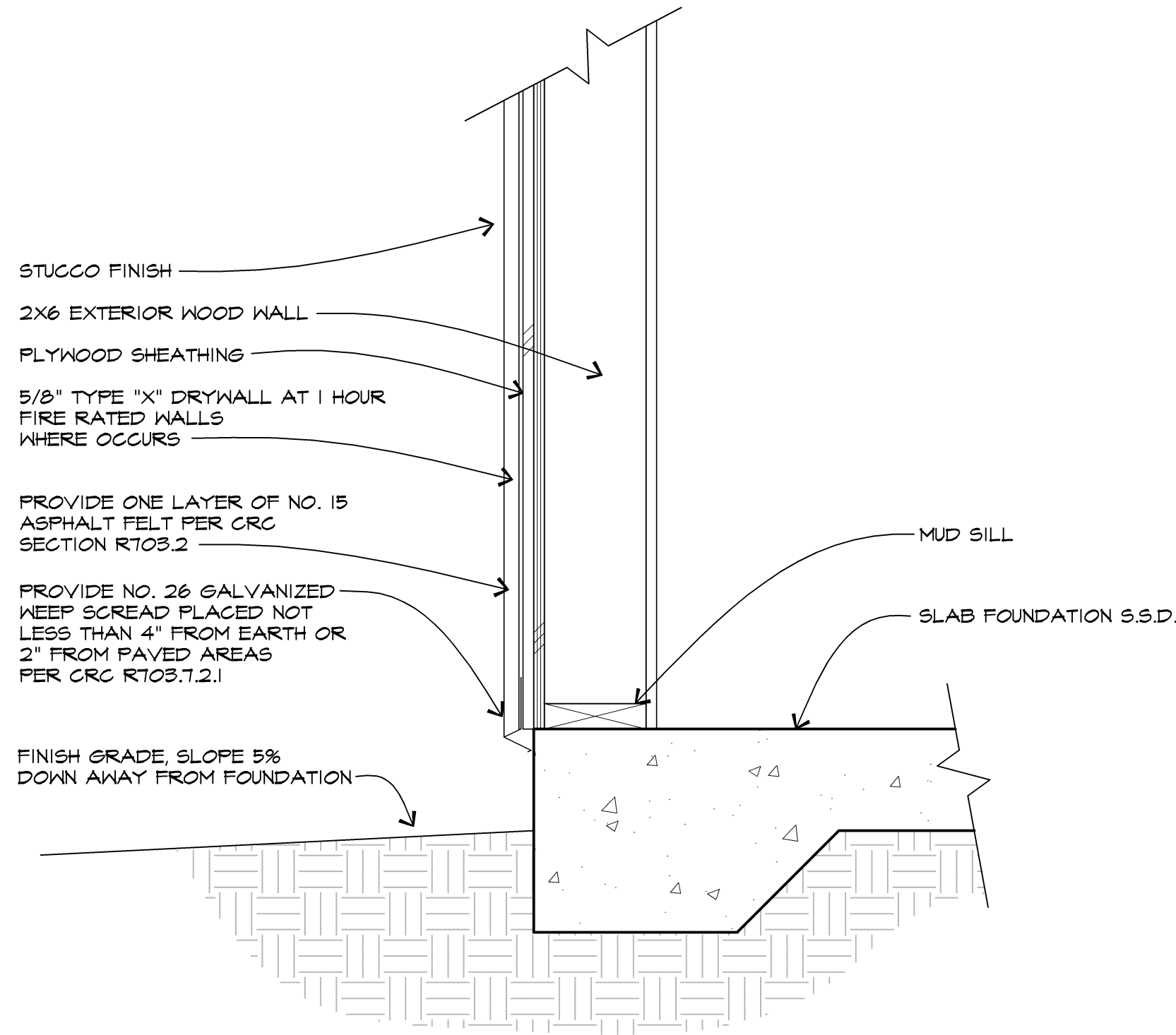
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|--------------------|
| DRAWN<br>JJ        |
| CHECKED<br>WW      |
| DATE<br>03-30-23   |
| SCALE<br>AS SHOWN  |
| JOB NO.<br>20.921R |
| SHEET<br>A3        |
| OF<br>SHEETS       |





TYPICAL WALL DETAIL

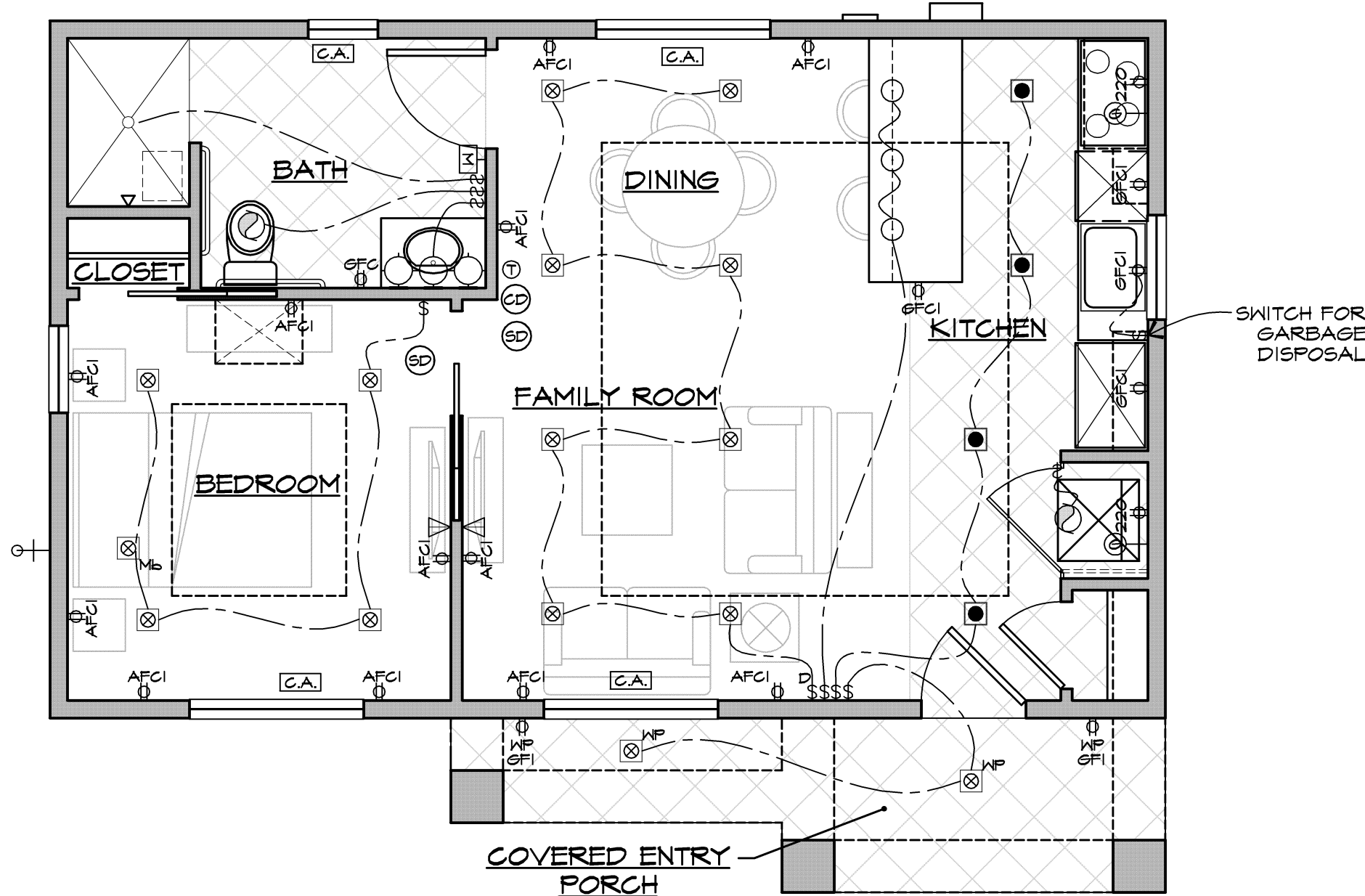
SCALE: 1 1/2" = 1'-0"

ELECTRICAL/MECHANICAL KEY

- SWITCHED RECEPTACLE OUTLET @ 12" U.N.O.
- AFCI DUPLX RECEPTACLE OUTLET @ 12" U.N.O. W/ ARC-FAULT CIRCUIT INTERRUPTER
- EFCI DUPLX RECEPTACLE OUTLET W/ GROUND FAULT CIRCUIT INTERRUPTER
- WP WEATHER PROOF DUPLX RECEPTACLE OUTLET (GFCI PROTECTED PER NEC210-8(g)(3))
- 220 DUPLX RECEPTACLE OUTLET - 220 VOLT
- \$ SINGLE POLE SWITCH @ 48" U.N.O.
- 3S THREE-WAY SWITCH
- SD SWITCH W/ DIMMER
- SL SWITCH W/ MOTION LIGHT
- M MOTION SENSOR
- CEILING MOUNTED LIGHT FIXTURE
- WALL MOUNTED LIGHT FIXTURE
- WALL MOUNTED LIGHT FIXTURE - SHALL BE SUITABLE FOR DAMP LOCATIONS
- H HANGING LIGHT
- RECESSED LED CEILING LIGHT FIXTURE
- RECESSED LED LOW VOLTAGE CEILING LIGHT
- NP RECESSED LIGHT FIXTURE - SHALL BE LABELED SUITABLE FOR DAMP LOCATIONS
- E EXHAUST FAN
- SD SMOKE DETECTOR - (110V W/ BATTERY BACK-UP) HARD WIRED & INTERCONNECTED
- CD CARBON MONOXIDE DETECTOR - (110V W/ BATTERY BACK-UP) HARD WIRED & INTERCONNECTED
- TELEVISION OUTLET
- HOSE BIBB (1/2" CW) W/ NON-REMOVABLE ANTI-SIPHON DEVICE (FOR OUTSIDE BIBB)
- GS GAS OUTLET
- T THERMOSTAT
- CA CEILING SUPPLY AIR REGISTER
- FA FLOOR AIR SUPPLY REGISTER
- RA COLD AIR RETURN @ CEILING

ELECTRICAL NOTES

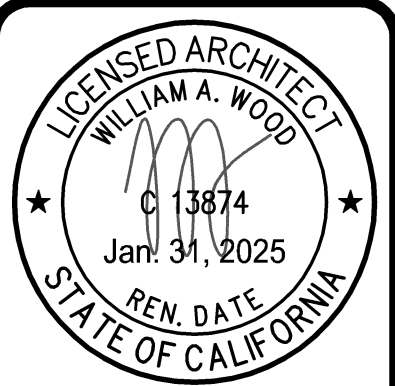
- THERMOSTAT LOCATION TO BE DETERMINED BY HVAC DESIGNER.
- CEILING AIR REGISTERS TO BE DETERMINED BY HVAC DESIGNER.
- KITCHEN & BATHROOM LIGHTING SHALL MEET EFFICIENCY REQUIREMENT OF 2022 TITLE 24.
- CONTRACTOR TO PROVIDE A COLD WATER CONNECTION @ THE REFRIGERATOR.
- CONTRACTOR TO PROVIDE THE OPTION OF GAS OR 220V @ THE COOK TOP (VERIFY W/ OWNER).
- WATER CLOSETS TO BE MAX 1.28 GALLONS PER FLUSH PER CAL GREEN SECTION 4303.1.4.
- INSTALLATION INSTRUCTIONS FOR ALL EQUIP. SHALL BE PROVIDED TO THE FIELD INSPECTOR @ THE TIME OF INSPECTION.
- PROVIDE TWO SMALL APPLIANCE BRANCH CIRCUITS FOR THE KITCHEN AND ARE LIMITED TO SUPPLYING WALL AND COUNTER SPACE OUTLETS FOR THE KITCHEN PANTRY, BREAKFAST ROOM, DINING ROOM, OR SIMILAR AREAS. NOTE: THESE CIRCUITS CANNOT SERVE OUTSIDE PLUGS, RANGE HOOD, DISPOSALS, DISHWASHERS OR MICROWAVES-ONLY THE REQUIRED COUNTERTOP/WALL OUTLETS INCLUDING THE REFRIGERATOR.
- PROVIDE A DEDICATED 20-AMP BRANCH CIRCUIT TO SUPPLY THE LAUNDRY RECEPTACLE OUTLET.
- PROVIDE AN ARC-FAULT CIRCUIT INTERRUPTER TO PROTECT ALL RECEPTABLES IN THE BEDROOMS.
- PROVIDE RECEPTABLE OUTLETS IN FOLLOWING LOCATIONS:
  - AT EACH KITCHEN AND DINING AREA COUNTER SPACE WIDER THAN 12" LOCATED SO THAT NO POINT ALONG THE COUNTER WALL IS OVER 24" FROM A RECEPTACLE.
  - AN EXTERIOR RECEPTABLES AT THE FRONT AND REAR OF THE HOME. THEY MUST BE WITHIN 6 FEET, 6 INCHES OF GRADE AND WATERPROOF.
  - ONE RECEPTACLE FOR THE LAUNDRY (I.E. WASHER).
  - IN ANY HALLWAY 10 FT OR MORE IN LENGTH.
- KITCHEN COUNTERTOP RECEPTABLES SHALL BE LOCATED ABOVE THE COUNTERTOP NOT MORE THAN 18", AND MAY NOT BE INSTALLED FACE-UP IN THE COUNTER.
- ALL LIGHT FIXTURE IN TUB OR SHOWER ENCLOSURES SHALL BE LABEL "SUITABLE FOR DAMP LOCATIONS" AND IF CEILING HEIGHT IS > 8 FT. BE PROTECTED BY GFCI.
- AN APPROVED CARBON MONOXIDE ALARM SHALL BE INSTALLED IN DWELLING UNITS AND IN SLEEPING UNITS WITHIN WHICH FUEL-BURNING APPLIANCES ARE INSTALLED. CARBON MONOXIDE ALARMS REQUIRED BY SECTIONS R315.1 AND R315.2 SHALL BE INSTALLED IN THE FOLLOWING LOCATIONS: OUTSIDE OF EACH SEPARATE DWELLING UNIT SLEEPING ARE IN THE IMMEDIATE VICINITY OF THE BEDROOM(S); ON EVERY LEVEL OF A DWELLING INCLUDING BASEMENTS. CARBON MONOXIDE ALARMS COMBINED WITH SMOKE ALARMS SHALL COMPLY WITH SECTION R315, ALL APPLICABLE STANDARDS, AND REQUIREMENTS FOR LISTING AND APPROVAL BY THE OFFICE OF THE STATE FIRE MARSHALL, FOR SMOKE ALARMS.
- EXHAUST FANS TO BE 50 CFM INTERMITTENT OR 20 CFM CONTINUOUS IN WATER CLOSETS, 50 CFM CONTINUOUS.
- ALL RECEPTABLES IN THE BATHROOMS, UTILITY ROOMS, KITCHEN COUNTERS, KITCHEN ISLAND, GARAGE (INCLUDING CEILING MOUNTED) AND ALL EXTERIOR LOCATIONS ARE TO BE GFCI PROTECTED CEC 210.8(g).
- CONDUIT IN CONCRETE SLAB IS TO BE RATED FOR WET LOCATIONS. CEC 430.
- PROVIDE DEDICATED CIRCUITS FOR FOR BATHROOM CIRCUITS SERVING ONLY THE RECEPTABLES PER CEC201.11(g)(3).
- PROVIDE TAMPER RESISTANT RECEPTABLES IN ALL NEW CIRCUITS PER CEC SECTION 406.12 & 406.4(D)(5).
- OUTDOOR LIGHTS TO BE "HIGH EFFICACY" OR "LOW EFFICACY" AND ON PHOTO/MOTION SENSOR PER CA ENERGY SECTION 150.0(k)(4).
- HOSE BIBS SHALL HAVE NON-REMOVABLE BACKFLOW PREVENTER OR BIB-TYPE VACUUM BREAKER.
- WATER CLOSETS TO BE 1.28 GALLONS PER FLUSH MAXIMUM OR DUAL FLUSH PER CFC 401.2.
- KITCHEN FAUCET TO BE 1.8 GALLONS PER MINUTE, MAXIMUM PER CFC 4303.1.4.4.
- LAVATORY FAUCET TO BE 1.2 GALLONS PER MINUTE, MAXIMUM, PER CFC 401.2.2.
- SHOWER HEADS TO BE 1.8 GALLONS PER MINUTE AT 80 PSI, MAXIMUM, PER CFC 403.3.



ELECTRICAL/ MECHANICAL PLAN

SCALE: 1/4" = 1'-0"

| REVISIONS | DATE |
|-----------|------|
|           |      |
|           |      |
|           |      |
|           |      |
|           |      |
|           |      |
|           |      |



DANVILLE ACCESSORY  
DWELLING UNITS - STUDIO

DANVILLE CA 94526

WILLIAM WOOD  
ARCHITECTS  
301 HARTZ AVENUE, SUITE 203  
DANVILLE, CALIFORNIA 94526  
(925) 820-8233

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WORK, AND MAY NOT BE DUPLICATED,  
PUBLISHED, OR OTHERWISE USED  
WITHOUT WRITTEN CONSENT OF  
WILLIAM WOOD ARCHITECTS.

|                    |
|--------------------|
| DRAWN<br>JJ        |
| CHECKED<br>WW      |
| DATE<br>03-30-23   |
| SCALE<br>AS SHOWN  |
| JOB NO.<br>20.921R |
| SHEET              |

A4

OF SHEETS

Apr 26, 2025 - 3:47pm A4 Studio Contemporary styling

PLAN SET ID: S-CO-M-F



# **BUILDING ENERGY ANALYSIS REPORT**

## **PROJECT:**

Town of Danville ADU  
Danville, CA 94526

## **Project Designer:**

William Wood Architects  
301 Hartz Ave #203  
Danville, CA 94526  
(925) 820-8233

## **Report Prepared by:**

Jason Bennett  
DP Advanced Engineering Inc.  
3381 Walnut Blvd. Suite 220  
Brentwood, CA 94513  
(925) 516-3502

## **Job Number:**

W021420

## **Date:**

March 31, 2023



**CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD**

CF1R-PRF-01E

Project Name: Danville ADU Contemporary Studio

Calculation Date/Time: 2023-03-30T18:32:03-07:00

(Page 1 of 13)

Calculation Description: Title 24 Analysis

Input File Name: Danville ADU\_Contemporary\_Studio.ribd22

| GENERAL INFORMATION |                                              |                                  |    |                                   |                    |
|---------------------|----------------------------------------------|----------------------------------|----|-----------------------------------|--------------------|
| 01                  | Project Name                                 | Danville ADU Contemporary Studio |    |                                   |                    |
| 02                  | Run Title                                    | Title 24 Analysis                |    |                                   |                    |
| 03                  | Project Location                             | Varies                           |    |                                   |                    |
| 04                  | City                                         | Danville, CA                     | 05 | Standards Version                 | 2022               |
| 06                  | Zip code                                     | 94526                            | 07 | Software Version                  | CBECC-Res 2022.2.1 |
| 08                  | Climate Zone                                 | 12                               | 09 | Front Orientation (deg/ Cardinal) | All orientations   |
| 10                  | Building Type                                | Single family                    | 11 | Number of Dwelling Units          | 1                  |
| 12                  | Project Scope                                | Newly Constructed                | 13 | Number of Bedrooms                | 1                  |
| 14                  | Addition Cond. Floor Area (ft <sup>2</sup> ) | 0                                | 15 | Number of Stories                 | 1                  |
| 16                  | Existing Cond. Floor Area (ft <sup>2</sup> ) | n/a                              | 17 | Fenestration Average U-factor     | 0.3                |
| 18                  | Total Cond. Floor Area (ft <sup>2</sup> )    | 640                              | 19 | Glazing Percentage (%)            | 17.30%             |
| 20                  | ADU Bedroom Count                            | n/a                              |    |                                   |                    |

| COMPLIANCE RESULTS |                                                                                                                                                                     |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01                 | Building Complies with Computer Performance                                                                                                                         |
| 02                 | This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CEC-approved HERS provider. |
| 03                 | This building incorporates one or more Special Features shown below                                                                                                 |

Registration Number:

223-P010038750A-000-000-00000000-0000

Registration Date/Time:

2023-03-31 08:33:37

HERS Provider:

CalCERTS inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance

Report Version: 2022.0.000

Schema Version: rev 20220901

Report Generated: 2023-03-30 18:32:45



**CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD**
**CF1R-PRF-01E**
**Project Name:** Danville ADU Contemporary Studio

**Calculation Date/Time:** 2023-03-30T18:32:03-07:00

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**Calculation Description:** Title 24 Analysis

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| ENERGY DESIGN RATINGS                                                                                                                                                                                                                                                                                                                                                                                                |                         |                                                 |                                       |                         |                                                 |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------------|---------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                      | Energy Design Ratings   |                                                 |                                       | Compliance Margins      |                                                 |                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                      | Source Energy<br>(EDR1) | Efficiency <sup>1</sup> EDR<br>(EDR2efficiency) | Total <sup>2</sup> EDR<br>(EDR2total) | Source Energy<br>(EDR1) | Efficiency <sup>1</sup> EDR<br>(EDR2efficiency) | Total <sup>2</sup> EDR<br>(EDR2total) |
| Standard Design                                                                                                                                                                                                                                                                                                                                                                                                      | 41                      | 44.1                                            | 58.6                                  |                         |                                                 |                                       |
| Proposed Design                                                                                                                                                                                                                                                                                                                                                                                                      |                         |                                                 |                                       |                         |                                                 |                                       |
| North Facing                                                                                                                                                                                                                                                                                                                                                                                                         | 33.8                    | 40.4                                            | 56.4                                  | 7.2                     | 3.7                                             | 2.2                                   |
| East Facing                                                                                                                                                                                                                                                                                                                                                                                                          | 34                      | 41.4                                            | 57                                    | 7                       | 2.7                                             | 1.6                                   |
| South Facing                                                                                                                                                                                                                                                                                                                                                                                                         | 33.5                    | 39.6                                            | 55.9                                  | 7.5                     | 4.5                                             | 2.7                                   |
| West Facing                                                                                                                                                                                                                                                                                                                                                                                                          | 34.1                    | 43                                              | 57.9                                  | 6.9                     | 1.1                                             | 0.7                                   |
| RESULT <sup>3</sup> : PASS                                                                                                                                                                                                                                                                                                                                                                                           |                         |                                                 |                                       |                         |                                                 |                                       |
| <sup>1</sup> Efficiency EDR includes improvements like a better building envelope and more efficient equipment<br><sup>2</sup> Total EDR includes efficiency and demand response measures such as photovoltaic (PV) system and batteries<br><sup>3</sup> Building complies when source energy, efficiency and total compliance margins are greater than or equal to zero and unmet load hour limits are not exceeded |                         |                                                 |                                       |                         |                                                 |                                       |
| <ul style="list-style-type: none"> <li>Standard Design PV Capacity: 0.00 kWdc</li> <li>Proposed PV Capacity Scaling: North (0.00 kWdc) East (0.00 kWdc) South (0.00 kWdc) West (0.00 kWdc)</li> </ul>                                                                                                                                                                                                                |                         |                                                 |                                       |                         |                                                 |                                       |

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**CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD**
**CF1R-PRF-01E**
**Project Name:** Danville ADU Contemporary Studio

**Calculation Date/Time:** 2023-03-30T18:32:03-07:00

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**Input File Name:** Danville ADU\_Contemporary\_Studio.ribd22

| ENERGY USE SUMMARY                              |                                                                 |                                                              |                                                                 |                                                              |                          |                          |
|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------|--------------------------|--------------------------|
| Energy Use                                      | Standard Design Source Energy (EDR1) (kBtu/ft <sup>2</sup> -yr) | Standard Design TDV Energy (EDR2) (kTDV/ft <sup>2</sup> -yr) | Proposed Design Source Energy (EDR1) (kBtu/ft <sup>2</sup> -yr) | Proposed Design TDV Energy (EDR2) (kTDV/ft <sup>2</sup> -yr) | Compliance Margin (EDR1) | Compliance Margin (EDR2) |
| Space Heating                                   | 7.13                                                            | 31.36                                                        | 3.26                                                            | 24.98                                                        | 3.87                     | 6.38                     |
| Space Cooling                                   | 1.06                                                            | 31.57                                                        | 0.99                                                            | 33.34                                                        | 0.07                     | -1.77                    |
| IAQ Ventilation                                 | 0.87                                                            | 9.28                                                         | 1.38                                                            | 14.79                                                        | -0.51                    | -5.51                    |
| Water Heating                                   | 3.59                                                            | 37.82                                                        | 2.64                                                            | 27.67                                                        | 0.95                     | 10.15                    |
| Self Utilization/Flexibility Credit             |                                                                 |                                                              |                                                                 | 0                                                            |                          | 0                        |
| <b>North Facing Efficiency Compliance Total</b> | <b>12.65</b>                                                    | <b>110.03</b>                                                | <b>8.27</b>                                                     | <b>100.78</b>                                                | <b>4.38</b>              | <b>9.25</b>              |
| Space Heating                                   | 7.13                                                            | 31.36                                                        | 3.24                                                            | 24.63                                                        | 3.89                     | 6.73                     |
| Space Cooling                                   | 1.06                                                            | 31.57                                                        | 1.14                                                            | 36.21                                                        | -0.08                    | -4.64                    |
| IAQ Ventilation                                 | 0.87                                                            | 9.28                                                         | 1.38                                                            | 14.79                                                        | -0.51                    | -5.51                    |
| Water Heating                                   | 3.59                                                            | 37.82                                                        | 2.64                                                            | 27.67                                                        | 0.95                     | 10.15                    |
| Self Utilization/Flexibility Credit             |                                                                 |                                                              |                                                                 | 0                                                            |                          | 0                        |
| <b>East Facing Efficiency Compliance Total</b>  | <b>12.65</b>                                                    | <b>110.03</b>                                                | <b>8.4</b>                                                      | <b>103.3</b>                                                 | <b>4.25</b>              | <b>6.73</b>              |

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**CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD**
**CF1R-PRF-01E**
**Project Name:** Danville ADU Contemporary Studio

**Calculation Date/Time:** 2023-03-30T18:32:03-07:00

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**Input File Name:** Danville ADU\_Contemporary\_Studio.ribd22

**ENERGY USE SUMMARY**

| Energy Use                                      | Standard Design Source Energy (EDR1) (kBtu/ft <sup>2</sup> -yr) | Standard Design TDV Energy (EDR2) (kTDV/ft <sup>2</sup> -yr) | Proposed Design Source Energy (EDR1) (kBtu/ft <sup>2</sup> -yr) | Proposed Design TDV Energy (EDR2) (kTDV/ft <sup>2</sup> -yr) | Compliance Margin (EDR1) | Compliance Margin (EDR2) |
|-------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------|--------------------------|--------------------------|
| Space Heating                                   | 7.13                                                            | 31.36                                                        | 3.12                                                            | 23.56                                                        | 4.01                     | 7.8                      |
| Space Cooling                                   | 1.06                                                            | 31.57                                                        | 0.99                                                            | 32.77                                                        | 0.07                     | -1.2                     |
| IAQ Ventilation                                 | 0.87                                                            | 9.28                                                         | 1.38                                                            | 14.79                                                        | -0.51                    | -5.51                    |
| Water Heating                                   | 3.59                                                            | 37.82                                                        | 2.64                                                            | 27.67                                                        | 0.95                     | 10.15                    |
| Self Utilization/Flexibility Credit             |                                                                 |                                                              |                                                                 | 0                                                            |                          | 0                        |
| <b>South Facing Efficiency Compliance Total</b> | <b>12.65</b>                                                    | <b>110.03</b>                                                | <b>8.13</b>                                                     | <b>98.79</b>                                                 | <b>4.52</b>              | <b>11.24</b>             |
| Space Heating                                   | 7.13                                                            | 31.36                                                        | 3.19                                                            | 24.44                                                        | 3.94                     | 6.92                     |
| Space Cooling                                   | 1.06                                                            | 31.57                                                        | 1.26                                                            | 40.32                                                        | -0.2                     | -8.75                    |
| IAQ Ventilation                                 | 0.87                                                            | 9.28                                                         | 1.38                                                            | 14.79                                                        | -0.51                    | -5.51                    |
| Water Heating                                   | 3.59                                                            | 37.82                                                        | 2.64                                                            | 27.67                                                        | 0.95                     | 10.15                    |
| Self Utilization/Flexibility Credit             |                                                                 |                                                              |                                                                 | 0                                                            |                          | 0                        |
| <b>West Facing Efficiency Compliance Total</b>  | <b>12.65</b>                                                    | <b>110.03</b>                                                | <b>8.47</b>                                                     | <b>107.22</b>                                                | <b>4.18</b>              | <b>2.81</b>              |

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**CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD**
**CF1R-PRF-01E**
**Project Name:** Danville ADU Contemporary Studio

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| ENERGY USE INTENSITY                                                                                                                                               |                                              |                                              |                                                |                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------|------------------------------------------------|-------------------|
|                                                                                                                                                                    | Standard Design (kBtu/ft <sup>2</sup> - yr ) | Proposed Design (kBtu/ft <sup>2</sup> - yr ) | Compliance Margin (kBtu/ft <sup>2</sup> - yr ) | Margin Percentage |
| <b>North Facing</b>                                                                                                                                                |                                              |                                              |                                                |                   |
| <b>Gross EUI<sup>1</sup></b>                                                                                                                                       | 32.25                                        | 26.59                                        | 5.66                                           | 17.55             |
| <b>Net EUI<sup>2</sup></b>                                                                                                                                         | 32.25                                        | 26.59                                        | 5.66                                           | 17.55             |
| <b>East Facing</b>                                                                                                                                                 |                                              |                                              |                                                |                   |
| <b>Gross EUI<sup>1</sup></b>                                                                                                                                       | 32.25                                        | 26.84                                        | 5.41                                           | 16.78             |
| <b>Net EUI<sup>2</sup></b>                                                                                                                                         | 32.25                                        | 26.84                                        | 5.41                                           | 16.78             |
| <b>South Facing</b>                                                                                                                                                |                                              |                                              |                                                |                   |
| <b>Gross EUI<sup>1</sup></b>                                                                                                                                       | 32.25                                        | 26.41                                        | 5.84                                           | 18.11             |
| <b>Net EUI<sup>2</sup></b>                                                                                                                                         | 32.25                                        | 26.41                                        | 5.84                                           | 18.11             |
| <b>West Facing</b>                                                                                                                                                 |                                              |                                              |                                                |                   |
| <b>Gross EUI<sup>1</sup></b>                                                                                                                                       | 32.25                                        | 26.94                                        | 5.31                                           | 16.47             |
| <b>Net EUI<sup>2</sup></b>                                                                                                                                         | 32.25                                        | 26.94                                        | 5.31                                           | 16.47             |
| <b>Notes</b><br>1. Gross EUI is Energy Use Total (not including PV) / Total Building Area.<br>2. Net EUI is Energy Use Total (including PV) / Total Building Area. |                                              |                                              |                                                |                   |

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Calculation Description: Title 24 Analysis

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| REQUIRED PV SYSTEMS   |           |                   |            |                   |      |               |            |                   |                 |                   |                         |
|-----------------------|-----------|-------------------|------------|-------------------|------|---------------|------------|-------------------|-----------------|-------------------|-------------------------|
| 01                    | 02        | 03                | 04         | 05                | 06   | 07            | 08         | 09                | 10              | 11                | 12                      |
| DC System Size (kWdc) | Exception | Module Type       | Array Type | Power Electronics | CFI  | Azimuth (deg) | Tilt Input | Array Angle (deg) | Tilt: (x in 12) | Inverter Eff. (%) | Annual Solar Access (%) |
| 0                     |           | Standard (14-17%) | Fixed      | none              | true | n/a           | n/a        | n/a               | n/a             | n/a               |                         |

**REQUIRED SPECIAL FEATURES**

The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.

- PV exception 2: No PV required when minimum PV size (Section 150.1(c)14) < 1.8 kWdc (0 kW)
- Indoor air quality, balanced fan
- IAQ Ventilation System Heat Recovery: minimum 67 SRE and 73 ASRE
- IAQ Ventilation System: supply outside air inlet, filter, and H/ERV cores accessible per RACM Reference Manual
- IAQ Ventilation System: fault indicator display
- Insulation below roof deck
- Window overhangs and/or fins
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

**HERS FEATURE SUMMARY**

The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry

- Indoor air quality ventilation
- Kitchen range hood
- Minimum Airflow
- Verified SEER/SEER2
- Verified Refrigerant Charge
- Fan Efficacy Watts/CFM
- Verified HSPF
- Verified heat pump rated heating capacity
- Duct leakage testing

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**Calculation Description:** Title 24 Analysis

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| BUILDING - FEATURES INFORMATION  |                                           |                          |                    |                 |                                       |                                 |
|----------------------------------|-------------------------------------------|--------------------------|--------------------|-----------------|---------------------------------------|---------------------------------|
| 01                               | 02                                        | 03                       | 04                 | 05              | 06                                    | 07                              |
| Project Name                     | Conditioned Floor Area (ft <sup>2</sup> ) | Number of Dwelling Units | Number of Bedrooms | Number of Zones | Number of Ventilation Cooling Systems | Number of Water Heating Systems |
| Danville ADU Contemporary Studio | 640                                       | 1                        | 1                  | 1               | 0                                     | 1                               |

| ZONE INFORMATION |             |                  |                                    |                     |                        |        |
|------------------|-------------|------------------|------------------------------------|---------------------|------------------------|--------|
| 01               | 02          | 03               | 04                                 | 05                  | 06                     | 07     |
| Zone Name        | Zone Type   | HVAC System Name | Zone Floor Area (ft <sup>2</sup> ) | Avg. Ceiling Height | Water Heating System 1 | Status |
| Accessory Unit   | Conditioned | HVAC System 1    | 640                                | 10                  | DHW System 1           | New    |

| OPAQUE SURFACES     |                |                        |         |             |                               |                                         |            |
|---------------------|----------------|------------------------|---------|-------------|-------------------------------|-----------------------------------------|------------|
| 01                  | 02             | 03                     | 04      | 05          | 06                            | 07                                      | 08         |
| Name                | Zone           | Construction           | Azimuth | Orientation | Gross Area (ft <sup>2</sup> ) | Window and Door Area (ft <sup>2</sup> ) | Tilt (deg) |
| Front Wall          | Accessory Unit | Exterior 2x6 Wall R-21 | 0       | Front       | 320                           | 74                                      | 90         |
| Left Wall           | Accessory Unit | Exterior 2x6 Wall R-21 | 90      | Left        | 200                           | 9                                       | 90         |
| Back Wall           | Accessory Unit | Exterior 2x6 Wall R-21 | 180     | Back        | 320                           | 19                                      | 90         |
| Right Wall          | Accessory Unit | Exterior 2x6 Wall R-21 | 270     | Right       | 200                           | 9                                       | 90         |
| Ceiling Below Attic | Accessory Unit | R-38 Attic Ceiling     | n/a     | n/a         | 640                           | n/a                                     | n/a        |

| ATTIC |              |            |                     |                  |                |                 |           |
|-------|--------------|------------|---------------------|------------------|----------------|-----------------|-----------|
| 01    | 02           | 03         | 04                  | 05               | 06             | 07              | 08        |
| Name  | Construction | Type       | Roof Rise (x in 12) | Roof Reflectance | Roof Emittance | Radiant Barrier | Cool Roof |
| Attic | Attic Roof   | Ventilated | 4                   | 0.1              | 0.85           | No              | No        |

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223-P010038750A-000-000-00000000-0000

**Registration Date/Time:**

2023-03-31 08:33:37

**HERS Provider:**

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CA Building Energy Efficiency Standards - 2022 Residential Compliance

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**Schema Version:** rev 20220901

**Report Generated:** 2023-03-30 18:32:45



**CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD**
**Project Name:** Danville ADU Contemporary Studio

**Calculation Description:** Title 24 Analysis

**Calculation Date/Time:** 2023-03-30T18:32:03-07:00

**Input File Name:** Danville ADU\_Contemporary\_Studio.ribd22

**CF1R-PRF-01E**
**(Page 8 of 13)**

| FENESTRATION / GLAZING |        |            |             |         |            |             |       |                         |          |                 |      |             |                  |
|------------------------|--------|------------|-------------|---------|------------|-------------|-------|-------------------------|----------|-----------------|------|-------------|------------------|
| 01                     | 02     | 03         | 04          | 05      | 06         | 07          | 08    | 09                      | 10       | 11              | 12   | 13          | 14               |
| Name                   | Type   | Surface    | Orientation | Azimuth | Width (ft) | Height (ft) | Mult. | Area (ft <sup>2</sup> ) | U-factor | U-factor Source | SHGC | SHGC Source | Exterior Shading |
| Front Door             | Window | Front Wall | Front       | 0       | 3          | 8           | 1     | 24                      | 0.32     | NFRC            | 0.16 | NFRC        | Bug Screen       |
| FamilyRm 5050          | Window | Front Wall | Front       | 0       | 5          | 5           | 1     | 25                      | 0.3      | NFRC            | 0.23 | NFRC        | Bug Screen       |
| Bedroom 5050           | Window | Front Wall | Front       | 0       | 5          | 5           | 1     | 25                      | 0.3      | NFRC            | 0.23 | NFRC        | Bug Screen       |
| Kitchen 3030           | Window | Left Wall  | Left        | 90      | 3          | 3           | 1     | 9                       | 0.3      | NFRC            | 0.23 | NFRC        | Bug Screen       |
| Bathroom 2020          | Window | Back Wall  | Back        | 180     | 2          | 2           | 1     | 4                       | 0.3      | NFRC            | 0.23 | NFRC        | Bug Screen       |
| DiningRm 5030          | Window | Back Wall  | Back        | 180     | 5          | 3           | 1     | 15                      | 0.3      | NFRC            | 0.23 | NFRC        | Bug Screen       |
| Bedroom 3030           | Window | Right Wall | Right       | 270     | 3          | 3           | 1     | 9                       | 0.3      | NFRC            | 0.23 | NFRC        | Bug Screen       |

| OVERHANGS AND FINS |          |         |             |              |          |          |        |        |        |           |        |        |        |
|--------------------|----------|---------|-------------|--------------|----------|----------|--------|--------|--------|-----------|--------|--------|--------|
| 01                 | 02       | 03      | 04          | 05           | 06       | 07       | 08     | 09     | 10     | 11        | 12     | 13     | 14     |
| Window             | Overhang |         |             |              |          | Left Fin |        |        |        | Right Fin |        |        |        |
|                    | Depth    | Dist Up | Left Extent | Right Extent | Flap Ht. | Depth    | Top Up | Dist L | Bot Up | Depth     | Top Up | Dist R | Bot Up |
| Front Door         | 6        | 0       | 2           | 2            | 0        | 0        | 0      | 0      | 0      | 0         | 0      | 0      | 0      |
| FamilyRm 5050      | 4        | 0       | 2           | 2            | 0        | 0        | 0      | 0      | 0      | 0         | 0      | 0      | 0      |
| Bedroom 5050       | 1        | 0       | 2           | 2            | 0        | 0        | 0      | 0      | 0      | 0         | 0      | 0      | 0      |
| Kitchen 3030       | 1        | 0       | 2           | 2            | 0        | 0        | 0      | 0      | 0      | 0         | 0      | 0      | 0      |
| Bathroom 2020      | 1        | 0       | 2           | 2            | 0        | 0        | 0      | 0      | 0      | 0         | 0      | 0      | 0      |
| DiningRm 5030      | 1        | 0       | 2           | 2            | 0        | 0        | 0      | 0      | 0      | 0         | 0      | 0      | 0      |

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**CF1R-PRF-01E**
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**Calculation Description:** Title 24 Analysis

**Input File Name:** Danville ADU\_Contemporary\_Studio.ribd22

| OVERHANGS AND FINIS |          |         |             |              |          |          |        |        |        |           |        |        |        |
|---------------------|----------|---------|-------------|--------------|----------|----------|--------|--------|--------|-----------|--------|--------|--------|
| 01                  | 02       | 03      | 04          | 05           | 06       | 07       | 08     | 09     | 10     | 11        | 12     | 13     | 14     |
| Window              | Overhang |         |             |              |          | Left Fin |        |        |        | Right Fin |        |        |        |
|                     | Depth    | Dist Up | Left Extent | Right Extent | Flap Ht. | Depth    | Top Up | Dist L | Bot Up | Depth     | Top Up | Dist R | Bot Up |
| Bedroom 3030        | 1        | 0       | 2           | 2            | 0        | 0        | 0      | 0      | 0      | 0         | 0      | 0      | 0      |

| SLAB FLOORS   |                |                         |                |                               |                               |                   |        |
|---------------|----------------|-------------------------|----------------|-------------------------------|-------------------------------|-------------------|--------|
| 01            | 02             | 03                      | 04             | 05                            | 06                            | 07                | 08     |
| Name          | Zone           | Area (ft <sup>2</sup> ) | Perimeter (ft) | Edge Insul. R-value and Depth | Edge Insul. R-value and Depth | Carpeted Fraction | Heated |
| Slab On Grade | Accessory Unit | 640                     | 104            | none                          | 0                             | 80%               | No     |

| OPAQUE SURFACE CONSTRUCTIONS |                        |                     |                                            |                      |                                        |          |                                                                                                                                                                   |
|------------------------------|------------------------|---------------------|--------------------------------------------|----------------------|----------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01                           | 02                     | 03                  | 04                                         | 05                   | 06                                     | 07       | 08                                                                                                                                                                |
| Construction Name            | Surface Type           | Construction Type   | Framing                                    | Total Cavity R-value | Interior / Exterior Continuous R-value | U-factor | Assembly Layers                                                                                                                                                   |
| Exterior 2x6 Wall R-21       | Exterior Walls         | Wood Framed Wall    | 2x6 @ 16 in. O. C.                         | R-21                 | None / None                            | 0.065    | Inside Finish: Gypsum Board<br>Cavity / Frame: R-21 / 2x6<br>Sheathing / Insulation: Wood<br>Siding/sheathing/decking<br>Exterior Finish: 3 Coat Stucco           |
| Attic Roof                   | Attic Roofs            | Wood Framed Ceiling | 2x4 Top Chord of Roof Truss @ 24 in. O. C. | R-13                 | None / None                            | 0.078    | Roofing: Light Roof (Asphalt Shingle)<br>Roof Deck: Wood<br>Siding/sheathing/decking<br>Cavity / Frame: R-13.0 / 2x4 Top Chrd<br>Around Roof Joists: R-0.0 insul. |
| R-38 Attic Ceiling           | Ceilings (below attic) | Wood Framed Ceiling | 2x4 Bottom Chord of Truss @ 24 in. O. C.   | R-38                 | None / None                            | 0.025    | Over Ceiling Joists: R-28.9 insul.<br>Cavity / Frame: R-9.1 / 2x4 Btm Chrd<br>Inside Finish: Gypsum Board                                                         |

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**Calculation Description:** Title 24 Analysis

**Input File Name:** Danville ADU\_Contemporary\_Studio.ribd22

| BUILDING ENVELOPE - HERS VERIFICATION |                                    |                               |       |       |
|---------------------------------------|------------------------------------|-------------------------------|-------|-------|
| 01                                    | 02                                 | 03                            | 04    | 05    |
| Quality Insulation Installation (QII) | High R-value Spray Foam Insulation | Building Envelope Air Leakage | CFM50 | CFM50 |
| Not Required                          | Not Required                       | N/A                           | n/a   | n/a   |

| WATER HEATING SYSTEMS |                          |                   |                   |                 |                      |                      |                   |                       |
|-----------------------|--------------------------|-------------------|-------------------|-----------------|----------------------|----------------------|-------------------|-----------------------|
| 01                    | 02                       | 03                | 04                | 05              | 06                   | 07                   | 08                | 09                    |
| Name                  | System Type              | Distribution Type | Water Heater Name | Number of Units | Solar Heating System | Compact Distribution | HERS Verification | Water Heater Name (#) |
| DHW System 1          | Domestic Hot Water (DHW) | Standard          | Heat Pump WH      | 1               | n/a                  | None                 | n/a               | Heat Pump WH (1)      |

| WATER HEATERS - NEEA HEAT PUMP |            |                 |                      |                        |               |                       |                        |
|--------------------------------|------------|-----------------|----------------------|------------------------|---------------|-----------------------|------------------------|
| 01                             | 02         | 03              | 04                   | 05                     | 06            | 07                    | 08                     |
| Name                           | # of Units | Tank Vol. (gal) | NEEA Heat Pump Brand | NEEA Heat Pump Model   | Tank Location | Duct Inlet Air Source | Duct Outlet Air Source |
| Heat Pump WH                   | 1          | 40              | Rheem                | RheemPROPH40T2R H37515 | Outside       | Outside               | Outside                |

| WATER HEATING - HERS VERIFICATION |                 |                 |                      |                           |                       |                                  |
|-----------------------------------|-----------------|-----------------|----------------------|---------------------------|-----------------------|----------------------------------|
| 01                                | 02              | 03              | 04                   | 05                        | 06                    | 07                               |
| Name                              | Pipe Insulation | Parallel Piping | Compact Distribution | Compact Distribution Type | Recirculation Control | Shower Drain Water Heat Recovery |
| DHW System 1 - 1/1                | Not Required    | Not Required    | Not Required         | None                      | Not Required          | Not Required                     |

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**Calculation Description:** Title 24 Analysis

**Input File Name:** Danville ADU\_Contemporary\_Studio.ribd22

| SPACE CONDITIONING SYSTEMS |                           |                   |                         |                   |                         |                   |                       |                          |
|----------------------------|---------------------------|-------------------|-------------------------|-------------------|-------------------------|-------------------|-----------------------|--------------------------|
| 01                         | 02                        | 03                | 04                      | 05                | 06                      | 07                | 08                    | 09                       |
| Name                       | System Type               | Heating Unit Name | Heating Equipment Count | Cooling Unit Name | Cooling Equipment Count | Fan Name          | Distribution Name     | Required Thermostat Type |
| HVAC System 1              | Heat pump heating cooling | PEAD-A24AA7       | 1                       | PEAD-A24AA7       | 1                       | HVAC Fan System 1 | Distribution System 1 | Setback                  |

| HVAC - HEAT PUMPS |                  |                 |                 |                    |        |        |                 |              |                  |                    |                 |                         |
|-------------------|------------------|-----------------|-----------------|--------------------|--------|--------|-----------------|--------------|------------------|--------------------|-----------------|-------------------------|
| 01                | 02               | 03              | 04              | 05                 | 06     | 07     | 08              | 09           | 10               | 11                 | 12              | 13                      |
| Name              | System Type      | Number of Units | Heating         |                    |        |        | Cooling         |              |                  | Zonally Controlled | Compressor Type | HERS Verification       |
|                   |                  |                 | Efficiency Type | HSPF / HSPF2 / COP | Cap 47 | Cap 17 | Efficiency Type | SEER / SEER2 | EER / EER / CEER |                    |                 |                         |
| PEAD-A24AA7       | Central split HP | 1               | HSPF            | 10.8               | 26000  | 14800  | EERSEER         | 19.6         | 11.7             | Not Zonal          | Single Speed    | PEAD-A24AA7-hers-htpump |

| HVAC HEAT PUMPS - HERS VERIFICATION |                  |                |                   |                     |                             |                     |                         |                         |
|-------------------------------------|------------------|----------------|-------------------|---------------------|-----------------------------|---------------------|-------------------------|-------------------------|
| 01                                  | 02               | 03             | 04                | 05                  | 06                          | 07                  | 08                      | 09                      |
| Name                                | Verified Airflow | Airflow Target | Verified EER/EER2 | Verified SEER/SEER2 | Verified Refrigerant Charge | Verified HSPF/HSPF2 | Verified Heating Cap 47 | Verified Heating Cap 17 |
| PEAD-A24AA7-hers-htpump             | Required         | 350            | Not Required      | Required            | Yes                         | Yes                 | Yes                     | Yes                     |

| HVAC - DISTRIBUTION SYSTEMS |                     |              |                   |        |               |        |              |        |                |                   |                                 |
|-----------------------------|---------------------|--------------|-------------------|--------|---------------|--------|--------------|--------|----------------|-------------------|---------------------------------|
| 01                          | 02                  | 03           | 04                | 05     | 06            | 07     | 08           | 09     | 10             | 11                | 12                              |
| Name                        | Type                | Design Type  | Duct Ins. R-value |        | Duct Location |        | Surface Area |        | Bypass Duct    | Duct Leakage      | HERS Verification               |
|                             |                     |              | Supply            | Return | Supply        | Return | Supply       | Return |                |                   |                                 |
| Distribution System 1       | Unconditioned attic | Non-Verified | R-6               | R-6    | Attic         | Attic  | n/a          | n/a    | No Bypass Duct | Sealed and Tested | Distribution System 1-hers-dist |

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**Calculation Description:** Title 24 Analysis

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| HVAC DISTRIBUTION - HERS VERIFICATION |                           |                         |                        |                      |              |                     |                         |                                                 |
|---------------------------------------|---------------------------|-------------------------|------------------------|----------------------|--------------|---------------------|-------------------------|-------------------------------------------------|
| 01                                    | 02                        | 03                      | 04                     | 05                   | 06           | 07                  | 08                      | 09                                              |
| Name                                  | Duct Leakage Verification | Duct Leakage Target (%) | Verified Duct Location | Verified Duct Design | Buried Ducts | Deeply Buried Ducts | Low-leakage Air Handler | Low Leakage Ducts Entirely in Conditioned Space |
| Distribution System 1-hers-dist       | Yes                       | 5.0                     | Not Required           | Not Required         | Not Required | Credit not taken    | Not Required            | No                                              |

| HVAC - FAN SYSTEMS |          |                       |                            |
|--------------------|----------|-----------------------|----------------------------|
| 01                 | 02       | 03                    | 04                         |
| Name               | Type     | Fan Power (Watts/CFM) | Name                       |
| HVAC Fan System 1  | HVAC Fan | 0.45                  | HVAC Fan System 1-hers-fan |

| HVAC FAN SYSTEMS - HERS VERIFICATION |                        |                                   |
|--------------------------------------|------------------------|-----------------------------------|
| 01                                   | 02                     | 03                                |
| Name                                 | Verified Fan Watt Draw | Required Fan Efficacy (Watts/CFM) |
| HVAC Fan System 1-hers-fan           | Required               | 0.45                              |

| INDOOR AIR QUALITY (IAQ) FANS |               |                      |              |                                |                                  |                                   |                   |        |
|-------------------------------|---------------|----------------------|--------------|--------------------------------|----------------------------------|-----------------------------------|-------------------|--------|
| 01                            | 02            | 03                   | 04           | 05                             | 06                               | 07                                | 08                | 09     |
| Dwelling Unit                 | Airflow (CFM) | Fan Efficacy (W/CFM) | IAQ Fan Type | Includes Heat/Energy Recovery? | IAQ Recovery Effectiveness - SRE | Includes Fault Indicator Display? | HERS Verification | Status |
| SFam IAQVentRpt 1-1           | 49            | 0.816326             | Balanced     | Yes                            | 73                               | No                                | Yes               |        |

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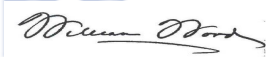
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**Project Name:** Danville ADU Contemporary Studio**Calculation Date/Time:** 2023-03-30T18:32:03-07:00**(Page 13 of 13)****Calculation Description:** Title 24 Analysis**Input File Name:** Danville ADU\_Contemporary\_Studio.ribd22

| DOCUMENTATION AUTHOR'S DECLARATION STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                        |                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1. I certify that this Certificate of Compliance documentation is accurate and complete.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                                                                                                                        |                                                                                     |
| Documentation Author Name:<br>Jason E Bennett                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | Documentation Author Signature:<br> |                                                                                     |
| Company:<br>DP Advanced Engineering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | Signature Date:<br>2023-03-30 19:18:04                                                                                 |  |
| Address:<br>3381 Walnut Blvd. Ste. 220                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | CEA/ HERS Certification Identification (If applicable):<br>R19-21-30042                                                |                                                                                     |
| City/State/Zip:<br>Brentwood, CA 94513                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | Phone:<br>925-516-3502                                                                                                 |                                                                                     |
| RESPONSIBLE PERSON'S DECLARATION STATEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                                                                        |                                                                                     |
| I certify the following under penalty of perjury, under the laws of the State of California:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                        |                                                                                     |
| <ol style="list-style-type: none"><li>1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.</li><li>2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.</li><li>3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.</li></ol> |  |                                                                                                                        |                                                                                     |
| Responsible Designer Name:<br>William Wood                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  | Responsible Designer Signature:<br> |                                                                                     |
| Company:<br>William Wood Architects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | Date Signed:<br>2023-03-31 08:33:37                                                                                    |                                                                                     |
| Address:<br>301 Hartz Ave #203                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | License:<br>C13874                                                                                                     |                                                                                     |
| City/State/Zip:<br>Danville, CA 94526                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  | Phone:<br>925-820-8233                                                                                                 |                                                                                     |

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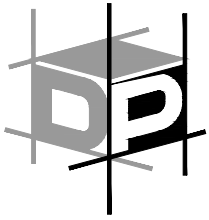
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# ADVANCED ENGINEERING

STRUCTURAL ENGINEERING SOLUTIONS

## TITLE 24 SUMMARY OF FEATURES

PROJECT: TOWN OF DANVILLE ADU

DATE: 3-31-2023

JOB NO: W021420

ANALYST: J. BENNETT

### ENVELOPE INSULATION

#### EXTERIOR WALLS:

R-21 IN 2x6

#### FOUNDATION:

SLAB, NOT INSULATED

#### ROOF OVER LIVING SPACE:

R-38 BETWEEN CEILING JOISTS

R-13 BETWEEN RAFTERS

### WINDOW PERFORMANCE

#### MAXIMUM WINDOW PERFORMANCE VALUES (U-FACTOR / SHGC)

WINDOWS: .30/.23

FRENCH DOORS: .32/.16

### DOMESTIC HOT WATER

RHEEM 40-GALLON HEAT PUMP WATER HEATER OR EQUIV.

### SOLAR (STUDIO)

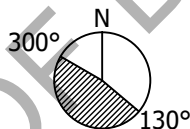
(NOT REQUIRED; CALCULATED SIZE IS <1.8 KW)

### SOLAR (1 BEDROOM)

2.0 KW MINIMUM

ACCEPTABLE ORIENTATION:

(DEGREES EAST OF TRUE NORTH)



### HERS VERIFICATIONS

- INDOOR AIR QUALITY VENTILATION
- KITCHEN RANGE HOOD
- MINIMUM AIRFLOW [350 CFM/TON]
- VERIFIED SEER [19.6]
- VERIFIED REFRIGERANT CHARGE
- FAN EFFICACY WATTS/CFM [0.45]
- VERIFIED HSPF [10.8]
- VERIFIED HEAT PUMP RATED HEATING CAPACITY
- DUCT LEAKAGE TESTING [5%]

### SPACE HEATING & COOLING

HEAT PUMP (10.2 HSPF, 19.6 SEER, 11.7 EER)

MITSUBISHI PEAD-A24AA7 + PUZ-A24NHA7

AHRI # 201754661

### DUCTS

SUPPLY AIR DUCTS IN ATTIC

DUCTS IN UNCONDITIONED SPACE TO HAVE R-6 INSULATION

### INDOOR AIR QUALITY

BROAN ERV100S ENERGY RECOVERY VENTILATOR OR EQUIV.

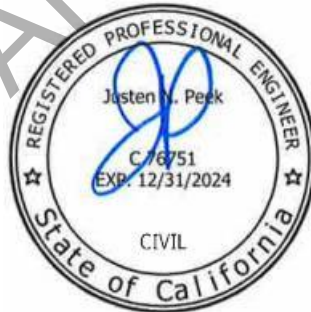


## Structural Calculations

**PROJECT:** Town of Danville Studio ADU  
**ADDRESS:** Danville, California

**JOB No.:** W021420  
**DELTA:** Permit Submittal  
**DATE:** March 24, 2023

**CLIENT:** Town of Danville



**GOVERNING CODE:** California Building Code, 2022 Edition  
**CONSTRUCTION:** One-Story Wood Framed Building

**STRUCTURE:**  
Vertical Load System - Wood Framed Roof  
Lateral Load System - Wood Framed Shear Walls



**PROJECT:** Town of Danville Studio ADU

**CLIENT:** Town of Danville

**JOB NO.:** W021420

**CALCS BY:** J. Peek

**DATE:** 3/24/2023

*STRUCTURAL CALCULATIONS ARE BASED ON THE FOLLOWING CRITERIA, UNLESS NOTED OTHERWISE*

## **STRUCTURAL MATERIALS:**

### **Structural Steel:**

|                                         |                        |
|-----------------------------------------|------------------------|
| W Shapes .....                          | ASTM A992, Fy = 50 ksi |
| Shapes (M, S, HP, C, MC, L) .....       | ASTM A572, Grade 50    |
| Pipe .....                              | ASTM A53, Grade B      |
| Tube (HSS) .....                        | ASTM A500, Grade B     |
| Plates and Bars .....                   | ASTM A572, Grade 50    |
| Welding .....                           | Current AWS D1.1       |
| Bolts - Unfinished .....                | ASTM A307              |
| Bolts - High Strength (HSB) .....       | ASTM A325 SC/N/X       |
| Threaded Rods .....                     | ASTM A449              |
| Light Gage Steel Studs and Joists ..... | ASTM A653, Grade 50    |
| Welding (Light Gage) .....              | Current AWS D1.3       |

### **Concrete:**

|                                       |                     |
|---------------------------------------|---------------------|
| Slab on Grade .....                   | 2500 psi @ 28 Days  |
| Foundation .....                      | 2500 psi @ 28 Days  |
| Tilt-Up Wall Panels .....             | 4000 psi @ 28 Days  |
| Structural Concrete .....             | 3000 psi @ 28 Days  |
| Reinforcing Steel (#3 Rebar) .....    | ASTM A615, Grade 40 |
| Reinforcing Steel (#4 & larger) ..... | ASTM A615, Grade 60 |
| Welding (Reinf.) .....                | Current AWS D1.4    |

### **Wood:**

|                                     |                            |
|-------------------------------------|----------------------------|
| 2" to 4" Thick x 2" and Wider ..... | DF No. 2 or better         |
| Joists and Planks .....             | DF No. 2 or better         |
| Beams and Stringers .....           | DF No. 1 or better         |
| Posts and Timbers .....             | DF No. 1 or better         |
| Glu-lam Beams (simple span) .....   | 2400F-V4 DF/DF             |
| Glu-lam Beams (cantilevers) .....   | 2400F-V8 DF/DF             |
| Sheathing .....                     | Exposure 1, Grade C-D, C-C |





**PROJECT:** Town of Danville Studio ADU

**CLIENT:** Town of Danville

**JOB NO.:** W021420

**CALCS BY:** J. Peek

**DATE:** 3/24/2023

*STRUCTURAL CALCULATIONS ARE BASED ON THE FOLLOWING CRITERIA, UNLESS NOTED OTHERWISE*

**LOADING SCHEDULE:**

**Roof Dead Load:**

**Max. Roof Pitch /12:**

5

|             |                                                   |                 |
|-------------|---------------------------------------------------|-----------------|
| Roofing:    | Concrete Tile                                     | 10.8 psf        |
| Sheathing:  | 1/2" Plywood                                      | 1.8 psf         |
| Insulation: | R38 Insulation Ceiling & R19 Insulation Roof Deck | 1.0 psf         |
| Framing:    | Trusses @ 24" o.c.                                | 2.5 psf         |
| Ceiling:    | 5/8" Gyp. Installed on Bottom of Roof Framing     | 2.8 psf         |
| Sprinklers: | Automatic Fire Sprinklers                         | 1.0 psf         |
| Misc:       | HVAC + Miscellaneous                              | 2.1 psf         |
|             |                                                   | <b>22.0 psf</b> |

**Photovoltaic Dead Load:**

Non-concurrent with Live Load

**3.0 psf**

**Roof Live Load:**

Sloped Roof (Reducible)

**20.0 psf**

**Exterior Wall Load:**

Wall Type: 2x6 @ 16 in, 5/8" Gyp, Insulated, 7/8" Stucco

**17.0 psf**

**Interior Wall Load:**

Wall Type: 2x4 @ 16 in, (2) 5/8" Gyp, Insulated

**7.0 psf**



PROJECT: Town of Danville Studio ADU

CLIENT: Town of Danville

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CALCS BY: J. Peek

DATE: 3/24/2023

## SEISMIC LOADS: ASCE 7-16 SECTION 12.8 (EQUIV. LATERAL FORCE):

### SITE INFORMATION:

$S_s$  ..... 2.500 ASCE 7-16 Sect. 11.4.2  
 $S_1$  ..... 1.200 ASCE 7-16 Sect. 11.4.2  
 Site Class..... D Per Geotech Report  
 Risk Category ..... II ASCE 7-16 Table 1.5-1  
 Importance Factor ..... 1.0 ASCE 7-16 Table 1.5-2

Site coefficients and adjusted maximum considered eq. spectral response accel. parameters

$F_a$  ..... 1.200 ASCE 7-16 Sect. 11.4.4  
 $F_v$  ..... 1.700 ASCE 7-16 Sect. 11.4.4

**Table 11.4-1 Short-Period Site Coefficient  $F_a$**

| Site Class | $S_s \leq 0.25$                          | $S_s = 0.50$ | $S_s = 0.75$ | $S_s = 1.00$ | $S_s = 1.25$ | $S_s \geq 1.50$ |
|------------|------------------------------------------|--------------|--------------|--------------|--------------|-----------------|
| A          | 0.8                                      | 0.8          | 0.8          | 0.8          | 0.8          | 0.8             |
| B          | 0.9                                      | 0.9          | 0.9          | 0.9          | 0.9          | 0.9             |
| C          | 1.3                                      | 1.3          | 1.2          | 1.2          | 1.2          | 1.2             |
| D          | 1.6                                      | 1.4          | 1.2          | 1.1          | 1.0          | 1.0             |
| E          | 2.4                                      | 1.7          | 1.3          | 1.2          | 1.2          | 1.2             |
| F          | Site-Specific Response Analysis Required |              |              |              |              |                 |

**Table 11.4-2 Short-Period Site Coefficient  $F_v$**

| Site Class | $S_1 \leq 0.10$                          | $S_1 = 0.20$ | $S_1 = 0.30$ | $S_1 = 0.40$ | $S_1 = 0.50$ | $S_1 \geq 0.60$ |
|------------|------------------------------------------|--------------|--------------|--------------|--------------|-----------------|
| A          | 0.8                                      | 0.8          | 0.8          | 0.8          | 0.8          | 0.8             |
| B          | 0.8                                      | 0.8          | 0.8          | 0.8          | 0.8          | 0.8             |
| C          | 1.5                                      | 1.5          | 1.5          | 1.5          | 1.5          | 1.4             |
| D          | 2.4                                      | 2.2          | 2            | 1.9          | 1.8          | 1.7             |
| E          | 4.2                                      | 3.3          | 2.8          | 2.4          | 2.2          | 2               |
| F          | Site-Specific Response Analysis Required |              |              |              |              |                 |

$S_{MS} = F_a S_s$  ..... 3.000 (EQ. 11.4-1)

$S_{M1} = F_v S_1$  ..... 2.040 (EQ. 11.4-2)

$S_{DS} = (2/3) S_{MS}$  ..... 2.000 g (EQ. 11.4-3)

$S_{D1} = (2/3) S_{M1}$  ..... 1.360 g (EQ. 11.4-4)

### Seismic Design Category Based on Short-Period Response Accelerations:

| VALUE OF $S_{DS}$            | 1 OR 11 | 111 | 1V | S1 IS GREATER THAN 0.75<br>USE CATEGORY E<br>PER CBC 1613.2.5 |
|------------------------------|---------|-----|----|---------------------------------------------------------------|
| $S_{DS} < 0.167g$            | A       | A   | A  |                                                               |
| $0.167g \leq S_{DS} < 0.33g$ | B       | B   | C  |                                                               |
| $0.33g \leq S_{DS} < 0.50g$  | C       | C   | D  |                                                               |
| $0.50g \leq S_{DS}$          | D       | D   | D  |                                                               |

### Seismic Design Category Based on 1-Second Response Accelerations:

| VALUE OF $S_{D1}$             | 1 OR 11 | 111 | 1V | S1 IS GREATER THAN 0.75<br>USE CATEGORY E<br>PER CBC 1613.2.5 |
|-------------------------------|---------|-----|----|---------------------------------------------------------------|
| $S_{D1} < 0.067g$             | A       | A   | A  |                                                               |
| $0.067g \leq S_{D1} < 0.133g$ | B       | B   | C  |                                                               |
| $0.133g \leq S_{D1} < 0.20g$  | C       | C   | D  |                                                               |
| $0.20g \leq S_{D1}$           | D       | D   | D  |                                                               |





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DATE: 3/24/2023

## SEISMIC LOADS: ASCE 7-16 SECTION 12.8 (CONT.):

### BUILDING INFORMATION:

Building Height,  $h_n$ ..... 14.7 ft  
 Mean Roof Height,  $H_m$ ..... 12.3 ft  
 Eave Height,  $h$ ..... 10.0 ft

### Building Depth:

Bldg Depth (Roof Level)..... 25.0 ft

### Building Width:

Bldg Width (Roof Level)..... 32.0 ft

### EQUIVALENT LATERAL FORCE PROCEDURE:

#### Seismic Base Shear:

$R$  (ASCE 7-16 Table 12.2-1)..... 6.5  
 $C_t$ ..... 0.020  
 $X$ ..... 0.75  
 $T_a = C_t(h_n)^X$ ..... 0.15 sec

#### Seismic Response Coefficient:

$C_S = S_{DS}/(R/I)$ ..... 0.308 (EQ. 12.8-2)  
 $C_S = S_{D1}/T(R/I)$ ..... 1.396 (EQ. 12.8-3)  
 $C_S = 0.044S_{DS}I$ ..... 0.088 (EQ. 12.8-5)  
 $C_S = 0.5S_1/(R/I)$ ..... 0.092 (EQ. 12.8-6)

#### Seismic Base Shear:

$V = C_S W$  ..... 0.308 W (EQ. 12.8-1)

### BUILDING WEIGHTS:

| Roof Loads:       | AREA (sq ft) | WEIGHT (psf) | TOTAL (lb) |
|-------------------|--------------|--------------|------------|
| Roof Area         | 842          | 22.0         | 18545      |
| Roof Top Deck     | 0            | 15.0         | 0          |
| Photovoltaic Area | 842          | 3.0          | 2526       |

### SEISMIC BASE SHEAR:

Building DL = 33802 lb  
 Seismic Coef. = 0.308  
 $k = 1.00$   
**Base Shear = 10401 lb**

| Roof Loads:              | LENGTH (ft) | WEIGHT (psf) | TOTAL (lb) |
|--------------------------|-------------|--------------|------------|
| Linear Feet of Ext. Wall | 114         | 17.0         | 8305       |
| Linear Feet of Int. Wall | 125         | 7.0          | 4426       |

\*Note: Approximate Fenestration Percentage: 15 %  
**TOTAL ROOF LOAD (lb): 33802**

### CALCULATE SEISMIC SHEAR LOADS:

| VERTICAL DISTRIBUTION OF SEISMIC FORCES |            |                       |                      |            |                  |
|-----------------------------------------|------------|-----------------------|----------------------|------------|------------------|
| Level                                   | $w_x$ (lb) | Top Plate Height (ft) | $h_x$ (ft)           | $F_x$ (lb) | Unit Shear (psf) |
| ROOF                                    | 33802      | 10.1                  | 12.3                 | 10401      | 12.4             |
|                                         |            |                       | $\sum w_i * h_i^k =$ | 416945     |                  |

### REDUNDANCY FACTOR (ASCE 7-16 SECTION 12.3.4):

Seismic Design Cat: **USE CATEGORY E**  
 Roof East/ West: **1.0**

\*Note: Refer to calculations on following sheets  
 Roof North/South: **1.3**

### SUMMARY OF SEISMIC DESIGN LOADS:

| Level | Direction   | SEISMIC    | UNIT        | Redundancy | ASD DESIGN | ASD DESIGN |
|-------|-------------|------------|-------------|------------|------------|------------|
|       |             | FORCE (lb) | SHEAR (psf) |            | FORCE (lb) | LOAD (psf) |
| Roof  | North/South | 10401      | 12.4        | 1.3        | 9464       | 11.2       |
| Roof  | East/West   | 10401      | 12.4        | 1.0        | 7280       | 8.6        |



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**DATE:** 3/24/2023

## **WIND ANALYSIS (ENCLOSED, PARTIALLY ENCLOSED AND OPEN BUILDINGS OF ALL HEIGHTS)**

### **MAIN WIND-FORCE RESISTING SYSTEM:**

Design Wind Speed..... 95 mph  
 Wind Exposure..... C  
 Site Elevation..... Unknown Feet  
 Topographic factor, ASCE 7-10 Section 26.8.2 -  
 $K_{zt}$  (Assumed Flat Area)..... 1.00

### **BUILDING INFORMATION:**

Building Height,  $h_n$ ..... 14.7 ft  
 Mean Roof Height,  $H_m$ ..... 12.3 ft  
 Eave Height,  $h$ ..... 10.0 ft

### **Building Depth "B":**

Bldg Depth (Roof Level)..... 25.0 ft  
 Bldg Depth (Floor Level)..... 0.0 ft

### **Building Width "L":**

Bldg Width (Roof Level)..... 32.0 ft  
 Bldg Width (Floor Level)..... 0.0 ft

### **DETERMINE WIND LOAD PARAMETERS:**

DIRECTIONALITY FACTOR ( $K_d$ ): 0.85 \*\* See ASCE 7-16 Section 26.6 and Table 26.6-1  
 TOPOGRAPHIC FACTOR ( $K_{zt}$ ): 1.00 \*\* See ASCE 7-16 Section 26.8 and Figure 26.8-1  
 GUST FACTOR (G): 0.85 \*\* See ASCE 7-16 Section 26.11.1  
 ENCLOSURE CLASSIFICATION Enclosed \*\* See ASCE 7-16 Section 26.12  
 INTERNAL PRESSURE ( $CG_{PI}$ ) 0.18 \*\* See ASCE 7-16 Section 26.12 and Table 26.13-1  
 GROUND ELEVATION FACTOR ( $K_e$ ) 1.00 \*\* See ASCE 7-16 Table 26.9-1, Note 2

**Table 26.10-1 Velocity Pressure Coefficients,  $K_z$**

| Height Above Ground (ft) | Exposure Category |      |      |
|--------------------------|-------------------|------|------|
|                          | B                 | C    | D    |
| 15.0                     | 0.57              | 0.85 | 1.03 |
| 20.0                     | 0.62              | 0.90 | 1.08 |
| 25.0                     | 0.66              | 0.94 | 1.12 |
| 30.0                     | 0.70              | 0.98 | 1.16 |
| 35.0                     | 0.73              | 1.01 | 1.19 |
| 40.0                     | 0.76              | 1.04 | 1.22 |
| 45.0                     | 0.79              | 1.07 | 1.25 |
| 50.0                     | 0.81              | 1.09 | 1.27 |
| 55.0                     | 0.83              | 1.11 | 1.29 |
| 60.0                     | 0.85              | 1.13 | 1.31 |

VELOCITY COEFFICIENT ( $K_z$ ): 0.85  
 \*\* See ASCE 7-16 Table 26.10.1

### **DETERMINE VELOCITY PRESSURE:**

$q_z = 0.00256 K_z K_{zt} K_d K_e V^2$ : 16.69 psf





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**DATE:** 3/24/2023

## **WIND ANALYSIS (ENCLOSED, PARTIALLY ENCLOSED AND OPEN BUILDINGS OF ALL HEIGHTS)**

### **DETERMINE WALL PRESSURE:**

Wall Pressure Coefficients, ASCE-7 (Figure 27..3-1)

| Surface       | L/B        | Cp   | Use With       |
|---------------|------------|------|----------------|
| Windward Wall | All Values | 0.8  | q <sub>z</sub> |
| Leeward Wall  | 0-1        | -0.5 | q <sub>h</sub> |
|               | 2          | -0.3 |                |
|               | >4         | -0.2 |                |
| Side Wall     | All Values | -0.7 | q <sub>h</sub> |

### **Determine Cp Values**

| Level | Direction | L/B Values | Windward C <sub>p</sub> Value | Leeward C <sub>p</sub> Value |
|-------|-----------|------------|-------------------------------|------------------------------|
| Roof  | East/West | 1.28       | 0.80                          | -0.444                       |
|       |           |            |                               |                              |
|       |           |            |                               |                              |

| Level | Direction   | L/B Values | Windward C <sub>p</sub> Value | Leeward C <sub>p</sub> Value |
|-------|-------------|------------|-------------------------------|------------------------------|
| Roof  | North/South | 0.78       | 0.80                          | -0.500                       |
|       |             |            |                               |                              |
|       |             |            |                               |                              |

### **Windward Pressures:**

Plan North/South

CASE 1: 14.36  
CASE 2: 8.35

Plan East/West

CASE 1: 14.36  
CASE 2: 8.35

### **Leeward Pressures:**

Plan North/South

CASE 1: 4.09  
CASE 2: 10.10

Plan East/West

CASE 1: 3.30  
CASE 2: 9.30

### **SUMMARY OF WIND FORCE DESIGN LOADS**

| Level | Direction   | WIND DESIGN<br>FORCE (lb) | UNIT<br>SHEAR (plf) |  | ASD DESIGN<br>FORCE (lb) | ASD DESIGN<br>LOAD (plf) |
|-------|-------------|---------------------------|---------------------|--|--------------------------|--------------------------|
| Roof  | North/South | 4305                      | 135                 |  | <b>2583</b>              | <b>81</b>                |
|       |             |                           |                     |  |                          |                          |
|       |             |                           |                     |  |                          |                          |
| Roof  | East/West   | 3218                      | 129                 |  | <b>1931</b>              | <b>77</b>                |
|       |             |                           |                     |  |                          |                          |
|       |             |                           |                     |  |                          |                          |



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CALCS BY: J. Peek

DATE: 3/24/2023

## **SHEARWALL DESIGN: ROOF LEVEL**

Shearwall Framing: 3/8" CDX ply with 8d Nailing

| <b>SHEAR LINE ID:</b> | <b>1</b> | <b>2</b> |
|-----------------------|----------|----------|
|-----------------------|----------|----------|

### **DETERMINATION OF LATERAL DESIGN LOADS:**

|                                |      |      |
|--------------------------------|------|------|
| Grid Line Trib. Area ( sq ft): | 375  | 467  |
| Seismic Shear Load (psf):      | 8.6  | 8.6  |
| Seismic Shear Force (lb):      | 3242 | 4038 |

|                             |     |      |
|-----------------------------|-----|------|
| Grid Line Trib. Width (ft): | 10  | 15   |
| Wind Design Load (plf):     | 77  | 77   |
| Wind Design Force (lb):     | 772 | 1159 |

### **SHEARWALL LENGTHS:**

|                     |     |     |
|---------------------|-----|-----|
| Wall Length 1 (ft): | 8.0 | 5.2 |
| Wall Length 2 (ft): | 7.4 | 4.0 |
| Wall Length 3 (ft): | 0.0 | 0.0 |
| Wall Length 4 (ft): | 0.0 | 0.0 |
| Wall Length 5 (ft): | 0.0 | 0.0 |

### **SHEARWALL RIGIDITY DESIGN:**

|                                 |      |      |
|---------------------------------|------|------|
| Wall 1 Rigidity $K_i$ (kip/in): | 5.12 | 4.42 |
| Wall 2 Rigidity $K_i$ (kip/in): | 4.58 | 2.99 |
| Wall 3 Rigidity $K_i$ (kip/in): |      |      |
| Wall 4 Rigidity $K_i$ (kip/in): |      |      |
| Wall 5 Rigidity $K_i$ (kip/in): |      |      |

### **NAILING DESIGN BASED ON SDPWS SECTION 4.3.4 CAPACITY ADJ:**

|                                 |      |      |
|---------------------------------|------|------|
| Wall 1 Design Shear (plf):      | 214  | 466  |
| Sec. 4.3.4.2 Capacity Reduction | 1.00 | 1.00 |
| Wall 2 Design Shear (plf):      | 206  | 436  |
| Sec. 4.3.4.2 Capacity Reduction | 1.00 | 0.93 |
| Wall 3 Design Shear (plf):      |      |      |
| Sec. 4.3.4.2 Capacity Reduction |      |      |
| Wall 4 Design Shear (plf):      |      |      |
| Sec. 4.3.4.2 Capacity Reduction |      |      |
| Wall 5 Design Shear (plf):      |      |      |
| Sec. 4.3.4.2 Capacity Reduction |      |      |

|                       |     |     |
|-----------------------|-----|-----|
| Shear Capacity (plf): | 260 | 490 |
|-----------------------|-----|-----|

**Shear Designation #:**      **Type 1**              **Type 3**

### **REDUNDANCY FACTOR ANALYSIS (ASCE 7-16 SECTION 12.3.4):**

|                      |      |      |
|----------------------|------|------|
| Wall 1 Capacity (%): | 0.24 | 0.30 |
| Wall 2 Capacity (%): | 0.23 | 0.23 |
| Wall 3 Capacity (%): |      |      |
| Wall 4 Capacity (%): |      |      |
| Wall 5 Capacity (%): |      |      |

**Redundancy Factor:**      **Use 1.0**              **Use 1.0**





PROJECT: Town of Danville Studio ADU

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## **SHEARWALL DESIGN (CONT.): ROOF LEVEL**

| <b>SHEAR LINE ID:</b> | <b>1</b> | <b>2</b> |
|-----------------------|----------|----------|
|-----------------------|----------|----------|

### **SHEARWALL OVERTURNING DESIGN:**

|                        |      |      |
|------------------------|------|------|
| Wall Height (ft):      | 10.1 | 10.1 |
| Wall Weight (psf):     | 17.0 | 17.0 |
| Roof Trib. Width (ft): | 2    | 2    |
| Roof Weight (psf):     | 22.0 | 22.0 |

### **SEISMIC UPLIFT FORCE (lb): Load Combo (ASCE 7-16): (0.6-0.14\*SDS)D+0.7E**

|                       |      |      |
|-----------------------|------|------|
| Wall Dead Load (plf): | 69   | 69   |
| Wall 1 Uplift (lb):   | 1881 | 4521 |
| Wall 2 Uplift (lb):   | 1826 | 3971 |
| Wall 3 Uplift (lb):   |      |      |
| Wall 4 Uplift (lb):   |      |      |
| Wall 5 Uplift (lb):   |      |      |

### **WIND UPLIFT FORCE (lb): Load Combo (ASCE 7-16): 0.6D+0.6W**

|                       |     |      |
|-----------------------|-----|------|
| Wall Dead Load (plf): | 129 | 129  |
| Wall 1 Uplift (lb):   | -3  | 1014 |
| Wall 2 Uplift (lb):   | 16  | 920  |
| Wall 3 Uplift (lb):   |     |      |
| Wall 4 Uplift (lb):   |     |      |
| Wall 5 Uplift (lb):   |     |      |

### **HOLDOWN TYPE:**

|                      |      |      |
|----------------------|------|------|
| Wall 1 Holdown Type: | HDU2 | HDU5 |
| Wall 2 Holdown Type: | HDU2 | HDU5 |
| Wall 3 Holdown Type: |      |      |
| Wall 4 Holdown Type: |      |      |
| Wall 5 Holdown Type: |      |      |

### **STORY DRIFT CHECK ( $C_d=4$ ): Due to approximate nature of rigidity calculation methods, +/- 10% variation OK.**

|                          |     |     |
|--------------------------|-----|-----|
| Wall 1 Defl. Check (in): | 1.5 | 2.8 |
| Wall 2 Defl. Check (in): | 1.5 | 2.8 |
| Wall 3 Defl. Check (in): |     |     |
| Wall 4 Defl. Check (in): |     |     |
| Wall 5 Defl. Check (in): |     |     |
| Wall 1 Drift Check (in): | OK  | OK  |
| Wall 2 Drift Check (in): | OK  | OK  |
| Wall 3 Drift Check (in): |     |     |
| Wall 4 Drift Check (in): |     |     |
| Wall 5 Drift Check (in): |     |     |

### **AREA VERIFICATION CHECK:**

Seismic Trib Area Sum: 842 sq ft

Trib Width Sum: 25 ft



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## SHEARWALL DESIGN: ROOF LEVEL

Shearwall Framing: 3/8" CDX ply with 8d Nailing

| SHEAR LINE ID: | A | B |
|----------------|---|---|
|----------------|---|---|

### DETERMINATION OF LATERAL DESIGN LOADS:

|                                |      |      |
|--------------------------------|------|------|
| Grid Line Trib. Area ( sq ft): | 451  | 391  |
| Seismic Shear Load (psf):      | 11.2 | 11.2 |
| Seismic Shear Force (lb):      | 5069 | 4395 |

|                             |      |      |
|-----------------------------|------|------|
| Grid Line Trib. Width (ft): | 16   | 16   |
| Wind Design Load (plf):     | 81   | 81   |
| Wind Design Force (lb):     | 1291 | 1291 |

### SHEARWALL LENGTHS:

|                     |      |     |
|---------------------|------|-----|
| Wall Length 1 (ft): | 11.5 | 9.5 |
| Wall Length 2 (ft): | 0.0  | 0.0 |
| Wall Length 3 (ft): | 0.0  | 0.0 |
| Wall Length 4 (ft): | 0.0  | 0.0 |
| Wall Length 5 (ft): | 0.0  | 0.0 |

### SHEARWALL RIGIDITY DESIGN:

|                                 |       |       |
|---------------------------------|-------|-------|
| Wall 1 Rigidity $K_i$ (kip/in): | 13.50 | 10.63 |
| Wall 2 Rigidity $K_i$ (kip/in): |       |       |
| Wall 3 Rigidity $K_i$ (kip/in): |       |       |
| Wall 4 Rigidity $K_i$ (kip/in): |       |       |
| Wall 5 Rigidity $K_i$ (kip/in): |       |       |

### NAILING DESIGN BASED ON SDPWS SECTION 4.3.4 CAPACITY ADJ:

|                                 |      |      |
|---------------------------------|------|------|
| Wall 1 Design Shear (plf):      | 441  | 463  |
| Sec. 4.3.4.2 Capacity Reduction | 1.00 | 1.00 |
| Wall 2 Design Shear (plf):      |      |      |
| Sec. 4.3.4.2 Capacity Reduction |      |      |
| Wall 3 Design Shear (plf):      |      |      |
| Sec. 4.3.4.2 Capacity Reduction |      |      |
| Wall 4 Design Shear (plf):      |      |      |
| Sec. 4.3.4.2 Capacity Reduction |      |      |
| Wall 5 Design Shear (plf):      |      |      |
| Sec. 4.3.4.2 Capacity Reduction |      |      |

|                       |     |     |
|-----------------------|-----|-----|
| Shear Capacity (plf): | 490 | 490 |
|-----------------------|-----|-----|

Shear Designation #: Type 3 Type 3

### REDUNDANCY FACTOR ANALYSIS (ASCE 7-16 SECTION 12.3.4):

|                      |      |
|----------------------|------|
| Wall 1 Capacity (%): | 0.45 |
| Wall 2 Capacity (%): |      |
| Wall 3 Capacity (%): |      |
| Wall 4 Capacity (%): |      |
| Wall 5 Capacity (%): |      |

Redundancy Factor: Use 1.0 Use 1.3





PROJECT: Town of Danville Studio ADU

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## **SHEARWALL DESIGN (CONT.): ROOF LEVEL**

| <b>SHEAR LINE ID:</b> | <b>A</b> | <b>B</b> |
|-----------------------|----------|----------|
|-----------------------|----------|----------|

### **SHEARWALL OVERTURNING DESIGN:**

|                        |      |      |
|------------------------|------|------|
| Wall Height (ft):      | 10.1 | 10.1 |
| Wall Weight (psf):     | 17.0 | 17.0 |
| Roof Trib. Width (ft): | 0    | 0    |
| Roof Weight (psf):     | 22.0 | 22.0 |

### **SEISMIC UPLIFT FORCE (lb): Load Combo (ASCE 7-16): (0.6-0.14\*SDS)D+0.7E**

|                       |      |      |
|-----------------------|------|------|
| Wall Dead Load (plf): | 55   | 55   |
| Wall 1 Uplift (lb):   | 4130 | 4404 |
| Wall 2 Uplift (lb):   |      |      |
| Wall 3 Uplift (lb):   |      |      |
| Wall 4 Uplift (lb):   |      |      |
| Wall 5 Uplift (lb):   |      |      |

### **WIND UPLIFT FORCE (lb): Load Combo (ASCE 7-16): 0.6D+0.6W**

|                       |     |     |
|-----------------------|-----|-----|
| Wall Dead Load (plf): | 103 | 103 |
| Wall 1 Uplift (lb):   | 541 | 882 |
| Wall 2 Uplift (lb):   |     |     |
| Wall 3 Uplift (lb):   |     |     |
| Wall 4 Uplift (lb):   |     |     |
| Wall 5 Uplift (lb):   |     |     |

### **HOLDOWN TYPE:**

|                      |      |      |
|----------------------|------|------|
| Wall 1 Holdown Type: | HDU5 | HDU5 |
| Wall 2 Holdown Type: |      |      |
| Wall 3 Holdown Type: |      |      |
| Wall 4 Holdown Type: |      |      |
| Wall 5 Holdown Type: |      |      |

### **STORY DRIFT CHECK ( $C_d=4$ ): Due to approximate nature of rigidity calculation methods, +/- 10% variation OK.**

|                          |     |     |
|--------------------------|-----|-----|
| Wall 1 Defl. Check (in): | 2.0 | 2.2 |
| Wall 2 Defl. Check (in): |     |     |
| Wall 3 Defl. Check (in): |     |     |
| Wall 4 Defl. Check (in): |     |     |
| Wall 5 Defl. Check (in): |     |     |
| Wall 1 Drift Check (in): | OK  | OK  |
| Wall 1 Drift Check (in): |     |     |
| Wall 1 Drift Check (in): |     |     |
| Wall 1 Drift Check (in): |     |     |
| Wall 5 Drift Check (in): |     |     |

### **AREA VERIFICATION CHECK:**

Seismic Trib Area Sum: 842 sq ft

Trib Width Sum: 32 ft



**PROJECT:** Town of Danville Studio ADU

**CLIENT:** Town of Danville

**JOB NO.:** W021420

**CALCS BY:** J. Peek

**DATE:** 3/24/2023

## ROOF DIAPHRAGM DESIGN:

### DIMENSIONS:

L = 32 ft

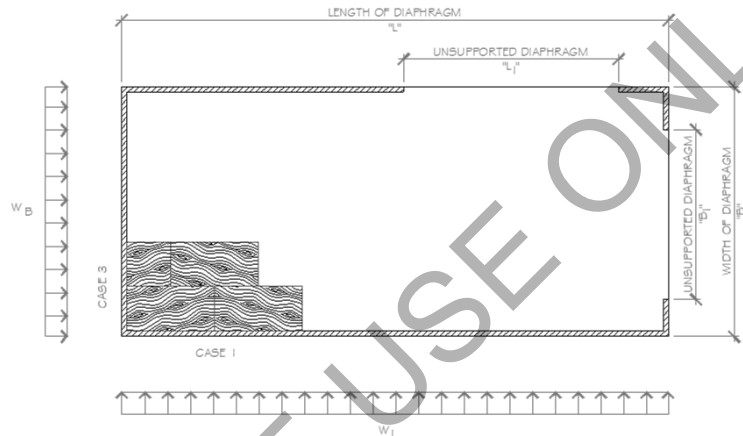
B = 25 ft

B<sub>1</sub> = 0 ft

L<sub>1</sub> = 0 ft

### FRAMING MATERIALS:

Plywood Panel Grade **CD, CC**  
 Minimum Nominal Framing Size: **2 x**  
 Nominal Plywood Thickness: **15/32**  
 Common Nail Size: **8 d**  
 Wall framing size: **2x4**  
 Specific Gravity of Framing Members: **0.5**



### LATERAL FORCE ALONG L SIDE:

$w_L = 281 \text{ plf}$

### LATERAL FORCE ALONG B SIDE:

$w_B = 277 \text{ plf}$

### ANALYSIS -

The diaphragm is considered flexible if its maximum lateral deformation is more than 2x the average shearwall deflection of the associated story.

**Diaphragm Ratio:**  $L/B = 1.28 < 3$  Diaphragm OK

Shear<sub>MAX</sub> along Side L:  $w_B * B / 2 * L = 108 \text{ plf}$

Shear<sub>MAX</sub> along Side B:  $w_L * L / 2 * B = 180 \text{ plf}$

### Chord Forces:

Side L:  $T_L = C_L = w_L * L^2 / 8 * B = 1439 \text{ lb}$

\*\* Min. Blkg Req'd @ 96 in o.c.

Side B:  $T_B = C_B = w_B * B^2 / 8 * L = 676 \text{ lb}$

\*\* Min. Blkg Req'd @ 96 in o.c.

### Drag Forces:

Side L:  $F_L = V_L * L_1 = 0 \text{ lb}$

\*\* Min. Strap Req'd - NONE

Side B:  $F_B = V_B * B_1 = 0 \text{ lb}$

\*\* Min. Strap Req'd - NONE

### DIAPHRAGM DEFLECTION -

\* per APA: Supplement For Shearwall and Diaphragms

$$D = \frac{5vL^3}{8EAb} + \frac{vL}{4Gt} + 0.188Le_n + \frac{S(D_cX)}{2b}$$

### Chord Properties:

Area (in<sup>2</sup>): 5.25

G<sub>v</sub>t<sub>v</sub> of ply (lb/in): 83500

E (psi): 1600000

e<sub>n</sub> (in) = (V<sub>n</sub>/616)<sup>3.018</sup>: 0.045

ν (plf): 180

S (D<sub>c</sub>X) (in): 2.50

**D = 0.37 in**

D<sub>ALLOW</sub> = 0.025 \* Story Height = 3.7 in

**Deflection OK**





PROJECT: Town of Danville Studio ADU

CLIENT: Town of Danville

JOB NO.: W021420

CALCS BY: J. Peek

DATE: 45009

0

## ROOF DIAPHRAGM DESIGN:

### NAILING PATTERN -

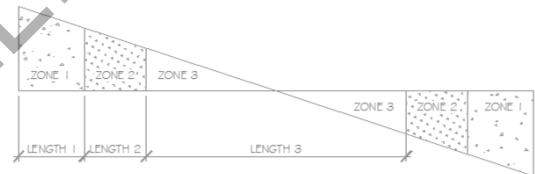
| Panel Grade | Common Nail | Min. Pen. (in) | Min. Thick. (in) | Member Width (in) | Blocked Nail Spacing   |       |         |       | Unblocked |        |
|-------------|-------------|----------------|------------------|-------------------|------------------------|-------|---------|-------|-----------|--------|
|             |             |                |                  |                   | Boundary / Other Edges |       |         |       |           |        |
|             |             |                |                  |                   | 6 / 6                  | 4 / 6 | 2.5 / 4 | 2 / 3 | Case 1    | Others |
| CD, CC      | 8 d         | 1 1/2          | 15/32            | 2                 | 270                    | 360   | 530     | 600   | 240       | 180    |

### DIAPHRAGM NAILING DESIGN -

Along Length 'L'

#### Zone 1: 32 FT WIDE x 25 FT DEEP

UNBLOCKED 15/32 SHEATHING WITH 8 d COMMON NAILS  
6.0 IN O.C. BOUNDARY/ 12 IN O.C. EDGES/ 12 IN O.C. FIELD

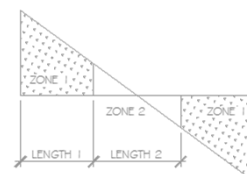
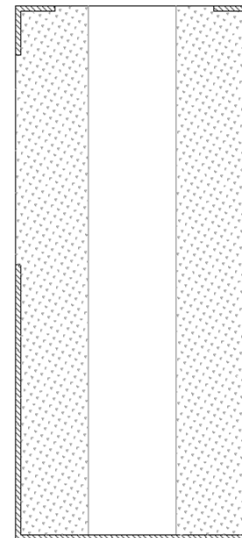


### DIAPHRAGM NAILING DESIGN -

Along Length 'B'

#### Zone 1: 25 FT WIDE x 32 FT DEEP

UNBLOCKED 15/32 SHEATHING WITH 8 d COMMON NAILS  
6.0 IN O.C. BOUNDARY/ 12 IN O.C. EDGES/ 12 IN O.C. FIELD



## Wood Beam

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Lic. #: KW-06006640

DP ADVANCED ENGINEERING INC.

DESCRIPTION: Typical Header

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

### Material Properties

Analysis Method : Allowable Stress Design

Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch

Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 1,350.0 psi

Fb - 1,350.0 psi

Fc - Prll 925.0 psi

Fc - Perp 625.0 psi

Fv 170.0 psi

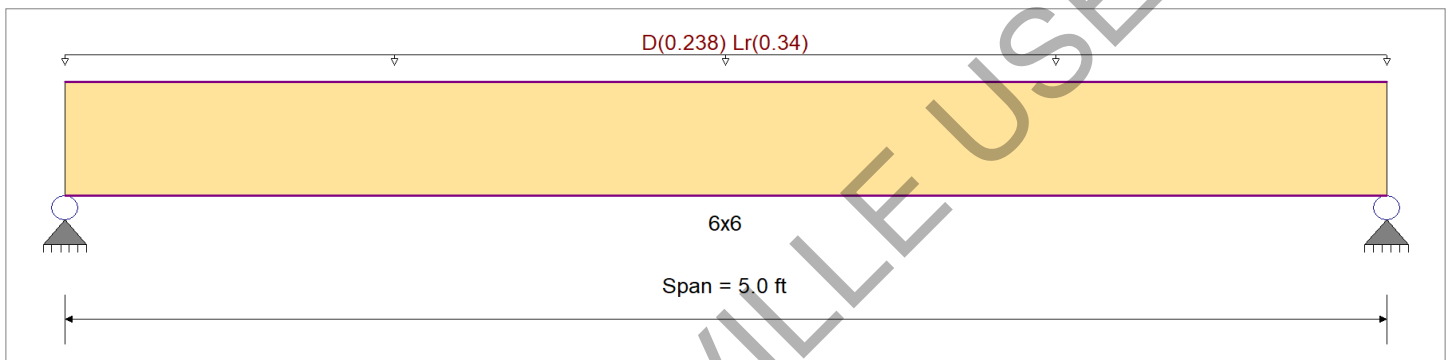
Ft 675.0 psi

E : Modulus of Elasticity

Ebend-xx 1,600.0 ksi

Eminbend-xx 580.0 ksi

Density 31.210 pcf



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Uniform Load : D = 0.0140, Lr = 0.020 ksf, Tributary Width = 17.0 ft

### DESIGN SUMMARY

Design OK

|                                   |   |              |              |                             |   |            |   |
|-----------------------------------|---|--------------|--------------|-----------------------------|---|------------|---|
| Maximum Bending Stress Ratio      | = | 0.468        | 1            | Maximum Shear Stress Ratio  | = | 0.279      | 1 |
| Section used for this span        | = | 6x6          |              | Section used for this span  | = | 6x6        |   |
|                                   | = | 790.53 psi   |              |                             | = | 59.24 psi  |   |
|                                   | = | 1,687.50 psi |              |                             | = | 212.50 psi |   |
| Load Combination                  | = | +D+Lr        |              | Load Combination            | = | +D+Lr      |   |
| Location of maximum on span       | = | 2.500 ft     |              | Location of maximum on span | = | 0.000 ft   |   |
| Span # where maximum occurs       | = | Span # 1     |              | Span # where maximum occurs | = | Span # 1   |   |
| Maximum Deflection                |   |              |              |                             |   |            |   |
| Max Downward Transient Deflection |   | 0.039 in     | Ratio = 1522 |                             |   |            |   |
| Max Upward Transient Deflection   |   | 0.000 in     | Ratio = 0    |                             |   |            |   |
| Max Downward Total Deflection     |   | 0.068 in     | Ratio = 885  |                             |   |            |   |
| Max Upward Total Deflection       |   | 0.000 in     | Ratio = 0    |                             |   |            |   |

### Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length  | Span # | Max Stress Ratios |       | C <sub>d</sub> | C <sub>F/V</sub> | C <sub>i</sub> | C <sub>r</sub> | C <sub>m</sub> | C <sub>t</sub> | C <sub>L</sub> | Moment Values |                |                | Shear Values |                |                |
|------------------|-----------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|---------------|----------------|----------------|--------------|----------------|----------------|
|                  |                 |        | M                 | V     |                |                  |                |                |                |                |                | M             | f <sub>b</sub> | F <sub>b</sub> | V            | f <sub>v</sub> | F <sub>v</sub> |
| D Only           | Length = 5.0 ft | 1      | 0.272             | 0.162 | 0.90           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 0.76          | 330.73         | 0.00           | 0.00         | 0.00           | 0.00           |
| +D+Lr            | Length = 5.0 ft | 1      | 0.468             | 0.279 | 1.25           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.83          | 790.53         | 1687.50        | 1.19         | 59.24          | 212.50         |
| +D+0.750Lr       | Length = 5.0 ft | 1      | 0.400             | 0.238 | 1.25           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.56          | 675.58         | 1687.50        | 1.02         | 50.63          | 212.50         |
| +0.60D           | Length = 5.0 ft | 1      | 0.092             | 0.055 | 1.60           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 0.46          | 198.44         | 2160.00        | 0.30         | 14.87          | 272.00         |

### Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr            | 1    | 0.0678        | 2.518            |                  | 0.0000        | 0.000            |



## Wood Beam

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DESCRIPTION: Typical Header

### Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum  | 1.461     | 1.461     |
| Overall MINimum  | 0.850     | 0.850     |
| D Only           | 0.611     | 0.611     |
| +D+Lr            | 1.461     | 1.461     |
| +D+0.750Lr       | 1.249     | 1.249     |
| +0.60D           | 0.367     | 0.367     |
| Lr Only          | 0.850     | 0.850     |

## Wood Beam

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DP ADVANCED ENGINEERING INC.

DESCRIPTION: B1

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

### Material Properties

Analysis Method : Allowable Stress Design

Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch

Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 1,350.0 psi

Fb - 1,350.0 psi

Fc - Prll 925.0 psi

Fc - Perp 625.0 psi

Fv 170.0 psi

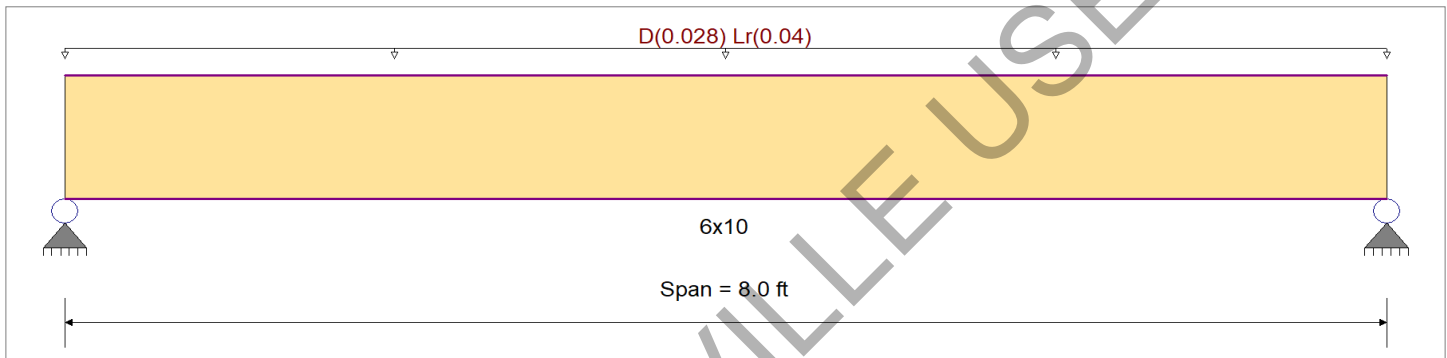
Ft 675.0 psi

E : Modulus of Elasticity

Ebend-xx 1,600.0 ksi

Eminbend-xx 580.0 ksi

Density 31.210 pcf



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Uniform Load : D = 0.0140, Lr = 0.020 ksf, Tributary Width = 2.0 ft

### DESIGN SUMMARY

Design OK

|                                   |   |              |               |                             |   |            |   |
|-----------------------------------|---|--------------|---------------|-----------------------------|---|------------|---|
| Maximum Bending Stress Ratio      | = | 0.055        | 1             | Maximum Shear Stress Ratio  | = | 0.034      | 1 |
| Section used for this span        | = | 6x10         |               | Section used for this span  | = | 6x10       |   |
|                                   | = | 92.05 psi    |               |                             | = | 7.31 psi   |   |
|                                   | = | 1,687.50 psi |               |                             | = | 212.50 psi |   |
| Load Combination                  | = | +D+Lr        |               | Load Combination            | = | +D+Lr      |   |
| Location of maximum on span       | = | 4.000 ft     |               | Location of maximum on span | = | 7.212 ft   |   |
| Span # where maximum occurs       | = | Span # 1     |               | Span # where maximum occurs | = | Span # 1   |   |
| Maximum Deflection                |   |              |               |                             |   |            |   |
| Max Downward Transient Deflection |   | 0.006 in     | Ratio = 16278 |                             |   |            |   |
| Max Upward Transient Deflection   |   | 0.000 in     | Ratio = 0     |                             |   |            |   |
| Max Downward Total Deflection     |   | 0.012 in     | Ratio = 8208  |                             |   |            |   |
| Max Upward Total Deflection       |   | 0.000 in     | Ratio = 0     |                             |   |            |   |

### Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length  | Span # | Max Stress Ratios |       | Moment Values  |                  |                |                |                |                |                |      |                |                | Shear Values |                |                |
|------------------|-----------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|------|----------------|----------------|--------------|----------------|----------------|
|                  |                 |        | M                 | V     | C <sub>d</sub> | C <sub>F/V</sub> | C <sub>i</sub> | C <sub>r</sub> | C <sub>m</sub> | C <sub>t</sub> | C <sub>L</sub> | M    | f <sub>b</sub> | F <sub>b</sub> | V            | f <sub>v</sub> | F <sub>v</sub> |
| D Only           | Length = 8.0 ft | 1      | 0.038             | 0.024 | 0.90           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 0.31 | 45.63          | 1215.00        | 0.00         | 0.00           | 0.00           |
| +D+Lr            | Length = 8.0 ft | 1      | 0.055             | 0.034 | 1.25           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 0.63 | 92.05          | 1687.50        | 0.00         | 0.00           | 0.00           |
| +D+0.750Lr       | Length = 8.0 ft | 1      | 0.048             | 0.030 | 1.25           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 0.55 | 80.45          | 1687.50        | 0.00         | 0.00           | 0.00           |
| +0.60D           | Length = 8.0 ft | 1      | 0.013             | 0.008 | 1.60           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 0.19 | 27.38          | 2160.00        | 0.00         | 0.00           | 0.00           |

### Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr            | 1    | 0.0117        | 4.029            |                  | 0.0000        | 0.000            |



## Wood Beam

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DESCRIPTION: B1

### Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum  | 0.317     | 0.317     |
| Overall MINimum  | 0.160     | 0.160     |
| D Only           | 0.157     | 0.157     |
| +D+Lr            | 0.317     | 0.317     |
| +D+0.750Lr       | 0.277     | 0.277     |
| +0.60D           | 0.094     | 0.094     |
| Lr Only          | 0.160     | 0.160     |

## Wood Beam

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DESCRIPTION: B2

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

### Material Properties

Analysis Method : Allowable Stress Design  
Load Combination : ASCE 7-16

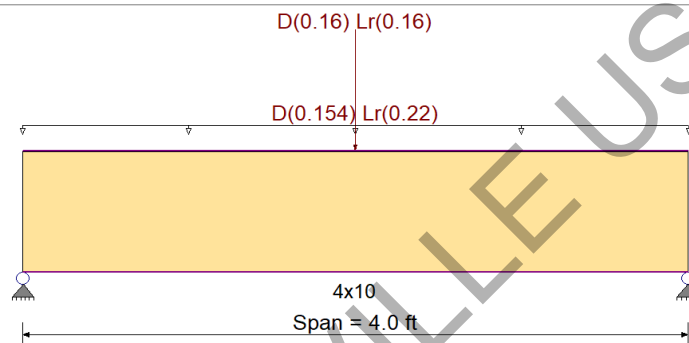
Wood Species : Douglas Fir-Larch  
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

F<sub>b</sub> + 1,350.0 psi  
F<sub>b</sub> - 1,350.0 psi  
F<sub>c</sub> - Prll 925.0 psi  
F<sub>c</sub> - Perp 625.0 psi  
F<sub>v</sub> 170.0 psi  
F<sub>t</sub> 675.0 psi

E : Modulus of Elasticity  
E<sub>bend</sub> - xx 1,600.0 ksi  
E<sub>minbend</sub> - xx 580.0 ksi

Density 31.210 pcf



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Uniform Load : D = 0.0140, Lr = 0.020 ksf, Tributary Width = 11.0 ft

Point Load : D = 0.160, Lr = 0.160 k @ 2.0 ft, (PL FROM B1)

### DESIGN SUMMARY

Design OK

|                                   |   |              |                      |                             |   |            |   |
|-----------------------------------|---|--------------|----------------------|-----------------------------|---|------------|---|
| Maximum Bending Stress Ratio      | = | 0.128        | 1                    | Maximum Shear Stress Ratio  | = | 0.138      | 1 |
| Section used for this span        |   | 4x10         |                      | Section used for this span  |   | 4x10       |   |
|                                   | = | 260.15 psi   |                      |                             | = | 29.32 psi  |   |
|                                   | = | 2,025.00 psi |                      |                             | = | 212.50 psi |   |
| Load Combination                  |   | +D+Lr        |                      | Load Combination            |   | +D+Lr      |   |
| Location of maximum on span       | = | 2.000 ft     |                      | Location of maximum on span | = | 3.241 ft   |   |
| Span # where maximum occurs       | = | Span # 1     |                      | Span # where maximum occurs | = | Span # 1   |   |
| Maximum Deflection                |   |              |                      |                             |   |            |   |
| Max Downward Transient Deflection |   | 0.004 in     | Ratio = 10775 >= 360 |                             |   |            |   |
| Max Upward Transient Deflection   |   | 0.000 in     | Ratio = 0 < 360      |                             |   |            |   |
| Max Downward Total Deflection     |   | 0.008 in     | Ratio = 6012 >= 240  |                             |   |            |   |
| Max Upward Total Deflection       |   | 0.000 in     | Ratio = 0 < 240      |                             |   |            |   |

### Maximum Forces & Stresses for Load Combinations

| Load Combination<br>Segment Length | Span # | Max Stress Ratios |       |                |                  |                |                |                |                |                |  | Moment Values |                |                | Shear Values |                |                |
|------------------------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|--|---------------|----------------|----------------|--------------|----------------|----------------|
|                                    |        | M                 | V     | C <sub>d</sub> | C <sub>F/V</sub> | C <sub>i</sub> | C <sub>r</sub> | C <sub>m</sub> | C <sub>t</sub> | C <sub>L</sub> |  | M             | f <sub>b</sub> | F <sub>b</sub> | V            | f <sub>v</sub> | F <sub>v</sub> |
| D Only<br>Length = 4.0 ft          | 1      | 0.079             | 0.085 | 0.90           | 1.200            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |  | 0.48          | 115.89         | 1458.00        | 0.00         | 0.00           | 0.00           |
| +D+Lr<br>Length = 4.0 ft           | 1      | 0.128             | 0.138 | 1.25           | 1.200            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |  | 1.08          | 260.15         | 2025.00        | 0.63         | 29.32          | 212.50         |
| +D+0.750Lr<br>Length = 4.0 ft      | 1      | 0.111             | 0.119 | 1.25           | 1.200            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |  | 0.93          | 224.08         | 2025.00        | 0.54         | 25.23          | 212.50         |
| +0.60D<br>Length = 4.0 ft          | 1      | 0.027             | 0.029 | 1.60           | 1.200            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |  | 0.29          | 69.54          | 2592.00        | 0.17         | 7.78           | 272.00         |

### Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr            | 1    | 0.0080        | 2.015            |                  | 0.0000        | 0.000            |



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DESCRIPTION: B2

### Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum  | 0.922     | 0.922     |
| Overall MINimum  | 0.520     | 0.520     |
| D Only           | 0.402     | 0.402     |
| +D+Lr            | 0.922     | 0.922     |
| +D+0.750Lr       | 0.792     | 0.792     |
| +0.60D           | 0.241     | 0.241     |
| Lr Only          | 0.520     | 0.520     |

## Wood Beam

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DESCRIPTION: B3

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

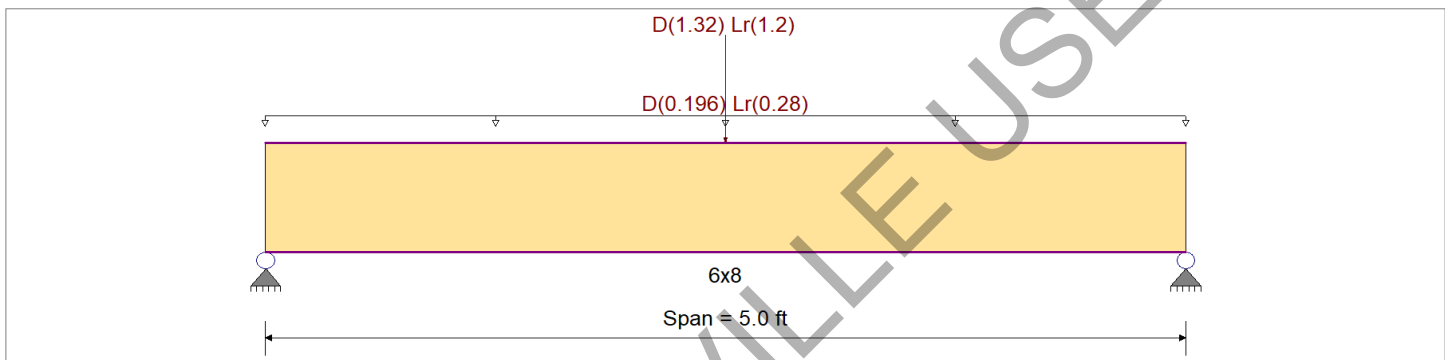
### Material Properties

Analysis Method : Allowable Stress Design  
Load Combination : ASCE 7-16

Wood Species : Douglas Fir-Larch  
Wood Grade : No.1

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 1,350.0 psi  
Fb - 1,350.0 psi  
Fc - Prll 925.0 psi  
Fc - Perp 625.0 psi  
Fv 170.0 psi  
Ft 675.0 psi  
E : Modulus of Elasticity  
Ebend- xx 1,600.0 ksi  
Eminbend - xx 580.0 ksi  
Density 31.210 pcf



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Uniform Load : D = 0.0140, Lr = 0.020 ksf, Tributary Width = 14.0 ft

Point Load : D = 1.320, Lr = 1.20 k @ 2.50 ft, (PL From G.T.)

### DESIGN SUMMARY

Design OK

|                                   |   |          |     |                             |   |          |       |
|-----------------------------------|---|----------|-----|-----------------------------|---|----------|-------|
| Maximum Bending Stress Ratio      | = | 0.643    | 1   | Maximum Shear Stress Ratio  | = | 0.372    | 1     |
| Section used for this span        |   | 6x8      |     | Section used for this span  |   | 6x8      |       |
|                                   | = | 1,085.77 | psi |                             | = | 78.96    | psi   |
|                                   | = | 1,687.50 | psi |                             | = | 212.50   | psi   |
| Load Combination                  |   | +D+Lr    |     | Load Combination            |   | +D+Lr    |       |
| Location of maximum on span       | = | 2.500    | ft  | Location of maximum on span | = | 0.000    | ft    |
| Span # where maximum occurs       | = | Span # 1 |     | Span # where maximum occurs | = | Span # 1 |       |
| <b>Maximum Deflection</b>         |   |          |     |                             |   |          |       |
| Max Downward Transient Deflection |   | 0.030    | in  | Ratio =                     |   | 1976     | >=360 |
| Max Upward Transient Deflection   |   | 0.000    | in  | Ratio =                     |   | 0        | <360  |
| Max Downward Total Deflection     |   | 0.059    | in  | Ratio =                     |   | 1016     | >=240 |
| Max Upward Total Deflection       |   | 0.000    | in  | Ratio =                     |   | 0        | <240  |

### Maximum Forces & Stresses for Load Combinations

| Load Combination<br>Segment Length | Span # | Max Stress Ratios |       |                |                  |                |                |                |                |                |  | Moment Values |                |                | Shear Values |                |                |
|------------------------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|--|---------------|----------------|----------------|--------------|----------------|----------------|
|                                    |        | M                 | V     | C <sub>d</sub> | C <sub>F/V</sub> | C <sub>i</sub> | C <sub>r</sub> | C <sub>m</sub> | C <sub>t</sub> | C <sub>L</sub> |  | M             | f <sub>b</sub> | F <sub>b</sub> | V            | f <sub>v</sub> | F <sub>v</sub> |
| D Only<br>Length = 5.0 ft          | 1      | 0.439             | 0.248 | 0.90           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |  | 2.29          | 533.05         | 1215.00        | 0.00         | 0.00           | 0.00           |
| +D+Lr<br>Length = 5.0 ft           | 1      | 0.643             | 0.372 | 1.25           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |  | 4.67          | 1,085.77       | 1687.50        | 2.17         | 78.96          | 212.50         |
| +D+0.750Lr<br>Length = 5.0 ft      | 1      | 0.562             | 0.323 | 1.25           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |  | 4.07          | 947.59         | 1687.50        | 1.89         | 68.72          | 212.50         |
| +0.60D<br>Length = 5.0 ft          | 1      | 0.148             | 0.084 | 1.60           | 1.000            | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |  | 1.37          | 319.83         | 2160.00        | 0.63         | 22.80          | 272.00         |

### Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr            | 1    | 0.0590        | 2.518            |                  | 0.0000        | 0.000            |



## Wood Beam

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Lic. # : KW-06006640

DESCRIPTION: B3

### Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum  | 2.472     | 2.472     |
| Overall MINimum  | 1.300     | 1.300     |
| D Only           | 1.172     | 1.172     |
| +D+Lr            | 2.472     | 2.472     |
| +D+0.750Lr       | 2.147     | 2.147     |
| +0.60D           | 0.703     | 0.703     |
| Lr Only          | 1.300     | 1.300     |

## Wood Column

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Lic. #: KW-06006640

DESCRIPTION: 6x6 POST

### Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
Load Combinations Used : ASCE 7-16

### General Information

|                                                           |           |                                   |            |                                                                                |             |
|-----------------------------------------------------------|-----------|-----------------------------------|------------|--------------------------------------------------------------------------------|-------------|
| Analysis Method : Allowable Stress Design                 |           |                                   |            | Wood Section Name 6x6                                                          |             |
| End Fixities Top & Bottom Pinned                          |           |                                   |            | Wood Grading/Manuf. Graded Lumber                                              |             |
| Overall Column Height                                     |           | 9 ft                              |            | Wood Member Type Sawn                                                          |             |
| ( Used for non-slender calculations )                     |           |                                   |            |                                                                                |             |
| Wood Species Douglas Fir-Larch                            |           | Allow Stress Modification Factors |            |                                                                                |             |
| Wood Grade No.2                                           |           |                                   |            |                                                                                |             |
| Fb +                                                      | 750.0 psi | Fv                                | 170.0 psi  | Exact Width                                                                    | 5.50 in     |
| Fb -                                                      | 750.0 psi | Ft                                | 475.0 psi  | Exact Depth                                                                    | 5.50 in     |
| Fc - Prll                                                 | 700.0 psi | Density                           | 31.210 pcf | Area                                                                           | 30.250 in^2 |
| Fc - Perp                                                 | 625.0 psi |                                   |            | Ix                                                                             | 76.255 in^4 |
|                                                           |           |                                   |            | Iy                                                                             | 76.255 in^4 |
| E : Modulus of Elasticity . . .                           |           |                                   |            | Incising Factors :                                                             |             |
|                                                           |           |                                   |            | for Bending 0.80                                                               |             |
| x-x Bending                                               |           | y-y Bending                       |            | for Elastic Modulus 0.95                                                       |             |
| Basic 1,300.0                                             |           | 1,300.0                           |            | Cfu : Flat Use Factor 1.0                                                      |             |
| Minimum 470.0                                             |           | 470.0                             |            | Kf : Built-up columns 1.0                                                      |             |
|                                                           |           |                                   |            | Use Cr : Repetitive ? No                                                       |             |
| Brace condition for deflection (buckling) along columns : |           |                                   |            |                                                                                |             |
|                                                           |           |                                   |            | X-X (width) axis : Unbraced Length for buckling ABOUT Y-Y Axis = 9 ft, K = 1.0 |             |
|                                                           |           |                                   |            | Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 9 ft, K = 1.0 |             |

### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 59.006 lbs \* Dead Load Factor

AXIAL LOADS . . .

Axial Load at 9.0 ft, D = 0.660, Lr = 0.820 k

### DESIGN SUMMARY

#### Bending & Shear Check Results

|      |                                      |                       |                                                        |                             |
|------|--------------------------------------|-----------------------|--------------------------------------------------------|-----------------------------|
| PASS | Max. Axial+Bending Stress Ratio =    | 0.09102 : 1           | Maximum SERVICE Lateral Load Reactions . .             |                             |
|      | Load Combination                     | +D+Lr                 | Top along Y-Y                                          | 0.0 k                       |
|      | Governing NDS Formula                | Comp Only, $f_c/F_c'$ | Bottom along Y-Y                                       | 0.0 k                       |
|      | Location of max. above base          | 0.0 ft                | Top along X-X                                          | 0.0 k                       |
|      | Bottom along X-X                     |                       |                                                        | 0.0 k                       |
|      | At maximum location values are . . . |                       | Maximum SERVICE Load Lateral Deflections . .           |                             |
|      | Applied Axial                        | 1.539 k               | Along Y-Y                                              | 0.0 in at 0.0 ft above base |
|      | Applied Mx                           | 0.0 k-ft              | for load combination :                                 | n/a                         |
|      | Applied My                           | 0.0 k-ft              | Along X-X                                              | 0.0 in at 0.0 ft above base |
|      | Fc : Allowable                       | 558.95 psi            | for load combination :                                 | n/a                         |
| PASS | Maximum Shear Stress Ratio =         | 0.0 : 1               | Other Factors used to calculate allowable stresses . . |                             |
|      | Load Combination                     | +0.60D                | Bending                                                | Compression                 |
|      | Location of max. above base          | 9.0 ft                | Tension                                                |                             |
|      | Applied Design Shear                 | 0.0 psi               |                                                        |                             |
|      | Allowable Shear                      | 217.60 psi            |                                                        |                             |

### Load Combination Results

| Load Combination | C <sub>D</sub> | C <sub>P</sub> | Maximum Axial + Bending Stress Ratios |        |          | Maximum Shear Ratios |        |          |
|------------------|----------------|----------------|---------------------------------------|--------|----------|----------------------|--------|----------|
|                  |                |                | Stress Ratio                          | Status | Location | Stress Ratio         | Status | Location |
| D Only           | 0.900          | 0.866          | 0.05444                               | PASS   | 0.0 ft   | 0.0                  | PASS   | 9.0 ft   |
| +D+Lr            | 1.250          | 0.799          | 0.09102                               | PASS   | 0.0 ft   | 0.0                  | PASS   | 9.0 ft   |
| +D+0.750Lr       | 1.250          | 0.799          | 0.07890                               | PASS   | 0.0 ft   | 0.0                  | PASS   | 9.0 ft   |
| +0.60D           | 1.600          | 0.728          | 0.02186                               | PASS   | 0.0 ft   | 0.0                  | PASS   | 9.0 ft   |

### Maximum Reactions

Note: Only non-zero reactions are listed.

| Load Combination | X-X Axis Reaction |       | k | Y-Y Axis Reaction |       | k | My - End Moments |       | k-ft | Mx - End Moments |       | k-ft  |
|------------------|-------------------|-------|---|-------------------|-------|---|------------------|-------|------|------------------|-------|-------|
|                  | @ Base            | @ Top |   | @ Base            | @ Top |   | @ Base           | @ Top |      | @ Base           | @ Top |       |
| D Only           |                   |       |   |                   |       |   |                  |       |      |                  |       | 0.719 |
| +D+Lr            |                   |       |   |                   |       |   |                  |       |      |                  |       | 1.539 |
| +D+0.750Lr       |                   |       |   |                   |       |   |                  |       |      |                  |       | 1.334 |



## Wood Column

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DESCRIPTION: 6x6 POST

### Maximum Reactions

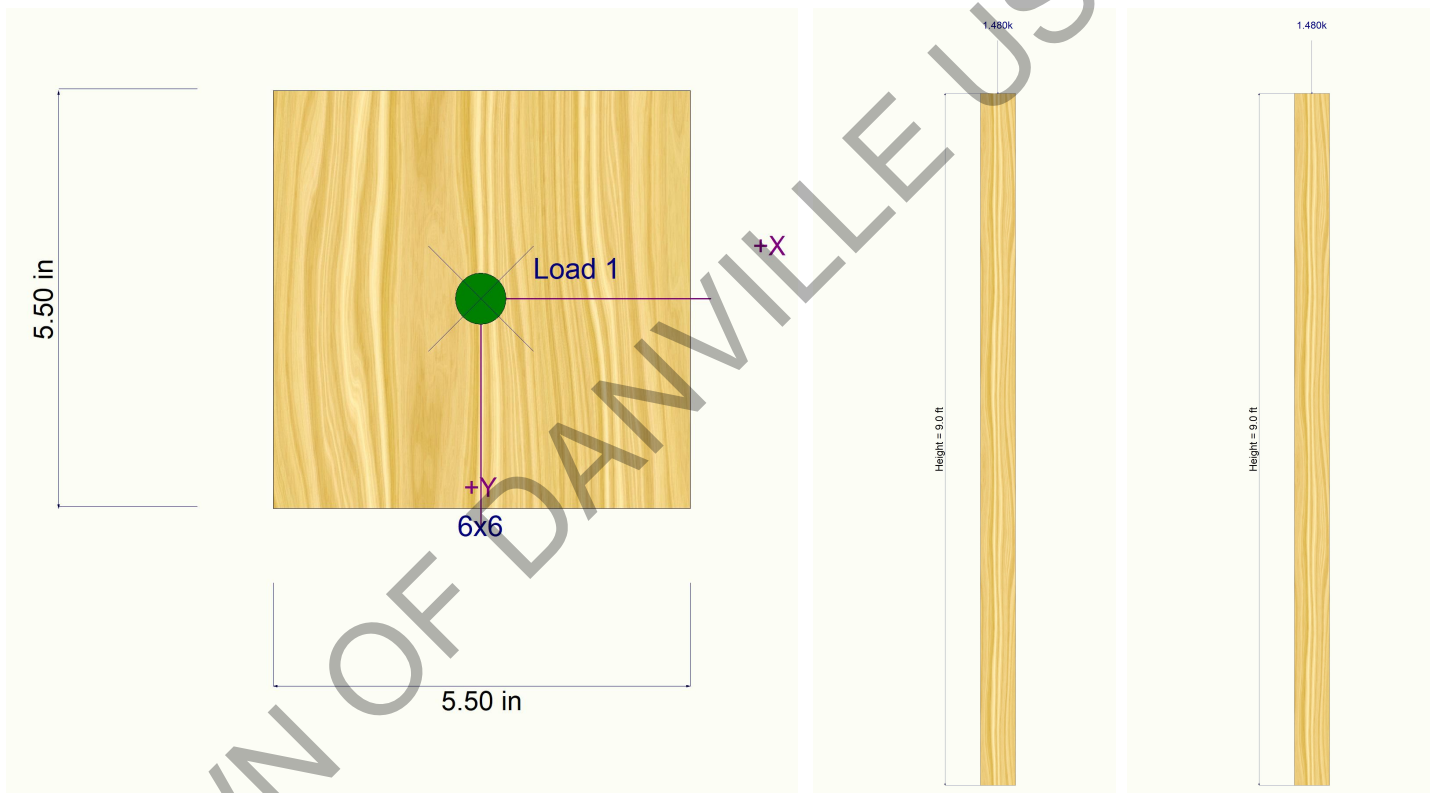
Note: Only non-zero reactions are listed.

| Load Combination | X-X Axis Reaction |       | k | Y-Y Axis Reaction |       | Axial Reaction | My - End Moments |       | k-ft | Mx - End Moments |       |
|------------------|-------------------|-------|---|-------------------|-------|----------------|------------------|-------|------|------------------|-------|
|                  | @ Base            | @ Top |   | @ Base            | @ Top | @ Base         | @ Base           | @ Top |      | @ Base           | @ Top |
| +0.60D           |                   |       |   |                   |       | 0.431          |                  |       |      |                  |       |
| Lr Only          |                   |       |   |                   |       | 0.820          |                  |       |      |                  |       |

### Maximum Deflections for Load Combinations

| Load Combination | Max. X-X Deflection |    | Distance | Max. Y-Y Deflection |        | Distance |
|------------------|---------------------|----|----------|---------------------|--------|----------|
|                  |                     |    |          |                     |        |          |
| D Only           | 0.0000              | in | 0.000    | ft                  | 0.0000 | in       |
| +D+Lr            | 0.0000              | in | 0.000    | ft                  | 0.0000 | in       |
| +D+0.750Lr       | 0.0000              | in | 0.000    | ft                  | 0.0000 | in       |
| +0.60D           | 0.0000              | in | 0.000    | ft                  | 0.0000 | in       |
| Lr Only          | 0.0000              | in | 0.000    | ft                  | 0.0000 | in       |

### Sketches





**PROJECT:** Town of Danville Studio ADU

**CLIENT:** Town of Danville

**JOB NO.:** W021420

**CALCS BY:** J. Peek

**DATE:** 3/24/2023

## **SPREAD FOOTING FOUNDATION ANALYSIS:**

### Allowable Stress:

fy (ksi): 60  
f'c (psi): 2500

### Footing Reinf:

(2) #4 in Top  
(2) #4 in Bottom

As used: 0.4

| <b><i>Grid Line:</i></b>                  | <b><i>1</i></b> | <b><i>2</i></b> | <b><i>A</i></b> | <b><i>B</i></b> |
|-------------------------------------------|-----------------|-----------------|-----------------|-----------------|
| <b><u>Footing Design Criteria:</u></b>    |                 |                 |                 |                 |
| Allow. Bearing Pres. (psf):               | 1500            | 1500            | 1500            | 1500            |
| Footing Width (in):                       | 12              | 12              | 12              | 12              |
| Footing Depth (in):                       | 18              | 18              | 18              | 18              |
| Unsupported Length (ft):                  | 5.0             | 5.0             | 5.0             | 5.0             |
| <b><u>Uniform Loads:</u></b>              |                 |                 |                 |                 |
| Roof Trib (ft)                            | 11.0            | 13.0            | 17.0            | 17.0            |
| Roof DL (psf)                             | 22.0            | 22.0            | 22.0            | 22.0            |
| Roof LL (psf)                             | 20.0            | 20.0            | 20.0            | 20.0            |
| Floor Trib (ft)                           | 0.0             | 0.0             | 0.0             | 0.0             |
| Floor DL (psf)                            | 15.0            | 15.0            | 15.0            | 15.0            |
| Floor LL (psf)                            | 40.0            | 40.0            | 40.0            | 40.0            |
| Lower Floor Trib (ft)                     | 0.0             | 0.0             | 0.0             | 0.0             |
| Lower Floor DL (psf)                      | 15.0            | 15.0            | 15.0            | 15.0            |
| Lower Floor LL (psf)                      | 40.0            | 40.0            | 40.0            | 40.0            |
| Deck Trib (ft)                            | 0.0             | 0.0             | 0.0             | 0.0             |
| Deck DL (psf)                             | 15.0            | 15.0            | 15.0            | 15.0            |
| Deck LL (psf)                             | 60.0            | 60.0            | 60.0            | 60.0            |
| Wall Trib (ft)                            | 10.0            | 10.0            | 10.0            | 10.0            |
| Wall DL (psf)                             | 17.0            | 17.0            | 17.0            | 17.0            |
| <b>TOTAL DL (plf):</b>                    | <b>412</b>      | <b>456</b>      | <b>544</b>      | <b>544</b>      |
| <b>TOTAL Lr (plf):</b>                    | <b>220</b>      | <b>260</b>      | <b>340</b>      | <b>340</b>      |
| <b>TOTAL LL (plf):</b>                    | <b>0</b>        | <b>0</b>        | <b>0</b>        | <b>0</b>        |
| <b><u>Point Load:</u></b>                 |                 |                 |                 |                 |
| Max. Point DL (lbs)                       | 1320            | 1320            | 0               | 0               |
| Max. Point Lr (lbs)                       | 1200            | 1200            | 0               | 0               |
| Max. Point LL (lbs)                       | 0               | 0               | 0               | 0               |
| Max. HD Load (lbs)                        | 1881            | 3521            | 4130            | 4404            |
| <b><u>Soil Analysis:</u></b>              |                 |                 |                 |                 |
| q (psf):                                  | 1247            | 1331            | 723             | 771             |
| q/ q <sub>ALLOW</sub> :                   | 0.83            | 0.89            | 0.48            | 0.51            |
| <b>M<sub>max</sub> (ft-lb):</b>           | 7026 ft-lb      | 7391 ft-lb      | 5417 ft-lb      | 5674 ft-lb      |
| <b>V<sub>max</sub> (lb):</b>              | 3869 lbs        | 4161 lbs        | 2993 lbs        | 2993 lbs        |
| <b>Allowable M<sub>max</sub> (ft-lb):</b> | 25253 ft-lb     | 25253 ft-lb     | 25253 ft-lb     | 25253 ft-lb     |
| <b>Allowable V<sub>max</sub> (lb):</b>    | 7395 lbs        | 7395 lbs        | 7395 lbs        | 7395 lbs        |
| Footing A(s) req'd:                       | 0.40            | 0.40            | 0.40            | 0.40            |
|                                           | <b>O.K.</b>     | <b>O.K.</b>     | <b>O.K.</b>     | <b>O.K.</b>     |



**PROJECT:** Town of Danville Studio ADU

**CLIENT:** Town of Danville

**JOB NO.:** W021420

**CALCS BY:** J. Peek

**DATE:** 3/24/2023

## PIER AND GRADE BEAM FOUNDATION ANALYSIS:

### Allowable Stress:

fy (ksi): 60  
f'c (psi): 2500

### Grade Beam Reinf:

(3) #5 in Top  
(3) #5 in Bottom

As used: 0.93

| <b>Grid Line:</b>                         | <b>1</b>    | <b>2</b>    | <b>A</b>    | <b>B</b>    |
|-------------------------------------------|-------------|-------------|-------------|-------------|
| <b>Pier Design Criteria:</b>              |             |             |             |             |
| Allow. Skin Friction (psf):               | 250         | 250         | 250         | 250         |
| Pier Diameter (in):                       | 16          | 16          | 16          | 16          |
| Neglect Pier Depth (ft):                  | 2           | 2           | 2           | 2           |
| <b>Grade Beam Design Criteria:</b>        |             |             |             |             |
| Grade Beam Width (in):                    | 12          | 12          | 12          | 12          |
| Grade Beam Depth (in):                    | 18          | 18          | 18          | 18          |
| Grade Beam Span (ft):                     | 8.0         | 8.0         | 8.0         | 8.0         |
| <b>Uniform Loads:</b>                     |             |             |             |             |
| Roof Trib (ft)                            | 11.0        | 13.0        | 17.0        | 17.0        |
| Roof DL (psf)                             | 22.0        | 22.0        | 22.0        | 22.0        |
| Roof LL (psf)                             | 20.0        | 20.0        | 20.0        | 20.0        |
| Floor Trib (ft)                           | 0.0         | 0.0         | 0.0         | 0.0         |
| Floor DL (psf)                            | 15.0        | 15.0        | 15.0        | 15.0        |
| Floor LL (psf)                            | 40.0        | 40.0        | 40.0        | 40.0        |
| Lower Floor Trib (ft)                     | 0.0         | 0.0         | 0.0         | 0.0         |
| Lower Floor DL (psf)                      | 15.0        | 15.0        | 15.0        | 15.0        |
| Lower Floor LL (psf)                      | 40.0        | 40.0        | 40.0        | 40.0        |
| Deck Trib (ft)                            | 0.0         | 0.0         | 0.0         | 0.0         |
| Deck DL (psf)                             | 15.0        | 15.0        | 15.0        | 15.0        |
| Deck LL (psf)                             | 60.0        | 60.0        | 60.0        | 60.0        |
| Wall Trib (ft)                            | 10.0        | 10.0        | 10.0        | 10.0        |
| Wall DL (psf)                             | 17.0        | 17.0        | 17.0        | 17.0        |
| <b>TOTAL DL (plf):</b>                    | <b>637</b>  | <b>681</b>  | <b>769</b>  | <b>769</b>  |
| <b>TOTAL Lr (plf):</b>                    | <b>220</b>  | <b>260</b>  | <b>340</b>  | <b>340</b>  |
| <b>TOTAL LL (plf):</b>                    | <b>0</b>    | <b>0</b>    | <b>0</b>    | <b>0</b>    |
| <b>Point Load:</b>                        |             |             |             |             |
| Max. Point DL (lbs)                       | 1320        | 1320        | 0           | 0           |
| Max. Point Lr (lbs)                       | 1200        | 1200        | 0           | 0           |
| Max. Point LL (lbs)                       | 0           | 0           | 0           | 0           |
| Max. HD Load (lbs)                        | 1881        | 3521        | 4130        | 4404        |
| <b>Grade Beam Analysis:</b>               |             |             |             |             |
| <b>M<sub>max</sub> (ft-lb):</b>           | 15942 ft-lb | 16877 ft-lb | 11764 ft-lb | 12176 ft-lb |
| <b>V<sub>max</sub> (lb):</b>              | 6219 lbs    | 6686 lbs    | 5869 lbs    | 5869 lbs    |
| <b>Allowable M<sub>max</sub> (ft-lb):</b> | 56104 ft-lb | 56104 ft-lb | 56104 ft-lb | 56104 ft-lb |
| <b>Allowable V<sub>max</sub> (lb):</b>    | 7395 lbs    | 7395 lbs    | 7395 lbs    | 7395 lbs    |
| Grade Beam A(s) req'd:                    | 0.93        | 0.93        | 0.93        | 0.93        |
|                                           | <b>O.K.</b> | <b>O.K.</b> | <b>O.K.</b> | <b>O.K.</b> |
| <b>Pier Analysis:</b>                     |             |             |             |             |
| Design Pier Load (lbs):                   | 9378        | 10051       | 8875        | 8875        |
| Req'd Pier Depth (ft)                     | 10.96       | 11.60       | 10.48       | 10.48       |
| <b>Use Pier Depth (ft):</b>               | <b>11</b>   | <b>12</b>   | <b>11</b>   | <b>11</b>   |