

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

- 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.
- 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.
- Notify the Architect of any discrepancies in the Documents or between the Documents and the existing conditions before proceeding with any work.
- The Contractor shall obtain all required inspections for his work and give the Owner timely notice of his intent to have inspections.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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).
- 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 1/4" 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 1 1/2" 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.
- Maximum 3.5-inch handrail projection into the required stair width. Stringers and other projections such as trim are limited to 1- 1/2 inches on each side.
- Handrail(s) is required for stairways with four or more risers.
- Batt insulation shall have maximum flame spread of 25 and smoke development of 450. .
- 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.
- Glass & glazing to comply with 2022 CRC.
- 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

- 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.
- Non-removable backflow prevention to be provided at meter and provide non-removable vacuum breaker on all hose bibbs.
- All utilities to be field verified by contractor. William Wood Architects assume no responsibility for accuracy of utility locations, as shown on plans.
- 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.
- Work to comply with TOWN OF DANVILLE ordinance for setbacks and grading requirements as shown on the site plan.
- 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.
- All retaining walls shall have drainage with 4" perforated PVC rigid wall and collected with PVC Tight line rigid wall.
- 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:

- 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

- Showerheads shall be flow control of 1.8 G.P.M. or less.
- All lavatory faucets shall be flow control of 1.2 G.P.M. or less.
- Kitchen faucet to be 1.8 gallons per minute, maximum.
- Water closet to be 1.28 gallon per flush maximum. or dual flush per CPC 411.2.
- All piping and equipment shall be supported as per section 313 in the CPC.
- 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.
- All backflow prevention devices shall be installed per CPC 603.3.
- 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.
- Hose bibbs shall be protected with a nonremovable hose-bib0-type backflow preventer, a non removable hose-bib-type vacuum 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:

- Electrical receptacles in bathrooms, outdoors and within 6'-0" of sink to be on ground fault protection (G.F.I.);
- Provide 1/2-switched outlet under counter at sink for disposal.
- Switch and duplex outlet, or multiple switches shown adjacent to each other on plan are to be under one plate.
- 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.
- All appliances shall conform to the standards set forth by the California Energy Commission Title 24 requirements.
- Gas fired cooking appliances and space-heating equipment shall have intermittent ignition devices.
- 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.
- Contractor to verify space requirements for plenums and ducts prior to start of work.
- 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.
- Gaskets to be provided at exterior receptacles and switch plates.
- Final locations of all mechanical and electrical equipment, panel boards, meters, fixtures, flues, vents, switches etc., shall be approved by Owner prior to installation.
- Lights: All lights shall be high efficiency.
- HVAC equipment, water heaters, showerheads and faucets to be certified by the CEC.
- Provide a setback thermostat on all applicable heating systems.
- Ducts penetrating the one-hour separation between garage and the house shall be not less than 26 gauge galvanized steel.
- 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.
- Fused disconnect at A/C compressor unit or approved circuit breaker to be installed.
- Clothes dryer, vented range hoods, and bathroom vent fans must be exhausted to outside per 2022 CMC.
- Install new receptacle outlets as specified in NEC.
- Provide a dedicated 20-amp branch circuit to supply the laundry receptacle outlet.
- Contractor to provide additional electrical load as necessary to equip all new & existing elect. equipment.

REVISIONS	DATE



DANVILLE ACCESSORY DWELLING UNITS - STUDIO
 DANVILLE CA 94526

WILLIAM WOOD ARCHITECTS
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DRAWN	HW
CHECKED	WW
DATE	03-30-23
SCALE	AS SHOWN
JOB NO.	20.921R
SHEET	GN1
OF SHEETS	

Apr 26, 2023 - 3:15pm G:\1 Gen Notes.dwg

2022 CAL GREEN RESIDENTIAL MANDATORY MEASURES



2022 CALIFORNIA GREEN BUILDING STANDARDS CODE RESIDENTIAL MANDATORY MEASURES, SHEET 1 (January 2023)

Table with 2 columns: REVISIONS, DATE. Contains a grid for tracking changes.



DANVILLE ACCESSORY DWELLING UNITS - STUDIO DANVILLE CA 94526

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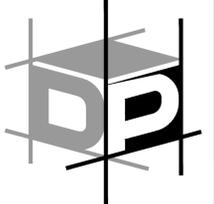
Project information block including: DRAWN: JJ, CHECKED: WW, DATE: 03-30-23, SCALE: AS SHOWN, JOB NO.: 20.921R, SHEET: GN2 OF SHEETS.

Main table with 4 columns (1-4) for compliance tracking. Each column contains a checkbox and a detailed description of a code section, such as 'CHAPTER 3 GREEN BUILDING SECTION 301 GENERAL' and 'DIVISION 4.1 PLANNING AND DESIGN'.

TABLE H-2: STANDARDS FOR COMMERCIAL PRE-RINSE SPRAY VALVES MANUFACTURED ON OR AFTER JANUARY 28, 2019. Includes columns for PRODUCT CLASS and MAXIMUM FLOW RATE (gpm).

TABLE - MAXIMUM FIXTURE WATER USE: Lists fixture types (Shower Heads, Lavatory Faucets, etc.) and their corresponding flow rates.

DISCLAIMER: THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE. DUE TO THE VARIABLES BETWEEN BUILDING DEPARTMENT JURISDICTIONS, THIS CHECKLIST IS TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL NEEDS.



DANVILLE, CALIFORNIA

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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 HEIGHT, OUTDOOR DESIGN TEMPERATURES, COIL SIZING, AVAILABILITY OF EQUIPMENT, OVERSIZING, 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 SYSTEM 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. DP ADVANCED ENGINEERING, INC. DOES NOT WARRANT OR ASSUME RESPONSIBILITY FOR PERFORMANCE OR INSTALLATION OF ANY EQUIPMENT LABELED OR ALLOWED TO ON ANY CALCULATION PROVIDED BY DP ADVANCED ENGINEERING, INC. BUILDER 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

- 1
- 2
- 3
- 4
- 5
- 6

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

Sheet Description:

ENERGY CALCULATIONS 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.



CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD
Project Name: Danville ADU Craftsman Studio
Calculation Date/Time: 2023-03-30T18:27:39-07:00
Input File Name: Danville ADU_Craftsman_Studio.rbd22

CF1R-PHF-01E (Page 4 of 13)

Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft ² -yr)	Standard Design TSD Energy (EDR2) (kBtu/ft ² -yr)	Proposed Design Source Energy (EDR1) (kBtu/ft ² -yr)	Proposed Design TSD Energy (EDR2) (kBtu/ft ² -yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)
Space Heating	7.21	11.73	2.92	22.02	-4.29	9.73
Space Cooling	1	30.5	0.91	30.79	0.09	-0.29
IAQ Ventilation	0.88	9.46	2.88	14.79	-0.5	-5.33
Water Heating	3.59	37.63	2.64	27.67	0.95	9.96
Self Utilization/Health Credit	0	0	0	0	0	0
South Facing Efficiency Compliance Total	12.68	109.32	7.85	95.27	4.83	14.05
Space Heating	7.21	11.73	0.03	23.24	-4.18	8.49
Space Cooling	1	30.5	0.91	30.95	-0.24	-0.45
IAQ Ventilation	0.88	9.46	3.38	14.79	-0.5	-5.33
Water Heating	3.59	37.63	2.64	27.67	0.95	9.96
Self Utilization/Health Credit	0	0	0	0	0	0
West Facing Efficiency Compliance Total	12.68	109.32	8.29	105.65	4.39	3.67

Registration Number: 203-P01038751A-000-0000000-0000
Registration Date/Time: 2023-03-31 08:34:18
HERS Provider: CaCERTS, Inc.
CA Building Energy Efficiency Standards - 2022 Residential Compliance
Report Version: 2022.0.000
Report Generated: 2023-03-30 18:28:22

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Zone Name	Zone Type	HVAC System Name	Zone Floor Area (ft ²)	Avg. Ceiling Height	Water Heating System	Status
Accessory Unit	Conditioned	HVAC System 1	640	9	DHW System 1	New

Zone Name	Zone Type	Construction	Altimath	Orientation	Gross Area (ft ²)	Window and Door Area (ft ²)	Tilt (deg)
Front Wall	Accessory Unit	Below 2nd Wall R.21	0	Front	288	96	90
Left Wall	Accessory Unit	Exterior 2nd Wall R.21	50	Left	180	9	90
Back Wall	Accessory Unit	Exterior 2nd Wall R.21	180	Back	288	19	90
Right Wall	Accessory Unit	Exterior 2nd Wall R.21	270	Right	180	9	90
Ceiling Below Attic	Accessory Unit	8-38 Attic Ceiling	n/a	n/a	640	n/a	n/a

Attic	Construction	Type	Roof Rise (x to 12)	Roof Reflectance	Roof Emittance	Radiant Barrier	Cool Roof
Attic	Attic Roof	Wood/Board	4	0.1	0.85	No	No

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Name	System Type	Number of Units	Efficiency Type	HSPF / COP	Cap 17	Efficiency Type	SEER / SEER2	EEER / EER / CEF	Zonally Controlled	Compressor Type	HERS Verification	
PEAD-A2AA47	Central split HP	1	HSPF	10.8	20000	14800	EER/SEER	19.6	11.7	Not Zoned	Single Speed	PEAD-A2AA47-hrs-tupump

Name	System Type	Design Type	Duct % R-value	Duct Location	Surface Area	Bypass Duct	Duct Leakage	HERS Verification			
Distribution System 1	Unconditioned attic	Non-Verified	8.6	8.6	ATK	ATK	n/a	n/a	No Bypass Duct	Sealed and Insulated	Distribution System 1 hrs-dit

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Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft ² -yr)	Standard Design TSD Energy (EDR2) (kBtu/ft ² -yr)	Proposed Design Source Energy (EDR1) (kBtu/ft ² -yr)	Proposed Design TSD Energy (EDR2) (kBtu/ft ² -yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)
Space Heating	7.21	11.73	3.11	23.96	4.09	7.77
Space Cooling	1	30.5	0.92	31.5	0.08	-1
IAQ Ventilation	0.88	9.46	3.38	14.79	-0.5	-5.33
Water Heating	3.59	37.63	2.64	27.67	0.95	9.96
Self Utilization/Health Credit	0	0	0	0	0	0
North Facing Efficiency Compliance Total	12.68	109.32	8.06	97.92	4.62	11.4
Space Heating	7.21	11.73	0.11	23.5	4.11	8.23
Space Cooling	1	30.5	2.08	34.6	-0.08	-4.1
IAQ Ventilation	0.88	9.46	3.38	14.79	-0.5	-5.33
Water Heating	3.59	37.63	2.64	27.67	0.95	9.96
Self Utilization/Health Credit	0	0	0	0	0	0
East Facing Efficiency Compliance Total	12.68	109.32	8.2	100.56	4.48	8.76

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DC System Size (kWdc)	Exception	Module Type	Array Type	Power Electronics	CFI	Altimath (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(5)(4) < 1.8 kWdc (3 kW))
- Indoor air quality balanced fan
- IAQ Ventilation System Heat Recovery: minimum 67 SRE and 73 ASH
- IAQ Ventilation System: supply outside air, HEPA, filter, and 100% UV or accessible per SACHM Reference Manual
- IAQ Ventilation System: built-in LCD or display
- Insulation below roof deck
- Window overhang and/or fins
- Northwest Energy Efficiency Alliance (NEEA) rated hot water heater, specific BEPS model, or equivalent, must be installed

HERS FEATURE SUMMARY

The following is a summary of the features that must be 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 CCRs and CTRs 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 Efficiency Watts/CFM
- Verified HSPF
- Verified hot pump rated heating capacity
- Duct leakage testing

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Source Energy (EDR1)	Efficiency* EDR (EDR2/Efficiency)	Total* EDR (EDR2Total)	Source Energy (EDR1)	Efficiency* EDR (EDR2/Efficiency)	Total* EDR (EDR2Total)
Standard Design	39.9	45.2	39.9	33.8	33.8

Proposed Design

North Facing	East Facing	South Facing	West Facing
31.8	40.5	51	8.1
4.7	4.7	2.8	2.8
32	41.6	51.7	7.9
3.6	3.6	2.1	2.1
31.4	39.4	50.3	8.5
5.8	5.8	3.5	3.5
32.2	43.7	53	7.7
1.5	1.5	0.8	0.8

RESULT: PASS

*Efficiency EDR includes improvements like a better building envelope and more efficient equipment.
*Total EDR includes efficiency and demand response measures such as airpilotable (DS) smart and demand.
*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.

- Standard Design PV Capacity: 0.00 kWdc
- Proposed PV Capacity Sizing: North (0.00 kWdc) East (0.00 kWdc) South (0.00 kWdc) West (0.00 kWdc)

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01	02	03	04	05	06	07	08	09	10	11	12
North Facing	28.17	22.23	5.94	21.09							
Net EU ¹	28.17	22.23	5.94	21.09							

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01	02	03	04	05	06	07	08
01	02	03	04	05	06	07	08
04	05	06	07	08	09	10	11
06	07	08	09	10	11	12	13
08	09	10	11	12	13	14	15
10	11	12	13	14	15	16	17
12	13	14	15	16	17	18	19
14	15	16	17	18	19	20	21
16	17	18	19	20	21	22	23
18	19	20	21	22	23	24	25
20	21	22	23	24	25	26	27

COMPLIANCE RESULTS

01	02	03
01	02	03
02	03	04

Registration Number: 203-P01038751A-000-0000000-0000
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CA Building Energy Efficiency Standards - 2022 Residential Compliance
Report Version: 2022.0.000
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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD
Project Name: Danville ADU Craftsman Studio
Calculation Date/Time: 2023-03-30T18:27:39-07:00
Input File Name: Danville ADU_Craftsman_Studio.rbd22

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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):	Air Leakage. 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):	Labeling. Fenestration products and exterior doors must have a label meeting the requirements of § 10-111(a).
§ 110.6(b):	Field-fabricated exterior doors and fenestration products must use U-factors and solar heat gain coefficient (SHGC) values from Tables 110.6.A, 110.6.B, or JA4.5 for exterior doors. They must be caulked and/or weather-stripped.
§ 110.7:	Air Leakage. 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):	Insulation Certification by Manufacturers. Insulation must be certified by the Department of Consumer Affairs, Bureau of Household Goods and Services (BHGS).
§ 110.8(g):	Insulation Requirements for Heated Slab Floors. Heated slab floors must be insulated per the requirements of § 110.8(g).
§ 110.8(i):	Roofing Products Solar Reflectance and Thermal Emission. The thermal emittance and aged solar reflectance values of the roofing material must meet the requirements of § 110.8(i) and be labeled per §10-113 when the installation of a cool roof is specified on the CFIR.
§ 110.8(j):	Radiant Barrier. When required, radiant barriers must have an emittance of 0.05 or less and be certified to the Department of Consumer Affairs.
§ 110.8(k):	Roof Deck, Ceiling and Rafter Roof Insulation. 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. Attic access doors must have permanent 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 a 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):	Loose-fill Insulation. Loose fill insulation must meet the manufacturer's required density for the labeled R-value.
§ 150.0(c):	Wall Insulation. 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):	Raised-floor Insulation. Minimum R-19 insulation in raised wood framed floor or 0.037 maximum U-factor. *
§ 150.0(f):	Slab Edge Insulation. 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(i).
§ 150.0(g)(1):	Vapor Retarder. In climate zones 1 through 16, the earth floor or unvented crawl space must be covered with a Class I or Class II vapor retarder. This requirement also applies to controlled ventilation crawlspace for buildings complying with the Exception to §150.0(g).
§ 150.0(g)(2):	Vapor Retarder. 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):	Fenestration Products. 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:

§ 110.5(i):	Pilot Light. Continuously burning pilot lights are not allowed for indoor and outdoor fireplaces.
§ 150.0(e)(1):	Closable Doors. Masonry or factory-built fireplaces must have a closable metal or glass door covering the entire opening of the fireplace.
§ 150.0(e)(2):	Combustion Intake. 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 airtight-fitting damper or combustion-air control device.
§ 150.0(e)(3):	Flue Damper. Masonry or factory-built fireplaces must have a flue damper with a readily accessible control. *

Space Conditioning, Water Heating, and Plumbing System:

§ 110.0-§ 110.3:	Certification. 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):	HVAC Efficiency. Equipment must meet the applicable efficiency requirements in Table 110.2-A through Table 110.2-N. *
§ 110.2(b):	Controls for Heat Pumps with Supplementary Electric Resistance Heaters. 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):	Thermostats. All heating or cooling systems not controlled by a central energy management control system (EMCS) must have a setback thermostat. *
§ 110.3(c)(3):	Insulation. 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):	Isolation Valves. 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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2022 Single-Family Residential Mandatory Requirements Summary

§ 150.0(k)(1)(G):	Screw based luminaires. Screw based luminaires must contain lamps that comply with Reference Joint Appendix JA8. *
§ 150.0(k)(1)(H):	Light Sources in Enclosed or Recessed Luminaires. Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.
§ 150.0(k)(1)(I):	Light Sources in Drawers, Cabinets, and Linen Closets. Light sources internal to drawers, cabinet 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)(2)(A):	Interior Switches and Controls. All forward phase cut dimmers used with LED light sources must comply with NEMA SSL 7A.
§ 150.0(k)(2)(B):	Interior Switches and Controls. Exhaust fans must be controlled separately from lighting systems. *
§ 150.0(k)(2)(A):	Accessible Controls. Lighting must have readily accessible wall-mounted controls that allow the lighting to be manually turned on and off. *
§ 150.0(k)(2)(B):	Multiple Controls. Controls must not bypass a dimmer, occupant sensor, or vacancy sensor function of the dimmer or sensor is installed to comply with § 150.0(k).
§ 150.0(k)(2)(C):	Mandatory Requirements. Lighting controls must comply with the applicable requirements of § 110.9.
§ 150.0(k)(2)(D):	Energy Management Control Systems. 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)(2).
§ 150.0(k)(2)(E):	Automatic Shutoff Controls. 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)(2)(F):	Dimmers. 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)(2)(K):	Independent controls. 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)(3)(A):	Residential Outdoor Lighting. 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):	Internally illuminated address signs. Internally illuminated address signs must either comply with § 140.6 or consume no more than 5 watts of power.
§ 150.0(k)(5):	Residential Garages for Eight or More Vehicles. 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:

§ 110.10(a)(1):	Single-family Residences. 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)(1)(A):	Minimum Solar Zone Area. 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):	Azimuth. All sections of the solar zone located on steep-sloped roofs must have an azimuth between 90-300° of true north.
§ 110.10(b)(3)(A):	Shading. The solar zone must not contain any obstructions, including but not limited to: vents, chimneys; architectural features, and roof mounted equipment.
§ 110.10(b)(3)(B):	Shading. 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):	Structural Design Loads on Construction Documents. 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):	Interconnection Pathways. 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):	Documentation. 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):	Main Electrical Service Panel. The main electrical service panel must have a minimum busbar rating of 200 amps.
§ 110.10(e)(2):	Main Electrical Service Panel. 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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2022 Single-Family Residential Mandatory Requirements Summary

§ 110.5:	Pilot Lights. 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):	Building Cooling and Heating Loads. 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)(3)(A):	Clearances. 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)(3)(B):	Liquid Line Drier. 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):	Water Piping, Solar Water-heating System Piping, and Space Conditioning System Line Insulation. All domestic hot water piping must be insulated as specified in § 609.11.6 of the California Plumbing Code. *
§ 150.0(j)(2):	Insulation Protection. 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 tape). 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. Pipes insulation buried below grade must be installed in a waterproof and non-crushable casing or sleeve.
§ 150.0(n)(1):	Gas or Propane Water Heating Systems. 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):	Solar Water-heating Systems. 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:

§ 110.8(d)(3):	Ducts. 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):	CMC Compliance. 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):	Factory-fabricated Duct Systems. 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 adhesive duct tapes unless such tape is used in combination with mastic and draw bands.
§ 150.0(m)(3):	Field-fabricated Duct Systems. 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):	Backdraft Damper. Fan systems that exchange air between the conditioned space and outdoors must have backdraft or automatic dampers.
§ 150.0(m)(8):	Gravity Ventilation Dampers. 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):	Protection of Insulation. 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):	Porous Inner Core Flex Duct. 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):	Duct System Sealing and Leakage Test. 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):	Air Filtration. 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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2022 Single-Family Residential Mandatory Requirements Summary

§ 150.0(s):	Energy Storage System (ESS) Ready. 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 source 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):	Heat Pump Space Heater Ready. 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):	Electric Cooktop Ready. 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):	Electric Clothes Dryer Ready. 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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2022 Single-Family Residential Mandatory Requirements Summary

§ 150.0(m)(13):	Space Conditioning System Airflow Rate and Fan Efficacy. 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 all 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. *
§ 150.0(o)(1):	Requirements for Ventilation and Indoor Air Quality. 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)(1)(B):	Central Fan Integrated (CFI) Ventilation Systems. Continuous operation of CFI air handlers is not allowed to provide the whole-dwelling unit ventilation airflow required per §150.0(o)(1)(C). 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 controlled per §150.0(o)(1)(B)(iii). 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)(1)(C).
§ 150.0(o)(1)(C):	Whole-Dwelling Unit Mechanical Ventilation for Single-Family Detached and Townhouses. 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)(1)(C)(ii).
§ 150.0(o)(1)(G):	Local Mechanical Exhaust. Kitchens and bathrooms must have local mechanical exhaust; nonenclosed kitchens must have demand-controlled exhaust system meeting requirements of §150.0(o)(1)(G)(ii) enclosed kitchens and bathrooms can use demand-controlled or continuous exhaust meeting §150.0(o)(1)(G)(iii). Airflow must be measured by the installer per §150.0(o)(1)(G), and rated for sound per §150.0(o)(1)(H). *
§ 150.0(o)(1)(H&I):	Airflow Measurement and Sound Ratings of Whole-Dwelling Unit Ventilation Systems. The airflow required per § 150.0(o)(1)(C) must be measured by using a flow hood, flow grid, 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)(1)(C).
§ 150.0(o)(2):	Field Verification and Diagnostic Testing. 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)(1)(G).
§ 110.4(a):	Certification by Manufacturers. 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):	Piping. Any pool or spa heating system or equipment must be installed with at least 36 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):	Covers. Outdoor pools or spas that have a heat pump or gas heater must have a cover.
§ 110.4(b)(3):	Directional Inlets and Time Switches for Pools. 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:	Pilot Light. Natural gas pool and spa heaters must not have a continuously burning pilot light.
§ 150.0(p):	Pool Systems and Equipment Installation. Residential pool systems or equipment must meet the specified requirements for pump sizing, flow rate, piping, filters, and valves.
§ 110.9:	Lighting Controls and Components. All lighting control devices and systems, ballasts, and luminaires must meet the applicable requirements of § 110.9. *
§ 150.0(k)(1)(A):	Luminaire Efficacy. 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)(1)(B):	Screw based luminaires. Screw based luminaires must contain lamps that comply with Reference Joint Appendix JA8. *
§ 150.0(k)(1)(C):	Recessed Downlight Luminaires in Ceilings. 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)(1)(D):	Light Sources in Enclosed or Recessed Luminaires. Lamps and other separable light sources that are not compliant with the JAB elevated temperature requirements, including marking requirements, must not be installed in enclosed or recessed luminaires.
§ 150.0(k)(1)(E):	Blank Electrical Boxes. 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)(1)(F):	Lighting Integral to Exhaust Fans. Lighting integral to exhaust fans (except when installed by the manufacturer in kitchen exhaust hoods) must meet the applicable requirements of § 150.0(k).

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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 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) 300°



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

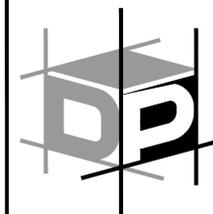
HEAT PUMP (10.2 HSPF, 19.6 SEER, 11.7 EER)
MITSUBISHI PEAD-A24AA7 + PUZ-A24NH7
AHRI # 201754661

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.



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 PIPING, 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. DP 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 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/OR 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

- 1
- 2
- 3
- 4
- 5
- 6

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

Sheet Designation:

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

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 unit 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 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.
- For more details about controls, refer to the **Main and auxiliary wall controls** user guide, also available at 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

Outdoor Temperature*		Defrost in Minutes / Air Exchange in Minutes	
Outdoor Temp. °C	Outdoor Temp. °F	Low Speed	High Speed
Warmer than 10	Warmer than 50	No defrost	No defrost
from 10 to -15	from 50 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 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 Reheem.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††
- LeakSense™ Built-in Leak Detection System detects any leak large or small, internal or external††

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

*Available with select models. †WiFi broadband internet connection required. ††Sensor: Rheem Leak-Sensing Data, testing under a vacuum for using 50 gallon tank, no expansion tank, average tank pressure of 40 psi, assuming no additional fixtures are opened. †††Water level from the heater only, not lowest access components including a minimum of 5.5 inch water level only, using most common installation scenarios.



Professional Prestige ProTerra Hybrid
40, 50, 65 and 80-Gallon Capacities
208-240 Volt / 1 PH Electric



See specifications chart on next page.

PEAD-A24AA7 & PUZ-A24NH7(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 Standard Model: PUZ-A24NH7
Seacoast Model: PUZ-A24NH7-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"†)
- 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:
 - Keuro class® 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

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Certificate of Product Ratings

AHRI Certified Reference Number: 201754461 Date: 03-30-2023 Model Status: Active
AHRI Type: HFC/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-A24NH7***
Indoor Type: Mini-Splits (Ducted)
Indoor Model Number(s): PEAD-A24AA7
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 : 19.20
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 - 2023, 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 (H14a) - Single or High Stage (47F), btuh : 26000
HSPF2 (Region IV) : 9.10
Sold in: USA, Canada



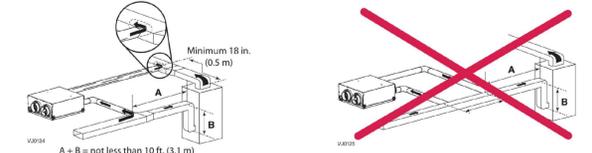
†Active Model Status are those that an AHRI Certification Program Participant is currently producing and offering for sale; OR new models that are being marketed but are not yet being produced. ††Model Status are those that an AHRI Certification Program Participant is no longer producing and offering for sale. †††Addendums that are accompanied by NAEI include an involuntary re-rate. The new published rating is shown along with the previous (i.e. WAEI) 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(c). Please refer to www.AHRI.net for more information about updated energy efficiency metrics.

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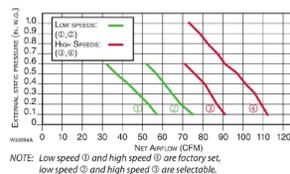
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©2023 Air-Conditioning, Heating, and Refrigeration Institute
CERTIFICATE NO.: 133247144299790

Simplified Installation (connection to a forced air system)



VENTILATION PERFORMANCE



ENERGY PERFORMANCE

Supply Temperature °C	Supply Temperature °F	Net Air Flow (CFM)	Power (Watts)	Sensible Energy (kWh)	Sensible Energy (BTU)	Ambient Sensible Energy (kWh)	Latent Recovery (kWh)	Latent Recovery (BTU)
0	32	23	88	40	67	73	75	0.55
0	32	30	144	109	50	65	70	0.51
0	32	40	85	144	64	61	66	0.51
-10	14	23	49	83	40	65	71	0.53
-25	-13	24	50	85	36	51	73	0.39

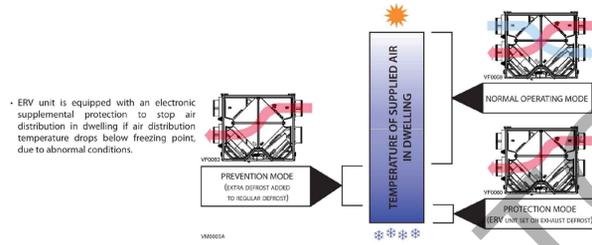
Acoustic Noise Power Chart (dBA)

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

The data shown on left chart come from measurement performed according to ISO 5136 Standard. These data represent the sound power directly measured at the fresh air distribution port and exhaust air from building port. To get the actual noise level in the room, consider noise attenuation resulting from total ductwork installation.

Coldshield™ Protection

ERV UNIT MODES BASED ON AIR DISTRIBUTION TEMPERATURE

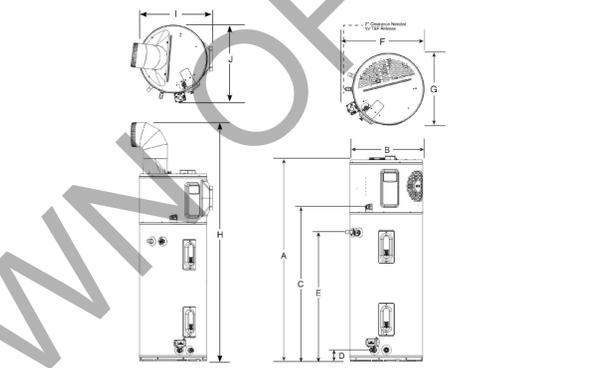


ERV unit is equipped with an electronic supplemental protection to stop air distribution in dwelling if air distribution temperature drops below freezing point, due to abnormal conditions.

Professional Prestige® ProTerra Hybrid Specifications

Model	Rated Capacity	Model Number	Model Voltage	Electrical Power (kW)	Electrical Power (HP)	Compressor	Sound Power Level (dB)	SEER	EER	Recovery (h)	Elementary Water	Total Water	Max. Amps	Unit Weight (kg)	Unit Weight (lb)
ProTerra with LeakGuard															
40	36	PROPH40 T2 RH075-S0	208/240	3.75	\$104	4,200	49	80	27	4,500	5,000	21	247	174	384
50	45	PROPH50 T2 RH075-S0	208/240	3.75	\$104	4,200	49	87	27	4,500	5,000	21	247	174	384
65	59	PROPH65 T2 RH075-S0	208/240	3.86	\$106	4,200	49	75	27	4,500	5,000	21	247	174	384
80	72	PROPH80 T2 RH075-S0	208/240	4.00	\$148	4,200	49	87	27	4,500	5,000	21	247	174	384
ProTerra 30 Amp without LeakGuard															
40	36	PROPH40 T2 RH075-S0	208/240	3.75	\$104	4,200	49	80	27	4,500	5,000	21	247	174	384
50	45	PROPH50 T2 RH075-S0	208/240	3.75	\$104	4,200	49	87	27	4,500	5,000	21	247	174	384
65	59	PROPH65 T2 RH075-S0	208/240	3.86	\$106	4,200	49	75	27	4,500	5,000	21	247	174	384
80	72	PROPH80 T2 RH075-S0	208/240	4.00	\$148	4,200	49	87	27	4,500	5,000	21	247	174	384
ProTerra 15 Amp without LeakGuard															
40	36	PROPH40 T2 RH075-S0	208/240	1.5	\$146	4,200	49	80	16	2,250	2,750	12	157	174	384
50	45	PROPH50 T2 RH075-S0	208/240	1.5	\$146	4,200	49	87	16	2,250	2,750	12	157	174	384
65	59	PROPH65 T2 RH075-S0	208/240	1.5	\$110	4,200	49	54	16	2,250	2,750	12	225	282	282
80	72	PROPH80 T2 RH075-S0	208/240	1.5	\$106	4,200	49	87	16	2,250	2,750	12	244	281	281

Estimated energy cost based on a residential average electricity cost of \$0.17/kWh. Unit's Energy Factor (UEF) value given is based on Department of Energy (DOE) requirements. All units have integrated WiFi control option.



Model	Rated Capacity	Model Number	Dimensions (mm)	Dimensions (inches)							
40	PROPH40	65-616	29-114	47	3-5/8	39-5/8	25-3/8	20-1/2	18-1/8	23-3/8	23-1/4
50	PROPH50	61-3/4	22-1/4	47	3-5/8	39-5/8	25-3/8	22-1/2	18-5/8	24-3/8	25-9/16
65	PROPH65	84-3/8	24-1/4	49	3-7/8	42-3/8	27-1/2	24-5/8	21-1/8	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	21-1/2	25-1/2	27-3/8

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SPECIFICATIONS: PEAD-A24AA7 & PUZ-A24NH7(BS)

Model	Rated Capacity	Model Number	Model Voltage	Electrical Power (kW)	Electrical Power (HP)	Compressor	Sound Power Level (dB)	SEER	EER	Recovery (h)	Elementary Water	Total Water	Max. Amps	Unit Weight (kg)	Unit Weight (lb)
Cooling at 95°F															
Maximum Capacity	BTU/h														
Rated Capacity	BTU/h														
Minimum Capacity	BTU/h														
Maximum Power Input	W														
Rated Power Input	W														
Moisture Removal	Pints/h														
Sensible Heat Factor	%														
Power Factor	%														
Heating at 47°F															
Maximum Capacity	BTU/h														
Rated Capacity	BTU/h														
Minimum Capacity	BTU/h														
Maximum Power Input	W														
Rated Power Input	W														
Power Factor	%														
Heating at 17°F															
Maximum Capacity	BTU/h														
Rated Capacity	BTU/h														
Maximum Power Input	W														
Rated Power Input	W														
Heating at 0°F															
Maximum Capacity	BTU/h														
Rated Capacity	BTU/h														
Maximum Power Input	W														

GENERAL FRAMING NOTES

- 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.
- 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 P5 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.) ¹	STUD GRADE, MINIMUM	BUILT UP HEADERS (2-2x)	D.F. #2, MIN. U.N.O.
MUDSILLS (2x MIN.) ²	P.T. DF. STD & BETTER	4x POSTS/BEAMS/RAFTERS	D.F. #2, MIN. U.N.O.
TOP PLATES (2x MIN.) ³	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 SHTG
FLR JOISTS (2x DIMENSIONAL)	D.F. #2, MIN. U.N.O.	LUMBER EXPOSED TO WEATHER ⁴	P.T. D.F. #2 U.N.O.

- 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.
- 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.
- 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.

- 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).

- ALL INTERIOR/DAMP CONSTRUCTION, UC2 CATEGORY, SHALL BE TREATED WITH SODIUM BORATE SBX/DOT.
 - 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.
- 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)
 - 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.
 - 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.

- 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.

- 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.
 - GLULAM MEMBERS, SEE PLAN SPECIFICATIONS FOR CAMBER WHERE OCCURS.

MATERIAL GRADE	E (x10 ³ 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

- GLULAM MEMBERS IN WET SERVICE USE SHALL BE ALASKAN CEDAR 20F-V12 (SINGLE SPAN) OR COMBINATION 20F-V13 (MULTI-SPAN & CANTILEVER) U.N.O.
 - GLULAM MEMBERS, SEE PLAN SPECIFICATIONS FOR CAMBER WHERE OCCURS.

MATERIAL GRADE	E (x10 ³ 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

- 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.

- 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.

- 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.) ²	E (x10 ³ psi)	Fb (psi)	Fv (psi)	Fc (psi)	F _{CL} (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

- BEAM DEPTH IS ASSUMED TO MATCH FLOOR FRAMING DEPTH U.N.O.
- MFR BEAM MEMBERS MAY BE BUILT UP TO ACHIEVE SPECIFIED WIDTHS PER DETAIL 609 U.N.O. ON PLANS.

- 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.

- 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.
- 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. 401

- PROVIDE KING STUDS AT THE ENDS OF ALL HEADERS OR OTHER BEAMS INSTALLED IN WALLS, SEE DETAIL SD4 ADJACENT, STACKING WINDOWS SHALL BE SEPARATED BY KING STUDS THAT ARE CONTINUOUS FROM SILL TO TOP PLATE. CRIPPLE STUDS UNDER HEADERS SHALL BE CONTINUOUS TO SILL PLATE. END NAIL KING STUDS TO HEADERS.

- ALL MEMBERS IN BEARING SHALL BE ACCURATELY CUT AND ALIGNED SO THAT FULL BEARING IS PROVIDED WITHOUT THE USE OF SHIMS.

- BLOCK ALL STUD WALLS AS REQUIRED FOR SHEATHING AND FINISHES. BALLOON FRAME ALL WALLS WITH SLOPING CEILING OR WITH RAISED CEILINGS.

- 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.

- 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.

- 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".

- 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).

- 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.

- 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.

- CONCRETE REQUIREMENTS: BASED ON NORMAL WEIGHT CONCRETE (UNIT WEIGHT OF 145 TO 150 pcf).

	MINIMUM COMPRESSIVE STRENGTH (psi) (+/- 1/2") (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.

- 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.
 - 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.

- 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.

- MIXING WATER SHALL BE CLEAN AND FREE FROM INJURIOUS AMOUNTS OF OIL, ACIDS, ALKALIES, ORGANIC MATERIALS OR OTHER DELTERIOUS SUBSTANCES.
- CONCRETE EXPOSED TO SULFATE SHALL USE TYPE V CEMENT WITH POZZOLAN.
- 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.
- ADMIXTURES CONTAINING CALCIUM CHLORIDE SHALL NOT BE USED.
- CEMENT SHALL CONFORM WITH ASTM C150 & C 595, PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENTS
- TRANSIT MIX SHALL BE PER ASTM C-94.
- MIX DESIGN SHALL MEET THE RECOMMENDED SPECIFICATION UNLESS AN ALTERNATE MIX IS SUBMITTED AND REVIEWED BY THE ENGINEER.

- 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:
 - ONE EACH DAY A GIVEN CLASS IS PLACED, NOR LESS THAN
 - ONCE FOR EACH 150 yd OF EACH CLASS PLACED EACH DAY, NOR LESS THAN
 - ONCE FOR EACH 5000 ft OF SLAB OR WALL SURFACE AREA PLACED EACH DAY.

- 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.
 - ALL BARS TO BE WELDED SHALL MEET THE REQUIREMENTS OF ASTM A706, GRADE 60.
 - WELDED WIRE FABRIC SHALL CONFORM TO ASTM
 - A-185, FLAT SHEETS ONLY. LAP FABRIC 6" MINIMUM.
 - REINFORCEMENT PLACEMENT SHALL CONFORM TO DETAIL A
 - ANCHOR BOLTS SHALL BE ASTM A307, U.N.O. AND SHALL CONFORM TO DETAIL SD3

- REINFORCEMENT 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

- CONCRETE CAST AGAINST EARTH, EXCEPT SLABS ON GRADE: 3" SLABS ON GRADE: 1-1/2" U.N.O.
- CONCRETE CAST IN FORMS, BUT EXPOSED TO EARTH OR WEATHER: NO. 5 REINFORCING AND SMALLER: 1-1/2" NO. 6 REINFORCING AND LARGER: 2"
- CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH THE GROUND: SLABS, WALLS AND JOISTS: 3/4" BEAMS AND COLUMNS: 1-1/2"

- UNFORMED CONCRETE SURFACE CURING:
 - CURE FOR ONE TO SEVEN DAYS BY MAINTAINING TEMPERATURE ABOVE 50 DEGREES FAHRENHEIT, AND IN A MOIST CONDITION.
 - APPLY MEMBRANE-FORMING CURING COMPOUND TO DAMP CONCRETE IMMEDIATELY AFTER COMPLETION OF THE MOIST-CURING PERIOD.

- 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.

- FOOTING/GRADE BEAM CONSTRUCTION JOINTS SHALL CONFORM TO DETAIL 204 SD2

- 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 205A 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 SD2

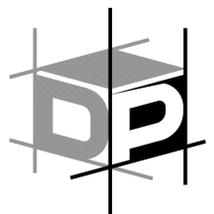
- ALL PIPES AND DUCTS THROUGH CONCRETE SHALL BE SLEEVED. VERIFY OPENINGS WITH PLUMBER AND ELECTRICIAN. SEE DETAIL 206 SD2

- 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 OCCURS) EXCEPT LOCATIONS WHERE SLAB IS INDEPENDENT OF FOUNDATION. CONTRACTOR SHALL PROVIDE SUPPORT CHAIRS TO ENSURE FABRIC IS LOCATED IN THE CENTER OF THE SLAB.

- WELDING OF REINFORCING BARS SHALL CONFORM TO AWS D1.4 USING ASTM A706 REINFORCING BAR SPECIFICATIONS.

STRUCTURAL STEEL NOTES

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



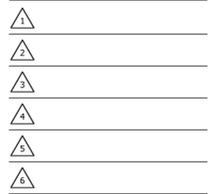
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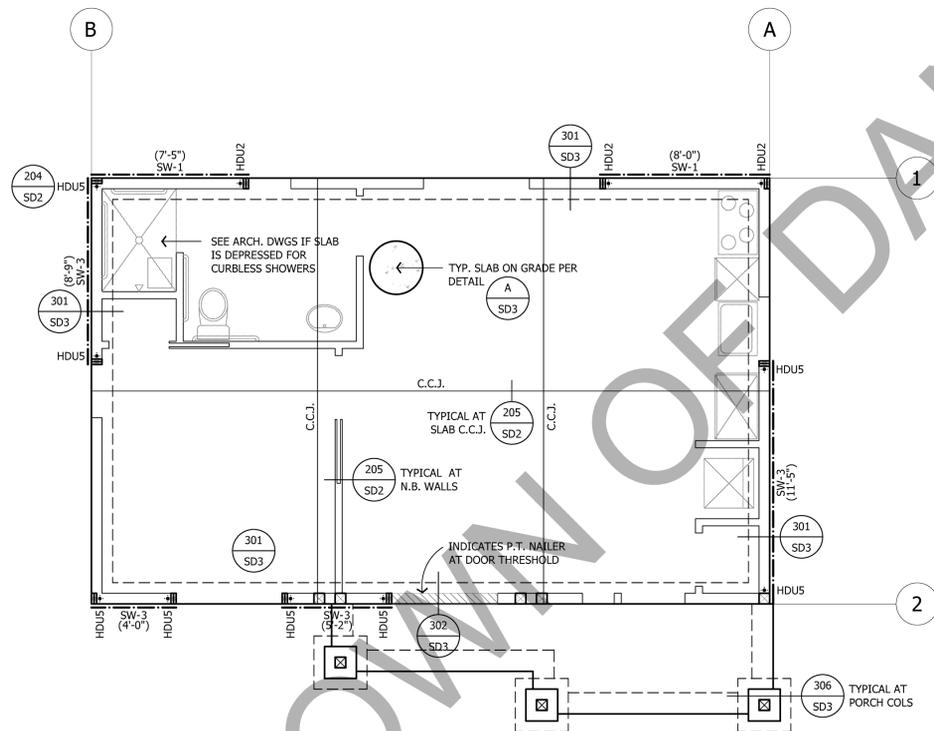
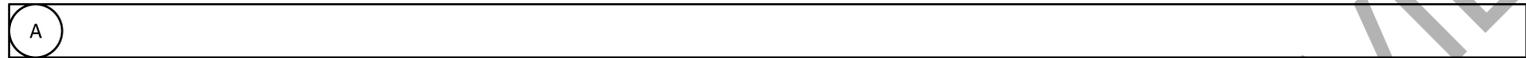
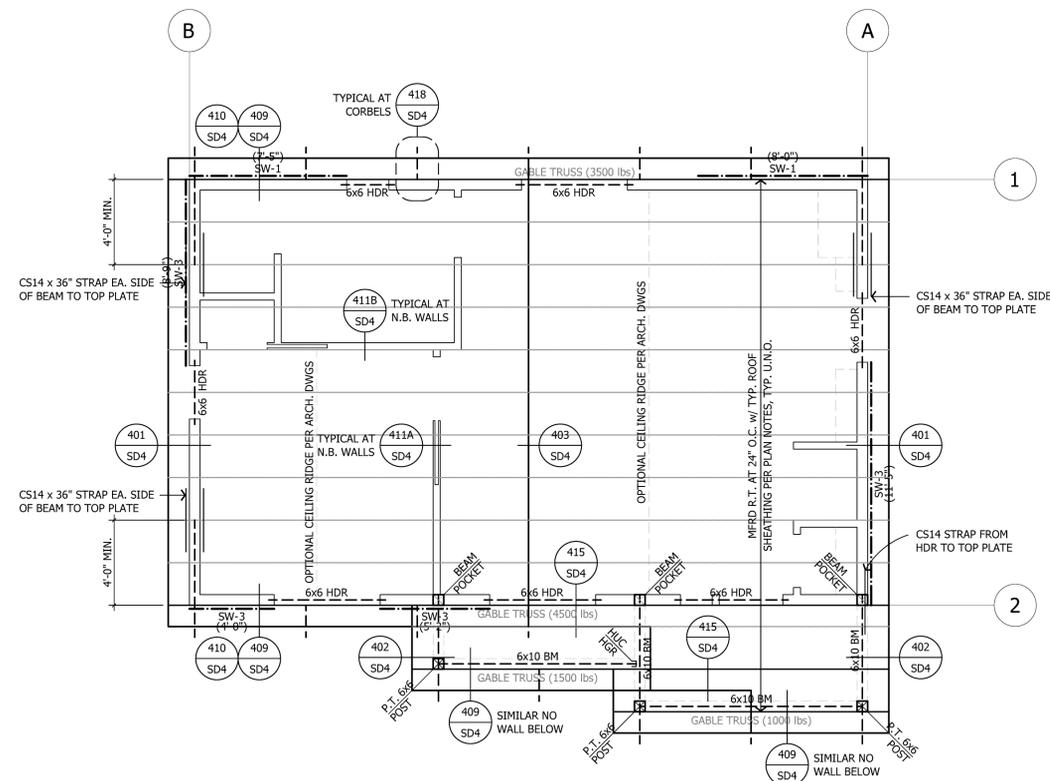
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Sheet Description:
GENERAL STRUCTURAL SPECIFICATIONS AND NOTES

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SN2

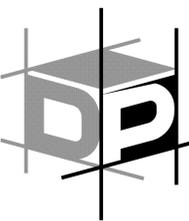


FOUNDATION NOTES

- 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.
- HOLD-DOWNS: HOLD-DOWNS NOTED OCCUR AT THE LEVEL OF FRAMING SHOWN FOR CONNECTION OF WALLS ABOVE TO FOOTING.
 - ALL HOLD-DOWN 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 HOLD-DOWNS SHALL BE INSTALLED WITH ANCHORS PER DETAIL (112) SD1.
 - CONTRACTOR SHALL REVIEW HOLD-DOWN ANCHOR REQUIREMENTS FOR EMBEDMENT CONDITIONS THAT REQUIRE DEEPENED STEM WALL. REFER TO (112) SD1 FOR REQUIREMENTS.
 - PROVIDE POSTS AT ALL HOLD-DOWNS 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 HOLD-DOWN PER FRAMER SHALL CONFIRM LAYOUT BEFORE CONCRETE IS POURED. NOTIFY ENGINEER OF CONFLICTS PRIOR TO PROCEEDING.
- CONTRACTOR SHALL REVIEW HOLD-DOWN ANCHOR REQUIREMENTS FOR EMBEDMENT CONDITIONS THAT REQUIRE DEEPENED FTG. REFER TO (112) SD1 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.
 - "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 (210) SD2 TO THE HEADER SCHEDULE, U.N.O. ON THE PLAN.
- 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 (103) SD1 PLAN). THE NUMBERS INDICATE THE MIN. DESIGN LENGTH OF THE SHEARWALL. SEE (103) SD1.
- HOLD-DOWN STRAPS: WHERE HOLD-DOWN STRAPS ARE SPECIFIED ON PLANS, INSTALL PER DETAIL (112) SD1 (113) SD1.
 - ALL NAIL HOLES SHALL BE FILLED ON HOLD-DOWN STRAPS



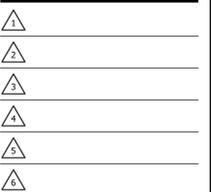
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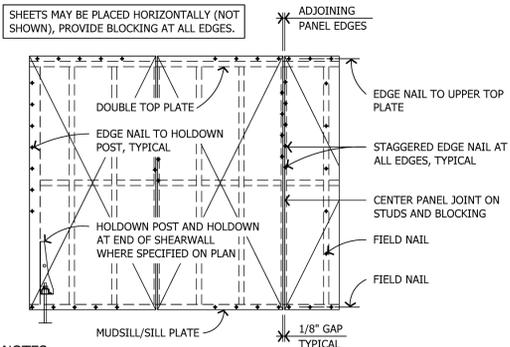


Sheet Description: **STUDIO MIRRORED PLAN**
STRUCTURAL ROOF FRAMING PLAN AND FOUNDATION PLAN

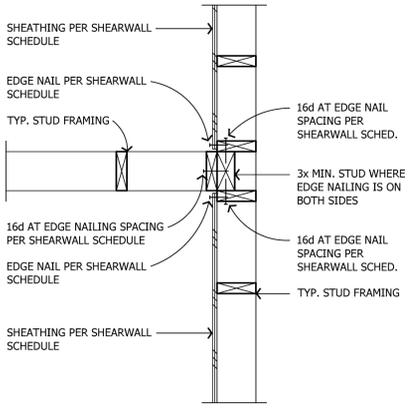
Scale: 1/4" = 1'-0"
Initial Issue Date: March 24, 2023
Drawn By: E. Bennett
Project Designer: J. Peek
Project Manager: J. Peek Ext. 23
Job No. W021420

Sheet No.

S1



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

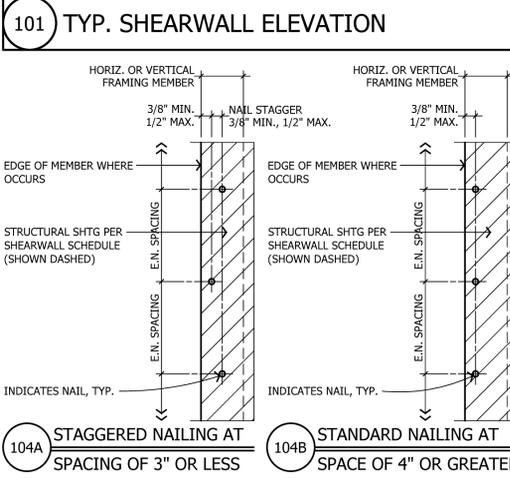


101 TYP. SHEARWALL ELEVATION

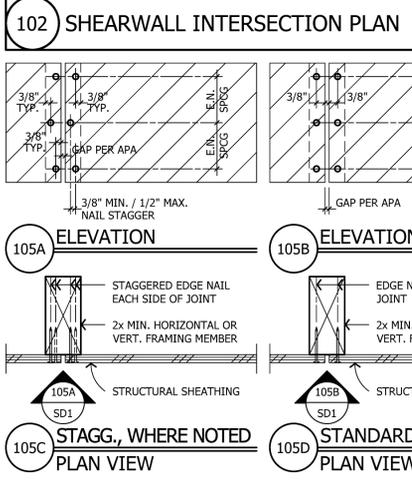
SHEARWALL LENGTH: SHEARWALL DESIGNATION:	X'-X" SW-1	X'-X" SW-2	X'-X" SW-3	X'-X" SW-4	X'-X" SW-5
	PLYWOOD OR O.S.B. SHEATHING THICKNESS:	15/32"	15/32"	15/32"	15/32"
10d EDGE NAIL (0.148 DIA):	10d @ 6" O.C.	10d @ 4" O.C.	10d @ 3" O.C.	10d @ 2" O.C.	10d @ 2" O.C.
10d FIELD NAIL (0.148 DIA.):	10d @ 21" O.C.	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
SILL CONNECTION: 16d NAIL (0.148 DIA.): SDS SCREW (SDS25600):	16d @ 4" O.C. SDS @ 21" O.C.	16d @ 3" O.C. SDS @ 14" O.C.	16d @ 2" O.C. SDS @ 9" O.C.	--	SDS @ 6" 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"	@ 16" O.C. MAX	@ 10" O.C. MAX	@ 8" O.C. MAX	@ 6" O.C. MAX	@ 6" O.C. MAX
TOP CONNECTION - "LTP4"	@ 23" O.C. MAX	@ 15" O.C. MAX	@ 12" O.C. MAX	@ 8" O.C. MAX	@ 8" O.C. MAX
TOP CONNECTION - "A35"	@ 24" O.C. MAX	@ 18" O.C. MAX	@ 13" O.C. MAX	@ 10" O.C. MAX	@ 8" O.C. MAX
ALLOWABLE SHEAR	310	460	600	770	870

SHEARWALL LENGTH: SHEARWALL 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
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. x 7.5"): 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 3x SILL	@ 18" O.C. MAX	@ 16" O.C. MAX	@ 12" O.C. MAX
TOP CONNECTION - "RBC"	@ 5" O.C. MAX	@ 5" O.C. MAX	--
TOP CONNECTION - "LTP4"	@ 7" O.C. MAX	@ 6" O.C. MAX	--
TOP CONNECTION - "A35"	@ 8" O.C. MAX	@ 6" O.C. MAX	@ 4.5" O.C. MAX
ALLOWABLE SHEAR	1020	1330	1740

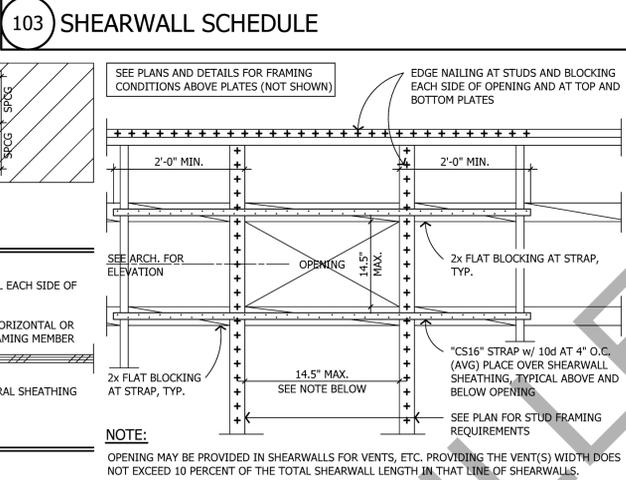
- ALL NAILS SHALL HAVE MINIMUM SHANK DIAMETER AS SPECIFIED IN SCHED.
- ALL FASTENERS THAT ARE INSTALLED INTO OR IN CONTACT WITH PRESSURE TREATED LUMBER ARE TO BE HOT DIPPED GALVANIZED PLYWOOD AND OSB SHALL BE TYPE CDX GRADE OR BETTER (EXCEPT WHERE STRUCTURAL 1 GRADE IS NOTED).
- STR. 1 = STRUCTURAL 1 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"x3"x0.229" 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



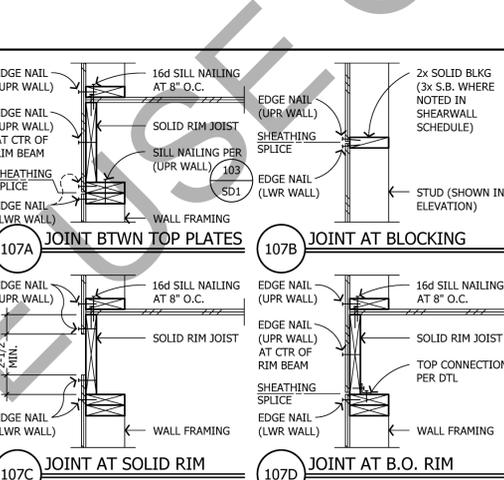
102 SHEARWALL INTERSECTION PLAN



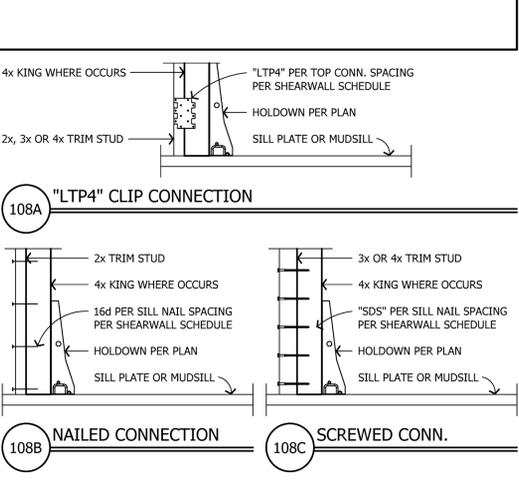
103 SHEARWALL SCHEDULE



104 TYP. SHEARWALL EDGE NAIL PATTERN



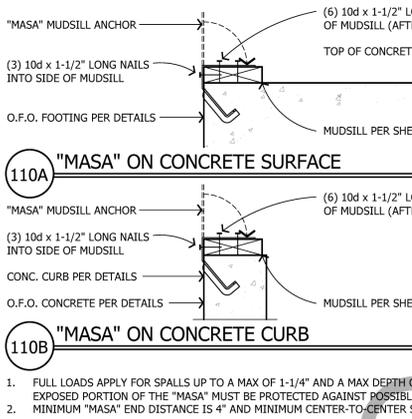
105 SHEARWALL SHEATHING AT JOINT



106 SMALL OPENING IN SHEARWALL

SHEARWALL DESIGNATION	ALTERNATIVE MUDSILL ANCHORAGE	
	"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.	24" O.C.
X'-X" SW-5	9" O.C.	24" O.C.
X'-X" SW-6	8" O.C.	24" O.C.
X'-X" SW-7 & SW-8	NOT ALLOWED	16" O.C. 3/4" DIA. TITEN HD

107 SHEATHING JOINT AT RIM OR BLKG



108 TRIM STUD TO HOLDOWN POST

NOMINAL ANCHOR DIA.	DRILL BIT DIA.	MAX. INSTALL TORQUE	MAX. IMPACT WRENCH TORQUE RATING	EMBEDMENT DEPTH	CRITICAL EDGE DISTANCE
3/4"	3/4"	150	385	7.5"	7 5/16"

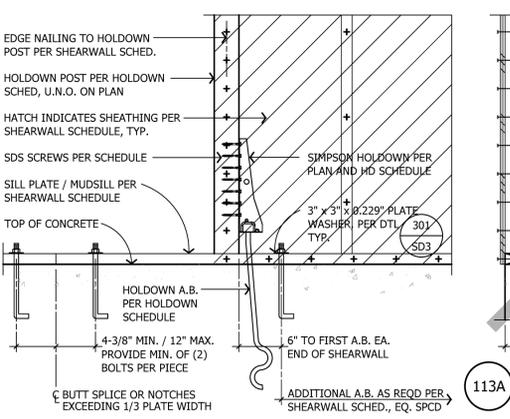
109 ALTERNATIVE MUDSILL ANCHORAGE

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

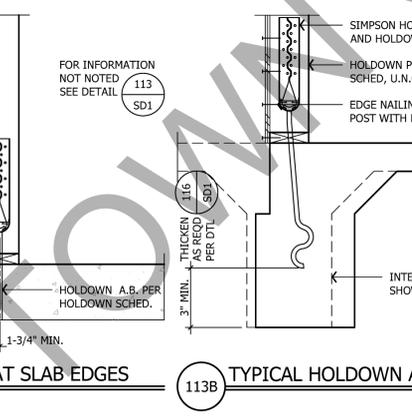
110 MASA ANCHORAGES

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(A)	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

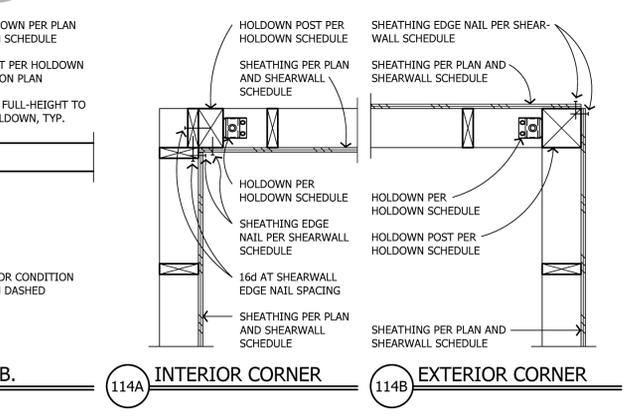
111 "TITEN HD" ANCHORAGE & NOTES



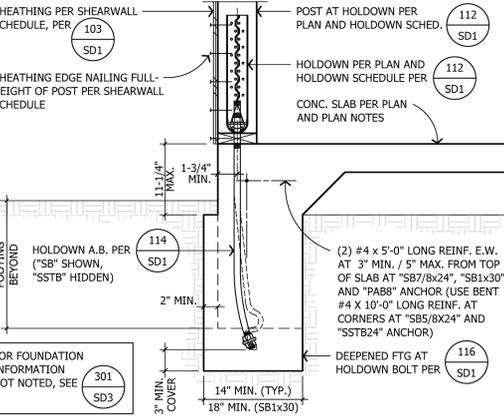
112 SLAB HOLDOWN SCHEDULES



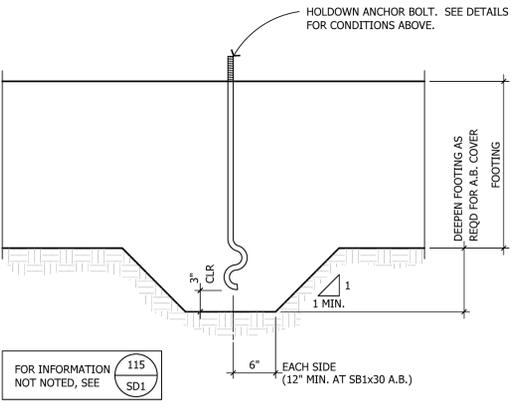
113 AT SLAB EDGES



114 HOLDOWN AT SHEARWALL CORNER (PLAN)



115 HOLDOWN A.B. TO EXTERIOR FOOTING



116 DEEPENED FOUNDATION (FOR A.B.)

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 SHEARWALL SCHEDULE AND HOLDOWN SCHEDULE AND TYPICAL DETAILS

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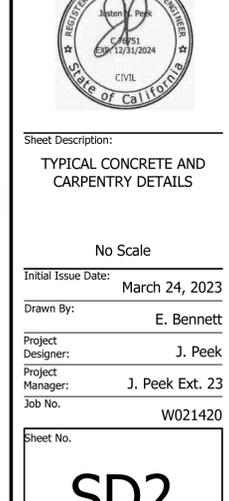
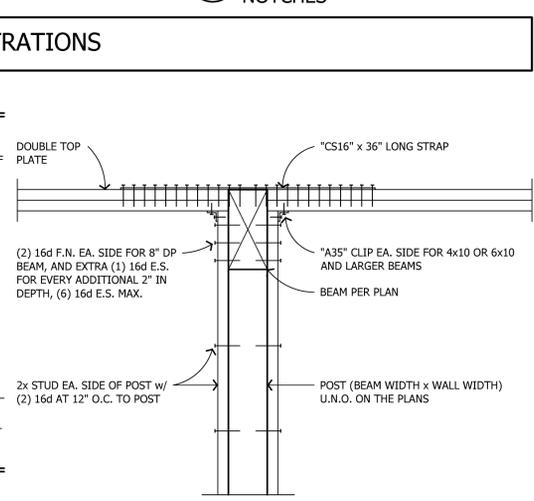
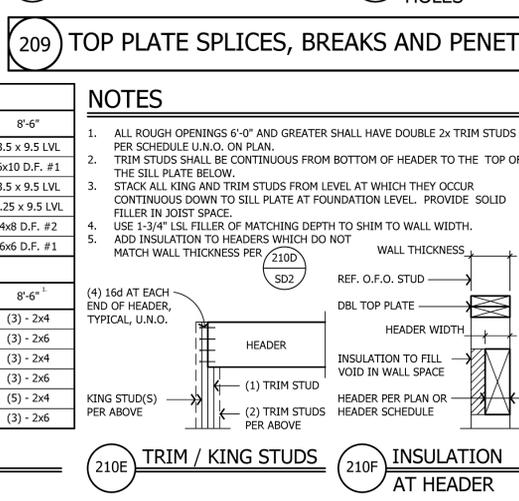
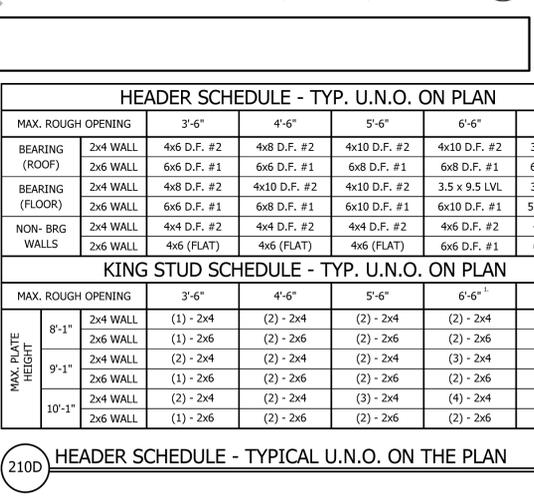
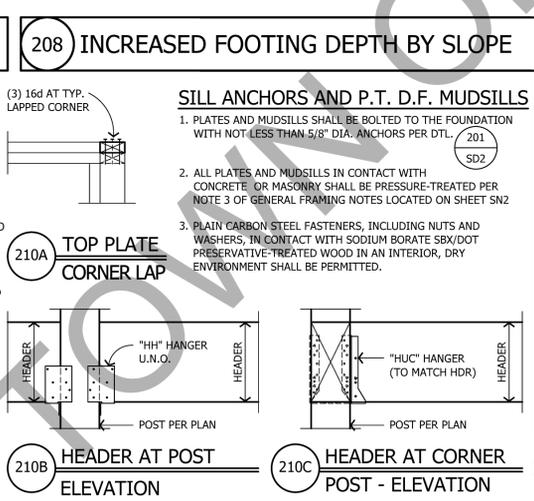
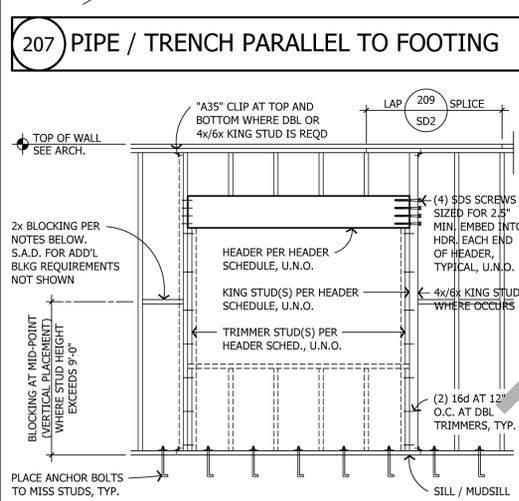
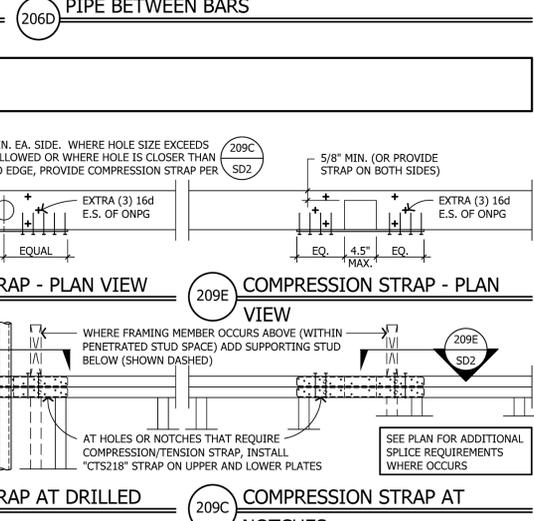
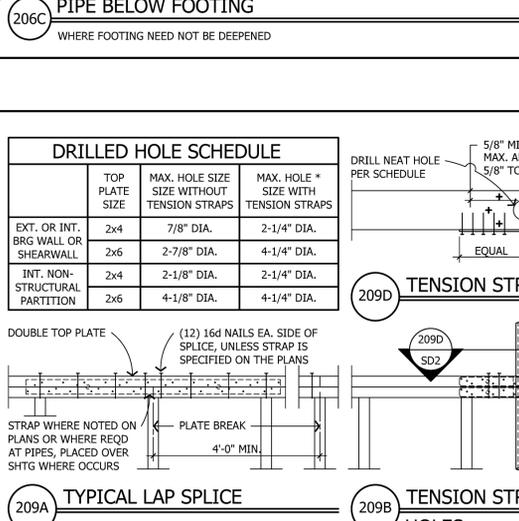
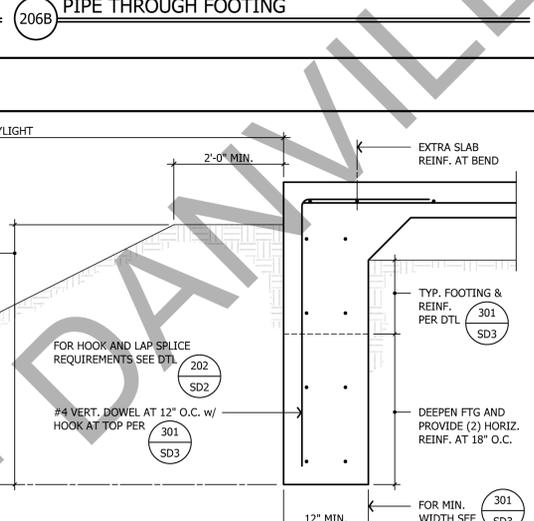
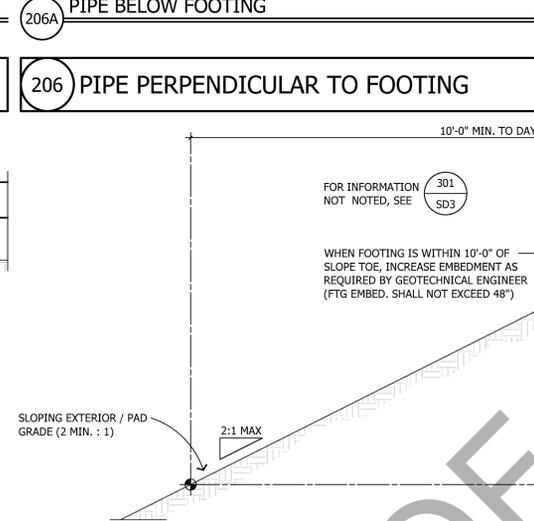
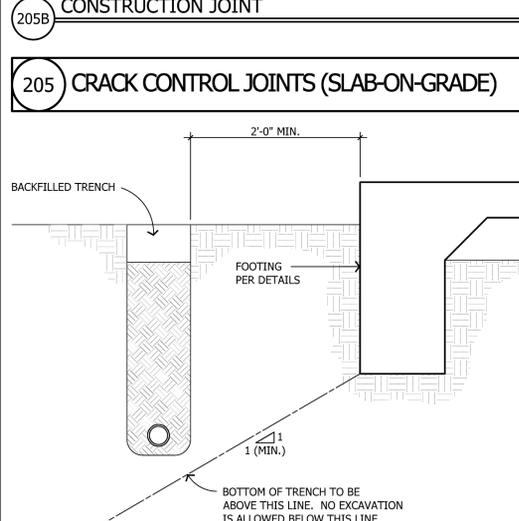
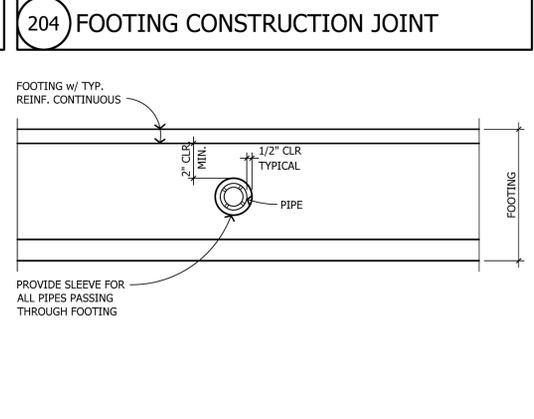
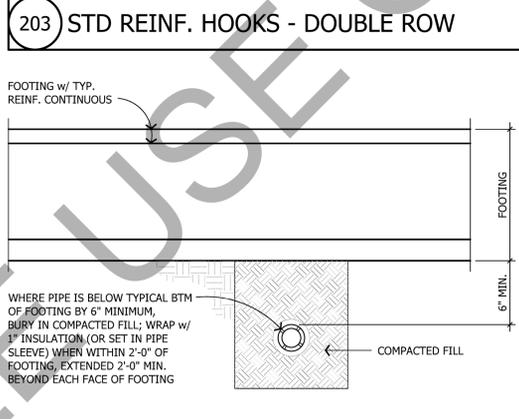
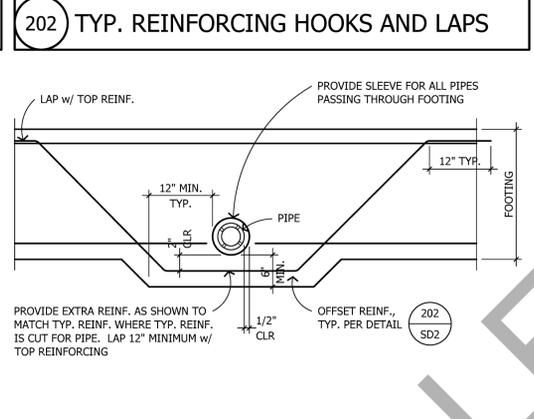
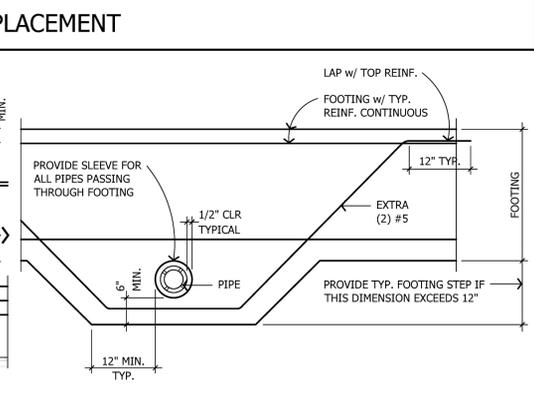
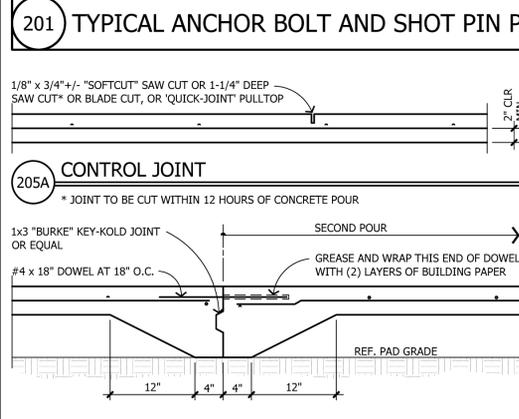
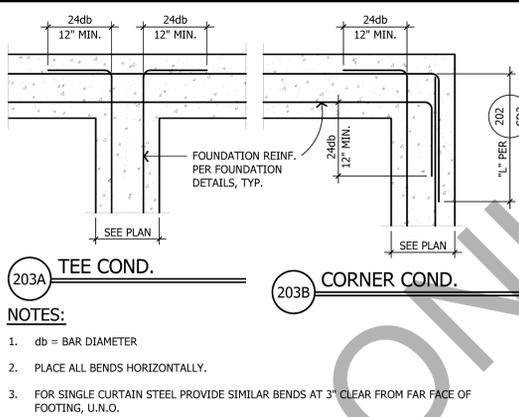
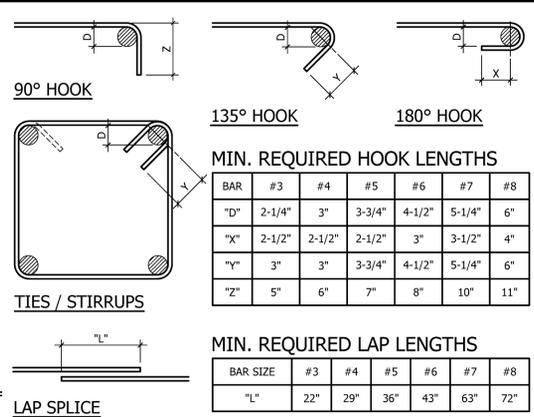
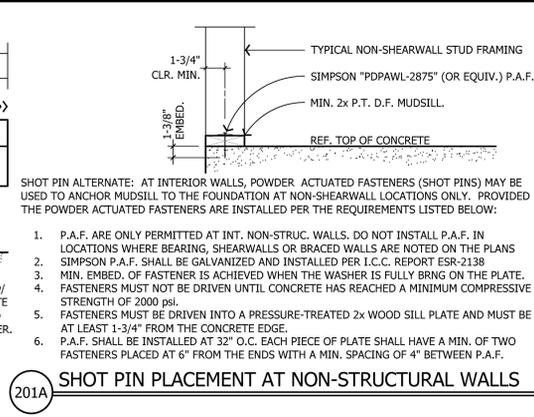
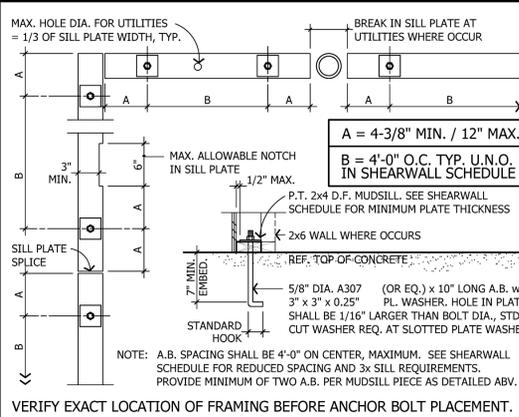
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Project Manager: J. Peek Ext. 23

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TYPICAL CONCRETE AND CARPENTRY DETAILS

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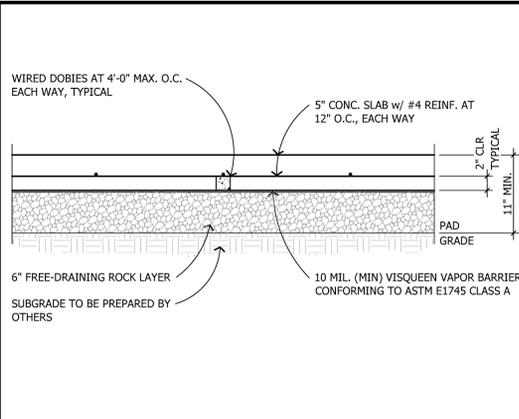
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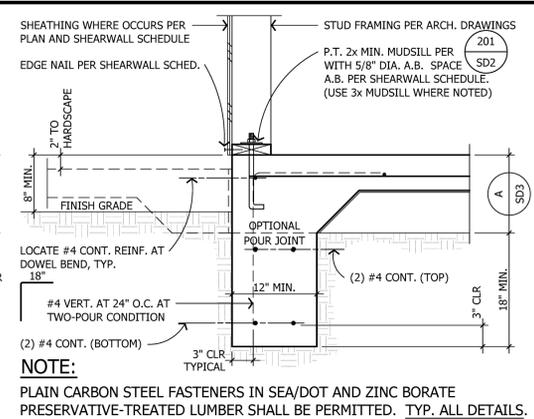
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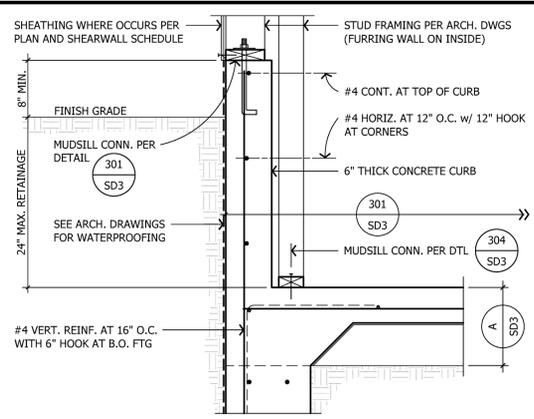
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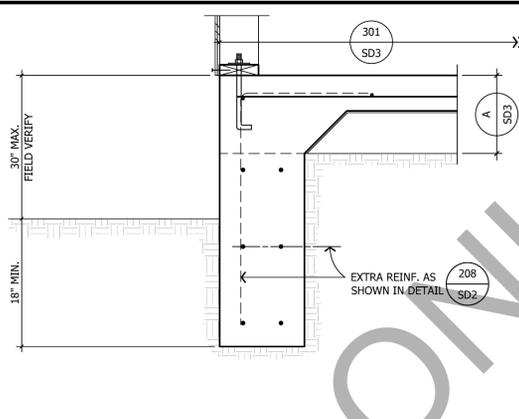
A TYPICAL SLAB-ON-GRADE SECTION



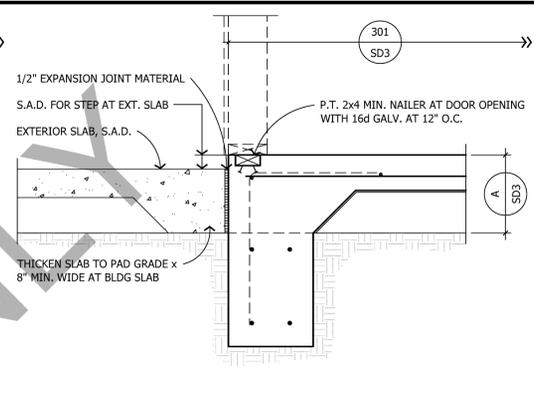
301 TYPICAL PERIMETER FOOTING



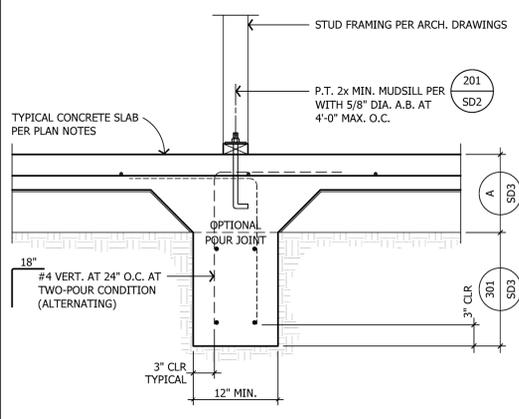
301A RAISED CONC. CURB AT HIGH GRADE COND.



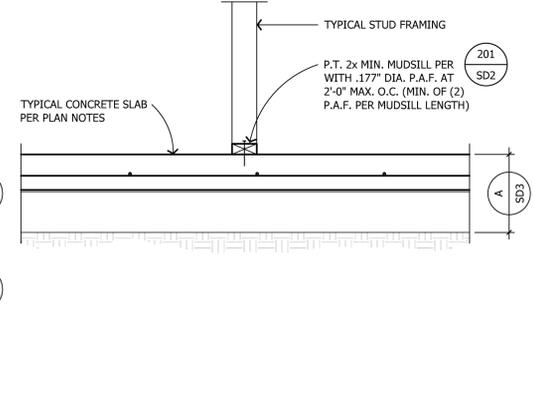
301B DEEPENED FOOTING AT LOW GRADE COND.



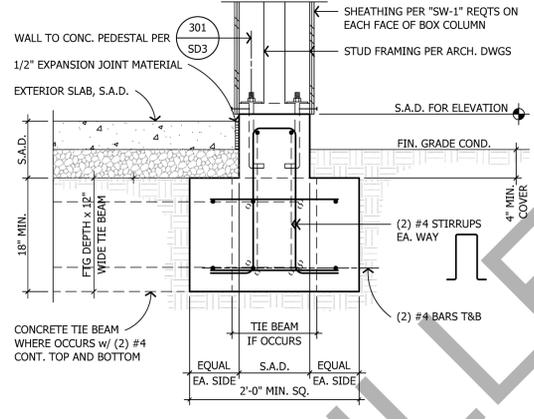
302 THRESHOLD EMBEDDED NAILER AT DOOR



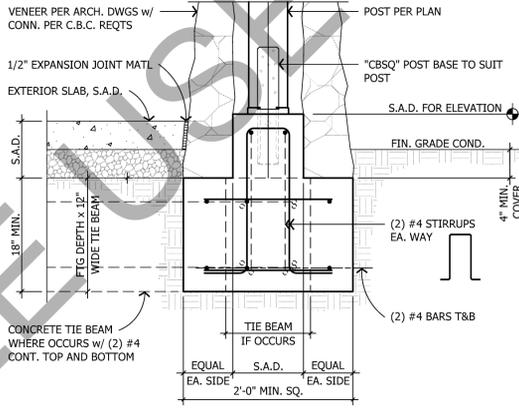
303 TYPICAL INTERIOR FOOTING



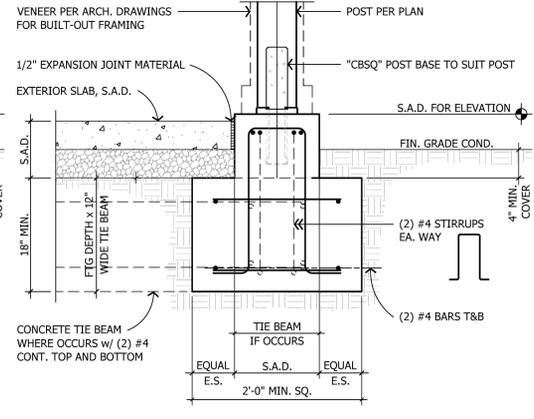
304 NON BRG / NON-SHEARWALL TO SLAB



305 PORCH STUD COLUMN AND FOOTING



306 PORCH STUD COLUMN AND FOOTING



307 PORCH STUD COLUMN AND FOOTING

TOWN OF DANVILLE



ADVANCED ENGINEERING

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CRAFTSMAN**

DANVILLE, CALIFORNIA

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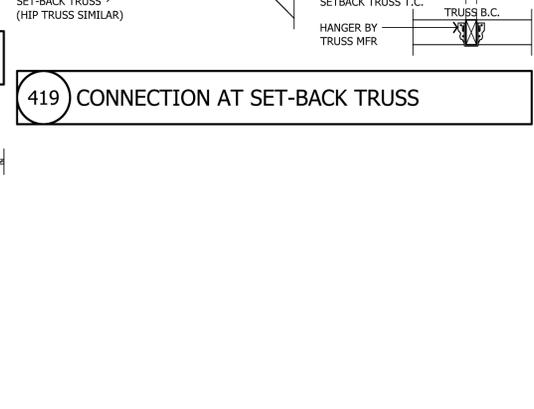
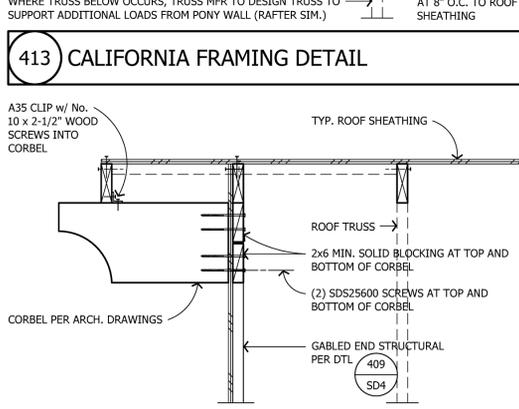
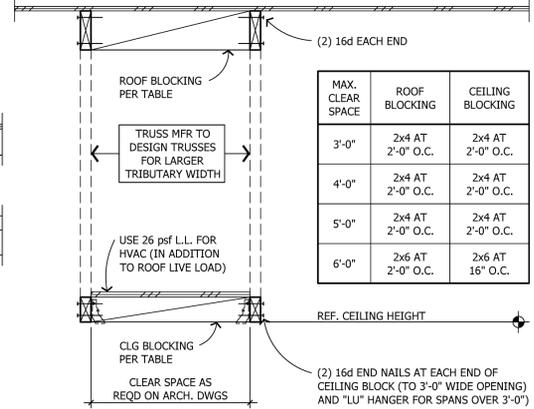
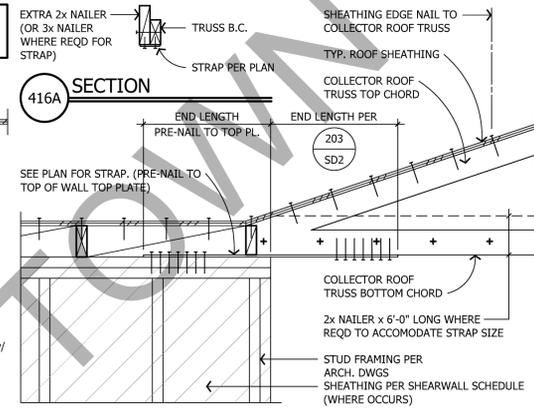
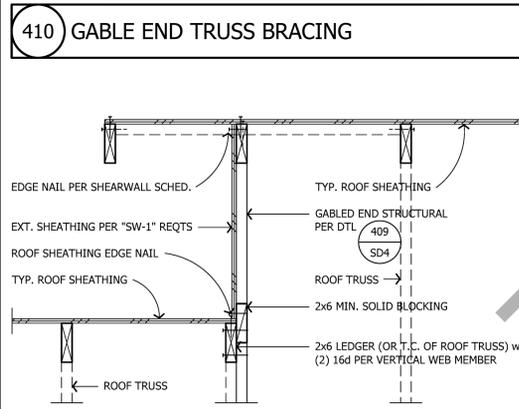
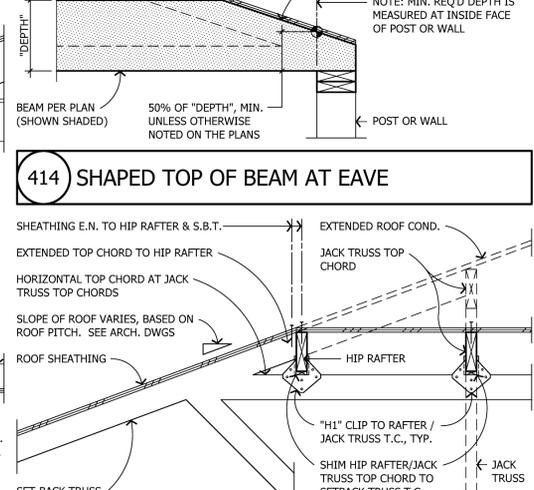
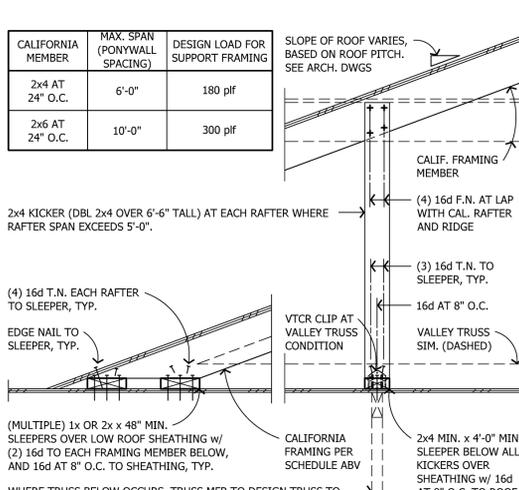
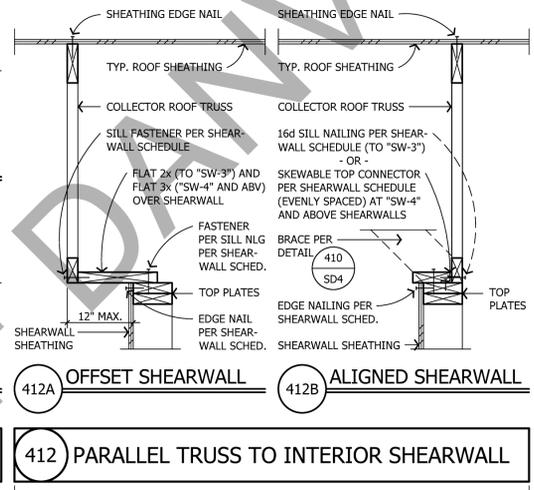
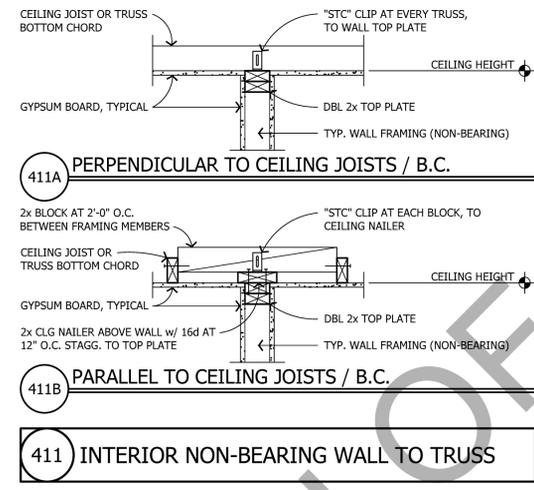
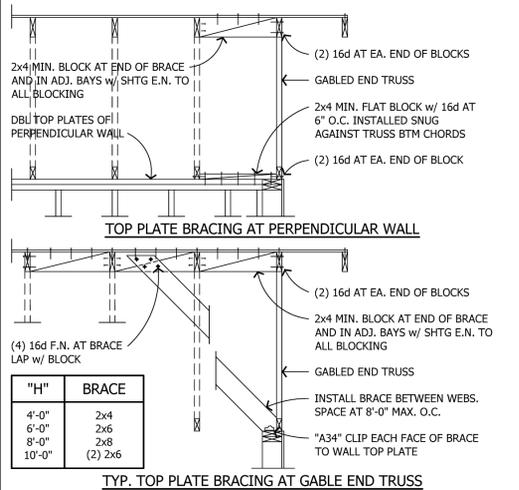
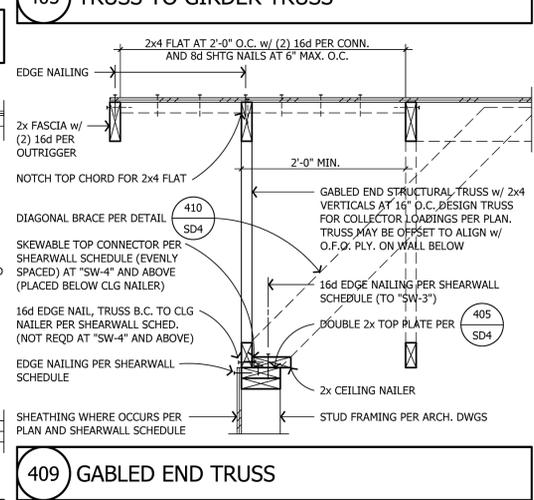
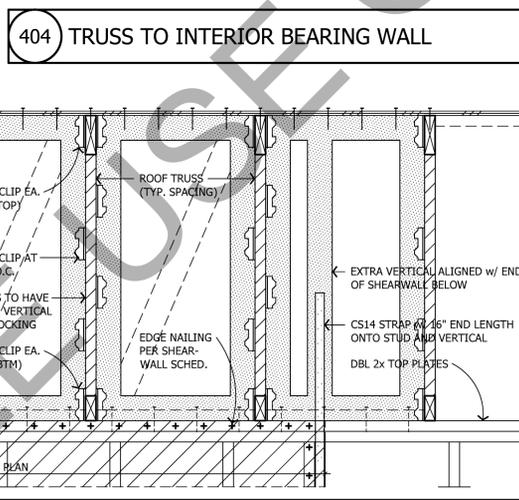
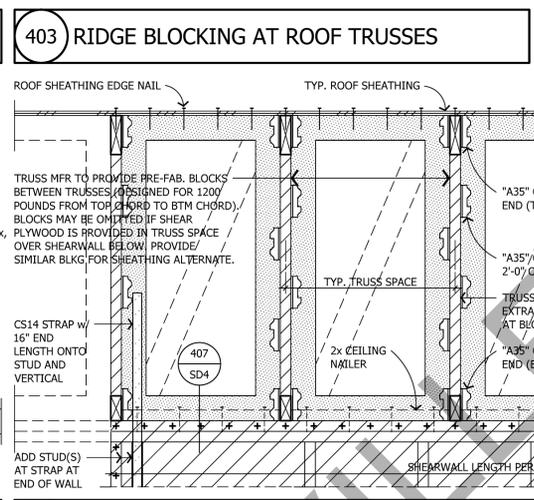
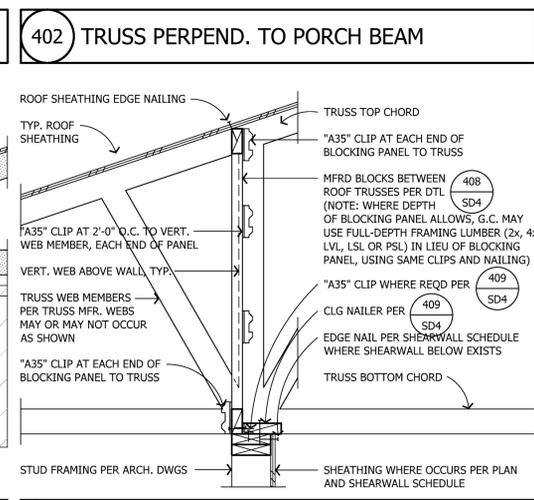
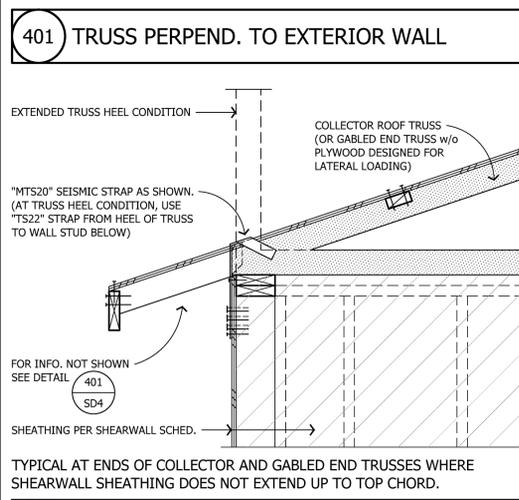
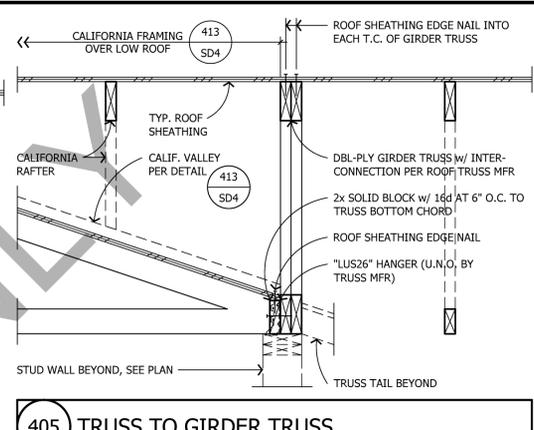
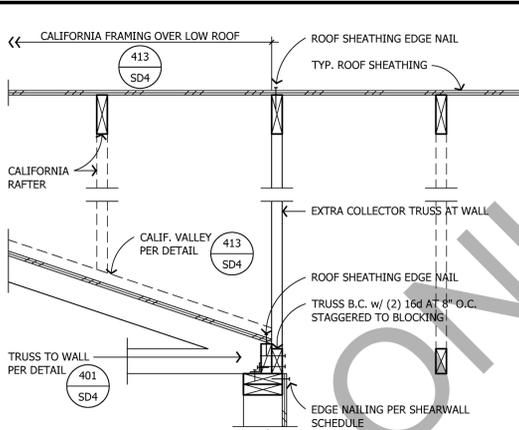
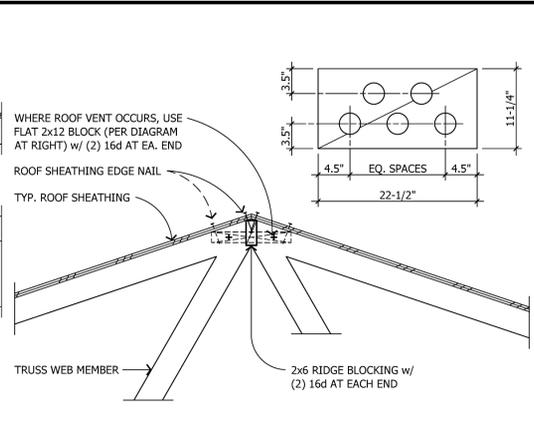
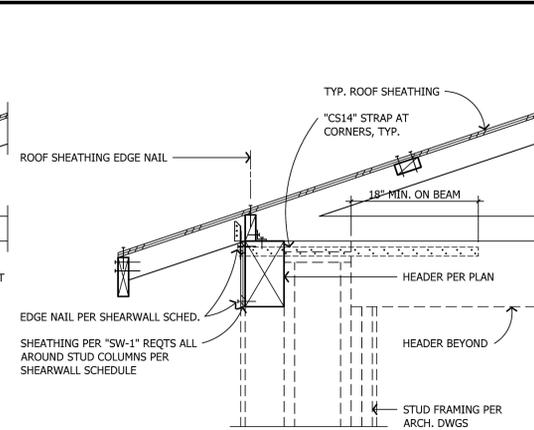
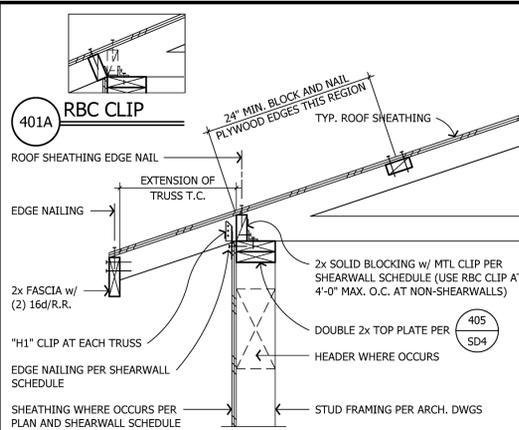
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Engineering Seal:



Sheet Description:
**FOUNDATION DETAILS
SLAB ON GRADE**

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



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 DANVILLE, CALIFORNIA

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 Engineering Seal:



Sheet Description:
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

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

NOTES:

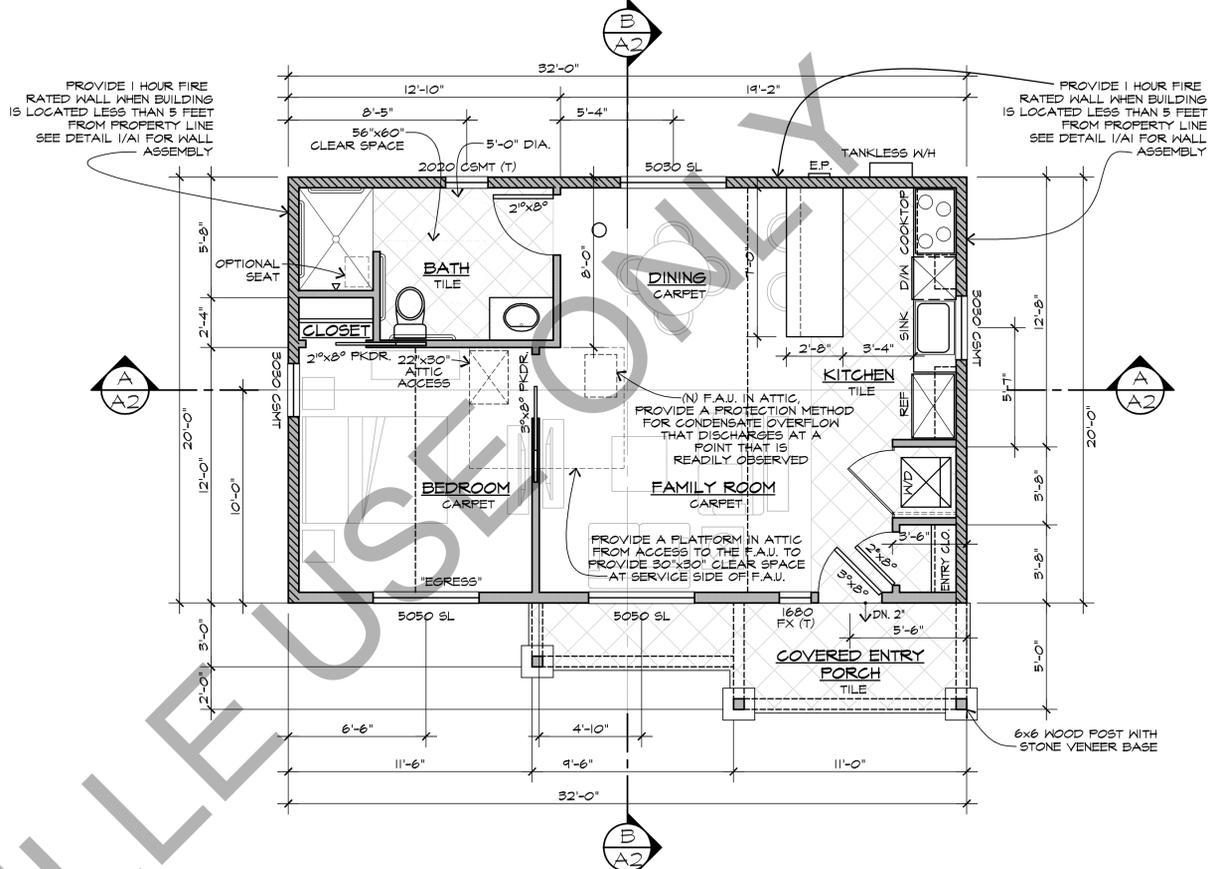
- 1) ALL NEW EXTERIOR WALLS TO BE 2X6 FRAMED STUD WALLS.
- 2) WINDOWS MARKED W/ (T) SHALL BE TEMPERED SAFETY GLASS.
- 3) ALL WINDOW HEAD HTS. SHALL BE 8'-0" TYP. UNLTD.
- 4) ALL WINDOWS MARKED "EGRESS" SHALL MEET MIN. EMERGENCY EGRESS WINDOW STANDARDS OF MIN. NET CLEAR OPENING OF 5.7 SQ. FT., 4 MIN. 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 W/M. 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 T02.3.7.

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

42"X20" = 840"/144 = 5.8 SQ.FT.

ESCAPE OR RESCUE WINDOWS SHALL HAVE A MINIMUM NET CLEAR OPENABLE AREA OF 5.7 SQ.FT. (0.53 M²). EXCEPT: THE MINIMUM NET CLEAR OPENING FOR EMERGENCY ESCAPE AND RESCUE GRADE-FLOOR OPENINGS SHALL BE 5 SQUARE FEET (0.46M²). 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.

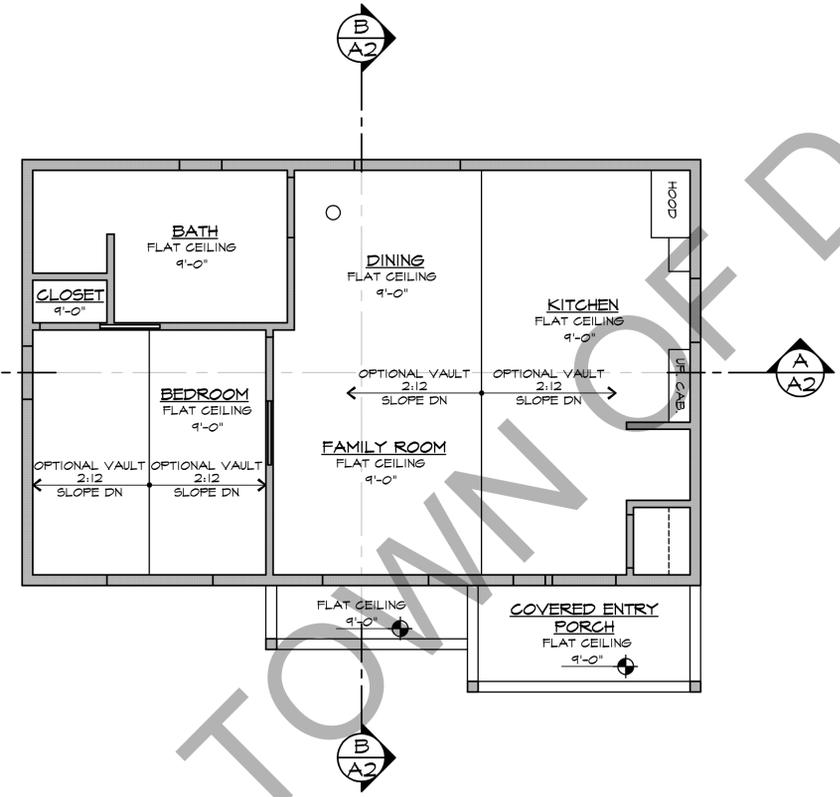
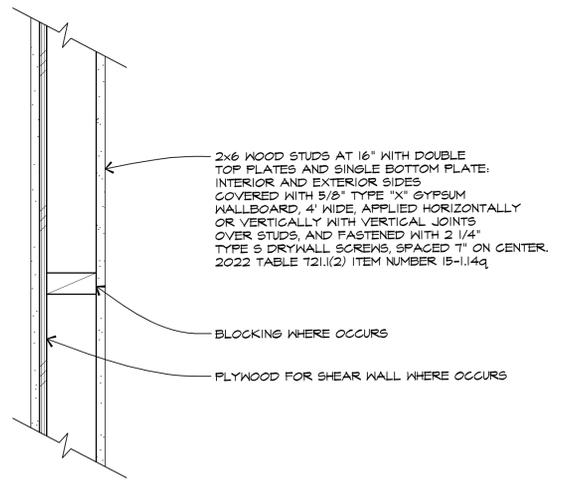
CONTRACTOR NOTE: CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL EGRESS REQUIREMENTS.



FLOOR PLAN (CRAFTSMAN STYLE)

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

1 1 HOUR FIRE RATED WALL DETAIL



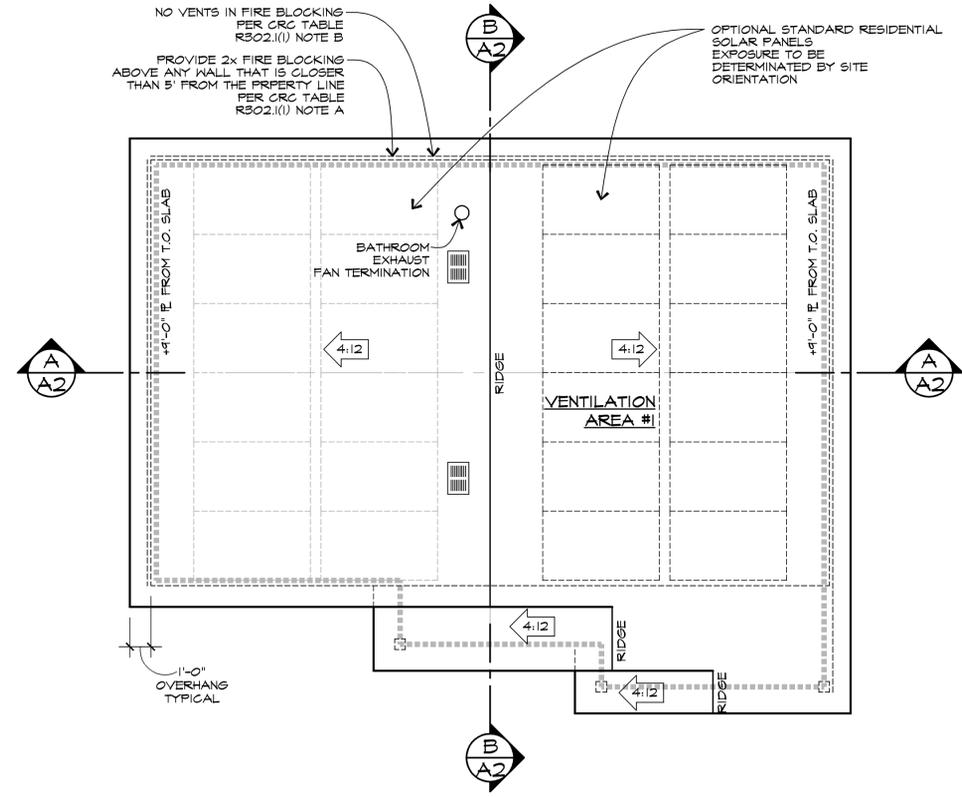
REFLECTED CEILING PLAN

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

VENTILATION CALCULATIONS

AREA I

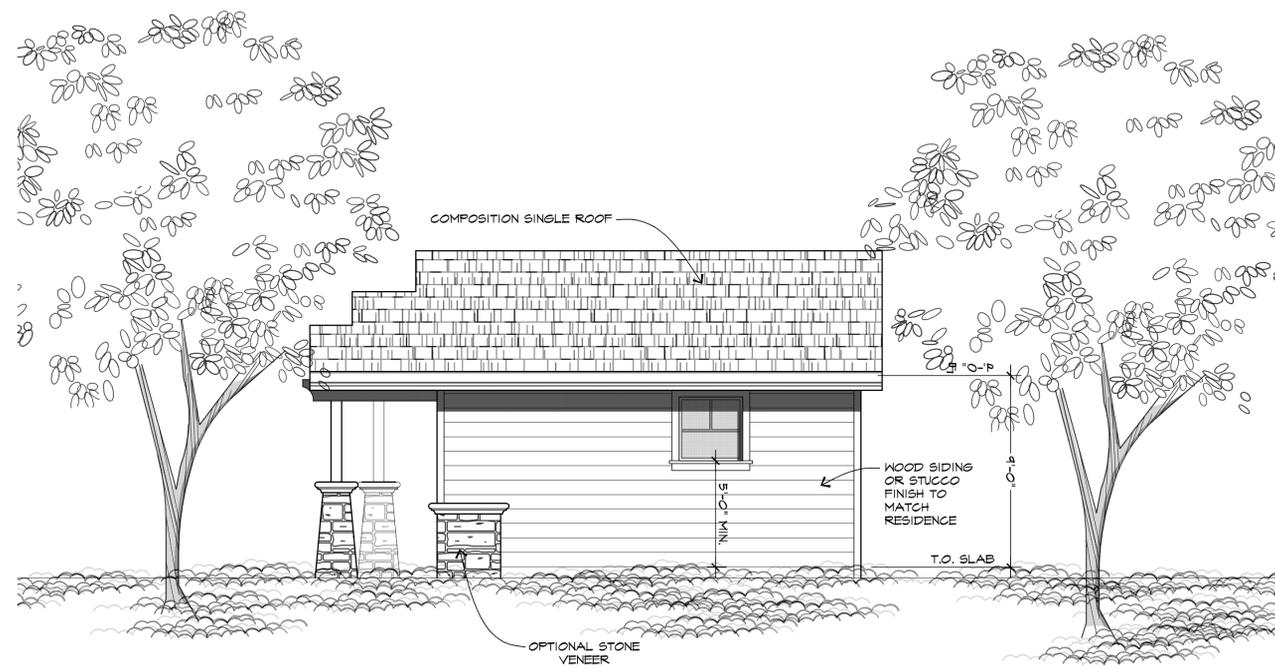
- * ATTIC AREA: 724 SQ. FT.
- * REQUIRED AREA: 347.5 SQ. IN. (CONVERTED TO INCHES @ 1/300)
- * UPPER AREA: 173.75 SQ. IN. (50% REQUIRED IN UPPER 1/3)
- * PROVIDE 173.75 SQ. IN. IN UPPER 1/3 OFF ROOF WITH O'HAGINS "FLAT" VENT (93.75 SQ. IN. FREE AREA) * 2 VENTS REQUIRED
- * LOWER AREA: 173.75 SQ. IN. (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

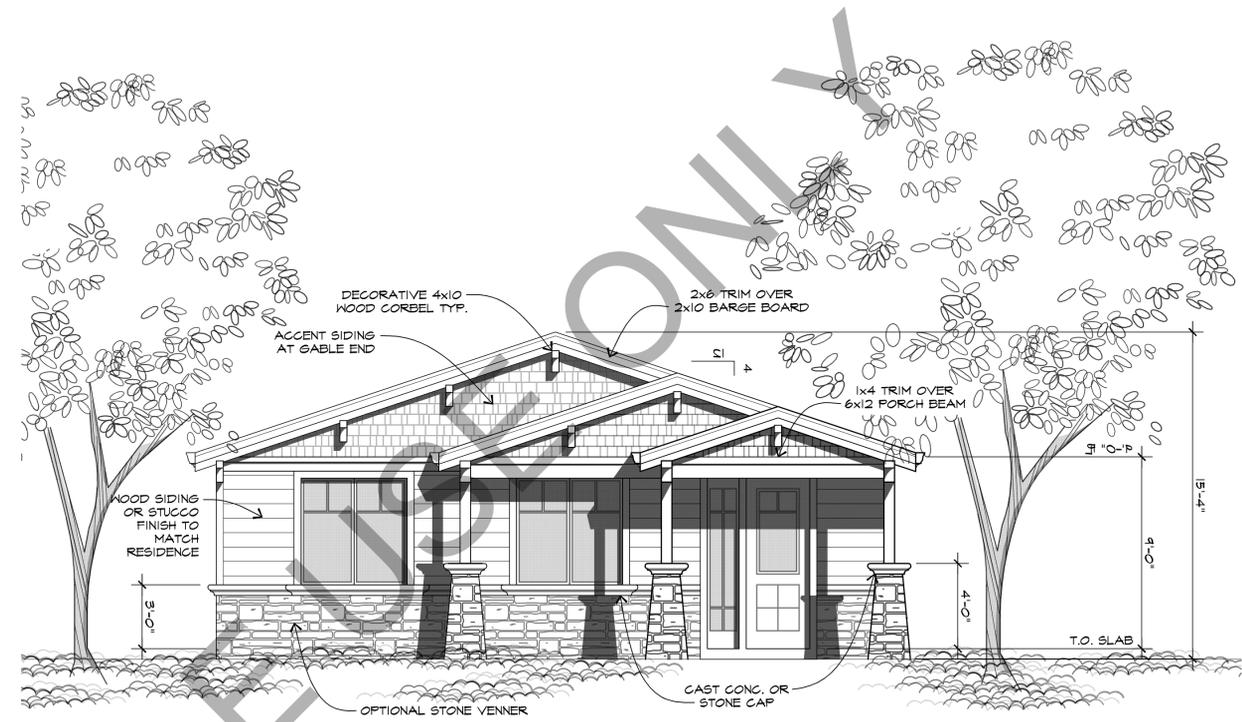
SCALE: 1/4" = 1'-0"

Apr. 26, 2023 - 4:00pm A2 Studio Craftsman style.dwg



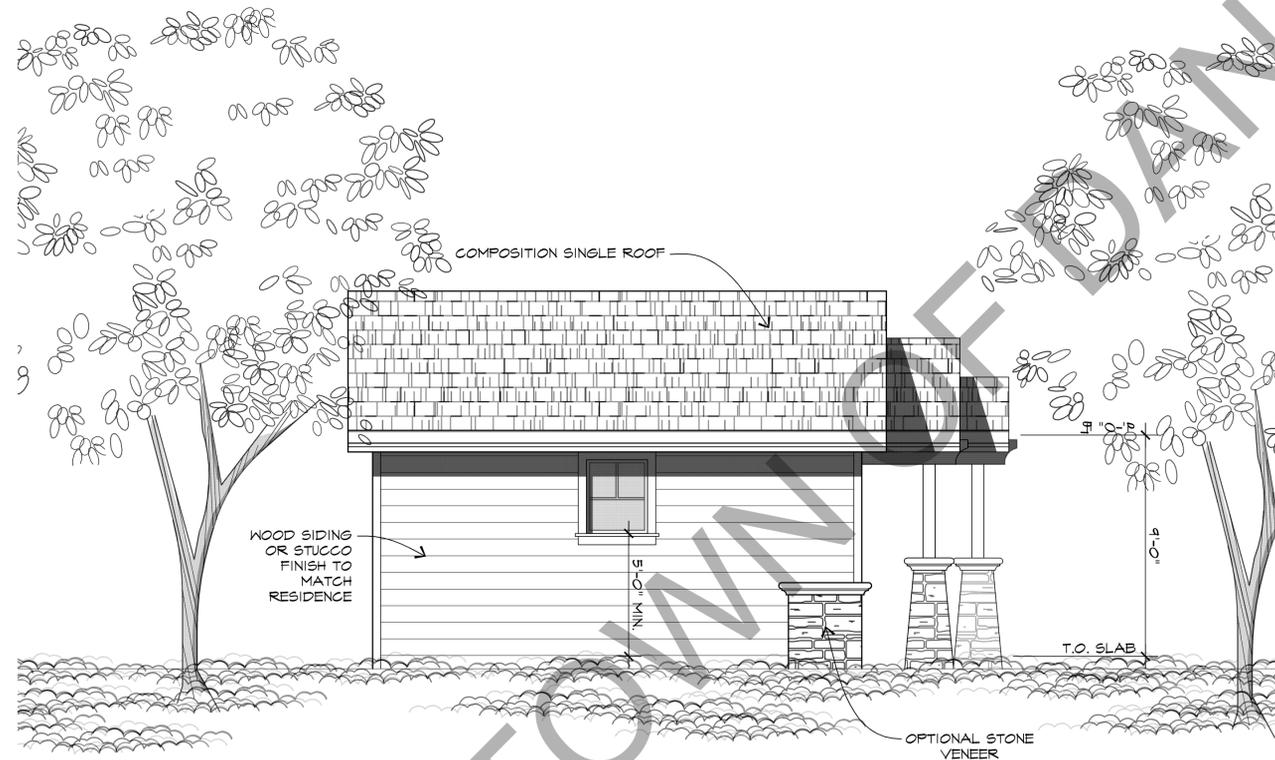
RIGHT ELEVATION (CRAFTSMAN STYLE)

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



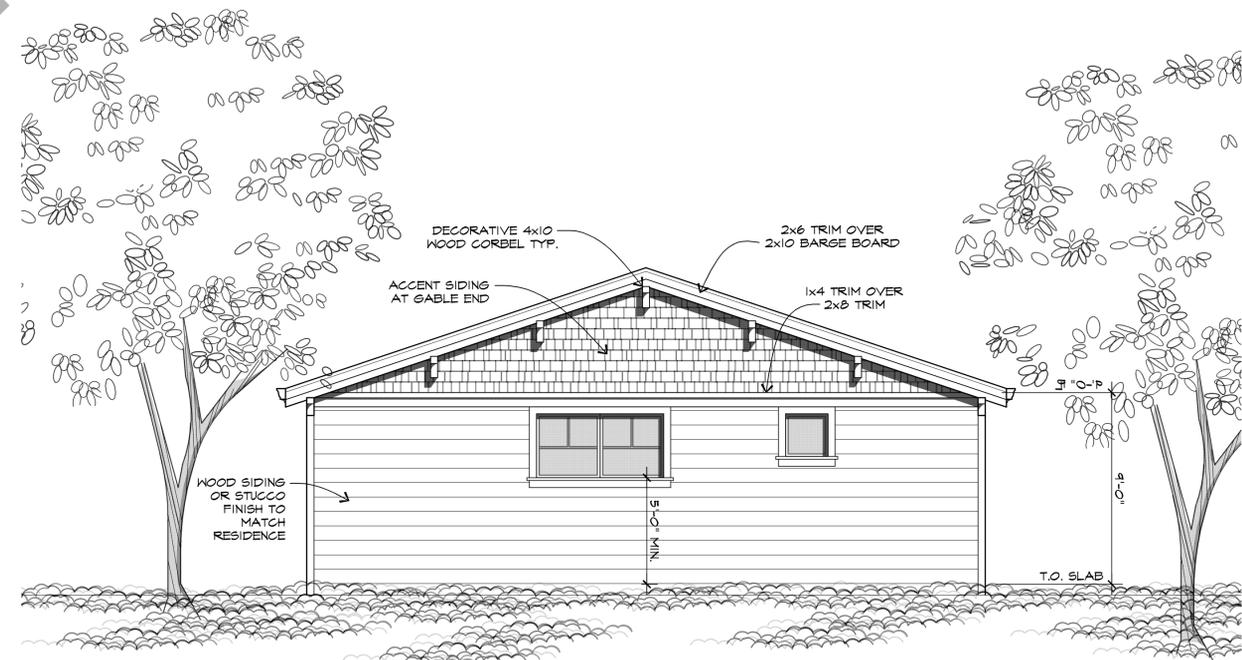
FRONT ELEVATION (CRAFTSMAN STYLE)

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



LEFT ELEVATION (CRAFTSMAN STYLE)

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



REAR ELEVATION (CRAFTSMAN STYLE)

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

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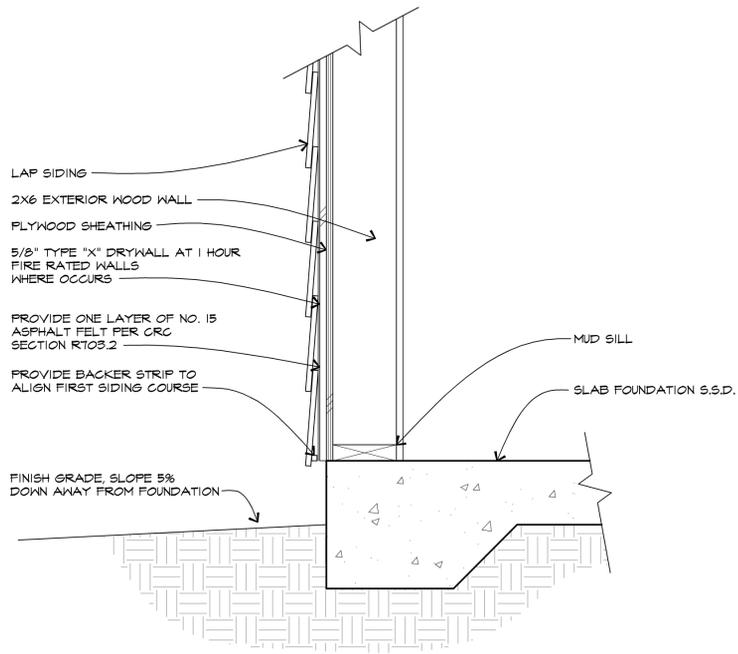
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CHECKED	WW
DATE	03-30-23
SCALE	AS SHOWN
JOB NO.	20.921R
SHEET	

A3

OF SHEETS

Apr. 26, 2025 - 4:55pm A3 Studio Craftsman style.dwg



TYPICAL WALL DETAIL

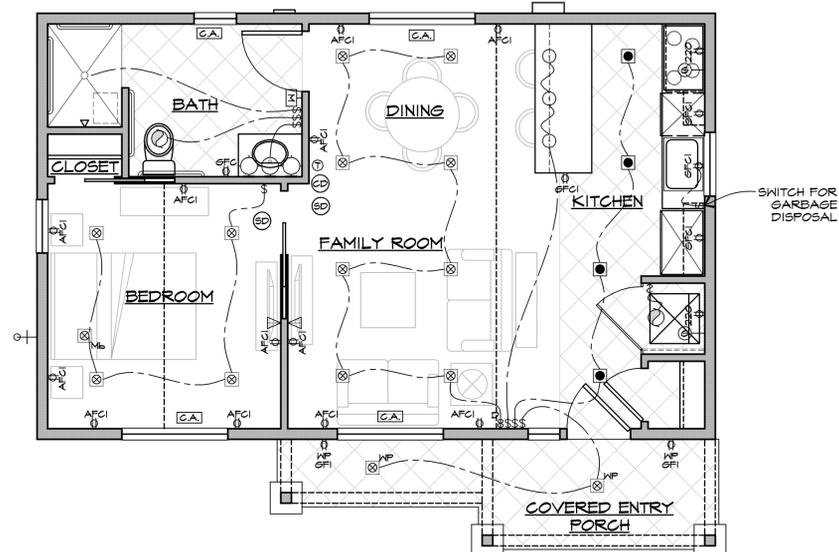
SCALE: 1/2" = 1'-0"

ELECTRICAL/MECHANICAL KEY

- ⊕ SWITCHED RECEPTACLE OUTLET @ 12' U.N.O.
- ⊕^{AFCI} DUPLEX RECEPTACLE OUTLET @ 12' U.N.O. W/ ARC-FAULT CIRCUIT INTERRUPTER
- ⊕^{GFCI} DUPLEX RECEPTACLE OUTLET W/ GROUND FAULT CIRCUIT INTERRUPTER
- ⊕^{W/P} WEATHER PROOF DUPLEX RECEPTACLE OUTLET (GFCI PROTECTED PER NEC210-8(a)(3))
- ⊕²²⁰ DUPLEX RECEPTACLE OUTLET - 220 VOLT
- ⊕ SINGLE POLE SWITCH @ 40" U.N.O.
- ⊕³ THREE-WAY SWITCH
- ⊕^{W/D} SWITCH W/ DIMMER
- ⊕^M SWITCH W/ MOTION LIGHT
- ⊕^{MS} MOTION SENSOR
- ⊕ CEILING MOUNTED LIGHT FIXTURE
- ⊕ WALL MOUNTED LIGHT FIXTURE
- ⊕^{W/D} WALL MOUNTED LIGHT FIXTURE - SHALL BE SUITABLE FOR DAMP LOCATIONS
- ⊕ HANGING LIGHT
- ⊕ RECESSED LED CEILING LIGHT FIXTURE
- ⊕^{W/D} RECESSED LED LOW VOLTAGE CEILING LIGHT
- ⊕^{W/P} RECESSED LIGHT FIXTURE - SHALL BE LABELED SUITABLE FOR DAMP LOCATIONS
- ⊕ 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)
- ⊕ GAS OUTLET
- ⊕ THERMOSTAT
- ⊕^{CA} CEILING SUPPLY AIR REGISTER
- ⊕^{FA} FLOOR AIR SUPPLY REGISTER
- ⊕^{RA} COLD AIR RETURN @ CEILING

ELECTRICAL NOTES

- 1) THERMOSTAT LOCATION TO BE DETERMINED BY HVAC DESIGNER.
- 2) CEILING AIR REGISTERS TO BE DETERMINED BY HVAC DESIGNER.
- 3) KITCHEN & BATHROOM LIGHTING SHALL MEET EFFICIENCY REQUIREMENT OF 2022 TITLE 24.
- 4) CONTRACTOR TO PROVIDE A COLD WATER CONNECTION @ THE REFRIGERATOR.
- 5) CONTRACTOR TO PROVIDE THE ORTION OF GAS OR 220V @ THE COOK TOP (VERIFY W/ OWNER).
- 6) WATER CLOSETS TO BE MAX 1.20 GALLONS PER FLUSH PER CAL GREEN SECTION 4.303.11.
- 7) INSTALLATION INSTRUCTIONS FOR ALL EQUIP. SHALL BE PROVIDED TO THE FIELD INSPECTOR @ THE TIME OF INSPECTION.
- 8) 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 FLUGS, RANGE HOOD DISPOSALS, DISHWASHERS OR MICROWAVES-ONLY THE REQUIRED COUNTERTOP/OUTLETS INCLUDING THE REFRIGERATOR.
- 9) PROVIDE A DEDICATED 20-AMP BRANCH CIRCUIT TO SUPPLY THE LAUNDRY RECEPTACLE OUTLET.
- 10) PROVIDE AN ARC-FAULT CIRCUIT INTERRUPTER TO PROTECT ALL RECEPTACLES IN THE BEDROOMS.
- 11) PROVIDE RECEPTACLE OUTLETS IN FOLLOWING LOCATIONS:
 - A. 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.
 - B. AN EXTERIOR RECEPTACLES AT THE FRONT AND REAR OF THE HOME. THEY MUST BE WITHIN 6 FEET 6 INCHES OF GRADE AND WATERPROOF.
 - C. ONE RECEPTACLE FOR THE LAUNDRY, (I.E. WASHER).
 - D. IN ANY HALLWAY 10 FT OR MORE IN LENGTH.
- 12) KITCHEN COUNTERTOP RECEPTACLES SHALL BE LOCATED ABOVE THE COUNTERTOP NOT MORE THAN 18", AND MAY NOT BE INSTALLED FACE-UP IN THE COUNTER.
- 13) 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.
- 14) 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 UNIT 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.
- 15) EXHAUST FANS TO BE 50 CFM INTERMITTENT OR 20 CFM CONTINUOUS. IN WATER CLOSETS, 50 CFM CONTINUOUS.
- 16) ALL RECEPTACLES 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).
- 17) CONDUIT IN CONCRETE SLAB IS TO BE RATED FOR WET LOCATIONS. CEC 430.
- 18) PROVIDE DEDICATED CIRCUITS FOR BATHROOM CIRCUITS SERVING ONLY THE RECEPTACLES PER CEC201.11(1)(3).
- 19) PROVIDE TAMPER RESISTANT RECEPTACLES IN ALL NEW CIRCUITS PER CEC SECTION 406.12 & 406.4(D)(5).
- 20) OUTDOOR LIGHTS TO BE "HIGH EFFICACY" OR "LOW EFFICACY" AND ON PHOTO/MOTION SENSOR PER CA ENERGY SECTION 150.0(k)(9A).
- 21) HOSE BIBBS SHALL HAVE NON-REMOVABLE BACKFLOW PREVENTER OR BID-TYPE VACUUM BREAKER.
- 22) WATER CLOSETS TO BE 1.20 GALLONS PER FLUSH MAXIMUM OR DUAL FLUSH PER CPC 411.2.
- 23) KITCHEN FAUCET TO BE 1.0 GALLONS PER MINUTE, MAXIMUM PER CPC 4.303.1.4.4.
- 24) LAVATORY FAUCET TO BE 1.2 GALLONS PER MINUTE, MAXIMUM, PER CPC 401.2.2.
- 25) SHOWER HEADS TO BE 1.8 GALLONS PER MINUTE AT 80 PSI, MAXIMUM, PER CPC 403.3.



ELECTRICAL/ MECHANICAL PLAN

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

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

A4
 OF SHEETS

Apr. 26, 2023 - 4:01pm A4 Studio Craftsman style.dwg

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 Craftsman Studio

Calculation Date/Time: 2023-03-30T18:27:39-07:00

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Calculation Description: Title 24 Analysis

Input File Name: Danville ADU_Craftsman_Studio.ribd22

GENERAL INFORMATION					
01	Project Name	Danville ADU Craftsman 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 (ft²)	0	15	Number of Stories	1
16	Existing Cond. Floor Area (ft²)	n/a	17	Fenestration Average U-factor	0.3
18	Total Cond. Floor Area (ft²)	640	19	Glazing Percentage (%)	19.20%
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-P010038751A-000-000-0000000-0000

Registration Date/Time:

2023-03-31 08:34:18

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 18:28:22

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ENERGY DESIGN RATINGS						
	Energy Design Ratings			Compliance Margins		
	Source Energy (EDR1)	Efficiency ¹ EDR (EDR2efficiency)	Total ² EDR (EDR2total)	Source Energy (EDR1)	Efficiency ¹ EDR (EDR2efficiency)	Total ² EDR (EDR2total)
Standard Design	39.9	45.2	53.8			
Proposed Design						
North Facing	31.8	40.5	51	8.1	4.7	2.8
East Facing	32	41.6	51.7	7.9	3.6	2.1
South Facing	31.4	39.4	50.3	8.5	5.8	3.5
West Facing	32.2	43.7	53	7.7	1.5	0.8
RESULT³: PASS						
¹ Efficiency EDR includes improvements like a better building envelope and more efficient equipment ² Total EDR includes efficiency and demand response measures such as photovoltaic (PV) system and batteries ³ 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"> 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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ENERGY USE SUMMARY						
Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft² -yr)	Standard Design TDV Energy (EDR2) (kTDV/ft² -yr)	Proposed Design Source Energy (EDR1) (kBtu/ft² -yr)	Proposed Design TDV Energy (EDR2) (kTDV/ft² -yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)
Space Heating	7.21	31.73	3.12	23.96	4.09	7.77
Space Cooling	1	30.5	0.92	31.5	0.08	-1
IAQ Ventilation	0.88	9.46	1.38	14.79	-0.5	-5.33
Water Heating	3.59	37.63	2.64	27.67	0.95	9.96
Self Utilization/Flexibility Credit				0		0
North Facing Efficiency Compliance Total	12.68	109.32	8.06	97.92	4.62	11.4
Space Heating	7.21	31.73	3.1	23.5	4.11	8.23
Space Cooling	1	30.5	1.08	34.6	-0.08	-4.1
IAQ Ventilation	0.88	9.46	1.38	14.79	-0.5	-5.33
Water Heating	3.59	37.63	2.64	27.67	0.95	9.96
Self Utilization/Flexibility Credit				0		0
East Facing Efficiency Compliance Total	12.68	109.32	8.2	100.56	4.48	8.76

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ENERGY USE SUMMARY						
Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft ² -yr)	Standard Design TDV Energy (EDR2) (kTDV/ft ² -yr)	Proposed Design Source Energy (EDR1) (kBtu/ft ² -yr)	Proposed Design TDV Energy (EDR2) (kTDV/ft ² -yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)
Space Heating	7.21	31.73	2.92	22.02	4.29	9.71
Space Cooling	1	30.5	0.91	30.79	0.09	-0.29
IAQ Ventilation	0.88	9.46	1.38	14.79	-0.5	-5.33
Water Heating	3.59	37.63	2.64	27.67	0.95	9.96
Self Utilization/Flexibility Credit				0		0
South Facing Efficiency Compliance Total	12.68	109.32	7.85	95.27	4.83	14.05
Space Heating	7.21	31.73	3.03	23.24	4.18	8.49
Space Cooling	1	30.5	1.24	39.95	-0.24	-9.45
IAQ Ventilation	0.88	9.46	1.38	14.79	-0.5	-5.33
Water Heating	3.59	37.63	2.64	27.67	0.95	9.96
Self Utilization/Flexibility Credit				0		0
West Facing Efficiency Compliance Total	12.68	109.32	8.29	105.65	4.39	3.67

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ENERGY USE INTENSITY				
	Standard Design (kBtu/ft ² - yr)	Proposed Design (kBtu/ft ² - yr)	Compliance Margin (kBtu/ft ² - yr)	Margin Percentage
North Facing				
Gross EUI ¹	28.17	22.23	5.94	21.09
Net EUI ²	28.17	22.23	5.94	21.09
East Facing				
Gross EUI ¹	28.17	22.51	5.66	20.09
Net EUI ²	28.17	22.51	5.66	20.09
South Facing				
Gross EUI ¹	28.17	21.98	6.19	21.97
Net EUI ²	28.17	21.98	6.19	21.97
West Facing				
Gross EUI ¹	28.17	22.64	5.53	19.63
Net EUI ²	28.17	22.64	5.53	19.63
Notes 1. Gross EUI is Energy Use Total (not including PV) / Total Building Area. 2. Net EUI is Energy Use Total (including PV) / Total Building Area.				

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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.
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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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BUILDING - FEATURES INFORMATION						
01	02	03	04	05	06	07
Project Name	Conditioned Floor Area (ft ²)	Number of Dwelling Units	Number of Bedrooms	Number of Zones	Number of Ventilation Cooling Systems	Number of Water Heating Systems
Danville ADU Craftsman 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 ²)	Avg. Ceiling Height	Water Heating System 1	Status
Accessory Unit	Conditioned	HVAC System 1	640	9	DHW System 1	New

OPAQUE SURFACES							
01	02	03	04	05	06	07	08
Name	Zone	Construction	Azimuth	Orientation	Gross Area (ft ²)	Window and Door Area (ft ²)	Tilt (deg)
Front Wall	Accessory Unit	Exterior 2x6 Wall R-21	0	Front	288	86	90
Left Wall	Accessory Unit	Exterior 2x6 Wall R-21	90	Left	180	9	90
Back Wall	Accessory Unit	Exterior 2x6 Wall R-21	180	Back	288	19	90
Right Wall	Accessory Unit	Exterior 2x6 Wall R-21	270	Right	180	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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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 ²)	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
Entry 1680 Sidelet	Window	Front Wall	Front	0	1.5	8	1	12	0.3	NFRC	0.23	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 FINNS													
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	5	0	2	2	0	0	0	0	0	0	0	0	0
Entry 1680 Sidelet	5	0	2	2	0	0	0	0	0	0	0	0	0
FamilyRm 5050	3	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
Bedroom 3030	1	0	2	2	0	0	0	0	0	0	0	0	0

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SLAB FLOORS							
01	02	03	04	05	06	07	08
Name	Zone	Area (ft ²)	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 Cavity / Frame: R-21 / 2x6 Sheathing / Insulation: Wood Siding/sheathing/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	0.072	Roofing: 10 PSF (RoofTileAirGap) Tile Gap: present Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-13.0 / 2x4 Top Chrd 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. Cavity / Frame: R-9.1 / 2x4 Btm Chrd Inside Finish: Gypsum Board

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

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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

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

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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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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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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

CF1R-PRF-01E

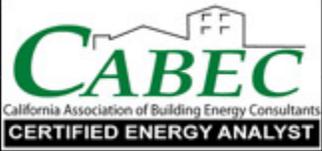
Project Name: Danville ADU Craftsman Studio

Calculation Date/Time: 2023-03-30T18:27:39-07:00

(Page 13 of 13)

Calculation Description: Title 24 Analysis

Input File Name: Danville ADU_Craftsman_Studio.ribd22

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name: Jason E Bennett	Documentation Author Signature: <i>Jason Bennett</i>
Company: DP Advanced Engineering	Signature Date: 2023-03-30 19:18:04
Address: 3381 Walnut Blvd. Ste. 220	CEA/ HERS Certification Identification (If applicable): R19-21-30042
City/State/Zip: Brentwood, CA 94513	Phone: 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"> 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. 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. 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. 	
Responsible Designer Name: William Wood	Responsible Designer Signature: <i>William Wood</i>
Company: William Wood Architects	Date Signed: 2023-03-31 08:34:18
Address: 301 Hartz Ave #203	License: C13874
City/State/Zip: Danville, CA 94526	Phone: 925-820-8233

Digitally signed by CalCERTS. 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.



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Registration Number:

223-P010038751A-000-000-0000000-0000

Registration Date/Time:

2023-03-31 08:34:18

HERS Provider:

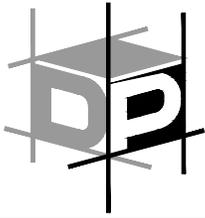
CalCERTS inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance

Report Version: 2022.0.000

Schema Version: rev 20220901

Report Generated: 2023-03-30 18:28:22



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)

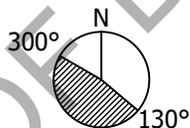
(NOT REQUIRED; CALCULATED SIZE IS <1.8 KW)

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

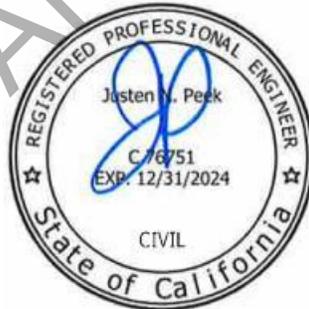
BROAN ERV100S ENERGY RECOVERY VENTILATOR OR EQUIV.

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

22.0 psf

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

TOWN OF DANVILLE USE ONLY



PROJECT: Town of Danville Studio ADU

CLIENT: Town of Danville

JOB NO.: W021420

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 ≤ 0.25	S _s = 0.50	S _s = 0.75	S _s = 1.00	S _s = 1.25	S _s ≥ 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	<i>Site-Specific Response Analysis Required</i>					

Table 11.4-2 Short-Period Site Coefficient F_v

Site Class	S ₁ ≤ 0.10	S ₁ = 0.20	S ₁ = 0.30	S ₁ = 0.40	S ₁ = 0.50	S ₁ ≥ 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	<i>Site-Specific Response Analysis Required</i>					

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
S _{DS} < 0.167g	A	A	A
0.167g ≤ S _{DS} < 0.33g	B	B	C
0.33g ≤ S _{DS} < 0.50g	C	C	D
0.50g ≤ S _{DS}	D	D	D

S₁ IS GREATER THAN 0.75
USE CATEGORY E
PER CBC 1613.2.5

Seismic Design Category Based on 1-Second Response Accelerations:

VALUE OF S _{D1}	1 OR 11	111	1V
S _{D1} < 0.067g	A	A	A
0.067g ≤ S _{D1} < 0.133g	B	B	C
0.133g ≤ S _{D1} < 0.20g	C	C	D
0.20g ≤ S _{D1}	D	D	D

S₁ IS GREATER THAN 0.75
USE CATEGORY E
PER CBC 1613.2.5



PROJECT: Town of Danville Studio ADU

CLIENT: Town of Danville

JOB NO.: W021420

CALCS BY: J. Peek

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)		Factor	FORCE (lb)
Roof	North/South	10401	12.4	1.3	9464	11.2
Roof	East/West	10401	12.4	1.0	7280	8.6



PROJECT: Town of Danville Studio ADU

CLIENT: Town of Danville

JOB NO.: W021420

CALCS BY: J. Peek

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



PROJECT: Town of Danville Studio ADU

CLIENT: Town of Danville

JOB NO.: W021420

CALCS BY: J. Peek

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 _z
Leeward Wall	0-1	-0.5	q _h
	2	-0.3	
	>4	-0.2	
Side Wall	All Values	-0.7	q _h

Determine Cp Values

Level	Direction	L/B Values	Windward C _p Value	Leeward C _p Value
Roof	East/West	1.28	0.80	-0.444

Level	Direction	L/B Values	Windward C _p Value	Leeward C _p 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 DEISGN	UNIT	ASD DESIGN	ASD DESIGN
		FORCE (lb)	SHEAR (plf)		FORCE (lb)
Roof	North/South	4305	135	2583	81
Roof	East/West	3218	129	1931	77



PROJECT: Town of Danville Studio ADU

CLIENT: Town of Danville

JOB NO.: W021420

CALCS BY: J. Peek

DATE: 3/24/2023

SHEARWALL DESIGN: ROOF LEVEL

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

SHEAR LINE ID:	1	2
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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
<i>Sec. 4.3.4.2 Capacity Reduction</i>	1.00	1.00
Wall 2 Design Shear (plf):	206	436
<i>Sec. 4.3.4.2 Capacity Reduction</i>	1.00	0.93
Wall 3 Design Shear (plf):		
<i>Sec. 4.3.4.2 Capacity Reduction</i>		
Wall 4 Design Shear (plf):		
<i>Sec. 4.3.4.2 Capacity Reduction</i>		
Wall 5 Design Shear (plf):		
<i>Sec. 4.3.4.2 Capacity Reduction</i>		

Shear Capacity (plf):	260	490
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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

CLIENT: Town of Danville

JOB NO.: W021420

CALCS BY: J. Peek

DATE: 3/24/2023

SHEARWALL DESIGN (CONT.): ROOF LEVEL

SHEAR LINE ID:	1	2
-----------------------	----------	----------

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 1 Drift Check (in):	OK	OK
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:	25 ft
------------------------	-----------	-----------------	-------



PROJECT: Town of Danville Studio ADU

CLIENT: Town of Danville

JOB NO.: W021420

CALCS BY: J. Peek

DATE: 3/24/2023

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
<i>Sec. 4.3.4.2 Capacity Reduction</i>	1.00	1.00
Wall 2 Design Shear (plf):		
<i>Sec. 4.3.4.2 Capacity Reduction</i>		
Wall 3 Design Shear (plf):		
<i>Sec. 4.3.4.2 Capacity Reduction</i>		
Wall 4 Design Shear (plf):		
<i>Sec. 4.3.4.2 Capacity Reduction</i>		
Wall 5 Design Shear (plf):		
<i>Sec. 4.3.4.2 Capacity Reduction</i>		

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

CLIENT: Town of Danville

JOB NO.: W021420

CALCS BY: J. Peek

DATE: 3/24/2023

SHEARWALL DESIGN (CONT.): ROOF LEVEL

SHEAR LINE ID:	A	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
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PROJECT: Town of Danville Studio ADU

CLIENT: Town of Danville

JOB NO.: W021420

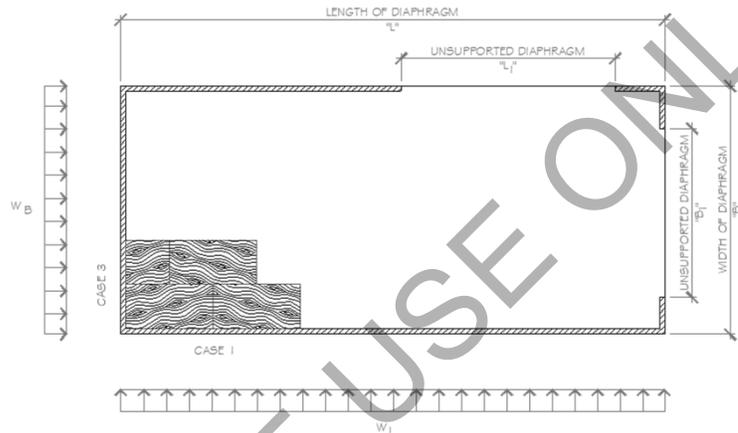
CALCS BY: J. Peek

DATE: 3/24/2023

ROOF DIAPHRAGM DESIGN:

DIMENSIONS:

L = 32 ft
 B = 25 ft
 B₁ = 0 ft
 L₁ = 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 plf

LATERAL FORCE ALONG B SIDE:

w_B = 277 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_{MAX} along Side V_L = w_B*B / 2*L = 108 plf

Shear_{MAX} along Side V_B = w_L*L / 2*B = 180 plf

Chord Forces:

Side L: T_L = C_L = w_L*L² / 8*B = 1439 lb

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

Side B: T_B = C_B = w_B*B² / 8*L = 676 lb

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

Drag Forces:

Side L: F_L = V_L*L₁ = 0 lb

** Min. Strap Req'd - NONE

Side B: F_B = V_B*B₁ = 0 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 (in²): 5.25

G_vt_v of ply (lb/in): 83500

E (psi): 1600000

e_n (in) = (V_n/616)^{3.018}: 0.045

ν (plf): 180

S (D_cX) (in): 2.50

D = 0.37 in

D_{ALLOW} = 0.025 * Story Height = 3.7 in

Deflection OK



PROJECT: Town of Danville Studio ADU

0

CLIENT: Town of Danville

JOB NO.: W021420

CALCS BY: J. Peek

DATE: 45009

ROOF DIAPHRAGM DESIGN:

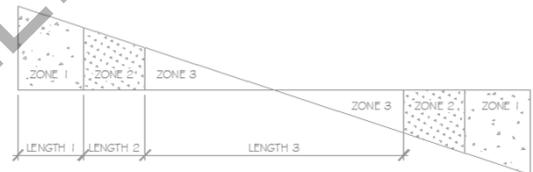
NAILING PATTERN -

Panel Grade	Common Nail	Min. Pen. (in)	Min. Thick. (in)	Member Width (in)	Blocked Nail Spacing				Unblocked	
					Boundary / Other Edges				Case 1	Others
					6 / 6	4 / 6	2.5 / 4	2 / 3		
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

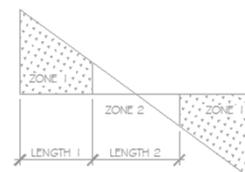
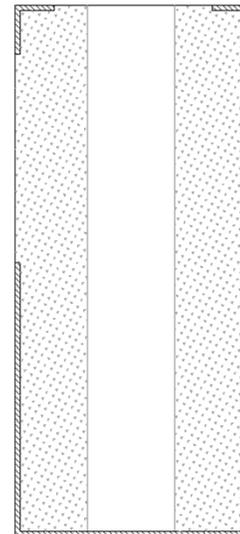
UNBLOCKED 15/32 SHEATHING WITH 8 d COMMON NAILS
6.0 IN O.C. BOUNDARY/ 12 IN O.C. EDGES/ 12 IN O.C. FIELD



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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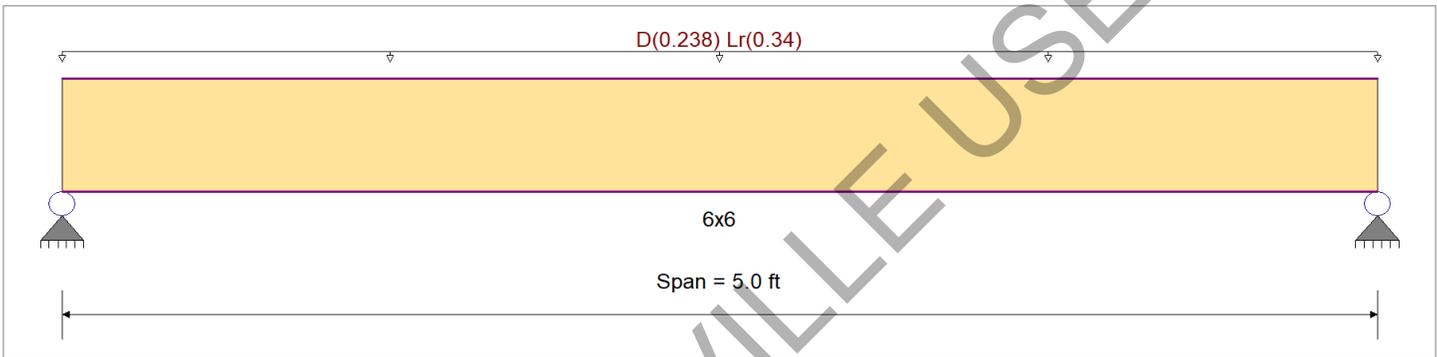
DESCRIPTION: Typical Header

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	Fb +	1,350.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	1,350.0 psi	Ebend- xx
	Fc - Prll	925.0 psi	Eminbend - xx
Wood Species : Douglas Fir-Larch	Fc - Perp	625.0 psi	
Wood Grade : No.1	Fv	170.0 psi	
	Ft	675.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			31.210pcf



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	=	2.500ft	Location of maximum on span	=	0.000ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.039 in	Ratio =	1522	>=360
Max Upward Transient Deflection		0.000 in	Ratio =	0	<360
Max Downward Total Deflection		0.068 in	Ratio =	885	>=240
Max Upward Total Deflection		0.000 in	Ratio =	0	<240

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values							
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v					
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	1.00	1.00	0.76	330.73	1215.00	0.00	0.00	0.00	0.50	24.78	153.00
+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	1.00	1.00	1.83	790.53	1687.50	0.00	0.00	0.00	0.00	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	1.00	1.00	1.56	675.58	1687.50	0.00	0.00	0.00	0.00	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	1.00	1.00	0.46	198.44	2160.00	0.00	0.00	0.00	0.00	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

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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

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Wood Beam

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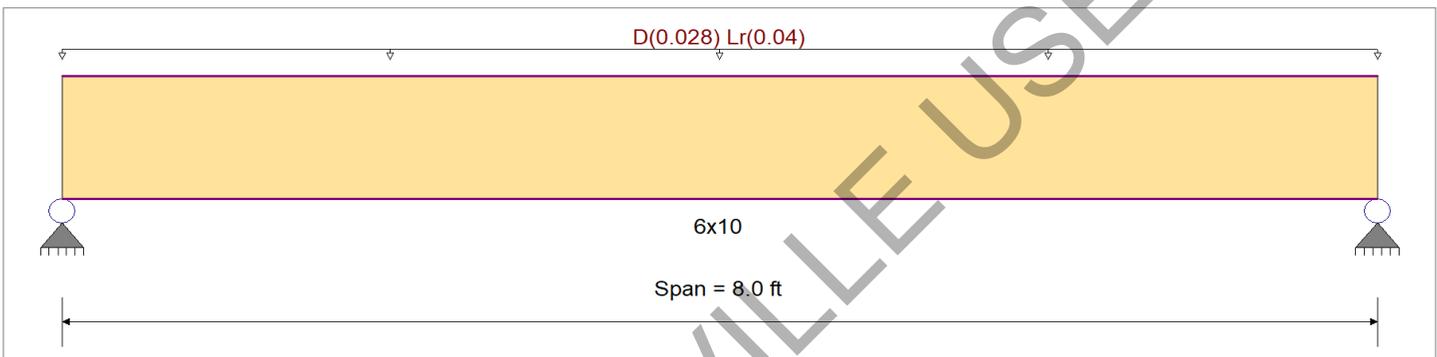
DESCRIPTION: B1

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	Fb +	1,350.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	1,350.0 psi	Ebend- xx
	Fc - Prll	925.0 psi	Eminbend - xx
Wood Species : Douglas Fir-Larch	Fc - Perp	625.0 psi	
Wood Grade : No.1	Fv	170.0 psi	
	Ft	675.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			31.210pcf



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 =	4.000ft	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 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.012 in	Ratio =	8208 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values						
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v				
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	1.00	0.31	45.63	1215.00	0.00	0.00	0.00	0.13	3.63	153.00
+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	1.00	0.63	92.05	1687.50	0.00	0.00	0.00	0.25	7.31	212.50
+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	1.00	0.55	80.45	1687.50	0.00	0.00	0.00	0.22	6.39	212.50
+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	1.00	0.19	27.38	2160.00	0.00	0.00	0.00	0.08	2.18	272.00

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

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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

TOWN OF DANVILLE USE ONLY

Wood Beam

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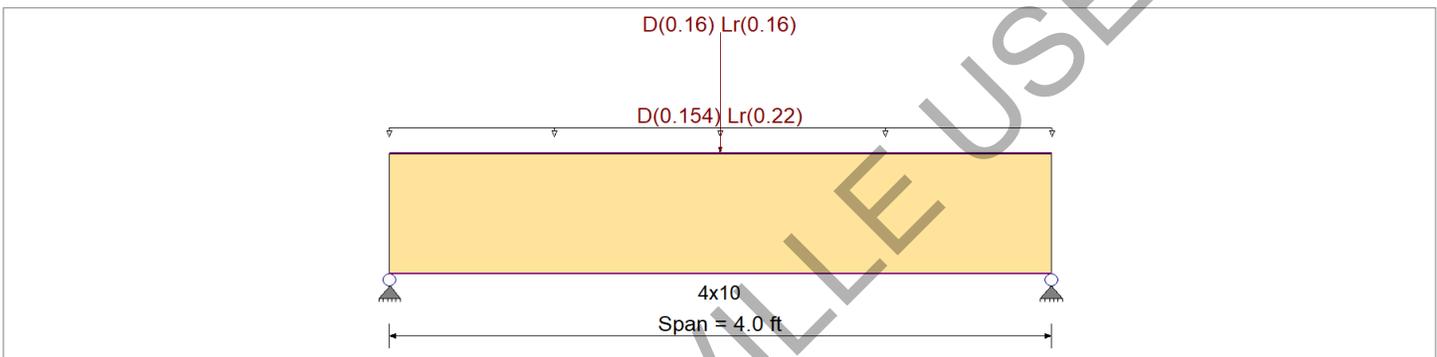
DESCRIPTION: B2

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	Fb +	1,350.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	1,350.0 psi	Ebend- xx
Wood Species : Douglas Fir-Larch	Fc - Prll	925.0 psi	Eminbend - xx
Wood Grade : No.1	Fc - Perp	625.0 psi	
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling	Fv	170.0 psi	Density
	Ft	675.0 psi	31.210pcf



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
=	260.15psi	=	29.32 psi
=	2,025.00psi	=	212.50 psi
Load Combination =	+D+Lr	Load Combination =	+D+Lr
Location of maximum on span =	2.000ft	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 Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values					
		M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v				
D Only Length = 4.0 ft	1	0.079	0.085	0.90	1.200	1.00	1.00	1.00	1.00	1.00	1.00	0.48	115.89	1458.00	0.00	0.00	0.00	0.28	12.96	153.00
+D+Lr Length = 4.0 ft	1	0.128	0.138	1.25	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.08	260.15	2025.00	0.63	29.32	212.50	0.00	0.00	0.00
+D+0.750Lr Length = 4.0 ft	1	0.111	0.119	1.25	1.200	1.00	1.00	1.00	1.00	1.00	1.00	0.93	224.08	2025.00	0.54	25.23	212.50	0.00	0.00	0.00
+0.60D Length = 4.0 ft	1	0.027	0.029	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.00	0.29	69.54	2592.00	0.17	7.78	272.00	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	0.0080	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

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Wood Beam

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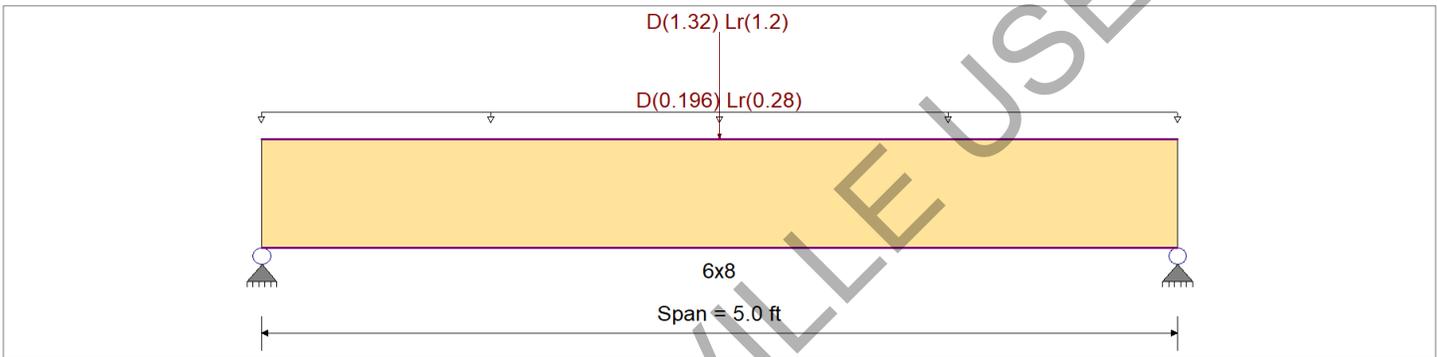
DESCRIPTION: B3

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	Fb +	1,350.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	1,350.0 psi	Ebend- xx
Wood Species : Douglas Fir-Larch	Fc - Prll	925.0 psi	Eminbend - xx
Wood Grade : No.1	Fc - Perp	625.0 psi	
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling	Fv	170.0 psi	Density
	Ft	675.0 psi	31.210pcf



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 =	2.500ft	Location of maximum on span =	0.000ft
Span # where maximum occurs =	Span # 1	Span # where maximum occurs =	Span # 1
Maximum Deflection			
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	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values							
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v				
D Only	Length = 5.0 ft	1	0.439	0.248	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.00	2.29	533.05	1215.00	0.00	0.00	0.00	1.05	38.01	153.00
+D+Lr	Length = 5.0 ft	1	0.643	0.372	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.00	4.67	1,085.77	1687.50	0.00	0.00	0.00	2.17	78.96	212.50
+D+0.750Lr	Length = 5.0 ft	1	0.562	0.323	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.00	4.07	947.59	1687.50	0.00	0.00	0.00	1.89	68.72	212.50
+0.60D	Length = 5.0 ft	1	0.148	0.084	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.37	319.83	2160.00	0.00	0.00	0.00	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

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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

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Wood Column

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DESCRIPTION: 6x6 POST

Maximum Reactions

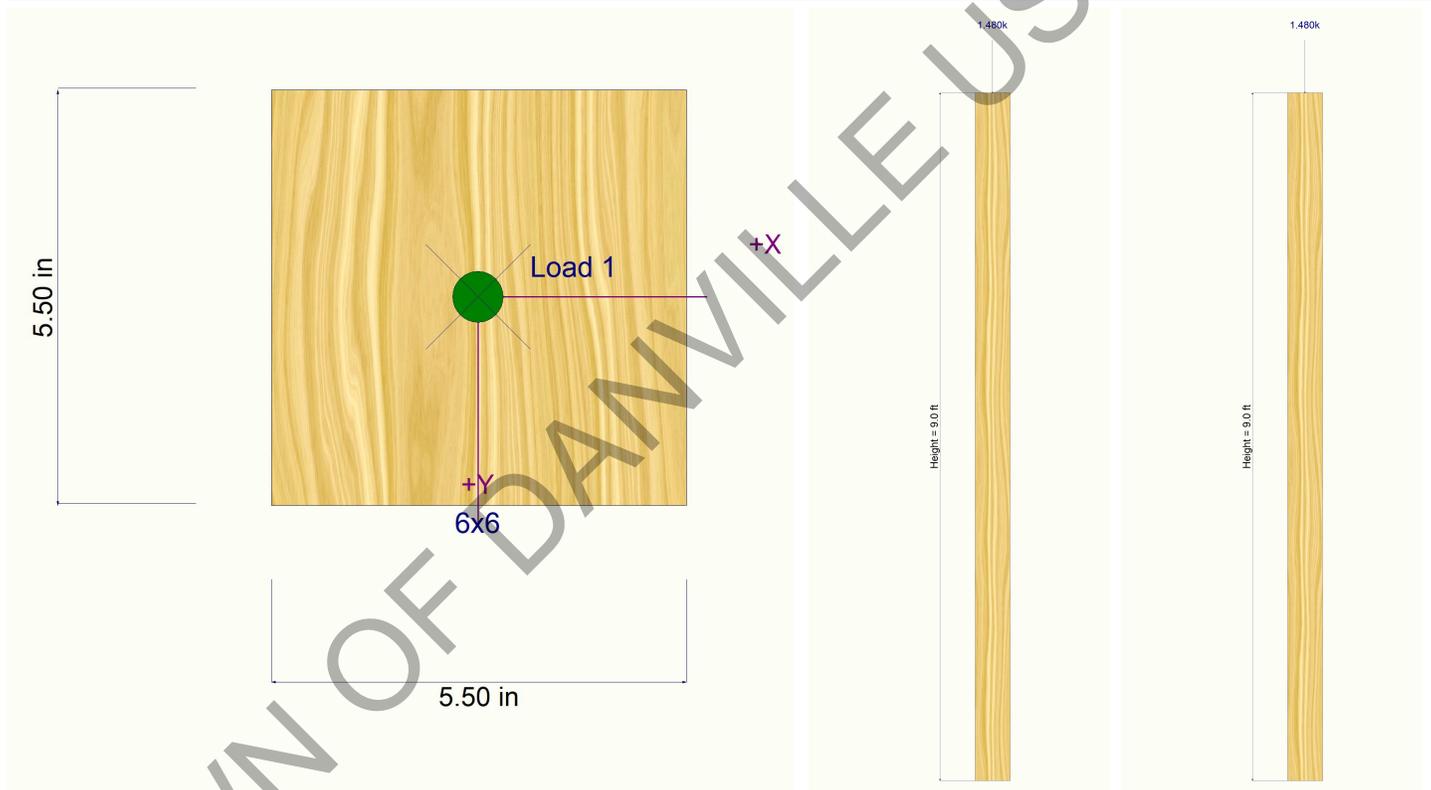
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction @ Base	My - End Moments		Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ 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	0.000 ft
+D+Lr	0.0000 in	0.000 ft	0.0000 in	0.000 ft
+D+0.750Lr	0.0000 in	0.000 ft	0.0000 in	0.000 ft
+0.60D	0.0000 in	0.000 ft	0.0000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.0000 in	0.000 ft

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:

<u>Allowable Stress:</u>		<u>Footing Reinf:</u>		
fy (ksi):	60	(2) #4 in Top	As used:	0.4
f'c (psi):	2500	(2) #4 in Bottom		

Grid Line:	1	2	A	B
<u>Footing Design Criteria:</u>				
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
<u>Uniform Loads:</u>				
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
TOTAL DL (plf):	412	456	544	544
TOTAL Lr (plf):	220	260	340	340
TOTAL LL (plf):	0	0	0	0
<u>Point Load:</u>				
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
<u>Soil Analysis:</u>				
q (psf):	1247	1331	723	771
q/ q _{ALLOW} :	0.83	0.89	0.48	0.51
M_{max} (ft-lb):	7026 ft-lb	7391 ft-lb	5417 ft-lb	5674 ft-lb
V_{max} (lb):	3869 lbs	4161 lbs	2993 lbs	2993 lbs
Allowable M_{max} (ft-lb):	25253 ft-lb	25253 ft-lb	25253 ft-lb	25253 ft-lb
Allowable V_{max} (lb):	7395 lbs	7395 lbs	7395 lbs	7395 lbs
Footing A(s) req'd:	0.40	0.40	0.40	0.40
	O.K.	O.K.	O.K.	O.K.



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:

<u>Allowable Stress:</u>		<u>Grade Beam Reinf:</u>		
fy (ksi):	60	(3) #5 in Top	As used:	0.93
f'c (psi):	2500	(3) #5 in Bottom		

Grid Line:	1	2	A	B
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Pier Design Criteria:

Allow. Skin Friction (psf):	250	250	250	250
Pier Diameter (in):	16	16	16	16
Neglect Pier Depth (ft):	2	2	2	2

Grade Beam Design Criteria:

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

Uniform Loads:

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
TOTAL DL (plf):	637	681	769	769
TOTAL Lr (plf):	220	260	340	340
TOTAL LL (plf):	0	0	0	0

Point Load:

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

Grade Beam Analysis:

M_{max} (ft-lb):	15942 ft-lb	16877 ft-lb	11764 ft-lb	12176 ft-lb
V_{max} (lb):	6219 lbs	6686 lbs	5869 lbs	5869 lbs
Allowable M_{max} (ft-lb):	56104 ft-lb	56104 ft-lb	56104 ft-lb	56104 ft-lb
Allowable V_{max} (lb):	7395 lbs	7395 lbs	7395 lbs	7395 lbs
Grade Beam A(s) req'd:	0.93	0.93	0.93	0.93
	O.K.	O.K.	O.K.	O.K.

Pier Analysis:

Design Pier Load (lbs):	9378	10051	8875	8875
Req'd Pier Depth (ft)	10.96	11.60	10.48	10.48
Use Pier Depth (ft):	11	12	11	11