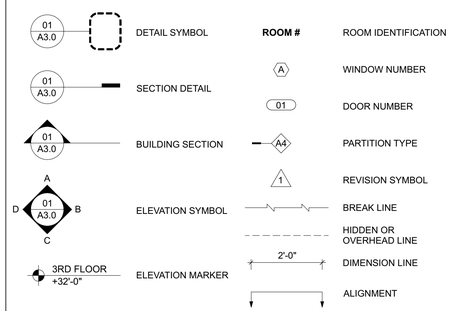
ABBREVIATIONS

AB	ANCHOR BOLT
ABV	ABOVE
AC	AIR CONDITIONING
ACOUST	ACOUSTICAL
AD	ACCESS DOOR, AREA DRAIN
ADDL	ADDITIONAL
AFF	ABOVE FINISHED FLOOR
AL	ALUMINUM
ALT	ALTERNATE
ALUM	ALUMINUM
ANOD	ANODIZED
APPD	APPROVED
APPROX	APPROXIMATE
ARCH	ARCHITECT
AUTO	AUTOMATIC
AVG	AVERAGE
BDRM	BEDROOM
BEL	BELOW
BTWN	BETWEEN
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
CB	CATCH BASIN
CCW	COUNTER CLOCKWISE
CEM	CEMENT
CER	CERAMIC
CFT	CUBIC FOOT
CIP	CAST-IN-PLACE
CJ	CONTROL JOINT
CL	CENTERLINE
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CONT	CONTINUOUS
CPT	CARPET
DBL	DOUBLE
DEG	DEGREE
DEM	DEMOLISH
DEMO	DEMOLITION
DEPT	DEPARTMENT
DET	DETAIL
DIAG	DIAGONAL
DIA	DIAMETER
DIM	DIMENSION
DN	DOWN
DTL	DETAIL
DWG	DRAWING
DS	DOWNSPOUT
EA	EACH
EJ	EXPANSION JOINT
ELECT	ELECTRICAL
ENGR	ENGINEER
EQ	EQUAL
EQUIP	EQUIPMENT
(E)	EXISTING
FDTN	FOUNDATION
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FF	FINISHED FLOOR
FHC	FIRE HOSE CABINET
FLR	FLOOR
FOS	FACE OF STUDS
FP	FIREPROOF
FT	FEET
FTG	FOOTING
GA	GAUGE
GALV	GALVANIZED
GB	GYPSUM BOARD
GC	GENERAL CONTRACTOR
GL	GLASS
GRND	GROUND
GWB	GYPSUM WALL BOARD
H	HIGH
HORIZ	HORIZONTAL
HR	HOUR
ID	INSIDE DIAMETER
IN	INCH
INFO	INFORMATION
J-BOX	JUNCTIONBOX
JT	JOINT
LAM	LAMINATE
LOC	LOCATE
LTWT	LIGHTWEIGHT
MAINT	MAINTENANCE
MAS	MASONRY
MAT	MATERIAL
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MET	METAL
MFG	MANUFACTURER
MISC	MISCELLANEOUS
MO	MASONRY OPENING
NAT	NATURAL
(N)	NEW
NOM	NOMINAL
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OHD	OVER HEAD
OPNG	OPENING
OPP	OPPOSITE HAND
PLAM	PLASTICLAMINATE
PTTN	PARTITION
PERP	PERPENDICULAR
PLMBG	PLUMBING
PLTF	PLATFORM
PLWD	PLYWOOD
PNT	PAINT
PREFAB	PREFABRICATED
QTY	QUANTITY
RA	RETURN AIR
RAD	RADIUS
REBAR	REINFORCING BAR
REF	REFERENCE
REQD	REQUIRED
REV	REVISION
RO	ROUGH OPENING
RWD	REDWOOD
SCHED	SCHEDULE
SC	SOLID CORE
SECT	SECTION
SF	SQUAREFOOT
SHT	SHEET
SIM	SIMILAR
SPECS	SPECIFICATIONS
SQ	SQUARE
SSTL	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STRUCT	STRUCTURAL
T&B	TOP AND BOTTOM
T&G	TONGUE & GROOVE
TBD	TO BE DETERMINED
TD	TRENCH DRAIN
TRD	TREAD
TSLAB	TOP OF SLAB
TS	TOP OF STEEL
TW	TOP OF WALL
(TYP)	TYPICAL
UL	UNDERWRITERS LAB
UNO	UNLESS NOTED OTHERWISE
UON	UNLESS OTHERWISE NOTED
VERT	VERTICAL
VIF	VERIFY IN FIELD
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WD	WOOD
WWM	WELDED WIRE MESH
WP	WATERPROOF

SYMBOLS



GENERAL NOTES

1. THE CONTRACTOR SHALL THOROUGHLY EXAMINE THE PREMISES AND SHALL BASE HIS BID ON THE EXISTING CONDITIONS. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE ACTUAL FIELD CONDITIONS. THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND FIELD CONDITIONS.
2. THE WORK INCLUDED UNDER THIS CONTRACT SHALL INCLUDE ALL LABOR, MATERIALS, TRANSPORTATION, TOOLS AND EQUIPMENT NECESSARY FOR THE CONSTRUCTION OF THE PROJECT, LEAVING ALL WORK READY FOR USE.
3. PRIOR TO CONSTRUCTION, DISCREPANCIES BETWEEN THE ARCHITECTURAL AND ENGINEERING DRAWINGS SHALL BE REPORTED TO THE ARCHITECT.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE APPLICABLE UNIFORM BUILDING CODE, HANDICAP ACCESS CODE AND ALL APPLICABLE ORDINANCES, INCLUDING STATE AND LOCAL BUILDING CODES AND REQUIREMENTS.
5. THESE PLANS INDICATE THE GENERAL EXTENT OF DEMOLITION AND NEW CONSTRUCTION NECESSARY FOR THE WORK, BUT ARE NOT INTENDED TO BE ALL INCLUSIVE. ALL DEMOLITION AND ALL NEW WORK NECESSARY TO ALLOW FOR A FINISHED JOB IN ACCORDANCE WITH THE INTENTION OF THESE DOCUMENTS SHALL BE INCLUDED REGARDLESS OF WHETHER SHOWN ON THE DRAWINGS OR IN THE NOTES. DO NOT DEMOLISH ANY ITEMS THAT APPEAR STRUCTURAL, UNLESS SPECIFICALLY INDICATED TO BE DEMOLISHED IN THE CONSTRUCTION DOCUMENT, WITHOUT PRIOR REVIEW AND WRITTEN APPROVAL BY THE ARCHITECT.
6. ANY ERRORS, OMISSIONS, AND CONFLICTS FOUND IN THESE CONSTRUCTION DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND OWNER FOR CLARIFICATION BEFORE PROCEEDING WITH WORK.
7. ALL DIMENSIONS ARE TO FACE OF FINISH UNLESS NOTED OTHERWISE. ALL DIMENSIONS SHALL BE VERIFIED.
8. THE CONTRACTOR SHALL CONFIRM IN WRITING APPROXIMATE ON-SITE DELIVERY DATES FOR ALL CONSTRUCTION ITEMS AS REQUIRED BY THE CONSTRUCTION DOCUMENTS, AND SHALL NOTIFY THE ARCHITECT IN WRITING OF ANY POSSIBLE DELAYS AFFECTING OCCUPANCY.
9. THE CONTRACTOR SHALL PROVIDE A SCHEDULE FOR CONSTRUCTION AS REQUIRED TO MEET THE OWNER'S PHASING REQUIREMENTS AND ULTIMATE COMPLETION DATE.
10. THE CONTRACTOR SHALL VERIFY THAT NO CONFLICTS EXIST IN THE LOCATION OF ANY AND ALL MECHANICAL, ELETRICAL, TELEPHONE, LIGHTING, PLUMBING AND FIRE SPRINKLER WORK (INCLUDING PIPING, DUCTWORK AND CONDUIT), AND THAT ALL CLEARANCES FOR INSTALLATION AND MAINTENANCE ARE PROVIDED.
11. NO WORK DEFECTIVE IN CONSTRUCTION OR QUALITY OR DEFICIENT IN ANY REQUIREMENT OF THE CONTRACT DOCUMENTS WILL BE ACCEPTABLE IN CONSEQUENCE OF THE OWNER'S OR ARCHITECT'S FAILURE TO DISCOVER OR POINT OUT DEFICIENCIES OR DEFECTS DURING CONSTRUCTION. DEFECTIVE WORK REVEALED WITHIN THE TIME REQUIRED BY GUARANTEES SHALL BE REPLACED BY WORK CONFORMING TO THE INTENT OF THE CONTRACT. NO PAYMENT, EITHER PARTIAL OR FINAL, SHALL BE CONSTRUED AS ACCEPTANCE OF DEFECTIVE WORK OR IMPROPER MATERIALS.
12. THE CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE EXISTING CONSTRUCTION AND SHALL BE RESPONSIBLE FOR REPAIRING ALL DAMAGES CAUSED BY CONTRACTOR AND SUB-CONTRACTORS.
13. THE CONTRACTOR SHALL REVIEW, APPROVE, STAMP AND SUBMIT WITH REASONABLE PROMPTNESS AND IN SUCH SEQUENCE AS TO CAUSE NO DELAY IN THE WORK, PRODUCT DATA, SHOP DRAWINGS AND SAMPLES FOR THE PROJECT.
14. BY APPROVING, STAMPING AND SUBMITTING SHOP DRAWINGS, PRODUCT DATA AND SAMPLES, THE CONTRACTOR REPRESENTS THAT HE HAS DETERMINED AND VERIFIED MATERIALS, FIELD MEASUREMENTS, AND FIELD CONSTRUCTION CRITERIA RELATED THERETO AND THAT HE HAS CHECKED AND COORDINATED THE INFORMATION WITHIN SUCH SUBMITTALS WITH THE REQUIREMENTS OF THE WORK AND CONTRACT DOCUMENTS.
15. THE CONTRACTOR SHALL NOT BE RELIEVED OF RESPONSIBILITY FOR ANY DEVIATION FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS BY THE ARCHITECT'S REVIEW OF THE SHOP DRAWINGS, PRODUCT DATA OR SAMPLES, UNLESS THE CONTRACTOR HAS SPECIFICALLY INFORMED THE ARCHITECT IN WRITING OF SUCH DEVIATION AT THE TIME OF SUBMISSION AND THE ARCHITECT HAS GIVEN WRITTEN APPROVAL TO THE SPECIFIC DEVIATION.
16. THE CONTRACTOR SHALL SUBMIT TO THE ARCHITECT THREE (3) PRINTS, TYPICALLY, OF EACH SHOP DRAWING SUBMITTAL PLUS THREE (3) COPIES OF EITHER PRODUCT DATA OR SAMPLES.
17. THE ARCHITECT ASSUMES NO RESPONSIBILITY FOR DIMENSIONS OR QUANTITIES ON REVIEWED SUBMITTALS.
18. SUBSTITUTIONS, REVISIONS AND/OR CHANGES MUST HAVE PRIOR WRITTEN APPROVAL BY THE ARCHITECT.
19. THE CONTRACTOR SHALL MAINTAIN A CURRENT AND COMPLETE SET OF CONSTRUCTION DOCUMENTS ON THE JOB SITE DURING ALL PHASES OF CONSTRUCTION FOR USE BY ALL TRADES AND SHALL PROVIDE ALL SUBCONTRACTORS WITH CURRENT CONSTRUCTION DOCUMENTS AS REQUIRED.
20. THE CONTRACTOR SHALL PROVIDE COMPLETE PRODUCT DATA AND RELATED INFORMATION APPROPRIATE FOR THE OWNER'S MAINTENANCE AND OPERATION OF PRODUCTS FURNISHED UNDER THE CONTRACT.
21. WORK UNDER THIS CONTRACT SHALL BE WARRANTED BY THE CONTRACTOR AGAINST ALL DEFECTS FOR ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION OF THE WORK OR DESIGNATED PORTIONS THEREOF OR FOR ONE (1) YEAR AFTER ACCEPTANCE BY THE OWNER OF DESIGNATED EQUIPMENT. IN THE CASE OF ITEMS REMAINING UNCOMPLETED AFTER THE DATE OF SUBSTANTIAL COMPLETION, THE ONE-YEAR WARRANTY PERIOD SHALL BE FROM DATE OF ACCEPTANCE OF SUCH ITEMS.
22. EACH TRADE SHALL EXAMINE THE PREMISES TO INSURE THAT CONDITIONS ARE APPROPRIATE FOR HIS WORK TO COMMENCE. PRIOR TO COMMENCING HIS WORK, AREAS NOT APPROPRIATE SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. COMMENCING WORK IMPLIES ACCEPTANCE OF EXISTING CONDITIONS.
23. THE GENERAL CONTRACTOR SHALL ASSIST IN THE COORDINATION AND BE RESPONSIBLE FOR THE INSTALLATION OF N.I.C. ITEMS, INCLUDING BUT NOT LIMITED TO FURNITURE, EQUIPMENT, APPLIANCES, PLUMBING FIXTURES, DISHWASHERS, VOICE/DATA CABLING, TELEPHONE WORK, ETC.
24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETE INSTALLATION AS REQUIRED FOR ACCESSORY ITEMS INCLUDING SINK, DISHWASHER, REFRIGERATOR, LAUNDRY EQUIPMENT, ETC.
25. ALL DRAWINGS AND NOTES ARE CONSIDERED COMPLEMENTARY, AND WHAT IS CALLED FOR BY EITHER WILL BE AS BINDING AS IF CALLED FOR BY ALL. ANY WORK SHOWN OR REFERRED TO ON ANY ONE SET OF DRAWINGS SHALL BE PROVIDED AS THOUGH SHOWN ON ALL RELATED DRAWINGS.
26. VERIFY ALL ARCHITECTURAL DETAILS AND COORDINATE DRAWINGS WITH STRUCTURAL AND MEP DRAWINGS BEFORE INITIATION OF ANY RELATED WORK.
27. ALL INSTALLATIONS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS, INDUSTRY AND BUILDING STANDARDS, AND CODE REQUIREMENTS. SEALANT, WEATHERSTRIPPING, AND FLASHING LOCATIONS IN DRAWINGS ARE NOT INTENDED TO BE INCLUSIVE.
28. LARGER SCALE DETAILED DRAWINGS SUPERCEDES SMALLER SCALED ELEVATION AND PLAN DRAWINGS.

PROJECT TEAM

OWNER
NAME _____
ADDRESS _____
_____
PHONE _____

ARCHITECT
RUSSELL DAVIDSON ARCHITECTURE + DESIGN
CONTACT: RUSSELL DAVIDSON
149 CROWN POINT CT, SUITE C
GRASS VALLEY, CA 95945
T (530) 913-2370

STRUCTURAL ENGINEER
JACKSON & SANDS ENGINEERING, INC.
CONTACT: SEAN JACKSON
900 E MAIN. ST #102
GRASS VALLEY, CA 95945
T (530) 715-7184

MECHANICAL ENGINEER
MELAS ENERGY ENGINEERING
CONTACT: MICHAEL MELAS
547 UREN ST #I
NEVADA CITY, CA 9595
T (530) 265-2492

ENERGY ANALYSIS
MELAS ENERGY ENGINEERING
CONTACT: MICHAEL MELAS
547 UREN ST #I
NEVADA CITY, CA 9595
T (530) 265-2492

PREFABRICATED TRUSSES
DIAMOND TRUSS INC.
12462 CHARLES DR.
GRASS VALLEY, CA 95945
T (530) 743-7494

FIRE SPRINKLERS
O'NEAL AND ASSOCIATES, INC.
11290 WEST LOST RIVER DR.
BOISE, ID 83709
T (208) 863-9772

APPLICABLE CODES

ALL CODES REFERENCED ARE TO BE USED AS AMENDED BY THE STATE OF CALIFORNIA AND LOCAL JURISDICTION.

2022 CALIFORNIA BUILDING CODE
2022 CALIFORNIA MECHANICAL CODE
2022 CALIFORNIA ELECTRICAL CODE
2022 CALIFORNIA PLUMBING CODE
2022 CALIFORNIA GREEN BUILDING CODE
2022 CALIFORNIA FIRE CODE
2022 CALIFORNIA ENERGY CODE

PROJECT DATA

SITE DATA

ADDRESS _____
_____
A.P.N.: _____
_____
ELEVATION: _____
SNOW LOAD: _____
WIND EXPOSURE: _____
CLIMATE ZONE: _____
FIRE HAZARD SEVERITY ZONE: _____
SUBJECT TO WUI REQUIREMENTS YES / NO

ZONING: _____
SITE AREA: _____
MAX. HEIGHT: _____
ALLOWABLE COVERAGE: _____
ACTUAL COVERAGE: 963 SF

SETBACKS
FRONT: _____
INTERIOR: _____
EXTERIOR: _____
REAR: _____

BUILDING ANALYSIS

OCC. GROUP:	R-3, U
CONST. TYPE:	V-B
FIRE SPRINKLERS:	YES*

*FIRE SPRINKLERS NOT REQUIRED IF PRIMARY RESIDENCE IS NOT EQUIPPED WITH AUTOMATIC FIRE SPRINKLERS

AREAS:

CONDITIONED (SFR):	661 SF
DECK/STAIRS:	138 SF

FOOTNOTES

1. REFERENCES TO WUI REQUIREMENTS MAY BE IGNORED IF PROPERTY IS NOT LOCATED WITHIN WUI REGULATED AREAS
2. PLANS ARE VALID FOR SITES WITH A 3H:1V SLOPE OR FLATTER WITH SOILS SUITABLE TO BEAR LOADS FROM STRUCTURE. IF UNSUITABLE SOILS ARE ENCOUNTERED, NOTIFY THE E.O.R. IMMEDIATELY
3. ENERGY CALCULATIONS MUST BE CERTIFIED ON AN ADDRESS SPECIFIC BASIS. DO NOT BEGIN CONSTRUCTION UNLESS CERTIFIED ENERGY CALCULATIONS ARE PROVIDED FOR BUILDING SITE.
4. SNOW LOAD REDUCTION TAKEN FOR PARTIALLY SHADED ROOF. METAL ROOF WITH NO RETENTION DEVICES REQUIRED FF ROOF IS FULLY SHELTERED.

MATERIAL SPECIFICATIONS

PROPOSED WUI COMPLIANT SIDING _____
OSFM CATEGORY 8140

PROPOSED WUI COMPLIANT DECKING _____
OSFM CATEGORY 8110

PROPOSED ROOF COVERING _____
OSFM CATEGORY 8180
IF METAL, PROVIDE ICC ES REPORT
AT TIME OF APPLICATION SUBMITTAL.

PROPOSED ROOF VENT PRODUCTS _____
OSFM CATEGORY 8160

PROPOSED CRAWLSPACE VENT PRODUCTS _____
OSFM CATEGORY 8165

SCOPE OF WORK

PROJECT CONSISTS OF A NEW 661 SF ACCESSORY DWELLING UNIT

SHEET INDEX

TITLE
T1.0 TITLE SHEET

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G1.0 GENERAL NOTES
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G1.2 CGBSC

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BUILDING PLANS
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EXTERIOR ELEVATIONS
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A5.0 TYPICAL WALL ASSEMBLY DETAILS
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STRUCTURAL GENERAL
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STRUCTURAL DETAILS
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S4.1 STRUCTURAL DETAILS
S4.2 STRUCTURAL DETAILS
S4.3 STRUCTURAL DETAILS (490)
S4.4 STRUCTURAL DETAILS (490)
S4.5 STRUCTURAL DETAILS (490)

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MP1.1 MECHANICAL PLAN (ZONE 16 / SLAB / DUCTED)
MP1.2 MECHANICAL PLAN (ZONE 16 / SLAB / DUCTLESS)
MP1.3 MECHANICAL PLAN (ZONE 11 & 16 / SLAB OR RAISED / DUCTED)
MP1.4 MECHANICAL PLAN (ZONE 11 & 16 / SLAB OR RAISED / DUCTED)

ELECTRICAL
E1.0 ELECTRICAL PLAN

TITLE 24 ENERGY REPORT
T24.1.1 TITLE 24 ENERGY REPORT - CZ16 RAISED DUCTED HP
T24.1.2 TITLE 24 ENERGY REPORT - CZ16 RAISED DUCTED HP
T24.2.1 TITLE 24 ENERGY REPORT - CZ16 RAISED DUCTLESS HP
T24.2.2 TITLE 24 ENERGY REPORT - CZ16 RAISED DUCTLESS HP
T24.3.1 TITLE 24 ENERGY REPORT - CZ11 RAISED DUCTED HP
T24.3.2 TITLE 24 ENERGY REPORT - CZ11 RAISED DUCTED HP
T24.4.1 TITLE 24 ENERGY REPORT - CZ11 RAISED DUCTLESS HP
T24.4.2 TITLE 24 ENERGY REPORT - CZ11 RAISED DUCTLESS HP
T24.5.1 TITLE 24 ENERGY REPORT - CZ11 SLAB DUCTED HP
T24.5.2 TITLE 24 ENERGY REPORT - CZ11 SLAB DUCTED HP
T24.6.1 TITLE 24 ENERGY REPORT - CZ11 SLAB DUCTLESS HP
T24.6.2 TITLE 24 ENERGY REPORT - CZ11 SLAB DUCTLESS HP
T24.7.1 TITLE 24 ENERGY REPORT - CZ16 SLAB DUCTED HP
T24.7.2 TITLE 24 ENERGY REPORT - CZ16 SLAB DUCTED HP
T24.8.1 TITLE 24 ENERGY REPORT - CZ16 SLAB DUCTLESS HP
T24.8.2 TITLE 24 ENERGY REPORT - CZ16 SLAB DUCTLESS HP

SOLAR
PV0.1 PV ARRAY SITE PLAN
PV0.2 PV ARRAY LAYOUT
PV0.3 PV SINGLE LINE DIAGRAM
PV0.4 PV ARRAY DETAILS
PV0.5 PV LABELS / SPEC SHEETS

FIRE SPRINKLERS
FP1 AUTOMATIC FIRE PROTECTION

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

JACKSON & SANDS ENGINEERING, Inc.

A Regional Partnership for Achievable Housing

LICENSED ARCHITECT
RUSSELL DAVIDSON
No. C36895
Ren. 11-30-25
STATE OF CALIFORNIA

YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23
1	REV 1	12/11/23

TITLE SHEET

T1.0

AGING-IN-PLACE DESIGN AND FALL PROTECTION

At least one bathroom on the entry level shall be provided with grab bar reinforcement. Reinforcement shall be nominal 2x8 lumber and shall be located between 32 inches and 39.5 inches above the finished floor. Water closet reinforcement shall be installed on both side walls of the fixture, or on the side wall and the back wall. Shower reinforcement shall be continuous where wall framing is provided. Bathtub and combination bathtub/shower reinforcement shall be continuous on each ed of the bathtub and the back wall. Back wall reinforcement for a lower grab bar shall be provided with the bottom edge located no more than 6 inches above the bathtub rim. Information identifying the location of the reinforcement shall be placed in the operations and maintenance manual. (CRC R327.1.1)

Electrical receptacles outlets, switches and controls shall be located not more than 48 inches measured from the top of the outlet box and not less than 15 inches measured from the bottom of the outlet box above the finished floor. (CRC R327.1.2)

Effective July 1st, 2024, at least one bathroom and one bedroom on the entry level shall provide a doorway with a net clear opening of not less than 32 inches measured with the door open at a 90-degree angle. (CRC R327.1.3)

Doorbell buttons shall be installed not more than 48" above the finished floor measured to the top of the button. (CRC R327.1.4)

GENERAL

Provide each bedroom, basement, and habitable attics with a minimum of one exterior window with a 44" maximum clear opening height, 5.7 sq. ft. minimum clear openable area (minimum 5.0 sq. ft. at grade floor openings), 24" minimum clear openable height and 20" minimum clear width, or an openable exterior exit door. (CRC R310.2.1 and CRC R310.2.2) Window wells, ladders, and steps shall comply with CRC R310.2.3. Bars, grilles, covers, ands screens shall be releasable or removable from the inside without the use of a key, tool, special knowledge, or force greater than 15lbs to operate the emergency escape and rescue openings. (CRC R310.4.4) Photovoltaic panels & modules shall not be below an emergency escape and rescue opening within 36". (R324.6.3)

Each bathroom containing a bathtub, shower or tub/shower combination shall be mechanically ventilated with Energy Star approved equipment (minimum 50cfm) with an integral humidistat installed. (CRC R303.3.1)

Provide attic cross ventilation: 1/150 of attic area or 1/300 with at least 40% but not more than 50% of vents are a minimum 3 ft. below the ridge or highest space in the attic and the balance is provided in the lower third of the attic space (not limited to eaves or cornice vents). As an alternative in Climate Zone 16 (Truckee region), the net area may be reduced to 1/300 when a Class I or II vapor barrier is installed on the warm-in-winter side of the ceiling. Baffles are required at vents for insulation. Provide minimum of 1" inch of air space between insulation and roof sheathing. (CRC R806)

Enclosed rafter spaces shall have a 1-inch clear cross ventilation. (Properly sized rafters for insulation) (CRC R806.3)

Under floor cross ventilation: minimum 1.0 sq. ft. for each 150 sq. ft. of under floor area. When a class 1 vapor retarder is installed on the ground surface the minimum area of ventilation may be limited to 1sq.ft for each 1,500 square feet of under-floor space. One ventilation opening shall be within three (3) feet of each corner of the building (CRC R408.1). Unvented crawl spaces shall comply with CRC R408.2. Unvented crawl space added option for dehumidification of 70 pints moisture per day per 1,000 sf to requirement for exemption. (R408.3)

Exterior balconies and elevated walking surfaces exposed to water, where structural framing is protected by an impervious moisture barrier require construction documents with manufacturer's installation instructions. (R106.1.5) Must be inspected and approved before concealing barrier. (R109.1.5.3)

Enclosed framing in exterior balconies and elevated walking surfaces exposed to rain, snow or drainage from irrigation shall be provided with cross-ventilation area of at least 1/150. (R317.1.3)

Provide landings and a porch light at all exterior doors. Landings are to be minimum 3 ft deep x width of door. Landings at required egress doors may step down a maximum of 7.75 inches when the door does not swing over the landing and 1.5 inches when door swings onto the landing. Other than required exterior exit doors may have a threshold of 7.75 inches maximum; a landing is not required if a stair with two or fewer risers is located on the exterior side and the door does not swing over the stairway. (CRC R311.3-R311.3.2)

Mezzanines shall not be greater than 1/3 of the story unless fire sprinklers are installed then the area can be ½ of the story. (R325.3)

At least one egress door shall be provided for each dwelling unit, the egress door shall be side hinged with a minimum openable width of 32 inches; the minimum clear openable height shall be 78 inches minimum (other doors shall not be required to comply with these dimensions). Egress doors shall be readily openable from the inside without the use of a key, special knowledge, or effort. (CRC R311.2)

Operable windows more than 72" above finish grade with a **clear opening** height less than 24" shall have openings not more than 4" apart or needs a compliant guard. (R312.2)

FOUNDATIONS & CONCRETE SLABS

Slope drainage 6" within the first 10ft. from the foundation wall. If physical obstructions or lot lines prohibit the 10ft distance, a 2-5 percent slope shall be provided to an approved alternative method of diverting the water away from the foundation. Impervious surfaces shall also be sloped a minimum of 2 percent for 10ft away from structures to an approved drainage way. (CRC R401.3)

Footings shall extend at least 12 inches into the undisturbed ground surface. (CRC R403.1.4) Unless erected on solid rock, to protect against frost and freezing, the minimum foundation depth is 18 inches below grade if between 4,000-7,000 foot elevation and 24 inches below grade for 7,000 foot elevation and above. Exception: Interior footings shall be a minimum of 12 inches below grade. (L-V 3.14)

Stepped footings shall be used when slope of footing bottom is greater than 1 in 10 (V: H). Step footing detail shall be shown on building elevations and foundation plan. (CRC R403.1.5)

Concrete slabs: 3 ½" minimum (CRC R506.1). Slabs under living areas and garages shall be reinforced with wire 6" x 6", 10 gauge x 10 gauge welded mesh or equivalent steel reinforcement and 4" thickness of 3/8 minimum gravel under the concrete slab. Separate from soil with a 6 mil polyethylene vapor retarder with joints lapped not less than 6 inches in living areas. A capillary break shall be installed when a vapor retarder is required.

Site excavation and grading shall comply with Chapter V, Article 13 of the Nevada County Land-Use Code.

A minimum 18" x 24" under-floor access, unobstructed by pipes or ducts and within 5' of each under-floor plumbing cleanout and not located under a door to the residence, is required. Provide a solid cover or screen. (CRC 408.4 & CPC 707.9)

Minimum sill bolting: ½" anchor bolts or approved anchors at 6 ft. o.c. maximum for one-story. (CRC R403.1.6) Use anchor bolts at 4 ft. o.c. maximum for three story construction. Embed bolts 7" minimum. The anchor bolts shall be placed in the middle third of the width of the plate. Locate end bolts not less than 7 bolt diameters, nor more than 12" from ends of sill members. In SDC D0 and above: Provide 3"X3"X0.229 plate washers on each bolt at braced or shear wall locations, standard cut washers shall be permitted for anchor bolts not located in braced/shear wall lines. The hole in the plate washer is permitted to be diagonally slotted with a width of up to 3/16" larger than the bolt diameter; the slot length shall not exceed 1 ¾", provided a standard cut washer is placed between the plate washer and the nut. (CRC R403.1.6.1 & R602.11.1)

CLEARANCES AND TREATMENT FOR WOOD FRAMING

All joists, girders, ledgers, structural blocking and support posts/column shall be wood of natural resistance to decay or pressure-treated lumber when exposed to the weather. (CRC R317.1(8))

Columns in basements when supported on concrete pier or metal pedestals shall be pressure treated or natural resistance to decay unless the pier/pedestals project 1" above concrete or 6" above earth and the earth is covered by an approved impervious moisture barrier. (CRC R317.1 (9))

Columns in enclosed crawl spaces or unexcavated areas located within the periphery of the building shall be pressure treated or natural resistance to decay unless the column is supported by a concrete pier or metal pedestal of a height 8" or more and the earth is covered by an impervious moisture barrier. (CRC R317.1(9))

FLOORS

Under-floor areas with storage, fuel-fired equipment or electric-powered equipment with less than 2x10 solid joists shall be protected on the underside by half-inch sheetrock or a sprinkler system. (R302.13)

Balconies must be designed for a minimum live load of 60lbs per square foot. (CRC T-R301.5)

WALLS

Specify post to beam connections. Positive connection shall be provided to ensure against uplift and lateral displacement. (CRC R502.9 & CBC 2304.10.7)

All fasteners used for attachment of siding & into pressure treated lumber shall be of a corrosion resistant type. (CRC R317.3)

Fire-block in concealed spaces of stud walls/partitions, vertically at ceiling/floor levels, & horizontally at 10ft. intervals. Fire-block at soffits, drop ceilings/similar locations & in concealed spaces at the top/bottom of stair stringers. (CRC R302.11)

Provide approved building paper under the building siding and approved flashing at exterior openings. (CRC R703.2) Specify a minimum of 2 layers of Grade D paper under stucco and 2 layers of 15lb felt (or equivalent) under stone veneer.

Stucco shall have a minimum clearance to earth of 4 inches and 2 inches to paved surfaces with an approved weep screed. (CRC R703.7.2.1) Masonry stone veneer shall be flashed beneath the first course of masonry and provided with weep holes immediately above the flashing. (CRC R703.8.5 and R703.8.6)

ROOF

Show minimum 22" x 30" access opening to attic (CRC R807); may be required to be 30"x30" to remove the largest piece of mechanical equipment per the California Mechanical Code.

Roof drains/gutters required to be installed per the California Plumbing Code with leaf/debris protection also installed.

Roof construction and coverings shall comply with CRC Chapters 8, 9 and local ordinance. All roofing shall be tested/listed Class A minimum.

Asphalt shingles with sloped roofs 2/12 to <4/12 shall have two layers of underlayment applied per CRC R905.2.2.

GARAGE AND CARPORT

Garage shall be separated from the dwelling unit & attic area by ½ inch gypsum board applied to the garage side. Garage beneath habitable rooms shall be separated by not less than 5/8" type X gypsum board. Structure supporting floor/ceiling assemblies used for required separations shall have ½" gypsum board installed minimum. Door openings from the garage to the dwelling shall be solid wood/steel doors or honeycomb steel doors not less than 1 3/8" thick or a 20-minute rated fire door. Doors shall be self-closing & self-latching. No openings directly into a sleeping room from the garage. When the dwelling and garage have fire sprinklers installed per R309.6 and R313, doors into the dwelling unit from the garage only need to be self-closing and self-latching. (CRC R302.5.1 & T-R302.6)

Ducts penetrating the garage to dwelling separation shall be a minimum of 26 gauge with no openings into the garage. (CRC R302.5.2)

Penetrations through the garage to dwelling separation wall (other than ducts as listed above) shall be fire-blocked per CRC section R302.11, item #4.

Garage and carport floor surfaces shall be non-combustible material and slope to drain towards the garage door opening. (CRC R309.1)

Appliances and receptacles installed in garage generating a glow, spark or flame shall be located 18" above floor unless it is listed as flammable vapor ignition resistant. (CMC 305.1) Provide protective post or other impact barrier from vehicles. (CMC 305.1.1)

Appliances in private garages and carports shall be installed with a minimum clearance of 6ft above the floor unless they are protected from vehicular impact. (CBC 406.2.9.3)

STAIRWAYS & RAMPS

Stair landings required every 12'?" of vertical rise. (CRC R311.7.3)

Exterior stair stringers must be naturally resistant to decay or pressure treated. (CRC R317.1)

Rise shall be maximum 7.75"; Run shall be 10" minimum; headroom 6'-8" minimum; width 36" minimum, 31.5" between a handrail on one side and 27" with handrails on two sides. Variation between riser heights 3/8" maximum. A nosing not less than .75 inches but not more than 1.25 inches shall be provided on stairways with solid risers where the tread depth is less than 11 inches. The leading edge of treads shall project not more than 1.25 inches beyond the tread below. Open risers are permitted, provided the opening between the treads does not permit the passage of a 4" sphere. (Openings are not limited when the stair has a rise of 30" or less). (CRC R311.7)

Stairways with 4 or more risers shall have a handrail on one side 34" to 38" above the tread nosing. Circular handrails shall have an outside diameter of 1.25"-2"; if not circular, it shall have a perimeter dimension of 4"-6.25" with a maximum cross-sectional dimension of 2.25". See R311.7.8.3 item# 2 for type II handrails with a parameter over 6.25". A minimum clearance of 1.5" shall be maintained from the wall or other surface. Handrails shall be returned, terminate in newel posts, or safety terminals. (CRC R311.7.8.2)

Guards shall be 42" minimum height (unless acting as a handrail/guard for a stairway; the guard height may be 34"-38" in height), with openings less than 4" inches clear (guards on the open sides of stairs may have 4 3/8" openings). (CRC R312)

Provide landings at the top/bottom of the stairway the width of the stairway. The depth of the landing shall be 36" minimum. (CRC R311.7.6)

Usable spaces underneath enclosed/unenclosed stairways shall be protected by a minimum of ½" gypsum board. (CRC R302.7)

Ramps serving the egress door shall have a slope of not more than 1 unit vertical in 12 units horizontal (8.3-percent slope). All other ramps shall have a maximum slope of 1 unit vertical in 8 units horizontal (12.5-percent slope). Exception: Where it is technically infeasible to comply because of site constraints, ramps shall have a slope of not more than 1 unit vertical in 8 units horizontal (12.5-percent slope) (CRC R311.8.1). Provide 3'X3' landings at the top and bottom of ramps, where doors open onto ramps, and where ramps change directions. (CRC R311.8.2)

DECKS

Guards are required if deck or floor is over 30" above grade, minimum 42" high, with openings less than 4". (CRC R312) Guardrails shall be designed and detailed for lateral forces according to CRC Table 301.5.

Provide deck lateral load connections at each end of the deck and at deck intersections per CRC R507.9.2. Specify connectors with a minimum allowable stress design capacity of 1,500lbs and install with 24" of the end of the deck. 750lb rated devices are allowed (DTT1Z as example) if located at 4 points along the deck.

Posts/columns shall be retrained at the bottom end to prevent lateral displacement; clearly show approved post bases, straps, etc to achieve this per CRC R407.3

Joists, girders, structural blocking and support posts shall be wood of natural resistance to decay or pressure-treated lumber when exposed to the weather. (CRC R317.1(8))

ELECTRICAL

Never install electrical panels in closets or bathrooms. Maintain a clearance of 36" inches in front of panels, 30" wide or width of equipment and 6'-6" high for headroom. (CEC 110.26)

Provide a minimum 3 lug intersystem bonding busbar at the main electrical service. (CEC 250.94)

Provide a four-wire feed (two ungrounded conductors, one grounded conductor and an equipment grounding conductor) to all detached structures.

Provide electrical service load calculations for dwellings over 3,000 sq. ft, services 400 amperes or greater or as determined by the Plans Examiner.

All automatic garage door openers that are installed in a residence shall have a battery backup function that is designed to operate when activated because of an electrical outage. (CBC 406.2.1)

A concrete-encased electrode (ufer) consisting of 20' of rebar or #4 copper wire placed in the bottom of a footing is required for all new construction. (CEC 250.52(A)(3)) Bond all metal gas and water pipes to ground. All ground clamps shall be accessible and of an approved type. (CEC 250.104)

All 15/20 ampere receptacles installed per CEC 210.52 **including attached and detached garages and accessory buildings** shall be listed tamper-resistant receptacles. (CEC 406.12)

All branch circuits supplying 15/20 ampere outlets in family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, kitchens, laundry room or similar rooms/areas shall be protected by a listed combination type arc-fault circuit interrupter. (CEC 210.12)

Provide a minimum of one 20A circuit to be used for the laundry receptacle. (CEC 210.11(C)(2))

Provide a minimum of one 20A circuit for bathroom receptacle outlets. (CEC 210.11(C)(3)

Provide at least 1 outlet in basements, garages, laundry rooms, decks, balconies, porches and within 3' of the outside of each bathroom basin. (CEC 210.52 (D), (F) & (G))

Furnaces installed in attics and crawl spaces shall have an access platform (catwalk in attics), light switch and receptacle in the space. Provide a service receptacle for the furnace. (CEC 210.63)

All dwellings must have one exterior outlet at the front and the back of the dwelling. (CEC 210.52(E))

Provide a minimum of one 20A circuit for attached and detached garage outlets. The circuit shall supply no other receptacle outlet. Exception: Garage circuit may serve readily accessible outdoor receptacle outlets. ((CEC 210.11 (C)(4))

A minimum of 1 receptacle shall be provided for each car space. (210.52(G)(1))

At least one wall switched lighting outlet or fixture shall be installed in every habitable room, bathroom, hallways, stairways, attached garages and detached garages with electrical power, equipment spaces (attics, basements, etc). (CEC 210.70).

Kitchens, dining rooms, pantries, breakfast nooks, and similar areas must have a minimum of two 20A circuits. Kitchen, pantry, breakfast nooks, dining rooms, work surfaces and similar areas counter outlets must be installed in every counter space 12" inches or wider, not greater than 4' o.c., within 24" inches of the end of any counter space and not higher than 20" above counter. (CEC 210.52 (C)) A minimum of 1 receptacle is required at each kitchen island as follows: one receptacle is required for first 9 ft^2 two receptacles required from 10 ft^2 – 27 ft^2 three receptacles required for 28 ft^2 – 47 ft^2 and four receptacles required for 48 ft^2 or more. (CEC 210.52(C)(1)) Island counter spaces shall have at least 1 receptacle outlet unless a range top or sink is installed than 2 receptacles may be required. 1 receptacle is required for peninsular counter spaces. Receptacles shall be located behind kitchen sinks if the counter area depth behind the sink is more than 12" for straight counters and 18" for corner installations. (CEC Figure 210.52(C)(1))

Receptacles shall be installed at 12' o.c. maximum in walls starting at 6' maximum from the wall end. Walls longer than two feet shall have a receptacle. Hallway walls longer than 10 ft shall have a receptacle in hallways. (CEC 210.52(A))

Stairways with 6 or more risers shall have wall switch at each floor level at the stair landings. (CEC 210.70(A)(2))

Receptacles shall not be installed within or directly over a bathtub or shower stall. (CEC 406.9 (C)) Light pendants, ceiling fans, lighting tracks, etc shall not be located within 3ft horizontally and 8ft vertically above a shower and/or bathtub threshold. (CEC 410.10(D))

All lighting/fan fixtures located in wet or damp locations shall be rated for the application. (CEC 410.10)

GFCI outlets are required: for all kitchen receptacles that are designed to serve countertop surfaces, dishwashers, bathrooms, in under-floor spaces or below grade level, in unfinished basements, crawl space lighting outlets, in exterior outlets, within 6' of a laundry/utility/wet bar sinks**, indoor damp locations, mud rooms, finished basements, laundry areas,** and in all garage outlets including outlets dedicated to a single device or garage door opener. (CEC 210.8).

Carbon-monoxide alarms shall be installed in dwelling units with fuel-burning appliances or with attached garages (CRC R315):

- Outside of each separate sleeping area in the immediate vicinity of bedrooms
- On every level of a dwelling unit including basements
- Alterations, repairs, or additions exceeding 1,000 dollars (May be battery operated)

Smoke alarms shall be installed (CRC R314):

- In each room used for sleeping purposes.
- Outside of each separate sleeping area in the immediate vicinity of bedrooms.
- In each story, including basements.
- At the top of stairways between habitable floors where an intervening door or obstruction prevents smoke from reaching the smoke detector.
- Shall not be installed within 20ft horizontally of cooking appliances and no closer than 3ft to mechanical registers, ceiling fans and bathroom doors with a bathtub or shower unless this would prevent placement of a smoke detector (R314.3(4)).
- Alterations, repairs, or additions exceeding 1,000 dollars. (May be battery operated.)
- All smoke and carbon-monoxide alarms shall be hardwired with a battery backup (smoke alarms shall have a 10-year sealed battery). (CRC R314.4 & R315.1.2)
- Smoke detectors within 10 feet to 20 feet of the stove shall be ionization type with alarm silencing switch. (CRC R314.3.3)

All 15/20 ampere receptacles in wet locations shall have in-use (bubble) covers installed. All receptacles in wet locations shall also be listed weather-resistant type. (CEC 406.9(B)(1))

ENERGY STORAGE SYSTEMS

Energy storage systems shall only be installed in detached garages and accessory structures, attached garages, outdoor not less than 3' from door and windows and enclosed utility closets, basements, storage or utility closets within dwelling units with finished or noncombustible walls and ceiling. (CRC R328.4)

Individual ESS units shall have a maximum rating of 20 kWh. The aggregate rating of the ESS shall not exceed 40 kWh within utility closets, basements and storage or utility spaces, 80 kWh in attached or detached garages or detached accessory structures, 80 kWh on exterior walls and 80 kWh outdoors on the ground. (CRC R328.5)

Rooms and areas within structures in which ESS are installed shall be protected by smoke alarms. A heat detector shall be installed in locations within structures where smoke alarms cannot be installed based on their listing. (CRC R328.7)

ESS installed in locations subject to vehicle damage shall be provided with impact protection. (CRC R328.8)

PLUMBING

Underfloor cleanouts shall not be more than 5' from an underfloor access, access door or trap door. (CPC 707.9)

Kitchen sinks require a cleanout above the floor level of the lowest floor of the building.

ABS piping shall not be exposed to direct sunlight unless protected by water based synthetic latex paints. (CPC 312.13)

PVC piping shall not be exposed to direct sunlight unless protected by water based synthetic latex paint, .04" thick wrap or otherwise protected from UV degradation. (CPC 312.14)

Underground water supply lines shall have a 14 awg blue tracer wire. (CPC 604.10.1)

The entire floor space in a room containing a shower without thresholds shall be considered a "wet location" when using the CRC, CBC, and the CEC. (CPC 408.5)

Shower compartments, regardless of shape, shall have a minimum finished interior of 1024 square inches (32" by 32") and shall also be capable of encompassing a 30" circle. The required area and dimensions shall be measured at a height equal to the top of the threshold and shall be maintained to a point of not less than 70" above the shower drain outlet. (CPC 408.6) Provide curtain rod or door a minimum of 22" in width (CPC 408.5). Showers and tubs with showers require a non-absorbent surface up to 6' above the floor. (CRC R307.2) Minimum shower receptor slope is 1/8" per foot. (CPC 408.5)

Show location and size of the water heater on plans. Provide pressure relief valve with drain to outside for water heater. (CPC 504.6) Provide seismic strapping in the upper & lower third of the water heater a minimum of 4" above controls. (CPC 507.2)

Water heaters using gas or propane shall designate a space 2.5 feet by 2.5 feet and 7 feet tall suitable for future installation of a heat pump water heater. Additional features are required. (California Energy Code 150.0(n))

Domestic hot water lines shall be insulated. Insulation shall be the thickness of the pipe diameter up to 2" in size and minimum 2" thickness for pipes larger than 2" in diameter. (CPC 609.12)

A 3-inch gravity drain shall be provided at the low point of the space, installed which provides 1/4-inch per foot grade and terminate at an exterior point of the building protected from blockage. The opening shall be screened with a corrosion-resistant wire mesh with mesh openings of 1/4-inch in dimension. Lengths of the gravity drains over 10 feet in length shall be first approved by the Building Official. (L-V 8.8)

Water heaters located in attics, ceiling assemblies and raised floor assemblies shall show a water-tight corrosion resistant minimum 1 ½" deep pan under the water heater with a minimum ¾ inch drain to the exterior of the building. (CPC 507.5)

Water closets shall be located in a space not less than 30" in width (15" on each side) and 24" minimum clearance in front. (CPC 402.5)

Indicate on the plans that the maximum hot water temperature discharging from a bathtub or whirlpool bathtub filler shall not exceed 120 degrees F. (CPC 408.3.2)

Provide anti-siphon valves on all hose bibs. (CPC 603.5.7)

Floor drains shall be provided with a trap primer. (CPC 1007)

Clearly label on the plans the maximum water flow rates per the (CGBSC 4.303.1):

- Water Closets: 1.28gpf
- Urinals: .125gpf
- Kitchen Faucets: 1.8gpm @ 60psi
- Lavatory Faucets: 1.2gpm @ 60psi
- Showerheads: 1.8gpm

MECHANICAL

All newly installed gas fireplaces shall be direct vent and sealed-combustion type. (CMC 912.2)

Any installed wood stove or pellet stove shall meet the U.S. EPA New Source Performance Standard emission limits and shall have a permanent label certifying emission limits.

Top of chimney must extend a minimum of 2 ft. above any part of the building within 10 ft. (CMC 802.5.4)

Fireplaces shall have closable metal or glass doors, have combustion air intake drawn from the outside and have a readily accessible flue dampener control. Continuous burning pilot lights are prohibited. (California Energy Code 150.0(e))

Provide combustion air for all gas fired appliances per CMC Chapter 7.

Roof top equipment on roofs with over 4/12 slope shall have a level 30"x30" working platform. (CMC 304.2)

Exhaust openings terminating to the outdoors shall be covered with a corrosion resistant screen ¼"-1/2" in opening size (not required for clothes dryers). (CMC 502.1)

Vent dryer to outside of building (not to under-floor area). Vent length shall be 14 ft. maximum. Shall terminate a minimum of 3' from the property line and any opening into the building. (CMC 504.4.2)

Environmental Air Ducts shall not terminate less than 3' to a property line, 10' to a forced air inlet, 3' to openings into the building and shall not discharge on to a public way. (CMC 502.2.1)

Provide minimum 100 square inches make-up air for clothes dryers installed in closets. (CMC 504.4.1(1))

Heating system is required to maintain 68 degrees at 3 ft. above floor level and 2ft from exterior walls in all habitable rooms. (CRC R303.10)

TITLE 24 ENERGY

Provide compliance documentation for mandatory measures to shown throughout the plans. All ducts in conditioned spaces must include R-4.2 insulation. (California Energy Code 150.1(c)9) Minimum heating and cooling filter ratings shall be MRV 13. (California Energy Code 150.0(m) 12)

Isolation water valves required for instantaneous water heaters 6.8kBTU/hr and above. Valves shall be installed on both cold and hot water lines. Each valve will need a hose bib or other fitting allowing for flushing the water heater when the valves are closed. (California Energy Code 110.3(c)6)

Energy storage system (ESS) ready. At least one of the following shall be provided:

- **ESS ready interconnection equipment with a minimum backed-up capacity of 60 amps and a minimum of four ESS-supplied branch circuits, or**
- **A dedicated raceway from the main service panel to a panelboard (subpanel) that supplies the following branch circuits: refrigerator, lighting circuit near primary egress door, sleeping room receptacle and one additional.**

The main panelboard shall have a minimum busbar rating of 225 amps. Space shall be reserved to allow future installation of a system isolation equipment/transfer switch within 3 feet of the main panelboard. Raceways shall be installed between the panelboard and the system isolation equipment to allow the connection of backup power source.

Heat pump space heater ready. Systems using a gas or propane furnace shall include a dedicated 240 volt branch circuit with 3 feet of the furnace. The branch circuit shall be rated at 30 amps minimum. The main electrical service shall have a reserved space to allow for the installation of a double pole circuit breaker. The reserved space shall be permanently marked as "For future 240V use". (California Energy Code 150.0(t))

Electric cooktop ready. Systems using a gas or propane cooktop shall include a dedicated 240 volt branch circuit with 3 feet of the cooktop. The branch circuit shall be rated at 50 amps minimum. The main electrical service shall have a reserved space to allow for the installation of a double pole circuit breaker. The reserved space shall be permanently marked as "For future 240V use". (California Energy Code 150.0(u))

Electrical clothes dryer ready. Systems using a gas or propane dryer shall include a dedicated 240 volt branch circuit with 3 feet of the clothes dryer. The branch circuit shall be rated at 30 amps minimum. The main electrical service shall have a reserved space to allow for the installation of a double pole circuit breaker. The reserved space shall be permanently marked as "For future 240V use". (California Energy Code 150.0(v))

ALL luminaires must be high efficacy. (California Energy Code 150.0(k)1A)

Luminaries recessed in insulated ceilings must meet five requirements (California Energy Code 150.0(k)1C):

- They must be rated for direct insulation contact (IC).
- They must be certified as airtight (AT) construction.
- They must have a sealed gasket or caulking between the housing and ceiling to prevent flow of heated or cooled air out of living areas and into the ceiling cavity.
- They may not contain a screw base sockets
- They shall contain a JA8 compliant light source

In bathrooms, garages, **walk-in closet,** laundry rooms, and utility rooms, at least on luminaire in each of these spaces shall be controlled by a vacancy sensor or occupant sensor provided the occupant sensor is initially programmed like a vacancy sensor (manual-on operation). (California Energy Code 150.0(k)2I)

Lighting in habitable spaces, including but not limited to living rooms, dining rooms, kitchens and bedrooms, shall have readily accessible dimming controls. (California Energy Code 150(k) 2F)

All exterior lighting shall be high efficacy, be controlled by a manual on/off switch and have one of the following controls (the manual switch shall not override the automatic control device) (150.0(k)3A):

- Photo-control and motion sensor
- Photo-control and automatic time switch control
- Astronomical time clock control turning lights off during the day

All high efficacy light fixtures shall be certified as "high-efficacy" light fixtures by the California Energy Commission.

Contractor shall provide the homeowner with a luminaire schedule giving the lamps used in the luminaires installed. (CGBSC 10-103(b))

The number of blank electrical boxes more than 5 feet above the finished floor shall not be greater than the number of bedrooms. These electrical boxes must be served by a dimmer, vacancy sensor, or fan speed control. (California Energy Code 150(k)1B)

Radiant barrier shall be installed, and it shall also be installed on all gable ends per the manufacture's specifications.

WILDLAND URBAN INTERFACE (WUI)

Exterior wall coverings shall be noncombustible, ignition resistant, heavy timber, log wall or fire resistive construction. (CRC R337.7)

Exterior wall coverings shall extend from the foundation to the roof and terminate at 2 inch nominal solid blocking between rafters and overhangs. (CRC R337.7.3.2)

Open/enclosed roof eaves and soffits, exterior porch ceilings, floor projections, under-floor areas and undersides of appendages to comply with ignition resistant construction requirements. (CRC R337.5-9)

Spaces created between roof coverings and roof decking shall be fire stopped by approved materials or have one layer of minimum 72lb mineral surfaced non-perforated cap sheet complying with ASTM D 3909. (CRC R337.5.2)

Indicate on the plans where valley flashing is installed, the flashing shall be not less than 26awg and installed over not less than one layer of minimum 72lb mineral surfaced non-perforated cap sheet complying with ASTM D 3909 and at least 36 inches wide running the full length. (CRC R337.5.3)

All vents are required to resist building ignition from the intrusion of flame and burning embers through the ventilation openings including crawlspace vents, gable end vents, eave vents, etc. Exception: Ridge vents and vents installed in a sloped roof.

Vents shall be covered with a noncombustible, corrosion resistant mesh where the dimensions of the mesh therein shall be a minimum of 1/16" and shall not exceed 1/8" in diameter.

Indicate on plans exterior glazing shall have a minimum of one-tempered pane, glass block, have a fire resistive rating of 20 minutes or be tested to meet performance requirements of SFM Standard 12-7A-2. (CRC R337.8.2)

Operable skylights shall be protected by a noncombustible mesh screen 1/8" max openings (R337.8.2.2)

Exterior doors including garage doors shall be noncombustible, ignition resistant material, minimum 1 3/8 inch solid core, minimum 20 minute fire resistive rating or shall be tested to meet the performance requirements of SFM Standard 12-7A-1. (CRC R337.8.3)

Garage door perimeter gap maximum 1/8". Metal flashing, jamb and header overlap, and weather-stripping meeting section requirements are permitted. (R337.8.4)

The walking surface material of decks, porches, balconies and stairs within 10ft of grade level shall be ignition resistant material, exterior fire-retardant treated wood or noncombustible material. (CRC R337.9)

GREEN BUILDING

Projects which disturb less than one acre of soil and are not part of a larger common plan of development which in total disturbs one acre or more, shall manage storm water drainage during construction, one or more of the following measures shall be implemented to prevent flooding of adjacent property, prevent erosion and retain soil runoff on the site (CGBSC 4.106.2):

Retention basins of sufficient size shall be utilized to retain storm water on site

Where storm water is conveyed to a public drainage system, collection point, gutter, or similar disposal method, water shall be filtered by use of a barrier system, wattle or other method approved by the enforcing agency.

All new residential construction with attached private garages shall have the following for electric vehicle (EV) charging stations (CGBSC 4.106.4):

- Install a minimum 1-inch conduit capable of supplying a 208/240V branch circuit to a suitable box location for EV charging. The other end shall terminate to the main service and/or subpanel.
- The main panel and/or subpanel shall be of sufficient size to install a 40-ampere dedicated branch circuit. The dedicated overcurrent protection space shall be labeled "EV CAPABLE".

Multiple shower heads serving a single shower shall have a combined flow rate of 1.8 gpm or the shower shall be designed to allow only one shower outlet to be in operation at a time. (CGBSC 4.303.1.3.2)

Residential projects with an aggregate landscape area equal to or greater than 500 square feet shall comply with either a local water efficient landscape ordinance or the current California Department of Water Resources' Model Water Efficient Landscape Ordinance (MWELO), whichever is more stringent. Automatic irrigation system controllers installed at time of final inspection shall have weather or soil based controllers and/or weather based controllers with rain sensors. Soil moisture based controllers are not required to have rain sensor input. (CGBSC 4.304)

Recycle and/or reuse a minimum of **65 percent** of nonhazardous construction and demolition waste. (CGBSC 4.408.2)

At time of final inspection, a building operation and maintenance manual, compact disc, etc shall be provided containing the following: (CGBSC 4.410)

- Directions that manual shall remain onsite for the life of the building
- Operation and maintenance instructions for equipment, appliances, roof/yard drainage, irrigation systems, etc
- Information from local utility, water and waste recovery providers
- Public transportation and carpool options
- Material regarding importance of keeping humidity levels between 30-60 percent
- Information regarding routine maintenance procedures
- State solar energy incentive program information
- A copy of any required special inspection verifications that were required (if any)

Clearly note on the plans how the project will meet minimum pollutant control requirements for adhesives, sealants, caulks, paints, carpet, resilient flooring systems, etc. (CGBSC 4.504)

Duct openings related to HVAC systems shall be covered with tape, plastic, sheet metal or other methods to reduce the amount of water, dust and debris which may enter the system. (CGBSC 4.504.1)

General notes based on the 2022 California Building Standard Codes. This is not an all inclusive list of code requirements specific to the project. Reference applicable sheets and specific areas of the plans for locations of fixtures/equipment, structural components, structural design criteria, building finishes and other components specific to the project construction.

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

JACKSON & SANDS ENGINEERING, Inc.

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A Regional Partnership for Achievable Housing

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STATE OF CALIFORNIA

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PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23
1	REV 1	12/11/23

GENERAL NOTES

G1.0

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

Y = YES
N/A = NOT APPLICABLE
RESPON. PARTY = RESPONSIBLE PARTY (ie: ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR ETC.)

CHAPTER 3
GREEN BUILDING
SECTION 301 GENERAL

301.1 SCOPE. Buildings shall be designed to include the green building measures specified as mandatory in the application checklists contained in this code. Voluntary green building measures are also included in the application checklists and may be included in the design and construction of structures covered by this code, but are not required unless adopted by a city, county, or city and county as specified in Section 101.7.

301.1.1 Additions and alterations. [HCD] The mandatory provisions of Chapter 4 shall be applied to additions or alterations of existing residential buildings where the addition or alteration increases the building's conditioned area, volume, or size. The requirements shall apply only to and/or within the specific area of the addition or alteration.

The mandatory provision of Section 4.106.4.2 may apply to additions or alterations of existing parking facilities or the addition of new parking facilities serving existing multifamily buildings. See Section 4.106.4.3 for application.

Note: Repairs including, but not limited to, resurfacing, restriping and repairing or maintaining existing lighting fixtures are not considered alterations for the purpose of this section.

Note: On and after January 1, 2014, residential buildings undergoing permitted alterations, additions, or improvements shall replace noncompliant plumbing fixtures with water-conserving plumbing fixtures. Plumbing fixture replacement is required prior to issuance of a certificate of final completion, certificate of occupancy or final permit approval by the local building department. See Civil Code Section 1101.1, et seq., for the definition of a noncompliant plumbing fixture, types of residential buildings affected and other important enactment dates.

301.2 LOW-RISE AND HIGH-RISE RESIDENTIAL BUILDINGS. [HCD] The provisions of individual sections of CALGreen may apply to either low-rise residential buildings high-rise residential buildings, or both. Individual sections will be designated by banners to indicate where the section applies specifically to low-rise only (LR) or high-rise only (HR). When the section applies to both low-rise and high-rise buildings, no banner will be used.

SECTION 302 MIXED OCCUPANCY BUILDINGS

302.1 MIXED OCCUPANCY BUILDINGS. In mixed occupancy buildings, each portion of a building shall comply with the specific green building measures applicable to each specific occupancy.
Exceptions:
1. [HCD] Accessory structures and accessory occupancies serving residential buildings shall comply with Chapter 4 and Appendix A4, as applicable.
2. [HCD] For purposes of CALGreen, live/work units, complying with Section 419 of the *California Building Code*, shall not be considered mixed occupancies. Live/Work units shall comply with Chapter 4 and Appendix A4, as applicable.

DIVISION 4.1 PLANNING AND DESIGN

ABBREVIATION DEFINITIONS:

HCD	Department of Housing and Community Development
BSC	California Building Standards Commission
DSA-SS	Division of the State Architect, Structural Safety
OSHPD	Office of Statewide Health Planning and Development
LR	Low Rise
HR	High Rise
AA	Additions and Alterations
N	New

CHAPTER 4
RESIDENTIAL MANDATORY MEASURES

SECTION 4.102 DEFINITIONS
4.102.1 DEFINITIONS
The following terms are defined in Chapter 2 *(and are included here for reference)*

FRENCH DRAIN. A trench, hole or other depressed area loosely filled with rock, gravel, fragments of brick or similar pervious material used to collect or channel drainage or runoff water.

WATTLES. Wattles are used to reduce sediment in runoff. Wattles are often constructed of natural plant materials such as hay, straw or similar material shaped in the form of tubes and placed on a downflow slope. Wattles are also used for perimeter and inlet controls.

4.106 SITE DEVELOPMENT
4.106.1 GENERAL. Preservation and use of available natural resources shall be accomplished through evaluation and careful planning to minimize negative effects on the site and adjacent areas. Preservation of slopes, management of storm water drainage and erosion controls shall comply with this section.

4.106.2 STORM WATER DRAINAGE AND RETENTION DURING CONSTRUCTION. Projects which disturb less than one acre of soil and are not part of a larger common plan of development which in total disturbs one acre or more, shall manage storm water drainage during construction. In order to manage storm water drainage during construction, one or more of the following measures shall be implemented to prevent flooding of adjacent property, prevent erosion and retain soil runoff on the site.

1. Retention basins of sufficient size shall be utilized to retain storm water on the site.
2. Where storm water is conveyed to a public drainage system, collection point, gutter or similar disposal method, water shall be filtered by use of a barrier system, wattle or other method approved by the enforcing agency.
3. Compliance with a lawfully enacted storm water management ordinance.

Note: Refer to the State Water Resources Control Board for projects which disturb one acre or more of soil, or are part of a larger common plan of development which in total disturbs one acre or more of soil.

(Website: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html)

4.106.3 GRADING AND PAVING. Construction plans shall indicate how the site grading or drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following:

1. Swales
2. Water collection and disposal systems
3. French drains
4. Water retention gardens
5. Other water measures which keep surface water away from buildings and aid in groundwater recharge.

Exception: Additions and alterations not altering the drainage path.

4.106.4 Electric vehicle (EV) charging for new construction. New construction shall comply with Sections 4.106.4.1 or 4.106.4.2 to facilitate future installation and use of EV chargers. Electric vehicle supply equipment (EVSE) shall be installed in accordance with the *California Electrical Code,* Article 625.

Exceptions:
1. On a case-by-case basis, where the local enforcing agency has determined EV charging and infrastructure are not feasible based upon one or more of the following conditions:
   1.1 Where there is no local utility power supply or the local utility is unable to supply adequate power.
   1.2 Where there is evidence suitable to the local enforcing agency substantiating that additional local utility infrastructure design requirements, directly related to the implementation of Section 4.106.4, may adversely impact the construction cost of the project.
2. Accessory Dwelling Units (ADU) and Junior Accessory Dwelling Units (JADU) without additional parking facilities.

4.106.4.1 New one- and two-family dwellings and townhouses with attached private garages. For each dwelling unit, install a listed raceway to accommodate a dedicated 208/240-volt branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall originate at the main service or subpanel and shall terminate into a listed cabinet, box or other enclosure in close proximity to the proposed location of an EV charger. Raceways are required to be continuous at enclosed, inaccessible or concealed areas and spaces. The service panel and/or subpanel shall provide capacity to install a 40-ampere 208/240-volt minimum dedicated branch circuit and space(s) reserved to permit installation of a branch circuit overcurrent protective device.

Exemption: A raceway is not required if a minimum 40-ampere 208/240-volt dedicated EV branch circuit is installed in close proximity to the proposed location of an EV charger at the time of original construction in accordance with the *California Electrical Code*.

4.106.4.1.1 Identification. The service panel or subpanel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging as "EV CAPABLE". The raceway termination location shall be permanently and visibly marked as "EV CAPABLE".

4.106.4.2 New multifamily dwellings, hotels and motels and new residential parking facilities.
When parking is provided, parking spaces for new multifamily dwellings, hotels and motels shall meet the requirements of Sections 4.106.4.2.1 and 4.106.4.2.2. Calculations for spaces shall be rounded up to the nearest whole number. A parking space served by electric vehicle supply equipment or designed as a future EV charging space shall count as at least one standard automobile parking space only for the purpose of complying with any applicable minimum parking space requirements established by a local jurisdiction. See Vehicle Code Section 22511.2 for further details.

4.106.4.2.1Multifamily development projects with less than 20 dwelling units; and hotels and motels with less than 20 sleeping units or guest rooms.
The number of dwelling units, sleeping units or guest rooms shall be based on all buildings on a project site subject to this section.

1.EV Capable. Ten (10) percent of the total number of parking spaces on a building site, provided for all types of parking facilities, shall be electric vehicle charging spaces (EV spaces) capable of supporting future Level 2 EVSE. Electrical load calculations shall demonstrate that the electrical panel service capacity and electrical system, including any on-site distribution transformer(s), have sufficient capacity to simultaneously charge all EVs at all required EV spaces at a minimum of 40 amperes.

The service panel or subpanel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging purposes as "EV CAPABLE" in accordance with the California Electrical Code.

Exceptions:

1.When EV chargers (Level 2 EVSE) are installed in a number equal to or greater than the required number of EV capable spaces.

2.When EV chargers (Level 2 EVSE) are installed in a number less than the required number of EV capable spaces, the number of EV capable spaces required may be reduced by a number equal to the number of EV chargers installed.

Notes:

a.Construction documents are intended to demonstrate the project's capability and capacity for facilitating future EV charging.

b.There is no requirement for EV spaces to be constructed or available until receptacles for EV charging or EV chargers are installed for use.

2.EV Ready. Twenty-five (25) percent of the total number of parking spaces shall be equipped with low power Level 2 EV charging receptacles. For multifamily parking facilities, no more than one receptacle is required per dwelling unit when more than one parking space is provided for use by a single dwelling unit.

Exception: Areas of parking facilities served by parking lifts.

4.106.4.2.2 Multifamily development projects with 20 or more dwelling units, hotels and motels with 20 or more sleeping units or guest rooms.
The number of dwelling units, sleeping units or guest rooms shall be based on all buildings on a project site subject to this section.

1.EV Capable. Ten (10) percent of the total number of parking spaces on a building site, provided for all types of parking facilities, shall be electric vehicle charging spaces (EV spaces) capable of supporting future Level 2 EVSE. Electrical load calculations shall demonstrate that the electrical panel service capacity and electrical system, including any on-site distribution transformer(s), have sufficient capacity to simultaneously charge all EVs at all required EV spaces at a minimum of 40 amperes.

The service panel or subpanel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging purposes as "EV CAPABLE" in accordance with the California Electrical Code.

Exception: When EV chargers (Level 2 EVSE) are installed in a number greater than five (5) percent of parking spaces required by Section 4.106.4.2.2, Item 3, the number of EV capable spaces required may be reduced by a number equal to the number of EV chargers installed over the five (5) percent required.

Notes:

a.Construction documents shall show locations of future EV spaces.

b.There is no requirement for EV spaces to be constructed or available until receptacles for EV charging or EV chargers are installed for use.

2.EV Ready. Twenty-five (25) percent of the total number of parking spaces shall be equipped with low power Level 2 EV charging receptacles. For multifamily parking facilities, no more than one receptacle is required per dwelling unit when more than one parking space is provided for use by a single dwelling unit.

Exception: Areas of parking facilities served by parking lifts.

3.EV Chargers. Five (5) percent of the total number of parking spaces shall be equipped with Level 2 EVSE. Where common use parking is provided, at least one EV charger shall be located in the common use parking area and shall be available for use by all residents or guests.

When low power Level 2 EV charging receptacles or Level 2 EVSE are installed beyond the minimum required, an automatic load management system (ALMS) may be used to reduce the maximum required electrical capacity to each space served by the ALMS. The electrical system and any on-site distribution transformers shall have sufficient capacity to deliver at least 3.3 kW simultaneously to each EV charging station (EVCS) served by the ALMS. The branch circuit shall have a minimum capacity of 40 amperes, and installed EVSE shall have a capacity of not less than 30 amperes. ALMS shall not be used to reduce the minimum required electrical capacity to the required EV capable spaces.

4.106.4.2.2.1 Electric vehicle charging stations (EVCS).
Electric vehicle charging stations required by Section 4.106.4.2.2, Item 3, shall comply with Section 4.106.4.2.2.1.

Exception: Electric vehicle charging stations serving public accommodations, public housing, motels and hotels shall not be required to comply with this section. See California Building Code, Chapter 11B, for applicable requirements.

4.106.4.2.2.1.1 Location.
EVCS shall comply with at least one of the following options:

1.The charging space shall be located adjacent to an accessible parking space meeting the requirements of the California Building Code, Chapter 11A, to allow use of the EV charger from the accessible parking space.

2.The charging space shall be located on an accessible route, as defined in the California Building Code, Chapter 2, to the building.

Exception: Electric vehicle charging stations designed and constructed in compliance with the California Building Code, Chapter 11B, are not required to comply with Section 4.106.4.2.2.1.1 and Section 4.106.4.2.2.1.2, Item 3.

4.106.4.2.2.1.2 Electric vehicle charging stations (EVCS) dimensions.
The charging spaces shall be designed to comply with the following:

1.The minimum length of each EV space shall be 18 feet (5486 mm).

2.The minimum width of each EV space shall be 9 feet (2743 mm).

3.One in every 25 charging spaces, but not less than one, shall also have an 8-foot (2438 mm) wide minimum aisle. A 5-foot (1524 mm) wide minimum aisle shall be permitted provided the minimum width of the EV space is 12 feet (3658 mm).

a.Surface slope for this EV space and the aisle shall not exceed 1 unit vertical in 48 units horizontal (2.083 percent slope) in any direction.

4.106.4.2.2.1.3 Accessible EV spaces.
In addition to the requirements in Sections 4.106.4.2.2.1.1 and 4.106.4.2.2.1.2, all EVSE, when installed, shall comply with the accessibility provisions for EV chargers in the California Building Code, Chapter 11B. EV ready spaces and EVCS in multifamily developments shall comply with California Building Code, Chapter 11A, Section 1109A.

4.106.4.2.3 EV space requirements.
1.Single EV space required. Install a listed raceway capable of accommodating a 208/240-volt dedicated branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall originate at the main service or subpanel and shall terminate into a listed cabinet, box or enclosure in close proximity to the location or the proposed location of the EV space. Construction documents shall identify the raceway termination point, receptacle or charger location, as applicable. The service panel and/ or subpanel shall have a 40-ampere minimum dedicated branch circuit, including branch circuit overcurrent protective device installed, or space(s) reserved to permit installation of a branch circuit overcurrent protective device.

Exception: A raceway is not required if a minimum 40-ampere 208/240-volt dedicated EV branch circuit is installed in close proximity to the location or the proposed location of the EV space, at the time of original construction in accordance with the California Electrical Code.

2.Multiple EV spaces required. Construction documents shall indicate the raceway termination point and the location of installed or future EV spaces, receptacles or EV chargers. Construction documents shall also provide information on amperage of installed or future receptacles or EVSE, raceway method(s), wiring schematics and electrical load calculations. Plan design shall be based upon a 40-ampere minimum branch circuit. Required raceways and related components that are planned to be installed underground, enclosed, inaccessible or in concealed areas and spaces shall be installed at the time of original construction.

Exception: A raceway is not required if a minimum 40-ampere 208/240-volt dedicated EV branch circuit is installed in close proximity to the location or the proposed location of the EV space at the time of original construction in accordance with the California Electrical Code.

4.106.4.2.4 Identification.
The service panel or subpanel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging purposes as "EV CAPABLE" in accordance with the California Electrical Code.

4.106.4.2.5 Electric Vehicle Ready Space Signage.
Electric vehicle ready spaces shall be identified by signage or pavement markings, in compliance with Caltrans Traffic Operations Policy Directive 13-01 (Zero Emission Vehicle Signs and Pavement Markings) or its successor(s).

4.106.4.3 Electric vehicle charging for additions and alterations of parking facilities serving existing multifamily buildings.
When new parking facilities are added, or electrical systems or lighting of existing parking facilities are added or altered and the work requires a building permit, ten (10) percent of the total number of parking spaces added or altered shall be electric vehicle charging spaces (EV spaces) capable of supporting future Level 2 EVSE.

Notes:

1.Construction documents are intended to demonstrate the project's capability and capacity for facilitating future EV charging.

2.There is no requirement for EV spaces to be constructed or available until EV chargers are installed for use.

DIVISION 4.2 ENERGY EFFICIENCY
4.201 GENERAL
4.201.1 SCOPE. For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory standards.

DIVISION 4.3 WATER EFFICIENCY AND CONSERVATION
4.303 INDOOR WATER USE
4.303.1 WATER CONSERVING PLUMBING FIXTURES AND FITTINGS. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the sections 4.303.1.1, 4.303.1.2, 4.303.1.3, and 4.303.4.4.

Note: All noncompliant plumbing fixtures in any residential real property shall be replaced with water-conserving plumbing fixtures. Plumbing fixture replacement is required prior to issuance of a certificate of final completion, certificate of occupancy, or final permit approval by the local building department. See Civil Code Section 1101.1, et seq., for the definition of a noncompliant plumbing fixture, types of residential buildings affected and other important enactment dates.

4.303.1.1 Water Closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-type Toilets.

Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.

4.303.1.2 Urinals. The effective flush volume of wall mounted urinals shall not exceed 0.125 gallons per flush. The effective flush volume of all other urinals shall not exceed 0.5 gallons per flush.

4.303.1.3 Showerheads.

4.303.1.3.1 Single Showerhead. Showerheads shall have a maximum flow rate of not more than 1.8 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Showerheads.

4.303.1.3.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all the showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gallons per minute at 80 psi, or the shower shall be designed to only allow one shower outlet to be in operation at a time.

Note: A hand-held shower shall be considered a showerhead.

4.303.1.4 Faucets.

4.303.1.4.1 Residential Lavatory Faucets. The maximum flow rate of residential lavatory faucets shall not exceed 1.2 gallons per minute at 60 psi. The minimum flow rate of residential lavatory faucets shall not be less than 0.8 gallons per minute at 20 psi.

4.303.1.4.2 Lavatory Faucets in Common and Public Use Areas. The maximum flow rate of lavatory faucets installed in common and public use areas (outside of dwellings or sleeping units) in residential buildings shall not exceed 0.5 gallons per minute at 60 psi.

4.303.1.4.3 Metering Faucets. Metering faucets when installed in residential buildings shall not deliver more than 0.2 gallons per cycle.

4.303.1.4.4 Kitchen Faucets. The maximum flow rate of kitchen faucets shall not exceed 1.8 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons per minute at 60 psi.

Note: Where complying faucets are unavailable, aerators or other means may be used to achieve reduction.

4.303.1.4.5 Pre-rinse spray valves.
When installed, shall meet the requirements in the *California Code of Regulations*, Title 20 (Appliance Efficiency Regulations), Sections 1605.1 (h)(4) Table H-2, Section 1605.3 (h)(4)(A), and Section 1607 (d)(7) and shall be equipped with an integral automatic shutoff.

FOR REFERENCE ONLY: The following table and code section have been reprinted from the *California Code of Regulations*, Title 20 (Appliance Efficiency Regulations),Section 1605.1 (h)(4) and Section 1605.3 (h)(4)(A).

TABLE H-2

STANDARDS FOR COMMERCIAL PRE-RINSE SPRAY VALVES MANUFACTURED ON OR AFTER JANUARY 28, 2019

PRODUCT CLASS [spray force in ounce force (ozf)]	MAXIMUM FLOW RATE (gpm)
Product Class 1 (≤ 5.0 ozf)	1.00
Product Class 2 (> 5.0 ozf and ≤ 8.0 ozf)	1.20
Product Class 3 (> 8.0 ozf)	1.28

Title 20 Section 1605.3 (h)(4)(A): Commercial prerinse spray values manufactured on or after January 1, 2006, shall have a minimum spray force of not less than 4.0 ounces-force (ozf)[113 grams-force(gf)]

4.303.2 Submeters for multifamily buildings and dwelling units in mixed-used residential/commercial buildings.
Submeters shall be installed to measure water usage of individual rental dwelling units in accordance with the *California Plumbing Code*.

4.303.3 Standards for plumbing fixtures and fittings. Plumbing fixtures and fittings shall be installed in accordance with the *California Plumbing Code*, and shall meet the applicable standards referenced in Table 1701.1 of the *California Plumbing Code*.

NOTE:
THIS TABLE COMPILES THE DATA IN SECTION 4.303.1, AND IS INCLUDED AS A CONVENIENCE FOR THE USER.

TABLE - MAXIMUM FIXTURE WATER USE

FIXTURE TYPE	FLOW RATE
SHOWER HEADS (RESIDENTIAL)	1.8 GMP @ 80 PSI
LAVATORY FAUCETS (RESIDENTIAL)	MAX. 1.2 GPM @ 60 PSI MIN. 0.8 GPM @ 20 PSI
LAVATORY FAUCETS IN COMMON & PUBLIC USE AREAS	0.5 GPM @ 60 PSI
KITCHEN FAUCETS	1.8 GPM @ 60 PSI
METERING FAUCETS	0.2 GAL/CYCLE
WATER CLOSET	1.28 GAL/FLUSH
URINALS	0.125 GAL/FLUSH

4.304 OUTDOOR WATER USE
4.304.1 OUTDOOR POTABLE WATER USE IN LANDSCAPE AREAS. Residential developments shall comply with a local water efficient landscape ordinance or the current California Department of Water Resources' Model Water Efficient Landscape Ordinance (MWELO), whichever is more stringent.

NOTES:

1. The Model Water Efficient Landscape Ordinance (MWELO) is located in the *California Code Regulations,* Title 23, Chapter 2.7, Division 2. MWELO and supporting documents, including water budget calculator, are available at: https://www.water.ca.gov/

DIVISION 4.4 MATERIAL CONSERVATION AND RESOURCE EFFICIENCY
4.406 ENHANCED DURABILITY AND REDUCED MAINTENANCE
4.406.1 RODENT PROOFING. Annular spaces around pipes, electric cables, conduits or other openings in sole/bottom plates at exterior walls shall be protected against the passage of rodents by closing such openings with cement mortar, concrete masonry or a similar method acceptable to the enforcing agency.

4.408 CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING
4.408.1 CONSTRUCTION WASTE MANAGEMENT. Recycle and/or salvage for reuse a minimum of 65 percent of the non-hazardous construction and demolition waste in accordance with either Section 4.408.2, 4.408.3 or 4.408.4, or meet a more stringent local construction and demolition waste management ordinance.

Exceptions:

1. Excavated soil and land-clearing debris.
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist or are not located reasonably close to the jobsite.
3. The enforcing agency may make exceptions to the requirements of this section when isolated jobsites are located in areas beyond the haul boundaries of the diversion facility.

4.408.2 CONSTRUCTION WASTE MANAGEMENT PLAN. Submit a construction waste management plan in conformance with Items 1 through 5. The construction waste management plan shall be updated as necessary and shall be available during construction for examination by the enforcing agency.

1. Identify the construction and demolition waste materials to be diverted from disposal by recycling, reuse on the project or salvage for future use or sale.
2. Specify if construction and demolition waste materials will be sorted on-site (source separated) or bulk mixed (single stream).
3. Identify diversion facilities where the construction and demolition waste material collected will be taken.
4. Identify construction methods employed to reduce the amount of construction and demolition waste generated.
5. Specify that the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.

4.408.3 WASTE MANAGEMENT COMPANY. Utilize a waste management company, approved by the enforcing agency, which can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with Section 4.408.1.

Note: The owner or contractor may make the determination if the construction and demolition waste materials will be diverted by a waste management company.

4.408.4 WASTE STREAM REDUCTION ALTERNATIVE [LR]. Projects that generate a total combined weight of construction and demolition waste disposed of in landfills, which do not exceed 3.4 lbs./sq.ft. of the building area shall meet the minimum 65% construction waste reduction requirement in Section 4.408.1

4.408.4.1 WASTE STREAM REDUCTION ALTERNATIVE. Projects that generate a total combined weight of construction and demolition waste disposed of in landfills, which do not exceed 2 pounds per square foot of the building area, shall meet the minimum 65% construction waste reduction requirement in Section 4.408.1

4.408.5 DOCUMENTATION. Documentation shall be provided to the enforcing agency which demonstrates compliance with Section 4.408.2, items 1 through 5, Section 4.408.3 or Section 4.408.4..

Notes:

1. Sample forms found in "A Guide to the California Green Building Standards Code (Residential)" located at www.hcd.ca.gov/CALGreen.html may be used to assist in documenting compliance with this section.
2. Mixed construction and demolition debris (C & D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

4.410 BUILDING MAINTENANCE AND OPERATION
4.410.1 OPERATION AND MAINTENANCE MANUAL. At the time of final inspection, a manual, compact disc, web-based reference or other media acceptable to the enforcing agency which includes all of the following shall be placed in the building:

1. Directions to the owner or occupant that the manual shall remain with the building throughout the life cycle of the structure.
2. Operation and maintenance instructions for the following:
   a. Equipment and appliances, including water-saving devices and systems, HVAC systems, photovoltaic systems, electric vehicle chargers, water-heating systems and other major appliances and equipment.
   b. Roof and yard drainage, including gutters and downspouts.
   c. Space conditioning systems, including condensers and air filters.
   d. Landscape irrigation systems.
   e. Water reuse systems.
3. Information from local utility, water and waste recovery providers on methods to further reduce resource consumption, including recycle programs and locations.
4. Public transportation and/or carpool options available in the area.
5. Educational material on the positive impacts of an interior relative humidity between 30-60 percent and what methods an occupant may use to maintain the relative humidity level in that range.
6. Information about water-conserving landscape and irrigation design and controllers which conserve water.
7. Instructions for maintaining gutters and downspouts and the importance of diverting water at least 5 feet away from the foundation.
8. Information on required routine maintenance measures, including, but not limited to, caulking, painting, grading around the building, etc.
9. Information about state solar energy and incentive programs available.
10. A copy of all special inspections verifications required by the enforcing agency or this code.
11. Information from the Department of Forestry and Fire Protection on maintenance of defensible space around residential structures.
12. Information and/or drawings identifying the location of grab bar reinforcements.

4.410.2 RECYCLING BY OCCUPANTS. Where 5 or more multifamily dwelling units are constructed on a building site, provide readily accessible area(s) that serves all buildings on the site and are identified for the depositing, storage and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics, organic waster, and metals, or meet a lawfully enacted local recycling ordinance, if more restrictive.

Exception: Rural jurisdictions that meet and apply for the exemption in Public Resources Code Section 42649.82 (a)(2)(A) et seq. are note required to comply with the organic waste portion of this section.

DIVISION 4.5 ENVIRONMENTAL QUALITY
SECTION 4.501 GENERAL
4.501.1 Scope
The provisions of this chapter shall outline means of reducing the quality of air contaminants that are odorous, irritating and/or harmful to the comfort and well being of a building's installers, occupants and neighbors.

SECTION 4.502 DEFINITIONS
5.102.1 DEFINITIONS
The following terms are defined in Chapter 2 *(and are included here for reference)*

AGRIFIBER PRODUCTS. Agrifiber products include wheatboard, strawboard, panel substrates and door cores, not including furniture, fixtures and equipment (FF&E) not considered base building elements.

COMPOSITE WOOD PRODUCTS. Composite wood products include hardwood plywood, particleboard and medium density fiberboard. "Composite wood products" does not include hardboard, structural plywood, structural panels, structural composite lumber, oriented strand board, glued laminated timber, prefabricated wood I-joists or finger-jointed lumber, all as specified in California Code of regulations (CCR), title 17, Section 93120.1.

DIRECT-VENT APPLIANCE. A fuel-burning appliance with a sealed combustion system that draws all air for combustion from the outside atmosphere and discharges all flue gases to the outside atmosphere.

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ARCHITECTURE + DESIGN

JACKSON & SANDS ENGINEERING, Inc.

Truckee · County of Placer
A Regional Partnership for Achievable Housing

LICENSED ARCHITECT
RUSSELL DAVIDSON
No. C36895
Ren. 11-30-25
STATE OF CALIFORNIA

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1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

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2022 CALIFORNIA GREEN BUILDING STANDARDS CODE
RESIDENTIAL MANDATORY MEASURES, SHEET 2 (January 2023)

Y = YES
N/A = NOT APPLICABLE
RESPON. PARTY = RESPONSIBLE PARTY (ex: ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR ETC.)

MAXIMUM INCREMENTAL REACTIVITY (MIR). The maximum change in weight of ozone formed by adding a compound to the "Base Reactive Organic Gas (ROG) Mixture" per weight of compound added, expressed to hundredths of a gram (g O^3/g ROC).
Note: MIR values for individual compounds and hydrocarbon solvents are specified in CCR, Title 17, Sections 94700 and 94701.

MOISTURE CONTENT. The weight of the water in wood expressed in percentage of the weight of the oven-dry wood.

PRODUCT-WEIGHTED MIR (PWMIR). The sum of all weighted-MIR for all ingredients in a product subject to this article. The PWMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging).
Note: PWMIR is calculated according to equations found in CCR, Title 17, Section 94521 (a).

REACTIVE ORGANIC COMPOUND (ROC). Any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere.

VOC. A volatile organic compound (VOC) broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94508(a).

4.503 FIREPLACES
4.503.1 GENERAL. Any installed gas fireplace shall be a direct-vent sealed-combustion type. Any installed woodstove or pellet stove shall comply with U.S. EPA New Source Performance Standards (NSPS) emission limits as applicable, and shall have a permanent label indicating they are certified to meet the emission limits. Woodstoves, pellet stoves and fireplaces shall also comply with applicable local ordinances.

4.504 POLLUTANT CONTROL
4.504.1 COVERING OF DUCT OPENINGS & PROTECTION OF MECHANICAL EQUIPMENT DURING CONSTRUCTION. At the time of rough installation, during storage on the construction site and until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheet metal or other methods acceptable to the enforcing agency to reduce the amount of water, dust or debris which may enter the system.

4.504.2 FINISH MATERIAL POLLUTANT CONTROL. Finish materials shall comply with this section.

4.504.2.1 Adhesives, Sealants and Caulks. Adhesives, sealant and caulks used on the project shall meet the requirements of the following standards unless more stringent local or regional air pollution or air quality management district rules apply:

1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable or SCAQMD Rule 1168 VOC limits, as shown in Table 4.504.1 or 4.504.2, as applicable. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and tricloroethylene), except for aerosol products, as specified in Subsection 2 below.
2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than 1 pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations*, Title 17, commencing with section 94507.

4.504.2.2 Paints and Coatings. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Suggested Control Measure, as shown in Table 4.504.3, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table 4.504.3 shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in subsections 4.21, 4.36, and 4.37 of the 2007 California Air Resources Board, Suggested Control Measure, and the corresponding Flat, Nonflat or Nonflat-High Gloss VOC limit in Table 4.504.3 shall apply.

4.504.2.3 Aerosol Paints and Coatings. Aerosol paints and coatings shall meet the Product-weighted MIR Limits for ROC in Section 94522(a)(2) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(e)(1) and (f)(1) of *California Code of Regulations*, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8, Rule 49.

4.504.2.4 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:

1. Manufacturer's product specification.
2. Field verification of on-site product containers.

TABLE 4.504.1 - ADHESIVE VOC LIMIT[1,2]
(Less Water and Less Exempt Compounds in Grams per Liter)

ARCHITECTURAL APPLICATIONS	VOC LIMIT
INDOOR CARPET ADHESIVES	50
CARPET PAD ADHESIVES	50
OUTDOOR CARPET ADHESIVES	150
WOOD FLOORING ADHESIVES	100
RUBBER FLOOR ADHESIVES	60
SUBFLOOR ADHESIVES	50
CERAMIC TILE ADHESIVES	65
VCT & ASPHALT TILE ADHESIVES	50
DRYWALL & PANEL ADHESIVES	50
COVE BASE ADHESIVES	50
MULTIPURPOSE CONSTRUCTION ADHESIVE	70
STRUCTURAL GLAZING ADHESIVES	100
SINGLE-PLY ROOF MEMBRANE ADHESIVES	250
OTHER ADHESIVES NOT LISTED	50
SPECIALTY APPLICATIONS	
PVC WELDING	510
CPVC WELDING	490
ABS WELDING	325
PLASTIC CEMENT WELDING	250
ADHESIVE PRIMER FOR PLASTIC	550
CONTACT ADHESIVE	80
SPECIAL PURPOSE CONTACT ADHESIVE	250
STRUCTURAL WOOD MEMBER ADHESIVE	140
TOP & TRIM ADHESIVE	250
SUBSTRATE SPECIFIC APPLICATIONS	
METAL TO METAL	30
PLASTIC FOAMS	50
POROUS MATERIAL (EXCEPT WOOD)	50
WOOD	30
FIBERGLASS	80

1. IF AN ADHESIVE IS USED TO BOND DISSIMILAR SUBSTRATES TOGETHER, THE ADHESIVE WITH THE HIGHEST VOC CONTENT SHALL BE ALLOWED.
2. FOR ADDITIONAL INFORMATION REGARDING METHODS TO MEASURE THE VOC CONTENT SPECIFIED IN THIS TABLE, SEE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 1168.

TABLE 4.504.2 - SEALANT VOC LIMIT
(Less Water and Less Exempt Compounds in Grams per Liter)

SEALANTS	VOC LIMIT
ARCHITECTURAL	250
MARINE DECK	760
NONMEMBRANE ROOF	300
ROADWAY	250
SINGLE-PLY ROOF MEMBRANE	450
OTHER	420
SEALANT PRIMERS	
ARCHITECTURAL	
NON-POROUS	250
POROUS	775
MODIFIED BITUMINOUS	500
MARINE DECK	760
OTHER	750

TABLE 4.504.3 - VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS[2,3]
GRAMS OF VOC PER LITER OF COATING, LESS WATER & LESS EXEMPT COMPOUNDS

COATING CATEGORY	VOC LIMIT
FLAT COATINGS	50
NON-FLAT COATINGS	100
NONFLAT-HIGH GLOSS COATINGS	150
SPECIALTY COATINGS	
ALUMINUM ROOF COATINGS	400
BASEMENT SPECIALTY COATINGS	400
BITUMINOUS ROOF COATINGS	50
BITUMINOUS ROOF PRIMERS	350
BOND BREAKERS	350
CONCRETE CURING COMPOUNDS	350
CONCRETE/MASONRY SEALERS	100
DRIVEWAY SEALERS	50
DRY FOG COATINGS	150
FAUX FINISHING COATINGS	350
FIRE RESISTIVE COATINGS	350
FLOOR COATINGS	100
FORM-RELEASE COMPOUNDS	250
GRAPHIC ARTS COATINGS (SIGN PAINTS)	500
HIGH TEMPERATURE COATINGS	420
INDUSTRIAL MAINTENANCE COATINGS	250
LOW SOLIDS COATINGS[1]	120
MAGNESITE CEMENT COATINGS	450
MASTIC TEXTURE COATINGS	100
METALLIC PIGMENTED COATINGS	500
MULTICOLOR COATINGS	250
PRETREATMENT WASH PRIMERS	420
PRIMERS, SEALERS, & UNDERCOATERS	100
REACTIVE PENETRATING SEALERS	350
RECYCLED COATINGS	250
ROOF COATINGS	50
RUST PREVENTATIVE COATINGS	250
SHELLACS	
CLEAR	730
OPAQUE	550
SPECIALTY PRIMERS, SEALERS & UNDERCOATERS	100
STAINS	250
STONE CONSOLIDANTS	450
SWIMMING POOL COATINGS	340
TRAFFIC MARKING COATINGS	100
TUB & TILE REFINISH COATINGS	420
WATERPROOFING MEMBRANES	250
WOOD COATINGS	275
WOOD PRESERVATIVES	350
ZINC-RICH PRIMERS	340

1. GRAMS OF VOC PER LITER OF COATING, INCLUDING WATER & EXEMPT COMPOUNDS
2. THE SPECIFIED LIMITS REMAIN IN EFFECT UNLESS REVISED LIMITS ARE LISTED IN SUBSEQUENT COLUMNS IN THE TABLE.
3. VALUES IN THIS TABLE ARE DERIVED FROM THOSE SPECIFIED BY THE CALIFORNIA AIR RESOURCES BOARD, ARCHITECTURAL COATINGS SUGGESTED CONTROL MEASURE, FEB. 1, 2008. MORE INFORMATION IS AVAILABLE FROM THE AIR RESOURCES BOARD.

TABLE 4.504.5 - FORMALDEHYDE LIMITS[1]
MAXIMUM FORMALDEHYDE EMISSIONS IN PARTS PER MILLION

PRODUCT	CURRENT LIMIT
HARDWOOD PLYWOOD VENEER CORE	0.05
HARDWOOD PLYWOOD COMPOSITE CORE	0.05
PARTICLE BOARD	0.09
MEDIUM DENSITY FIBERBOARD	0.11
THIN MEDIUM DENSITY FIBERBOARD[2]	0.13

1. VALUES IN THIS TABLE ARE DERIVED FROM THOSE SPECIFIED BY THE CALIF. AIR RESOURCES BOARD, AIR TOXICS CONTROL MEASURE FOR COMPOSITE WOOD AS TESTED IN ACCORDANCE WITH ASTM E 1333. FOR ADDITIONAL INFORMATION, SEE CALIF. CODE OF REGULATIONS, TITLE 17, SECTIONS 93120 THROUGH 93120.12.
2. THIN MEDIUM DENSITY FIBERBOARD HAS A MAXIMUM THICKNESS OF 5/16" (8 MM).

DIVISION 4.5 ENVIRONMENTAL QUALITY (continued)
4.504.3 CARPET SYSTEMS. All carpet installed in the building interior shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specification 01350)

See California Department of Public Health's website for certification programs and testing labs.

https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx.

4.504.3.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specification 01350)

See California Department of Public Health's website for certification programs and testing labs.

https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx.

4.504.3.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 4.504.1.

4.504.4 RESILIENT FLOORING SYSTEMS. Where resilient flooring is installed , at least 80% of floor area receiving resilient flooring shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specification 01350)

See California Department of Public Health's website for certification programs and testing labs.

hhttps://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx.

4.504.5 COMPOSITE WOOD PRODUCTS. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the buildings shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections, as shown in Table 4.504.5

4.504.5.1 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:

1. Product certifications and specifications.
2. Chain of custody certifications.
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.).
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269, European 636 3S standards, and Canadian CSA 0121, CSA 0151, CSA 0153 and CSA 0325 standards.
5. Other methods acceptable to the enforcing agency.

4.505 INTERIOR MOISTURE CONTROL
4.505.1 General. Buildings shall meet or exceed the provisions of the *California Building Standards Code*.

4.505.2 CONCRETE SLAB FOUNDATIONS. Concrete slab foundations required to have a vapor retarder by California Building Code, Chapter 19, or concrete slab-on-ground floors required to have a vapor retarder by the California Residential Code, Chapter 5, shall also comply with this section.

4.505.2.1 Capillary break. A capillary break shall be installed in compliance with at least one of the following:

1. A 4-inch (101.6 mm) thick base of 1/2 inch (12.7mm) or larger clean aggregate shall be provided with a vapor barrier in direct contact with concrete and a concrete mix design, which will address bleeding, shrinkage, and curling, shall be used. For additional information, see American Concrete Institute, ACI 302.2R-06.
2. Other equivalent methods approved by the enforcing agency.
3. A slab design specified by a licensed design professional.

4.505.3 MOISTURE CONTENT OF BUILDING MATERIALS. Building materials with visible signs of water damage shall not be installed. Wall and floor framing shall not be enclosed when the framing members exceed 19 percent moisture content. Moisture content shall be verified in compliance with the following:

1. Moisture content shall be determined with either a probe-type or contact-type moisture meter.Equivalent moisture verification methods may be approved by the enforcing agency and shall satisfy requirements found in Section 101.8 of this code.
2. Moisture readings shall be taken at a point 2 feet (610 mm) to 4 feet (1219 mm) from the grade stamped end of each piece verified.
3. At least three random moisture readings shall be performed on wall and floor framing with documentation acceptable to the enforcing agency provided at the time of approval to enclose the wall and floor framing.

Insulation products which are visibly wet or have a high moisture content shall be replaced or allowed to dry prior to enclosure in wall or floor cavities. Wet-applied insulation products shall follow the manufacturers' drying recommendations prior to enclosure.

4.506 INDOOR AIR QUALITY AND EXHAUST
4.506.1 Bathroom exhaust fans. Each bathroom shall be mechanically ventilated and shall comply with the following:

1. Fans shall be ENERGY STAR compliant and be ducted to terminate outside the building.
2. Unless functioning as a component of a whole house ventilation system, fans must be controlled by a humidity control.
   a. Humidity controls shall be capable of adjustment between a relative humidity range less than or equal to 50% to a maximum of 80%. A humidity control may utilize manual or automatic means of adjustment.
   b. A humidity control may be a separate component to the exhaust fan and is not required to be integral (i.e., built-in)

Notes:

1. For the purposes of this section, a bathroom is a room which contains a bathtub, shower or tub/shower combination.
2. Lighting integral to bathroom exhaust fans shall comply with the *California Energy Code*.

4.507 ENVIRONMENTAL COMFORT
4.507.2 HEATING AND AIR-CONDITIONING SYSTEM DESIGN. Heating and air conditioning systems shall be sized, designed and have their equipment selected using the following methods:

1. The heat loss and heat gain is established according to ANSI/ACCA 2 Manual J - 2011 (Residential Load Calculation), ASHRAE handbooks or other equivalent design software or methods.
2. Duct systems are sized according to ANSI/ACCA 1 Manual D - 2014 (Residential Duct Systems), ASHRAE handbooks or other equivalent design software or methods.
3. Select heating and cooling equipment according to ANSI/ACCA 3 Manual S - 2014 (Residential Equipment Selection), or other equivalent design software or methods.

Exception: Use of alternate design temperatures necessary to ensure the system functions are acceptable.

CHAPTER 7
INSTALLER & SPECIAL INSPECTOR QUALIFICATIONS
702 QUALIFICATIONS
702.1 INSTALLER TRAINING. HVAC system installers shall be trained and certified in the proper installation of HVAC systems including ducts and equipment by a nationally or regionally recognized training or certification program. Uncertified persons may perform HVAC installations when under the direct supervision and responsibility of a person trained and certified to install HVAC systems or contractor licensed to install HVAC systems. Examples of acceptable HVAC training and certification programs include but are not limited to the following:

1. State certified apprenticeship programs.
2. Public utility training programs.
3. Training programs sponsored by trade, labor or statewide energy consulting or verification organizations.
4. Programs sponsored by manufacturing organizations.
5. Other programs acceptable to the enforcing agency.

702.2 SPECIAL INSPECTION [HCD]. When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition to other certifications or qualifications acceptable to the enforcing agency, the following certifications or education may be considered by the enforcing agency when evaluating the qualifications of a special inspector:

1. Certification by a national or regional green building program or standard publisher.
2. Certification by a statewide energy consulting or verification organization, such as HERS raters, building performance contractors, and home energy auditors.
3. Successful completion of a third party apprentice training program in the appropriate trade.
4. Other programs acceptable to the enforcing agency.

Notes:
1. Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.
2. HERS raters are special inspectors certified by the California Energy Commission (CEC) to rate homes in California according to the Home Energy Rating System (HERS).

[BSC] When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition, the special inspector shall have a certification from a recognized state, national or international association, as determined by the local agency. The area of certification shall be closely related to the primary job function, as determined by the local agency.

Note: Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.

703 VERIFICATIONS
703.1 DOCUMENTATION. Documentation used to show compliance with this code shall include but is not limited to, construction documents, plans, specifications, builder or installer certification, inspection reports, or other methods acceptable to the enforcing agency which demonstrate substantial conformance. When specific documentation or special inspection is necessary to verify compliance, that method of compliance will be specified in the appropriate section or identified applicable checklist.

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1 BEDROOM (661 SF)

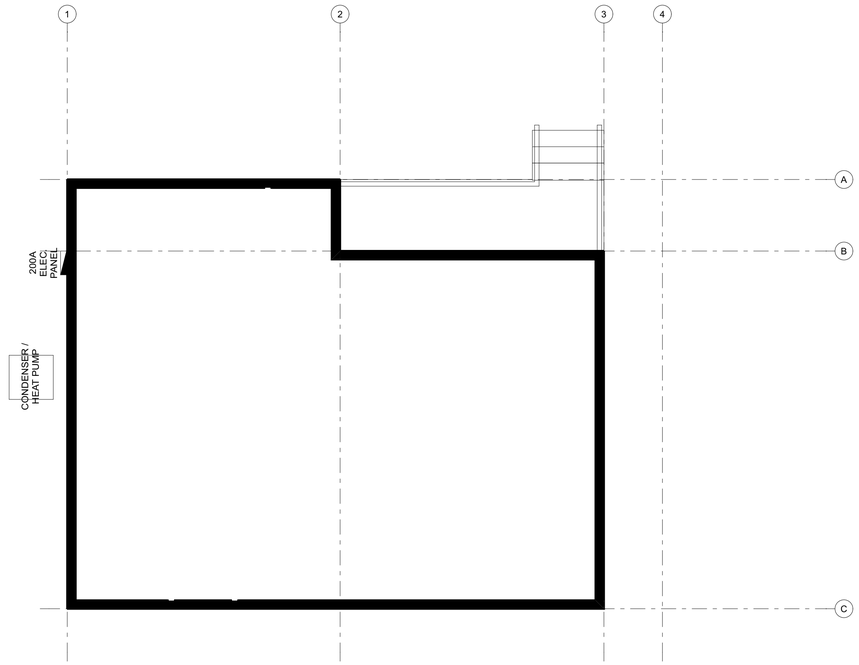
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5' MIN. CLEARANCE FROM ALL WALLS TO PROPERTY LINES

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

SITE NOTES

1. EXTERIOR WALLS OF ADU SHALL NOT BE INSTALLED CLOSER THAN 5' TO THE NEAREST PROPERTY LINE, CENTERLINE OF A STREET, ALLEY, OR PUBLIC WAY, OR TO AN IMAGINARY LINE BETWEEN TWO BUILDINGS ON THE LOT.
2. SURFACE DRAINAGE SHALL BE DIVERTED TO A STORM SEWER CONVEYANCE OR OTHER APPROVED POINT OF COLLECTION THAT DOES NOT CREATE A HAZARD. LOTS SHALL BE GRADED TO DRAIN SURFACE WATER AWAY FROM FOUNDATION WALLS. THE GRADE SHALL FALL NOT FEWER THAN 6 INCHES WITHIN THE FIRST 10 FEET.

   EXCEPTION: WHERE LOT LINES, WALLS, SLOPES OR OTHER PHYSICAL BARRIERS PROHIBIT 6 INCHES OF FALL WITHIN 10 FEET, DRAINS OR SWALES SHALL BE CONSTRUCTED TO ENSURE DRAINAGE AWAY FROM THE STRUCTURE. IMPERVIOUS SURFACES WITHIN 10 FEET OF THE BUILDING FOUNDATION SHALL BE SLOPED NOT LESS THAN 2 PERCENT AWAY FROM THE BUILDING.
3. PROJECT WILL COMPLY WITH LOCAL AHJ STORM WATER REQUIREMENTS.

EXTERIOR WALL FIRE RATINGS - WITHOUT FIRE SPRINKLERS (CRC TABLE R302.1(1))

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.3 of the *California Building Code* with exposure from both sides	0 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[a, b]	≥ 2 feet to < 5 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Openings in walls	Not allowed	NA	< 3 feet
	25% maximum of wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet

a. THE FIRE-RESISTANCE RATING SHALL BE PERMITTED TO BE REDUCED TO 0 HOURS ON THE UNDERSIDE OF THE EAVE OVERHANG IF FIREBLOCKING IS PROVIDED FROM THE WALL TOP PLATE TO THE UNDERSIDE OF THE ROOF SHEATHING.

b. THE FIRE-RESISTANCE RATING SHALL BE PERMITTED TO BE REDUCED TO 0 HOURS ON THE UNDERSIDE OF THE RAKE OVERHANG WHERE GABLE VENT OPENINGS ARE NOT INSTALLED.

EXTERIOR WALL FIRE RATINGS - WITH FIRE SPRINKLERS (CRC TABLE R302.1(2))

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *California Building Code* with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	NA	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]
Penetrations	All	None required	3 feet

a. FOR RESIDENTIAL SUBDIVISIONS WHERE ALL DWELLINGS ARE EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM INSTALLED IN ACCORDANCE WITH SECTION R313, THE FIRE SEPARATION DISTANCE FOR EXTERIOR WALLS NOT FIRE-RESISTANCE RATED AND FOR FIRE-RESISTANCE-RATED PROJECTIONS SHALL BE PERMITTED TO BE REDUCED TO 0 FEET, AND UNLIMITED UNPROTECTED OPENINGS AND PENETRATIONS SHALL BE PERMITTED, WHERE THE ADJOINING LOT PROVIDES AN OPEN SETBACK YARD THAT IS 6 FEET OR MORE IN WIDTH ON THE OPPOSITE SIDE OF THE PROPERTY LINE.

b. THE FIRE-RESISTANCE RATING SHALL BE PERMITTED TO BE REDUCED TO 0 HOURS ON THE UNDERSIDE OF THE EAVE OVERHANG IF FIREBLOCKING IS PROVIDED FROM THE WALL TOP PLATE TO THE UNDERSIDE OF THE ROOF SHEATHING.

c. THE FIRE-RESISTANCE RATING SHALL BE PERMITTED TO BE REDUCED TO 0 HOURS ON THE UNDERSIDE OF THE RAKE OVERHANG WHERE GABLE VENT OPENINGS ARE NOT INSTALLED.

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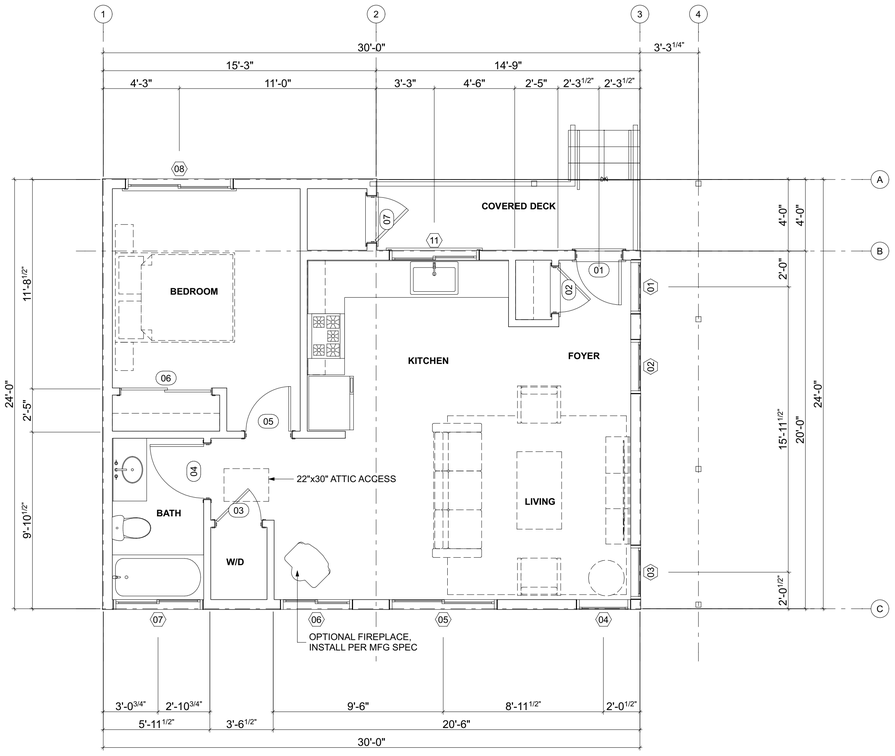
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

GENERIC SITE PLAN

A0.1



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

PLAN NOTES

1. ALL DIMENSIONS TO FACE OF FRAMING, U.N.O.
2. ALL DOORS SHOULD BE 3 1/2" FROM NEAREST INTERSECTING WALL AT HINGED SIDE, U.N.O.
3. WRITTEN DIMENSIONS TO PREVAIL OVER SCALING OF DRAWINGS. SUBCONTRACTOR TO VERIFY ALL DIM. PRIOR TO CONSTRUCTION.
4. SEE SCHEDULE FOR DOOR AND WINDOW INFORMATION.
5. SEE PLANS AND DETAILS FOR LOCATIONS, QUANTITY AND CONFIGURATION OF MISCELLANEOUS IRON AND STEEL WORK INCLUDING ASSORTED CLIPS, BRACKETS ANGLES, STRAPS, POST ANCHORS AND LIKE ITEMS. FURNISH AND INSTALL ALL SUCH ITEMS NECESSARY TO MAKE A COMPLETE INSTALLATION WHETHER OR NOT SPECIFICALLY DETAILED OR NOTED ON THE DRAWINGS. ALL EXTERIOR METAL AND HARDWARE IS TO BE GALVANIZED. STEEL IS TO BE ASTM A3.
6. FRAMER IS TO LAYOUT CEILING JOISTS/ROOF RAFTERS TO ACCOMMODATE RECESSED LIGHTS EXHAUST FANS OR OTHER ELECTRICAL/ MECHANICAL FIXTURES.
7. WOOD SOFFIT/CEILING, SIDING & TRIM ALL NAILS, FASTENERS AND HARDWARE MUST BE STAINLESS STEEL, NUMBER OR TOP-QUALITY, HOT-DIPPED GALVANIZED. STAPLES ARE NOT PERMITTED
8. FLASHING AND SHEET METAL ALL FLASHING AND COUNTER FLASHING IS TO BE GALVANIZED AND INSTALLED AS PER SMACNA STANDARDS. ALL PROPOSED FLASHING AND SHEET METAL MATERIALS, GAUGE AND INSTALLATION IS TO BE IN ACCORDANCE WITH SMACNA MANUAL STANDARDS.
   A. MATERIALS FOR PLASTER IS TO BE THE STANDARD PRODUCTS OF RECOGNIZED MANUFACTURES, AND SHALL BE AS MANUFACTURED BY US GYPSUM CO. OR APPROVED EQUAL.
   B. ALL PLASTER CORNER BEADS, CASING BEADS, CONTROL JOINTS,EXPANSION SCREEDS AND ACCESSORIES ARE TO BE GALVANIZED.PROVIDE CASING BEADS AT ALL JOINTS OF STUCCO TO DISSIMILAR SURFACES UNLESS OTHERWISE NOTED C. WHERE INDICATED ON THE DRAWINGS, PORTLAND CEMENT PLASTER IS TO BE HAND APPLIED (3) THREE COAT WORK, 7/8" THICK ON EXTERIOR SURFACES. THE COATS ARE TO CONSIST OF A SCRATCH (3/8" AND A TWO COAT FINISH (1/8" MIN.) COAT PROPORTIONED AND MIXED ADS RECOMMENDED BY THE CALIFORNIA LATHING AND PLASTERING CONTRACTORS ASSOCIATION.
9. AT LEAST ONE BATHROOM ON THE ENTRY LEVEL SHALL BE PROVIDED WITH GRAB BAR REINFORCEMENT. REINFORCEMENT SHALL BE NOMINAL 2X8 LUMBER AND SHALL BE LOCATED BETWEEN 32 INCHES AND 39.5 INCHES ABOVE THE FINISHED FLOOR. WATER CLOSET REINFORCEMENT SHALL BE INSTALLED ON BOTH SIDE WALLS OF THE FIXTURE, OR ON THE SIDE WALL AND THE BACK WALL.
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ROOF VENTING REQUIRED

ROOF NOTES

REFER TO TITLE SHEET T1 FOR ROOF AND VENT MATERIAL SPECIFICATIONS

ROOF VENTING

1 SF OF ROOF VENTING PER 150 SF OF ENCLOSED AREA OR ENCLOSED RAFTER AREA

FLOOR ENCLOSED
RAFTER AREA = 798 SF

798 SF/150 SF = 5.3 SF

VENTILATION AREA REQUIRED = 5.3 SF (766 SQ. IN.)

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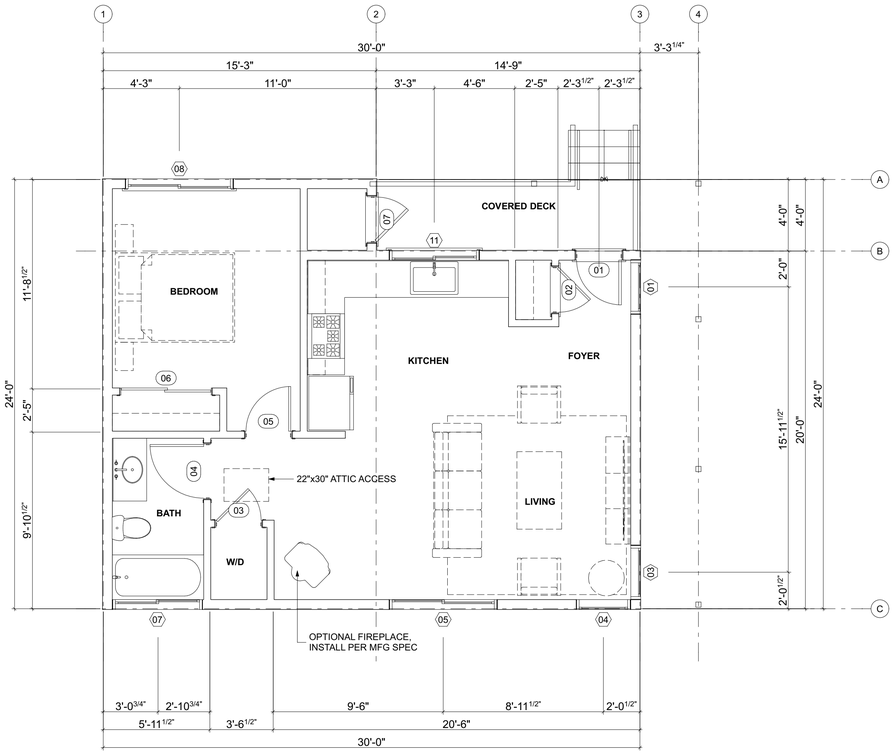
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
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FLOOR PLAN (30,50,70)

A1.0



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

NOTES (ABOVE 4,000' ELEV.)

1. DIRECT-VENT APPLIANCES, EXIT TERMINALS, GAS VENTS, ETC. SHALL TERMINATE ABOVE THE ANTICIPATED SNOW DEPTH (ANTICIPATED SNOW DEPTH IS THE GROUND SNOW LOAD DIVIDED BY 25). VENT TERMINATIONS SHALL NOT BE LOCATED UNDER DECKS WHICH COULD BE SEALED OFF AROUND THE PERIMETER WITH SNOW ACCUMULATION.
2. ABOVE 4,000 FEET ELEVATION ABOVE SEA LEVEL ALL DIRECT VENT APPLIANCES, EXIT TERMINALS, GAS VENTS, ETC TERMINATION SHALL BE PROTECTED FROM CLOSURE AND SLIDING SNOW AND ICE BY THE USE OF FORMED METAL CRICKETS. THE METAL CRICKETS SHALL HAVE A MINIMUM VERTICAL HEIGHT (AT THE APEX) AT LEAST ONE-HALF OF THE REQUIRED VERTICAL HEIGHT OF THE VENT EXTENSION ABOVE THE ROOF. IN NO CASE SHALL THE CRICKET MEASURE LESS THAN 8 INCHES AT THE APEX. THE CRICKET AND FLASHING SHALL BE SECURED TO THE ROOF FRAMING AND SHEATHING TO WITHSTAND THE SHEAR LOADS ANTICIPATED. COMBINED FLASHING AND CRICKET UNITS MAY BE USED. VENT PIPES SHALL EXTEND THROUGH THEIR FLASHINGS AND BE TIGHTLY SEALED AT THE POINT OF PENETRATION SO AS TO PREVENT THE RETURN OF SEWER GASES INTO THE STRUCTURE. ALL APPLIANCE VENTS, FLUES AND CHIMNEYS SHALL BE STRAPPED TO THE CRICKET NEAR ITS APEX WITH A GALVANIZED STEEL STRAP WITH A MINIMUM THICKNESS OF 16 GAUGE.
   EXCEPTION: VENT TERMINATIONS WHICH ARE MADE WITHIN 36 INCHES OF THE RIDGE OR ON ROOFS HAVING A PITCH OF 2 IN 12 OR FLATTER SHALL NOT BE REQUIRED TO HAVE CRICKETS.
3. AN "ICE DAM" OR "ICE GUARD" IS REQUIRED ON THE ROOFS OF HEATED BUILDINGS CONSTRUCTED AT ELEVATIONS ABOVE 4,000 FEET ABOVE SEA LEVEL. ALL ROOFS, REGARDLESS OF COVERING, WITH A PITCH OF LESS THAN 8 IN 12 SHALL BE PROTECTED AGAINST LEAKAGE (CAUSED BY ICE AND SNOW) BY EITHER: (1) A BASE SHEET OF FELT SOLID CEMENTED TO THE ROOF SHEATHING WITH AN APPROVED CEMENTING MATERIAL, OR (2) AN APPROVED MANUFACTURED MEMBRANE INSTALLED PER THE MANUFACTURER'S SPECIFICATIONS. APPLICATION SHALL EXTEND FROM THE ROOF EAVE EDGE UP THE ROOF TO A LINE FIVE (5) FEET HORIZONTALLY INSIDE THE EXTERIOR WALL LINE OF THE HEATED BUILDING AND UP 30 INCHES ALONG EACH SIDE OF A VALLEY. WHERE THERE EXISTS BOTH CONDITIONED SPACE AND UNCONDITIONED SPACE, THE REQUIRED COVERING SHALL ALSO EXTEND HORIZONTALLY TO A POINT AT LEAST FIVE (5) FEET ONTO THE UNCONDITIONED SPACE. THIS "ICE DAM"/"ICE GUARD" SHALL BE IN ADDITION TO ANY UNDERLAYMENT OTHERWISE REQUIRED.
4. ABOVE 4,000 FEET ELEVATION ABOVE SEA LEVEL, WHEN STRUCTURAL CONDITIONS NECESSITATE INSTALLATION OF WATER PIPING IN EXTERIOR WALLS OR ABOVE CEILINGS OF BUILDINGS, THE PIPES SHALL BE INSTALLED TO THE INSIDE EDGE OF THE WALL OR CEILING FRAMING AND INSULATED, ON THE UNHEATED SIDE OF THE PIPES, WITH AT LEAST R-19 INSULATION OR EQUIVALENT. ABOVE 4,000 FEET ELEVATION ABOVE SEA LEVEL ALL COLD WATER PIPING SHALL BE GRADED BACK TO THE WATER SERVICE. HOT WATER LINES SHALL BE SLOPED TO A BLEEDER VALVE OR VALVES THAT ARE READILY ACCESSIBLE. GRAVITY DRAINS OR OTHER APPROVED DEVICES MAY BE USED TO SATISFY THIS REQUIREMENT. NO PART OF SUCH WATER LINES SHALL BE TRAPPED.
5. ABOVE 4,000 FEET ELEVATION ABOVE SEA LEVEL THE BUILDING WATER SERVICE LINE SHALL BE EQUIPPED WITH A "STOP AND DRAIN" VALVE LOCATED WHERE THE LINE DAYLIGHTS OUT OF THE GROUND WITHIN THE BUILDING FOOTPRINT. THE DRAIN PORT OF THE VALVE SHALL BE PROTECTED FROM BLOCKAGE BY THE USE OF A SLEEVE OR BOX OVER THE VALVE. THE VALVE SHALL BE PROTECTED FROM FREEZING WITH INSULATION MATERIAL AND FITTED WITH A HANDLE THAT IS READILY ACCESSIBLE.
6. ABOVE 4,000 FEET ELEVATION ABOVE SEA LEVEL WATER SUPPLY YARD PIPING SHALL BE PROTECTED FROM FREEZING BY A MINIMUM OF 36 INCHES OF EARTH COVERING AND SHALL BE EXTENDED TO WITHIN THE BUILDING FOOTPRINT BEFORE DAYLIGHTING OUT OF THE GROUND.

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ROOF VENTING REQUIRED

ROOF NOTES

REFER TO TITLE SHEET T1 FOR ROOF AND VENT MATERIAL SPECIFICATIONS

ROOF VENTING

1 SF OF ROOF VENTING PER 150 SF OF ENCLOSED AREA OR ENCLOSED RAFTER AREA

FLOOR ENCLOSED
RAFTER AREA = 798 SF

798 SF/150 SF = 5.3 SF

VENTILATION AREA REQUIRED = 5.3 SF (766 SQ. IN.)

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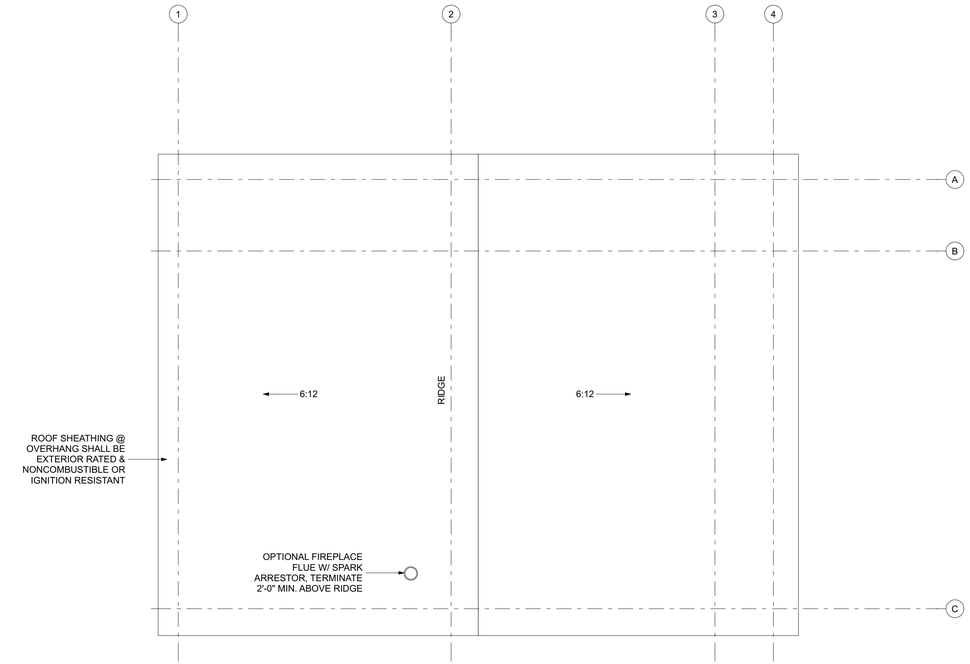
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
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FLOOR PLAN (170,490)

A1.2



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

ROOF VENTING REQUIRED

ROOF NOTES

A CLASS 'A' ROOF ASSEMBLY SHALL BE INSTALLED. IF THE APPLICANT DEVIATES FROM THE ROOF SPECIFICATIONS THE APPLICANT SHALL PROVIDE A COPY OF THE ICC/UL LISTING

ICC NUMBER_____
UL NUMBER_____

ROOF VENTING

1 SF OF ROOF VENTING PER 150 SF OF ENCLOSED AREA OR ENCLOSED RAFTER AREA

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798 SF/150 SF = 5.3 SF

VENTILATION AREA REQUIRED = 5.3 SF (766 SQ. IN.)

NON VENTED ROOF

R806.5 UNVENTED ATTIC AND UNVENTED ENCLOSED RAFTER ASSEMBLIES

A. IF INSULATION IS AIR-PERMEABLE AND IT IS INSTALLED DIRECTLY BELOW THE ROOF SHEATHING WITH RIGID BOARD OR SHEET INSULATION WITH A MINIMUM R-5 VALUE INSTALLED ABOVE THE ROOF SHEATHING. (OR)
B. IF THE INSULATION IS AIR-IMPERMEABLE AND IS IN DIRECT CONTACT WITH THE UNDERSIDE OF THE ROOF SHEATHING. (OR)
C. IF TWO LAYERS OF INSULATION ARE INSTALLED BELOW THE ROOF SHEATHING: AN AIR-IMPERMEABLE LAYER IN DIRECT CONTACT WITH THE UNDERSIDE OF THE ROOF SHEATHING AND AN ADDITIONAL LAYER OF AIR PERMEABLE INSULATION INSTALLED DIRECTLY UNDER THE AIR IMPERMEABLE INSULATION.
D. WHERE PREFORMED INSULATION BOARD IS USED AS THE AIR-IMPERMEABLE INSULATION LAYER, IT SHALL BE SEALED AT THE PERIMETER OF EACH INDIVIDUAL SHEET INTERIOR SURFACE TO FORM A CONTINUOUS LAYER.

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8. INSULATION THERMAL INSULATION IS TO BE FOIL BACKED BATT INSULATION WITH AN R FACTOR NOT LESS THAN R-15 FOR WALLS AND AN R-30 FOR CEILINGS @ BATHROOMS, LAUNDRY ROOM AND MASTER BED/BATHROOMS ARE TO BE PROVIDED WITH SOUND INSULATION FLOOR, WALLS AND CEILING LOCATIONS AS MANUFACTURED BY JOHNS-MANVILLE FORMALDEHYDE FREE OR APPROVED EQUAL.
9. FLASHING AND SHEET METAL ALL FLASHING AND COUNTER FLASHING IS TO BE GALVANIZED AND INSTALLED AS PER SMACNA STANDARDS. ALL PROPOSED FLASHING AND SHEET METAL MATERIALS, GAUGE AND INSTALLATION IS TO BE IN ACCORDANCE WITH SMACNA MANUAL STANDARDS.
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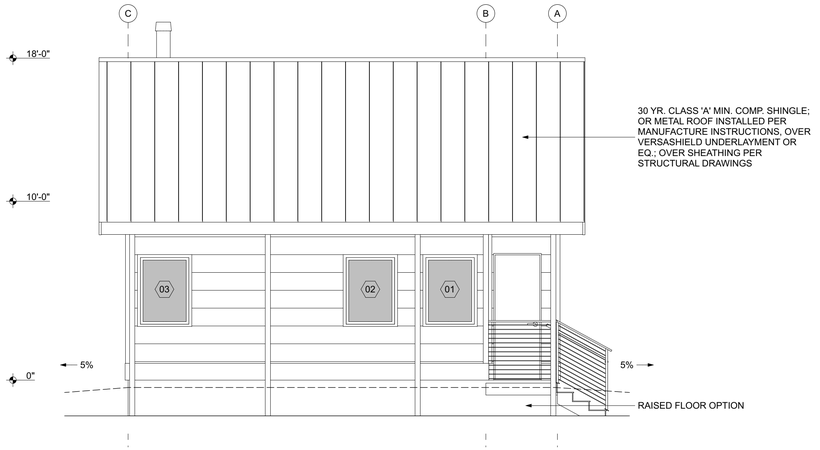
1 BEDROOM (661 SF)

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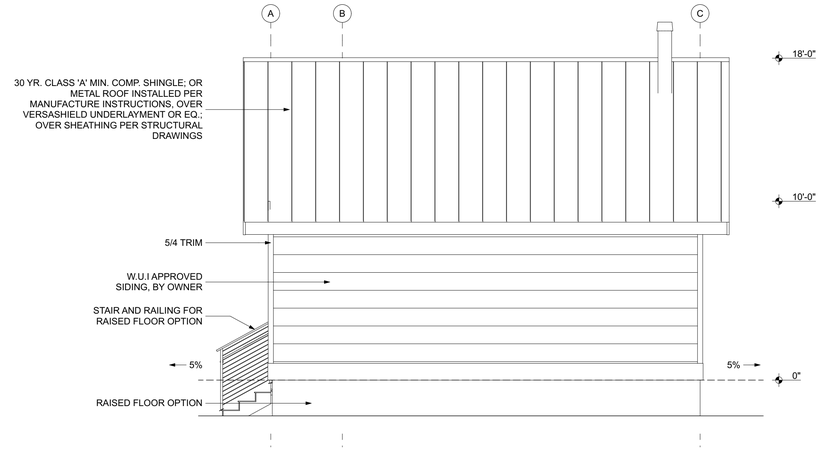
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	SUBMITTAL	3/30/23

ROOF PLAN

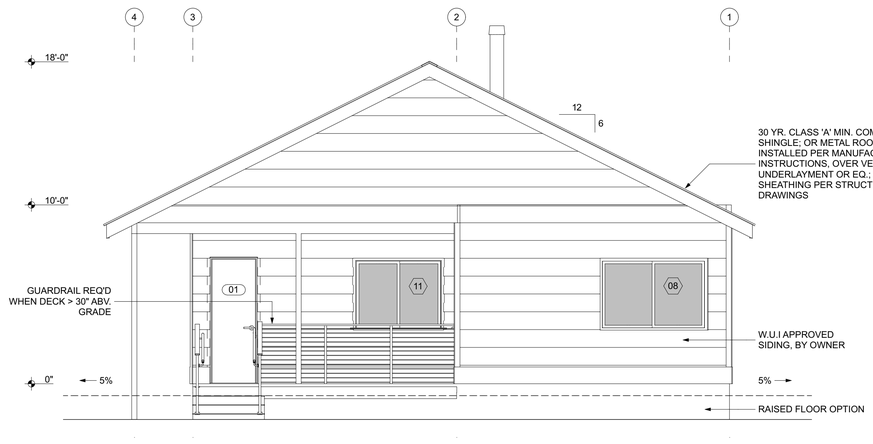
A1.3



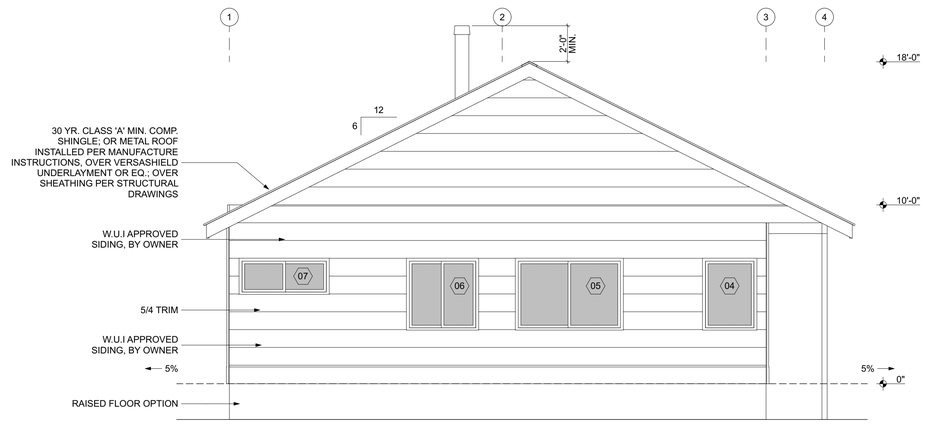
4 RIGHT ELEVATION
SCALE: 1/4" = 1'-0"



3 LEFT ELEVATION
SCALE: 1/4" = 1'-0"



2 REAR ELEVATION
SCALE: 1/4" = 1'-0"



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

GENERAL NOTES

1. IN ROOF COVERINGS WHERE THE PROFILE CREATES SPACE BETWEEN THE ROOF COVERING AND COMBUSTIBLE ROOF DECKING, SPECIFY ONE OF THE FOLLOWING MEANS OF PROTECTING SPACES AT EAVES ENDS.
   A. FIRE-STOPPING WITH APPROVED MATERIALS
   B. ONE LAYER OF 72 POUND (32.4 KG) MINERAL-SURFACED NON-PERFORATED CAP SHEET COMPLYING WITH ASTM D 3909 INSTALLED OVER THE COMBUSTIBLE DECKING
   C. OTHERWISE CONSTRUCTED TO PREVENT INTRUSION OF FLAMES AND EMBERS
2. EXPOSED VALLEY FLASHINGS SHALL BE CONSTRUCTED WITH NOT LESS THAN 0.019-INCH (NO. 26 GALVANIZED SHEET GAGE) CORROSION-RESISTANT METAL INSTALLED OVER A MINIMUM 36-INCH-WIDE UNDERLAYMENT CONSISTING OF ONE LAYER OF NO. 72 ASTM CAP SHEET RUNNING THE FULL LENGTH OF THE VALLEY.
3. ANY ROOF GUTTERS SHALL BE PROVIDED WITH MEANS TO PREVENT ACCUMULATION OF LEAVES AND DEBRIS.
4. SKYLIGHTS SHALL BE TEMPERED GLASS.
5. ALL VENTS (ROOF, FOUNDATION, COMBUSTION-AIR, ETC) SHALL RESIST THE INTRUSION OF FLAMES AND EMBERS
6. VENTILATION OPENINGS FOR ENCLOSED ATTICS, EAVE SOFFIT SPACES, ENCLOSED RAFTER SPACES FORMED WHERE CEILINGS ARE APPLIED DIRECTLY TO THE UNDERSIDE OF ROOF RAFTERS, UNDERFLOOR VENTILATION OPENINGS, AND VENT OPENINGS IN EXTERIOR WALLS AND EXTERIOR DOORS SHALL BE LISTED TO ASTM E 2886 AND COMPLY WITH ALL OF THE FOLLOWING:
   A. THERE SHALL BE NO FLAMING IGNITION OF THE COTTON MATERIAL DURING THE EMBER INTRUSION TEST
   B. THERE SHALL BE NO FLAMING IGNITION DURING THE INTEGRITY TEST PORTION OF THE FLAME INTRUSION TEST
   C. THE MAXIMUM TEMPERATURE OF THE UNEXPOSED SIDE OF THE VENT SHALL NOT EXCEED 662 DEGREES FAHRENHEIT (350 DEGREES CELSIUS)
7. EXTERIOR WALL FINISH SHALL COMPLY WITH ONE OF THE FOLLOWING:
   A. NON-COMBUSTIBLE MATERIAL (STUCCO, CEMENT FIBER BOARD, ETC)
      - STUCCO AND CEMENT PLASTER USED AS AN EXTERIOR WALL COVERING SHALL BE 7/8-INCH THICK
      - NONCOMBUSTIBLE OR FIRE-RETARDANT-TREATED WOOD SHAKE USED AS AN EXTERIOR WALL COVERING SHALL HAVE AN UNDERLAYMENT OF MINIMUM 1/2-INCH FIRE-RATED GYPSUM SHEATHING THAT IS TIGHTLY BUTTED, OR TAPED AND MUDDED, OR AN UNDERLAYMENT OF OTHER IGNITION RESISTANT MATERIAL APPROVED BY THE BUILDING OFFICIAL.
   B. IGNITION-RESISTANT MATERIAL
8. PATIO COVER, CARPORT AND TRELLIS CONSTRUCTION WITH ALL EXPOSED ELEMENTS SHALL COMPLY WITH ANY OF THE FOLLOWING:
   A. NON-COMBUSTIBLE MATERIAL
   B. 1-HOUR FIRE-RESISTANT-RATED MATERIAL
   C. APPROVED EXTERIOR FIRE-RETARDANT TREATED WOOD
   D. MODIFIED HEAVY TIMBER (MIN 2X TONGUE-AND-GROOVE SHEATHING, 4X6 RAFTERS/BEAMS, 6X6 POSTS)
9. DECK, BALCONY, AND EXTERIOR STAIR CONSTRUCTION, WITH ALL EXPOSED ELEMENTS SHALL COMPLY WITH THE FOLLOWING:
   A. NON-COMBUSTIBLE MATERIAL
   B. 1-HOUR FIRE-RESISTANT-RATED MATERIAL
   C. APPROVED EXTERIOR FIRE-RETARDANT TREATED WOOD
   D. MODIFIED HEAVY TIMBER (MIN 4X8 JOISTS, 4X10 OR 6X8 BEAMS, 6X6 POSTS)
   B. DECKING AND TREAD MATERIAL (ANY OF THE FOLLOWING):
      A. NON-COMBUSTIBLE MATERIAL
      B. 1-HOUR FIRE-RESISTANT-RATED MATERIAL
      C. APPROVED EXTERIOR FIRE-RETARDANT TREATED WOOD
      D. APPROVED ALTERNATIVE DECKING MATERIAL MEETING TESTS REQUIREMENTS OF COUNTY BUILDING CODE 92.1.709A.1.4)
10. EXTERIOR GARAGE DOORS SHALL RESIST THE INTRUSION OF EMBERS INTO THE GARAGE BY LIMITING THE SIZE OF ANY GAPS AT THE BOTTOM, SIDES, AND TOP OF THE DOOR TO 1/8 INCH OR LESS USING ONE OF THE FOLLOWING METHODS
    A. WEATHER-STRIPPING PRODUCTS WITH TENSILE STRENGTH AND FLAMMABILITY RATING PER CBC 708A.4
    B. DOOR OVERLAPS ONTO JAMBS AND HEADERS
    C. GARAGE DOOR JAMBS AND HEADERS COVERED WITH METAL FLASHING
11. PAPER-FACED INSULATION PROHIBITED IN ATTICS OR OTHER VENTILATED SPACES.
12. FENCES OR ANY STRUCTURE WITHIN 5 FEET OF BUILDING SHALL BE CONSTRUCTED PER ONE OF THE FOLLOWING:
    A. NON-COMBUSTIBLE MATERIAL
    B. APPROVED EXTERIOR FIRE-RETARDANT TREATED WOOD
    C. MATERIAL MEETING SAME FIRE-RESISTIVE STANDARDS AS EXTERIOR WALLS OF BUILDINGS
13. METAL CHIMNEY SHALL BE BRACED IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION REQUIREMENTS

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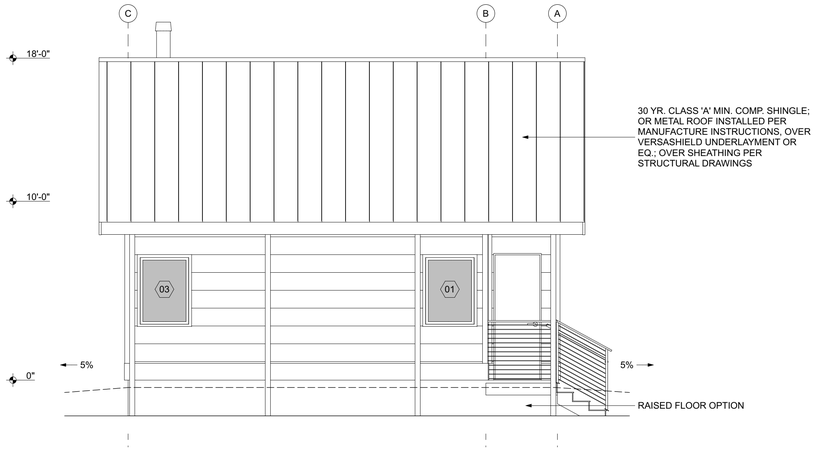
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
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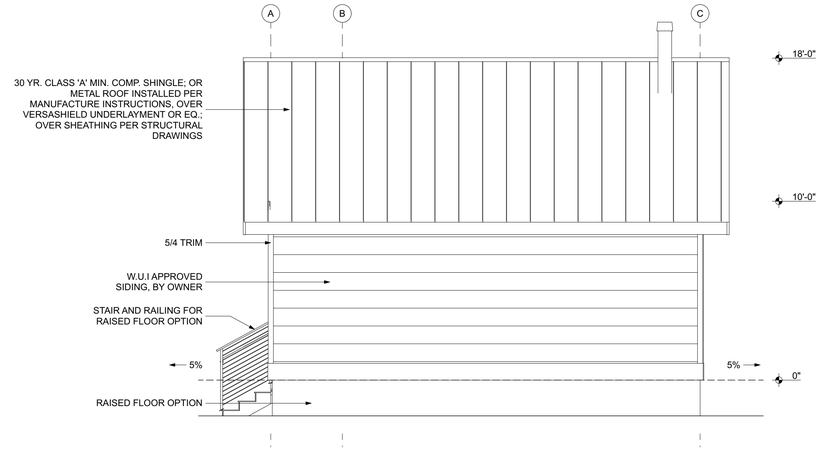
ID	NAME	DATE
	SUBMITTAL	3/30/23

BUILDING ELEVATIONS
(30,50,70)

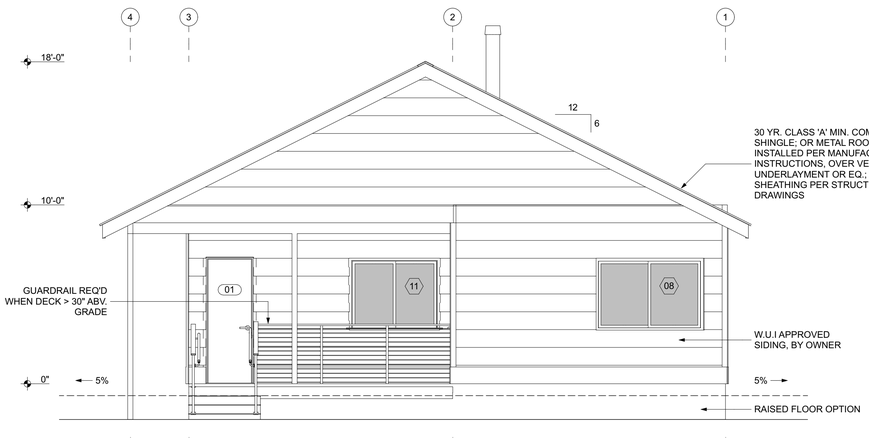
A2.0



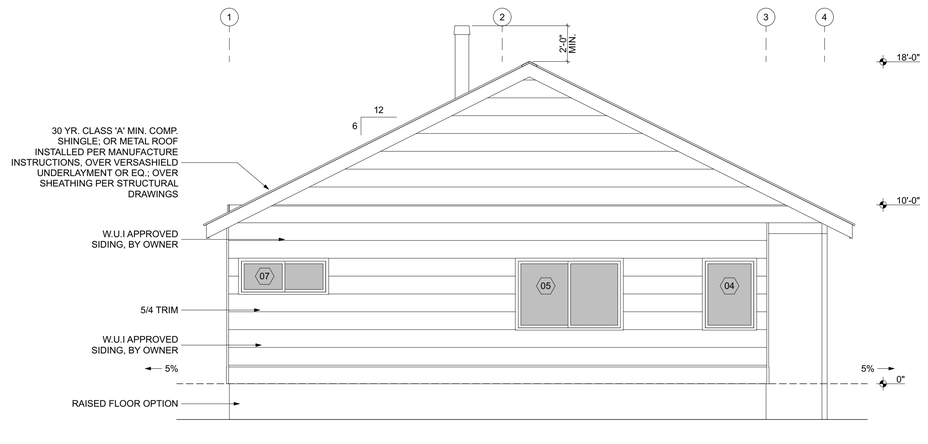
4 RIGHT ELEVATION
SCALE: 1/4" = 1'-0"



3 LEFT ELEVATION
SCALE: 1/4" = 1'-0"



2 REAR ELEVATION
SCALE: 1/4" = 1'-0"



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

GENERAL NOTES

1. IN ROOF COVERINGS WHERE THE PROFILE CREATES SPACE BETWEEN THE ROOF COVERING AND COMBUSTIBLE ROOF DECKING, SPECIFY ONE OF THE FOLLOWING MEANS OF PROTECTING SPACES AT EAVES ENDS.
   A. FIRE-STOPPING WITH APPROVED MATERIALS
   B. ONE LAYER OF 72 POUND (32.4 KG) MINERAL-SURFACED NON-PERFORATED CAP SHEET COMPLYING WITH ASTM D 3909 INSTALLED OVER THE COMBUSTIBLE DECKING
   C. OTHERWISE CONSTRUCTED TO PREVENT INTRUSION OF FLAMES AND EMBERS
2. EXPOSED VALLEY FLASHINGS SHALL BE CONSTRUCTED WITH NOT LESS THAN 0.019-INCH (NO. 26 GALVANIZED SHEET GAGE) CORROSION-RESISTANT METAL INSTALLED OVER A MINIMUM 36-INCH-WIDE UNDERLAYMENT CONSISTING OF ONE LAYER OF NO. 72 ASTM CAP SHEET RUNNING THE FULL LENGTH OF THE VALLEY.
3. ANY ROOF GUTTERS SHALL BE PROVIDED WITH MEANS TO PREVENT ACCUMULATION OF LEAVES AND DEBRIS.
4. SKYLIGHTS SHALL BE TEMPERED GLASS.
5. ALL VENTS (ROOF, FOUNDATION, COMBUSTION-AIR, ETC) SHALL RESIST THE INTRUSION OF FLAMES AND EMBERS
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   A. THERE SHALL BE NO FLAMING IGNITION OF THE COTTON MATERIAL DURING THE EMBER INTRUSION TEST
   B. THERE SHALL BE NO FLAMING IGNITION DURING THE INTEGRITY TEST PORTION OF THE FLAME INTRUSION TEST
   C. THE MAXIMUM TEMPERATURE OF THE UNEXPOSED SIDE OF THE VENT SHALL NOT EXCEED 662 DEGREES FAHRENHEIT (350 DEGREES CELSIUS)
7. EXTERIOR WALL FINISH SHALL COMPLY WITH ONE OF THE FOLLOWING:
   A. NON-COMBUSTIBLE MATERIAL (STUCCO, CEMENT FIBER BOARD, ETC)
      - STUCCO AND CEMENT PLASTER USED AS AN EXTERIOR WALL COVERING SHALL BE 7/8-INCH THICK
      - NONCOMBUSTIBLE OR FIRE-RETARDANT-TREATED WOOD SHAKE USED AS AN EXTERIOR WALL COVERING SHALL HAVE AN UNDERLAYMENT OF MINIMUM 1/2-INCH FIRE-RATED GYPSUM SHEATHING THAT IS TIGHTLY BUTTED, OR TAPED AND MUDDED, OR AN UNDERLAYMENT OF OTHER IGNITION RESISTANT MATERIAL APPROVED BY THE BUILDING OFFICIAL.
   B. IGNITION-RESISTANT MATERIAL
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14. ABOVE 4000' ELEVATION, PLUMBING VENTS, B-VENTS, CHIMNEYS, AND MISCELLANEOUS OBSTRUCTIONS PROJECTING THROUGH THE ROOF SHALL BE PROTECTED FROM DAMAGE BY SLIDING SNOW OR ICE BY USING GUYS, FORMED METAL GUARDS, CRICKETS, OR SADDLES.

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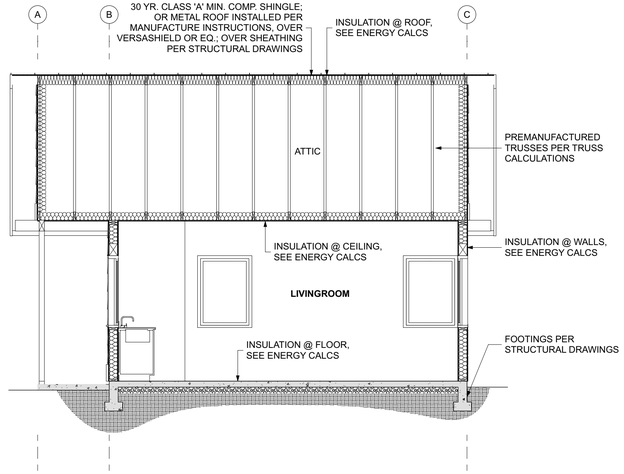
1 BEDROOM (661 SF)

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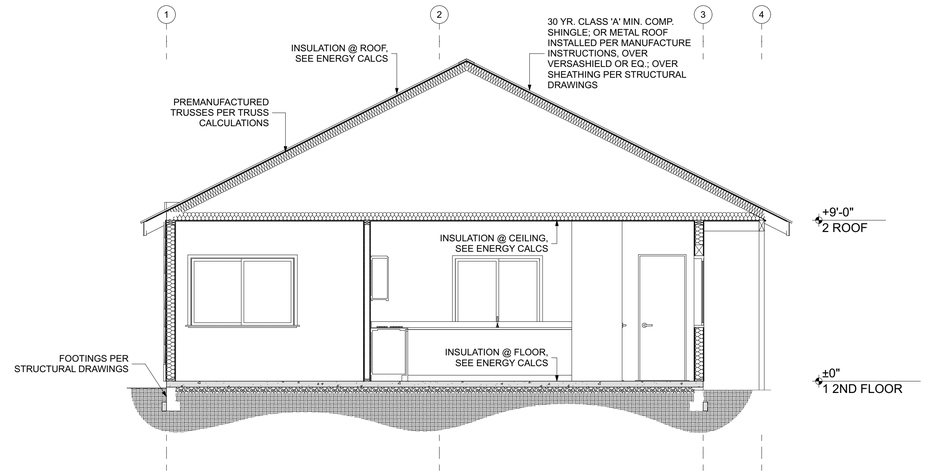
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	SUBMITTAL	3/30/23

BUILDING ELEVATIONS
(170,490)

A2.1



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



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

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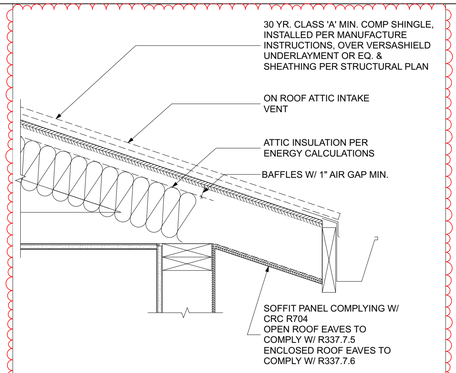
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
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ID	NAME	DATE
	SUBMITTAL	3/30/23

BUILDING SECTIONS

A3.0

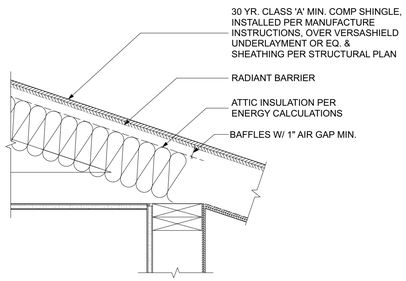


NOTES:
VENTILATION SHALL BE INSTALLED TO RESIST BUILDING IGNITION FROM THE INTRUSION OF BURNING EMBERS AND FLAME THROUGH THE VENTILATION OPENINGS.

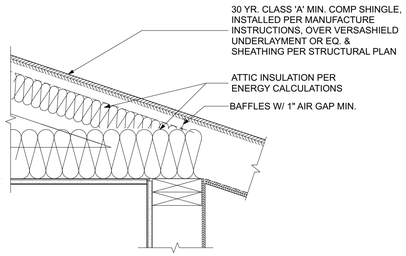
VENTS SHALL COMPLY WITH ALL THE FOLLOWING:
VENTS SHALL BE COVERED WITH A MESH WHERE THE DIMENSIONS OF THE MESH THEREIN SHALL BE A MINIMUM OF 1/16 INCH (1.6 MM) AND SHALL NOT EXCEED 1/8 INCH (3.2 MM) IN DIAMETER.
THE MESH MATERIAL SHALL BE NONCOMBUSTIBLE.
THE MESH MATERIAL SHALL BE CORROSION RESISTANT.

WHERE WUI APPLIES:
VENTILATION OPENINGS SHALL BE FULLY COVERED WITH WILDFIRE FLAME AND EMBER RESISTANT VENTS APPROVED AND LISTED BY THE CALIFORNIA STATE FIRE MARSHAL, OR WUI VENTS TESTED TO ASTM E2886 AND LISTED.

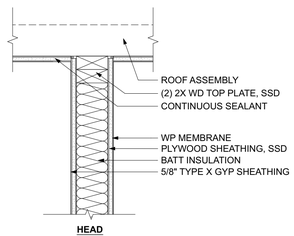
13 EAVE DETAIL
SCALE: 1 1/2"= 1'-0"



17 ROOF ASSEMBLY W/ RADIANT BARRIER
SCALE: 1 1/2"= 1'-0"



16 ROOF ASSEMBLY W/O RADIANT BARRIER
SCALE: 1 1/2"= 1'-0"



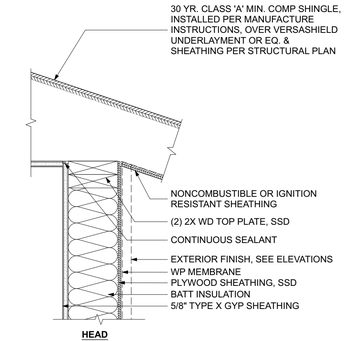
2 INTERIOR WALL ASSEMBLY
SCALE: 1 1/2"= 1'-0"

NOTE:

EXTERIOR COVERINGS SHALL COMPLY W/ CRC R703 & WHERE WUI APPLIES CRC 337.7

FOR STUCCO WALLS WATER-RESISTIVE BARRIERS SHALL COMPLY WITH ONE OF THE FOLLOWING:

1. THE WATER-RESISTIVE BARRIER SHALL BE TWO LAYERS OF 10-MINUTE GRADE D PAPER OR HAVE A WATER RESISTANCE EQUAL TO OR GREATER THAN TWO LAYERS OF A WATER-RESISTIVE BARRIER COMPLYING WITH ASTM E2556, TYPE I. THE INDIVIDUAL LAYERS SHALL BE INSTALLED INDEPENDENTLY SUCH THAT EACH LAYER PROVIDES A SEPARATE CONTINUOUS PLANE. FLASHING INSTALLED IN ACCORDANCE WITH SECTION R703.4 AND INTENDED TO DRAIN TO THE WATER-RESISTIVE BARRIER SHALL BE DIRECTED BETWEEN THE LAYERS.
2. THE WATER-RESISTIVE BARRIER SHALL BE 60-MINUTE GRADE D PAPER OR HAVE A WATER RESISTANCE EQUAL TO OR GREATER THAN ONE LAYER OF A WATER-RESISTIVE BARRIER COMPLYING WITH ASTM E2556, TYPE II. THE WATER-RESISTIVE BARRIER SHALL BE SEPARATED FROM THE STUCCO BY A LAYER OF FOAM PLASTIC INSULATING SHEATHING OR OTHER NON-WATER-ABSORBING LAYER, OR A DESIGNED DRAINAGE SPACE.



1 EXTERIOR WALL ASSEMBLY
SCALE: 1 1/2"= 1'-0"

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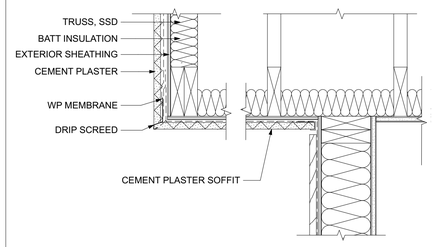
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

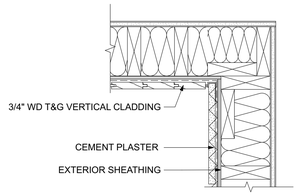
ID	NAME	DATE
	SUBMITTAL	3/30/23
1	REV 1	12/11/23

TYPICAL WALL ASSEMBLY DETAILS

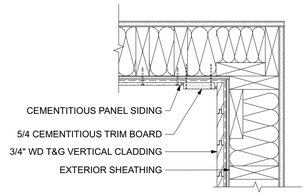
A5.0



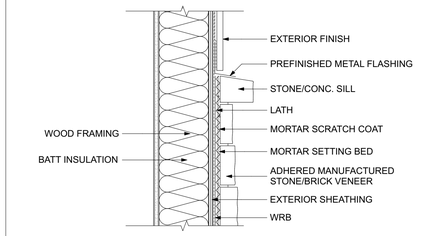
18 CEMENT PLASTER SOFFIT
SCALE: 1 1/2"= 1'-0"



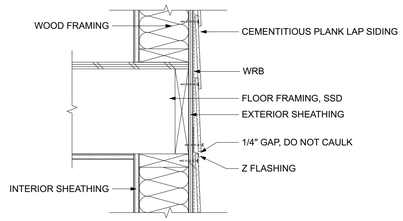
17 CLADDING TRANSITION @ INSIDE CORNER
SCALE: 1 1/2"= 1'-0"



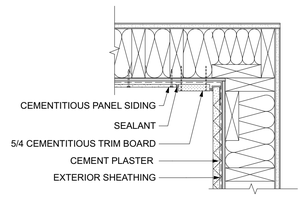
16 CLADDING TRANSITION @ INSIDE CORNER
SCALE: 1 1/2"= 1'-0"



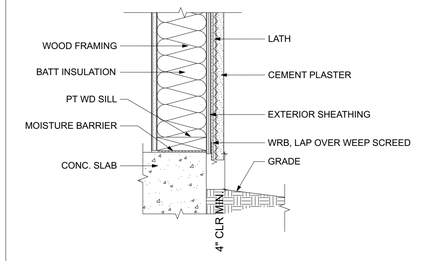
13 CAP @ STONE/BRICK VENEER
SCALE: 1 1/2"= 1'-0"



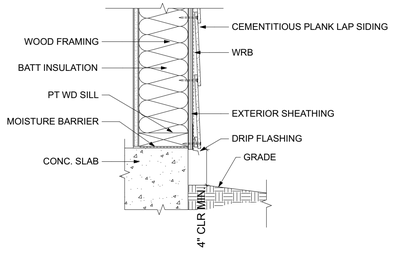
12 CEMENTITIOUS CLADDING @ FLOOR TRANSITION
SCALE: 1 1/2"= 1'-0"



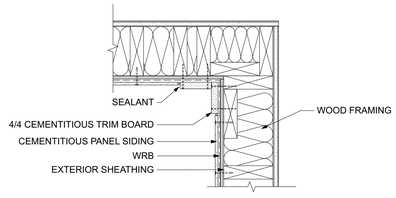
11 CLADDING TRANSITION @ INSIDE CORNER
SCALE: 1 1/2"= 1'-0"



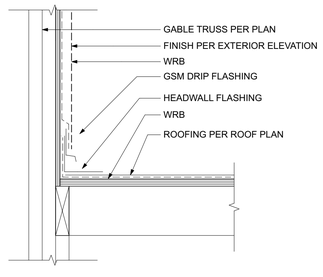
8 BASE @ CEMENT PLASTER SIDING
SCALE: 1 1/2"= 1'-0"



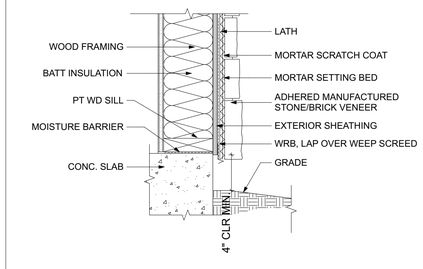
7 EXTERIOR SILL @ CONC. SLAB
SCALE: 1 1/2"= 1'-0"



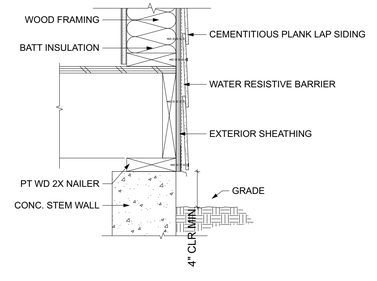
6 CEMENTITIOUS CLADDING @ INSIDE CORNER
SCALE: 1 1/2"= 1'-0"



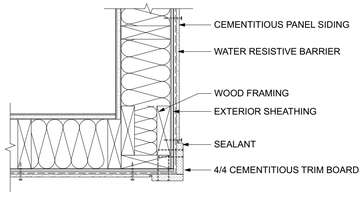
4 WALL TO ROOF TRANSITION
SCALE: 1 1/2"= 1'-0"



3 BASE @ STONE/BRICK VENEER
SCALE: 1 1/2"= 1'-0"



2 EXTERIOR SILL @ CONC. STEM WALL
SCALE: 1 1/2"= 1'-0"



1 CEMENTITIOUS CLADDING @ OUTSIDE CORNER
SCALE: 1 1/2"= 1'-0"

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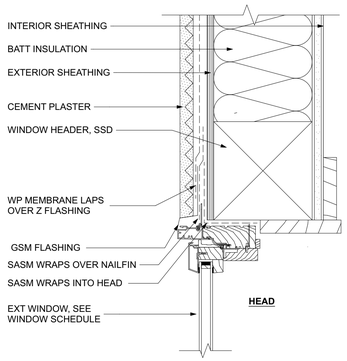
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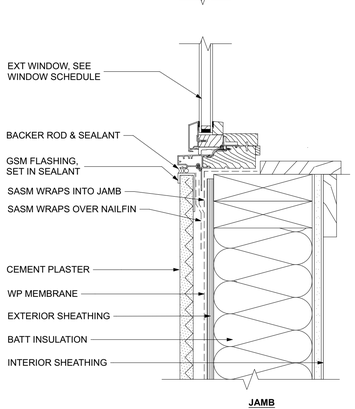
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TYPICAL SIDING DETAILS

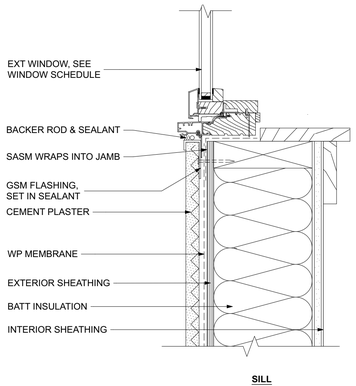
A5.1



HEAD



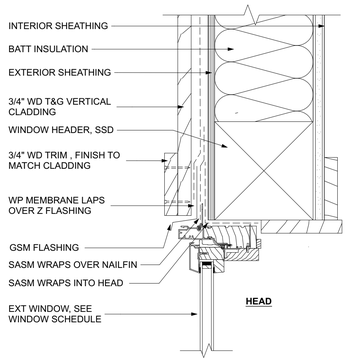
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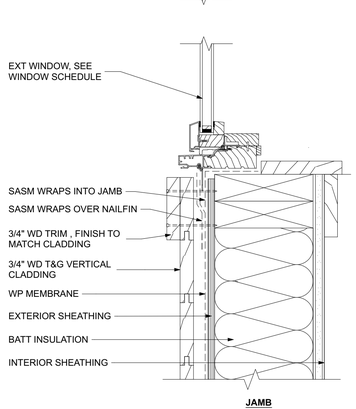
SILL

3 WINDOW @ CEMENT PLASTER CLADDING

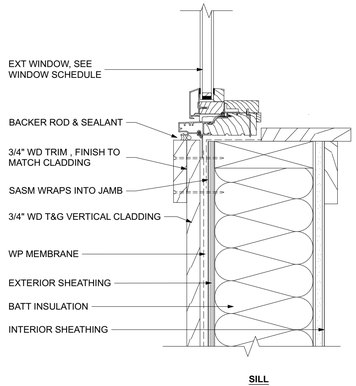
SCALE: 3" = 1'-0"



HEAD



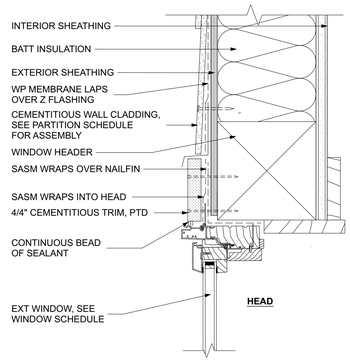
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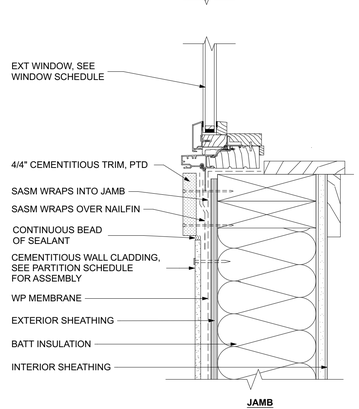
SILL

2 WINDOW @ WOOD CLADDING

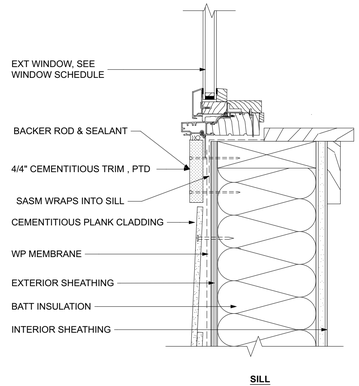
SCALE: 3" = 1'-0"



HEAD



JAMB



SILL

1 WINDOW @ CEMENTITIOUS CLADDING

SCALE: 3" = 1'-0"

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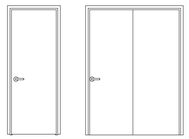
TYPICAL SIDING DETAILS

A5.2

SCHEDULES - 490 LB SNOW LOAD

DOOR SCHEDULE - 490

DOOR #	ROOM	LOCATION	TYPE	W	H	MFG	MATERIAL	FINISH	HARDWARE	CLOSURE	FIRE RATING	NOTES
01	FOYER	EXT	A	2'-6"	7'-0"		SC WOOD			N/A	UNRATED	
02	FOYER	INT	A	2'-6"	7'-0"		SC WOOD			N/A	UNRATED	
03	W/D	INT	A	2'-6"	7'-0"		SC WOOD			N/A	UNRATED	
04	BATH	INT	A	3'-0"	7'-0"		SC WOOD			N/A	UNRATED	
05	BEDROOM	INT	A	2'-6"	7'-0"		SC WOOD			N/A	UNRATED	
06	BEDROOM	INT	B	5'-0"	7'-0"		SC WOOD			N/A	UNRATED	
07	BEDROOM	EXT	A	2'-6"	7'-0"		SC WOOD			N/A	UNRATED	



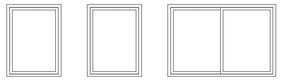
HINGED — A — 01, 02, 03, 04, 05, 07

HINGED, DBL — B — 06

4 DOOR TYPES
SCALE: 1" = 1'-0"

WINDOW SCHEDULE - 490

ID	TYPE	W	H	HDR	MANUF.	MODEL	FINISH		TEMPERING	NOTES
							EXTERIOR	INTERIOR		
01	B	3'-0"	4'-0"	7'-0"					TEMP, DUAL	
03	A	3'-0"	4'-0"	7'-0"					TEMP, SINGLE	
04	A	3'-0"	4'-0"	7'-0"					TEMP, SINGLE	
05	C	6'-0"	4'-0"	7'-0"					TEMP, SINGLE	
07	C	5'-0"	2'-0"	7'-0"					TEMP, DUAL	
08	C	6'-0"	4'-0"	7'-0"					TEMP, SINGLE	
11	C	5'-0"	4'-0"	7'-0"					TEMP, DUAL	



CSMT — A — 03, 04

FIXED — B — 01

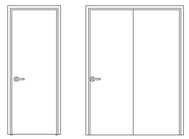
SLIDER — C — 05, 07, 08, 11

3 WINDOW TYPES
SCALE: 1" = 1'-0"

SCHEDULES

DOOR SCHEDULE

DOOR #	ROOM	LOCATION	TYPE	W	H	MFG	MATERIAL	FINISH	HARDWARE	CLOSURE	FIRE RATING	NOTES
01	FOYER	EXT	A	2'-6"	7'-0"		SC WOOD			N/A	UNRATED	
02	FOYER	INT	A	2'-6"	7'-0"		SC WOOD			N/A	UNRATED	
03	W/D	INT	A	2'-6"	7'-0"		SC WOOD			N/A	UNRATED	
04	BATH	INT	A	3'-0"	7'-0"		SC WOOD			N/A	UNRATED	
05	BEDROOM	INT	A	2'-6"	7'-0"		SC WOOD			N/A	UNRATED	
06	BEDROOM	INT	B	5'-0"	7'-0"		SC WOOD			N/A	UNRATED	
07	BEDROOM	EXT	A	2'-6"	7'-0"		SC WOOD			N/A	UNRATED	



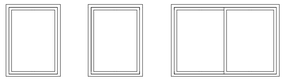
HINGED — A — 01, 02, 03, 04, 05, 07

HINGED, DBL — B — 06

2 DOOR TYPES
SCALE: 1" = 1'-0"

WINDOW SCHEDULE - 490 copy 1

ID	TYPE	W	H	MANUF.	MODEL	FINISH		TEMPERING	NOTES
						EXTERIOR	INTERIOR		
01	B	3'-0"	4'-0"					TEMP, DUAL	
02	B	3'-0"	4'-0"					TEMP, SINGLE	
03	A	3'-0"	4'-0"					TEMP, SINGLE	
04	A	3'-0"	4'-0"					TEMP, SINGLE	
05	C	6'-0"	4'-0"					TEMP, SINGLE	
06	C	4'-0"	4'-0"					TEMP, SINGLE	
07	C	5'-0"	2'-0"					TEMP, DUAL	
08	C	6'-0"	4'-0"					TEMP, SINGLE	
11	C	5'-0"	4'-0"					TEMP, DUAL	



CSMT — A — 03, 04

FIXED — B — 01, 02

SLIDER — C — 05, 06, 07, 08, 11

1 WINDOW TYPES
SCALE: 1" = 1'-0"

DOOR NOTES

1. ALL GLASS IN DOORS SHALL BE TEMPERED. TEMPERED GLASS SHALL BE PERMANENTLY IDENTIFIED AND VISIBLE WHEN THE UNIT IS GLAZED.
2. ALL GLAZING WILL BE INSTALLED WITH A CERTIFYING LABEL ATTACHED, SHOWING THE "U" VALUE.
3. REFER TO FLOOR PLANS FOR DIRECTION OF DOOR SWING.
4. DOORS SHALL MEET THE MINIMUM INFILTRATION REQUIREMENTS PER SECTION 116 E.E.S.
5. VENTILATION SHALL COMPLY WITH C.B.C. 1203.4 AND R303.
7. ALL EXTERIOR WINDOW AND EXTERIOR DOOR ASSEMBLIES TO HAVE AN STC RATING OF 36 OR GREATER.
8. DOORS MAY OPEN TO THE EXTERIOR ONLY IF THE FLOOR OR LANDING IS NOT MORE THAN $1^{1/2}$ INCH LOWER THAN THE DOOR THRESHOLD. SECTION R311.3.1 CRC
9. GLAZED OPENINGS WITHIN EXTERIOR DOORS SHALL BE INSULATNG-GLASS UNITS WITH A MINIMUM OF ONE TEMPERED PANE,

WINDOW NOTES

1. SEE EXTERIOR ELEVATION FOR DIRECTION OF OPERATION OF WINDOWS (ALL OPERABLE WINDOWS TO HAVE SCREENS).
2. ALL WINDOW DIMENSIONS PERTAIN TO ROUGH OPENINGS (R.O.), CONTRACTOR TO FIELD VERIFY ACTUAL DIMENSIONS FOR WINDOWS
3. ALL GLAZING WILL BE INSTALLED WITH A CERTIFYING LABEL ATTACHED, SHOWING THE NFRC LABEL.
4. ALL GLAZING SHALL BE SPECTRALY SELECTIVE LOW E COATED TO MEET TITLE 24 ENERGY REQUIREMENTS.
5. WINDOWS SHALL MEET THE MINIMUM INFILTRATION REQUIREMENTS PER SECTION 116 E.E.S.D
6. VENTILATION SHALL COMPLY WITH C.B.C. 1203.4 AND R303
7. EVERY SLEEPING ROOM SHALL HAVE ONE OPERABLE WINDOW FOR EMERGENCY ESCAPE OR RESCUE WITH A MIN. NET CLEAR OPENABLE AREA OF 5.7 SQ. FT, MIN. NET CLEAR OPENABLE HEIGHT OF 24" MIN., NET CLEAR WIDTH OF 20" AND A FIN. SILL HEIGHT OF NOT MORE THAN 44" A.F.F. PER CRC SECTION 3101
9. ALL EXTERIOR WINDOW AND EXTERIOR DOOR ASSEMBLIES TO HAVE AN STC RATING OF 30 OR GREATER.
10. TEMPERED GLASS SHALL BE PERMANENTLY IDENTIFIED AND VISIBLE WHEN THE UNIT IS GLAZED.
11. EVERY SPACE INTENDED FOR HUMAN OCCUPANCY SHALL BE PROVIDED WITH NATURAL VENTILATION AND NATURAL LIGHT BY MEANS OF VENTILATION / ARTIFICIAL LIGHT. CBC SECTIONS 1203.4 AND 1205.1 AND R303
    A) THE MINIMUM NET GLAZED AREA FOR NATURAL LIGHT SHALL NOT BE LESS THAN 8%OF THE FLOOR AREA OF THE ROOM SERVED. CBC SECTION 1205.2
    B) THE MINIMUM OPENABLE AREA TO THE OUTDOORS FOR NATURAL VENTILATION SHALL BE 4% OF THE FLOOR AREA BEING VENTILATED. SECTION 1203.4
12. EXTERIOR WINDOWS AND EXTERIOR GLAZED DOOR ASSEMBLIES SHALL BE CONSTRUCTED OF MULTIPANE GLAZING WITH ONE TEMPERED PANE, HAVE A FIRE RESISTANCE RATING OF 20 MINUTES OR MEET THE REQUIREMENTS OF SFM 12-7A-2.

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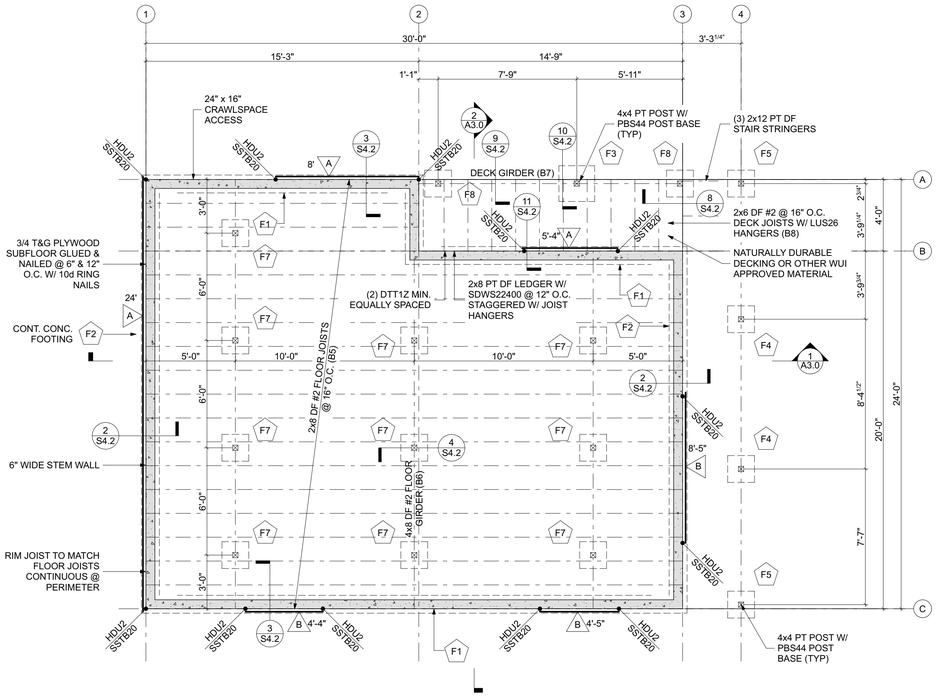
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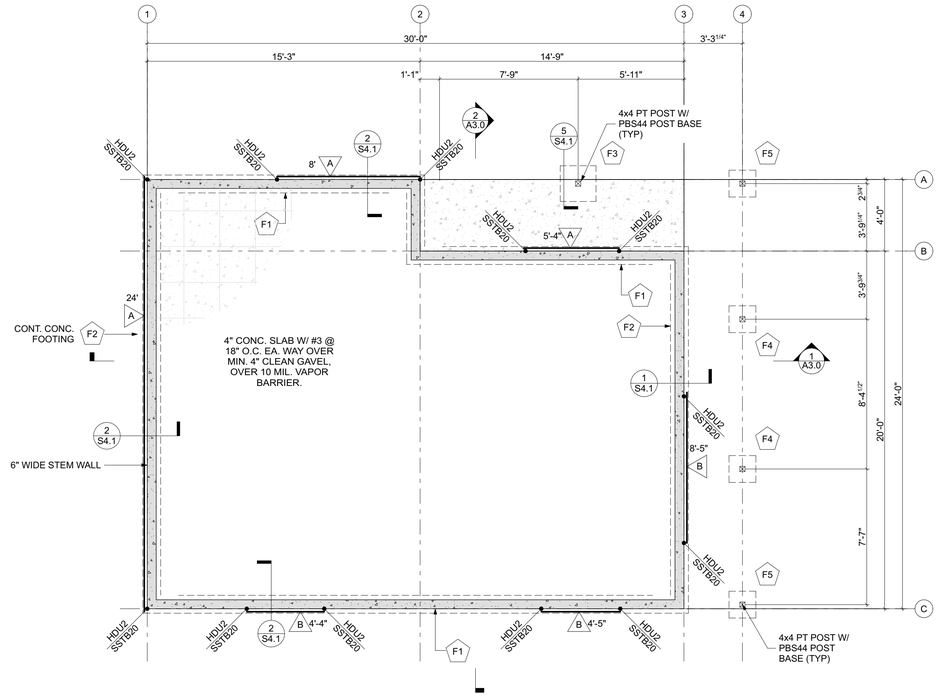
ID	NAME	DATE
	SUBMITTAL	3/30/23

SCHEDULES

A6.0



2 RAISED FLOOR FOUNDATION PLAN
SCALE: 1/4" = 1'-0"



1 SLAB FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

FOUNDATION VENTS

RAISED FLOOR VENTING REQUIRED

UNDERFLOOR AREA = 661 SF

REQUIRED VENTILATION
TOTAL CALC: 661/150 x 144 = 635 SQ. INCHES

PROVIDED VENTILATION
(13) 8x16 VENTS (50 SQ IN NFVA EA.)
AIR VENT AUTOMATIC FOUNDATION VENTS OR EQUIVALENT

GENERAL NOTES

1. SSTB ANCHOR BOLTS ARE TO BE LOCATED PER MANUFACTURERS SPECS AND ARE THE RESPONSIBILITY OF THE FRAMNG CONTRACTOR TO LOCATE, BASED ON THE TYPICAL FRAMING METHODS
2. BEAM SCHEDULE SHOWN ON SHEET S2.0
3. SHEAR SCHEDULE SHOWN ON SHEET S3.0
4. PROVIDE 16" x 24" MIN. CRAWLSPACE ACCESS

BEAM SCHEDULE

#	DESCRIPTION	SNOW LOAD		
		30 LBS	50 LBS	70 LBS
B1	HDR. (LINE A,B,C)	6x8 DF #1	6x8 DF #1	6x8 DF #1
B2	HDR. (LINE 1-4)	6x8 DF #1	6x8 DF #1	6x8 DF #1
B3	ROOF PORCH BEAM (LINE 4)	4x8 PT DF #2	4x8 PT DF #2	4x8 PT DF #2
B4	ROOF PORCH BEAM (LINE A)	4x8 PT DF #2 W/ HUC48 & ST22 FOR BM.	4x8 PT DF #2 W/ HUC48 & ST22 FOR BM.	4x8 PT DF #2 W/ HUC48 & ST22 FOR BM.
B5	FLOOR JOISTS @ 16" O.C.	2x8 @ DF #2 W/ LUS28	2x8 @ DF #2 W/ LUS28	2x8 @ DF #2 W/ LUS28
B6	FLOOR GIRDER	4x8 DF #2	4x8 DF #2	4x8 DF #2
B7	DECK GIRDER	4x6 PT DF #2	4x6 PT DF #2	4x6 PT DF #2
B8	DECK JOISTS @ 16" O.C.	2x6 PT DF #2 W/ LUS26	2x6 PT DF #2 W/ LUS26	2x6 PT DF #2 W/ LUS26

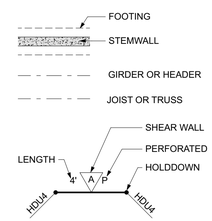
NOTE:

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FOUNDATION SCHEDULE

#	DESCRIPTION	SIZE (WIDTH x CONC THICKNESS x DEPTH EMBED INTO NATIVE SOIL)		
		30 LBS	50 LBS	70 LBS
F1	PERIMETER	12" W x 6" T x 12" DP W/ (2) #4	12" W x 6" T x 12" DP W/ (2) #4	12" W x 6" T x 12" DP W/ (2) #4
F2	PERIMETER	12" W x 6" T x 12" DP W/ (2) #4	12" W x 6" T x 12" DP W/ (2) #4	18" W x 6" T x 12" DP W/ (2) #4
F3	PIER	15" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY	18" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY	18" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY
F4	PIER	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY	15" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY
F5	PIER	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY	15" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY
F6	PERIMETER	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY
F7	INTERIOR	24" SQ x 12" T x 12" DP W/ (3) #4 EA. WAY	24" SQ x 12" T x 12" DP W/ (3) #4 EA. WAY	24" SQ x 12" T x 12" DP W/ (3) #4 EA. WAY
F8	DECK FOOTING	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY

LEGEND



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Ren. 11-30-25
STATE OF CALIFORNIA

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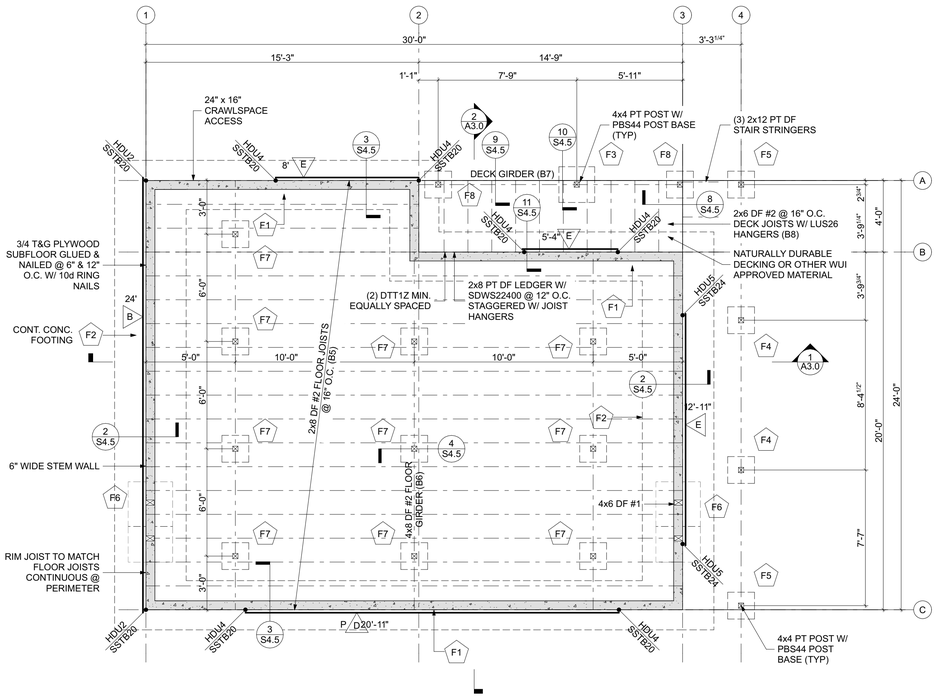
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OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23
1	REV 1	12/11/23

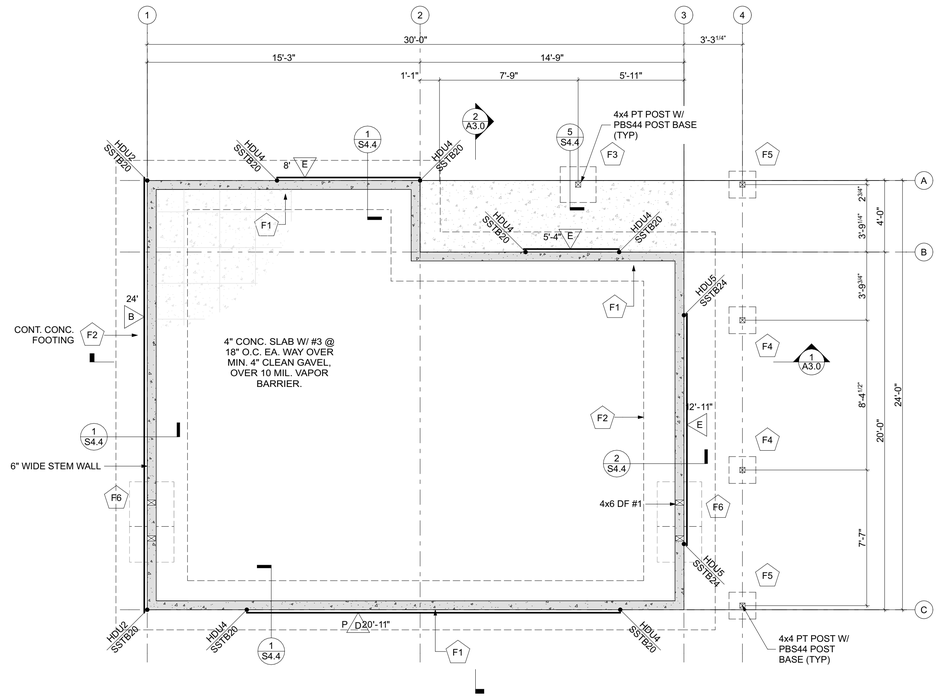
SLAB FOUNDATION PLAN

S1.0



2 RAISED FLOOR FOUNDATION PLAN

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



1 SLAB FOUNDATION PLAN

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

FOUNDATION VENTS

RAISED FLOOR VENTING REQUIRED

UNDERFLOOR AREA = 661 SF

REQUIRED VENTILATION
TOTAL CALC: 661/150 x 144 = 635 SQ. INCHES

PROVIDED VENTILATION
(13) 8x16 VENTS (50 SQ IN NFVA EA.)
AIR VENT AUTOMATIC FOUNDATION VENTS OR EQUIVALENT

GENERAL NOTES

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2. BEAM SCHEDULE SHOWN ON SHEET S2.0
3. SHEAR SCHEDULE SHOWN ON SHEET S3.0
4. PROVIDE 16" x 24" MIN. CRAWLSPACE ACCESS
5. WITHIN THE TAHOE/TRUCKEE REGION, AND ABOVE 4000' ELEVATION, PRESSURE TREATED DECK FRAMING NOT IN DIRECT CONTACT WITH CONCRETE AND 8" OR MORE ABOVE GRADE MAY BE SUBSTITUTED WITH "RAW" DF OF THE SAME DIMENSIONS AND GRADE. CARE MUST BE USED TO ENSURE MEMBERS ARE NOT FASTERED OR ADJOINED TOGETHER IN A MANNER THAT DOES NOT ALLOW ALL SIDES OF A MEMBER TO HAVE FREE AIRFLOW MOVEMENT. ADDITIONALLY, FLASHING AROUND THE TOP BEAMS AND DOWN AROUND THE POST CAPS IS REQUIRED TO PREVENT WATER PONDING IN SADDLES. LASTLY, POST BASES MUST BE PLACED SO POSTS OVERHANG OR MATCH BASE EDGES (BASES NOT ALLOWED TO OVERHANG POSTS)

BEAM SCHEDULE

#	DESCRIPTION	BEAM
B1	HDR. (LINE A,B,C)	6x8 DF #1
B2	HDR. (LINE 1-4)	6x8 DF #1
B3	ROOF PORCH BEAM (LINE 4)	4x10 PT DF #2
B4	ROOF PORCH BEAM (LINE A)	4x10 PT DF #2 W/ HUC410 & ST22 FOR BM.
B5	FLOOR JOISTS @ 16" O.C.	2x8 @ DF #2 W/ LUS28
B6	FLOOR GIRDER	4x8 DF #2
B7	DECK GIRDER	4x6 PT DF #2
B8	DECK JOISTS @ 16" O.C.	2x6 PT DF #2 W/ LUS26

NOTE:

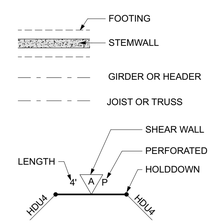
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FOUNDATION SCHEDULE

#	DESCRIPTION	SIZE (WIDTH x CONC THICKNESS x DEPTH EMBED INTO NATIVE SOIL)
F1	PERIMETER	12" W x 12" T x 18" DP W/ (1) #5 @ 12" O.C. T&B
F2	PERIMETER	36" W x 12" T x 18" DP W/ (3) #5 & (1) #5 HORIZ. @ 12" O.C.
F3	PIER	24" SQ x 12" T x 12" DP W/ (3) #4 EA. WAY
F4	PIER	21" SQ x 12" T x 12" DP W/ (3) #4 EA. WAY
F5	PIER	18" SQ x 12" T x 18" DP W/ (2) #4 EA. WAY
F6	PERIMETER	27" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY
F7	INTERIOR	24" SQ x 12" T x 18" DP W/ (3) #4 EA. WAY
F8	DECK FOOTING	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY

* INCREASE DEPTH TO 24" MINIMUM FOR SITES LOCATED AT OR ABOVE 7000' ELEVATION.

LEGEND



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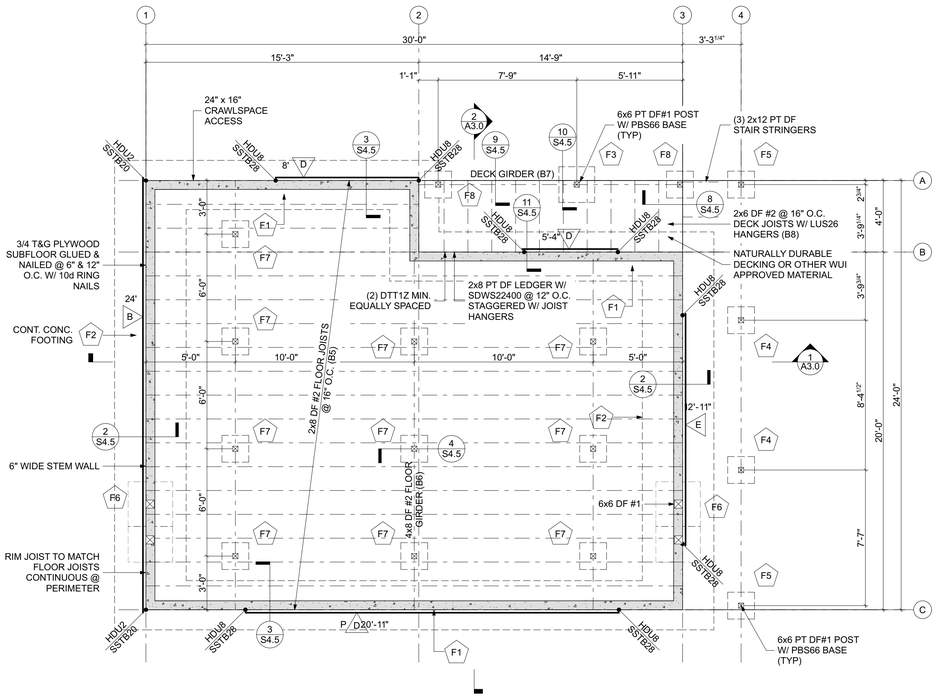
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

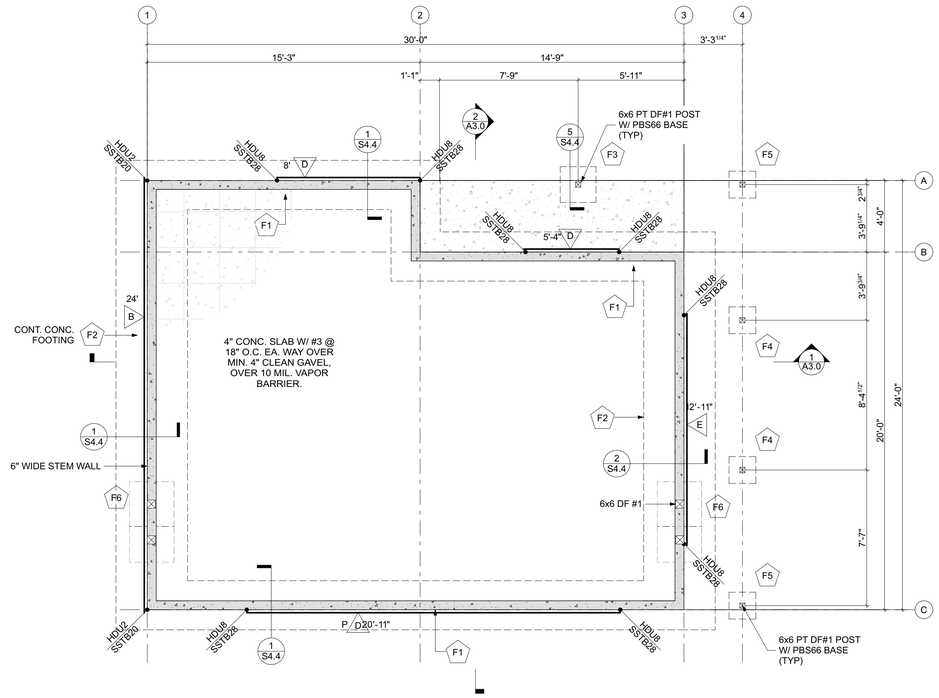
ID	NAME	DATE
1	REV 1	12/11/23

SLAB FOUNDATION PLAN (170)

S1.1



2 RAISED FLOOR FOUNDATION PLAN
SCALE: 1/4" = 1'-0"



1 SLAB FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

FOUNDATION VENTS

RAISED FLOOR VENTING REQUIRED

UNDERFLOOR AREA = 661 SF

REQUIRED VENTILATION
TOTAL CALC: 661/150 x 144 = 635 SQ. INCHES

PROVIDED VENTILATION
(13) 8x16 VENTS (50 SQ IN NFVA EA.)
AIR VENT AUTOMATIC FOUNDATION VENTS OR EQUIVALENT

GENERAL NOTES

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2. BEAM SCHEDULE SHOWN ON SHEET S2.0
3. SHEAR SCHEDULE SHOWN ON SHEET S3.0
4. PROVIDE 16" x 24" MIN. CRAWLSPACE ACCESS
5. WITHIN THE TAHOE/TRUCKEE REGION, AND ABOVE 4000' ELEVATION, PRESSURE TREATED DECK FRAMING NOT IN DIRECT CONTACT WITH CONCRETE AND 8" OR MORE ABOVE GRADE MAY BE SUBSTITUTED WITH "RAW" DF OF THE SAME DIMENSIONS AND GRADE. CARE MUST BE USED TO ENSURE MEMBERS ARE NOT TWISTED OR ADJOINED TOGETHER IN A MANNER THAT DOES NOT ALLOW ALL SIDES OF A MEMBER TO HAVE FREE AIRFLOW MOVEMENT. ADDITIONALLY, FLASHING AROUND THE TOP BEAMS AND DOWN AROUND THE POST CAPS IS REQUIRED TO PREVENT WATER PONDING IN SADDLES. LASTLY, POST BASES MUST BE PLACED SO POSTS OVERHANG OR MATCH BASE EDGES (BASES NOT ALLOWED TO OVERHANG POSTS)

BEAM SCHEDULE

#	DESCRIPTION	BEAM
B1	HDR. (LINE A,B,C)	6x8 DF #1
B2	HDR. (LINE 1-4)	5.25 x 11.875 LVL 2900Fb-2.0E
B3	ROOF PORCH BEAM (LINE 4)	6x12 PT DF #1
B4	ROOF PORCH BEAM (LINE A)	6x12 PT DF #1 W/ HUC612 & ST6224 FOR BM.
B5	FLOOR JOISTS @ 16" O.C.	2x8 @ DF #2 W/ LUS28
B6	FLOOR GIRDER	4x8 DF #2
B7	DECK GIRDER	4x6 PT DF #2
B8	DECK JOISTS @ 16" O.C.	2x6 PT DF #2 W/ LUS26

NOTE:

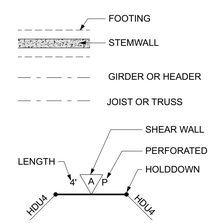
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FOUNDATION SCHEDULE

#	DESCRIPTION	SIZE (WIDTH x CONC THICKNESS x DEPTH EMBED INTO NATIVE SOIL)
F1	PERIMETER	24" W x 12" T x 18" DP W/ (1) #5 @ 12" O.C. T&B
F2	PERIMETER	48" W x 12" T x 18" DP W/ (3) #5 & (1) #5 HORIZ. @ 12" O.C.
F3	PIER	36" SQ x 12" T x 18" DP W/ (4) #4 EA. WAY
F4	PIER	33" SQ x 12" T x 18" DP W/ (4) #4 EA. WAY
F5	PIER	30" SQ x 12" T x 18" DP W/ (4) #4 EA. WAY
F6	PAD	36" SQ x 12" T x 18" DP W/ (3) #5 EA. WAY
F7	INTERIOR	24" SQ x 12" T x 18" DP W/ (3) #4 EA. WAY
F8	DECK	12" SQ x 12" T x 12" DP W/ (2) #4 EA. WAY

* INCREASE DEPTH TO 24" MINIMUM FOR SITES LOCATED AT OR ABOVE 7000' ELEVATION.

LEGEND



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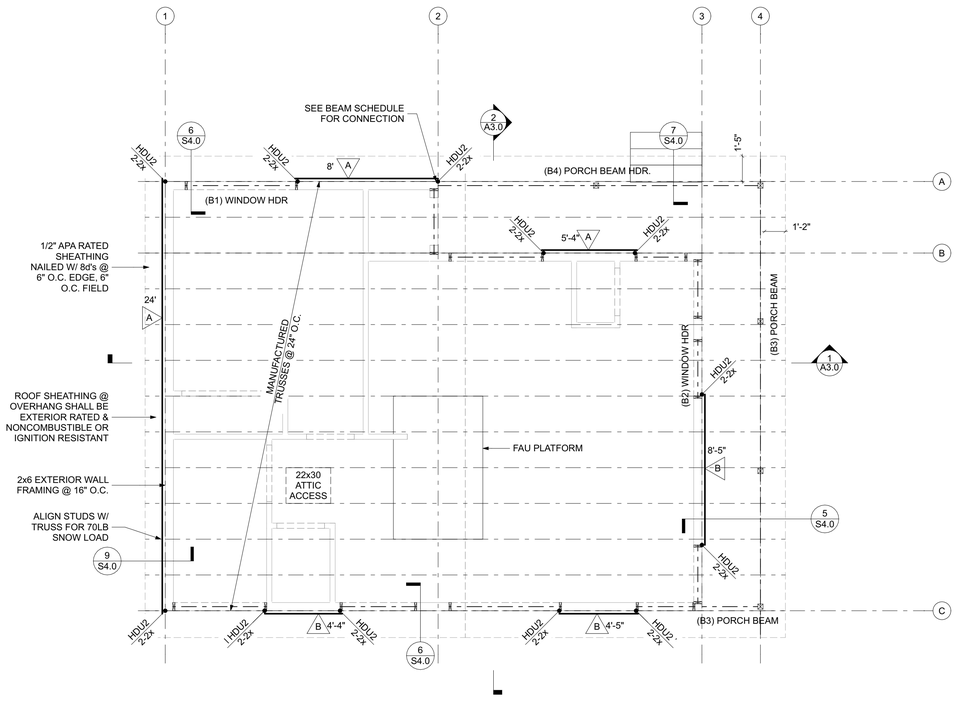
1 BEDROOM (661 SF)

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ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23
1	REV 1	12/11/23

SLAB FOUNDATION PLAN (490)

S1.2

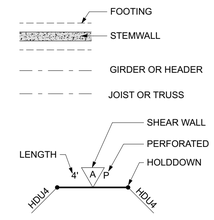


1 ROOF FRAMING PLAN
SCALE: 1/4" = 1'-0"

BEAM SCHEDULE

#	DESCRIPTION	SNOW LOAD		
		30 LBS	50 LBS	70 LBS
B1	HDR. (LINE A,B,C)	6x8 DF #1	6x8 DF #1	6x8 DF #1
B2	HDR. (LINE 1-4)	6x8 DF #1	6x8 DF #1	6x8 DF #1
B3	ROOF PORCH BEAM (LINE 4)	4x8 PT DF #2	4x8 PT DF #2	4x8 PT DF #2
B4	ROOF PORCH BEAM (LINE A)	4x8 PT DF #2 W/ HUC48 & ST22 FOR BM.	4x8 PT DF #2 W/ HUC48 & ST22 FOR BM.	4x8 PT DF #2 W/ HUC48 & ST22 FOR BM.
B5	FLOOR JOISTS @ 16" O.C.	2x8 @ DF #2 W/ LUS28	2x8 @ DF #2 W/ LUS28	2x8 @ DF #2 W/ LUS28
B6	FLOOR GIRDER	4x8 DF #2	4x8 DF #2	4x8 DF #2
B7	DECK GIRDER	4x6 PT DF #2	4x6 PT DF #2	4x6 PT DF #2
B8	DECK JOISTS @ 16" O.C.	2x6 PT DF #2 W/ LUS26	2x6 PT DF #2 W/ LUS26	2x6 PT DF #2 W/ LUS26

LEGEND



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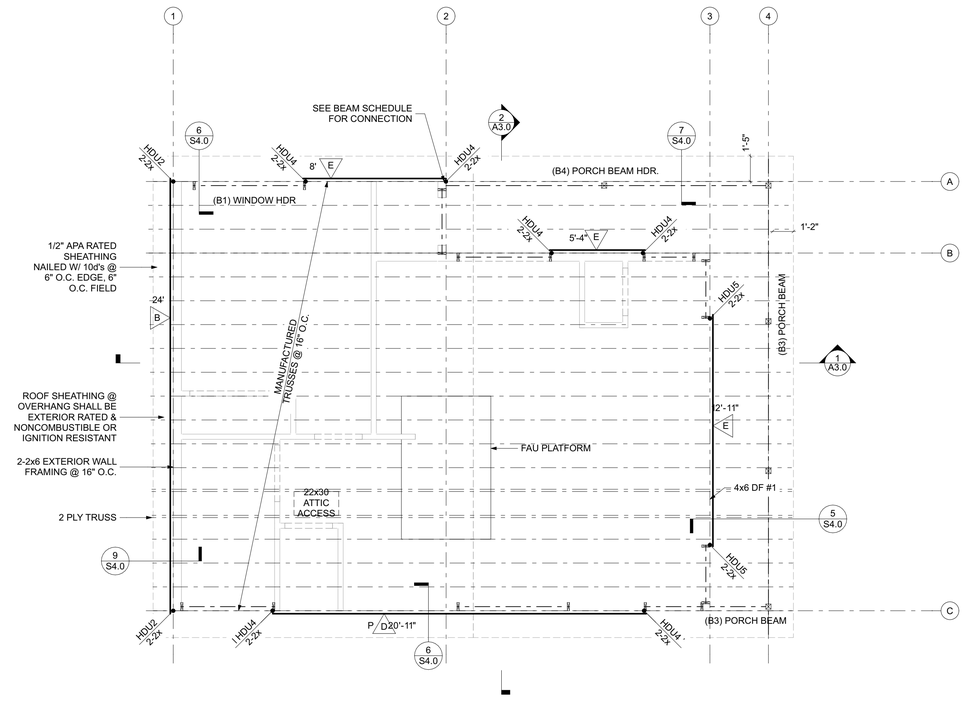
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ADDRESS:
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ID	NAME	DATE
	SUBMITTAL	3/30/23

ROOF FRAMING

S2.0

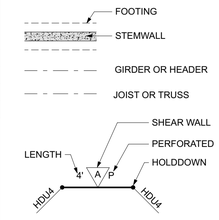


1 ROOF FRAMING PLAN
SCALE: 1/4" = 1'-0"

BEAM SCHEDULE

#	DESCRIPTION	BEAM
B1	HDR. (LINE A,B,C)	6x8 DF #1
B2	HDR. (LINE 1-4)	6x8 DF #1
B3	ROOF PORCH BEAM (LINE 4)	4x10 PT DF #2
B4	ROOF PORCH BEAM (LINE A)	4x10 PT DF #2 W/ HUC410 & ST22 FOR BM.
B5	FLOOR JOISTS @ 16" O.C.	2x8 @ DF #2 W/ LUS28
B6	FLOOR GIRDER	4x8 DF #2
B7	DECK GIRDER	4x6 PT DF #2
B8	DECK JOISTS @ 16" O.C.	2x6 PT DF #2 W/ LUS26

LEGEND



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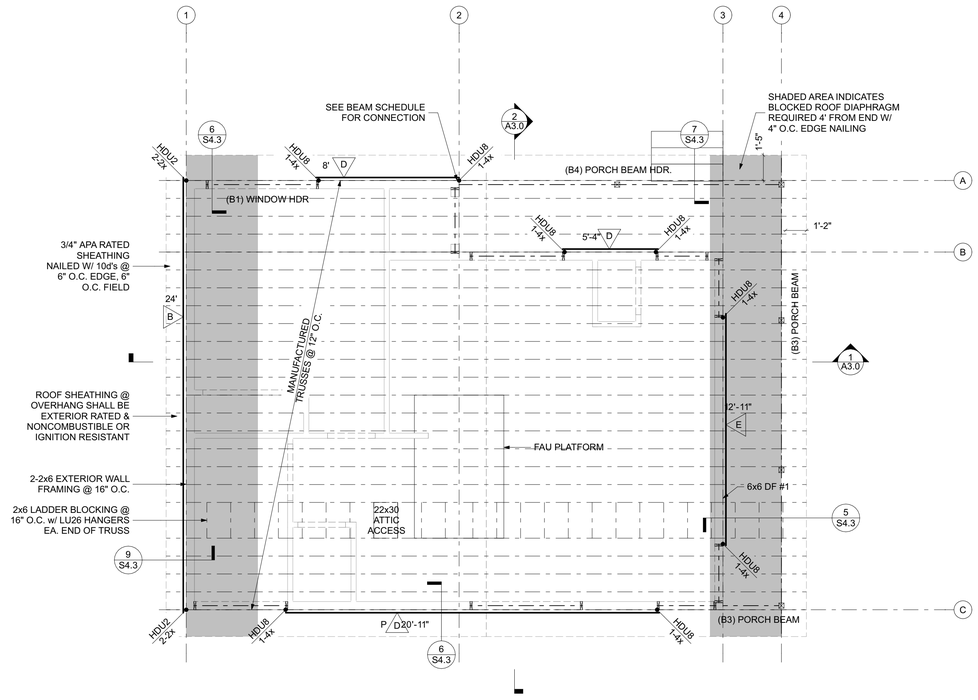
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ID	NAME	DATE
1	REV 1	12/11/23

ROOF FRAMING (170)

S2.1

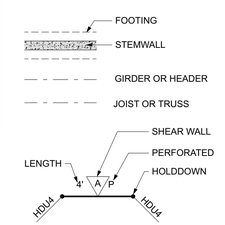


1 ROOF FRAMING PLAN
SCALE: 1/4" = 1'-0"

BEAM SCHEDULE

#	DESCRIPTION	BEAM
B1	HDR. (LINE A,B,C)	6x8 DF #1
B2	HDR. (LINE 1-4)	5.25 x 11.875 LVL 2900Fb-2.0E
B3	ROOF PORCH BEAM (LINE 4)	6x12 PT DF #1
B4	ROOF PORCH BEAM (LINE A)	6x12 PT DF #1 W/ HUC612 & ST6224 FOR BM.
B5	FLOOR JOISTS @ 16" O.C.	2x8 @ DF #2 W/ LUS28
B6	FLOOR GIRDER	4x8 DF #2
B7	DECK GIRDER	4x6 PT DF #2
B8	DECK JOISTS @ 16" O.C.	2x6 PT DF #2 W/ LUS26

LEGEND



RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

JACKSON & SANDS
ENGINEERING, Inc.

A Regional Partnership for Achievable Housing

LICENSED ARCHITECT
RUSSELL DAVIDSON
No. C36895
Ren. 11-30-25
STATE OF CALIFORNIA

YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

ROOF FRAMING (490)

S2.2

TABLE 2304.10.1
FASTENING SCHEDULE

	CONNECTION	FASTENING [a,m]	LOCATION
1.	JOIST TO SILL OR GIRDER	3-8d COMMON (2.5" X 0.131")	TOENAIL
2.	BRIDGING TO JOIST	2-8d COMMON (2.5" X 0.131")	TOENAIL EA. END
3.	1"X6" SUBFLOOR OR LESS TO EA. JOIST	2-8d COMMON (2.5" X 0.131")	FACE NAIL
4.	WIDER THAN 1"X6" SUBFLOOR TO EA. JOIST	3-8d COMMON (2.5" X 0.131")	FACE NAIL
5.	2" SUBFLOOR TO JOIST OR GIRDER	2-16d COMMON (2.5" X 0.162")	BLIND AND FACENAIL
6.	SOLE PLATE TO JOIST OR BLOCKING	16d (3.5" X 0.135") @ 16" O.C.	TYPICAL FACE NAIL
	SOLE PLATE TO JOIST OR BLOCKING @ BRACED WALL PANEL	3" - 16d (3.5" X 0.135")@ 16" O.C.	BRACED WALL PANELS
7.	TOP PLATE TO STUD	2-16d COMMON (2.5" X 0.162")	END NAIL
8.	STUD TO SOLE PLATE	4-8d COMMON (2.5" X 0.131")	TOENAIL
		2-16d COMMON (3.5" X 0.162")	END NAIL
9.	DOUBLE STUDS	16d (3.5" X 0.135") @ 24" O.C.	FACE NAIL
10.	DOUBLE TOP PLATES	16d (3.5" X 0.135") @ 16" O.C.	TYP. FACE NAIL
	DOUBLE TOP PLATES	8-16d COMMON (2.5" X 0.162")	LAP SPLICE
11.	BLOCKING BETWEEN JOISTS OR RAFTERS TO TOP PLATE	3-8d COMMON (2.5" X 0.131")	TOENAIL
12.	RIM JOIST TO TOP PLATE	8d (2.5" X 0.131") @6" O.C.	TOENAIL
13.	TOP PLATES, LAPS AND INTERSECTIONS	2-16d COMMON (2.5" X 0.162")	FACE NAIL
14.	CONTINUOUS HEADER, TWO PIECES	16d COMMON (3.5" X 0.162")	16" O.C. ALONG EDGE
15.	CEILING JOISTS TO PLATE	3-8d COMMON (2.5" X 0.131")	TOENAIL
16.	CONTINUOUS HEADER TO STUD	4-8d COMMON (2.5" X 0.131")	TOENAIL
17.	CEILING JOISTS, LAPS OVER PARTITIONS SEE SECTION 2308.10.4.1, TABLE 2308.10.4.1)	3-16d COMMON (3.5" X 0.162") MINIMUM, TABLE 2308.10.4.1	FACE NAIL
18.	CEILING JOISTS TO PARALLEL RAFTERS SEE SECTION 2308.10.4.1, TABLE 2308.10.4.1)	3-16d COMMON (3.5" X 0.162") MINIMUM, TABLE 2308.10.4.1	FACE NAIL
19.	RAFTER TO PLATE SEE SECTION 2308.10.1, TABLE 2308.10.1)	3-8d COMMON (2.5" X 0.131")	TOENAIL
20.	1" DIAGONAL BRACE TO EA. STUD AND PLATE	2-8d COMMON (2.5" X 0.131")	
21.	1"X8" SHEATHING TO EA. BEARING	3-8d COMMON (2.5" X 0.131")	
22.	WIDER THAN 1"X8" SHEATHING TO EA. BEARING	3-8d COMMON (2.5" X 0.131")	
23.	BUILT-UP CORNER STUDS	16d COMMON (3.5" X 0.162")	
24.	BUILT-UP GIRDER AND BEAMS	20d COMMON (4" X 0.192") 32" O.C.	
		2 - 20d COMMON (4" X 0.192").	
25.	2" PLANKS	16d COMMON (3.5" X 0.162")	
26.	COLLAR TIE TO RAFTER	3-10d COMMON (3" X 0.148")	
27.	JACK RAFTER TO HIP	3-10d COMMON (3" X 0.148")	
		2-16d COMMON (3.5" X 0.162")	
28.	ROOF RAFTER TO 2 BY RIDGE BEAM	2-16d COMMON (3.5" X 0.162")	
		2-16d COMMON (3.5" X 0.162")	
29.	JOIST TO BAND JOIST	3-16d COMMON (3.5" X 0.162")	
30.	LEDGER STRIP	3-16d COMMON (2.5" X 0.131")	
31.	WOOD STRUCTURAL PANELS AND [b] PARTICLEBOARD SUBFLOOR, ROOF AND WALL SHEATHING (TO FRAMING)	1/2" AND LESS	6d [c,l]
		19/32" TO 3/4"	8d [d] OR 6d [e]
		7/8" TO 1"	8d
		1 1/8" TO 1 1/4"	10d [c] or 8d
	SINGLE FLOOR (COMBINATION SUBFLOOR-UNDERLAYMENT TO FRAMING	3/4" AND LESS	6d [e]
		7/8" TO 1"	8d [e]
		1 1/8" TO 1 1/4"	10d [d] or 8d [e]
32.	PANEL SIDING (TO FRAMING)	1/2" AND LESS	6d [f]
		5/8" AND LESS	8d [f]
33.	FIBERBOARD SHEATHING	1/2" AND LESS	No. 11 GA ROOFING NAIL [h] 6d COMMON NAIL (2" X 0.113") No. 16 GA STAPLE [i]
		25/32"	No. 11 GA ROOFING NAIL [h] 8d COMMON NAIL (2 1/2" X 0.131") No. 16 GA STAPLE [i]
34.	INTERIOR PANELING	1/4"	4d [j]
		3/8"	6d [k]

a. Common or box nails are permitted to be used except where otherwise noted.
b. Nails spaced at 6 inches on center at edges, 12 inches at intermediate supports except 6 inches at supports where spans are 48 inches or more. For nailing of wood structural panel and particle board diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.
c. Common or deformed shank (6d - 2" x 0.113";8d - 2 1/2" x 0.131"; 10d - 3" x 0.148").
d. Common (6d - 2" x 0.113";8d - 2 1/2" x 0.131"; 10d - 3" x 0.148").
e. Deformed shank (6d - 2" x 0.113"; 8d - 2 1/2" x 0.131"; 10d - 3" x 0.148").
f. Corrosion resistant siding (6d - 1 7/8" x 0.106"; 8d - 2 3/8" x 0.128") or casing (6d - 2" x 0.099"; 8d - 2 1/2" x 113") nail.
g. Fasteners spaced 3 inches on center at exterior edges and 6 inches on center at intermediate supports, when used as structural sheathing. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications.
h. Corrosion resistant roofing nails with 7/16 inch dia. head and 1 1/2" inch length for 1/2" length for 1/2" inch sheathing and 1 3/4 inch length for 25/32 inch sheathing.
i. Corrosion resistant staples with nominal 7/16" crown and 1 1/8" length for 1/2" inch sheathing and 1 3/4" inch length for 25/32 inch sheathing.
j. Casing (1 1/2" x 0.080" or finish (1 1/2" x 0.072") nails spaced 6" on panel edges, 12" at intermediate supports.
k. Panel supports at 24". Casing or finish nails spaced 6" on panel edges, 12" at intermediate supports.
l. For roof sheathing applications, 8d nails (2 1/2" x 0.113") are the minimum required for wood structural panels.
m. Staples shall have a minimum crown width of 7/16 inch.
n. For roof sheathing applications, fasteners spaced 4 inches on center at edges, 8 inches at intermediate supports for subfloor and wall sheathing and 3 inches on center at edges, 6 inches at intermediate supports for roof sheathing.
o. Fasteners spaced 4inches on center at edges, 8 inches at intermediate supports for subfloor and wall sheathing and 3 inches on center at edges, 6 inches at intermediate supports for roof sheathing.
p. Fasteners spaced 4 inches on center at edges, 8 inches at intermediate supports.

EXCAVATION, GRADING AND FILL:

1. EXCAVATION NEAR FOUNDATION FOR ANY PURPOSE SHALL NOT REDUCE LATERAL SUPPORT FROM ANY FOUNDATION OR ADJACENT FOUNDATION WITHOUT FIRST UNDERPINNING OR PROTECTING THE FOUNDATION AGAINST DETRIMENTAL LATERAL OR VERTICAL MOVEMENT OR BOTH.
   1.1. WHERE UNDERPINNING IS CHOSEN TO PROVIDE THE PROTECTION OR SUPPORT OF ADJACENT STRUCTURES, THE UNDERPINNING STEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH PROVISIONS OF CURRENT CALIFORNIA BUILDING CODE.
   1.2. UNDERPINNING SHALL BE INSTALLED IN A SEQUENTIAL MANNER THAT PROTECTS THE NEIGHBORING STRUCTURE AND THE WORKING CONSTRUCTION SITE. THE ENGINEER OF RECORD SHALL BE NOTIFIED IF THIS CONDITION EXISTS TO ALLOW FOR PREPARATION OF CONSTRUCTION DOCUMENTS.
2. PLACEMENT OF BACKFILL: THE EXCAVATION OUTSIDE THE FOUNDATION SHALL BE BACKFILLED WITH SOIL THAT IS FREE OF ORGANIC MATERIAL, CONSTRUCTION DEBRIS, COBBLES AND BOULDERS OR WITH CONTROLLED LOW-STRENGTH MATERIAL (CLSM). THE BACKFILL SHALL BE PLACED IN LIFTS AND COMPACTED IN A MANNER THAT DOES NOT DAMAGE THE FOUNDATION OR THE WATERPROOFING OR DAMPPROOFING MATERIAL.
3. SITE GRADING: THE GROUND IMMEDIATELY ADJACENT TO THE FOUNDATION SHALL BE SLOPED AWAY FROM THE BUILDING AT A SLOPE OF NOT LESS THAN 5% FOR A MINIMUM DISTANCE OF 10 FEET MEASURED PERPENDICULAR TO THE WALL. IF PHYSICAL OBSTRUCTIONS OR LOT LINES PROHIBIT 10 FEET AN APPROVED METHOD OF DRAINAGE AWAY FROM STRUCTURE SHALL BE USED. SWALES USED FOR THIS PURPOSE SHALL BE SLOPED A MINIMUM OF 2% WHERE LOCATED WITHIN 10 FEET OF BUILDING FOUNDATION. IMPERVIOUS SURFACES WITHIN 10 FEET OF THE BUILDING FOUNDATION SHALL BE SLOPED A MIN. OF 2% AWAY FROM THE BUILDING. 2% SLOPES MAY BE USED WHEN APPROVED BY THE ENGINEER OF RECORD.
4. WHERE SHALLOW FOUNDATIONS WILL BEAR ON COMPACTED FILL MATERIAL, THE COMPACTED FILL SHALL COMPLY WITH THE APPROVED GEOTECHNICAL REPORT.
   4.1. WHERE COMPACTED FILL MATERIAL 12 INCHES IN DEPTH OR LESS NEED NOT COMPLY WITH AN APPROVED REPORT, PROVIDED THE IN-PLACE DRY DENSITY IS NOT LESS THAN 90% OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT DETERMINED IN ACCORDANCE WITH ASTM D1557. THE COMPACTION SHALL BE VERIFIED BY SPECIAL INSPECTION IN ACCORDANCE WITH SECTION 1705.6

FOUNDATIONS:

1. NO FILL OR OTHER SURCHARGE LOADS SHALL BE PLACED ADJACENT TO ANY BUILDING OR STRUCTURE UNLESS SUCH STRUCTURE IS CAPABLE OF WITHSTANDING THE ADDITIONAL LOADS CAUSED BY THE FILL OR SURCHARGE.
2. IF VIBRATORY LOADS ARE TO BE PRESENT DURING THE USE OF THE STRUCTURE, THE ENGINEER OF RECORD SHALL BE NOTIFIED TO DETERMINE IF ADDITIONAL CONSIDERATION IS REQUIRED TO PREVENT DETRIMENTAL DISTURBANCES OF THE SOIL.
3. IF EXPANSIVE SOILS ARE DISCOVERED THE ENGINEER OF RECORD SHALL BE NOTIFIED TO PROVIDE ADDITIONAL FOUNDATION DESIGN AND CONSTRUCTION REQUIREMENTS.
4. BUILDING CLEARANCES FROM ASCENDING SLOPES SHALL IN GENERAL BE SET A SUFFICIENT DISTANCE FROM THE SLOPE TO PROVIDE PROTECTION FROM SLOPE DRAINAGE, EROSION AND SHALLOW FAILURES.
5. FOUNDATION SETBACK FROM DESCENDING SLOPE SURFACE SHALL BE FOUNDED IN FIRM MATERIAL WITH AN EMBEDMENT AND SET BACK FROM THE SLOPE SURFACE SUFFICIENT TO PROVIDE VERTICAL AND LATERAL SUPPORT FOR THE FOUNDATION WITHOUT DETRIMENTAL SETTLEMENT.
6. FOR FOUNDATIONS SUPPORTING GROUP R OR U OCCUPANCIES OF LIGHT-FRAME CONSTRUCTION, TWO STORIES OR LESS IN HEIGHT, ASSIGNED TO SEISMIC DESIGN CATEGORY D, E OR F SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2,500 psi
7. CONCRETE FOUNDATIONS ARE PERMITTED TO BE CAST AGAINST THE EARTH WHERE SOIL CONDITIONS DO NOT REQUIRE FORMWORK.
8. SHALLOW FOUNDATIONS SHALL BE BUILT ON UNDISTURBED SOIL, COMPACTED FILL MATERIAL OR CLSM. COMPACTED FILL MATERIAL SHALL BE PLACED IN ACCORDANCE WITH CBC SECTION 1804.5
9. THE TOP SURFACE OF FOOTINGS SHALL BE LEVEL. THE BOTTOM SURFACE OF FOOTINGS SHALL BE PERMITTED TO HAVE A SLOPE NOT EXCEEDING 10%. FOOTINGS SHALL BE STEPPED WHERE IT IS NECESSARY TO CHANGE THE ELEVATION OF THE TOP SURFACE OF THE FOOTING OR WHERE THE SURFACE OF THE GROUND SLOPES MORE THAN 10%.
10. FOR SINGLE STORIES, THE MIN. DEPTH OF FOOTINGS SHALL BE 12" BELOW UNDISTURBED GROUND SURFACE. THE MIN. WIDTH OF FOOTING SHALL BE 12". FOR TWO STORIES, THE MIN DEPTH OF FOOTINGS SHALL BE 18" BELOW UNDISTURBED GROUND SURFACE AND THE MIN. WIDTH OF THE FOOTING SHALL BE 15".
11. ALL LOAD BEARING WALLS SHALL BE PLACED ON CONTINUOUS CONCRETE FOOTINGS BONDED INTEGRALLY WITH THE EXTERIOR WALL FOOTINGS.
12. MIN. SLAB THICKNESS SHALL BE 4", A 10-MIL POLYETHYLENE VAPOR RETARDER WITH JOINTS LAPPED NOT LESS THAN 6" SHALL BE PLACED BETWEEN THE BASE COURSE AND THE CONCRETE FLOOR SLAB. A VAPOR RETARDER IS NOT REQUIRED FOR DETACHED STRUCTURES ACCESSORY TO OCCUPANCIES IN GROUP R-3, SUCH AS GARAGES, UTILITY BUILDINGS OR OTHER UNHEATED FACILITIES.
13. PLANS ARE VALID FOR SITES WITH A 3H:1V SLOPE OR FLATTER WITH SOILS SUITABLE TO BEAR LOADS FROM STRUCTURE. IF UNSUITABLE SOILS ARE ENCOUNTERED, NOTIFY E.O.R. IMMEDIATELY

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH THE CURRENTLY ACCEPTED EDITION OF THE CALIFORNIA BUILDING CODE (CBC) AND CBC STANDARDS.
2. IF CONDITIONS ARISE OUTSIDE THE SCOPE OF THESE PLANS, THE ENGINEER OF RECORD SHALL BE NOTIFIED.
3. ALL CONCRETE SHALL HAVE A MIN. STRENGTH OF 2500 PSI (28 DAY)
4. REINFORCEMENT BAR SHALL BE GRADE 40 FOR BARS #4 AND SMALLER AND GRADE 60 FOR BARS #5 AND LARGER
5. BOTTOM HORIZONTAL REINFORCING BAR PLACED IN THE FOOTING SHALL BE 3" CLEAR OF BOTTOM OF FOOTING. TOP HORIZONTAL REINFORCING BAR PLACED IN THE FOOTING SHALL BE 2" CLEAR OF THE TOP OF THE FOOTING

SHEAR WALL NOTES: (PER SDPWS-2021)

1. FRAMING REQUIREMENTS: ALL FRAMING MEMBERS AND BLOCKING USED FOR SHEAR WALL CONSTRUCTION SHALL BE 2" NOMINAL OR GREATER. WHERE SHEAR WALLS ARE DESIGNED AS BLOCKED, ALL JOINTS IN SHEATHING SHALL OCCUR OVER AND BE FASTENED TO COMMON FRAMING MEMBERS OR COMMON BLOCKING. SHEAR WALL BOUNDARY ELEMENTS,SUCH AS END POSTS, SHALL BE PROVIDED TO TRANSMIT THE DESIGN TENSION AND COMPRESSION FORCES. SHEAR WALL SHEATHING SHALL NOT BE USED TO SPLICE BOUNDARY ELEMENTS. END POSTS (STUDS OR COLUMNS) SHALL BE FRAMED TO PROVIDE FULL END BEARING.
2. COMMON FRAMING MEMBER. WHERE A COMMON FRAMING MEMBER IS REQUIRED AT ADJOINING PANEL EDGES, TWO FRAMING MEMBERS THAT ARE AT LEAST 2" NOMINAL THICKNESS SHALL BE PERMITTED PROVIDED THEY ARE FASTENED TOGETHER WITH FASTENERS DESIGNED IN ACCORDANCE WITH THE NDS TO TRANSFER THE INDUCED SHEAR BETWEEN MEMBERS. WHEN FASTENERS CONNECTING THE TWO FRAMING MEMBERS ARE SPACED LESS THAN 4" ON CENTER, THEY SHALL BE STAGGERED.
3. TENSION AND COMPRESSION CHORDS SHALL BE INSTALLED AT EACH END OF SHEAR WALL.
4. FASTENERS: SHEATHING SHALL BE ATTACHED TO FRAMING MEMBERS USING NAILS OR OTHER APPROVED FASTENERS. NAILS SHALL BE DRIVEN WITH THE HEAD OF THE NAIL FLUSH WITH THE SURFACE OF THE SHEATHING. OTHER APPROVED FASTENERS SHALL BE DRIVEN AS REQUIRED FOR PROPER INSTALLATION OF THAT FASTENER, SEE TABLE FOR NAIL DIMENSIONS.
5. ANCHOR BOLTS: FOUNDATION ANCHOR BOLTS SHALL HAVE A STEEL PLATE WASHER UNDER EACH NUT NOT LESS THAT 0.229"X3"X3" IN SIZE. THE HOLE IN THE PLATE WASHER SHALL BE PERMITTED TO BE DIAGONALLY SLOTTED WITH A WIDTH OF UP TO $\frac{3}{16}$" LARGER THAN THE BOLT DIAMETER AND A SLOT LENGTH NOT TO EXCEED 1-3/4", PROVIDED A STANDARD CUT WASHER IS PLACED BETWEEN THE PLATE WASHER AND THE NUT. THE PLATE WASHER SHALL EXTEND TO WITHIN $\frac{1}{2}$" OF THE BOTTOM PLATE ON THE SIDE(S) WITH SHEATHING OR OTHER MATERIAL WITH NOMINAL UNIT SHEAR CAPACITY GREATER THAN 400 PLF FOR WIND OR SEISMIC (TYPE C, D AND E SHEAR WALLS) EXCEPTIONS MAY APPLY PER SECTION 4.3.6.4.3.
6. WOOD STRUCTURAL PANEL SHEAR WALL CONSTRUCTION. PANELS SHALL NOT BE LESS THAN 4'X8', EXCEPT AT BOUNDARIES AND CHANGES IN FRAMING.
   6.1. ALL EDGES OF PANELS SHALL BE SUPPORTED BY AND FASTENED TO FRAMING MEMBERS OR BLOCKING.
   6.2. NAILS SHALL BE LOCATED AT LEAST $\frac{3}{8}$" FROM THE PANEL EDGES. MAXIMUM NAIL SPACING AT PANEL EDGES SHALL BE 6" ON CENTER.
   6.3. NAILS ALONG INTERMEDIATE FRAMING MEMBERS SHALL BE THE SAME SIZE AS NAILS SPECIFIED FOR PANEL EDGE NAILING. AT INTERMEDIATE FRAMING MEMBERS, THE MAXIMUM NAILING SPACING SHALL BE 6" ON CENTER. WHERE PANELS ARE THICKER THAN $\frac{3}{4}$" NOMINAL OR STUDS ARE SPACED LESS THAN 24" ON CENTER, THE MAXIMUM NAIL SPACING SHALL BE 12" ON CENTER.
   6.4. THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS AND BLOCKING SHALL BE 2" NOMINAL OR GREATER.
   6.5. WHERE ANY OF THE FOLLOWING CONDITIONS OCCUR, THE WIDTH OF THE NAILED FACE OF A COMMON FRAMING MEMBER OR BLOCKING AT ADJOINING PANEL EDGES SHALL BE 3" NOMINAL OR GREATER AND NAILING SHALL BE STAGGERED AT ALL PANEL EDGES (IN LIEU OF A SINGLE COMMON FRAMING MEMBER, TWO FRAMING MEMBERS THAT ARE AT LEAST 2" IN NOMINAL THICKNESS SHALL BE PERMITTED):
      6.5.1. NAIL SPACING OF 2" ON CENTER AT ADJOINING PANEL EDGES IS SPECIFIED (TYPE E SHEAR WALL), OR
      6.5.2. 10D COMMON NAILS HAVING PENETRATION INTO FRAMING MEMBERS AND BLOCKING OF MORE THAN 1-1/2" ARE SPECIFIED AT 3" ON CENTER, OR LESS AT ADJOINING PANEL EDGES, OR
      6.5.3. THE NOMINAL UNIT SHEAR CAPACITY ON EITHER SIDE OF THE SHEAR WALL, TYPE E, EXCEEDS 700 PLF IN SEISMIC DESIGN CATEGORY D, E, OR F.
   6.6. MAXIMUM STUD SPACING SHALL BE 24" ON CENTER
   6.7. WOOD STRUCTURAL PANELS SHALL CONFORM TO THE REQUIREMENTS FOR ITS TYPE.
7. SHEAR WALL CONSTRUCTION WITH GYPSUM WALLBOARD OR GYPSUM SHEATING BOARD SHALL MEET THE FOLLOWING REQUIREMENTS:
   7.1. END JOINTS OF ADJACENT COURSES OF GYPSUM WALLBOARD OR SHEATING SHALL NOT OCCUR OVER THE SAME STUD. THE SIZE AND SPACING OF FASTENERS AT SHEAR WALL BOUNDARIES, PANEL EDGES, AND INTERMEDIATE SUPPORTS SHALL BE PER SHEAR WALL SCHEDULE. NAILS SHALL BE LOCATED AT LEAST $\frac{3}{8}$" FROM THE EDGES AND ENDS OF PANELS. THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS AND BLOCKING SHALL BE 2" NOMINAL OR GREATER.
   7.2. GYPSUM WALLBOARD SHALL BE APPLIED PARALLEL OR PERPENDICULAR TO STUDS. GYPSUM WALLBOARD SHALL CONFORM TO ASTM C 1396 AND SHALL BE INSTALLED IN ACCORDANCE WITH ASTM C 840.
   7.3. GYPSUM SHEATING BOARD: 4' WIDE PIECES OF GYPSUM SHEATING BOARD SHALL BE APPLIED PARALLEL OR PERPENDICULAR TO STUDS. 2' WIDE PIECES OF GYPSUM SHEATHING BOARD SHALL BE APPLIED PERPENDICULAR TO THE STUDS. GYPSUM SHEATHING BOARD SHALL CONFORM TO ASTM C 1396 AND SHALL BE INSTALLED IN ACCORDANCE WITH ASTM C 1280.

DESIGN CRITERIA:	
SEISMIC:ASCE7-16, CHP 12.8	
EQUIVALENT LATERAL FORCE PROCEDURE.	
I=	II
SS=	1.671
S1=	0.57
SMS=	2.005
SM1=	null
SDS=	0.67
SD1=	null
TL=	12
RO=	1.3
R=	6.5
ROOF LOADS:	
LIVE LOAD	20 PSF
SNOW LOAD(Pg)	30,50,70 PSF
SNOW LOAD(Pf)	23.1,38.5,53.9 PSF
WIND:	
MAIN WIND FORCE RESISTING SYSTEM, ALL HEIGHTS METHOD, ASCE7-16 CHP. 26 & 27	
WIND SPEED=	85MPH
EXPOSURE=	C
ENCLOSURE=	ENCLOSED
SOIL:	
ALLOWABLE = SOIL BEARING	1500 PSF

DESIGN CRITERIA:	
SEISMIC:ASCE7-16, CHP 12.8	
EQUIVALENT LATERAL FORCE PROCEDURE.	
I=	II
SS=	1.471
S1=	0.447
SMS=	1.765
SM1=	null
SDS=	1.29
SD1=	null
TL=	6
RO=	1.3
R=	6.5
ROOF LOADS:	
LIVE LOAD	20 PSF
SNOW LOAD(Pg)	170 PSF
SNOW LOAD(Pf)	131 PSF
WIND:	
MAIN WIND FORCE RESISTING SYSTEM, ALL HEIGHTS METHOD, ASCE7-16 CHP. 26 & 27	
WIND SPEED=	120MPH
EXPOSURE=	C
ENCLOSURE=	ENCLOSED
SOIL:	
ALLOWABLE = SOIL BEARING	2000 PSF

TYPE OR LOCATION OF CONCRETE CONSTRUCTION (TABLE R402.2)	MINIMUM COMPRESSIVE STRENGTH (f'c)	
	WEATHERING POTENTIAL	
	MODERATE	SEVERE
BASEMENT WALLS, FOUNDATIONS, AND OTHERS NOT EXPOSED TO WEATHER	2,500	2,500
BASEMENT SLABS AND INTERIOR SLAB ON GRADE, EXCEPT GARAGE FLOORS	2,500	2,500
BASEMENT WALLS, FOUNDATIONS WALLS , AND OTHERS EXPOSED TO WEATHER	3,000	3,000
PORCHES, CARPORT SLABS AND STEPS EXPOSED TO THE WEATHER, & GARAGE FLOOR	3,000	3,500

APA RATED ROOF SHEATHING			
SNOW LOAD	TRUSS SPACING	PANEL SPAN RATING	TYP. PANEL THICKNESS (")
30 #	24" O.C.	32/16	1/2
50#	24" O.C.	32/16	1/2
70#	24" O.C.	32/16	1/2
170#	16" O.C.	32/16	1/2
490#	12" O.C.	48/24	3/4

SHEAR WALL SCHEDULE
30/50/70/170# SNOW

A — WALL SYSTEM STRENGTH: 173 PLF SEISMIC, 173 PLF WIND
3/8" STRUCTURAL WOOD PANELS (BLOCKED)
NAILING: 8d (COMMON OR HOT DIPPED GALVANIZED)
6" O.C. @ EDGES
12" O.C. @ FIELD
1/2"Φ ANCHOR BOLT SPACING 72" W/ 2X P.T. SILL
SIMPSON A35 SHEAR TRANSFER @ 36" O.C.
SILL SHEAR TRANSFER NAILING 16d @ 6" O.C. (COMMON, BOX OR SINKER)

B — WALL SYSTEM STRENGTH: 260 PLF SEISMIC, 260 PLF WIND
3/8" STRUCTURAL WOOD PANELS (BLOCKED)
NAILING: 8d (COMMON OR HOT DIPPED GALVANIZED)
6" O.C. @ EDGES
12" O.C. @ FIELD
1/2"Φ ANCHOR BOLT SPACING 48" W/ 2X P.T. SILL
SIMPSON A35 SHEAR TRANSFER @ 27" O.C.
SILL SHEAR TRANSFER NAILING 16d @ 6" O.C. (COMMON, BOX OR SINKER)

C — WALL SYSTEM STRENGTH: 260 PLF SEISMIC, 346 PLF WIND
3/8" STRUCTURAL WOOD PANELS (BLOCKED)
NAILING: 8d (COMMON OR HOT DIPPED GALVANIZED)
6" O.C. @ EDGES
12" O.C. @ FIELD
1/2"Φ ANCHOR BOLT SPACING 36" W/ 2X P.T. SILL
SIMPSON A35 SHEAR TRANSFER @ 18" O.C.
SILL SHEAR TRANSFER NAILING 16d @ 4" O.C. (COMMON, BOX OR SINKER)

D — WALL SYSTEM STRENGTH: SEE NOTE 1: 340 PLF SEISMIC, 520 PLF WIND
3/8" STRUCTURAL WOOD PANELS (BLOCKED)
NAILING: 8d (COMMON OR HOT DIPPED GALVANIZED)
4" O.C. @ EDGES
12" O.C. @ FIELD
1/2"Φ ANCHOR BOLT SPACING 24" W/ 2X P.T. SILL
SIMPSON A35 SHEAR TRANSFER @ 12" O.C.
SILL SHEAR TRANSFER NAILING (2) ROWS
16d @ 4" O.C. (COMMON, BOX OR SINKER)

E — WALL SYSTEM STRENGTH: SEE NOTE 1: 640 PLF SEISMIC, 895 WIND
3/8" STRUCTURAL WOOD PANELS (BLOCKED)
NAILING: 10d (COMMON OR HOT DIPPED GALVANIZED)
2" O.C. @ EDGES
12" O.C. @ FIELD
5/8"Φ ANCHOR BOLT SPACING 24" W/ 3X P.T. SILL
SIMPSON A35 SHEAR TRANSFER @ 8" O.C.
SILL SHEAR TRANSFER NAILING (2) ROWS
16d @ 4" O.C. (COMMON, BOX OR SINKER)

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

JACKSON & SANDS
ENGINEERING, Inc.

A Regional Partnership for Achievable Housing

LICENSED ARCHITECT — RUSSELL DAVIDSON — No. C36895 Ren. 11-30-25 — STATE OF CALIFORNIA

YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

STRUCTURAL NOTES

S3.0

TABLE 2304.10.1
FASTENING SCHEDULE

	CONNECTION	FASTENING [a,m]	LOCATION
1.	JOIST TO SILL OR GIRDER	3-8d COMMON (2.5" X 0.131")	TOENAIL
2.	BRIDGING TO JOIST	2-8d COMMON (2.5" X 0.131")	TOENAIL EA. END
3.	1"X6" SUBFLOOR OR LESS TO EA. JOIST	2-8d COMMON (2.5" X 0.131")	FACE NAIL
4.	WIDER THAN 1"X6" SUBFLOOR TO EA. JOIST	3-8d COMMON (2.5" X 0.131")	FACE NAIL
5.	2" SUBFLOOR TO JOIST OR GIRDER	2-16d COMMON (2.5" X 0.162")	BLIND AND FACENAIL
6.	SOLE PLATE TO JOIST OR BLOCKING	16d (3.5" X 0.135") @ 16" O.C.	TYPICAL FACE NAIL
	SOLE PLATE TO JOIST OR BLOCKING @ BRACED WALL PANEL	3" - 16d (3.5" X 0.135")@ 16" O.C.	BRACED WALL PANELS
7.	TOP PLATE TO STUD	2-16d COMMON (2.5" X 0.162")	END NAIL
8.	STUD TO SOLE PLATE	4-8d COMMON (2.5" X 0.131")	TOENAIL
		2-16d COMMON (3.5" X 0.162")	END NAIL
9.	DOUBLE STUDS	16d (3.5" X 0.135") @ 24" O.C.	FACE NAIL
10.	DOUBLE TOP PLATES	16d (3.5" X 0.135") @ 16" O.C.	TYP. FACE NAIL
	DOUBLE TOP PLATES	8-16d COMMON (2.5" X 0.162")	LAP SPLICE
11.	BLOCKING BETWEEN JOISTS OR RAFTERS TO TOP PLATE	3-8d COMMON (2.5" X 0.131")	TOENAIL
12.	RIM JOIST TO TOP PLATE	8d (2.5" X 0.131") @6" O.C.	TOENAIL
13.	TOP PLATES, LAPS AND INTERSECTIONS	2-16d COMMON (2.5" X 0.162")	FACE NAIL
14.	CONTINUOUS HEADER, TWO PIECES	16d COMMON (3.5" X 0.162")	16" O.C. ALONG EDGE
15.	CEILING JOISTS TO PLATE	3-8d COMMON (2.5" X 0.131")	TOENAIL
16.	CONTINUOUS HEADER TO STUD	4-8d COMMON (2.5" X 0.131")	TOENAIL
17.	CEILING JOISTS, LAPS OVER PARTITIONS SEE SECTION 2308.10.4.1, TABLE 2308.10.4.1)	3-16d COMMON (3.5" X 0.162") MINIMUM, TABLE 2308.10.4.1	FACE NAIL
18.	CEILING JOISTS TO PARALLEL RAFTERS SEE SECTION 2308.10.4.1, TABLE 2308.10.4.1)	3-16d COMMON (3.5" X 0.162") MINIMUM, TABLE 2308.10.4.1	FACE NAIL
19.	RAFTER TO PLATE SEE SECTION 2308.10.1, TABLE 2308.10.1)	3-8d COMMON (2.5" X 0.131")	TOENAIL
20.	1" DIAGONAL BRACE TO EA. STUD AND PLATE	2-8d COMMON (2.5" X 0.131")	
21.	1"X8" SHEATHING TO EA. BEARING	3-8d COMMON (2.5" X 0.131")	
22.	WIDER THAN 1"X8" SHEATHING TO EA. BEARING	3-8d COMMON (2.5" X 0.131")	
23.	BUILT-UP CORNER STUDS	16d COMMON (3.5" X 0.162")	
24.	BUILT-UP GIRDER AND BEAMS	20d COMMON (4" X 0.192") 32" O.C.	
		2 - 20d COMMON (4" X 0.192")	
25.	2" PLANKS	16d COMMON (3.5" X 0.162")	
26.	COLLAR TIE TO RAFTER	3-10d COMMON (3" X 0.148")	
27.	JACK RAFTER TO HIP	3-10d COMMON (3" X 0.148")	
		2-16d COMMON (3.5" X 0.162")	
28.	ROOF RAFTER TO 2 BY RIDGE BEAM	2-16d COMMON (3.5" X 0.162")	
		2-16d COMMON (3.5" X 0.162")	
29.	JOIST TO BAND JOIST	3-16d COMMON (3.5" X 0.162")	
30.	LEDGER STRIP	3-16d COMMON (2.5" X 0.131")	
31.	WOOD STRUCTURAL PANELS AND PARTICLEBOARD SUBFLOOR, ROOF AND WALL SHEATHING (TO FRAMING) [b]	1/2" AND LESS — 6d [c,j]	
		19/32" TO 3/4" — 8d [d] OR 6d [e]	
		7/8" TO 1" — 8d	
		1 1/8" TO 1 1/4" — 10d [c] or 8d	
	SINGLE FLOOR (COMBINATION SUBFLOOR-UNDERLAYMENT TO FRAMING)	3/4" AND LESS — 6d [e]	
		7/8" TO 1" — 8d [e]	
		1 1/8" TO 1 1/4" — 10d [d] or 8d [e]	
32.	PANEL SIDING (TO FRAMING)	1/2" AND LESS — 6d [f]	
		5/8" AND LESS — 8d [f]	
33.	FIBERBOARD SHEATHING	1/2" AND LESS — No. 11 GA ROOFING NAIL [h] 6d COMMON NAIL (2" X 0.113") No. 16 GA STAPLE [i]	
		25/32" — No. 11 GA ROOFING NAIL [h] 8d COMMON NAIL (2 1/2" X 0.131") No. 16 GA STAPLE [i]	
34.	INTERIOR PANELING	1/4" — 4d [j]	
		3/8" — 6d [k]	

a. Common or box nails are permitted to be used except where otherwise noted.
b. Nails spaced at 6 inches on center at edges, 12 inches at intermediate supports except 6 inches at supports where spans are 48 inches or more. For nailing of wood structural panel and particle board diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.
c. Common or deformed shank (6d - 2" x 0.113";8d - 2 1/2" x 0.131"; 10d - 3" x 0.148").
d. Common (6d - 2" x 0.113";8d - 2 1/2" x 0.131"; 10d - 3" x 0.148").
e. Deformed shank (6d - 2" x 0.113"; 8d - 2 1/2" x 0.131"; 10d - 3" x 0.148").
f. Corrosion resistant siding (6d - 1 7/8" x 0.106"; 8d - 2 3/8" x 0.128") or casing (6d - 2" x 0.099"; 8d - 2 1/2" x 113") nail.
g. Fasteners spaced 3 inches on center at exterior edges and 6 inches on center at intermediate supports, when used as structural sheathing. Spacing shall be 6 inches on center on the edges and 12 inches on center at intermediate supports for nonstructural applications.
h. Corrosion resistant roofing nails with 7/16 inch dia. head and 1 1/2" inch length for 1/2" length for 1/2" inch sheathing and 1 3/4 inch length for 25/32 inch sheathing.
i. Corrosion resistant staples with nominal 7/16" crown and 1 1/8" length for 1/2" inch sheathing and 1 3/4" inch length for 25/32 inch sheathing.
j. Casing (1 1/2" x 0.080" or finish (1 1/2" x 0.072") nails spaced 6" on panel edges, 12" at intermediate supports.
k. Panel supports at 24". Casing or finish nails spaced 6" on panel edges, 12" at intermediate supports.
l. For roof sheathing applications, 8d nails (2 1/2" x 0.113") are the minimum required for wood structural panels.
m. Staples shall have a minimum crown width of 7/16 inch.
n. For roof sheathing applications, fasteners spaced 4 inches on center at edges, 8 inches at intermediate supports for subfloor and wall sheathing and 3 inches on center at edges, 6 inches at intermediate supports for roof sheathing.
o. Fasteners spaced 4inches on center at edges, 8 inches at intermediate supports for subfloor and wall sheathing and 3 inches on center at edges, 6 inches at intermediate supports for roof sheathing.
p. Fasteners spaced 4 inches on center at edges, 8 inches at intermediate supports.

EXCAVATION, GRADING AND FILL:

1. EXCAVATION NEAR FOUNDATION FOR ANY PURPOSE SHALL NOT REDUCE LATERAL SUPPORT FROM ANY FOUNDATION OR ADJACENT FOUNDATION WITHOUT FIRST UNDERPINNING OR PROTECTING THE FOUNDATION AGAINST DETRIMENTAL LATERAL OR VERTICAL MOVEMENT OR BOTH.
   1.1. WHERE UNDERPINNING IS CHOSEN TO PROVIDE THE PROTECTION OR SUPPORT OF ADJACENT STRUCTURES, THE UNDERPINNING STEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH PROVISIONS OF CURRENT CALIFORNIA BUILDING CODE.
   1.2. UNDERPINNING SHALL BE INSTALLED IN A SEQUENTIAL MANNER THAT PROTECTS THE NEIGHBORING STRUCTURE AND THE WORKING CONSTRUCTION SITE. THE ENGINEER OF RECORD SHALL BE NOTIFIED IF THIS CONDITION EXISTS TO ALLOW FOR PREPARATION OF CONSTRUCTION DOCUMENTS.
2. PLACEMENT OF BACKFILL: THE EXCAVATION OUTSIDE THE FOUNDATION SHALL BE BACKFILLED WITH SOIL THAT IS FREE OF ORGANIC MATERIAL, CONSTRUCTION DEBRIS, COBBLES AND BOULDERS OR WITH CONTROLLED LOW-STRENGTH MATERIAL (CLSM). THE BACKFILL SHALL BE PLACED IN LIFTS AND COMPACTED IN A MANNER THAT DOES NOT DAMAGE THE FOUNDATION OR THE WATERPROOFING OR DAMPPROOFING MATERIAL.
3. SITE GRADING: THE GROUND IMMEDIATELY ADJACENT TO THE FOUNDATION SHALL BE SLOPED AWAY FROM THE BUILDING AT A SLOPE OF NOT LESS THAN 5% FOR A MINIMUM DISTANCE OF 10 FEET MEASURED PERPENDICULAR TO THE WALL. IF PHYSICAL OBSTRUCTIONS OR LOT LINES PROHIBIT 10 FEET AN APPROVED METHOD OF DRAINAGE AWAY FROM STRUCTURE SHALL BE USED. SWALES USED FOR THIS PURPOSE SHALL BE SLOPED A MINIMUM OF 2% WHERE LOCATED WITHIN 10 FEET OF BUILDING FOUNDATION. IMPERVIOUS SURFACES WITHIN 10 FEET OF THE BUILDING FOUNDATION SHALL BE SLOPED A MIN. OF 2% AWAY FROM THE BUILDING. 2% SLOPES MAY BE USED WHEN APPROVED BY THE ENGINEER OF RECORD.
4. WHERE SHALLOW FOUNDATIONS WILL BEAR ON COMPACTED FILL MATERIAL, THE COMPACTED FILL SHALL COMPLY WITH THE APPROVED GEOTECHNICAL REPORT.
   4.1. WHERE COMPACTED FILL MATERIAL 12 INCHES IN DEPTH OR LESS NEED NOT COMPLY WITH AN APPROVED REPORT, PROVIDED THE IN-PLACE DRY DENSITY IS NOT LESS THAN 90% OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT DETERMINED IN ACCORDANCE WITH ASTM D1557. THE COMPACTION SHALL BE VERIFIED BY SPECIAL INSPECTION IN ACCORDANCE WITH SECTION 1705.6

FOUNDATIONS:

1. NO FILL OR OTHER SURCHARGE LOADS SHALL BE PLACED ADJACENT TO ANY BUILDING OR STRUCTURE UNLESS SUCH STRUCTURE IS CAPABLE OF WITHSTANDING THE ADDITIONAL LOADS CAUSED BY THE FILL OR SURCHARGE.
2. IF VIBRATORY LOADS ARE TO BE PRESENT DURING THE USE OF THE STRUCTURE, THE ENGINEER OF RECORD SHALL BE NOTIFIED TO DETERMINE IF ADDITIONAL CONSIDERATION IS REQUIRED TO PREVENT DETRIMENTAL DISTURBANCES OF THE SOIL.
3. IF EXPANSIVE SOILS ARE DISCOVERED THE ENGINEER OF RECORD SHALL BE NOTIFIED TO PROVIDE ADDITIONAL FOUNDATION DESIGN AND CONSTRUCTION REQUIREMENTS.
4. BUILDING CLEARANCE FROM ASCENDING SLOPES SHALL IN GENERAL BE SET A SUFFICIENT DISTANCE FROM THE SLOPE TO PROVIDE PROTECTION FROM SLOPE DRAINAGE, EROSION AND SHALLOW FAILURES.
5. FOUNDATION SETBACK FROM DESCENDING SLOPE SURFACE SHALL BE FOUNDED IN FIRM MATERIAL WITH AN EMBEDMENT AND SET BACK FROM SLOPE SURFACE SUFFICIENT TO PROVIDE VERTICAL AND LATERAL SUPPORT FOR THE FOUNDATION WITHOUT DETRIMENTAL SETTLEMENT.
6. FOR FOUNDATIONS SUPPORTING GROUP R OR U OCCUPANCIES OF LIGHT-FRAME CONSTRUCTION, TWO STORIES OR LESS IN HEIGHT, ASSIGNED TO SEISMIC DESIGN CATEGORY D, E OR F SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2500 psi
7. CONCRETE FOUNDATIONS ARE PERMITTED TO BE CAST AGAINST THE EARTH WHERE SOIL CONDITIONS DO NOT REQUIRE FORMWORK.
8. SHALLOW FOUNDATIONS SHALL BE BUILT ON UNDISTURBED SOIL, COMPACTED FILL MATERIAL OR CLSM. COMPACTED FILL MATERIAL SHALL BE PLACED IN ACCORDANCE WITH CBC SECTION 1804.5
9. THE TOP SURFACE OF FOOTINGS SHALL BE LEVEL. THE BOTTOM SURFACE OF FOOTINGS SHALL BE PERMITTED TO HAVE A SLOPE NOT EXCEEDING 10%. FOOTINGS SHALL BE STEPPED WHERE IT IS NECESSARY TO CHANGE THE ELEVATION OF THE TOP SURFACE OF THE FOOTING OR WHERE THE SURFACE OF THE GROUND SLOPES MORE THAN 10%.
10. FOR SINGLE STORIES, THE MIN. DEPTH OF FOOTINGS SHALL BE 12" BELOW UNDISTURBED GROUND SURFACE. THE MIN. WIDTH OF FOOTING SHALL BE 12". FOR TWO STORIES, THE MIN DEPTH OF FOOTINGS SHALL BE 18" BELOW UNDISTURBED GROUND SURFACE AND THE MIN. WIDTH OF THE FOOTING SHALL BE 15".
11. ALL LOAD BEARING WALLS SHALL BE PLACED ON CONTINUOUS CONCRETE FOOTINGS BONDED INTEGRALLY WITH THE EXTERIOR WALL FOOTINGS.
12. MIN. SLAB THICKNESS SHALL BE 4". A 6-MIL POLYETHYLENE VAPOR RETARDER WITH JOINTS LAPPED NOT LESS THAN 6" SHALL BE PLACED BETWEEN THE BASE COURSE AND THE CONCRETE FLOOR SLAB. A VAPOR RETARDER IS NOT REQUIRED FOR DETACHED STRUCTURES ACCESSORY TO OCCUPANCIES IN GROUP R-3, SUCH AS GARAGES, UTILITY BUILDINGS OR OTHER UNHEATED FACILITIES.
13. PLANS ARE VALID FOR SITES WITH A 5H:1V SLOPE OR FLATTER WITH SOILS SUITABLE TO BEAR LOADS FROM STRUCTURE. IF UNSUITABLE SOILS ARE ENCOUNTERED, NOTIFY E.O.R. IMMEDIATELY
14. CONCRETE SUBJECT TO FREEZING SHALL BE AIR-ENTRAINED. TOTAL AIR CONTENT (PERCENT BY VOLUME OF CONCRETE) SHALL BE NOT LESS THAN 5% OR MORE THAN 7%. R402.2
15. FOR GARAGE FLOORS WITH A STEEL TROWELED FINISH, REDUCTION OF THE TOTAL AIR CONTENT (PERCENT BY VOLUME OF CONCRETE) TO NOT LESS THAN 3 PERCENT IS PERMITTED IF THE SPECIFIED COMPRESSIVE STRENGTH OF THE CONCRETE IS INCREASED TO NOT LESS THAN 4000 PSI.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH THE CURRENTLY ACCEPTED EDITION OF THE CALIFORNIA BUILDING CODE (CBC) AND CBC STANDARDS.
2. IF CONDITIONS ARISE OUTSIDE THE SCOPE OF THESE PLANS, THE ENGINEER OF RECORD SHALL BE NOTIFIED.
3. ALL CONCRETE SHALL HAVE A MIN. STRENGTH OF 2,500 PSI (28 DAY)
4. REINFORCEMENT BAR SHALL BE GRADE 40 FOR BARS #4 AND SMALLER AND GRADE 60 FOR BARS #5 AND LARGER
5. BOTTOM HORIZONTAL REINFORGING BAR PLACED IN THE FOOTING SHALL BE 3" CLEAR OF BOTTOM OF FOOTING. TOP HORIZONTAL REINFORGING BAR PLACED IN THE FOOTING SHALL BE 2" CLEAR OF THE TOP OF THE FOOTING

SHEAR WALL NOTES: (PER SDPWS-2015)

1. FRAMING REQUIREMENTS: ALL FRAMING MEMBERS AND BLOCKING USED FOR SHEAR WALL CONSTRUCTION SHALL BE 2" NOMINAL OR GREATER. WHERE SHEAR WALLS ARE DESIGNED AS BLOCKED, ALL JOINTS IN SHEATHING SHALL OCCUR OVER AND BE FASTENED TO COMMON FRAMING MEMBERS OR COMMON BLOCKING. SHEAR WALL BOUNDARY ELEMENTS,SUCH AS END POSTS, SHALL BE PROVIDED TO TRANSMIT THE DESIGN TENSION AND COMPRESSION FORCES. SHEAR WALL SHEATHING SHALL NOT BE USED TO SPLICE BOUNDARY ELEMENTS. END POSTS (STUDS OR COLUMNS) SHALL BE FRAMED TO PROVIDE FULL END BEARING.
2. COMMON FRAMING MEMBER. WHERE A COMMON FRAMING MEMBER IS REQUIRED AT ADJOINING PANEL EDGES, TWO FRAMING MEMBERS THAT ARE AT LEAST 2" NOMINAL THICKNESS SHALL BE PERMITTED PROVIDED THEY ARE FASTENED TOGETHER WITH FASTENERS DESIGNED IN ACCORDANCE WITH THE NDS TO TRANSFER THE INDUCED SHEAR BETWEEN MEMBERS. WHEN FASTENERS CONNECTING THE TWO FRAMING MEMBERS ARE SPACED LESS THAN 4" ON CENTER, THEY SHALL BE STAGGERED.
3. TENSION AND COMPRESSION CHORDS SHALL BE INSTALLED AT EACH END OF SHEAR WALL.
4. FASTENERS: SHEATHING SHALL BE ATTACHED TO FRAMING MEMBERS USING NAILS OR OTHER APPROVED FASTENERS. NAILS SHALL BE DRIVEN WITH THE HEAD OF THE NAIL FLUSH WITH THE SURFACE OF THE SHEATHING. OTHER APPROVED FASTENERS SHALL BE DRIVEN AS REQUIRED FOR PROPER INSTALLATION OF THAT FASTENER, SEE TABLE FOR NAIL DIMENSIONS.
5. ANCHOR BOLTS: FOUNDATION ANCHOR BOLTS SHALL HAVE A STEEL PLATE WASHER UNDER EACH NUT NOT LESS THAT 0.229"X3"X3" IN SIZE. THE HOLE IN THE PLATE WASHER SHALL BE PERMITTED TO BE DIAGONALLY SLOTTED WITH A WIDTH OF UP TO $\frac{3}{16}$" LARGER THAN THE BOLT DIAMETER AND A SLOT LENGTH NOT TO EXCEED 1-3/4", PROVIDED A STANDARD CUT WASHER IS PLACED BETWEEN THE PLATE WASHER AND THE NUT. THE PLATE WASHER SHALL EXTEND TO WITHIN $\frac{1}{2}$" OF THE BOTTOM PLATE ON THE SIDE(S) WITH SHEATHING OR OTHER MATERIAL WITH NOMINAL UNIT SHEAR CAPACITY GREATER THAN 400 PLF FOR WIND OR SEISMIC (TYPE C, D AND E SHEAR WALLS) EXCEPTIONS MAY APPLY PER SECTION 4.3.6.4.3.
6. WOOD STRUCTURAL PANEL SHEAR WALL CONSTRUCTION. PANELS SHALL NOT BE LESS THAN 4'X8', EXCEPT AT BOUNDARIES AND CHANGES IN FRAMING.
   6.1. ALL EDGES OF PANELS SHALL BE SUPPORTED BY AND FASTENED TO FRAMING MEMBERS OR BLOCKING.
   6.2. NAILS SHALL BE LOCATED AT LEAST $\frac{3}{8}$" FROM THE PANEL EDGES. MAXIMUM NAIL SPACING AT PANEL EDGES SHALL BE 6" ON CENTER.
   6.3. NAILS ALONG INTERMEDIATE FRAMING MEMBERS SHALL BE THE SAME SIZE AS NAILS SPECIFIED FOR PANEL EDGE NAILING. AT INTERMEDIATE FRAMING MEMBERS, THE MAXIMUM NAILING SPACING SHALL BE 6" ON CENTER. WHERE PANELS ARE THICKER THAN $\frac{3}{4}$" NOMINAL OR STUDS ARE SPACED LESS THAN 24" ON CENTER, THE MAXIMUM NAIL SPACING SHALL BE 12" ON CENTER. THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS AND BLOCKING SHALL BE 2" NOMINAL OR GREATER.
   6.4. WHERE ADJOINING CONDITIONS OCCUR, THE WIDTH OF THE NAILED FACE OF A COMMON FRAMING MEMBER OR BLOCKING AT ADJOINING PANEL EDGES SHALL BE 3" NOMINAL OR GREATER AND NAILING SHALL BE STAGGERED AT ALL PANEL EDGES (IN LIEU OF A SINGLE COMMON FRAMING MEMBER, TWO FRAMING MEMBERS THAT ARE AT LEAST 2" IN NOMINAL THICKNESS SHALL BE PERMITTED):
      6.5.1. NAIL SPACING OF 2" ON CENTER AT ADJOINING PANEL EDGES IS SPECIFIED (TYPE E SHEAR WALL), OR
      6.5.2. 10D COMMON NAILS HAVING PENETRATION INTO FRAMING MEMBERS AND BLOCKING OF MORE THAN 1-1/2" ARE SPECIFIED AT 3" ON CENTER, OR LESS AT ADJOINING PANEL EDGES, OR
      6.5.3. THE NOMINAL UNIT SHEAR CAPACITY ON EITHER SIDE OF THE SHEAR WALL, TYPE E, EXCEEDS 700 PLF IN SEISMIC DESIGN CATEGORY D, E, OR F.
   6.6. MAXIMUM STUD SPACING SHALL BE 24" ON CENTER
   6.7. WOOD STRUCTURAL PANELS SHALL CONFORM TO THE REQUIREMENTS FOR ITS TYPE.
7. SHEAR WALL CONSTRUCTION WITH GYPSUM WALLBOARD OR GYPSUM SHEATING BOARD SHALL MEET THE FOLLOWING REQUIREMENTS:
   7.1. END JOINTS OF ADJACENT COURSES OF GYPSUM WALLBOARD OR SHEATING SHALL NOT OCCUR OVER THE SAME STUD. THE SIZE AND SPACING OF FASTENERS AT SHEAR WALL BOUNDARIES, PANEL EDGES, AND INTERMEDIATE SUPPORTS SHALL BE PER SHEAR WALL SCHEDULE. NAILS SHALL BE LOCATED AT LEAST $\frac{3}{8}$" FROM THE EDGES AND ENDS OF PANELS. THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS AND BLOCKING SHALL BE 2" NOMINAL OR GREATER.
   7.2. GYPSUM WALLBOARD SHALL BE APPLIED PARALLEL OR PERPENDICULAR TO STUDS. GYPSUM WALLBOARD SHALL CONFORM TO ASTM C 1396 AND SHALL BE INSTALLED IN ACCORDANCE WITH ASTM C 840.
   7.3. GYPSUM SHEATING BOARD: 4' WIDE PIECES OF GYPSUM SHEATING BOARD SHALL BE APPLIED PARALLEL OR PERPENDICULAR TO STUDS. 2' WIDE PIEGES OF GYPSUM SHEATHING BOARD SHALL BE APPLIED PERPENDICULAR TO THE STUDS. GYPSUM SHEATHING BOARD SHALL CONFORM TO ASTM C 1396 AND SHALL BE INSTALLED IN ACCORDANCE WITH ASTM C 1280.

DESIGN CRITERIA:	
SEISMIC: ASCE7-16, CHP 12.8	
EQUIVALENT LATERAL FORCE PROCEDURE.	
I=	1
SS=	1.671
S1=	0.57
SMS=	2.005
SM1=	null
SDS=	1.337
SD1=	null
TL=	6
R0=	1.3
R=	6.5
ROOF LOADS:	
LIVE LOAD	20 PSF
SNOW LOAD(Pg)	440 PSF
SNOW LOAD (Ps)	377.5 PSF
SURFACE (Ce)	1
THERMAL (Ct)	1.1
WIND:	
MAIN WIND FORCE RESISTING SYSTEM, ALL HEIGHTS METHOD, ASCE7-16 CHP. 26 & 27	
WIND SPEED=	150MPH
EXPOSURE=	C
ENCLOSURE=	ENCLOSED
SOIL:	
ALLOWABLE = SOIL BEARING	2000 PSF

TYPE OR LOCATION OF CONCRETE CONSTRUCTION (TABLE R402.2)	MINIMUM COMPRESSIVE STRENGTH (f'c)	
	WEATHERING POTENTIAL	
	MODERATE	SEVERE
BASEMENT WALLS, FOUNDATIONS, AND OTHERS NOT EXPOSED TO WEATHER	2,500	2,500
BASEMENT SLABS AND INTERIOR SLAB ON GRADE, EXCEPT GARAGE FLOORS	2,500	2,500
BASEMENT WALLS, FOUNDATIONS WALLS , AND OTHERS EXPOSED TO WEATHER	3,000	3,000
PORCHES, CARPORT SLABS AND STEPS EXPOSED TO THE WEATHER, & GARAGE FLOOR	3,000	3,500

APA RATED ROOF SHEATHING			
SNOW LOAD	TRUSS SPACING	PANEL SPAN RATING	TYP. PANEL THICKNESS (")
30 #	24" O.C.	32/16	1/2
50#	24" O.C.	32/16	1/2
70#	24" O.C.	32/16	1/2
170#	16" O.C.	32/16	1/2
490#	12" O.C.	48/24	3/4

SHEAR WALL SCHEDULE
490 # SNOW

A — WALL SYSTEM STRENGTH: 1173 PLF SEISMIC, 1173 PLF WIND

3/8" STRUCTURAL WOOD PANELS (BLOCKED)

NAILING: 8d (COMMON OR HOT DIPPED GALVANIZED)
6" O.C. @ EDGES
12" O.C. @ FIELD

5/8"Ø ANCHOR BOLT SPACING 72" W/ 3X P.T. SILL
SIMPSON A35 SHEAR TRANSFER @ 36" O.C.
SILL SHEAR TRANSFER NAILING 16d @ 6" O.C. (COMMON, BOX OR SINKER)

B — WALL SYSTEM STRENGTH: 340 PLF SEISMIC, 475 PLF WIND

19/32" STRUCTURAL WOOD PANELS (BLOCKED)

NAILING: 10d (COMMON OR HOT DIPPED GALVANIZED)
6" O.C. @ EDGES
12" O.C. @ FIELD

5/8"Ø ANCHOR BOLT SPACING 48" W/ 3X P.T. SILL
SIMPSON A35 SHEAR TRANSFER @ 27" O.C.
SILL SHEAR TRANSFER NAILING 16d @ 6" O.C. (COMMON, BOX OR SINKER)

C — WALL SYSTEM STRENGTH: 510 PLF SEISMIC, 715 PLF WIND

19/32" STRUCTURAL WOOD PANELS (BLOCKED)

NAILING: 10d (COMMON OR HOT DIPPED GALVANIZED)
6" O.C. @ EDGES
12" O.C. @ FIELD

5/8"Ø ANCHOR BOLT SPACING 36" W/ 3X P.T. SILL
SIMPSON A35 SHEAR TRANSFER @ 27" O.C.
SILL SHEAR TRANSFER NAILING 16d @ 4" O.C. (COMMON, BOX OR SINKER)

D — WALL SYSTEM STRENGTH: 665 PLF SEISMIC, SEE NOTE 1; 930 PLF WIND

19/32" STRUCTURAL WOOD PANELS (BLOCKED)

NAILING: 10d (COMMON OR HOT DIPPED GALVANIZED)
4" O.C. @ EDGES
12" O.C. @ FIELD

5/8"Ø ANCHOR BOLT SPACING 24" W/ 3X P.T. SILL
SIMPSON A35 SHEAR TRANSFER @ 12" O.C.
SILL SHEAR TRANSFER NAILING (2) ROWS 16d @ 4" O.C. (COMMON, BOX OR SINKER)

E — WALL SYSTEM STRENGTH: 870 PLF SEISMIC, SEE NOTE 1; 1217.5 PLF WIND

19/32" STRUCTURAL WOOD PANELS (BLOCKED)

NAILING: 10d (COMMON OR HOT DIPPED GALVANIZED)
2" O.C. @ EDGES
12" O.C. @ FIELD

5/8"Ø ANCHOR BOLT SPACING 24" W/ 3X P.T. SILL
SIMPSON A35 SHEAR TRANSFER @ 8" O.C.
SILL SHEAR TRANSFER NAILING (2) ROWS 16d @ 4" O.C. (COMMON, BOX OR SINKER)

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ARCHITECTURE + DESIGN

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LICENSED ARCHITECT — RUSSELL DAVIDSON — No. C36895 Ren. 11-30-25 — STATE OF CALIFORNIA

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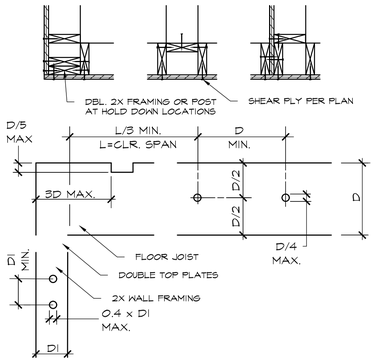
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

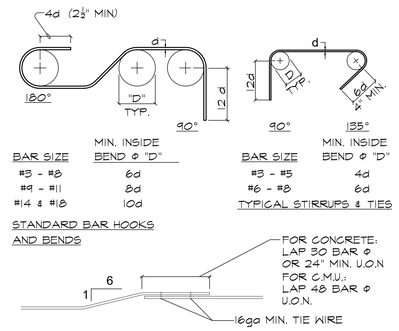
ID	NAME	DATE
	SUBMITTAL	3/30/23

STRUCTURAL NOTES (490)

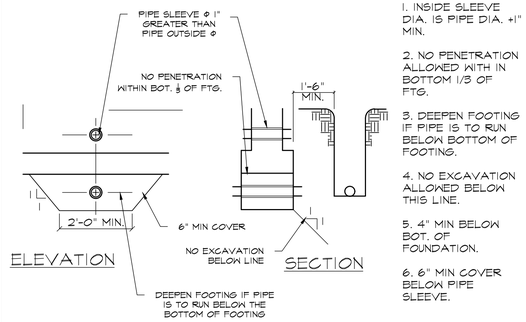
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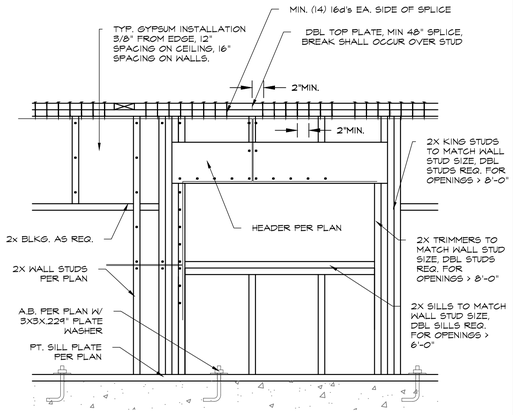
TYPICAL WALL CORNERS | 1



TYPICAL HOOKS & BENDS | 2



FOUNDATION PENETRATIONS | 3



TYP. WALL CONN. DETAIL | 4

ROOF EAVE DETAIL | 5

GABLE END DETAIL | 6

GABLE END @ BEAM DETAIL | 7

ROOF EAVE DETAIL | 9

OUTLOOKER DETAIL | 10

ROOF PORCH EAVE DETAIL | 11

ANCHOR CONNECTION DETAIL | 12

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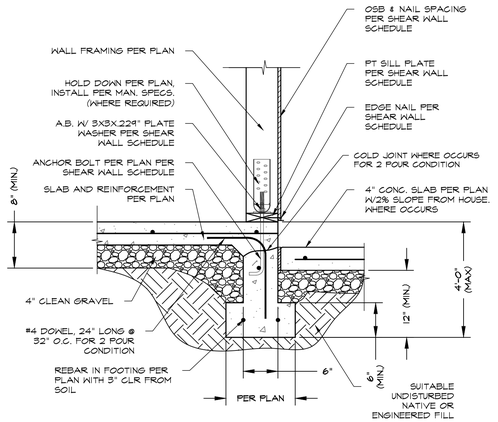
1 BEDROOM (661 SF)

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ADDRESS:
APN:

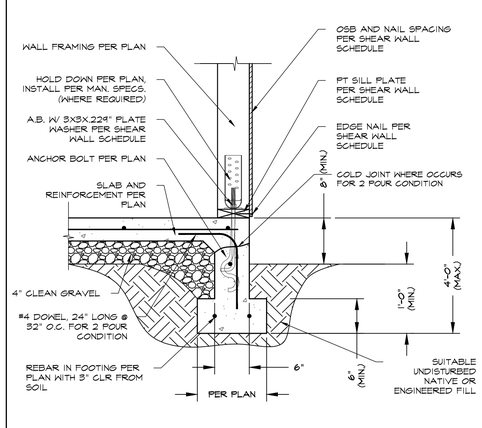
ID	NAME	DATE
	SUBMITTAL	3/30/23

STRUCTURAL DETAILS

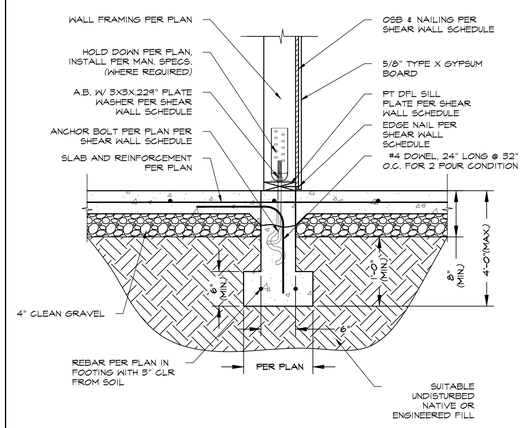
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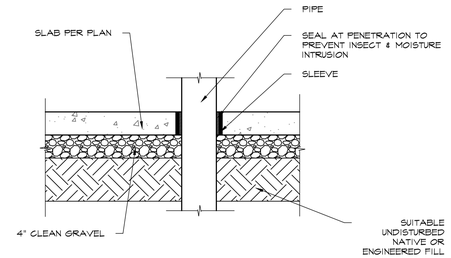
SHEAR/HOLDOWN CONN. @ FOUNDATION | 1



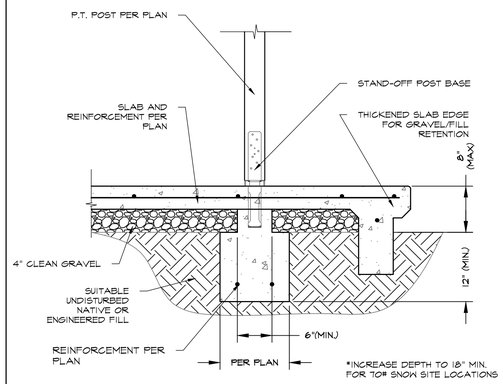
SHEAR/HOLDOWN CONN. @ FOUNDATION | 2



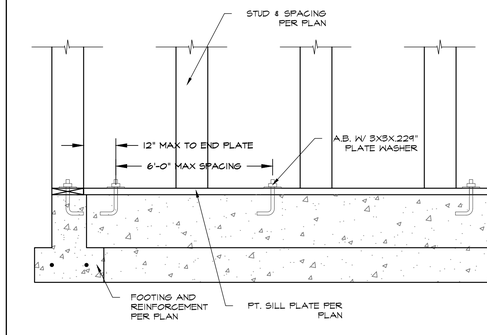
SHEAR/HOLDOWN CONN. @ FOUNDATION | 3



PLUMBING THROUGH SLAB | 4



FOOTING AND POST AT PORCH | 5



ANCHOR CONNECTION DETAIL | 6

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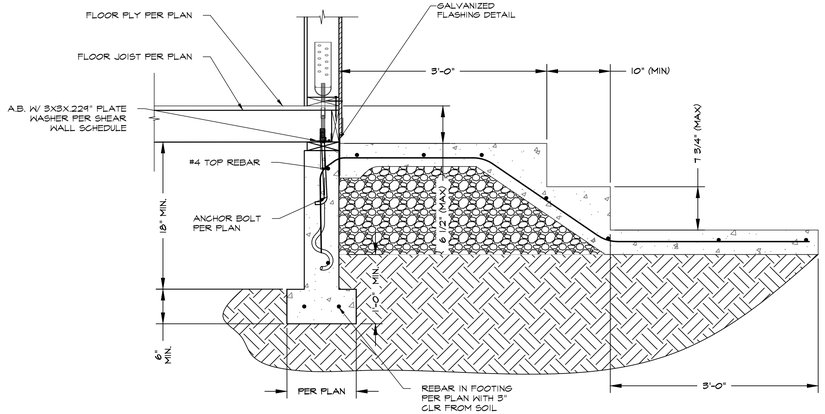
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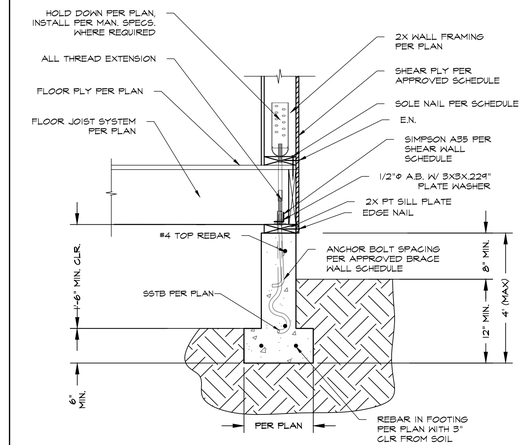
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	SUBMITTAL	3/30/23

STRUCTURAL DETAILS

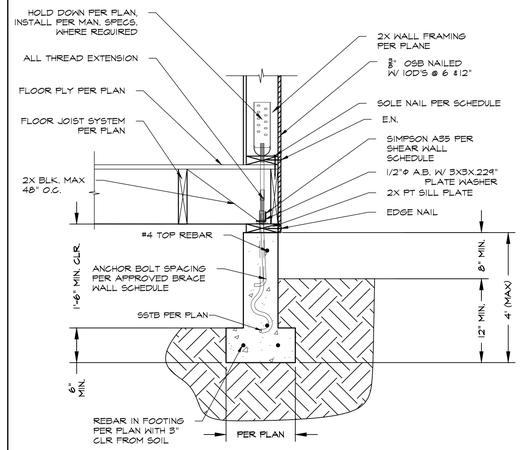
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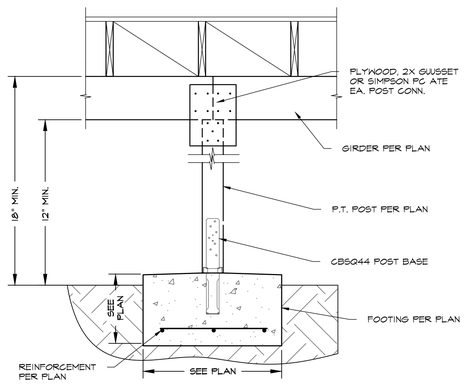
STAIR/STEP DETAIL @ DOOR | 1



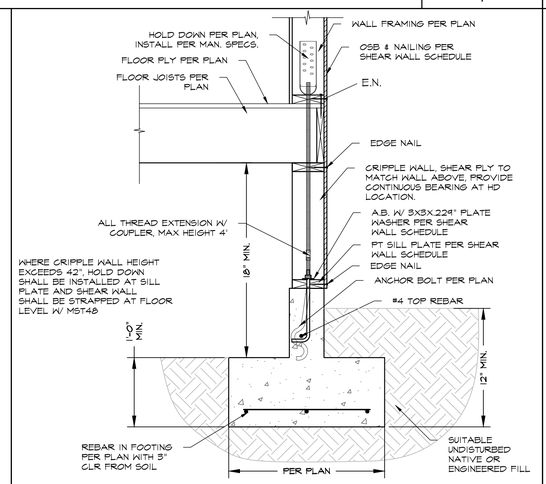
SHEAR/HOLDOWN CONN. @ FOUNDATION | 2



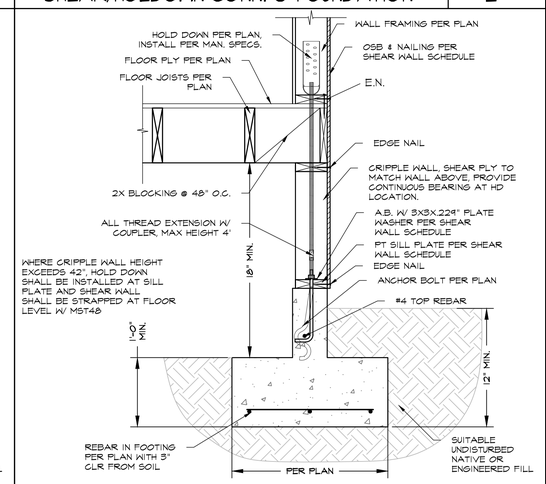
SHEAR/HOLDOWN CONN. @ FOUNDATION | 3



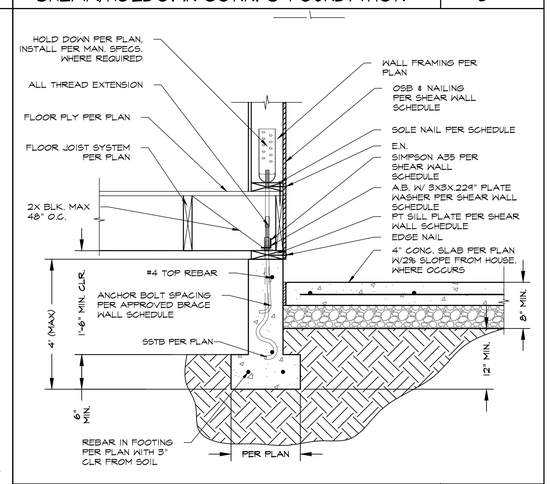
TYP. INT. PIER | 4



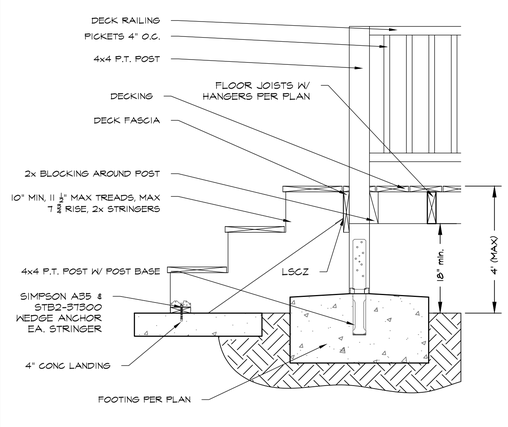
SHEAR/HOLDOWN CONN. @ FOUNDATION | 5



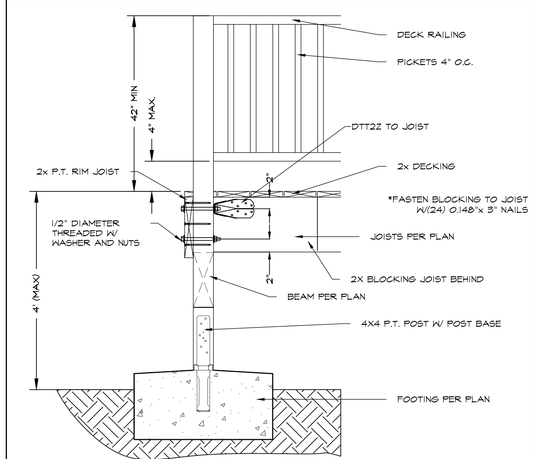
SHEAR/HOLDOWN CONN. @ FOUNDATION | 6



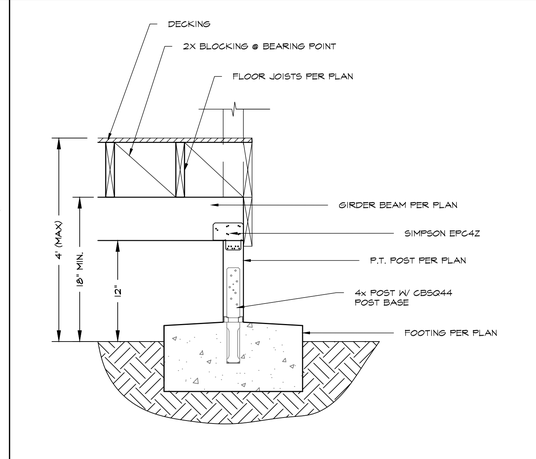
SHEAR/HOLDOWN CONN. @ FOUNDATION | 7



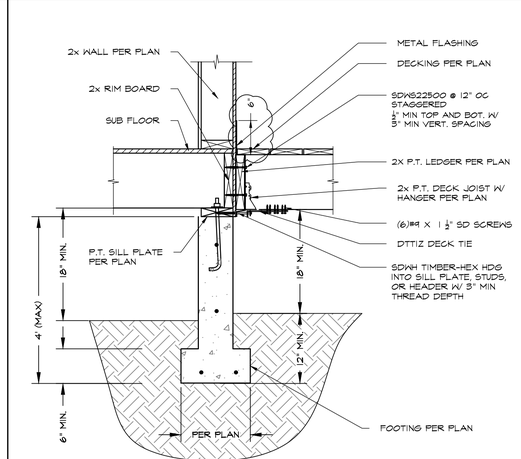
STAIR DETAIL | 8



POST & BEAM AT DECK DETAIL | 9



PORCH POST & GIRDER FOOTING DETAIL | 10



DECK LEDGER DETAIL | 11

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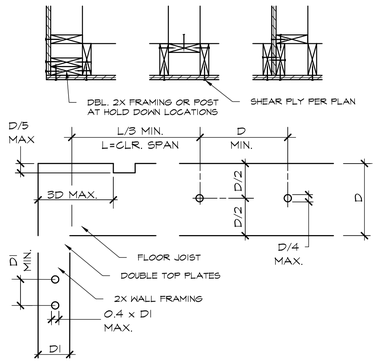
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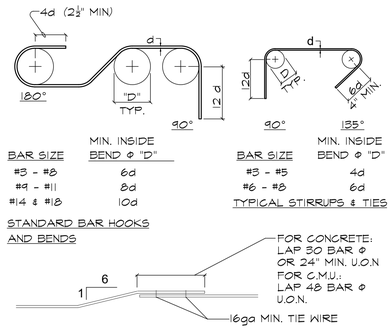
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1	REV 1	12/11/23

STRUCTURAL DETAILS

S4.2



TYPICAL WALL CORNERS | 1



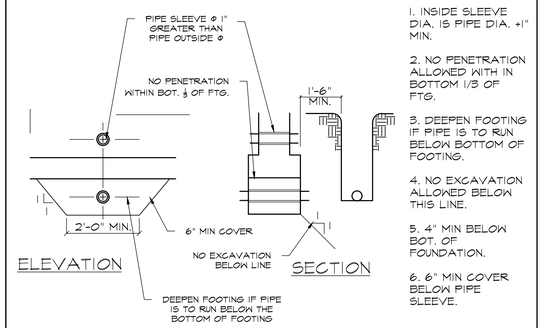
BAR SIZE	MIN. INSIDE BEND ø "D"
#3 - #5	6d
#6 - #8	8d
#9 - #11	10d

BAR SIZE	MIN. INSIDE BEND ø "D"
#3 - #5	4d
#6 - #8	6d

TYPICAL STIRRUPS & TIES

STANDARD BAR HOOKS AND BENDS

TYPICAL HOOKS & BENDS | 2



1. INSIDE SLEEVE DIA. IS PIPE DIA. +1" MIN.

2. NO PENETRATION ALLOWED WITH IN BOTTOM 1/3 OF FTG.

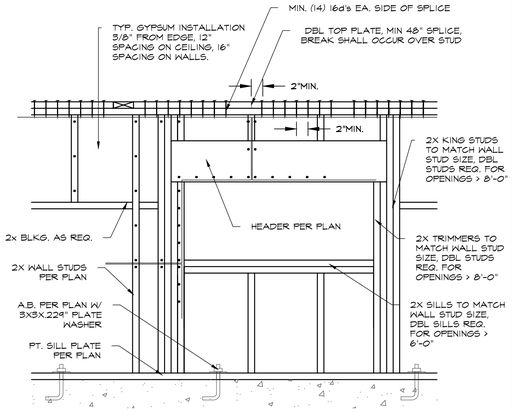
3. DEEPEN FOOTING IF PIPE IS TO RUN BELOW BOTTOM OF FOOTING.

4. NO EXCAVATION ALLOWED BELOW THIS LINE.

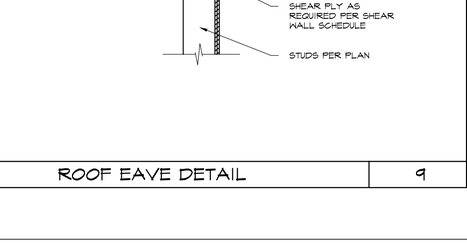
5. 4" MIN BELOW BOT. OF FOUNDATION.

6. 6" MIN COVER BELOW PIPE SLEEVE.

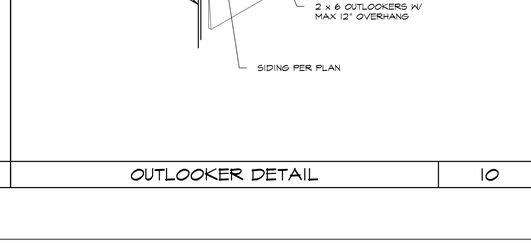
FOUNDATION PENETRATIONS | 3



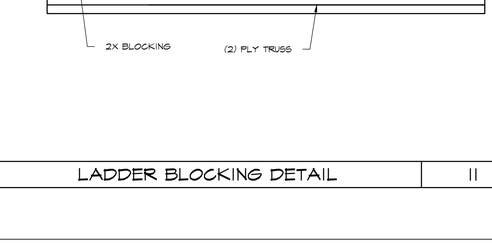
TYP. WALL CONN. DETAIL | 4



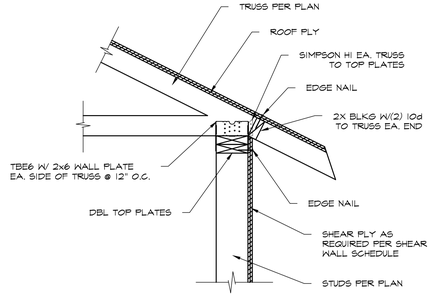
ROOF EAVE DETAIL | 5



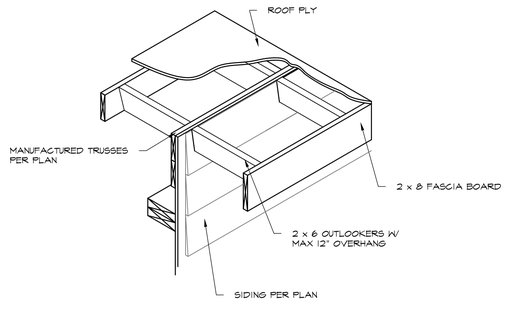
GABLE END DETAIL | 6



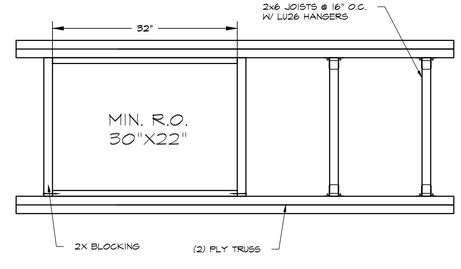
GABLE END DETAIL @ BEAM | 7



ROOF EAVE DETAIL | 9



OUTLOOKER DETAIL | 10



LADDER BLOCKING DETAIL | 11

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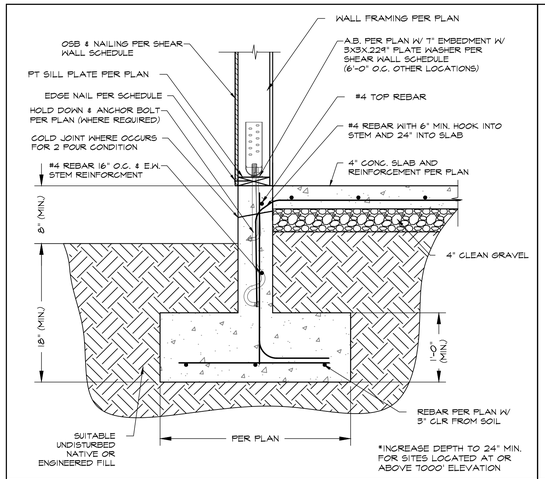
1 BEDROOM (661 SF)

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ADDRESS:
APN:

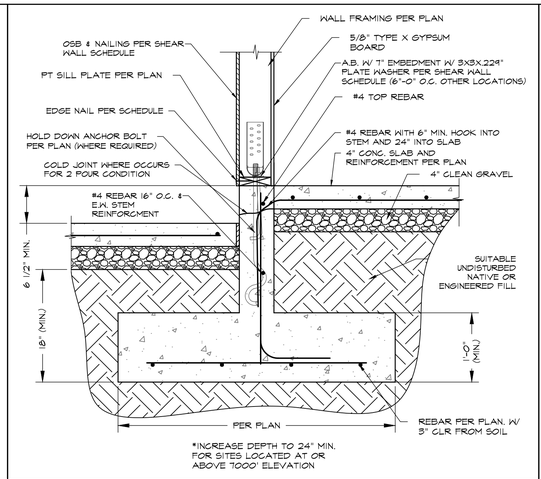
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1	REV 1	12/11/23

STRUCTURAL DETAILS (490)

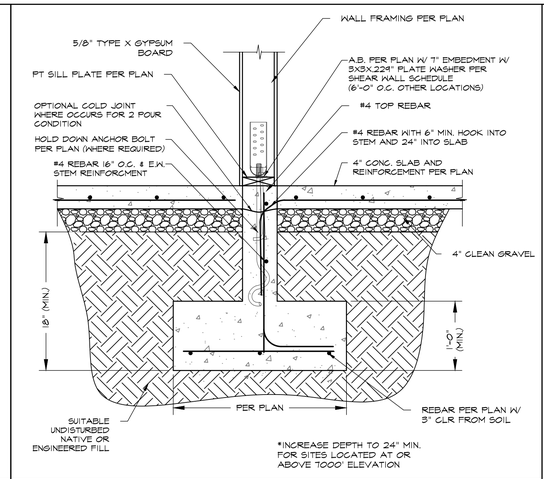
S4.3



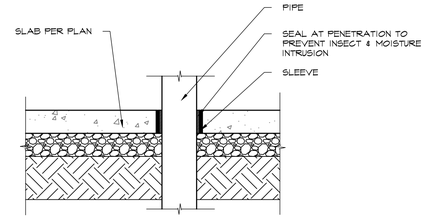
SHEAR/HOLDOWN CONN. @ FOUNDATION | 1



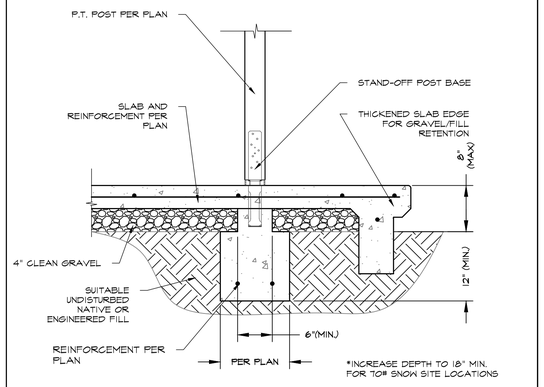
SHEAR/HOLDOWN CONN. @ FOUNDATION | 2



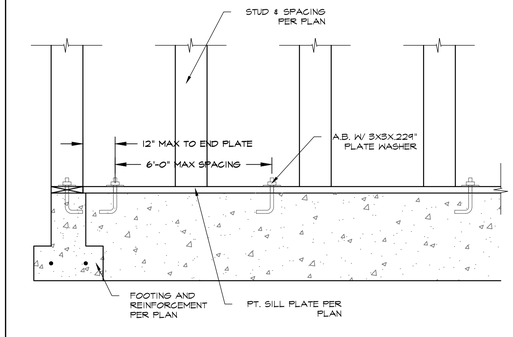
SHEAR/HOLDOWN CONN. @ FOUNDATION | 3



PLUMBING THROUGH SLAB | 4



FOOTING AND POST AT PORCH | 5



ANCHOR CONNECTION DETAIL | 6

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

JACKSON & SANDS
ENGINEERING, Inc.

A Regional Partnership for Achievable Housing

LICENSED ARCHITECT
RUSSELL DAVIDSON
No. C36895
Ren. 11-30-25
STATE OF CALIFORNIA

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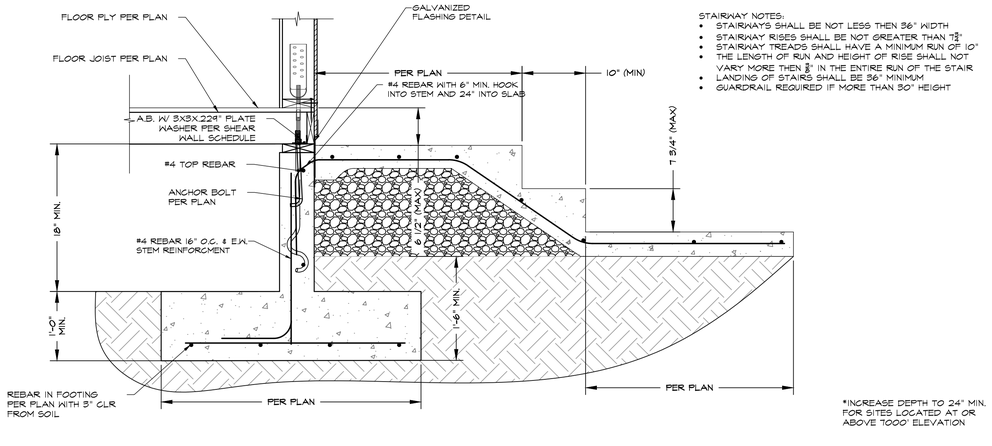
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

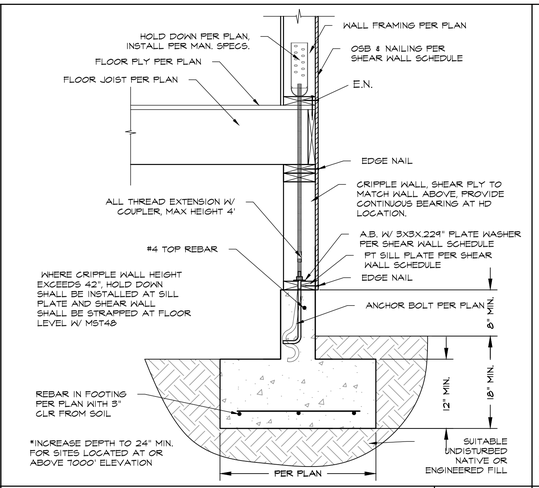
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	SUBMITTAL	3/30/23

STRUCTURAL DETAILS
(490)

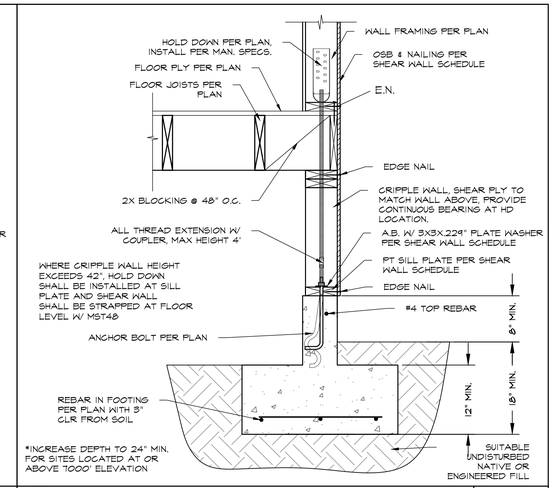
S4.4



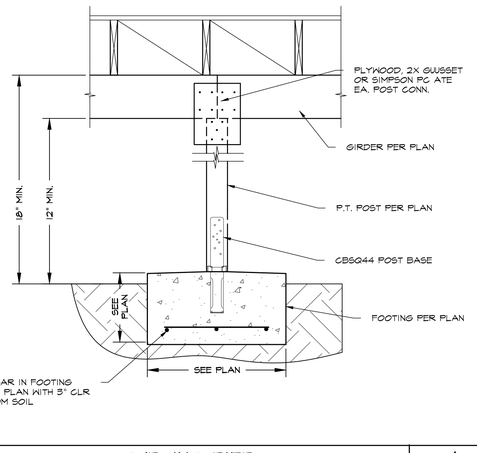
STAIR/STEP DETAIL @ DOOR | 1



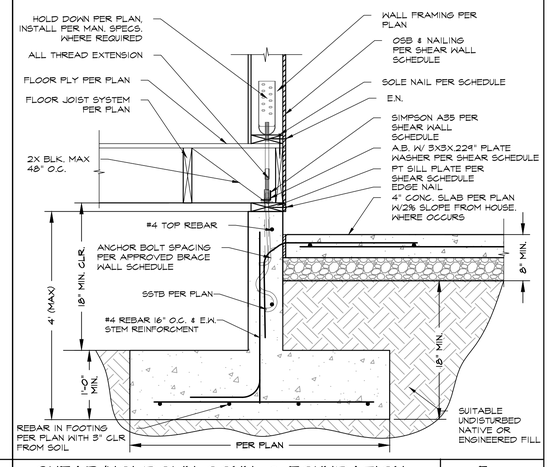
SHEAR/HOLDOWN CONN. @ FOUNDATION | 2



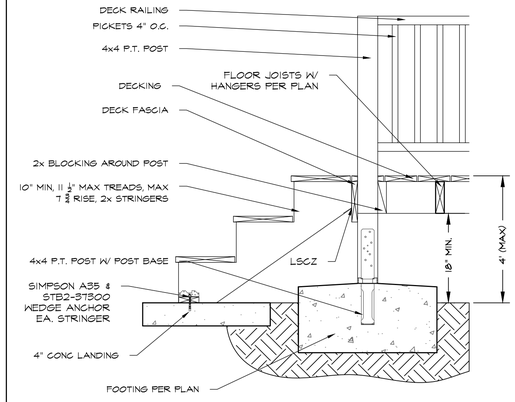
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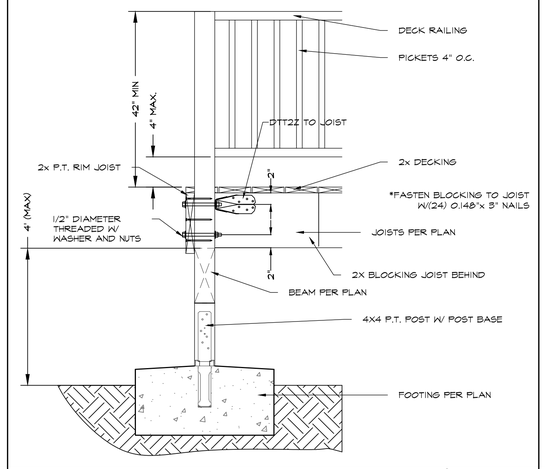
TYP. INT. PIER | 4



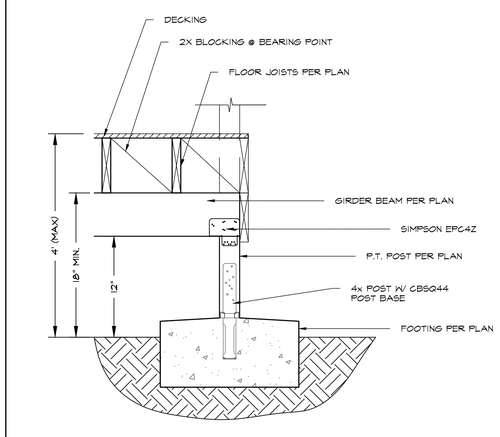
SHEAR/HOLDOWN CONN. @ FOUNDATION | 5



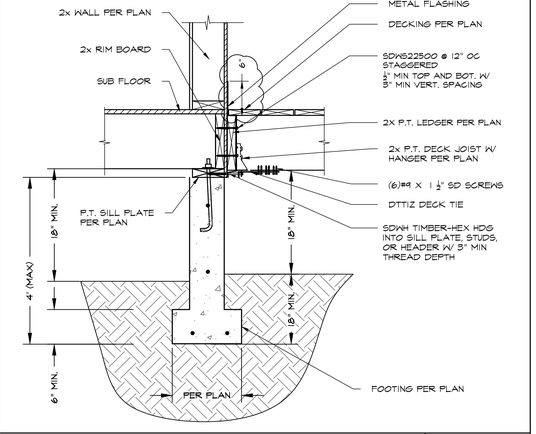
STAIR DETAIL | 8



POST & BEAM AT DECK DETAIL | 9



PORCH POST & GIRDER FOOTING DETAIL | 10



DECK LEDGER DETAIL | 11

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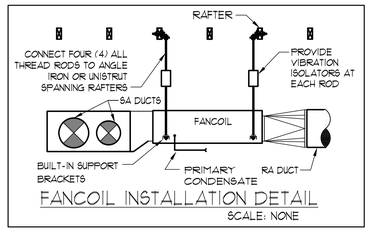
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

STRUCTURAL DETAILS (490)

S4.5



FANCOIL INSTALLATION DETAIL

SCALE: NONE

PLOT AT 1/4"

HVAC LEGEND

12"x6" SA 40 CFM	SUPPLY DIFFUSER, SIZE AND FLOW RATE LISTED ARROWS INDICATE THROW PATTERN
24"x10" RA 40 CFM	RETURN GRILLE, SIZE AND FLOW RATE LISTED
4"x10" EA 40 CFM	CEILING EXHAUST GRILLE, SIZE AND FLOW RATE LISTED
	RECTANGULAR SUPPLY AIR CROSS SECTION
	RECTANGULAR RETURN AIR CROSS SECTION
	BALANCING DAMPER
10"ø	RIGID DUCT
10"ø	FLEXIBLE DUCT
CFM	CUBIC FEET PER MINUTE
EF	EXHAUST FAN
RA	RETURN AIR
SA	SUPPLY AIR
FC	FAN COIL UNIT
HP	HEAT PUMP

HVAC EQUIPMENT SCHEDULE

		COOLING			HEATING		FAN			ELECT.							
SYMBOL	AREA SERVED	TOTAL (BTU/HR)	SENSIBLE (BTU/HR)	COIL EDB/EWB (°F)	HIGH INPUT/OUTPUT (BTU/HR)	DB (°F)	CFM	S.P. (WC)	O.A. (CFM) (MIN)	VOLTAGE	MCA	COMP. LRA	FUSE/MOCP	MFGR & MODEL NO.	WEIGHT (LBS)	EFFICIENCY	REMARKS
FC-1	HOUSE	24,000	17,500	80/65	27,000	47	800	0-0.80	---	(1)	2.10	---	(1)	FUJITSU # ARU24RGLX	93	---	INDOOR HEAT PUMP MEDIUM STATIC FANCOIL UNIT DIMENSIONS: H=11-13/16", W=39-3/8", D=24-13/32" FAN SET AT HIGH SPEED 34 dBA
HP-1	HOUSE	24,000	17,500	80/65	27,000	47	---	---	---	208/230 V. 1 PHASE	20.8	---	30	FUJITSU # AOU24RGLX	134	HSPF2 = 10.8 SEER2 = 17.5 EER2= 12.6	SINGLE ZONE HIGH HEAT GROUND MOUNTED OUTDOOR HEAT PUMP DIMENSIONS: H=32-11/16", W=35-7/16", D=13"

NOTES:
(1) ELECTRICAL FOR INDOOR UNITS, FC-#, WILL BE PROVIDED BY OUTDOOR UNIT HP-#.
(2) FLOAT SWITCH FOR AIR HANDLER WILL INTERRUPT POWER TO THE FANCOIL UNIT WHEN MOISTURE IS DETECTED IN THE DRAIN PAN. THIS SATISFIES THE REQUIREMENT FOR SECONDARY CONDENSATE.

EXHAUST FAN SCHEDULE

			COOLING	FAN			ELECT.						
SYMBOL	QTY.	AREA SERVED	DESCRIPTION	CFM	S.P. (WC)	RPM	VOLTAGE	BHP	WATTS	MFGR & MODEL NO.	WEIGHT (LBS)	SONES	REMARKS
EF-1	1	BATH	CEILING CABINET FAN/LIGHT	80	0.25	---	115 V. 1 PHASE	---	5.1	PANASONIC WHISPERGREEN™ FV-05-11VKSL2	10	0.4	FAN SHALL BE SET FOR 40 CFM CONTINUOUS VENTILATION. REFER TO NOTE (2). AIRFLOW INDICATED IS SETTING FOR "BOOST" AIRFLOW. PROVIDE CONDENSATION SENSOR ACCESSORY #FVCSVK1 FAN SHALL HAVE 4" DIA. DUCT CONNECTION INCLUDES 10 W DIMMABLE LED LIGHT
EF-2	1	LAUNDRY	CEILING CABINET FAN	50	0.25	---	115 V. 1 PHASE	---	3.1	PANASONIC WHISPERGREEN™ FV-0511VK2	11	<0.3	UNIT HAS BUILT-IN BACKDRAFT DAMPER EXHAUST FAN SHALL HAVE 4" DUCT CONNECTION INSTALL CONDENSATION SENSOR MODULE FOR HUMIDITY CONTROL PROVIDE OVERRIDE CONTROL WITH SEPARATE SWITCH SELECT DESIRED AIRFLOW (50-80-110 CFM)

NOTES:
(1) INSTALL/MOUNT EXHAUST FANS ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
(2) THE CONTINUOUS FLOW RATE OF EXHAUST FANS EF-1 IS 40 CFM. THIS MEETS THE REQUIRED VENTILATION ACCORDING TO ASHRAE STANDARD 62.2 FLR. AREA x .03 + (7.5 x (# OF BEDROOMS +1)); 661 x .03 + (7.5 x 2)= 35 CFM
(3) ALL BATHROOM AND LAUNDRY ROOM EXHAUST FANS SHALL HAVE A MINIMUM RATE OF 50 CFM INTERMITTENT OR 20 CFM CONTINUOUS.

HVAC SYSTEM SUMMARY

HVAC SYSTEM SUMMARY

1) DESIGN SUPPLY DUCTING SUCH THAT AIR FLOW RATES DO NOT EXCEED A FRICTION OF 0.08 INCHES WATER PER 100'. SEE TABLE BELOW.

DUCT DIA. (INCHES)	FLEX DUCT AIR FLOW RANGE (CFM)	SHEET METAL DUCT AIR FLOW RANGE (CFM)
6	0-80	0-100
8	80-160	100-200
10	160-240	200-360
12	240-420	360-600
14	420-700	600-900
16	700-1000	900-1250
18	1000-1450	1250-1750
20	1450-2000	1750-2300

NOTES
a) WHEN USING FLEX DUCT AS LEADERS (10 FT. MAX.) TO AND FROM AIR TERMINALS USE SAME SIZE AS SHEET METAL DUCT.

2) DESIGN RETURN AIR DUCTING SUCH THAT AIR FLOW RATES DO NOT EXCEED A FRICTION OF 0.06 INCHES WATER PER 100'. SEE TABLE BELOW.

DUCT DIA. (INCHES)	FLEX DUCT AIR FLOW RANGE (CFM)	SHEET METAL DUCT AIR FLOW RANGE (CFM)
6	0-60	0-80
8	60-130	80-170
10	130-230	170-300
12	230-360	300-500
14	360-540	500-800
16	540-750	800-1100
18	750-1200	1100-1500
20	1200-1600	1500-2000

3) SUPPLY AIR DIFFUSERS SHALL BE SIZED FOR A FACE VELOCITY NOT TO EXCEED 600 FPM.
4) RETURN AIR GRILLES SHALL BE SIZED FOR A FACE VELOCITY NOT TO EXCEED 400 FPM.
5) INSTALL DIFFUSERS AND GRILLES WHERE INDICATED ON MECHANICAL DRAWINGS. SUPPLY DIFFUSERS AND RETURN GRILLES SHALL SHOEMAKER, OR EQUAL AS FOLLOWS:

TYPE	MODEL #	REMARKS
CEILING - SA	SCB	STEEL CURVED BLADE DIFFUSER THROW PATTERN INDICATED ON PLANS
CEILING/SIDEWALL RA	FG2	LOUVERED 2" FILTER GRILLE

6) HEATING - DUCTED HEAT PUMP; HSPF2 ≥ 10.5
7) COOLING - DUCTED HEAT PUMP; SEER2 ≥ 17.0, EER2 ≥ 12.5
8) PROVIDE ANCHORAGE FOR ALL HVAC UNITS PER CMC 303.4
9) DUCTING
- WHEN USING FLEX DUCT, MINIMIZE BENDS AND FULLY EXTEND THE DUCT IN ORDER TO MINIMIZE FRICTION LOSSES. FLEX DUCT INSULATION SHALL BE R-8.0 (MIN.).
- WHERE TURNS AND/OR TRANSITIONS EXCEED 45 DEGREES USE SHEET METAL FITTINGS AND ELBOWS. PROVIDE SHEET METAL SLEEVES FOR ALL SPLICES.
- FLEX DUCTING SHALL BE SUPPORTED AT 4 FEET INTERVALS (MAX.). EACH SUPPORT SHALL ONLY SUPPORT ONE DUCT.
- ALL TAPES AND MASTIC SEALANTS SHALL COMPLY WITH UL181, UL 181A, OR UL181B.

10) DUCT LAYOUT MEETS THE CRITERIA LISTED ABOVE.
11) KITCHEN COOKTOP EXHAUST HOOD/FAN SHALL HAVE A MINIMUM RATE OF 100 CFM.
12) ALL DRYER, KITCHEN, AND BATHROOM EXHAUST DUCTS ARE REQUIRED TO TERMINATE 3' MIN. FROM DOOR/WINDOWS.
13) PROVIDE MOISTURE EXHAUST DUCT FOR THE CLOTHES DRYER TO THE OUTSIDE. THE DUCT SHALL BE OF METAL OR APPROVED MATERIAL WITH SMOOTH SURFACE WITH MINIMUM 4 INCHES IN DIAMETER. CMC 504.3.
14) EXHAUST DUCTING FROM DRYER SHALL BE EQUIPPED WITH A LISTED BACK DRAFT DAMPER AT OUTSIDE TERMINATION. R304.4
15) HEATING AND COOLING LOADS AND ROOM AIRFLOWS HAVE BEEN CALCULATED ACCORDING TO ASHRAE METHOD. SUPPLY AIR QUANTITIES ARE TO BE DIVIDED INTO THE VARIOUS ROOMS ACCORDING TO THE FRACTIONS BELOW, BASED ON 400 CFM PER TON.

ROOM NAME	AIR BALANCE AIRFLOW (CFM)
FOYER	80
LIVING	230
KITCHEN	130
DINING	60
BEDROOM	230
BATHROOM	70
TOTAL	800

•THE ABOVE AIRFLOW CALCULATIONS AND CORRESPONDING DUCT DESIGN ARE BASED ON A 2 TON COOLING CAPACITY. THE DUCT SYSTEM IS UNDERSIZED FOR A LARGER UNIT. PLEASE CONTACT US FOR REVISED CALCULATION AND DUCT LAYOUT IF A LARGER SYSTEM IS DESIRED.

GAS SYMBOLS AND LEGEND

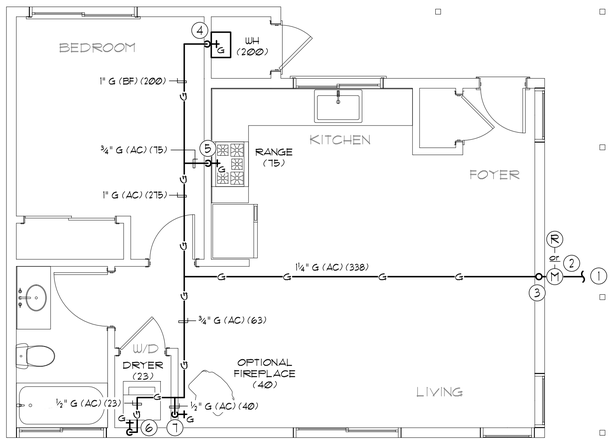
AC	ABOVE CEILING
BF	BELOW FLOOR
M	GAS METER
R	GAS REGULATOR
G	GAS SHUT-OFF BIBB
½" G (BF) (95)	GAS PIPING, SIZE LISTED W/ KBTU/hr IN PARENTHESES

GAS PIPING NOTES

1. GAS PIPING SIZED ACCORDING TO TABLE 1215.2(2') OF THE 2022 CPC. PIPE SIZING FOR UNDILUTED PROPANE AT 11 INW.C. WITH PRESSURE DROP = 0.5 INW.C. OR GAS PIPING SIZED ACCORDING TO TABLE 1215.2(1) OF THE 2022 CPC. PIPE SIZING FOR NATURAL GAS LESS THAN 2 PSI WITH PRESSURE DROP = 0.5 INW.C.
2. DISTANCE FROM METER TO FURTHEST APPLIANCE = 30 FEET. FITTING EQUIVALENT LENGTH = 16 FEET. USE 50 FEET ROW IN TABLE 1215.2(2'). OR USE 50 FEET ROW IN TABLE 1215.2(1).
3. GAS PIPING SHALL SCHEDULE 40 BLACK STEEL.
4. PROVIDE SHUTOFF VALVES OR STOPS AT EACH CONNECTION WITHIN 6 FEET OF APPLIANCE. AT GAS CONNECTIONS, PROVIDE GAS COCK, DIRT LEG, UNION AND FLEX CONNECTION.
5. MAIN GAS SHUT OFF TO THE BUILDING SHALL BE IDENTIFIED WITH PERMANENT ALL WEATHER SIGNAGE STATING "MAIN GAS SHUT OFF". INSTALL LINE SIZED SHUT-OFF DOWNSTREAM OF REGULATOR WHERE GAS ENTERS THE BUILDING.
6. PROVIDE A PROPANE DRAIN AT LOW POINT IN CRAWLSPACE. DRAIN SHALL EXTEND OUTSIDE BUILDING FOOTPRINT A MINIMUM OF 10 FEET. PROVIDE UNOBSTRUCTED TERMINATION TO DAYLIGHT. TERMINATION SHALL BE PROTECTED FROM BLOCKAGE.

GAS PIPING KEYED NOTES

1. ¾" @ 150 PSI PROPANE LINE TO PROPANE TANK FOR PROPANE ONLY.
2. GAS REGULATOR SHALL REDUCE PRESSURE TO 11 INW.C. PROVIDE 36" SIDE CLEARANCE TO ELECTRIC EQUIPMENT AND 8' SIDE CLEARANCE TO COMBUSTION AIR INTAKE FOR PROPANE ONLY.
3. 1-1/4" GAS PIPE RISER TO ATTIC FROM REGULATOR OR METER.
4. 1" GAS DROP TO WATER HEATER IN MECH ROOM. (200 KBTU/HR)
5. 3/4" GAS DROP TO RANGE. (75 KBTU/HR)
6. 1/2" GAS DROP TO DRYER. (23 KBTU/HR)
7. 1/2" GAS DROP TO OPTIONAL FIREPLACE. (40 KBTU/HR)

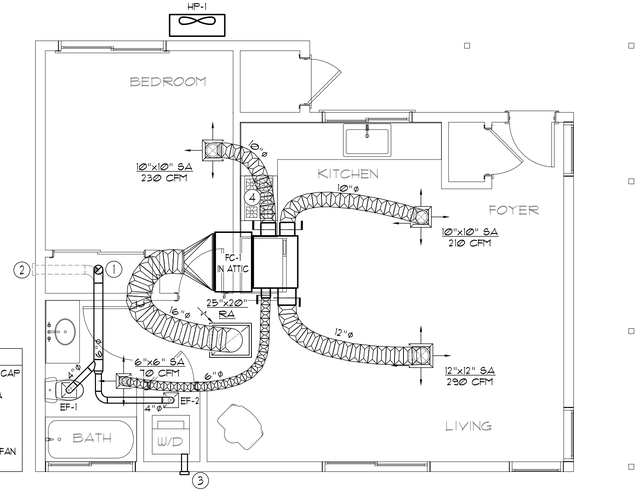


GAS PIPING FLOOR PLAN

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

HVAC KEYED NOTES

1. 6"ø EA DUCT RISER THROUGH ROOF TO ROOF CAP
2. AT HIGHER ELEVATIONS WITH HIGHER SNOW LOADS, IF REQUIRED BY CODE, TERMINATE EA DUCT THOUGH SIDE WALL WITH WALL CAP
3. 4"ø DRYER VENT WITH BACKDRAFT DAMPER. PROVIDE MIN. 36" CLEARANCE TO OPERABLE PORTION OF WINDOWS
4. PROVIDE KITCHEN COOKTOP EXHAUST HOOD/FAN WITH A MINIMUM RATE OF 100 CFM.



HVAC FLOOR PLAN

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

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MELAS ENERGY ENGINEERING

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REGISTERED PROFESSIONAL ENGINEER — JAMES C. MELAS — No. 26789 — EXP. 9/30/24 — MECHANICAL — STATE OF CALIFORNIA

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

MECHANICAL PLAN (ZONE 16 / SLAB / DUCTED)

MP1.1

HVAC LEGEND	
⊠	CEILING EXHAUST FAN
HP	HEAT PUMP UNIT
FC	FANCOIL UNIT

HVAC EQUIPMENT SCHEDULE

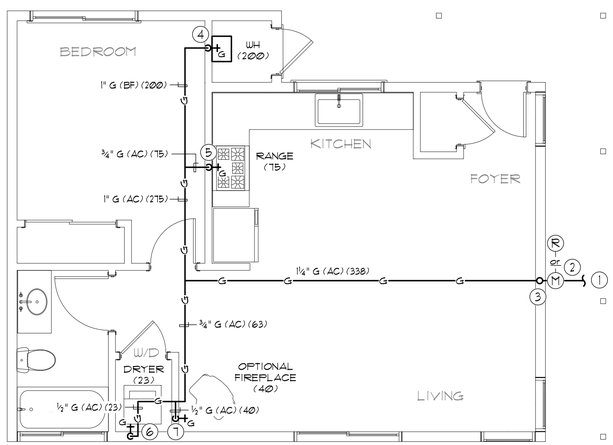
		COOLING			HEATING		FAN			ELECT.							
SYMBOL	AREA SERVED	TOTAL (BTU/HR)	SENSIBLE (BTU/HR)	COIL EDB/EWB (°F)	HIGH INPUT/OUTPUT (BTU/HR)	DB (°F)	CFM	S.P. (WC)	O.A. (CFM) (MIN)	VOLTAGE	MCA	COMP. LRA	FUSE/MOCP	MFGR & MODEL NO.	WEIGHT (LBS)	EFFICIENCY	REMARKS
FC-1A	LIVING AREA	12,000	9,500	80/65	12,800	47	412	0.36	---	(1)	0.35	---	(1)	FUJITSU # ASUH12LPAS	22	---	INDOOR HEAT PUMP WALL UNIT DIMENSIONS: H=10-5/8", W=32-13/16", D=9-3/4" FAN SET AT HIGH SPEED 40dBA PROVIDE CONDENSATE PUMP (3)
FC-1B	BEDROOM	9,000	5,000	80/65	9,600	47	412	---	---	(1)	0.20	---	(1)	FUJITSU # ASUH09LPAS	21	---	INDOOR HEAT PUMP WALL UNIT DIMENSIONS: H=10-5/8", W=32-13/16", D=8-3/4" FAN SET AT HIGH SPEED 40dBA PROVIDE CONDENSATE PUMP (3)
HP-1	HOUSE	18,000	12,500	80/65	21,600	47	---	---	---	208/230 V. 1 PHASE	17.4	---	20	FUJITSU # AOU18RLXFZH	95	HSPF2 = 9.6 SEER2 = 20.5 EER2 = 13.5	MULTI ZONE HIGH HEAT GROUND MOUNTED OUTDOOR HEAT PUMP DIMENSIONS: H=32-11/16", W=35-7/16", D=13"

NOTES:
(1) ELECTRICAL FOR INDOOR UNITS, FC-#, WILL BE PROVIDED BY OUTDOOR UNIT HP-#.
(2) FLOAT SWITCH FOR AIR HANDLER WILL INTERRUPT POWER TO THE FANCOIL UNIT WHEN MOISTURE IS DETECTED IN THE DRAIN PAN. THIS SATISFIES THE REQUIREMENT FOR SECONDARY CONDENSATE.
(3) CONDENSATE PUMP SHALL BE GOBI II, MANUFACTURED BY REFCO. SPECIFICATIONS: 1.5 GPH, HEAD=65 FT, 1.3 LBS, 20 DBA

EXHAUST FAN SCHEDULE

			COOLING	FAN			ELECT.						
SYMBOL	QTY.	AREA SERVED	DESCRIPTION	CFM	S.P. (WC)	RPM	VOLTAGE	BHP	WATTS	MFGR & MODEL NO.	WEIGHT (LBS)	SONES	REMARKS
EF-1	1	BATH	CEILING CABINET FAN/LIGHT	80	0.25	---	115 V. 1 PHASE	---	5.1	PANASONIC WHISPERGREEN™ FV-05-11VKSL2	10	0.4	FAN SHALL BE SET FOR ***40 CFM CONTINUOUS*** VENTILATION. REFER TO NOTE (2). AIRFLOW INDICATED IS SETTING FOR "BOOST" AIRFLOW. PROVIDE CONDENSATION SENSOR ACCESSORY #FVCSVK1 FAN SHALL HAVE 4" DIA. DUCT CONNECTION INCLUDES 10 W DIMMABLE LED LIGHT
EF-2	1	LAUNDRY	CEILING CABINET FAN	50	0.25	---	115 V. 1 PHASE	---	3.1	PANASONIC WHISPERGREEN™ FV-0511VK2	11	<0.3	UNIT HAS BUILT-IN BACKDRAFT DAMPER EXHAUST FAN SHALL HAVE 4" DUCT CONNECTION INSTALL CONDENSATION SENSOR MODULE FOR HUMIDITY CONTROL PROVIDE OVERRIDE CONTROL WITH SEPARATE SWITCH SELECT DESIRED AIRFLOW (50-80-110 CFM)

NOTES:
(1) INSTALL/MOUNT EXHAUST FANS ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
(2) THE CONTINUOUS FLOW RATE OF EXHAUST FANS EF-1 IS 40 CFM. THIS MEETS THE REQUIRED VENTILATION ACCORDING TO ASHRAE STANDARD 62.2 FLR. AREA x .03 + (7.5 x (# OF BEDROOMS +1)); 661 x .03 + (7.5 x 2)= 35 CFM
(3) ALL BATHROOM AND LAUNDRY ROOM EXHAUST FANS SHALL HAVE A MINIMUM RATE OF 50 CFM INTERMITTENT OR 20 CFM CONTINUOUS.



GAS PIPING FLOOR PLAN

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

GAS SYMBOLS AND LEGEND

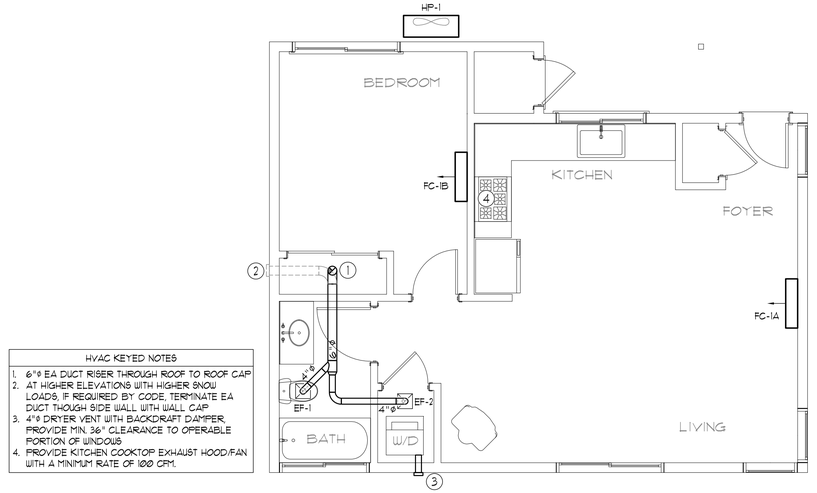
AC	ABOVE CEILING
BF	BELOW FLOOR
Ⓜ	GAS METER
Ⓡ	GAS REGULATOR
G	GAS SHUT-OFF BIBB
½" G (BF) (95)	GAS PIPING, SIZE LISTED W/ KBTU/hr IN PARENTHESES

GAS PIPING NOTES

1. GAS PIPING SIZED ACCORDING TO TABLE 1215.2(27) OF THE 2022 CPC. PIPE SIZING FOR UNDILUTED PROPANE AT 11 INWC. WITH PRESSURE DROP = Ø.5 INWC. OR GAS PIPING SIZED ACCORDING TO TABLE 1215.2(1) OF THE 2022 CPC. PIPE SIZING FOR NATURAL GAS LESS THAN 2 PSI WITH PRESSURE DROP = Ø.5 INWC.
2. DISTANCE FROM METER TO FURTHEST APPLIANCE = 30 FEET. FITTING EQUIVALENT LENGTH = 16 FEET. USE 50 FEET ROW IN TABLE 1215.2(27). OR USE 50 FEET ROW IN TABLE 1215.2(1).
3. GAS PIPING SHALL SCHEDULE 40 BLACK STEEL.
4. PROVIDE SHUTOFF VALVES OR STOPS AT EACH CONNECTION WITHIN 6 FEET OF APPLIANCE AT GAS CONNECTIONS, PROVIDE GAS COCK, DIRT LEG, UNION AND FLEX CONNECTION.
5. MAIN GAS SHUT OFF TO THE BUILDING SHALL BE IDENTIFIED WITH PERMANENT ALL WEATHER SIGNAGE STATING "MAIN GAS SHUT OFF". INSTALL LINE SIZED SHUT-OFF DOWNSTREAM OF REGULATOR WHERE GAS ENTERS THE BUILDING.
6. PROVIDE A PROPANE DRAIN AT LOW POINT IN CRAWLSPACE. DRAIN SHALL EXTEND OUTSIDE BUILDING FOOTPRINT A MINIMUM OF 10 FEET. PROVIDE UNOBSTRUCTED TERMINATION TO DAYLIGHT. TERMINATION SHALL BE PROTECTED FROM BLOCKAGE.

GAS PIPING KEYED NOTES

1. ¾" 10 PSI PROPANE LINE TO PROPANE TANK FOR PROPANE ONLY.
2. GAS REGULATOR SHALL REDUCE PRESSURE TO 11 INWC. PROVIDE 36" SIDE CLEARANCE TO ELECTRIC EQUIPMENT AND 8' SIDE CLEARANCE TO COMBUSTION AIR INTAKE FOR PROPANE ONLY.
3. 1-1/4" GAS PIPE RISER TO ATTIC FROM REGULATOR OR METER.
4. 1" GAS DROP TO WATER HEATER IN MECH ROOM. (100 KBTU/HR)
5. 3/4" GAS DROP TO RANGE. (75 KBTU/HR)
6. 1/2" GAS DROP TO DRYER. (23 KBTU/HR)
7. 1/2" GAS DROP TO OPTIONAL FIREPLACE. (40 KBTU/HR)



HVAC KEYED NOTES

1. 6"ø EA DUCT RISER THROUGH ROOF TO ROOF CAP
2. AT HIGHER ELEVATIONS WITH HIGHER SNOW LOADS, IF REQUIRED BY CODE, TERMINATE EA DUCT THOUGH SIDE WALL WITH WALL CAP
3. 4"ø DRYER VENT WITH BACKDRAFT DAMPER, PROVIDE MIN. 36" CLEARANCE TO OPERABLE PORTION OF WINDOWS
4. PROVIDE KITCHEN COOKTOP EXHAUST HOOD/FAN WITH A MINIMUM RATE OF 100 CFM.

HVAC FLOOR PLAN

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

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing



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PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

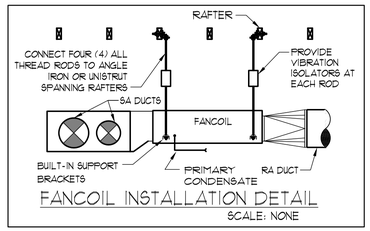
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

MECHANICAL PLAN (ZONE 16 / SLAB / DUCTLESS)

MP1.2



FANCOIL INSTALLATION DETAIL

SCALE: NONE

PLOT AT 1/4"

HVAC LEGEND

12"x6" SA 40 CFM	SUPPLY DIFFUSER, SIZE AND FLOW RATE LISTED ARROWS INDICATE THROW PATTERN
24"x10" RA 40 CFM	RETURN GRILLE, SIZE AND FLOW RATE LISTED
4"x10" EA 40 CFM	CEILING EXHAUST GRILLE, SIZE AND FLOW RATE LISTED
	RECTANGULAR SUPPLY AIR CROSS SECTION
	RECTANGULAR RETURN AIR CROSS SECTION
	BALANCING DAMPER
10"ø	RIGID DUCT
10"ø	FLEXIBLE DUCT
CFM	CUBIC FEET PER MINUTE
EF	EXHAUST FAN
RA	RETURN AIR
SA	SUPPLY AIR
FC	FAN COIL UNIT
HP	HEAT PUMP

HVAC SYSTEM SUMMARY

HVAC SYSTEM SUMMARY

1) DESIGN SUPPLY DUCTING SUCH THAT AIR FLOW RATES DO NOT EXCEED A FRICTION OF 0.08 INCHES WATER PER 100'. SEE TABLE BELOW.

DUCT DIA. (INCHES)	FLEX DUCT AIR FLOW RANGE (CFM)	SHEET METAL DUCT AIR FLOW RANGE (CFM)
6	0-80	0-100
8	80-160	100-200
10	160-240	200-360
12	240-420	360-600
14	420-700	600-900
16	700-1000	900-1250
18	1000-1450	1250-1750
20	1450-2000	1750-2300

NOTES

a) WHEN USING FLEX DUCT AS LEADERS (10 FT. MAX.) TO AND FROM AIR TERMINALS USE SAME SIZE AS SHEET METAL DUCT.

2) DESIGN RETURN AIR DUCTING SUCH THAT AIR FLOW RATES DO NOT EXCEED A FRICTION OF 0.06 INCHES WATER PER 100'. SEE TABLE BELOW.

DUCT DIA. (INCHES)	FLEX DUCT AIR FLOW RANGE (CFM)	SHEET METAL DUCT AIR FLOW RANGE (CFM)
6	0-60	0-80
8	60-130	80-170
10	130-230	170-300
12	230-360	300-500
14	360-540	500-800
16	540-750	800-1100
18	750-1200	1100-1500
20	1200-1600	1500-2000

3) SUPPLY AIR DIFFUSERS SHALL BE SIZED FOR A FACE VELOCITY NOT TO EXCEED 600 FPM.
4) RETURN AIR GRILLES SHALL BE SIZED FOR A FACE VELOCITY NOT TO EXCEED 400 FPM.
5) INSTALL DIFFUSERS AND GRILLES WHERE INDICATED ON MECHANICAL DRAWINGS. SUPPLY DIFFUSERS AND RETURN GRILLES SHALL SHOEMAKER, OR EQUAL AS FOLLOWS:

TYPE	MODEL #	REMARKS
CEILING - SA	SCB	STEEL CURVED BLADE DIFFUSER THROW PATTERN INDICATED ON PLANS
CEILING/SIDEWALL RA	FG2	LOUVERED 2" FILTER GRILLE

6) HEATING - DUCTED HEAT PUMP; HSPF2 ≥ 10.5
7) COOLING - DUCTED HEAT PUMP; SEER2 ≥ 17.0, EER2 ≥ 12.3
8) PROVIDE ANCHORAGE FOR ALL HVAC UNITS PER CMC 303.4
9) DUCTING
- WHEN USING FLEX DUCT, MINIMIZE BENDS AND FULLY EXTEND THE DUCT IN ORDER TO MINIMIZE FRICTION LOSSES. FLEX DUCT INSULATION SHALL BE R-8.0 (MIN.).
- WHERE TURNS AND/OR TRANSITIONS EXCEED 45 DEGREES USE SHEET METAL FITTINGS AND ELBOWS. PROVIDE SHEET METAL SLEEVES FOR ALL SPLICES.
- FLEX DUCTING SHALL BE SUPPORTED AT 4 FEET INTERVALS (MAX.). EACH SUPPORT SHALL ONLY SUPPORT ONE DUCT.
- ALL TAPES AND MASTIC SEALANTS SHALL COMPLY WITH UL181, UL 181A, OR UL181B.

10) DUCT LAYOUT MEETS THE CRITERIA LISTED ABOVE.
11) KITCHEN COOKTOP EXHAUST HOOD/FAN SHALL HAVE A MINIMUM RATE OF 100 CFM.
12) ALL DRYER, KITCHEN, AND BATHROOM EXHAUST DUCTS ARE REQUIRED TO TERMINATE 3' MIN FROM DOOR/WINDOWS.
13) PROVIDE MOISTURE EXHAUST DUCT FOR THE CLOTHES DRYER TO THE OUTSIDE. THE DUCT SHALL BE OF METAL OR APPROVED MATERIAL WITH SMOOTH SURFACE WITH MINIMUM 4 INCHES IN DIAMETER. CMC 504.3.
14) EXHAUST DUCTING FROM DRYER SHALL BE EQUIPPED WITH A LISTED BACK DRAFT DAMPER AT OUTSIDE TERMINATION. R304.4
15) HEATING AND COOLING LOADS AND ROOM AIRFLOWS HAVE BEEN CALCULATED ACCORDING TO ASHRAE METHOD. SUPPLY AIR QUANTITIES ARE TO BE DIVIDED INTO THE VARIOUS ROOMS ACCORDING TO THE FRACTIONS BELOW, BASED ON 400 CFM PER TON.

ROOM NAME	AIR BALANCE AIRFLOW (CFM)
FOYER	80
LIVING	230
KITCHEN	130
DINING	60
BEDROOM	230
BATHROOM	70
TOTAL	800

*THE ABOVE AIRFLOW CALCULATIONS AND CORRESPONDING DUCT DESIGN ARE BASED ON A 2 TON COOLING CAPACITY. THE DUCT SYSTEM IS UNDERSIZED FOR A LARGER UNIT. PLEASE CONTACT US FOR REVISED CALCULATION AND DUCT LAYOUT IF A LARGER SYSTEM IS DESIRED.

HVAC EQUIPMENT SCHEDULE

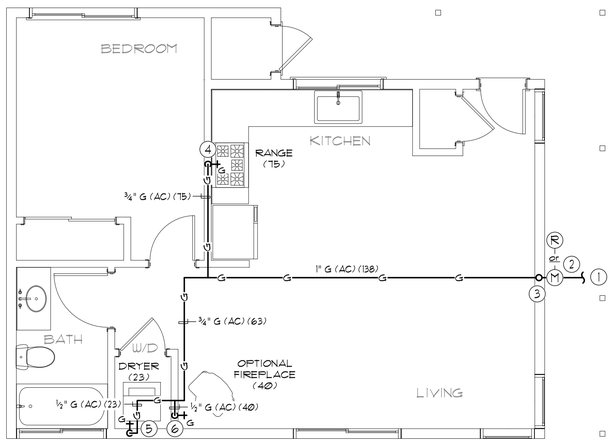
SYMBOL	AREA SERVED	COOLING TOTAL (BTU/HR)	COOLING SENSIBLE (BTU/HR)	COOLING COIL EDB/EWB (°F)	HEATING HIGH INPUT/OUTPUT (BTU/HR)	HEATING DB (°F)	FAN CFM	FAN S.P. (WC)	FAN O.A. (CFM) (MIN)	ELECT. VOLTAGE	ELECT. MCA	ELECT. COMP. LRA	ELECT. FUSE/MOCP	MFGR & MODEL NO.	WEIGHT (LBS)	EFFICIENCY	REMARKS
FC-1	HOUSE	24,000	17,500	80/65	27,000	47	800	0-0.80	---	(1)	2.10	---	(1)	FUJITSU # ARU24RGLX	93	---	INDOOR HEAT PUMP MEDIUM STATIC FANCOIL UNIT DIMENSIONS: H=11-13/16", W=39-3/8", D=24-13/32" FAN SET AT HIGH SPEED 34 dBA
HP-1	HOUSE	24,000	17,500	80/65	27,000	47	---	---	---	208/230 V. 1 PHASE	20.8	---	30	FUJITSU # AOU24RGLX	134	HSPF2 = 10.8 SEER2 = 17.5 EER2= 12.6	SINGLE ZONE HIGH HEAT GROUND MOUNTED OUTDOOR HEAT PUMP DIMENSIONS: H=32-11/16", W=35-7/16", D=13"

NOTES:
(1) ELECTRICAL FOR INDOOR UNITS, FC-#, WILL BE PROVIDED BY OUTDOOR UNIT HP-#.
(2) FLOAT SWITCH FOR AIR HANDLER WILL INTERRUPT POWER TO THE FANCOIL UNIT WHEN MOISTURE IS DETECTED IN THE DRAIN PAN. THIS SATISFIES THE REQUIREMENT FOR SECONDARY CONDENSATE.

EXHAUST FAN SCHEDULE

SYMBOL	QTY.	AREA SERVED	COOLING DESCRIPTION	FAN CFM	FAN S.P. (WC)	FAN RPM	ELECT. VOLTAGE	ELECT. BHP	ELECT. WATTS	MFGR & MODEL NO.	WEIGHT (LBS)	SONES	REMARKS
EF-1	1	BATH	CEILING CABINET FAN/LIGHT	80	0.25	---	115 V. 1 PHASE	---	5.1	PANASONIC WHISPERGREEN™ FV-05-11VKSL2	10	0.4	FAN SHALL BE SET FOR ***40 CFM CONTINUOUS*** VENTILATION. REFER TO NOTE (2). AIRFLOW INDICATED IS SETTING FOR "BOOST" AIRFLOW. PROVIDE CONDENSATION SENSOR ACCESSORY #FVCSVK1 FAN SHALL HAVE 4" DIA. DUCT CONNECTION INCLUDES 10 W DIMMABLE LED LIGHT
EF-2	1	LAUNDRY	CEILING CABINET FAN	50	0.25	---	115 V. 1 PHASE	---	3.1	PANASONIC WHISPERGREEN™ FV-0511VK2	11	<0.3	UNIT HAS BUILT-IN BACKDRAFT DAMPER EXHAUST FAN SHALL HAVE 4" DUCT CONNECTION INSTALL CONDENSATION SENSOR MODULE FOR HUMIDITY CONTROL PROVIDE OVERRIDE CONTROL WITH SEPARATE SWITCH SELECT DESIRED AIRFLOW (50-80-110 CFM)

NOTES:
(1) INSTALL/MOUNT EXHAUST FANS ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
(2) THE CONTINUOUS FLOW RATE OF EXHAUST FANS EF-1 IS 40 CFM. THIS MEETS THE REQUIRED VENTILATION ACCORDING TO ASHRAE STANDARD 62.2 FLR. AREA x .03 + (7.5 x (# OF BEDROOMS +1)); 661 x .03 + (7.5 x 2)= 35 CFM
(3) ALL BATHROOM AND LAUNDRY ROOM EXHAUST FANS SHALL HAVE A MINIMUM RATE OF 50 CFM INTERMITTENT OR 20 CFM CONTINUOUS.



GAS PIPING FLOOR PLAN HP/FC

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

GAS SYMBOLS AND LEGEND

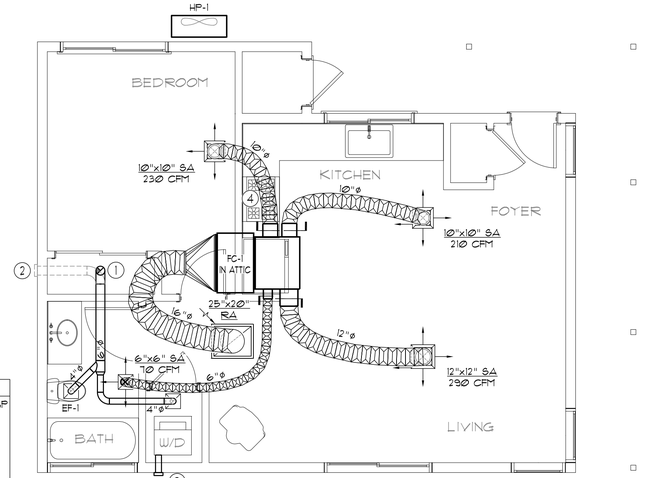
AC	ABOVE CEILING
BF	BELOW FLOOR
M	GAS METER
R	GAS REGULATOR
G	GAS SHUT-OFF BIBB
½" G (BF) (95)	GAS PIPING, SIZE LISTED W/ KBTU/hr IN PARENTHESES

GAS PIPING NOTES

1. GAS PIPING SIZED ACCORDING TO TABLE 1215.2(2?) OF THE 2022 CPC. PIPE SIZING FOR UNDILUTED PROPANE AT 11 INWC, WITH PRESSURE DROP = .05 INWC, OR
   GAS PIPING SIZED ACCORDING TO TABLE 1215.2(1) OF THE 2022 CPC. PIPE SIZING FOR NATURAL GAS LESS THAN 2 PSI WITH PRESSURE DROP = .05 INWC.
2. DISTANCE FROM METER TO FURTHEST APPLIANCE = 28 FEET. FITTING EQUIVALENT LENGTH = 23 FEET.
   USE 60 FEET ROW IN TABLE 1215.2(2?), OR
   USE 60 FEET ROW IN TABLE 1215.2(1).
3. GAS PIPING SHALL SCHEDULE 40 BLACK STEEL.
4. PROVIDE SHUTOFF VALVES OR STOPS AT EACH CONNECTION WITHIN 6 FEET OF APPLIANCE, AT GAS CONNECTIONS, PROVIDE GAS COCK, DIRT LEG, UNION AND FLEX CONNECTION.
5. MAIN GAS SHUT OFF TO THE BUILDING SHALL BE IDENTIFIED WITH PERMANENT ALL WEATHER SIGNAGE STATING "MAIN GAS SHUT OFF". INSTALL LINE SIZED SHUT-OFF DOWNSTREAM OF REGULATOR WHERE GAS ENTERS THE BUILDING.

GAS PIPING KEYED NOTES

1. ¾" Ø PSI PROPANE LINE TO PROPANE TANK FOR PROPANE ONLY.
2. GAS REGULATOR SHALL REDUCE PRESSURE TO 11 INWC. PROVIDE 36" SIDE CLEARANCE TO ELECTRIC EQUIPMENT AND 8' SIDE CLEARANCE TO COMBUSTION AIR INTAKE FOR PROPANE ONLY.
3. 1" GAS PIPE RISER TO ATTIC FROM REGULATOR OR METER.
4. 3/4" GAS DROP TO RANGE. (75 KBTU/HR)
5. 1/2" GAS DROP TO DRYER. (23 KBTU/HR)
6. 1/2" GAS DROP TO OPTIONAL FIREPLACE. (40 KBTU/HR)



HVAC FLOOR PLAN

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

HVAC KEYED NOTES

1. 6"ø EA DUCT RISER THROUGH ROOF TO ROOF CAP
2. AT HIGHER ELEVATIONS WITH HIGHER SNOW LOADS, IF REQUIRED BY CODE, TERMINATE EA DUCT THOUGH SIDE WALL WITH WALL CAP
3. 4"ø DRYER VENT WITH BACKDRAFT DAMPER, PROVIDE MIN. 36" CLEARANCE TO OPERABLE PORTION OF WINDOWS
4. PROVIDE KITCHEN RANGE EXHAUST HOOD/FAN WITH A MINIMUM RATE OF 100 CFM.

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1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

MECHANICAL PLAN (ZONE 11 & 16 / SLAB OR RAISED / DUCTED)

MP1.3

HVAC LEGEND

⊠	CEILING EXHAUST FAN
HP	HEAT PUMP UNIT
FC	FANCOIL UNIT

HVAC EQUIPMENT SCHEDULE

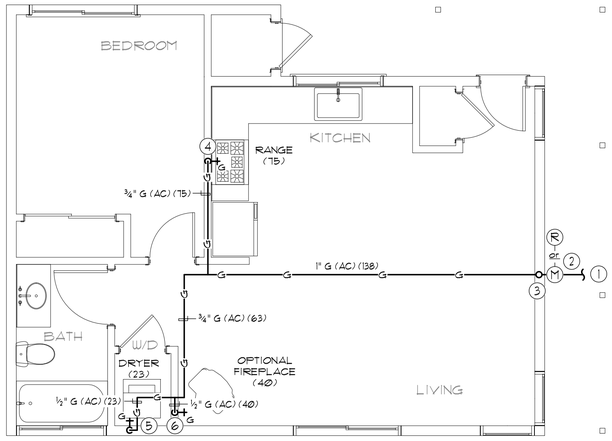
		COOLING			HEATING		FAN			ELECT.							
SYMBOL	AREA SERVED	TOTAL (BTU/HR)	SENSIBLE (BTU/HR)	COIL EDB/EWB (°F)	HIGH INPUT/OUTPUT (BTU/HR)	DB (°F)	CFM	S.P. (WC)	O.A. (CFM) (MIN)	VOLTAGE	MCA	COMP. LRA	FUSE/MOCP	MFGR & MODEL NO.	WEIGHT (LBS)	EFFICIENCY	REMARKS
FC-1A	LIVING AREA	12,000	9,500	80/65	12,800	47	412	0.36	---	(1)	0.35	---	(1)	FUJITSU # ASUH12LPAS	22	---	INDOOR HEAT PUMP WALL UNIT DIMENSIONS: H=10-5/8", W=32-13/16", D=9-3/4" FAN SET AT HIGH SPEED 40dBA PROVIDE CONDENSATE PUMP (3)
FC-1B	BEDROOM	9,000	5,000	80/65	9,600	47	412	---	---	(1)	0.20	---	(1)	FUJITSU # ASUH09LPAS	21	---	INDOOR HEAT PUMP WALL UNIT DIMENSIONS: H=10-5/8", W=32-13/16", D=8-3/4" FAN SET AT HIGH SPEED 40dBA PROVIDE CONDENSATE PUMP (3)
HP-1	HOUSE	18,000	12,500	80/65	21,600	47	---	---	---	208/230 V. 1 PHASE	17.4	---	20	FUJITSU # AOU18RLXFZH	95	HSPF2 = 9.6 SEER2 = 20.5 EER2 = 13.5	MULTI ZONE HIGH HEAT GROUND MOUNTED OUTDOOR HEAT PUMP DIMENSIONS: H=32-11/16", W=35-7/16", D=13"

NOTES:
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(3) CONDENSATE PUMP SHALL BE GOBI II, MANUFACTURED BY REFCO. SPECIFICATIONS: 1.5 GPH, HEAD=65 FT, 1.3 LBS, 20 DBA

EXHAUST FAN SCHEDULE

			COOLING	FAN			ELECT.						
SYMBOL	QTY.	AREA SERVED	DESCRIPTION	CFM	S.P. (WC)	RPM	VOLTAGE	BHP	WATTS	MFGR & MODEL NO.	WEIGHT (LBS)	SONES	REMARKS
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GAS PIPING FLOOR PLAN HP/FC

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

GAS SYMBOLS AND LEGEND

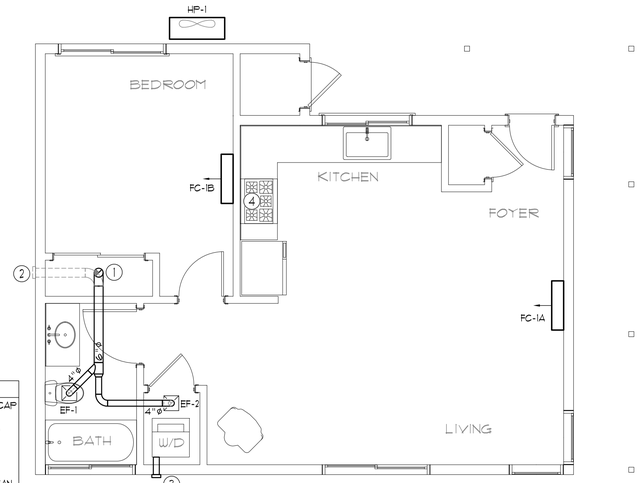
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2. AT HIGHER ELEVATIONS WITH HIGHER SNOW LOADS, IF REQUIRED BY CODE, TERMINATE EA DUCT THOUGH SIDE WALL WITH WALL CAP
3. 4"ø DRYER VENT WITH BACKDRAFT DAMPER. PROVIDE MIN. 36" CLEARANCE TO OPERABLE PORTION OF WINDOWS
4. PROVIDE KITCHEN COOKTOP EXHAUST HOOD/FAN WITH A MINIMUM RATE OF 100 CFM.

HVAC FLOOR PLAN

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

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing



YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

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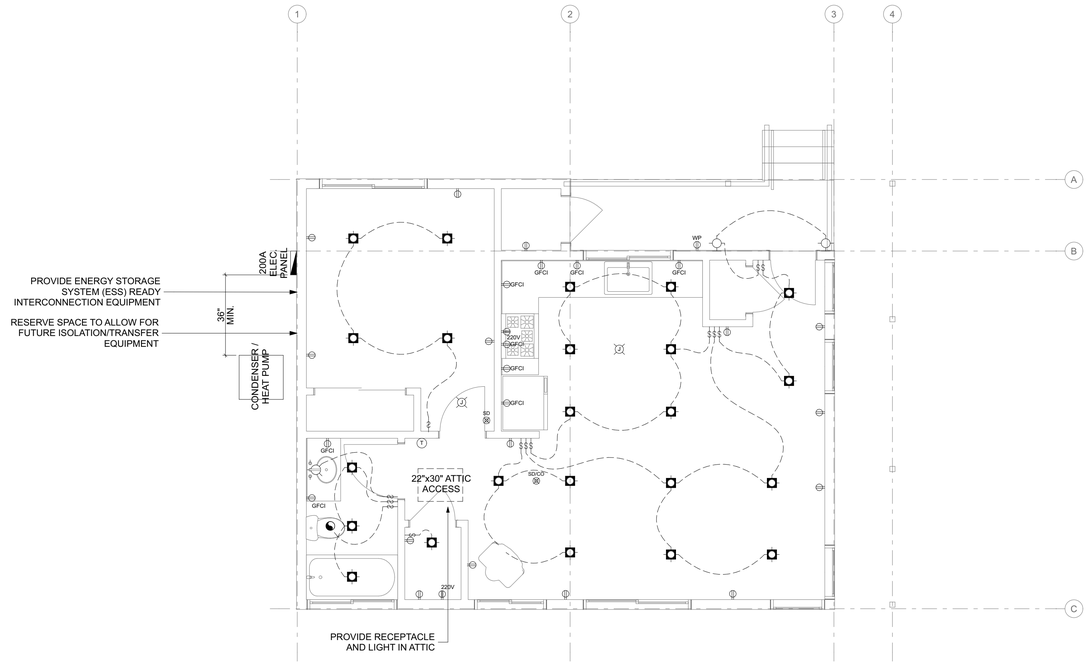
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

MECHANICAL PLAN (ZONE 11 & 16 / SLAB OR RAISED / DUCTED)

MP1.4



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

NOTES

1. REFER TO GENERAL NOTES ON G1.0
2. EXTERIOR LIGHTS AND BATHTUB/SHOWER LIGHT TO BE RATED FOR DAMP/WET LOCATION.
3. ELECTRICAL CLOTHES DRYER READY. SYSTEMS USING A GAS OR PROPANE DRYER SHALL INCLUDE A DEDICATED 240 VOLT BRANCH CIRCUIT WITH 3 FEET OF THE CLOTHES DRYER. THE BRANCH CIRCUIT SHALL BE RATED AT 30 AMPS MINIMUM. THE MAIN ELECTRICAL SERVICE SHALL HAVE A RESERVED SPACE TO ALLOW FOR THE INSTALLATION OF A DOUBLE POLE CIRCUIT BREAKER. THE RESERVED SPACE SHALL BE PERMANENTLY MARKED AS “FOR FUTURE 240V USE”.
4. READILY ACCESSIBLE, WALL MOUNTED DIMMER CONTROLS THAT ALLOW LIGHTING TO BE ADJUSTED UP AND DOWN ARE REQUIRED IN ALL HABITABLE SPACES. HABITABLE SPACES INCLUDE LIVING ROOMS, DINING ROOMS, KITCHENS, AND BEDROOMS. DIMMER NOT REQUIRED WHEN:

   AUTO-OFF SENSORS ARE UTILIZED FOR VACANCY/OCCUPANCY CONTROLS IN THE SPACE

   LUMINAIRES ARE CONNECTED TO A CIRCUIT WITH CONTROLLED LIGHTING POWER <20 WATTS.
5. IN BATHROOMS, GARAGES, WALK-IN CLOSET, LAUNDRY ROOMS, AND UTILITY ROOMS, AT LEAST ONE LUMINAIRE IN EACH OF THESE SPACES SHALL BE CONTROLLED BY A VACANCY SENSOR.
6. ENERGY STORAGE SYSTEM (ESS) READY. AT LEAST ONE OF THE FOLLOWING SHALL BE PROVIDED:

   ESS READY INTERCONNECTION EQUIPMENT WITH A MINIMUM BACKED-UP CAPACITY OF 60 AMPS AND A MINIMUM OF FOUR ESS-SUPPLIED BRANCH CIRCUITS, OR

   A DEDICATED RACEWAY FROM THE MAIN SERVICE PANEL TO A PANELBOARD (SUBPANEL) THAT SUPPLIES THE FOLLOWING BRANCH CIRCUITS: REFRIGERATOR, LIGHTING CIRCUIT NEAR PRIMARY EGRESS DOOR, SLEEPING ROOM RECEPTACLE AND ONE ADDITIONAL.
7. THE MAIN PANELBOARD SHALL HAVE A MINIMUM BUSBAR RATING OF 225 AMPS. SPACE SHALL BE RESERVED TO ALLOW FUTURE INSTALLATION OF A SYSTEM ISOLATION EQUIPMENT/TRANSFER SWITCH WITHIN 3 FEET OF THE MAIN PANELBOARD. RACEWAYS SHALL BE INSTALLED BETWEEN THE PANELBOARD AND THE SYSTEM ISOLATION EQUIPMENT TO ALLOW THE CONNECTION OF BACKUP POWER SOURCE.
8. ENERGY STORAGE SYSTEMS SHALL ONLY BE INSTALLED IN DETACHED GARAGES AND ACCESSORY STRUCTURES, ATTACHED GARAGES, OUTDOOR NOT LESS THAN 3’ FROM DOOR AND WINDOWS AND ENCLOSED UTILITY CLOSETS, BASEMENTS, STORAGE OR UTILITY CLOSETS WITHIN DWELLING UNITS WITH FINISHED OR NONCOMBUSTIBLE WALLS AND CEILING. (CRC R328.4)
9. INDIVIDUAL ESS UNITS SHALL HAVE A MAXIMUM RATING OF 20 KWH. THE AGGREGATE RATING OF THE ESS SHALL NOT EXCEED 40 KWH WITHIN UTILITY CLOSETS, BASEMENTS AND STORAGE OR UTILITY SPACES, 80 KWH IN ATTACHED OR DETACHED GARAGES OR DETACHED ACCESSORY STRUCTURES, 80 KWH ON EXTERIOR WALLS AND 80 KWH OUTDOORS ON THE GROUND. (CRC R328.5)
10. ROOMS AND AREAS WITHIN STRUCTURES IN WHICH ESS ARE INSTALLED SHALL BE PROTECTED BY SMOKE ALARMS. A HEAT DETECTOR SHALL BE INSTALLED IN LOCATIONS WITHIN STRUCTURES WHERE SMOKE ALARMS CANNOT BE INSTALLED BASED ON THEIR LISTING. (CRC R328.7) ESS INSTALLED IN LOCATIONS SUBJECT TO VEHICLE DAMAGE SHALL BE PROVIDED WITH IMPACT PROTECTION. (CRC R328.8)
11. WHERE PV DISCONNECTING MEANS (ABOVE 30 VOLTS) ARE READILY ACCESSIBLE TO UNQUALIFIED PERSONS, ANY ENCLOSURE DOOR OR HINGED COVER THAT EXPOSES LIVE PARTS WHEN OPENED, ARE REQUIRED TO BE LOCKED OR REQUIRE A TOOL TO OPEN. (CEC 690.13(A))
12. ALL SERVICES SUPPLYING DWELLING UNITS SHALL BE PROVIDED A SURGE PROTECTION DEVICE. THE SPD SHALL BE AN INTEGRAL PART OF THE SERVICE EQUIPMENT OR SHALL BE LOCATED IMMEDIATELY ADJACENT THERETO. (CEC 230.67)
13. 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"
14. 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."
15. 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"

ELECTRICAL LEGEND

- DUPLEX OUTLET
- GFCI DUPLEX OUTLET
- OVERHEAD GFCI DUPLEX OUTLET
- FLOOR OUTLET
- WATERPROOF DUPLEX OUTLET
- 220V DUPLEX OUTLET
- SWITCHED DUPLEX OUTLET
- SWITCH
- 3-WAY SWITCH
- DIMMER SWITCH
- VACANCY SWITCH
- TV JACK
- THERMOSTAT
- CO & SMOKE DETECTOR
- HOSE BIB
- GAS
- ELECTRICAL PANEL
- FAN / LIGHT COMBO
- J-BOX
- RECESSED LIGHT
- WALL MOUNTED LIGHT
- WALL MOUNTED MOTION LIGHT
- UNDERCOUNTER LIGHT
- FLOURESCENT LIGHT
- CEILING FAN

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

JACKSON & SANDS
ENGINEERING, Inc.

A Regional Partnership for Achievable Housing

LICENSED ARCHITECT
RUSSELL DAVIDSON
No. C36895
Ren. 11-30-25
STATE OF CALIFORNIA

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1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23
1	REV 1	12/11/23

ELECTRICAL PLAN

E1.0

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T12:39:22-07:00 **(Page 1 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ducted HP - 23043.ribd22x

GENERAL INFORMATION					
01	Project Name	1 Bedroom Raised CZ16 Ducted HP			
02	Run Title	Title 24 Analysis			
03	Project Location	TBD			
04	City	Truckee	05	Standards Version	2022
06	Zip code	96161	07	Software Version	EnergyPro 9.1
08	Climate Zone	16	09	Front Orientation (deg/ Cardinal)	All orientations
10	Building Type	Single family	11	Number of Dwelling Units	1
12	Project Scope	Newly Constructed	13	Number of Bedrooms	1
14	Addition Cond. Floor Area (ft^2)	0	15	Number of Stories	1
16	Existing Cond. Floor Area (ft^2)	n/a	17	Fenestration Average U-factor	0.3
18	Total Cond. Floor Area (ft^2)	661	19	Glazing Percentage (%)	19.26%
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-P100826848A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:32:19 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 12:41:18

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T12:39:22-07:00 **(Page 2 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ducted HP - 23043.ribd22x

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	48.4	48.6	56.5			
Proposed Design						
North Facing	40.3	44.8	54.1	8.1	3.8	2.4
East Facing	40.2	44.7	54	8.2	3.9	2.5
South Facing	40.3	44.9	54.2	8.1	3.7	2.3
West Facing	40.9	46.2	55	7.5	2.4	1.5
RESULT[3]: 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

- 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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Project Name: 1 Bedroom Raised CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T12:39:22-07:00 **(Page 3 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ducted HP - 23043.ribd22x

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	12.63	85.24	9.59	102.9	3.04	-17.66
Space Cooling	0.8	10.22	0.29	3.89	0.51	6.33
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.21	52.4	2.34	29.13	1.87	23.27
Self Utilization/Flexibility Credit				0		0
North Facing Efficiency Compliance Total	**18.04**	**152.23**	**12.62**	**140.29**	**5.42**	**11.94**
Space Heating	12.63	85.24	9.33	100.31	3.3	-14.87
Space Cooling	0.8	10.22	0.52	6.46	0.28	3.76
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.21	52.4	2.34	29.05	1.87	23.35
Self Utilization/Flexibility Credit				0		0
East Facing Efficiency Compliance Total	**18.04**	**152.23**	**12.59**	**139.99**	**5.45**	**12.24**

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T12:39:22-07:00 **(Page 4 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ducted HP - 23043.ribd22x

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	12.63	85.24	9.52	103.25	3.11	-18.01
Space Cooling	0.8	10.22	0.36	4.1	0.44	6.12
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.21	52.4	2.34	29.14	1.87	23.26
Self Utilization/Flexibility Credit				0		0
South Facing Efficiency Compliance Total	**18.04**	**152.23**	**12.62**	**140.86**	**5.42**	**11.37**
Space Heating	12.63	85.24	9.79	105.69	2.84	-20.45
Space Cooling	0.8	10.22	0.49	5.76	0.31	4.46
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.21	52.4	2.34	29.1	1.87	23.3
Self Utilization/Flexibility Credit				0		0
West Facing Efficiency Compliance Total	**18.04**	**152.23**	**13.02**	**144.92**	**5.02**	**7.31**

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T12:39:22-07:00 **(Page 5 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ducted HP - 23043.ribd22x

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]	37.43	31.94	5.49	14.67
Net EUI[2]	37.43	31.94	5.49	14.67
East Facing				
Gross EUI[1]	37.43	31.95	5.48	14.64
Net EUI[2]	37.43	31.95	5.48	14.64
South Facing				
Gross EUI[1]	37.43	32.12	5.31	14.19
Net EUI[2]	37.43	32.12	5.31	14.19
West Facing				
Gross EUI[1]	37.43	32.61	4.82	12.88
Net EUI[2]	37.43	32.61	4.82	12.88

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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Project Name: 1 Bedroom Raised CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T12:39:22-07:00 **(Page 6 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ducted HP - 23043.ribd22x

REQUIRED PV SYSTEMS

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

REQUIRED SPECIAL FEATURES

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

- PV exception 2: No PV required when minimum PV size (Section 150.1(c)14) < 1.8 kWdc (0 kW)
- Insulation below roof deck
- Window overhangs and/or fins
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

HERS FEATURE SUMMARY

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

- Indoor air quality ventilation
- Kitchen range hood
- Minimum Airflow
- Verified EER/EER2
- Verified SEER/SEER2
- Verified Refrigerant Charge
- Fan Efficacy Watts/CFM
- Verified HSPF2
- Verified heat pump rated heating capacity
- Duct leakage testing

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**
1 Bedroom Raised CZ16 Ducted HP	661	1	1	1	0	1

Registration Number: 223-P100826848A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:32:19 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T12:39:22-07:00 **(Page 7 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ducted HP - 23043.ribd22x

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**
1 Bed Unit Zone	Conditioned	HVAC1	661	9	DHW Sys 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 (ft2)**	**Tilt (deg)**
Front Wall	1 Bed Unit Zone	R-21 Wall	0	Front	270	61.5	90
Right Wall	1 Bed Unit Zone	R-21 Wall	270	Right	216	0	90
Back Wall	1 Bed Unit Zone	R-21 Wall	180	Back	270	46	90
Left Wall	1 Bed Unit Zone	R-21 Wall	90	Left	216	54.02	90
Ceiling	1 Bed Unit Zone	R-38+R-13 HP Attic	n/a	n/a	661	n/a	n/a
Raised Floor	1 Bed Unit Zone	R-19 Crawl	n/a	n/a	661	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 1 Bed Unit Zone	Attic Roof1 Bed Unit Zone	Ventilated	6	0.1	0.85	No	No

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 Window (OP)	Window	Front Wall	Front	0			1	24	0.3	NFRC	0.4	NFRC	Bug Screen

Registration Number: 223-P100826848A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:32:19 HERS Provider: CalCERTS Inc.

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Project Name: 1 Bedroom Raised CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T12:39:22-07:00 **(Page 8 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ducted HP - 23043.ribd22x

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 Window (OP) 2	Window	Front Wall	Front	0	5	4	1	20	0.3	NFRC	0.4	NFRC	Bug Screen
Back Window (OP)	Window	Back Wall	Back	180			1	10	0.3	NFRC	0.4	NFRC	Bug Screen
Back Window (OP) 2	Window	Back Wall	Back	180			1	24	0.3	NFRC	0.4	NFRC	Bug Screen
Back Window (OP) 3	Window	Back Wall	Back	180			1	12	0.3	NFRC	0.4	NFRC	Bug Screen
Left Window (OP)	Window	Left Wall	Left	90	3	4.44	1	13.32	0.3	NFRC	0.4	NFRC	Bug Screen
Left Window (OP) 2	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.4	NFRC	Bug Screen
Left Window (OP) 3	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.4	NFRC	Bug Screen

OPAQUE DOORS

01	02	03	04
Name	**Side of Building**	**Area (ft^2)**	**U-factor**
Front Door	Front Wall	17.5	0.5
Left Door	Left Wall	16.7	0.5

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM: NA – EXCEPTION 2: <1.8 KWDC
PV EXCEPTION EQ: SEE EQUATION 150-1 BELOW
kW_{PV} = (661X0.59)/1000 + (1X1.22) = 1.61 KW_{DC} < 1.8 KW_{DC}
SPECIAL FEATURES: NONE
SPACE HEATING: DUCTED HEAT PUMP (HSPF2=9.5)
SPACE COOLING: DUCTED HEAT PUMP (SEER2=17.0, EER2=12.0)
HEAT & COOL LOADS: HEAT: 16,906 BTU/HR COOL: 6,997 BTU/HR
DUCT INSULATION: R-8 ATTIC
WATER HEATING: NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1)
MANUF/MODEL: RHEEM/XE50T10H45U0
PIPE INSULATION: ALL DHW PIPING SHALL BE INSULATED WITH 1"THICK OR MINIMUM R-VALUE 7.7
RADIANT BARRIER: NA
HERS TESTS: INDOOR AIR QUALITY VENTILATION, DUCT LEAKAGE TESTING, MINIMUM AIRFLOW, FAN EFFICACY WATTS/CFM (0.58 WATTS/CFM), VERIFIED REFRIGERANT CHARGE, VERIFIED EER2, VERIFIED SEER2, VERIFIED HSPF2, VERIFIED HEAT PUMP RATED HEATING CAPACITY, KITCHEN RANGE HOOD
IAQ VENTILATION: 0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION: KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION: THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S: ENV-01 – FENESTRATION, ENV-03 – INSULATION, LTG-01 – LIGHTING, MCH-01 – SPACE CONDITIONING SYSTEMS, PLB-22 – WATER HEATERS, PVB-01 – PV SYSTEMS
EXTERIOR WALLS: R-21
ROOF ATTIC: R-38 WITH R-13 ON PITCH TOUCHING ROOF SHEATHING
FLOOR: R-19
WINDOWS: NON-METAL FRAMED, DOUBLE PANE WITH LOW-E GLASS (U-VALUE=0.30, SHGC=0.40)
GLASS DOORS: NA
EXTERIOR SC DOOR: SOLID CORE (U-FACTOR=0.50)
SKYLIGHTS: NA

PV EXCEPTION 2 EQUATION 150-1 (CEC SECTION 150.1(C)14)

kW_{PV} = (CFA X A)/1000 + (N_{DU} X B)

WHERE: kW_{PV} = kW_{DC} SIZE OF PV SYSTEM
CFA = CONDITIOEND FLOOR AREA
N_{DU} = NUMBER OF DWELLING UNITS
A = CFA ADJUSTMENT FACTOR FROM TABLE 150 1-C
B = DWELLING UNIT ADJUSTMENT FACTOR FROM TABLE 150 1-C

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing

REGISTERED PROFESSIONAL ENGINEER
MICHAEL MELAS
No. 26789
EXP. 9/30/24
MECHANICAL
STATE OF CALIFORNIA

YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

TITLE 24 ENERGY REPORT - CZ16 RAISED DUCTED HP

T24.1.1

OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Window	Overhang					Left Fin				Right Fin			
	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up
Front Window (OP) 2	4	0.3	12	0.8	0	0	0	0	0	0	0	0	0
Left Window (OP)	18	0.3	0.5	0	0	0	0	0	0	0	0	0	0

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
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / None	0.066	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Exterior Finish: Wood Siding/sheathing/decking
Attic Roof1 Bed Unit Zone	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-13	None / 0	0.078	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-13.0 / 2x4 Around Roof Joists: R-0.0 Insul.
R-19 Crawl	Floors Over Crawlspace	Wood Framed Floor	2x6 @ 16 in. O. C.	R-19	None / None	0.049	Floor Surface: Carpeted Floor Deck: Wood Siding/sheathing/decking Cavity / Frame: R-19 / 2x6
R-38+R-13 HP Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-38	None / None	0.025	Over Ceiling Joists: R-28.9 insul. Cavity / Frame: R-9.1 / 2x4 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

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 Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (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
DHW Heater 1	1	50	Rheem	RheemXE50T10H45U0	Outside	1 Bed Unit Zone	1 Bed Unit Zone

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 Sys 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
HVAC1	Heat pump heating cooling	Heat Pump System 1	1	Heat Pump System 1	1	HVAC Fan 1	Air Distribution System 1	Setback

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	System Type	Number of Units	Heating				Cooling					HERS Verification
			Efficiency Type	HSPF / HSPF2 / COP	Cap 47	Cap 17	Efficiency Type	SEER / SEER2	EER / EER / CEER	Zonally Controlled	Compressor Type	
Heat Pump System 1	Central split HP	1	HSPF2	9.5	27000	22000	EER2SEER2	17	12	Not Zonal	Single Speed	Heat Pump System 1-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
Heat Pump System 1-hers-htpump	Required	350	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			
Air Distribution System 1	Unconditioned attic	Non-Verified	R-8	R-8	Attic	Attic	n/a	n/a	No Bypass Duct	Sealed and Tested	Air Distribution System 1-hers-dist

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
Air 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 1	HVAC Fan	0.58	HVAC Fan 1-hers-fan

HVAC FAN SYSTEMS - HERS VERIFICATION

01	02	03
Name	Verified Fan Watt Draw	Required Fan Efficacy (Watts/CFM)
HVAC Fan 1-hers-fan	Required	0.58

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	34	0.35	Exhaust	No	n/a	No	Yes	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I, I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Nicole E Porata	Documentation Author Signature: Nicole E Porata
Company: Melas Energy Engineering	Signature Date: 2023-07-12 12:45:38
Address: 547 Uren St.	CEA / HERS Certification Identification (If applicable): R19-17-30033
City/State/Zip: Nevada City, CA 95959	Phone: 530-265-2492

CABEC CERTIFIED ENERGY ANALYST

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.
2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name: Russell Davidson	Responsible Designer Signature: Russell Davidson
Company: Russell Davidson Architecture + Design	Date Signed: 2023-07-12 15:32:19
Address: 149 Crown Point Ct, Suite A	License: C36895
City/State/Zip: Grass Valley, CA 95949	Phone: 530-913-2370

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.

Easy to Verify at CalCERTS.com

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	NA – EXCEPTION 2: <1.8 KWDC
PV EXCEPTION EQ:	SEE EQUATION 150-1 BELOW KW_{PV} = (661X0.59)/1000 + (1X1.22) = 1.61 KW_{DC} < 1.8 KW_{DC}
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTED HEAT PUMP (HSPF2=9.5)
SPACE COOLING:	DUCTED HEAT PUMP (SEER2=17.0, EER2=12.0)
HEAT & COOL LOADS:	HEAT: 16,906 BTU/HR COOL: 6,997 BTU/HR
DUCT INSULATION:	R-8 ATTIC
WATER HEATING:	NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1) MANUF/MODEL: RHEEM/XE50T10H45U0
PIPE INSULATION:	ALL DHW PIPING SHALL BE INSULATED WITH 1"THICK OR MINIMUM R-VALUE 7.7
RADIANT BARRIER:	NA
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, DUCT LEAKAGE TESTING, MINIMUM AIRFLOW, FAN EFFICACY WATTS/CFM (0.58 WATTS/CFM), VERIFIED REFRIGERANT CHARGE, VERIFIED EER2, VERIFIED SEER2, VERIFIED HSPF2, VERIFIED HEAT PUMP RATED HEATING CAPACITY, KITCHEN RANGE HOOD
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV-01 – FENESTRATION, ENV-03 – INSULATION, LTG-01 – LIGHTING, MCH-01 – SPACE CONDITIONING SYSTEMS, PLB-22 – WATER HEATERS, PVB-01 – PV SYSTEMS
EXTERIOR WALLS:	R-21
ROOF ATTIC:	R-38 WITH R-13 ON PITCH TOUCHING ROOF SHEATHING
FLOOR:	R-19
WINDOWS:	NON-METAL FRAMED, DOUBLE PANE WITH LOW-E GLASS (U-VALUE=0.30, SHGC=0.40)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE (U-FACTOR=0.50)
SKYLIGHTS:	NA

PV EXCEPTION 2 EQUATION 150-1 (CEC SECTION 150.1(C)14)

kW_{PV} = (CFA X A)/1000 + (N_{DU} X B)

WHERE: kW_{PV} = kW_{DC} SIZE OF PV SYSTEM
CFA = CONDITIOEND FLOOR AREA
N_{DU} = NUMBER OF DWELLING UNITS
A = CFA ADJUSTMENT FACTOR FROM TABLE 150 1-C
B = DWELLING UNIT ADJUSTMENT FACTOR FROM TABLE 150 1-C

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

TRUCKEE COUNTY Placer

A Regional Partnership for Achievable Housing

LOUIS FRED PROFESSIONAL ENGINEER MECHANICAL No. 26789 Exp. 9/30/24 STATE OF CALIFORNIA

YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

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1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

TITLE 24 ENERGY REPORT - CZ16 RAISED DUCTED HP

T24.1.2

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T12:51:18-07:00 **(Page 1 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ductless HP - 23043.ribd22x

GENERAL INFORMATION

01	**Project Name**	1 Bedroom Raised CZ16 Ductless HP			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	TBD			
04	**City**	Truckee	05	**Standards Version**	2022
06	**Zip code**	96161	07	**Software Version**	EnergyPro 9.1
08	**Climate Zone**	16	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)**	661	19	**Glazing Percentage (%)**	19.26%
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-P010082857A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:52:56 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 12:53:17

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T12:51:18-07:00 **(Page 2 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ductless HP - 23043.ribd22x

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	48.4	48.6	56.5			
Proposed Design						
North Facing	38.1	39.7	51	10.3	8.9	5.5
East Facing	38.1	39.7	51	10.3	8.9	5.5
South Facing	38.1	39.9	51.1	10.3	8.7	5.4
West Facing	38.6	41.1	51.8	9.8	7.5	4.7
RESULT[3]: 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

- 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)

Registration Number: 223-P010082857A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:52:56 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 12:53:17

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T12:51:18-07:00 **(Page 3 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ductless HP - 23043.ribd22x

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	12.63	85.24	8.1	87.36	4.53	-2.12
Space Cooling	0.8	10.22	0.28	3.71	0.52	6.51
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.21	52.4	2.34	29.12	1.87	23.28
Self Utilization/Flexibility Credit				0		0
North Facing Efficiency Compliance Total	**18.04**	**152.23**	**11.12**	**124.56**	**6.92**	**27.67**
Space Heating	12.63	85.24	7.88	85.05	4.75	0.19
Space Cooling	0.8	10.22	0.49	6.13	0.31	4.09
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.21	52.4	2.34	29.05	1.87	23.35
Self Utilization/Flexibility Credit				0		0
East Facing Efficiency Compliance Total	**18.04**	**152.23**	**11.11**	**124.6**	**6.93**	**27.63**

Registration Number: 223-P010082857A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:52:56 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 12:53:17

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T12:51:18-07:00 **(Page 4 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ductless HP - 23043.ribd22x

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	12.63	85.24	8.05	87.75	4.58	-2.51
Space Cooling	0.8	10.22	0.35	3.96	0.45	6.26
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.21	52.4	2.34	29.13	1.87	23.27
Self Utilization/Flexibility Credit				0		0
South Facing Efficiency Compliance Total	**18.04**	**152.23**	**11.14**	**125.21**	**6.9**	**27.02**
Space Heating	12.63	85.24	8.31	89.98	4.32	-4.74
Space Cooling	0.8	10.22	0.46	5.47	0.34	4.75
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.21	52.4	2.34	29.09	1.87	23.31
Self Utilization/Flexibility Credit				0		0
West Facing Efficiency Compliance Total	**18.04**	**152.23**	**11.51**	**128.91**	**6.53**	**23.32**

Registration Number: 223-P010082857A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:52:56 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 12:53:17

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T12:51:18-07:00 **(Page 5 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ductless HP - 23043.ribd22x

ENERGY USE INTENSITY

	Standard Design (kBtu/ft² - yr)	Proposed Design (kBtu/ft² - yr)	Compliance Margin (kBtu/ft² - yr)	Margin Percentage
North Facing				
Gross EUI[1]	37.43	30.29	7.14	19.08
Net EUI[2]	37.43	30.29	7.14	19.08
East Facing				
Gross EUI[1]	37.43	30.34	7.09	18.94
Net EUI[2]	37.43	30.34	7.09	18.94
South Facing				
Gross EUI[1]	37.43	30.46	6.97	18.62
Net EUI[2]	37.43	30.46	6.97	18.62
West Facing				
Gross EUI[1]	37.43	30.91	6.52	17.42
Net EUI[2]	37.43	30.91	6.52	17.42

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.

Registration Number: 223-P010082857A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:52:56 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 12:53:17

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T12:51:18-07:00 **(Page 6 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ductless HP - 23043.ribd22x

REQUIRED PV SYSTEMS

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

REQUIRED SPECIAL FEATURES

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

- PV exception 2: No PV required when minimum PV size (Section 150.1(c)14) < 1.8 kWdc (0 kW)
- Window overhangs and/or fins
- Variable capacity heat pump compliance option (verification details from VCHP Staff report, Appendix B, and RA3)
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

HERS FEATURE SUMMARY

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

- Indoor air quality ventilation
- Kitchen range hood
- Verified Refrigerant Charge
- Airflow in habitable rooms (SC3.1.4.1.7)
- Verified heat pump rated heating capacity
- Wall-mounted thermostat in zones greater than 150 ft2 (SC3.4.5)
- Ductless indoor units located entirely in conditioned space (SC3.1.4.1.8)

BUILDING - FEATURES INFORMATION

01	02	03	04	05	06	07
Project Name	**Conditioned Floor Area (ft²)**	**Number of Dwelling Units**	**Number of Bedrooms**	**Number of Zones**	**Number of Ventilation Cooling Systems**	**Number of Water Heating Systems**
1 Bedroom Raised CZ16 Ductless HP	661	1	1	1	0	1

Registration Number: 223-P010082857A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:52:56 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T12:51:18-07:00 **(Page 7 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ductless HP - 23043.ribd22x

ZONE INFORMATION

01	02	03	04	05	06	07
Zone Name	**Zone Type**	**HVAC System Name**	**Zone Floor Area (ft²)**	**Avg. Ceiling Height**	**Water Heating System 1**	**Status**
1 Bed Unit Zone	Conditioned	HVAC1	661	9	DHW Sys 1	New

OPAQUE SURFACES

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft²)**	**Window and Door Area (ft2)**	**Tilt (deg)**
Front Wall	1 Bed Unit Zone	R-21 Wall	0	Front	270	61.5	90
Right Wall	1 Bed Unit Zone	R-21 Wall	270	Right	216	0	90
Back Wall	1 Bed Unit Zone	R-21 Wall	180	Back	270	46	90
Left Wall	1 Bed Unit Zone	R-21 Wall	90	Left	216	54.02	90
Ceiling	1 Bed Unit Zone	R-38 Attic w/ Rad Bar	n/a	n/a	661	n/a	n/a
Raised Floor	1 Bed Unit Zone	R-19 Crawl	n/a	n/a	661	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 1 Bed Unit Zone	Attic Roof\ Bed Unit Zone	Ventilated	6	0.1	0.85	Yes	No

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Front Window (OP)	Window	Front Wall	Front	0			1	24	0.3	NFRC	0.4	NFRC	Bug Screen

Registration Number: 223-P010082857A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:52:56 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 12:53:17

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T12:51:18-07:00 **(Page 8 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ16 Ductless HP - 23043.ribd22x

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Front Window (OP) 2	Window	Front Wall	Front	0	5	4	1	20	0.3	NFRC	0.4	NFRC	Bug Screen
Back Window (OP)	Window	Back Wall	Back	180			1	10	0.3	NFRC	0.4	NFRC	Bug Screen
Back Window (OP) 2	Window	Back Wall	Back	180			1	24	0.3	NFRC	0.4	NFRC	Bug Screen
Back Window (OP) 3	Window	Back Wall	Back	180			1	12	0.3	NFRC	0.4	NFRC	Bug Screen
Left Window (OP)	Window	Left Wall	Left	90	3	4.44	1	13.32	0.3	NFRC	0.4	NFRC	Bug Screen
Left Window (OP) 2	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.4	NFRC	Bug Screen
Left Window (OP) 3	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.4	NFRC	Bug Screen

OPAQUE DOORS

01	02	03	04
Name	**Side of Building**	**Area (ft²)**	**U-factor**
Front Door	Front Wall	17.5	0.5
Left Door	Left Wall	16.7	0.5

Registration Number: 223-P010082857A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 15:52:56 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 12:53:17

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM: NA – EXCEPTION 2: <1.8 KWDC
PV EXCEPTION EQ: SEE EQUATION 150-1 BELOW
kW_{PV} = (661X0.59)/1000 + (1X1.22) = 1.61 KW_{DC} < 1.8 KW_{DC}
SPECIAL FEATURES: NONE
SPACE HEATING: DUCTLESS HEAT PUMP (HSPF2=7.5)
SPACE COOLING: DUCTLESS HEAT PUMP (SEER2=14.3, EER2=9.0)
HEAT & COOL LOADS: HEAT: 15,954 BTU/HR COOL: 6,867 BTU/HR
DUCT INSULATION: NA
WATER HEATING: NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1)
MANUF/MODEL: RHEEM/XE50T10H45U0
PIPE INSULATION: FIRST 5' OF HOT & COLD DHW PIPING INSULATED WITH 1"THICK, IF RECIRC LOOP ALL PIPE INSULATED
RADIANT BARRIER: RADIANT BARRIER IN ATTIC AND GABLE ENDS INSTALLED PER MANUFACTURES SPECIFICATIONS REQUIRED
HERS TESTS: INDOOR AIR QUALITY VENTILATION, VERIFIED REFRIGERANT CHARGE, VERIFIED HEAT PUMP RATED HEATING CAPACITY, AIRFLOW IN HABITABLE ROOMS, WALL-MOUNTED THERMOSTAT IN ZONES 0 GREATER THAN 150 SQ FT, DUCTLESS INDOOR UNITS LOCATED ENTIRELY IN CONDITIONED SPACE, KITCHEN RANGE HOOD
IAQ VENTILATION: 0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION: KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION: THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S: ENV-01 – FENESTRATION, ENV-03 – INSULATION, LTG-01 – LIGHTING, MCH-01 – SPACE CONDITIONING SYSTEMS, PLB-22 – WATER HEATERS, PVB-01 – PV SYSTEMS
EXTERIOR WALLS: R-21
ROOF ATTIC: R-38
FLOOR: R-19
WINDOWS: NON-METAL FRAMED, DOUBLE PANE WITH LOW-E GLASS (U-VALUE=0.30, SHGC=0.40)
GLASS DOORS: NA
EXTERIOR SC DOOR: SOLID CORE (U-FACTOR=0.50)
SKYLIGHTS: NA

PV EXCEPTION 2 EQUATION 150-1 (CEC SECTION 150.1(C)14)

kW_{PV} = (CFA X A)/1000 + (N_{DU} X B)

WHERE: kW_{PV} = kW_{DC} SIZE OF PV SYSTEM
CFA = CONDITIOEND FLOOR AREA
N_{DU} = NUMBER OF DWELLING UNITS
A = CFA ADJUSTMENT FACTOR FROM TABLE 150 1-C
B = DWELLING UNIT ADJUSTMENT FACTOR FROM TABLE 150 1-C

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing



YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

TITLE 24 ENERGY REPORT - CZ16 RAISED DUCTLESS HP

T24.2.1

OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Window	Overhang					Left Fin				Right Fin			
	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up
Front Window (OP) 2	4	0.3	12	0.8	0	0	0	0	0	0	0	0	0
Left Window (OP)	18	0.3	0.5	0	0	0	0	0	0	0	0	0	0

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
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / None	0.066	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Exterior Finish: Wood Siding/sheathing/decking
Attic Roof1 Bed Unit Zone	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-0	None / 0	0.644	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: no insul. / 2x4
R-19 Crawl	Floors Over Crawlspace	Wood Framed Floor	2x6 @ 16 in. O. C.	R-19	None / None	0.049	Floor Surface: Carpeted Floor Deck: Wood Siding/sheathing/decking Cavity / Frame: R-19 / 2x6
R-38 Attic w/ Rad Bar	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 16 in. O. C.	R-38	None / None	0.025	Over Ceiling Joists: R-28.9 insul. Cavity / Frame: R-9.1 / 2x4 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

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 Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (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
DHW Heater 1	1	50	Rheem	RheemXE50T10H45U0	Outside	1 Bed Unit Zone	1 Bed Unit Zone

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 Sys 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
HVAC1	Heat pump heating cooling	Heat Pump System 1	1	Heat Pump System 1	1	n/a	n/a	Setback

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	System Type	Number of Units	Heating				Cooling			Zonally Controlled	Compressor Type	HERS Verification
			Efficiency Type	HSPF / HSPF2 / COP	Cap 47	Cap 17	Efficiency Type	SEER / SEER2	EER / EER / CEER			
Heat Pump System 1	VCHP-ductless	1	HSPF2	7.5	24000	22000	EER2SEER2	14.3	9	Not Zonal	Single Speed	Heat Pump System 1-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
Heat Pump System 1-hers-htpump	Not Required	0	Not Required	Not Required	Yes	No	Yes	Yes

VARIABLE CAPACITY HEAT PUMP COMPLIANCE OPTION - HERS VERIFICATION

01	02	03	04	05	06	07	08	09	10
Name	Certified Low-Static VCHP System	Airflow to Habitable Rooms	Ductless Units in Conditioned Space	Wall Mount Thermostat	Air Filter Sizing & Pressure Drop Rating	Low Leakage Ducts in Conditioned Space	Minimum Airflow per RA3.3 and SC3.3.4.1	Certified non-continuous Fan	Indoor Fan not Running Continuously
Heat Pump System 1	Not required	Required	Required	Required	Not required	Not required	Not required	Not required	Not required

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	34	0.35	Exhaust	No	n/a	No	Yes	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I, I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Nicole E Porata	Documentation Author Signature: Nicole E Porata
Company: Melas Energy Engineering	Signature Date: 2023-07-12 12:55:35
Address: 547 Uren St.	CEA / HERS Certification Identification (If applicable): R19-17-30033
City/State/Zip: Nevada City, CA 95959	Phone: 530-265-2492

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.
2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name: Russell Davidson	Responsible Designer Signature: Russell Davidson
Company: Russell Davidson Architecture + Design	Date Signed: 2023-07-12 15:52:56
Address: 149 Crown Point Ct, Suite A	License: C36895
City/State/Zip: Grass Valley, CA 95949	Phone: 530-913-2370

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.

Easy to Verify at CalCERTS.com

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	NA – EXCEPTION 2: <1.8 KWDC
PV EXCEPTION EQ:	SEE EQUATION 150-1 BELOW KW_{PV} = (661X0.59)/1000 + (1X1.22) = 1.61 KW_{DC} < 1.8 KW_{DC}
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTLESS HEAT PUMP (HSPF2=7.5)
SPACE COOLING:	DUCTLESS HEAT PUMP (SEER2=14.3, EER2=9.0)
HEAT & COOL LOADS:	HEAT: 15,954 BTU/HR COOL: 6,867 BTU/HR
DUCT INSULATION:	NA
WATER HEATING:	NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1) MANUF/MODEL: RHEEM/XE50T10H45U0
PIPE INSULATION:	FIRST 5' OF HOT & COLD DHW PIPING INSULATED WITH 1"THICK, IF RECIRC LOOP ALL PIPE INSULATED
RADIANT BARRIER:	RADIANT BARRIER IN ATTIC AND GABLE ENDS INSTALLED PER MANUFACTURES SPECIFICATIONS REQUIRED
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, VERIFIED REFRIGERANT CHARGE, VERIFIED HEAT PUMP RATED HEATING CAPACITY, AIRFLOW IN HABITABLE ROOMS, WALL-MOUNTED THERMOSTAT IN ZONES G GREATER THAN 150 SQ FT, DUCTLESS INDOOR UNITS LOCATED ENTIRELY IN CONDITIONED SPACE, KITCHEN RANGE HOOD
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV-01 – FENESTRATION, ENV-03 – INSULATION, LTG-01 – LIGHTING, MCH-01 – SPACE CONDITIONING SYSTEMS, PLB-22 – WATER HEATERS, PVB-01 – PV SYSTEMS
EXTERIOR WALLS:	R-21
ROOF ATTIC:	R-38
FLOOR:	R-19
WINDOWS:	NON-METAL FRAMED, DOUBLE PANE WITH LOW-E GLASS (U-VALUE=0.30, SHGC=0.40)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE (U-FACTOR=0.50)
SKYLIGHTS:	NA

PV EXCEPTION 2 EQUATION 150-1 (CEC SECTION 150.1(C)14)

kW_{PV} = (CFA X A)/1000 + (N_{DU} X B)

WHERE: kW_{PV} = kW_{DC} SIZE OF PV SYSTEM
CFA = CONDITIOEND FLOOR AREA
N_{DU} = NUMBER OF DWELLING UNITS
A = CFA ADJUSTMENT FACTOR FROM TABLE 150 1-C
B = DWELLING UNIT ADJUSTMENT FACTOR FROM TABLE 150 1-C

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing

REGISTERED PROFESSIONAL ENGINEER
NICOLE E PORATA
No. 26789
Exp. 9/30/24
MECHANICAL
STATE OF CALIFORNIA

YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

TITLE 24 ENERGY REPORT - CZ16 RAISED DUCTLESS HP

T24.2.2

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T07:58:16-07:00 **(Page 1 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ducted HP - 23043.ribd22x

GENERAL INFORMATION					
01	**Project Name**	1 Bedroom Raised CZ11 Ducted HP			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	TBD			
04	**City**	Nevada City	05	**Standards Version**	2022
06	**Zip code**	95959	07	**Software Version**	EnergyPro 9.1
08	**Climate Zone**	11	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)**	661	19	**Glazing Percentage (%)**	21.68%
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-P010082510A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:28:02 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:00:38

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T07:58:16-07:00 **(Page 2 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ducted HP - 23043.ribd22x

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	36.7	34.5	30.5			
Proposed Design						
North Facing	33.1	31.3	27.8	3.6	3.2	2.7
East Facing	33.6	33.7	29.4	3.1	0.8	1.1
South Facing	33.4	32.6	28.6	3.3	1.9	1.9
West Facing	33.8	33.7	29.3	2.9	0.8	1.2
RESULT[3]: 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

- Standard Design PV Capacity: 2.17 kWdc

Registration Number: 223-P010082510A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:28:02 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:00:38

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T07:58:16-07:00 **(Page 3 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ducted HP - 23043.ribd22x

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	5.07	34.25	5.07	38.56	0	-4.31
Space Cooling	2.65	59.15	2.36	57.9	0.29	1.25
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.63	36.12	1.76	20.79	1.87	15.33
Self Utilization/Flexibility Credit				0		0
North Facing Efficiency Compliance Total	**11.75**	**133.8**	**9.59**	**121.53**	**2.16**	**12.27**
Space Heating	5.07	34.25	5.01	38.27	0.06	-4.02
Space Cooling	2.65	59.15	2.7	67.65	-0.05	-8.5
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.63	36.12	1.76	20.77	1.87	15.35
Self Utilization/Flexibility Credit				0		0
East Facing Efficiency Compliance Total	**11.75**	**133.8**	**9.87**	**130.97**	**1.88**	**2.83**

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T07:58:16-07:00 **(Page 4 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ducted HP - 23043.ribd22x

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	5.07	34.25	5.09	39.28	-0.02	-5.03
Space Cooling	2.65	59.15	2.5	62.05	0.15	-2.9
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.63	36.12	1.76	20.81	1.87	15.31
Self Utilization/Flexibility Credit				0		0
South Facing Efficiency Compliance Total	**11.75**	**133.8**	**9.75**	**126.42**	**2**	**7.38**
Space Heating	5.07	34.25	5.22	40.48	-0.15	-6.23
Space Cooling	2.65	59.15	2.62	65.25	0.03	-6.1
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.63	36.12	1.77	20.8	1.86	15.32
Self Utilization/Flexibility Credit				0		0
West Facing Efficiency Compliance Total	**11.75**	**133.8**	**10.01**	**130.81**	**1.74**	**2.99**

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T07:58:16-07:00 **(Page 5 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ducted HP - 23043.ribd22x

ENERGY USE INTENSITY

	Standard Design (kBtu/ft² - yr)	Proposed Design (kBtu/ft² - yr)	Compliance Margin (kBtu/ft² - yr)	Margin Percentage
North Facing				
Gross EUI[1]	31.86	29	2.86	8.98
Net EUI[2]	14.85	11.25	3.6	24.24
East Facing				
Gross EUI[1]	31.86	29.65	2.21	6.94
Net EUI[2]	14.85	11.9	2.95	19.87
South Facing				
Gross EUI[1]	31.86	29.17	2.69	8.44
Net EUI[2]	14.85	11.42	3.43	23.1
West Facing				
Gross EUI[1]	31.86	29.68	2.18	6.84
Net EUI[2]	14.85	11.94	2.91	19.6

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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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T07:58:16-07:00 **(Page 6 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ducted HP - 23043.ribd22x

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 (%)**
2.17	NA	Standard (14-17%)	Fixed	none	true	150-270	n/a	n/a	<=7:12	96	100

REQUIRED SPECIAL FEATURES

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

- Insulation below roof deck
- Window overhangs and/or fins
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

HERS FEATURE SUMMARY

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

- Indoor air quality ventilation
- Kitchen range hood
- Minimum Airflow
- Verified EER/EER2
- Verified SEER/SEER2
- Verified Refrigerant Charge
- Fan Efficacy Watts/CFM
- Verified HSPF2
- Verified heat pump rated heating capacity
- Duct leakage testing

BUILDING - FEATURES INFORMATION

01	02	03	04	05	06	07
Project Name	**Conditioned Floor Area (ft²)**	**Number of Dwelling Units**	**Number of Bedrooms**	**Number of Zones**	**Number of Ventilation Cooling Systems**	**Number of Water Heating Systems**
1 Bedroom Raised CZ11 Ducted HP	661	1	1	1	0	1

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

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ZONE INFORMATION

01	02	03	04	05	06	07
Zone Name	**Zone Type**	**HVAC System Name**	**Zone Floor Area (ft²)**	**Avg. Ceiling Height**	**Water Heating System 1**	**Status**
1 Bed Unit Zone	Conditioned	HVAC1	661	9	DHW Sys 1	New

OPAQUE SURFACES

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft²)**	**Window and Door Area (ft2)**	**Tilt (deg)**
Front Wall	1 Bed Unit Zone	R-21 Wall	0	Front	270	61.5	90
Right Wall	1 Bed Unit Zone	R-21 Wall	270	Right	216	0	90
Back Wall	1 Bed Unit Zone	R-21 Wall	180	Back	270	62	90
Left Wall	1 Bed Unit Zone	R-21 Wall	90	Left	216	54.02	90
Ceiling	1 Bed Unit Zone	R-38+R-13 HP Attic	n/a	n/a	661	n/a	n/a
Raised Floor	1 Bed Unit Zone	R-19 Floor Crawl	n/a	n/a	661	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 1 Bed Unit Zone	Attic Roof1 Bed Unit Zone	Ventilated	6	0.1	0.85	No	No

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Front Window (OP)	Window	Front Wall	Front	0			1	24	0.3	NFRC	0.23	NFRC	Bug Screen

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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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Front Window (OP) 2	Window	Front Wall	Front	0	5	4	1	20	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP)	Window	Back Wall	Back	180			1	10	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 2	Window	Back Wall	Back	180			1	16	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 3	Window	Back Wall	Back	180			1	24	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 4	Window	Back Wall	Back	180			1	12	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP)	Window	Left Wall	Left	90	3	4.44	1	13.32	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP) 2	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP) 3	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.23	NFRC	Bug Screen

OPAQUE DOORS

01	02	03	04
Name	**Side of Building**	**Area (ft²)**	**U-factor**
Front Door	Front Wall	17.5	0.5
Left Door	Left Wall	16.7	0.5

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ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	2.17 KW MINIMUM – 150–270 DEG AT <=7/12 PITCH
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTED HEAT PUMP (HSPF2=9.5)
SPACE COOLING:	DUCTED HEAT PUMP (SEER2=17.0, EER2=12.0)
HEAT & COOL LOADS:	HEAT: 10,394 BTU/HR COOL: 6,549 BTU/HR
DUCT INSULATION:	R–8 ATTIC
WATER HEATING:	NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1) MANUF/MODEL: RHEEM/XE50T10H45U0
PIPE INSULATION:	ALL DHW PIPING SHALL BE INSULATED WITH 1"THICK OR MINIMUM R–VALUE 7.7
RADIANT BARRIER:	NA
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, DUCT LEAKAGE TESTING, MINIMUM AIRFLOW, FAN EFFICACY WATTS/CFM (0.58 WATTS/CFM), VERIFIED REFRIGERANT CHARGE, VERIFIED HSPF2, VERIFIED EER2, VERIFIED SEER2, VERIFIED HEAT PUMP RATED HEATING CAPACITY, KITCHEN RANGE HOOD
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE AND FUEL TYPE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV–01 – FENESTRATION, ENV–03 – INSULATION, LTG–01 – LIGHTING, MCH–01 – SPACE CONDITIONING SYSTEMS, PLB–22 – WATER HEATERS, PVB–01 – PV SYSTEMS
EXTERIOR WALLS:	R–21
ROOF ATTIC:	R–38 WITH R–13 ON PITCH TOUCHING ROOF SHEATHING
FLOOR:	R–19
WINDOWS:	NON–METAL FRAMED, DOUBLE PANE WITH LOW–E GLASS (U–VALUE=0.30, SHGC=0.23)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE (U–FACTOR=0.50)
SKYLIGHTS:	NA

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing



YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

TITLE 24 ENERGY REPORT - CZ11 RAISED DUCTED HP

T24.3.1

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T07:58:16-07:00 **(Page 9 of 13)**

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OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Window	Overhang					Left Fin				Right Fin			
	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up
Front Window (OP) 2	4	0.3	12	0.8	0	0	0	0	0	0	0	0	0
Left Window (OP)	18	0.3	0.5	0	0	0	0	0	0	0	0	0	0

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
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / None	0.066	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Exterior Finish: Wood Siding/sheathing/decking
Attic Roof1 Bed Unit Zone	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-13	None / 0	0.078	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-13.0 / 2x4 Around Roof Joists: R-0.0 Insul.
R-19 Floor Crawl	Floors Over Crawlspace	Wood Framed Floor	2x10 @ 16 in. O. C.	R-19	None / None	0.046	Floor Surface: Carpeted Floor Deck: Wood Siding/sheathing/decking Cavity / Frame: R-19 / 2x10
R-38+R-13 HP Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 16 in. O. C.	R-38	None / None	0.025	Over Ceiling Joists: R-28.9 insul. Cavity / Frame: R-9.1 / 2x4 Inside Finish: Gypsum Board

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Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ducted HP - 23043.ribd22x

BUILDING ENVELOPE - HERS VERIFICATION

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

WATER HEATING SYSTEMS

01	02	03	04	05	06	07	08	09
Name	System Type	Distribution Type	Water Heater Name	Number of Units	Solar Heating System	Compact Distribution	HERS Verification	Water Heater Name (#)
DHW Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (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
DHW Heater 1	1	50	Rheem	RheemXE50T10H45U0	Outside	1 Bed Unit Zone	1 Bed Unit Zone

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 Sys 1 - 1/1	Not Required	Not Required	Not Required	None	Not Required	Not Required

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

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Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ducted HP - 23043.ribd22x

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
HVAC1	Heat pump heating cooling	Heat Pump System 1	1	Heat Pump System 1	1	HVAC Fan 1	Air Distribution System 1	Setback

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	System Type	Number of Units	Heating				Cooling					HERS Verification
			Efficiency Type	HSPF / HSPF2 / COP	Cap 47	Cap 17	Efficiency Type	SEER / SEER2	EER / EER / CEER	Zonally Controlled	Compressor Type	
Heat Pump System 1	Central split HP	1	HSPF2	9.5	27000	22000	EER2SEER2	17	12	Not Zonal	Single Speed	Heat Pump System 1-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
Heat Pump System 1-hers-htpump	Required	350	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			
Air Distribution System 1	Unconditioned attic	Non-Verified	R-8	R-8	Attic	Attic	n/a	n/a	No Bypass Duct	Sealed and Tested	Air Distribution System 1-hers-dist

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

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Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ducted HP - 23043.ribd22x

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
Air 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 1	HVAC Fan	0.58	HVAC Fan 1-hers-fan

HVAC FAN SYSTEMS - HERS VERIFICATION

01	02	03
Name	Verified Fan Watt Draw	Required Fan Efficacy (Watts/CFM)
HVAC Fan 1-hers-fan	Required	0.58

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	34	0.35	Exhaust	No	n/a	No	Yes	

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T07:58:16-07:00 **(Page 13 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ducted HP - 23043.ribd22x

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I, I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Nicole E Porata	Documentation Author Signature: Nicole E Porata
Company: Melas Energy Engineering	Signature Date: 2023-07-12 08:03:23
Address: 547 Uren St.	CEA / HERS Certification Identification (If applicable): R19-17-30033
City/State/Zip: Nevada City, CA 95959	Phone: 530-265-2492

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.
2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name: Russell Davidson	Responsible Designer Signature: Russell Davidson
Company: Russell Davidson Architecture + Design	Date Signed: 2023-07-12 08:28:02
Address: 149 Crown Point Ct, Suite A	License: C36895
City/State/Zip: Grass Valley, CA 95949	Phone: 530-913-2370

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.

Easy to Verify at CalCERTS.com

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	2.17 KW MINIMUM – 150–270 DEG AT <=7/12 PITCH
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTED HEAT PUMP (HSPF2=9.5)
SPACE COOLING:	DUCTED HEAT PUMP (SEER2=17.0, EER2=12.0)
HEAT & COOL LOADS:	HEAT: 10,394 BTU/HR COOL: 6,549 BTU/HR
DUCT INSULATION:	R–8 ATTIC
WATER HEATING:	NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1) MANUF/MODEL: RHEEM/XE50T10H45U0
PIPE INSULATION:	ALL DHW PIPING SHALL BE INSULATED WITH 1"THICK OR MINIMUM R–VALUE 7.7
RADIANT BARRIER:	NA
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, DUCT LEAKAGE TESTING, MINIMUM AIRFLOW, FAN EFFICACY WATTS/CFM (0.58 WATTS/CFM), VERIFIED REFRIGERANT CHARGE, VERIFIED HSPF2, VERIFIED EER2, VERIFIED SEER2, VERIFIED HEAT PUMP RATED HEATING CAPACITY, KITCHEN RANGE HOOD
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE AND FUEL TYPE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV–01 – FENESTRATION, ENV–03 – INSULATION, LTG–01 – LIGHTING, MCH–01 – SPACE CONDITIONING SYSTEMS, PLB–22 – WATER HEATERS, PVB–01 – PV SYSTEMS
EXTERIOR WALLS:	R–21
ROOF ATTIC:	R–38 WITH R–13 ON PITCH TOUCHING ROOF SHEATHING
FLOOR:	R–19
WINDOWS:	NON–METAL FRAMED, DOUBLE PANE WITH LOW–E GLASS (U–VALUE=0.30, SHGC=0.23)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE (U–FACTOR=0.50)
SKYLIGHTS:	NA

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing

REGISTERED PROFESSIONAL ENGINEER – NICOLE E PORATA – No. 26789 – EXP. 9/30/24 – MECHANICAL – STATE OF CALIFORNIA

YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

TITLE 24 ENERGY REPORT - CZ11 RAISED DUCTED HP

T24.3.2

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:16:16-07:00 **(Page 1 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ductless HP - 23043.ribd22x

GENERAL INFORMATION

01	**Project Name**	1 Bedroom Raised CZ11 Ductless HP			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	TBD			
04	**City**	Nevada City	05	**Standards Version**	2022
06	**Zip code**	95959	07	**Software Version**	EnergyPro 9.1
08	**Climate Zone**	11	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)**	661	19	**Glazing Percentage (%)**	21.68%
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-P010082535A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:22:47 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:18:43

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:16:16-07:00 **(Page 2 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ductless HP - 23043.ribd22x

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	36.7	34.5	30.5			
Proposed Design						
North Facing	31.8	28.1	25.6	4.9	6.4	4.9
East Facing	32.2	30.1	27	4.5	4.4	3.5
South Facing	32	29.1	26.3	4.7	5.4	4.2
West Facing	32.4	30.1	27	4.3	4.4	3.5
RESULT[3]: 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

- Standard Design PV Capacity: 2.17 kWdc

Registration Number: 223-P010082535A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:22:47 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:16:16-07:00 **(Page 3 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ductless HP - 23043.ribd22x

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	5.07	34.25	4.33	33.11	0.74	1.14
Space Cooling	2.65	59.15	2.07	49.48	0.58	9.67
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.63	36.12	1.95	22.06	1.68	14.06
Self Utilization/Flexibility Credit				0		0
North Facing Efficiency Compliance Total	**11.75**	**133.8**	**8.75**	**108.93**	**3**	**24.87**
Space Heating	5.07	34.25	4.28	32.87	0.79	1.38
Space Cooling	2.65	59.15	2.38	57.84	0.27	1.31
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.63	36.12	1.95	22.04	1.68	14.08
Self Utilization/Flexibility Credit				0		0
East Facing Efficiency Compliance Total	**11.75**	**133.8**	**9.01**	**117.03**	**2.74**	**16.77**

Registration Number: 223-P010082535A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:22:47 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:16:16-07:00 **(Page 4 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ductless HP - 23043.ribd22x

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	5.07	34.25	4.35	33.76	0.72	0.49
Space Cooling	2.65	59.15	2.2	52.88	0.45	6.27
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.63	36.12	1.95	22.08	1.68	14.04
Self Utilization/Flexibility Credit				0		0
South Facing Efficiency Compliance Total	**11.75**	**133.8**	**8.9**	**113**	**2.85**	**20.8**
Space Heating	5.07	34.25	4.49	34.91	0.58	-0.66
Space Cooling	2.65	59.15	2.31	55.66	0.34	3.49
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.63	36.12	1.95	22.08	1.68	14.04
Self Utilization/Flexibility Credit				0		0
West Facing Efficiency Compliance Total	**11.75**	**133.8**	**9.15**	**116.93**	**2.6**	**16.87**

Registration Number: 223-P010082535A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:22:47 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:16:16-07:00 **(Page 5 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ductless HP - 23043.ribd22x

ENERGY USE INTENSITY

	Standard Design (kBtu/ft² - yr)	Proposed Design (kBtu/ft² - yr)	Compliance Margin (kBtu/ft² - yr)	Margin Percentage
North Facing				
Gross EUI[1]	31.86	28.02	3.84	12.05
Net EUI[2]	14.85	10.27	4.58	30.84
East Facing				
Gross EUI[1]	31.86	28.59	3.27	10.26
Net EUI[2]	14.85	10.84	4.01	27
South Facing				
Gross EUI[1]	31.86	28.17	3.69	11.58
Net EUI[2]	14.85	10.42	4.43	29.83
West Facing				
Gross EUI[1]	31.86	28.63	3.23	10.14
Net EUI[2]	14.85	10.89	3.96	26.67

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.

Registration Number: 223-P010082535A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:22:47 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:16:16-07:00 **(Page 6 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ductless HP - 23043.ribd22x

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: (≥ in 12)**	**Inverter Eff. (%)**	**Annual Solar Access (%)**
2.17	NA	Standard (14-17%)	Fixed	none	true	150-270	n/a	n/a	<=7:12	96	100

REQUIRED SPECIAL FEATURES

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

- Window overhangs and/or fins
- Variable capacity heat pump compliance option (verification details from VCHP Staff report, Appendix B, and RA3)
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

HERS FEATURE SUMMARY

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

- Indoor air quality ventilation
- Kitchen range hood
- Verified Refrigerant Charge
- Airflow in habitable rooms (SCS.1.4.1.7)
- Verified heat pump rated heating capacity
- Wall-mounted thermostat in zones greater than 150 ft2 (SCS.4.5)
- Ductless indoor units located entirely in conditioned space (SCS.1.4.1.8)

BUILDING - FEATURES INFORMATION

01	02	03	04	05	06	07
Project Name	**Conditioned Floor Area (ft²)**	**Number of Dwelling Units**	**Number of Bedrooms**	**Number of Zones**	**Number of Ventilation Cooling Systems**	**Number of Water Heating Systems**
1 Bedroom Raised CZ11 Ductless HP	661	1	1	1	0	1

Registration Number: 223-P010082535A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:22:47 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:18:43

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:16:16-07:00 **(Page 7 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ductless HP - 23043.ribd22x

ZONE INFORMATION

01	02	03	04	05	06	07
Zone Name	**Zone Type**	**HVAC System Name**	**Zone Floor Area (ft²)**	**Avg. Ceiling Height**	**Water Heating System 1**	**Status**
1 Bed Unit Zone	Conditioned	HVAC1	661	9	DHW Sys 1	New

OPAQUE SURFACES

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft²)**	**Window and Door Area (ft2)**	**Tilt (deg)**
Front Wall	1 Bed Unit Zone	R-21 Wall	0	Front	270	61.5	90
Right Wall	1 Bed Unit Zone	R-21 Wall	270	Right	216	0	90
Back Wall	1 Bed Unit Zone	R-21 Wall	180	Back	270	62	90
Left Wall	1 Bed Unit Zone	R-21 Wall	90	Left	216	54.02	90
Ceiling	1 Bed Unit Zone	R-38 Attic w/ Rad Bar	n/a	n/a	661	n/a	n/a
Raised Floor	1 Bed Unit Zone	R-19 Floor Crawl	n/a	n/a	661	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 1 Bed Unit Zone	Attic Roof1 Bed Unit Zone	Ventilated	6	0.1	0.85	Yes	No

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Front Window (OP)	Window	Front Wall	Front	0			1	24	0.3	NFRC	0.23	NFRC	Bug Screen

Registration Number: 223-P010082535A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:22:47 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Raised CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:16:16-07:00 **(Page 8 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Raised CZ11 Ductless HP - 23043.ribd22x

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Front Window (OP) 2	Window	Front Wall	Front	0	5	4	1	20	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP)	Window	Back Wall	Back	180			1	10	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 2	Window	Back Wall	Back	180			1	16	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 3	Window	Back Wall	Back	180			1	24	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 4	Window	Back Wall	Back	180			1	12	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP)	Window	Left Wall	Left	90	3	4.44	1	13.32	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP) 2	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP) 3	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.23	NFRC	Bug Screen

OPAQUE DOORS

01	02	03	04
Name	**Side of Building**	**Area (ft²)**	**U-factor**
Front Door	Front Wall	17.5	0.5
Left Door	Left Wall	16.7	0.5

Registration Number: 223-P010082535A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:22:47 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:18:43

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	2.17 KW MINIMUM – 150–270 DEG AT <=7/12 PITCH
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTLESS HEAT PUMP (HSPF2=7.5)
SPACE COOLING:	DUCTLESS HEAT PUMP (SEER2=14.3, EER2=9.0)
HEAT & COOL LOADS:	HEAT: 10,230 BTU/HR COOL: 6,410 BTU/HR
DUCT INSULATION:	NA
WATER HEATING:	NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1) MAUNF/MODEL: RHEEM/ XE40T10H45UO
PIPE INSULATION:	FIRST 5' OF HOT & COLD DHW PIPING INSULATED WITH 1"THICK, IF RECIRC LOOP ALL PIPE INSULATED
RADIANT BARRIER:	RADIANT BARRIER IN ATTIC AND GABLE ENDS INSTALLED PER MANUFACTURES SPECIFICATIONS REQUIRED
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, VERIFIED REFRIGERANT CHARGE, VERIFIED HEAT PUMP RATED HEATING CAPACITY, AIRFLOW IN HABITABLE ROOMS, WALL–MOUNTED THERMOSTAT IN ZONES GREATER THAN 150 SQ FT, DUCTLESS INDOOR UNITS LOCATED ENTIRELY IN CONDITIONED SPACE, KITCHEN RANGE HOOD
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOODS REQUIRE 100 CFM LOCAL EXHAUST MINIMUM WITH A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. HOOD FANS THAT EXHAUST >400 CFM AT MINIMUM SPEED ARE EXEMPT FROM HERS RATING. OTHER TYPES OF INTERMITTENT LOCAL EXHAUST FOR KITCHENS NEED 300 CFM OR A CAPACITY AT 5 ACH.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV–01 – FENESTRATION, ENV–03 – INSULATION, ENV–05 – ROOFING, LTG–01 – LIGHTING, MECH–01 – MECHANICAL, PLB–01 – WATER HEATERS, PLB–02 – PLUMBING
EXTERIOR WALLS:	R–21
ROOF ATTIC:	R–38
FLOOR:	R–19
WINDOWS:	NON–METAL FRAMED, DOUBLE PANE WITH LOW–E GLASS (U–VALUE=0.30, SHGC=0.23)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE (U–FACTOR=0.50)
SKYLIGHTS:	NA

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)

DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing

REGISTERED PROFESSIONAL ENGINEER MECHANICAL No. 26789 Exp. 9/30/24 STATE OF CALIFORNIA

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PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
1	REV 1	12/11/23

TITLE 24 ENERGY REPORT - CZ11 RAISED DUCTLESS HP

T24.4.1

OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Window	Overhang					Left Fin				Right Fin			
	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up
Front Window (OP) 2	4	0.3	12	0.8	0	0	0	0	0	0	0	0	0
Left Window (OP)	18	0.3	0.5	0	0	0	0	0	0	0	0	0	0

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
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / None	0.066	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Exterior Finish: Wood Siding/sheathing/decking
Attic Roof1 Bed Unit Zone	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-0	None / 0	0.644	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: no insul. / 2x4
R-19 Floor Crawl	Floors Over Crawlspace	Wood Framed Floor	2x10 @ 16 in. O. C.	R-19	None / None	0.046	Floor Surface: Carpeted Floor Deck: Wood Siding/sheathing/decking Cavity / Frame: R-19 / 2x10
R-38 Attic w/ Rad Bar	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 16 in. O. C.	R-38	None / None	0.025	Over Ceiling Joists: R-28.9 insul. Cavity / Frame: R-9.1 / 2x4 Inside Finish: Gypsum Board

Registration Number: 223-P010082535A-000-000-0000000-0000
CA Building Energy Efficiency Standards - 2022 Residential Compliance
Registration Date/Time: 2023-07-12 08:22:47
Report Version: 2022.0.000
Schema Version: rev 20220901
HERS Provider: CalCERTS Inc.
Report Generated: 2023-07-12 08:18:43

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	34	0.35	Exhaust	No	n/a	No	Yes	

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BUILDING ENVELOPE - HERS VERIFICATION

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

WATER HEATING SYSTEMS

01	02	03	04	05	06	07	08	09
Name	System Type	Distribution Type	Water Heater Name	Number of Units	Solar Heating System	Compact Distribution	HERS Verification	Water Heater Name (#)
DHW Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (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
DHW Heater 1	1	40	Rheem	RheemXE40T10H45U0	Outside	1 Bed Unit Zone	1 Bed Unit Zone

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 Sys 1 - 1/1	Not Required	Not Required	Not Required	None	Not Required	Not Required

Registration Number: 223-P010082535A-000-000-0000000-0000
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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I, I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Nicole E Porata	Documentation Author Signature: Nicole E Porata
Company: Melas Energy Engineering	Signature Date: 2023-07-12 08:20:52
Address: 547 Uren St.	CEA / HERS Certification Identification (If applicable): R19-17-30033
City/State/Zip: Nevada City, CA 95959	Phone: 530-265-2492

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.
2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name: Russell Davidson	Responsible Designer Signature: Russell Davidson
Company: Russell Davidson Architecture + Design	Date Signed: 2023-07-12 08:22:47
Address: 149 Crown Point Ct, Suite A	License: C36895
City/State/Zip: Grass Valley, CA 95949	Phone: 530-913-2370

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.

Easy to Verify at CalCERTS.com

Registration Number: 223-P010082535A-000-000-0000000-0000
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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
HVAC1	Heat pump heating cooling	Heat Pump System 1	1	Heat Pump System 1	1	n/a	n/a	Setback

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	System Type	Number of Units	Heating				Cooling			Zonally Controlled	Compressor Type	HERS Verification
			Efficiency Type	HSPF / HSPF2 / COP	Cap 47	Cap 17	Efficiency Type	SEER / SEER2	EER / EER / CEER			
Heat Pump System 1	VCHP-ductless	1	HSPF2	7.5	18000	12000	EER2SEER2	14.3	9	Not Zonal	Single Speed	Heat Pump System 1-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
Heat Pump System 1-hers-htpump	Not Required	0	Not Required	Not Required	Yes	No	Yes	Yes

VARIABLE CAPACITY HEAT PUMP COMPLIANCE OPTION - HERS VERIFICATION

01	02	03	04	05	06	07	08	09	10
Name	Certified Low-Static VCHP System	Airflow to Habitable Rooms	Ductless Units in Conditioned Space	Wall Mount Thermostat	Air Filter Sizing & Pressure Drop Rating	Low Leakage Ducts in Conditioned Space	Minimum Airflow per RA3.3 and SC3.3.4.1	Certified non-continuous Fan	Indoor Fan not Running Continuously
Heat Pump System 1	Not required	Required	Required	Required	Not required	Not required	Not required	Not required	Not required

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ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	2.17 KW MINIMUM – 150–270 DEG AT <=7/12 PITCH
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTLESS HEAT PUMP (HSPF2=7.5)
SPACE COOLING:	DUCTLESS HEAT PUMP (SEER2=14.3, EER2=9.0)
HEAT & COOL LOADS:	HEAT: 10,230 BTU/HR COOL: 6,410 BTU/HR
DUCT INSULATION:	NA
WATER HEATING:	NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1) MAUNF/MODEL: RHEEM/ XE40T10H45U0
PIPE INSULATION:	FIRST 5' OF HOT & COLD DHW PIPING INSULATED WITH 1"THICK, IF RECIRC LOOP ALL PIPE INSULATED
RADIANT BARRIER:	RADIANT BARRIER IN ATTIC AND GABLE ENDS INSTALLED PER MANUFACTURES SPECIFICATIONS REQUIRED
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, VERIFIED REFRIGERANT CHARGE, VERIFIED HEAT PUMP RATED HEATING CAPACITY, AIRFLOW IN HABITABLE ROOMS, WALL-MOUNTED THERMOSTAT IN ZONES GREATER THAN 150 SQ FT, DUCTLESS INDOOR UNITS LOCATED ENTIRELY IN CONDITIONED SPACE, KITCHEN RANGE HOOD
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOODS REQUIRE 100 CFM LOCAL EXHAUST MINIMUM WITH A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. HOOD FANS THAT EXHAUST >400 CFM AT MINIMUM SPEED ARE EXEMPT FROM HERS RATING. OTHER TYPES OF INTERMITTENT LOCAL EXHAUST FOR KITCHENS NEED 300 CFM OR A CAPACITY AT 5 ACH.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV-01 – FENESTRATION, ENV-03 – INSULATION, ENV-05 – ROOFING, LTG-01 – LIGHTING, MECH-01 – MECHANICAL, PLB-01 – WATER HEATERS, PLB-02 – PLUMBING
EXTERIOR WALLS:	R-21
ROOF ATTIC:	R-38
FLOOR:	R-19
WINDOWS:	NON-METAL FRAMED, DOUBLE PANE WITH LOW-E GLASS (U-VALUE=0.30, SHGC=0.23)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE (U-FACTOR=0.50)
SKYLIGHTS:	NA

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

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REGISTERED PROFESSIONAL ENGINEER
NICOLE E PORATA
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1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
1	REV 1	12/11/23

TITLE 24 ENERGY REPORT - CZ11 RAISED DUCTLESS HP

T24.4.2

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T08:04:43-07:00 **(Page 1 of 14)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ducted HP - 23043.ribd22x

GENERAL INFORMATION					
01	**Project Name**	1 Bedroom Slab CZ11 Ducted HP			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	TBD			
04	**City**	Nevada City	05	**Standards Version**	2022
06	**Zip code**	95959	07	**Software Version**	EnergyPro 9.1
08	**Climate Zone**	11	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)**	661	19	**Glazing Percentage (%)**	21.68%
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-P010082518A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:17:06 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:07:03

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T08:04:43-07:00 **(Page 2 of 14)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ducted HP - 23043.ribd22x

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	37.5	34.7	31.4			
Proposed Design						
North Facing	32.2	29.9	26.8	5.3	4.8	4.6
East Facing	32.6	32.2	28.4	4.9	2.5	3
South Facing	32.5	31.1	27.7	5	3.6	3.7
West Facing	32.9	32.2	28.4	4.6	2.5	3
RESULT[3]: 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

- Standard Design PV Capacity: 2.06 kWdc

Registration Number: 223-P010082518A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:17:06 HERS Provider: CalCERTS Inc.

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Project Name: 1 Bedroom Slab CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T08:04:43-07:00 **(Page 3 of 14)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ducted HP - 23043.ribd22x

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	6.64	44.9	5.54	42.41	1.1	2.49
Space Cooling	2.22	50.29	1.97	49.28	0.25	1.01
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.65	36.25	1.77	20.82	1.88	15.43
Self Utilization/Flexibility Credit				0		0
North Facing Efficiency Compliance Total	**12.91**	**135.72**	**9.68**	**116.79**	**3.23**	**18.93**
Space Heating	6.64	44.9	5.48	42.12	1.16	2.78
Space Cooling	2.22	50.29	2.31	58.84	-0.09	-8.55
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.65	36.25	1.76	20.8	1.89	15.45
Self Utilization/Flexibility Credit				0		0
East Facing Efficiency Compliance Total	**12.91**	**135.72**	**9.95**	**126.04**	**2.96**	**9.68**

Registration Number: 223-P010082518A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:17:06 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T08:04:43-07:00 **(Page 4 of 14)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ducted HP - 23043.ribd22x

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	6.64	44.9	5.56	43.17	1.08	1.73
Space Cooling	2.22	50.29	2.1	53.22	0.12	-2.93
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.65	36.25	1.77	20.83	1.88	15.42
Self Utilization/Flexibility Credit				0		0
South Facing Efficiency Compliance Total	**12.91**	**135.72**	**9.83**	**121.5**	**3.08**	**14.22**
Space Heating	6.64	44.9	5.69	44.29	0.95	0.61
Space Cooling	2.22	50.29	2.23	56.53	-0.01	-6.24
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.65	36.25	1.77	20.83	1.88	15.42
Self Utilization/Flexibility Credit				0		0
West Facing Efficiency Compliance Total	**12.91**	**135.72**	**10.09**	**125.93**	**2.82**	**9.79**

Registration Number: 223-P010082518A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:17:06 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T08:04:43-07:00 **(Page 5 of 14)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ducted HP - 23043.ribd22x

ENERGY USE INTENSITY

	Standard Design (kBtu/ft² - yr)	Proposed Design (kBtu/ft² - yr)	Compliance Margin (kBtu/ft² - yr)	Margin Percentage
North Facing				
Gross EUI[1]	32.56	28.72	3.84	11.79
Net EUI[2]	16.37	10.98	5.39	32.93
East Facing				
Gross EUI[1]	32.56	29.34	3.22	9.89
Net EUI[2]	16.37	11.6	4.77	29.14
South Facing				
Gross EUI[1]	32.56	28.9	3.66	11.24
Net EUI[2]	16.37	11.15	5.22	31.89
West Facing				
Gross EUI[1]	32.56	29.39	3.17	9.74
Net EUI[2]	16.37	11.65	4.72	28.83

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.

Registration Number: 223-P010082518A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:17:06 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:07:03

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T08:04:43-07:00 **(Page 6 of 14)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ducted HP - 23043.ribd22x

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: (≥ in 12)**	**Inverter Eff. (%)**	**Annual Solar Access (%)**
2.17	NA	Standard (14-17%)	Fixed	none	true	150-270	n/a	n/a	<=7:12	96	100

REQUIRED SPECIAL FEATURES

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

- Insulation below roof deck
- Window overhangs and/or fins
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

HERS FEATURE SUMMARY

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

- Indoor air quality ventilation
- Kitchen range hood
- Minimum Airflow
- Verified EER/EER2
- Verified SEER/SEER2
- Verified Refrigerant Charge
- Fan Efficacy Watts/CFM
- Verified HSPF2
- Verified heat pump rated heating capacity
- Duct leakage testing

BUILDING - FEATURES INFORMATION

01	02	03	04	05	06	07
Project Name	**Conditioned Floor Area (ft²)**	**Number of Dwelling Units**	**Number of Bedrooms**	**Number of Zones**	**Number of Ventilation Cooling Systems**	**Number of Water Heating Systems**
1 Bedroom Slab CZ11 Ducted HP	661	1	1	1	0	1

Registration Number: 223-P010082518A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:17:06 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:07:03

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T08:04:43-07:00 **(Page 7 of 14)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ducted HP - 23043.ribd22x

ZONE INFORMATION

01	02	03	04	05	06	07
Zone Name	**Zone Type**	**HVAC System Name**	**Zone Floor Area (ft²)**	**Avg. Ceiling Height**	**Water Heating System 1**	**Status**
1 Bed Unit Zone	Conditioned	HVAC1	661	9	DHW Sys 1	New

OPAQUE SURFACES

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft²)**	**Window and Door Area (ft2)**	**Tilt (deg)**
Front Wall	1 Bed Unit Zone	R-21 Wall	0	Front	270	61.5	90
Right Wall	1 Bed Unit Zone	R-21 Wall	270	Right	216	0	90
Back Wall	1 Bed Unit Zone	R-21 Wall	180	Back	270	62	90
Left Wall	1 Bed Unit Zone	R-21 Wall	90	Left	216	54.02	90
Ceiling	1 Bed Unit Zone	R-38+R-13 HP Attic	n/a	n/a	661	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 1 Bed Unit Zone	Attic Roof1 Bed Unit Zone	Ventilated	6	0.1	0.85	No	No

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Front Window (OP)	Window	Front Wall	Front	0			1	24	0.3	NFRC	0.23	NFRC	Bug Screen
Front Window (OP) 2	Window	Front Wall	Front	0	5	4	1	20	0.3	NFRC	0.23	NFRC	Bug Screen

Registration Number: 223-P010082518A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:17:06 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:07:03

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ducted HP **Calculation Date/Time:** 2023-07-12T08:04:43-07:00 **(Page 8 of 14)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ducted HP - 23043.ribd22x

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Back Window (OP)	Window	Back Wall	Back	180			1	10	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 2	Window	Back Wall	Back	180			1	16	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 3	Window	Back Wall	Back	180			1	24	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 4	Window	Back Wall	Back	180			1	12	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP)	Window	Left Wall	Left	90	3	4.44	1	13.32	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP) 2	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP) 3	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.23	NFRC	Bug Screen

OPAQUE DOORS

01	02	03	04
Name	**Side of Building**	**Area (ft²)**	**U-factor**
Front Door	Front Wall	17.5	0.5
Left Door	Left Wall	16.7	0.5

Registration Number: 223-P010082518A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:17:06 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:07:03

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	2.06 KW MINIMUM – 150–270 DEG AT <=7/12 PITCH
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTED HEAT PUMP (HSPF2=9.5)
SPACE COOLING:	DUCTED HEAT PUMP (SEER2=17.0, EER2=12.0)
HEAT & COOL LOADS:	HEAT: 13,088 BTU/HR COOL: 6,263 BTU/HR
DUCT INSULATION:	R–8 ATTIC
WATER HEATING:	NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1) MANUF/MODEL: RHEEM/XE50T10H45U0
PIPE INSULATION:	ALL DHW PIPING SHALL BE INSULATED WITH 1"THICK OR MINIMUM R–VALUE 7.7
RADIANT BARRIER:	NA
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, DUCT LEAKAGE TESTING, MINIMUM AIRFLOW, FAN EFFICACY WATTS/CFM (0.58 WATTS/CFM), VERIFIED REFRIGERANT CHARGE, VERIFIED HSPF2, VERIFIED EER2, VERIFIED SEER2, VERIFIED HEAT PUMP RATED HEATING CAPACITY, KITCHEN RANGE HOOD
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 37 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE AND FUEL TYPE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV–01 – FENESTRATION, ENV–03 – INSULATION, LTG–01 – LIGHTING, MCH–01 – SPACE CONDITIONING SYSTEMS, PLB–22 – WATER HEATERS, PVB–01 – PV SYSTEMS
EXTERIOR WALLS:	R–21
ROOF ATTIC:	R–38 WITH R–13 ON PITCH TOUCHING ROOF SHEATHING
FLOOR:	SLAB ON GRADE
WINDOWS:	NON–METAL FRAMED, DOUBLE PANE WITH LOW–E GLASS (U–VALUE=0.30, SHGC=0.23)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE (U–FACTOR=0.50)
SKYLIGHTS:	NA

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

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YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
1	REV 1	12/11/23

TITLE 24 ENERGY REPORT - CZ11 SLAB DUCTED HP

T24.5.1

OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Window	Overhang					Left Fin				Right Fin			
	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up
Front Window (OP) 2	4	0.3	12	0.8	0	0	0	0	0	0	0	0	0
Left Window (OP)	18	0.3	0.5	0	0	0	0	0	0	0	0	0	0

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	1 Bed Unit Zone	661	108	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
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / None	0.066	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Exterior Finish: Wood Siding/sheathing/decking
Attic Roof1 Bed Unit Zone	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-13	None / 0	0.078	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-13.0 / 2x4 Ground Roof Joists: R-0.0 Insul.

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
R-38+R-13 HP Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 16 in. O. C.	R-38	None / None	0.025	Over Ceiling Joists: R-28.9 insul. Cavity / Frame: R-9.1 / 2x4 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

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 Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (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
DHW Heater 1	1	50	Rheem	RheemXE50T10H45U0	Outside	1 Bed Unit Zone	1 Bed Unit Zone

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 Sys 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
HVAC1	Heat pump heating cooling	Heat Pump System 1	1	Heat Pump System 1	1	HVAC Fan 1	Air Distribution System 1	Setback

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
				Heating			Cooling					
Name	System Type	Number of Units	Efficiency Type	HSPF / HSPF2 / COP	Cap 47	Cap 17	Efficiency Type	SEER / SEER2	EER / EER / CEER	Zonally Controlled	Compressor Type	HERS Verification
Heat Pump System 1	Central split HP	1	HSPF2	9.5	27000	22000	EER2SEER2	17	12	Not Zonal	Single Speed	Heat Pump System 1-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
Heat Pump System 1-hers-htpump	Required	350	Required	Required	Yes	Yes	Yes	Yes

HVAC - DISTRIBUTION SYSTEMS

01	02	03	04	05	06	07	08	09	10	11	12
			Duct Ins. R-value		Duct Location		Surface Area				
Name	Type	Design Type	Supply	Return	Supply	Return	Supply	Return	Bypass Duct	Duct Leakage	HERS Verification
Air Distribution System 1	Unconditioned attic	Non-Verified	R-8	R-8	Attic	Attic	n/a	n/a	No Bypass Duct	Sealed and Tested	Air Distribution System 1-hers-dist

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
Air 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 1	HVAC Fan	0.58	HVAC Fan 1-hers-fan

HVAC FAN SYSTEMS - HERS VERIFICATION

01	02	03
Name	Verified Fan Watt Draw	Required Fan Efficacy (Watts/CFM)
HVAC Fan 1-hers-fan	Required	0.58

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	34	0.35	Exhaust	No	n/a	No	Yes	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I, I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Nicole E Porata	Documentation Author Signature: Nicole E Porata
Company: Melas Energy Engineering	Signature Date: 2023-07-12 08:09:43
Address: 547 Uren St.	CEA/ HERS Certification Identification (If applicable): R19-17-30033
City/State/Zip: Nevada City, CA 95959	Phone: 530-265-2492

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.
2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name: Russell Davidson	Responsible Designer Signature: Russell Davidson
Company: Russell Davidson Architecture + Design	Date Signed: 2023-07-12 08:17:06
Address: 149 Crown Point Ct, Suite A	License: C36895
City/State/Zip: Grass Valley, CA 95949	Phone: 530-913-2370

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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ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	2.06 KW MINIMUM – 150–270 DEG AT <=7/12 PITCH
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTED HEAT PUMP (HSPF2=9.5)
SPACE COOLING:	DUCTED HEAT PUMP (SEER2=17.0, EER2=12.0)
HEAT & COOL LOADS:	HEAT: 13,088 BTU/HR COOL: 6,263 BTU/HR
DUCT INSULATION:	R–8 ATTIC
WATER HEATING:	NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1) MANUF/MODEL: RHEEM/XE50T10H45U0
PIPE INSULATION:	ALL DHW PIPING SHALL BE INSULATED WITH 1"THICK OR MINIMUM R–VALUE 7.7
RADIANT BARRIER:	NA
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, DUCT LEAKAGE TESTING, MINIMUM AIRFLOW, FAN EFFICACY WATTS/CFM (0.58 WATTS/CFM), VERIFIED REFRIGERANT CHARGE, VERIFIED HSPF2, VERIFIED EER2, VERIFIED SEER2, VERIFIED HEAT PUMP RATED HEATING CAPACITY, KITCHEN RANGE HOOD
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE AND FUEL TYPE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV–01 – FENESTRATION, ENV–03 – INSULATION, LTG–01 – LIGHTING, MCH–01 – SPACE CONDITIONING SYSTEMS, PLB–22 – WATER HEATERS, PV8–01 – PV SYSTEMS
EXTERIOR WALLS:	R–21
ROOF ATTIC:	R–38 WITH R–13 ON PITCH TOUCHING ROOF SHEATHING
FLOOR:	SLAB ON GRADE
WINDOWS:	NON–METAL FRAMED, DOUBLE PANE WITH LOW–E GLASS (U–VALUE=0.30, SHGC=0.23)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE (U–FACTOR=0.50)
SKYLIGHTS:	NA

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

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REGISTERED PROFESSIONAL ENGINEER – MECHANICAL – No. 26789 – Exp. 9/30/24 – STATE OF CALIFORNIA

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PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
1	REV 1	12/11/23

TITLE 24 ENERGY REPORT - CZ11 SLAB DUCTED HP

T24.5.2

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:27:08-07:00 **(Page 1 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ductless HP - 23043.ribd22x

GENERAL INFORMATION

01	**Project Name**	1 Bedroom Slab CZ11 Ductless HP			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	TBD			
04	**City**	Nevada City	05	**Standards Version**	2022
06	**Zip code**	95959	07	**Software Version**	EnergyPro 9.1
08	**Climate Zone**	11	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)**	661	19	**Glazing Percentage (%)**	21.68%
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-P010082551A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:51:46 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:29:24

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:27:08-07:00 **(Page 2 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ductless HP - 23043.ribd22x

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	37.5	34.7	31.4			
Proposed Design						
North Facing	31.2	26.8	25.6	6.3	7.9	5.8
East Facing	31.6	28.9	26.9	5.9	5.8	4.5
South Facing	31.4	27.9	26.3	6.1	6.8	5.1
West Facing	31.8	28.9	26.9	5.7	5.8	4.5
RESULT[3]: 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

- Standard Design PV Capacity: 2.06 kWdc

Registration Number: 223-P010082551A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:51:46 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:29:24

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:27:08-07:00 **(Page 3 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ductless HP - 23043.ribd22x

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	6.64	44.9	4.77	36.71	1.87	8.19
Space Cooling	2.22	50.29	1.73	41.88	0.49	8.41
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.65	36.25	1.96	22.09	1.69	14.16
Self Utilization/Flexibility Credit				0		0
North Facing Efficiency Compliance Total	**12.91**	**135.72**	**8.86**	**104.96**	**4.05**	**30.76**
Space Heating	6.64	44.9	4.72	36.45	1.92	8.45
Space Cooling	2.22	50.29	2.03	50.08	0.19	0.21
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.65	36.25	1.95	22.08	1.7	14.17
Self Utilization/Flexibility Credit				0		0
East Facing Efficiency Compliance Total	**12.91**	**135.72**	**9.1**	**112.89**	**3.81**	**22.83**

Registration Number: 223-P010082551A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:51:46 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:29:24

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:27:08-07:00 **(Page 4 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ductless HP - 23043.ribd22x

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	6.64	44.9	4.79	37.38	1.85	7.52
Space Cooling	2.22	50.29	1.84	45.18	0.38	5.11
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.65	36.25	1.95	22.1	1.7	14.15
Self Utilization/Flexibility Credit				0		0
South Facing Efficiency Compliance Total	**12.91**	**135.72**	**8.98**	**108.94**	**3.93**	**26.78**
Space Heating	6.64	44.9	4.92	38.49	1.72	6.41
Space Cooling	2.22	50.29	1.96	47.97	0.26	2.32
IAQ Ventilation	0.4	4.28	0.4	4.28	0	0
Water Heating	3.65	36.25	1.96	22.1	1.69	14.15
Self Utilization/Flexibility Credit				0		0
West Facing Efficiency Compliance Total	**12.91**	**135.72**	**9.24**	**112.84**	**3.67**	**22.88**

Registration Number: 223-P010082551A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:51:46 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:29:24

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:27:08-07:00 **(Page 5 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ductless HP - 23043.ribd22x

ENERGY USE INTENSITY

	Standard Design (kBtu/ft² - yr)	Proposed Design (kBtu/ft² - yr)	Compliance Margin (kBtu/ft² - yr)	Margin Percentage
North Facing				
Gross EUI[1]	32.56	27.8	4.76	14.62
Net EUI[2]	16.37	10.96	5.41	33.05
East Facing				
Gross EUI[1]	32.56	28.34	4.22	12.96
Net EUI[2]	16.37	11.5	4.87	29.75
South Facing				
Gross EUI[1]	32.56	27.95	4.61	14.16
Net EUI[2]	16.37	11.11	5.26	32.13
West Facing				
Gross EUI[1]	32.56	28.4	4.16	12.78
Net EUI[2]	16.37	11.55	4.82	29.44

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.

Registration Number: 223-P010082551A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:51:46 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:27:08-07:00 **(Page 6 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ductless HP - 23043.ribd22x

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: (≥ in 12)**	**Inverter Eff. (%)**	**Annual Solar Access (%)**
2.06	NA	Standard (14-17%)	Fixed	none	true	150-270	n/a	n/a	<=7:12	96	100

REQUIRED SPECIAL FEATURES

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

- Window overhangs and/or fins
- Variable capacity heat pump compliance option (verification details from VCHP Staff report, Appendix B, and RA3)
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

HERS FEATURE SUMMARY

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

- Indoor air quality ventilation
- Kitchen range hood
- Verified Refrigerant Charge
- Airflow in habitable rooms (SCS.1.4.1.7)
- Verified heat pump rated heating capacity
- Wall-mounted thermostat in zones greater than 150 ft2 (SCS.4.5)
- Ductless indoor units located entirely in conditioned space (SCS.1.4.1.8)

BUILDING - FEATURES INFORMATION

01	02	03	04	05	06	07
Project Name	**Conditioned Floor Area (ft²)**	**Number of Dwelling Units**	**Number of Bedrooms**	**Number of Zones**	**Number of Ventilation Cooling Systems**	**Number of Water Heating Systems**
1 Bedroom Slab CZ11 Ductless HP	661	1	1	1	0	1

Registration Number: 223-P010082551A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:51:46 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:27:08-07:00 **(Page 7 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ductless HP - 23043.ribd22x

ZONE INFORMATION

01	02	03	04	05	06	07
Zone Name	**Zone Type**	**HVAC System Name**	**Zone Floor Area (ft²)**	**Avg. Ceiling Height**	**Water Heating System 1**	**Status**
1 Bed Unit Zone	Conditioned	HVAC1	661	9	DHW Sys 1	New

OPAQUE SURFACES

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft²)**	**Window and Door Area (ft2)**	**Tilt (deg)**
Front Wall	1 Bed Unit Zone	R-21 Wall	0	Front	270	61.5	90
Right Wall	1 Bed Unit Zone	R-21 Wall	270	Right	216	0	90
Back Wall	1 Bed Unit Zone	R-21 Wall	180	Back	270	62	90
Left Wall	1 Bed Unit Zone	R-21 Wall	90	Left	216	54.02	90
Ceiling	1 Bed Unit Zone	R-38 Attic w/ Rad Bar	n/a	n/a	661	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 1 Bed Unit Zone	Attic Roof1 Bed Unit Zone	Ventilated	6	0.1	0.85	Yes	No

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Front Window (OP)	Window	Front Wall	Front	0			1	24	0.3	NFRC	0.23	NFRC	Bug Screen
Front Window (OP) 2	Window	Front Wall	Front	0	5	4	1	20	0.3	NFRC	0.23	NFRC	Bug Screen

Registration Number: 223-P010082551A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:51:46 HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ11 Ductless HP **Calculation Date/Time:** 2023-07-12T08:27:08-07:00 **(Page 8 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ11 Ductless HP - 23043.ribd22x

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Back Window (OP)	Window	Back Wall	Back	180			1	10	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 2	Window	Back Wall	Back	180			1	16	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 3	Window	Back Wall	Back	180			1	24	0.3	NFRC	0.23	NFRC	Bug Screen
Back Window (OP) 4	Window	Back Wall	Back	180			1	12	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP)	Window	Left Wall	Left	90	3	4.44	1	13.32	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP) 2	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.23	NFRC	Bug Screen
Left Window (OP) 3	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.23	NFRC	Bug Screen

OPAQUE DOORS

01	02	03	04
Name	**Side of Building**	**Area (ft²)**	**U-factor**
Front Door	Front Wall	17.5	0.5
Left Door	Left Wall	16.7	0.5

Registration Number: 223-P010082551A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 08:51:46 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 08:29:24

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	2.06 KW MINIMUM – 150–270 DEG AT <=7/12 PITCH
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTLESS HEAT PUMP (HSPF2=7.5)
SPACE COOLING:	DUCTLESS HEAT PUMP (SEER2=14.3, EER2=9.0)
HEAT & COOL LOADS:	HEAT: 12,729 BTU/HR COOL: 6,150 BTU/HR
DUCT INSULATION:	NA
WATER HEATING:	NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1) MAUNF/MODEL: RHEEM/ XE40T10H45UD
PIPE INSULATION:	FIRST 5' OF HOT & COLD DHW PIPING INSULATED WITH 1"THICK, IF RECIRC LOOP ALL PIPE INSULATED
RADIANT BARRIER:	RADIANT BARRIER IN ATTIC AND GABLE ENDS INSTALLED PER MANUFACTURES SPECIFICATIONS REQUIRED
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, VERIFIED REFRIGERANT CHARGE, VERIFIED HEAT PUMP RATED HEATING CAPACITY, AIRFLOW IN HABITABLE ROOMS, WALL–MOUNTED THERMOSTAT IN ZONES GREATER THAN 150 SQ FT, DUCTLESS INDOOR UNITS LOCATED ENTIRELY IN CONDITIONED SPACE, KITCHEN RANGE HOOD
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOODS REQUIRE 100 CFM LOCAL EXHAUST MINIMUM WITH A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. HOOD FANS THAT EXHAUST >400 CFM AT MINIMUM SPEED ARE EXEMPT FROM HERS RATING. OTHER TYPES OF INTERMITTENT LOCAL EXHAUST FOR KITCHENS NEED 300 CFM OR A CAPACITY AT 5 ACH.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV–01 – FENESTRATION, ENV–03 – INSULATION, ENV–05 – ROOFING, LTG–01 – LIGHTING, MECH–01 – MECHANICAL, PLB–01 – WATER HEATERS, PLB–02 – PLUMBING
EXTERIOR WALLS:	R–21
ROOF ATTIC:	R–38
FLOOR:	SLAB ON GRADE
WINDOWS:	NON–METAL FRAMED, DOUBLE PANE WITH LOW–E GLASS (U–VALUE=0.30, SHGC=0.23)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE (U–FACTOR=0.50)
SKYLIGHTS:	NA

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing

REGISTERED PROFESSIONAL ENGINEER — MECHANICAL — No. 26789 — Exp. 9/30/24 — STATE OF CALIFORNIA

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PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
1	REV 1	12/11/23

TITLE 24 ENERGY REPORT - CZ11 SLAB DUCTLESS HP

T24.6.1

OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Window	Overhang					Left Fin				Right Fin			
	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up
Front Window (OP) 2	4	0.3	12	0.8	0	0	0	0	0	0	0	0	0
Left Window (OP)	18	0.3	0.5	0	0	0	0	0	0	0	0	0	0

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	1 Bed Unit Zone	661	108	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
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / None	0.066	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Exterior Finish: Wood Siding/sheathing/decking
Attic Roof1 Bed Unit Zone	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-0	None / 0	0.644	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: no insul. / 2x4
R-38 Attic w/ Rad Bar	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 16 in. O. C.	R-38	None / None	0.025	Over Ceiling Joists: R-28.9 insul. Cavity / Frame: R-9.1 / 2x4 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

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 Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (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
DHW Heater 1	1	40	Rheem	RheemXE40T10H45U0	Outside	1 Bed Unit Zone	1 Bed Unit Zone

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 Sys 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
HVAC1	Heat pump heating cooling	Heat Pump System 1	1	Heat Pump System 1	1	n/a	n/a	Setback

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	System Type	Number of Units	Heating				Cooling			Zonally Controlled	Compressor Type	HERS Verification
			Efficiency Type	HSPF / HSPF2 / COP	Cap 47	Cap 17	Efficiency Type	SEER / SEER2	EER / EER / CEER			
Heat Pump System 1	VCHP-ductless	1	HSPF2	7.5	18000	12000	EER2SEER2	14.3	9	Not Zonal	Single Speed	Heat Pump System 1-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
Heat Pump System 1-hers-htpump	Not Required	0	Not Required	Not Required	Yes	No	Yes	Yes

VARIABLE CAPACITY HEAT PUMP COMPLIANCE OPTION - HERS VERIFICATION

01	02	03	04	05	06	07	08	09	10
Name	Certified Low-Static VCHP System	Airflow to Habitable Rooms	Ductless Units in Conditioned Space	Wall Mount Thermostat	Air Filter Sizing & Pressure Drop Rating	Low Leakage Ducts in Conditioned Space	Minimum Airflow per RA3.3 and SC3.3.4.1	Certified non-continuous Fan	Indoor Fan not Running Continuously
Heat Pump System 1	Not required	Required	Required	Required	Not required	Not required	Not required	Not required	Not required

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	34	0.35	Exhaust	No	n/a	No	Yes	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I, I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Nicole E Porata	Documentation Author Signature: Nicole E Porata
Company: Melas Energy Engineering	Signature Date: 2023-07-12 08:31:51
Address: 547 Uren St.	CEA / HERS Certification Identification (If applicable): R19-17-30033
City/State/Zip: Nevada City, CA 95959	Phone: 530-265-2492

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.
2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name: Russell Davidson	Responsible Designer Signature: Russell Davidson
Company: Russell Davidson Architecture + Design	Date Signed: 2023-07-12 08:51:46
Address: 149 Crown Point Ct, Suite A	License: C36895
City/State/Zip: Grass Valley, CA 95949	Phone: 530-913-2370

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.

Easy to Verify at CalCERTS.com

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	2.06 KW MINIMUM – 150–270 DEG AT <=7/12 PITCH
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTLESS HEAT PUMP (HSPF2=7.5)
SPACE COOLING:	DUCTLESS HEAT PUMP (SEER2=14.3, EER2=9.0)
HEAT & COOL LOADS:	HEAT: 12,729 BTU/HR COOL: 6,150 BTU/HR
DUCT INSULATION:	NA
WATER HEATING:	NEEA RATED HEAT PUMP WATER HEATER (UEF=3.1) MAUNF/MODEL: RHEEM/ XE40T10H45U0
PIPE INSULATION:	FIRST 5' OF HOT & COLD DHW PIPING INSULATED WITH 1"THICK, IF RECIRC LOOP ALL PIPE INSULATED
RADIANT BARRIER:	RADIANT BARRIER IN ATTIC AND GABLE ENDS INSTALLED PER MANUFACTURES SPECIFICATIONS REQUIRED
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, VERIFIED REFRIGERANT CHARGE, VERIFIED HEAT PUMP RATED HEATING CAPACITY, AIRFLOW IN HABITABLE ROOMS, WALL–MOUNTED THERMOSTAT IN ZONES GREATER THAN 150 SQ FT, DUCTLESS INDOOR UNITS LOCATED ENTIRELY IN CONDITIONED SPACE, KITCHEN RANGE HOOD
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOODS REQUIRE 100 CFM LOCAL EXHAUST MINIMUM WITH A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. HOOD FANS THAT EXHAUST >400 CFM AT MINIMUM SPEED ARE EXEMPT FROM HERS RATING. OTHER TYPES OF INTERMITTENT LOCAL EXHAUST FOR KITCHENS NEED 300 CFM OR A CAPACITY AT 5 ACH.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV–01 – FENESTRATION, ENV–03 – INSULATION, ENV–05 – ROOFING, LTG–01 – LIGHTING, MECH–01 – MECHANICAL, PLB–01 – WATER HEATERS, PLB–02 – PLUMBING
EXTERIOR WALLS:	R–21
ROOF ATTIC:	R–38
FLOOR:	SLAB ON GRADE
WINDOWS:	NON–METAL FRAMED, DOUBLE PANE WITH LOW–E GLASS (U–VALUE=0.30, SHGC=0.23)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE (U–FACTOR=0.50)
SKYLIGHTS:	NA

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing

REGISTERED PROFESSIONAL ENGINEER Nicole E Porata No. 26789 Exp. 9/30/24 MECHANICAL STATE OF CALIFORNIA

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PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
1	REV 1	12/11/23

TITLE 24 ENERGY REPORT - CZ11 SLAB DUCTLESS HP

T24.6.2

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T09:19:45-07:00 **(Page 1 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ducted HP - 23043.ribd22x

GENERAL INFORMATION					
01	**Project Name**	1 Bedroom Slab CZ16 Ducted HP			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	TBD			
04	**City**	Truckee	05	**Standards Version**	2022
06	**Zip code**	96161	07	**Software Version**	EnergyPro 9.1
08	**Climate Zone**	16	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)**	661	19	**Glazing Percentage (%)**	19.26%
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-P010082621A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 09:34:05 HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Schema Version: rev 20220901 Report Generated: 2023-07-12 09:21:16

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T09:19:45-07:00 **(Page 2 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ducted HP - 23043.ribd22x

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	49.4	49.9	57			
Proposed Design						
North Facing	48.6	47.9	55.7	0.8	2	1.3
East Facing	48.7	48	55.8	0.7	1.9	1.2
South Facing	48.7	48.2	55.9	0.7	1.7	1.1
West Facing	49.2	49.2	56.6	0.2	0.7	0.4
RESULT[3]: 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

- 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)

Registration Number: 223-P010082621A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 09:34:05 HERS Provider: CalCERTS Inc.

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Project Name: 1 Bedroom Slab CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T09:19:45-07:00 **(Page 3 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ducted HP - 23043.ribd22x

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	15.55	104.75	6.94	72.89	8.61	31.86
Space Cooling	0.39	4.66	0.2	2.55	0.19	2.11
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.23	52.77	12.45	79.8	-8.22	-27.03
Self Utilization/Flexibility Credit				0		0
North Facing Efficiency Compliance Total	**20.57**	**166.55**	**19.99**	**159.61**	**0.58**	**6.94**
Space Heating	15.55	104.75	6.78	70.91	8.77	33.84
Space Cooling	0.39	4.66	0.41	4.92	-0.02	-0.26
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.23	52.77	12.45	79.8	-8.22	-27.03
Self Utilization/Flexibility Credit				0		0
East Facing Efficiency Compliance Total	**20.57**	**166.55**	**20.04**	**160**	**0.53**	**6.55**

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T09:19:45-07:00 **(Page 4 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ducted HP - 23043.ribd22x

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	15.55	104.75	7	73.98	8.55	30.77
Space Cooling	0.39	4.66	0.24	2.58	0.15	2.08
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.23	52.77	12.45	79.8	-8.22	-27.03
Self Utilization/Flexibility Credit				0		0
South Facing Efficiency Compliance Total	**20.57**	**166.55**	**20.09**	**160.73**	**0.48**	**5.82**
Space Heating	15.55	104.75	7.23	75.8	8.32	28.95
Space Cooling	0.39	4.66	0.37	4.24	0.02	0.42
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.23	52.77	12.45	79.8	-8.22	-27.03
Self Utilization/Flexibility Credit				0		0
West Facing Efficiency Compliance Total	**20.57**	**166.55**	**20.45**	**164.21**	**0.12**	**2.34**

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Project Name: 1 Bedroom Slab CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T09:19:45-07:00 **(Page 5 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ducted HP - 23043.ribd22x

ENERGY USE INTENSITY

	Standard Design (kBtu/ft² - yr)	Proposed Design (kBtu/ft² - yr)	Compliance Margin (kBtu/ft² - yr)	Margin Percentage
North Facing				
Gross EUI[1]	39.57	37.69	1.88	4.75
Net EUI[2]	39.57	37.69	1.88	4.75
East Facing				
Gross EUI[1]	39.57	37.78	1.79	4.52
Net EUI[2]	39.57	37.78	1.79	4.52
South Facing				
Gross EUI[1]	39.57	37.91	1.66	4.2
Net EUI[2]	39.57	37.91	1.66	4.2
West Facing				
Gross EUI[1]	39.57	38.32	1.25	3.16
Net EUI[2]	39.57	38.32	1.25	3.16

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.

Registration Number: 223-P010082621A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 09:34:05 HERS Provider: CalCERTS Inc.

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Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ducted HP - 23043.ribd22x

REQUIRED PV SYSTEMS

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

REQUIRED SPECIAL FEATURES

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

- PV exception 2: No PV required when minimum PV size (Section 150.1(c)14) < 1.8 kWdc (0 kW)
- Insulation below roof deck
- Window overhangs and/or fins

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.

- Quality insulation installation (QII)
- Indoor air quality ventilation
- Kitchen range hood
- Minimum Airflow
- Verified EER/EER2
- Verified SEER/SEER2
- Verified Refrigerant Charge
- Fan Efficacy Watts/CFM
- Verified HSPF2
- Verified heat pump rated heating capacity
- Duct leakage testing

BUILDING - FEATURES INFORMATION

01	02	03	04	05	06	07
Project Name	**Conditioned Floor Area (ft²)**	**Number of Dwelling Units**	**Number of Bedrooms**	**Number of Zones**	**Number of Ventilation Cooling Systems**	**Number of Water Heating Systems**
1 Bedroom Slab CZ16 Ducted HP	661	1	1	1	0	1

Registration Number: 223-P010082621A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 09:34:05 HERS Provider: CalCERTS Inc.

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Project Name: 1 Bedroom Slab CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T09:19:45-07:00 **(Page 7 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ducted HP - 23043.ribd22x

ZONE INFORMATION

01	02	03	04	05	06	07
Zone Name	**Zone Type**	**HVAC System Name**	**Zone Floor Area (ft²)**	**Avg. Ceiling Height**	**Water Heating System 1**	**Status**
1 Bed Unit Zone	Conditioned	HVAC1	661	9	DHW Sys 1	New

OPAQUE SURFACES

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft²)**	**Window and Door Area (ft2)**	**Tilt (deg)**
Front Wall	1 Bed Unit Zone	R-21 Wall	0	Front	270	61.5	90
Right Wall	1 Bed Unit Zone	R-21 Wall	270	Right	216	0	90
Back Wall	1 Bed Unit Zone	R-21 Wall	180	Back	270	46	90
Left Wall	1 Bed Unit Zone	R-21 Wall	90	Left	216	54.02	90
Ceiling	1 Bed Unit Zone	R-38+R-13 HP Attic	n/a	n/a	661	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 1 Bed Unit Zone	Attic Roof1 Bed Unit Zone	Ventilated	6	0.1	0.85	No	No

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Front Window (OP)	Window	Front Wall	Front	0			1	24	0.3	NFRC	0.4	NFRC	Bug Screen
Front Window (OP) 2	Window	Front Wall	Front	0	5	4	1	20	0.3	NFRC	0.4	NFRC	Bug Screen

Registration Number: 223-P010082621A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 09:34:05 HERS Provider: CalCERTS Inc.

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Project Name: 1 Bedroom Slab CZ16 Ducted HP **Calculation Date/Time:** 2023-07-12T09:19:45-07:00 **(Page 8 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ducted HP - 23043.ribd22x

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Back Window (OP)	Window	Back Wall	Back	180			1	10	0.3	NFRC	0.4	NFRC	Bug Screen
Back Window (OP) 2	Window	Back Wall	Back	180			1	24	0.3	NFRC	0.4	NFRC	Bug Screen
Back Window (OP) 3	Window	Back Wall	Back	180			1	12	0.3	NFRC	0.4	NFRC	Bug Screen
Left Window (OP)	Window	Left Wall	Left	90	3	4.44	1	13.32	0.3	NFRC	0.4	NFRC	Bug Screen
Left Window (OP) 2	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.4	NFRC	Bug Screen
Left Window (OP) 3	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.4	NFRC	Bug Screen

OPAQUE DOORS

01	02	03	04
Name	**Side of Building**	**Area (ft²)**	**U-factor**
Front Door	Front Wall	17.5	0.2
Left Door	Left Wall	16.7	0.2

OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Window	**Overhang**					**Left Fin**				**Right Fin**			
	Depth	**Dist Up**	**Left Extent**	**Right Extent**	**Flap Ht.**	**Depth**	**Top Up**	**Dist L**	**Bot Up**	**Depth**	**Top Up**	**Dist R**	**Bot Up**
Front Window (OP) 2	4	0.3	12	0.8	0	0	0	0	0	0	0	0	0

Registration Number: 223-P010082621A-000-000-0000000-0000 Registration Date/Time: 2023-07-12 09:34:05 HERS Provider: CalCERTS Inc.

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ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	NA – EXCEPTION 2: <1.8 KWDC
PV EXCEPTION EQ:	SEE EQUATION 150-1 BELOW kW_{PV} = (661X0.59)/1000 + (1X1.22) = 1.61 KW_{DC} < 1.8 KW_{DC}
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTED HEAT PUMP (HSPF2=10.5)
SPACE COOLING:	DUCTED HEAT PUMP (SEER2=17.0, EER2=12.5)
HEAT & COOL LOADS:	HEAT: 18,448 BTU/HR COOL: 6,600 BTU/HR
DUCT INSULATION:	R-8 ATTIC
WATER HEATING:	GAS ON DEMAND WATER HEATER (UEF=0.96)
PIPE INSULATION:	ALL DHW PIPING SHALL BE INSULATED WITH 1"THICK OR MINIMUM R-VALUE 7.7
RADIANT BARRIER:	NA
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, DUCT LEAKAGE TESTING, MINIMUM AIRFLOW, FAN EFFICACY WATTS/CFM (0.58 WATTS/CFM), VERIFIED REFRIGERANT CHARGE, VERIFIED EER2, VERIFIED SEER2, VERIFIED HSPF2, VERIFIED HEAT PUMP RATED HEATING CAPACITY, KITCHEN RANGE HOOD, QUALITY INSULATION INSPECTION (QII)
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV-01 – FENESTRATION, ENV-03 – INSULATION, LTG-01 – LIGHTING, MCH-01 – SPACE CONDITIONING SYSTEMS, PLB-22 – WATER HEATERS, PVB-01 – PV SYSTEMS
EXTERIOR WALLS:	R-21
ROOF ATTIC:	R-38 WITH R-13 ON PITCH TOUCHING ROOF SHEATHING
FLOOR:	SLAB ON GRADE
WINDOWS:	NON-METAL FRAMED, DOUBLE PANE WITH LOW-E GLASS (U-VALUE=0.30, SHGC=0.40)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE AT R-5 (U-FACTOR=0.20)
SKYLIGHTS:	NA

PV EXCEPTION 2 EQUATION 150-1 (CEC SECTION 150.1(C)14)

kW_{PV} = (CFA X A)/1000 + (N_{DU} X B)

WHERE: kW_{PV} = kW_{DC} SIZE OF PV SYSTEM
CFA = CONDITIOEND FLOOR AREA
N_{DU} = NUMBER OF DWELLING UNITS
A = CFA ADJUSTMENT FACTOR FROM TABLE 150 1-C
B = DWELLING UNIT ADJUSTMENT FACTOR FROM TABLE 150 1-C

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

SPECIAL HERS VERIFICATION QII REQUIRED

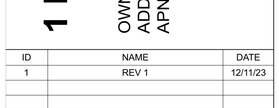
CONTACT ENERGY CONSULTANT OR HERS RATER
DURING FRAMING STAGE OF PROJECT

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

A Regional Partnership for Achievable Housing



YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
1	REV 1	12/11/23

TITLE 24 ENERGY REPORT - CZ16 SLAB DUCTED HP

T24.7.1

OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Window	Overhang					Left Fin				Right Fin			
	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up
Left Window (OP)	18	0.3	0.5	0	0	0	0	0	0	0	0	0	0

SLAB FLOORS

01	02	03	04	05	06	07	08
Name	Zone	Area (ft²)	Perimeter (ft)	Edge Insul. R-value and Depth	Edge Insul. R-value and Depth	Carpeted Fraction	Heated
Slab-on-Grade	1 Bed Unit Zone	661	108	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
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / None	0.066	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Exterior Finish: Wood Siding/sheathing/decking
Attic Roof1 Bed Unit Zone	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-13	None / 0	0.078	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-13.0 / 2x4 Around Roof Joists: R-0.0 insul.
R-38+R-13 HP Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-38	None / None	0.025	Over Ceiling Joists: R-28.9 insul. Cavity / Frame: R-9.1 / 2x4 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
Required	Not Required	N/A	n/a	n/a

WATER HEATING SYSTEMS

01	02	03	04	05	06	07	08	09
Name	System Type	Distribution Type	Water Heater Name	Number of Units	Solar Heating System	Compact Distribution	HERS Verification	Water Heater Name (#)
DHW Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (1)

WATER HEATERS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	Heating Element Type	Tank Type	# of Units	Tank Vol. (gal)	Heating Efficiency Type	Efficiency	Rated Input Type	Input Rating or Pilot	Tank Insulation R-value (Int/Ext)	Standby Loss or Recovery Eff	1st Hr. Rating or Flow Rate	Tank Location
DHW Heater 1	Propane	Consumer Instantaneous	1	0	UEF	0.96	Btu/Hr	200000	0	n/a		

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 Sys 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
HVAC1	Heat pump heating cooling	Heat Pump System 1	1	Heat Pump System 1	1	HVAC Fan 1	Air Distribution System 1	Setback

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	System Type	Number of Units	Heating				Cooling			Zonally Controlled	Compressor Type	HERS Verification
			Efficiency Type	HSPF / HSPF2 / COP	Cap 47	Cap 17	Efficiency Type	SEER / SEER2	EER / ER / CEER			
Heat Pump System 1	Central split HP	1	HSPF2	10.5	27000	22000	EER2SEER2	17	12.5	Not Zonal	Single Speed	Heat Pump System 1-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
Heat Pump System 1-hers-htpump	Required	350	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			
Air Distribution System 1	Unconditioned attic	Non-Verified	R-8	R-8	Attic	Attic	n/a	n/a	No Bypass Duct	Sealed and Tested	Air Distribution System 1-hers-dist

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
Air 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 1	HVAC Fan	0.58	HVAC Fan 1-hers-fan

HVAC FAN SYSTEMS - HERS VERIFICATION

01	02	03
Name	Verified Fan Watt Draw	Required Fan Efficacy (Watts/CFM)
HVAC Fan 1-hers-fan	Required	0.58

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	34	0.35	Exhaust	No	n/a	No	Yes	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I, I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Nicole E Porata	Documentation Author Signature: Nicole E Porata
Company: Melas Energy Engineering	Signature Date: 2023-07-12 09:24:35
Address: 547 Uren St.	CEA / HERS Certification Identification (If applicable): R19-17-30033
City/State/Zip: Nevada City, CA 95959	Phone: 530-265-2492

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.
2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name: Russell Davidson	Responsible Designer Signature: Russell Davidson
Company: Russell Davidson Architecture + Design	Date Signed: 2023-07-12 09:34:05
Address: 149 Crown Point Ct, Suite A	License: C36895
City/State/Zip: Grass Valley, CA 95949	Phone: 530-913-2370

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.

Easy to Verify at CalCERTS.com

SPECIAL HERS VERIFICATION QII REQUIRED

CONTACT ENERGY CONSULTANT OR HERS RATER
DURING FRAMING STAGE OF PROJECT

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	NA – EXCEPTION 2: <1.8 KWDC
PV EXCEPTION EQ:	SEE EQUATION 150-1 BELOW KW_{PV} = (661X0.59)/1000 + (1X1.22) = 1.61 KW_{DC} < 1.8 KW_{DC}
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTED HEAT PUMP (HSPF2=10.5)
SPACE COOLING:	DUCTED HEAT PUMP (SEER2=17.0, EER2=12.5)
HEAT & COOL LOADS:	HEAT: 18,448 BTU/HR COOL: 6,600 BTU/HR
DUCT INSULATION:	R-8 ATTIC
WATER HEATING:	GAS ON DEMAND WATER HEATER (UEF=0.96)
PIPE INSULATION:	ALL DHW PIPING SHALL BE INSULATED WITH 1"THICK OR MINIMUM R-VALUE 7.7
RADIANT BARRIER:	NA
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, DUCT LEAKAGE TESTING, MINIMUM AIRFLOW, FAN EFFICACY WATTS/CFM (0.58 WATTS/CFM), VERIFIED REFRIGERANT CHARGE, VERIFIED EER2, VERIFIED SEER2, VERIFIED HSPF2, VERIFIED HEAT PUMP RATED HEATING CAPACITY, KITCHEN RANGE HOOD, QUALITY INSULATION INSPECTION (QII)
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV-01 – FENESTRATION, ENV-03 – INSULATION, LTG-01 – LIGHTING, MCH-01 – SPACE CONDITIONING SYSTEMS, PLB-22 – WATER HEATERS, PVB-01 – PV SYSTEMS
EXTERIOR WALLS:	R-21
ROOF ATTIC:	R-38 WITH R-13 ON PITCH TOUCHING ROOF SHEATHING
FLOOR:	SLAB ON GRADE
WINDOWS:	NON-METAL FRAMED, DOUBLE PANE WITH LOW-E GLASS (U-VALUE=0.30, SHGC=0.40)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE AT R-5 (U-FACTOR=0.20)
SKYLIGHTS:	NA

PV EXCEPTION 2 EQUATION 150-1 (CEC SECTION 150.1(C)14)

kW_{PV} = (CFA X A)/1000 + (N_{DU} X B)

WHERE: kW_{PV} = kW_{DC} SIZE OF PV SYSTEM
CFA = CONDITIOEND FLOOR AREA
N_{DU} = NUMBER OF DWELLING UNITS
A = CFA ADJUSTMENT FACTOR FROM TABLE 150 1-C
B = DWELLING UNIT ADJUSTMENT FACTOR FROM TABLE 150 1-C

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

MELAS ENERGY ENGINEERING

Truckee Tahoe Truckee Placer County

A Regional Partnership for Achievable Housing



YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
1	REV 1	12/11/23

TITLE 24 ENERGY REPORT - CZ16 SLAB DUCTED HP

T24.7.2

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 1 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

GENERAL INFORMATION					
01	**Project Name**	1 Bedroom Slab CZ16 Ductless HP			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	TBD			
04	**City**	Truckee	05	**Standards Version**	2022
06	**Zip code**	96161	07	**Software Version**	EnergyPro 9.1
08	**Climate Zone**	16	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)**	661	19	**Glazing Percentage (%)**	19.26%
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-P010082636A-000-000-0000000-0000 | Registration Date/Time: 2023-07-12 09:55:13 | HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 2 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

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	49.4	49.9	57			
Proposed Design						
North Facing	48	46.4	54.8	1.4	3.5	2.2
East Facing	48.1	46.6	54.9	1.3	3.3	2.1
South Facing	48.2	46.8	55	1.2	3.1	2
West Facing	48.7	47.8	55.6	0.7	2.1	1.4
RESULT[3]: 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

- 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)

Registration Number: 223-P0100826036A-000-000-0000000-0000 | Registration Date/Time: 2023-07-12 09:55:13 | HERS Provider: CalCERTS Inc.

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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 3 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

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	15.55	104.75	6.22	65.85	9.33	38.9
Space Cooling	0.39	4.66	0.2	2.63	0.19	2.03
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.23	52.77	12.79	81.93	-8.56	-29.16
Self Utilization/Flexibility Credit				0		0
North Facing Efficiency Compliance Total	**20.57**	**166.55**	**19.61**	**154.78**	**0.96**	**11.77**
Space Heating	15.55	104.75	6.08	64.15	9.47	40.6
Space Cooling	0.39	4.66	0.41	4.91	-0.02	-0.25
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.23	52.77	12.79	81.93	-8.56	-29.16
Self Utilization/Flexibility Credit				0		0
East Facing Efficiency Compliance Total	**20.57**	**166.55**	**19.68**	**155.36**	**0.89**	**11.19**

Registration Number: 223-P0100826036A-000-000-0000000-0000 | Registration Date/Time: 2023-07-12 09:55:13 | HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance | Report Version: 2022.0.000 Schema Version: rev 20220901 | Report Generated: 2023-07-12 09:41:53

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 4 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

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	15.55	104.75	6.28	66.91	9.27	37.84
Space Cooling	0.39	4.66	0.25	2.73	0.14	1.93
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.23	52.77	12.79	81.93	-8.56	-29.16
Self Utilization/Flexibility Credit				0		0
South Facing Efficiency Compliance Total	**20.57**	**166.55**	**19.72**	**155.94**	**0.85**	**10.61**
Space Heating	15.55	104.75	6.51	68.71	9.04	36.04
Space Cooling	0.39	4.66	0.37	4.29	0.02	0.37
IAQ Ventilation	0.4	4.37	0.4	4.37	0	0
Water Heating	4.23	52.77	12.79	81.93	-8.56	-29.16
Self Utilization/Flexibility Credit				0		0
West Facing Efficiency Compliance Total	**20.57**	**166.55**	**20.07**	**159.3**	**0.5**	**7.25**

Registration Number: 223-P0100826036A-000-000-0000000-0000 | Registration Date/Time: 2023-07-12 09:55:13 | HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance | Report Version: 2022.0.000 Schema Version: rev 20220901 | Report Generated: 2023-07-12 09:41:53

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 5 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

ENERGY USE INTENSITY				
	Standard Design (kBtu/ft² - yr)	**Proposed Design (kBtu/ft² - yr)**	**Compliance Margin (kBtu/ft² - yr)**	**Margin Percentage**
North Facing				
Gross EUI[1]	39.57	37.27	2.3	5.81
Net EUI[2]	39.57	37.27	2.3	5.81
East Facing				
Gross EUI[1]	39.57	37.37	2.2	5.56
Net EUI[2]	39.57	37.37	2.2	5.56
South Facing				
Gross EUI[1]	39.57	37.47	2.1	5.31
Net EUI[2]	39.57	37.47	2.1	5.31
West Facing				
Gross EUI[1]	39.57	37.87	1.7	4.3
Net EUI[2]	39.57	37.87	1.7	4.3

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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CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 6 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

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

REQUIRED SPECIAL FEATURES
The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.
• PV exception 2: No PV required when minimum PV size (Section 150.1(c)14) < 1.8 KWdc (0 kW)
• Window overhangs and/or fins
• Variable capacity heat pump compliance option (verification details from VCHP Staff report, Appendix B, and RA3)

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.
• Quality insulation installation (QII)
• Indoor air quality ventilation
• Kitchen range hood
• Verified Refrigerant Charge
• Airflow in habitable rooms (SC3.1.4.1.7)
• Verified heat pump rated heating capacity
• Wall-mounted thermostat in zones greater than 150 ft2 (SC3.4.5)
• Ductless indoor units located entirely in conditioned space (SC3.1.4.1.8)

BUILDING - FEATURES INFORMATION						
01	**02**	**03**	**04**	**05**	**06**	**07**
Project Name	**Conditioned Floor Area (ft²)**	**Number of Dwelling Units**	**Number of Bedrooms**	**Number of Zones**	**Number of Ventilation Cooling Systems**	**Number of Water Heating Systems**
1 Bedroom Slab CZ16 Ductless HP	661	1	1	1	0	1

Registration Number: 223-P0100826036A-000-000-0000000-0000 | Registration Date/Time: 2023-07-12 09:55:13 | HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance | Report Version: 2022.0.000 Schema Version: rev 20220901 | Report Generated: 2023-07-12 09:41:53

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 7 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

ZONE INFORMATION						
01	**02**	**03**	**04**	**05**	**06**	**07**
Zone Name	**Zone Type**	**HVAC System Name**	**Zone Floor Area (ft²)**	**Avg. Ceiling Height**	**Water Heating System 1**	**Status**
1 Bed Unit Zone	Conditioned	HVAC1	661	9	DHW Sys 1	New

OPAQUE SURFACES							
01	**02**	**03**	**04**	**05**	**06**	**07**	**08**
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft²)**	**Window and Door Area (ft2)**	**Tilt (deg)**
Front Wall	1 Bed Unit Zone	R-21 Wall	0	Front	270	61.5	90
Right Wall	1 Bed Unit Zone	R-21 Wall	270	Right	216	0	90
Back Wall	1 Bed Unit Zone	R-21 Wall	180	Back	270	46	90
Left Wall	1 Bed Unit Zone	R-21 Wall	90	Left	216	54.02	90
Ceiling	1 Bed Unit Zone	R-38 Attic w/ Rad Bar	n/a	n/a	661	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 1 Bed Unit Zone	Attic Roof1 Bed Unit Zone	Ventilated	6	0.1	0.85	Yes	No

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**
Front Window (OP)	Window	Front Wall	Front	0			1	24	0.3	NFRC	0.4	NFRC	Bug Screen
Front Window (OP) 2	Window	Front Wall	Front	0	5	4	1	20	0.3	NFRC	0.4	NFRC	Bug Screen

Registration Number: 223-P0100826036A-000-000-0000000-0000 | Registration Date/Time: 2023-07-12 09:55:13 | HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance | Report Version: 2022.0.000 Schema Version: rev 20220901 | Report Generated: 2023-07-12 09:41:53

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 8 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

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 (ft²)**	**U-factor**	**U-factor Source**	**SHGC**	**SHGC Source**	**Exterior Shading**	
Back Window (OP)	Window	Back Wall	Back	180			1	10	0.3	NFRC	0.4	NFRC	Bug Screen	
Back Window (OP) 2	Window	Back Wall	Back	180			1	24	0.3	NFRC	0.4	NFRC	Bug Screen	
Back Window (OP) 3	Window	Back Wall	Back	180			1	12	0.3	NFRC	0.4	NFRC	Bug Screen	
Left Window (OP)	Window	Left Wall	Left	90	3	4.44	1	13.32	0.3	NFRC	0.4	NFRC	Bug Screen	
Left Window (OP) 2	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.4	NFRC	Bug Screen	
Left Window (OP) 3	Window	Left Wall	Left	90			1	12	0.3	NFRC	0.4	NFRC	Bug Screen	

OPAQUE DOORS			
01	**02**	**03**	**04**
Name	**Side of Building**	**Area (ft²)**	**U-factor**
Front Door	Front Wall	17.5	0.2
Left Door	Left Wall	16.7	0.2

OVERHANGS AND FINS													
01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**
Window	**Overhang**					**Left Fin**				**Right Fin**			
	Depth	**Dist Up**	**Left Extent**	**Right Extent**	**Flap Ht.**	**Depth**	**Top Up**	**Dist L**	**Bot Up**	**Depth**	**Top Up**	**Dist R**	**Bot Up**
Front Window (OP) 2	4	0.3	12	0.8	0	0	0	0	0	0	0	0	0

Registration Number: 223-P0100826036A-000-000-0000000-0000 | Registration Date/Time: 2023-07-12 09:55:13 | HERS Provider: CalCERTS Inc.

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SPECIAL HERS VERIFICATION QII REQUIRED

CONTACT ENERGY CONSULTANT OR HERS RATER
DURING FRAMING STAGE OF PROJECT

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM: NA – EXCEPTION 2: <1.8 KWDC
PV EXCEPTION EQ: SEE EQUATION 150-1 BELOW
kW_{PV} = (661X0.59)/1000 + (1X1.22) = 1.61 KW_{DC} < 1.8 KW_{DC}
SPECIAL FEATURES: NONE
SPACE HEATING: DUCTLESS HEAT PUMP (HSPF2=7.5)
SPACE COOLING: DUCTLESS HEAT PUMP (SEER2=14.3, EER2=9.0)
HEAT & COOL LOADS: HEAT: 17,331 BTU/HR COOL: 6,500 BTU/HR
DUCT INSULATION: NA
WATER HEATING: GAS ON DEMAND WATER HEATER (UEF=0.95)
PIPE INSULATION: FIRST 5' OF HOT & COLD DHW PIPING INSULATED WITH 1"THICK, IF RECIRC LOOP ALL PIPE INSULATED
RADIANT BARRIER: RADIANT BARRIER IN ATTIC AND GABLE ENDS INSTALLED PER MANUFACTURES SPECIFICATIONS REQUIRED
HERS TESTS: INDOOR AIR QUALITY VENTILATION, VERIFIED REFRIGERANT CHARGE, VERIFIED HEAT PUMP RATED HEATING CAPACITY, AIRFLOW IN HABITABLE ROOMS, WALL-MOUNTED THERMOSTAT IN ZONES GREATER THAN 150 SQ FT, DUCTLESS INDOOR UNITS LOCATED ENTIRELY IN CONDITIONED SPACE, KITCHEN RANGE HOOD, QUALITY INSULATION INSPECTION (QII)
IAQ VENTILATION: 0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION: KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION: THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S: ENV-01 – FENESTRATION, ENV-03 – INSULATION, LTG-01 – LIGHTING, MCH-01 – SPACE CONDITIONING SYSTEMS, PLB-22 – WATER HEATERS, PVB-01 – PV SYSTEMS
EXTERIOR WALLS: R-21
ROOF ATTIC: R-38
FLOOR: SLAB ON GRADE
WINDOWS: NON-METAL FRAMED, DOUBLE PANE WITH LOW-E GLASS (U-VALUE=0.30, SHGC=0.40)
GLASS DOORS: NA
EXTERIOR SC DOOR: SOLID CORE R-5 (U-FACTOR=0.20)
SKYLIGHTS: NA

PV EXCEPTION 2 EQUATION 150-1 (CEC SECTION 150.1(C)14)

kW_{PV} = (CFA X A)/1000 + (N_{DU} X B)

WHERE: kW_{PV} = kW_{DC} SIZE OF PV SYSTEM
CFA = CONDITIOEND FLOOR AREA
N_{DU} = NUMBER OF DWELLING UNITS
A = CFA ADJUSTMENT FACTOR FROM TABLE 150.1-C
B = DWELLING UNIT ADJUSTMENT FACTOR FROM TABLE 150.1-C

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

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MELAS ENERGY ENGINEERING

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PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
1	REV 1	12/11/23

TITLE 24 ENERGY REPORT - CZ16 SLAB DUCTLESS HP

T24.8.1

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 9 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

OVERHANGS AND FINS

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Window	Overhang					Left Fin				Right Fin			
	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up
Left Window (OP)	18	0.3	0.5	0	0	0	0	0	0	0	0	0	0

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	1 Bed Unit Zone	661	108	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
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / None	0.066	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Exterior Finish: Wood Siding/sheathing/decking
Attic Roof1 Bed Unit Zone	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-0	None / 0	0.644	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: no insul. / 2x4
R-38 Attic w/ Rad Bar	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 16 in. O. C.	R-38	None / None	0.025	Over Ceiling Joists: R-28.9 insul. Cavity / Frame: R-9.1 / 2x4 Inside Finish: Gypsum Board

Registration Number: 223-P010082636A-000-000-0000000-0000 | Registration Date/Time: 2023-07-12 09:55:13 | HERS Provider: CalCERTS Inc.

CA Building Energy Efficiency Standards - 2022 Residential Compliance | Report Version: 2022.0.000 | Report Generated: 2023-07-12 09:41:53

Schema Version: rev 20220901

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD **CF1R-PRF-01E**

Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 10 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

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
Required	Not Required	N/A	n/a	n/a

WATER HEATING SYSTEMS

01	02	03	04	05	06	07	08	09
Name	System Type	Distribution Type	Water Heater Name	Number of Units	Solar Heating System	Compact Distribution	HERS Verification	Water Heater Name (#)
DHW Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (1)

WATER HEATERS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	Heating Element Type	Tank Type	# of Units	Tank Vol. (gal)	Heating Efficiency Type	Efficiency	Rated Input Type	Input Rating or Pilot	Tank Insulation R-value (Int/Ext)	Standby Loss or Recovery Eff	1st Hr. Rating or Flow Rate	Tank Location
DHW Heater 1	Propane	Consumer Instantaneous	1	0	UEF	0.95	Btu/Hr	200000	0	n/a		

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 Sys 1 - 1/1	Not Required	Not Required	Not Required	None	Not Required	Not Required

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Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

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
HVAC1	Heat pump heating cooling	Heat Pump System 1	1	Heat Pump System 1	1	n/a	n/a	Setback

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	System Type	Number of Units	Heating				Cooling			Zonally Controlled	Compressor Type	HERS Verification
			Efficiency Type	HSPF / HSPF2 / COP	Cap 47	Cap 17	Efficiency Type	SEER / SEER2	EER / EER / CEER			
Heat Pump System 1	VCHP-ductless	1	HSPF2	7.5	24000	22000	EER2SEER2	14.3	9	Not Zonal	Single Speed	Heat Pump System 1-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
Heat Pump System 1-hers-htpump	Not Required	0	Not Required	Not Required	Yes	No	Yes	Yes

VARIABLE CAPACITY HEAT PUMP COMPLIANCE OPTION - HERS VERIFICATION

01	02	03	04	05	06	07	08	09	10
Name	Certified Low-Static VCHP System	Airflow to Habitable Rooms	Ductless Units in Conditioned Space	Wall Mount Thermostat	Air Filter Sizing & Pressure Drop Rating	Low Leakage Ducts in Conditioned Space	Minimum Airflow per RA3.3 and SC3.3.4.1	Certified non-continuous Fan	Indoor Fan not Running Continuously
Heat Pump System 1	Not required	Required	Required	Required	Not required	Not required	Not required	Not required	Not required

Registration Number: 223-P010082636A-000-000-0000000-0000 | Registration Date/Time: 2023-07-12 09:55:13 | HERS Provider: CalCERTS Inc.

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Project Name: 1 Bedroom Slab CZ16 Ductless HP **Calculation Date/Time:** 2023-07-12T09:40:13-07:00 **(Page 12 of 13)**

Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

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	34	0.35	Exhaust	No	n/a	No	Yes	

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Calculation Description: Title 24 Analysis **Input File Name:** NC Affordable Housing 1 Bed Slab CZ16 Ductless HP - 23043.ribd22x

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I, I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Nicole E Porata	Documentation Author Signature: Nicole E Porata
Company: Melas Energy Engineering	Signature Date: 2023-07-12 09:43:23
Address: 547 Uren St.	CEA / HERS Certification Identification (If applicable): R19-17-30033
City/State/Zip: Nevada City, CA 95959	Phone: 530-265-2492

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance.
2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.

Responsible Designer Name: Russell Davidson	Responsible Designer Signature: Russell Davidson
Company: Russell Davidson Architecture + Design	Date Signed: 2023-07-12 09:55:13
Address: 149 Crown Point Ct, Suite A	License: C36895
City/State/Zip: Grass Valley, CA 95949	Phone: 530-913-2370

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.

Easy to Verify at CalCERTS.com

Registration Number: 223-P010082636A-000-000-0000000-0000 | Registration Date/Time: 2023-07-12 09:55:13 | HERS Provider: CalCERTS Inc.

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SPECIAL HERS VERIFICATION QII REQUIRED

CONTACT ENERGY CONSULTANT OR HERS RATER
DURING FRAMING STAGE OF PROJECT

KITCHEN RANGE HOOD MUST BE HVI OR AHAM CERTIFIED

ENERGY CALCULATIONS ENERGY CONSERVATION MEASURES SUMMARY

PV SYSTEM:	NA – EXCEPTION 2: <1.8 KWDC
PV EXCEPTION EQ:	SEE EQUATION 150-1 BELOW kW_{PV} = (661X0.59)/1000 + (1X1.22) = 1.61 KW_{DC} < 1.8 KW_{DC}
SPECIAL FEATURES:	NONE
SPACE HEATING:	DUCTLESS HEAT PUMP (HSPF2=7.5)
SPACE COOLING:	DUCTLESS HEAT PUMP (SEER2=14.3, EER2=9.0)
HEAT & COOL LOADS:	HEAT: 17,331 BTU/HR COOL: 6,500 BTU/HR
DUCT INSULATION:	NA
WATER HEATING:	GAS ON DEMAND WATER HEATER (UEF=0.95)
PIPE INSULATION:	FIRST 5' OF HOT & COLD DHW PIPING INSULATED WITH 1"THICK, IF RECIRC LOOP ALL PIPE INSULATED
RADIANT BARRIER:	RADIANT BARRIER IN ATTIC AND GABLE ENDS INSTALLED PER MANUFACTURES SPECIFICATIONS REQUIRED
HERS TESTS:	INDOOR AIR QUALITY VENTILATION, VERIFIED REFRIGERANT CHARGE, VERIFIED HEAT PUMP RATED HEATING CAPACITY, AIRFLOW IN HABITABLE ROOMS, WALL-MOUNTED THERMOSTAT IN ZONES GREATER THAN 150 SQ FT, DUCTLESS INDOOR UNITS LOCATED ENTIRELY IN CONDITIONED SPACE, KITCHEN RANGE HOOD, QUALITY INSULATION INSPECTION (QII)
IAQ VENTILATION:	0.03*BUILDING SQUARE FOOTAGE + OCCUPANTS * 7.5 =0.03* 661+ 2*7.5 = 34 CFM
KITCHEN VENTILATION:	KITCHEN RANGE HOOD CFM REQUIREMENTS VARY BASED ON DWELLING UNIT SQUARE FOOTAGE. SEE TABLE BELOW OF REQUIRED CFM. A SOUND RATING OF 3 SONES OR LESS FOR NOISE UNLESS THE EXHAUST FAN IS 400 CFM OR GREATER, 0.25"EXTERNAL STATIC PRESSURE HOOD, DUCT VENT FANS REQUIRE 7"DUCT MIN. OTHER COMPLIANCE OPTIONS ARE LISTED UNDER TITLE 24, PART 6 SECTION 150.0.
BATHROOM VENTILATION:	THE MINIMUM BATHROOM INTERMITTENT VENTILATION AIRFLOW SHALL BE 50 CFM.
REQUIRED CF2R'S:	ENV-01 – FENESTRATION, ENV-03 – INSULATION, LTG-01 – LIGHTING, MCH-01 – SPACE CONDITIONING SYSTEMS, PLB-22 – WATER HEATERS, PVB-01 – PV SYSTEMS
EXTERIOR WALLS:	R-21
ROOF ATTIC:	R-38
FLOOR:	SLAB ON GRADE
WINDOWS:	NON-METAL FRAMED, DOUBLE PANE WITH LOW-E GLASS (U-VALUE=0.30, SHGC=0.40)
GLASS DOORS:	NA
EXTERIOR SC DOOR:	SOLID CORE R-5 (U-FACTOR=0.20)
SKYLIGHTS:	NA

PV EXCEPTION 2 EQUATION 150-1 (CEC SECTION 150.1(C)14)

kW_{PV} = (CFA X A)/1000 + (N_{DU} X B)

WHERE: kW_{PV} = kW_{DC} SIZE OF PV SYSTEM
CFA = CONDITIOEND FLOOR AREA
N_{DU} = NUMBER OF DWELLING UNITS
A = CFA ADJUSTMENT FACTOR FROM TABLE 150 1-C
B = DWELLING UNIT ADJUSTMENT FACTOR FROM TABLE 150 1-C

REQUIRED KITCHEN RANGE HOOD AIRFLOW RATES (CFM)		
DWELLING UNIT FLOOR AREA (FT2)	HOOD OVER ELECTRIC RANGE	HOOD OVER GAS RANGE
> 1500	110 CFM	180 CFM
< 1000 – 1500	110 CFM	250 CFM
750–1000	130 CFM	280 CFM
< 750	160 CFM	280 CFM

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PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
1	REV 1	12/11/23

TITLE 24 ENERGY REPORT - CZ16 SLAB DUCTLESS HP

T24.8.2

GENERAL NOTES

1. THIS SYSTEM IS GRID-TIED VIA A UL LISTED INVERTER.
2. ALL EQUIPMENT SHALL BE UL LISTED FOR ITS INTENDED PURPOSE.
3. THE MODULES, RACKING SYSTEMS AND INVERTERS ARE UL2703, UL1703, AND UL1741 LISTED WITH FIRE CLASSIFICATION BASED ON THE SPECIFIC TYPE OF BUILDING CONSTRUCTION..
4. THIS PROJECT SHALL COMPLY WITH LOCAL ORDINANCES.
5. ALL ROOF PENETRATIONS TO BE SEALED WITH A HIGH PERFORMANCE ROOF SEALANT.
6. THE SOLAR PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOFING VENTS.
7. WORKING SPACE AROUND ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
8. ELECTRICAL EQUIPMENT AND MATERIAL TO BE LISTED, LABELED, AND INSTALLED PER THE NEC, THE INSTALLATION STANDARDS/MANUFACTUREERS RECOMMENDATIONS.
9. LOCAL UTILITY PROVIDER SHALL BE NOTIFIED PRIOR TO USE AND ACTIVATION OF AND SOLAR PHOTOVOLTAIC INSTALLATION.
10. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND REVIEW ALL MANUFACTURER INSTALLATION DOCUMENTS PRIOR TO INITIATING CONSTRUCTION.
11. ALL EQUIPMENT SHALL BE RATED FOR THE ENVIRONMENT IN WHICH IT IS INSTALLED AND IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
12. ACCESS TO ELECTRICAL COMPONENTS OVER 150 VOLTS TO GROUND SHALL BE RESTRICTED TO QUALIFY PERSONNEL.
13. ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 VOLTS AND 90 DEG C WET ENVIRONMENT, UNLESS OTHERWISE NOTED.
14. WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED CONTRACTOR SHALL SIZE THEM ACCORDING TO APPLICABLE CODES.
15. ALL JUNCTION BOXES, COMBINER BOXES, AND DISCONNECTIONS SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
16. PV MODULE FRAMES SHALL BE BONDED TO TACKING RAIL OR BARE COPPER G.E.C PER THE MODULES MANUFACTURE'S LISTED INSTRUCTION SHEET.
17. PV MODULE RACKING RAIL SHALL BE BONDED TO BARE COPPER G.E.C VIA WEEB LUG, ILSCO GBL-4DBY LAY-IN-LUG, OR EQUIVALENT LISTED LUG.
18. GROUNDING ELECTRODE CONDUCTOR (G.E.C) SHALL BE CONTINUOUS AND/PR IRREVERSIBLY SPLICED/WELDED.
19. ALL JUNCTION BOXES, COMBINER BOXES, AND DISCONNECTIONS SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION.
20. ROOF ACCESS POINTS SHALL BE AT A STRONG POINT ON THE BUILDING AND NOT REQUIRE THE PLACEMENT OF LADDERS OVER EXTERIOR WALL OPENINGS.

WIRING/CIRCUIT INSTALLATIONS REQUIREMENTS

21. CONDUIT, RACEWAYS, AND WIRING SYSTEMS SHALL BE RUN AS CLOSE AS POSSIBLE TO RIDGES, HIPS, VALLEYS, ETC; THEY SHALL ALSO BE INSTALLED IN SUCH A MANNER TO LIMIT TRIP HAZARDS AND MAXIMIZE VENTILATION OPPORTUNITIES. DC WIRING IN ENCLOSED SPACES SHALL BE INSTALLED IN METALLIC CONDUIT; CONDUIT SHALL BE RUN ALONG THE BOTTOM OF LOAD BEARING MEMBERS.
22. PV SOURCE AND OUTPUT CIRCUITS INSIDE A BUILDING SHALL BE ROUTED ALONG BUILDING STRUCTURAL MEMBERS WHERE THE MEMBERS CAN BE OBSERVED (ACCESSIBLE ATTIC, ETC). IF CIRCUITS ARE EMBEDDED IN AREAS (NOT ACCESSIBLE) THAT ARE NOT COVERED BY PV MODULES, THOSE AREAS SHALL BE CLEARLY MARKED INDICATING THEIR LOCATIONS.
23. DC CIRCUITS RAN INSIDE A BUILDING 80 VOLTS OR GREATER SHALL BE PROTECTED BY A LISTED ARC-FAULT CIRCUIT INTERRUPTER. TO BE CONSIDERED OUTSIDE IT SHALL BE DIRECT BURIED, IN METALLIC CONDUIT, AND/OR METALLIC CABLES TRAYS.
24. WHERE MULTIPLE INVERTERS ARE INSTALLED AND NOT GROUPED A CLEAR LOCATION DIRECTORY SHALL BE PROVIDED AT EACH AC AND DC DISCONNECT LOCATION.
25. FMC ¾"OR SMALLER, MC CONDUIT 1"OR SMALLER OR EXPOSED WIRING INSTALLED ACROSS CEILING JOISTS OR FLOOR JOISTS SHALL BE PROTECTED BY GUARD STRIPS.
26. RAPID SHUTDOWN DEVICE REQUIRED FOR DC SYSTEMS CIRCUITS IN OR ON BUILDINGS WITH SPECIFIC REQUIREMENTS IF LOCATED IN OR OUTSIDE THE ARRAY BOUNDARY.
    - 30 V WITHIN 30 SECONDS IF OUTSIDE OF ARRAY BOUNDARY
    - 80 V WITHING 30 SECONDS IF WITHIN ARRAY BOUNDARY.
27. ROOF MOUNTED DC SYSTEM MANUALLY OPERATED LOAD BREAK DISCONNECT REQUIRED AT COMBINER BOXES OR WITHIN 6FT OF COMBINER BOXES.
28. DISCONNECTS REQUIRED FOR ENERGY STORAGE DEVICES WHERE MORE THAN 5FT FROM CONNECTED EQUIPMENT OR WHERE CIRCUITS PASS THROUGH A WALL/PARTITION.
29. SIZE OF SUPPLY SIDE CONNECTIONS COMPLY WITH CEC 705.12(B)(2).
30. SUPPLY SIDE CONNECTION REQUIRE OVERCURRENT PROTECTION WITHIN 10FT FROM THE SERVICE CONDUCTOR CONNECTION.
31. PROJECT TO COMPLY WITH THE FOLLOWING CALIFORNIA CODE OF REGULATIONS, TITLE 24
    - 2022 CALIFORNIA BUILDING CODE (CBC)
    - 2022 CALIFORNIA MECHANICAL CODE (CMC)
    - 2022 CALIFORNIA PLUMBING CODE (CPC)
    - 2022 CALIFORNIA ELECTRICAL CODE (CEC)
    - 2022 CALIFORNIA ENERGY CODE
    - 2022 CALIFORNIA FIRE CODE

SCOPE OF WORK

SYSTEM SIZE	2.275 kWdc
MODULES	(7) LG LG325N1C-A5
⚠2 INVERTER(S)	(1) SOLAREDGE SE3800H-US
RACKING	ECOFASTEN CLICKFIT RACKING SYSTEM
ATTACHMENT	ECOFASTEN GF-1
AZMUTH	150°- 270°
ROOF PITCH	6:12
ROOF TYPE	SHINGLE
WIND EXPOSURE	C
WINDS SPEED (30/50/70/170LB)	120 MPH
⚠1 WINDS SPEED (490LB)	150 MPH
CONSTRUCTION TYPE	RESIDENTIAL

VICINITY MAP

TBD

SITE PLAN

TBD

SOLAR EXEMPTIONS:

HIGH SNOW LOAD AND HEAVILY SHADED AREAS MAY BE EXEMPT FROM THE CALIFORNIA PV REQUIREMENT. PLEASE INQUIRE WITH YOUR LOCAL JURISDICTION TO SEE IF YOUR PROJECT QUALIFIES.

PROJECTS IN CLIMATE ZONE 16 DO NOT REQUIRE A PV SYSTEM BASED ON EXEMPTION 2: SOLAR REQUIREMENT IS LESS THAN 1.8 kW

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ARCHITECTURE + DESIGN

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1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

PV ARRAY SITE PLAN

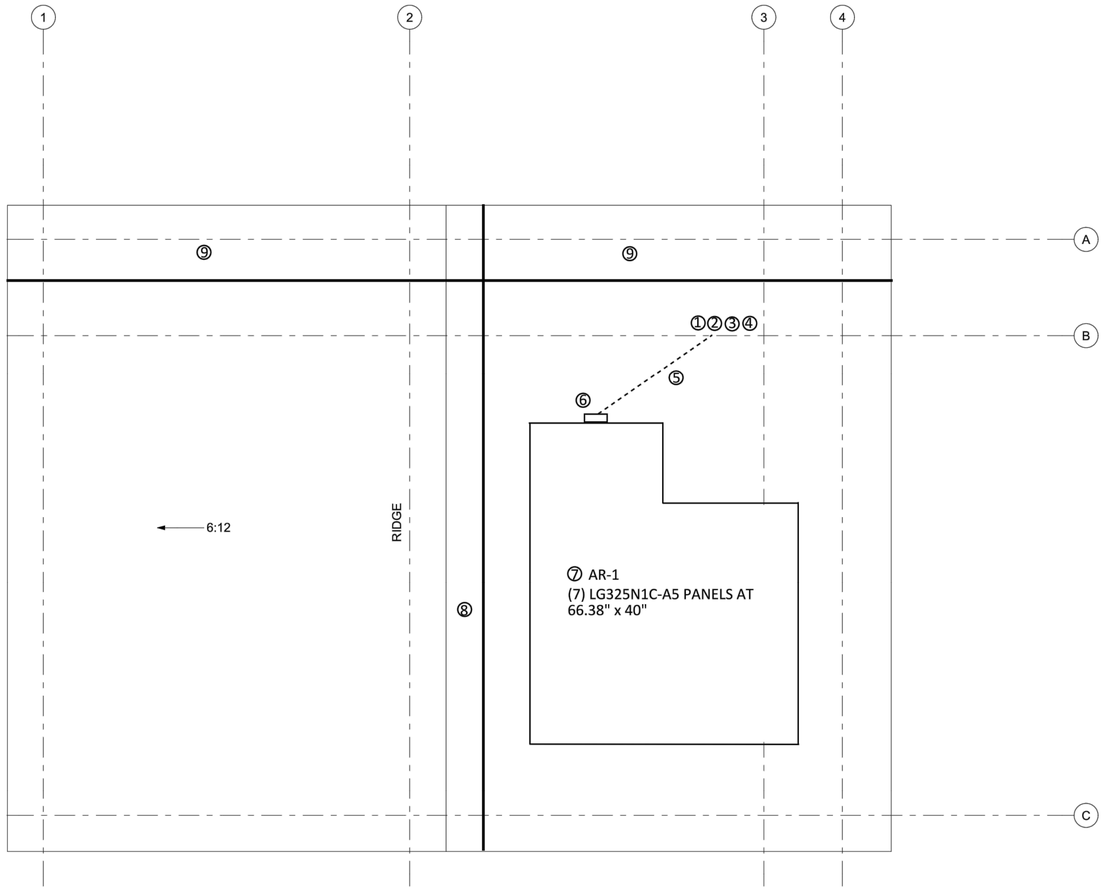
PV0.1

PV ARRAY NOTES

SYSTEM NAME	AR-1
MODULES	(7) LG LG325N1C-A5
INVERTER(S)	(1) SOLAREDGE SE3800H-US
RACKING	ECOFASTEN CLICKFIT RACKING SYSTEM
MOUNT SPACING	48" O.C MAX
ATTACHMENT	ECOFASTEN GF-1
AZMUTH	150°-270°
ROOF PITCH	6:12
ROOF TYPE	SHINGLE
SOLAR AREA (SQFT)	129.0 SQ. FT.
REQUIRED SYSTEM SIZE	2240W

KEYED NOTES

1. MAIN ELECTRIC METER, 200A
2. UTILITY AC DISCONNECT
3. PV GENERATOR METER
4. SOLAR INVERTER LOCATION (ON EXTERIOR WALL)
5. CONDUIT RUN (THROUGH ATTIC)
6. JUNCTION BOX
7. PV SYSTEM MODULES
8. RIDGE SETBACK (1.5FT)
9. ROOF ACCESS PATHWAYS (3FT TYPICAL)



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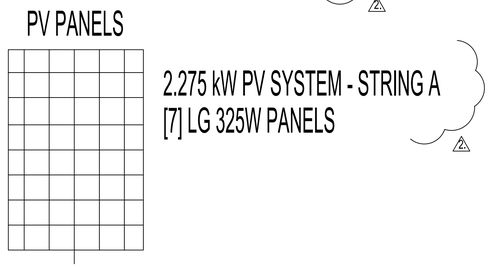
ID	NAME	DATE
	SUBMITTAL	3/30/23

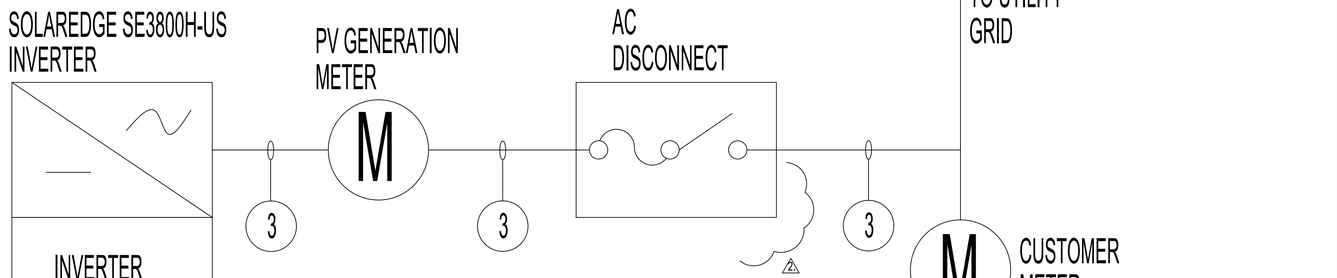
PV ARRAY LAYOUT

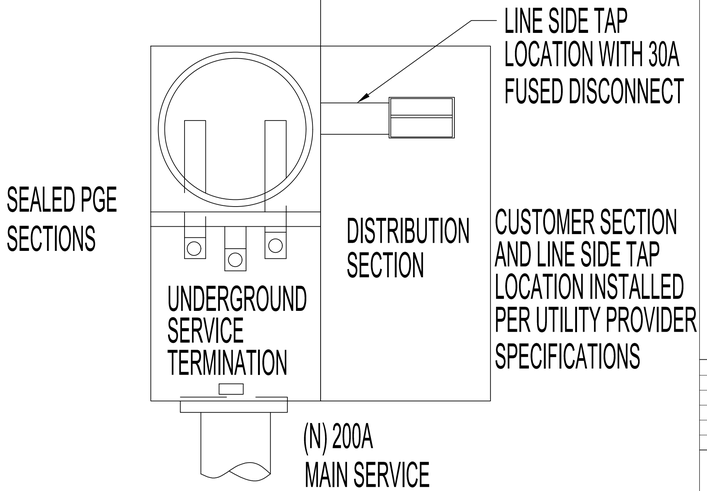
PV0.2

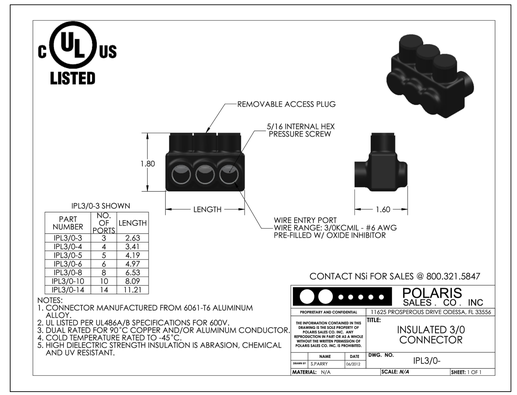
CONDUCTOR/CONDUIT SCHEDULE					
ID	Conductor Type	Conductor Size	Ground	Conduit	Neutral
1	PV Wire	(2) #12 AWG	(1) #12 GND	N/A	None
2	THHN/THWM-2	(2) #10 AWG	(1) #10 GND	3/4" EMT	None
3	THHN/THWM-2	(2) #10 AWG	(1) #8 GND	3/4" EMT	(1) #10 AWG

PHOTOVOLTAIC SYSTEM MUST BE EQUIPMENT WITH RAPID SHUTDOWN. TURN RAPID SHUTDOWN SWITCH TO OFF POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD.









INVERTER RATINGS	
Manufacturer	SolarEdge
Model #	SE3800H-US
Max Input Current	20.0A
Max Power (AC)	480W
Nom. AC Voltage	240V
Max AC Current	16.0A
Efficiency (%)	99%

MODULE AND ARRAY RATINGS: (7) MODULES			
Make	LG		
Model	LG325N1C-A5		
Imp	9.77A	Efficiency (%)	19.0%
Vmp	33.3V	Fire Rating	Type 1
Isc	10.41A	Pmax	325W
Voc	40.9V	AR-1 Pmax	2275W
%voc/C	-0.27%	Total Array Weight	277.76 LBS

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REGISTERED PROFESSIONAL ENGINEER
MECHANICAL
No. 26789
Exp. 9/30/24
STATE OF CALIFORNIA

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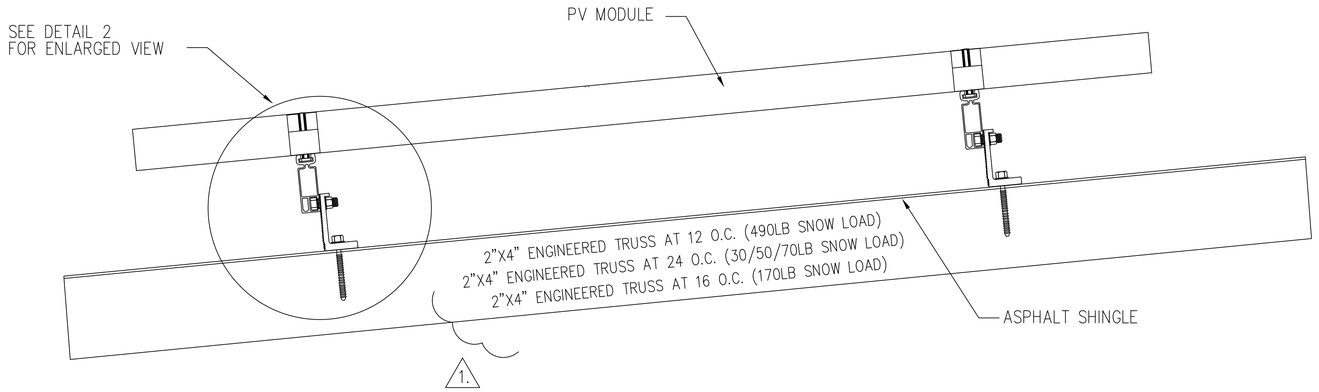
1 BEDROOM (661 SF)

OWNER:
ADDRESS:
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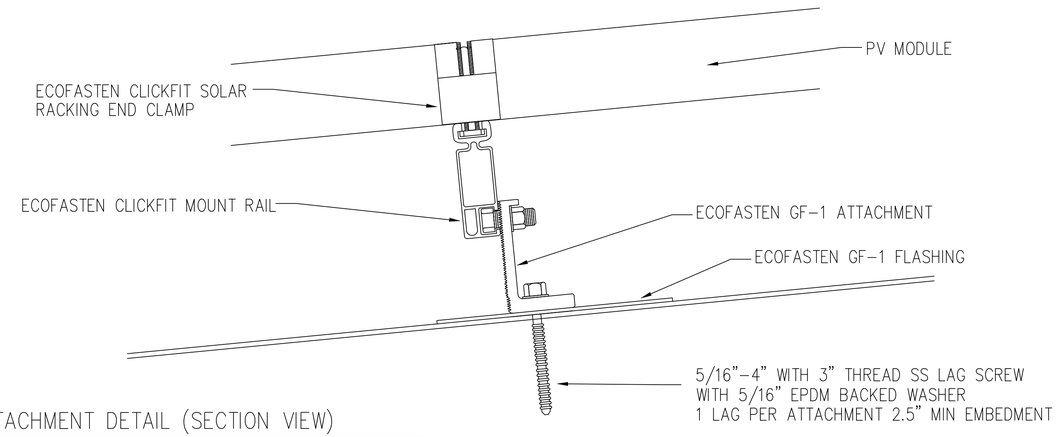
ID	NAME	DATE
	SUBMITTAL	3/30/23

PV SINGLE LINE DIAGRAM

PV0.3



1| ATTACHMENT DETAIL

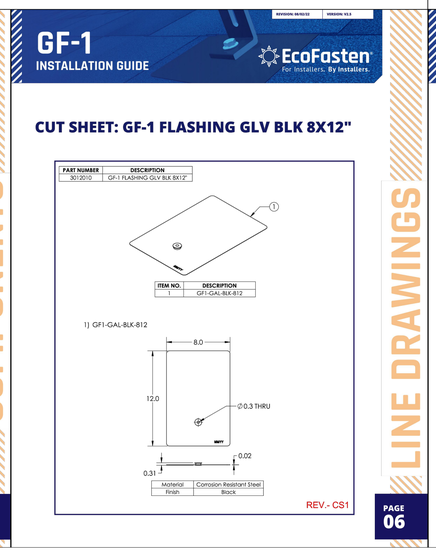


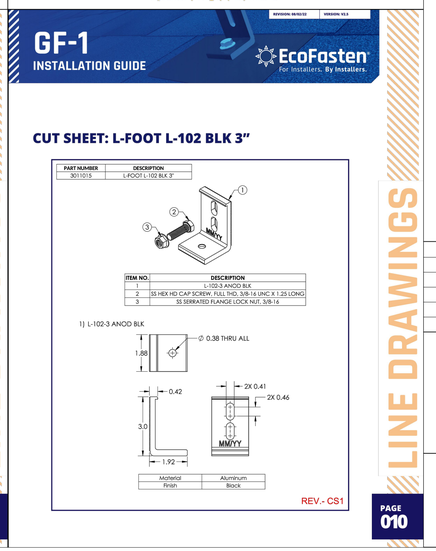
2| ATTACHMENT DETAIL (SECTION VIEW)











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PZSE structural ENGINEERS

January 27, 2023

EcoFasten Solar LLC
4141 W Van Buren St, Ste 2
Phoenix, AZ 85009
TEL: (877) 859-3947

Attn.: Eco Fasten Solar - Engineering Department

Re: Report # 2019-11325HG.05.01 – EcoFasten - ClickFit System for Gable and Hip Roofs
Subject: Engineering Certification for the State of California

PZSE, Inc. – Structural Engineers has provided engineering and span tables for the EcoFasten - ClickFit System, as presented in PZSE Report # 2019-11325HG.05.01, "Engineering Certification for the EcoFasten - ClickFit System for Gable and Hip Roofs". All information, data, and analysis therein are based on, and comply with, the following building codes and typical specifications:

Building Codes:
1. 2022 California Building Code, by California Building Standards Commission
2. ASCE/SEI 7-16, Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers
3. 2021 International Building Code, by International Code Council, Inc.
4. 2021 International Residential Code, by International Code Council, Inc.
5. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES
6. Aluminum Design Manual 2015, by The Aluminum Association, Inc.
7. ANSI/AWC NDS-2018, National Design Specification for Wood Construction, by the American Wood Council

Design Criteria:
Risk Category II
Seismic Design Category = A - E
Exposure Category = B, C & D
Basic Wind Speed (ultimate) per ASCE 7-16 = 90 mph to 180 mph
Ground Snow Load = 0 to 60 (psf)

This letter certifies that the loading criteria and design basis for the EcoFasten - ClickFit System Span Tables are in compliance with the above codes.

If you have any questions on the above, do not hesitate to call.

Prepared by:
PZSE, Inc. – Structural Engineers
Roseville, CA

DIGITALLY SIGNED
REGISTERED PROFESSIONAL ENGINEER
No. 5803
STRUCTURAL
STATE OF CALIFORNIA

1478 Stone Point Drive, Suite 190, Roseville, CA 95661
T 916.961.3960 F 916.961.3965 W www.pzse.com
Experience | Integrity | Empowerment

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

PV ARRAY DETAILS

PV0.4

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

Label to be installed at the photovoltaic O.C.P.D. per CEC 705.12(D)(2)

PHOTOVOLTAIC SYSTEM AC DISCONNECT

OPERATING VOLTAGE	240	VOLTS
OPERATING CURRENT	32	AMPS

Label to be installed at the POI and all AC disconnects per CEC 690.54 & CEC 705.10

PV SOLAR BREAKER
DO NOT RELOCATE THIS OVERCURRENT DEVICE

Label to be installed at the photovoltaic O.C.P.D. per CEC 705.12(D)(7)

PHOTOVOLTAIC SYSTEM DISCONNECT

Label to be installed next to Main Breaker

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

2014 NEC 605.12(D)(2)

WARNING: PHOTOVOLTAIC POWER SOURCE

PHOTOVOLTAIC SYSTEM DC DISCONNECT

OPERATING VOLTAGE	51.2	VDC
OPERATING CURRENT	130	AMPS
MAX SYSTEM VOLTAGE	58.4	VDC
SHORT CIRCUIT CURRENT	130	AMPS

Label to be installed at the photovoltaic DC disconnect per CEC 690.14(C)(2) CEC 690.53

WARNING
ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS TERMINALS ON BOTH THE LINE AND LOAD SIDE MAY BE ENERGIZED IN THE OPEN POSITION

Label to be installed at the photovoltaic DC disconnect per CEC 690.17

WARNING
ELECTRICAL SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

Label to be installed at the photovoltaic DC disconnect per CEC 690.35

INVERTER(S) LOCATED:
GARAGE

Label to be installed at the point of interconnection per NEC 705.10

CAUTION SOLAR CIRCUIT

Label to be installed on raceways, junction boxes, and conduit bodies per CEC 690.31

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY

SOLAR ELECTRIC PV PANELS

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION. TO SHUTDOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT

PV SYSTEM DISCONNECT

NOTES:

1) DIRECT CURRENT (DC) CONDUIT, ENCLOSURES, RACEWAYS, CABLE ASSEMBLIES, JUNCTION BOXES, COMBINER BOXES AND DISCONNECTS SHALL BE LABELED PER THE FOLLOWING:

- LABELS SHALL BE REFLECTIVE, WATER RESISTANT AND CAN WITHSTAND THE ENVIRONMENT AS REQUIRED IN SECTIONS R331.2.2 – R331.2.4
- LETTERING SHALL BE A MINIMUM ⅜ INCH IN HEIGHT WITH WHITE ON RED BACKGROUND.
- LABELS SHALL STATE, WARNING: PHOTOVOLTAIC POWER SOURCE.□
- LABELS SHALL BE PLACED AT EVERY SERVICE DISCONNECT; ALSO EVERY DC CONDUIT, RACEWAYS, ENCLOSURES, ETC AT 10FT O.C. AND WITHIN 1FT OF TURNS, BENDS, AND PENETRATIONS.
- RAPID SHUTDOWN INITIATION DEVICE SHALL BE LOCATED ON THE EXTERIOR LABELLED RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM□WITH WHITE OR RED MINIMUM ⅜INCH IN HEIGHT LETTERING

LG NeON®2

LG340N1C-AS | LG335N1C-AS | LG330N1C-AS | LG325N1C-A5

340W | 335W | 330W | 325W

The LG NeON® 2 is LG's best-selling solar module. The NeON® 2 received the acclaimed 2015 Intersolar AWARD for featuring LG's Cello Technology, which increases power output and reliability and makes the NeON® 2 one of the most powerful and versatile modules on the market.

Feature

- **Enhanced Performance Warranty** — LG NeON® 2 has an enhanced performance warranty. The annual degradation has fallen from -0.6 %/yr to -0.5%/yr. Even after 25 years, the cell guarantees 2.4% more output than the previous LG NeON® 2 modules.
- **High Power Output** — Compared with previous models, the LG NeON® 2 has been designed to significantly enhance its output efficiency, thereby making it efficient even in limited space.
- **Roof Aesthetics** — LG NeON® 2 has been designed with aesthetics in mind, using thinner wires that appear all black at a distance.
- **Outstanding Durability** — With its newly-reinforced frame design, LG has extended the warranty of the NeON® 2 from 15 years to 25 years, including labor. In addition, LG NeON® 2 can endure a front load up to 6000 Pa, and a rear load up to 5400 Pa.
- **Improved Performance on Sunny Days** — LG NeON® 2 now performs better on sunny days, thanks to its improved temperature coefficient.
- **Near Zero LID (Light Induced Degradation)** — The n-type cells used in LG NeON® 2 have almost no boron. This leads to less LID (Light Induced Degradation) right after installation.

About LG Electronics

LG Electronics is a truly global player committed to expanding its operations with the solar market. The company first embarked on a solar energy source research program in 1985, supported by LG Group's vast experience in the semi-conductor, LCD, chemistry and materials industries. In 2010, LG Solar successfully released its first Monox® module, which was followed by the highly successful MonoX® NETBi, MonoX® NEON®, MonoX® NEON® 2 and the "Intersolar AWARD" in 2015, 2013 and 2010, which demonstrated LG Solar's lead, innovation and commitment to the industry.

LG Life's Good

North America Solar Business Team
LG Electronics U.S.A. Inc.
1000 Sylvan Ave, Englewood Cliffs, NJ 07632

Contact: lgsolar@lge.com
www.lgsolar.co.kr/en

Product specifications are subject to change without notice.
DS-N3-US-C-G-F-EN-REV08

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LG NeON®2

LG340N1C-AS | LG335N1C-AS | LG330N1C-AS | LG325N1C-A5

Mechanical Properties

Cells	6 x 10
Cell Vendor	LG
Cell Type	Monocrystalline / N-type
Cell Dimensions	161.7 x 161.7 mm / 6 inches
# of Busbar	12 (Multi Wire Busbar)
Dimensions (L x W x H)	1,686 x 1,016 x 40 mm 66.38 x 40 x 1.57 in
Front Load	6,000Pa (*) 5,400Pa (**)
Rear Load	5,400Pa (*) (**)
Weight	18 kg / 39.68 lb
Connector Type	MC4 (MC), PV-KBT4/KST4 (MV)
Junction Box	IP68 with 3 Bypass Diodes
Cables	1,000 mm x 2 ea / 39.37 in x 2 ea
Glass	Tempered Glass with AR Coating
Frame	Anodized Aluminum

* Please refer to the installation manual for the details.

Certifications and Warranty

Certifications	IEC 61215, IEC 61730-1/-2 UL 1703 IEC 61701 (Salt mist corrosion test) IEC 62716 (Ammonia corrosion test)
Module Fire Performance	ISO 9001 Type 1 (UL 1703)
Fire Rating	Class C (UL/ORC (1703), IEC 61730)
Product Warranty	25 Years
Output Warranty of Pmax	Linear Warranty*

* 1) 1st year: 98%, 2) After 1st year 0.33% annual degradation 3) 89.15% for 25 years

Temperature Characteristics

NOCT	45 ± 3
Pmax	[%/°C] -0.37
Voc	[%/°C] -0.27
Isc	[%/°C] 0.03

Electrical Properties (STC*)

Model	LG340N1C-A5	LG335N1C-A5	LG330N1C-A5	LG325N1C-A5
Maximum Power (Pmax) [W]	340	335	330	325
MPP Voltage (Vmpp) [V]	34.5	34.1	33.7	33.3
MPP Current (Impp) [A]	9.86	9.83	9.80	9.73
Open Circuit Voltage (Voc) [V]	41.1	41.0	40.9	40.8
Short Circuit Current (Isc) [A]	10.53	10.49	10.45	10.41
Module Efficiency [%]	19.8	19.6	19.3	19.0
Operating Temperature [°C]	-40 ~ +90			
Maximum System Voltage [V]	1000(UL), IEC)			
Maximum Series Fuse Rating [A]	20			
Power Tolerance [%]	0 ~ +3			

* STC (Standard Test Conditions) Irradiance 1000 W/m², cell temperature 25 °C, AM 1.5
The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion.
The Typical change in module efficiency at 200 W/m² in relation to 1000 W/m² is -2.0%.

Electrical Properties (NOCT*)

Model	LG340N1C-A5	LG335N1C-A5	LG330N1C-A5	LG325N1C-A5
Maximum Power (Pmax) [W]	251	247	243	240
MPP Voltage (Vmpp) [V]	31.3	31.0	31.2	30.8
MPP Current (Impp) [A]	7.96	7.83	7.81	7.78
Open Circuit Voltage (Voc) [V]	38.5	38.2	38.1	38.0
Short Circuit Current (Isc) [A]	8.47	8.44	8.41	8.38

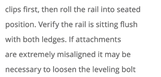
* Nominal Operating Cell Temperature(Irradiance 800 W/m², ambient temperature 20 °C, wind speed 1 m/s)

Dimensions (mm / inch)



Characteristic Curves





* The distance between the center of the mounting/grounding

LG Life's Good

North America Solar Business Team
LG Electronics U.S.A. Inc.
1000 Sylvan Ave, Englewood Cliffs, NJ 07632

Contact: lgsolar@lge.com
www.lgsolar.co.kr/en

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/ SolarEdge Home Hub Inverter
For North America
SE3800H-US / SE5700H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US[1]

HOME BACKUP

12-25 YEAR WARRANTY



Optimized battery storage with HD-Wave technology

- Record-breaking 99% weighted efficiency with 200% DC oversizing
- Small, lightweight, and easy to install
- Modular design, future ready with optional upgrades to:
  - DC-coupled storage for full or partial home backup
  - Built-in consumption monitoring
  - Direct connection to the SolarEdge Home EV Charger
- Multi-inverter, scalable storage solution, with enhanced battery power up to 10kW
- Integrated arc fault protection and rapid shutdown for NEC 2014 – 2023, per article 690.11 and 690.12
- Embedded revenue grade production data, ANSI C12.20 Class 0.5

solaredge.com

solaredge

/ SolarEdge Home Hub Inverter
For North America
SE3800H-US / SE5700H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US[1]

Applicable to inverters with part number	SExxxxH-USxxxBBxxx / SExxxxH-USxxxBBxxx						
	SE3800H-US	SE5700H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	Units
OUTPUT – DC (BATTERY)							
Supported Battery Types	SolarEdge Home Battery, LG RESU Prime						
Number of Batteries per Inverter	Up to 3 SolarEdge Home Battery, up to 2 LG RESU Prime						
Continuous Power[8]	7600 @ 240V 3800 @ 208V	5700 @ 240V 5700 @ 208V	6000		7600	7600 @ 240V 5000 @ 208V	W
Peak Power[8]	7600 @ 240V 3800 @ 208V	5700 @ 240V 5700 @ 208V	6000		7600	7600 @ 240V 5000 @ 208V	W
Max Input Current	20		25.5				Adc
Z-pole Disconnection	Up to inverter rated backup power						
SMART ENERGY CAPABILITIES							
Consumption Metering	Built-in[2]						
Backup & Battery Storage	With Backup Interface (purchased separately for service up to 200A, up to 3 inverters						
EV Charging	Direct connection to SolarEdge Home EV Charger						
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485, Ethernet, Cellular[3], Wi-Fi[4], SolarEdge Home Network						
Revenue Grade Metering, ANSI C12.20	Built-in[2]						
Integrated AC, DC and Communication Connection Unit	Yes						
Inverter Commissioning	With the SetApp mobile application using built-in Wi-Fi Access Point for local connection						
DC Voltage Rapid Shutdown (PV and Battery)	Yes, according to NEC 2014 – 2023 per article 690.12 and 690.12						
STANDARD COMPLIANCE							
Safety	UL1741, UL1741 SA, UL1741 SB, UL1741 PCS, UL 9098, UL 9098, UL9540, CSA 22.2						
Grid Connection Standards	IEEE1547-2018, Rule 21, Rule 14H, CSA C22.2 No. 9						
Emissions	FCC part 15 class B						
INSTALLATION SPECIFICATIONS							
AC Output and DC AC Output Conduit Size / AWG Range	1" maximum / 14-4 AWG						
DC Input (PV and Battery) Conduit Size / AWG Range	1" maximum / 14-4 AWG						
Dimensions with Connection Unit (H x W x D)	17.7 x 14.6 x 6.8 / 450 x 370 x 174	17.7 x 14.6 x 6.8 / 450 x 370 x 174	21.3/4 x 14.6 x 7.3/ 540 x 370 x 185	21.3/4 x 14.6 x 8.2 / 540 x 370 x 208			in / mm
Weight with Connection Unit	30.8 / 14		40.1 / 18.2		44.9 / 20.4		lb / kg
Noise	< 50						dBA
Cooling	Natural Convection						
Operating Temperature Range	-40 to +140 / -40 to +60						°F / °C
Protection Rating	NEMA 4X						

** Supported with PN SExxxxH-USxxxBBXxx or SExxxxH-USxxxBBNxx4.
*** Supported with PN SExxxxH-USxxxBBXB5 or SExxxxH-USxxxBBNB5.
(1) Discharge power is limited up to the inverter rated AC power for on-grid and backup applications, as well as up to the installed batteries' rating.
(2) The consumption metering current transformers should be ordered separately: SCT-SPL-CON-T-25 or SCACT0750-400NA-25 units are too. Revenue grade metering is only for production metering.
(3) For communication with the SolarEdge Home Battery, cellular connection requires the SolarEdge cellular plug-in.
(4) The part number SExxxxH-USxxxBBXB5 only supports the Wi-Fi communication interface, and the part number SExxxxH-USxxxBBLB5 only supports the cellular communication interface.
(5) Full power up to at least 50°C / 122°F, for power de-rating information refer to the Temperature Derating Technical Note for North America

/ Power Optimizer
For North America
P400 / P401 / P485 / P505

POWER OPTIMIZER

25 YEAR WARRANTY

PV power optimization at the module level

- Specifically designed to work with SolarEdge inverters
- High efficiency with module-level MPPT, for maximized system energy production and revenue, and fast project ROI
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

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Optimizer model (Typical module compatibility)	P400 (for 72 & 96-cell modules)	P401 (for high power 60 and 72 cell modules)	P485 (for high voltage modules)	P505 (for higher current modules)	
INPUT					
Rated Input DC Power[1]	400	430	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	80	60	125[2]	83[2]	Vdc
MPPT Operating Range	8 - 80	8 - 60	12.5 - 105	12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	10.1	12.5	11	14	Adc
Maximum Efficiency	99.5				%
Weighted Efficiency	98.8				%
Overvoltage Category	II				
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)					
Maximum Output Current	15				Adc
Maximum Output Voltage	60		85		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR INVERTER OFF)					
Safety Output Voltage per Power Optimizer	1 ± 0.1				Vdc
STANDARD COMPLIANCE					
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3				
Safety	IEC62109-1 (class II safety), UL1741, NEC/PVRSS				
Material	UL94 V-0, UV Resistant				
RoHS	Yes				
INSTALLATION SPECIFICATIONS					
Maximum Allowed System Voltage	1000				Vdc
Compatible Inverters	All SolarEdge Single Phase and Three Phase inverters				
Dimensions (W x L x H)	129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 153 x 29.5 / 5.1 x 6 x 1.16	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3	mm / in
Weight (including cables)	750 / 1.7	655 / 1.5	845 / 1.9	1064 / 2.3	gr / lb
Input Connector	MC4[3]				
Input Wire Length[4]	0.16 / 0.5				m / ft
Output Wire Type / Connector	Double Insulated / MC4				
Output Wire Length	1.2 / 3.9				m / ft
Operating Temperature Range[5]	-40 to +85 / -40 to +185				°C / °F
Protection Rating	IP68 / NEMA6P				
Relative Humidity	0 - 100				%

(1) The rated power of the module at STC will not exceed the optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.
(2) NEC 2017 requires that the maximum input voltage not be more than 80V
(3) For other connector types please contact SolarEdge
(4) For other wire lengths please contact SolarEdge. For the input wire length under P401 see above.
(5) For ambient temperatures above +85°C / +185°F power de-rating is applied. Refer to the Power Optimizers Temperature De-Rating Technical Note for more details.

PV System Design Using a SolarEdge Inverter[6,7]	SolarEdge Home Hub/Wave Single Phase	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	P400, P401	8	16	16	
	P485, P505	6	8	14	
Maximum String Length (Power Optimizers)		25	25	50	
Maximum Power per String		5700[8] (6000 with SE7600-US / SE7600B-US)	5250[9]	6000[8]	12750[9]	W
Parallel Strings of Different Lengths or Orientations		Yes			

(6) It is not allowed to mix P485/P505 with P400/P401 in one string.
(7) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement.
(8) For the 208V grid, it is allowed to install up to 6,000W per string when the maximum power difference between each string is 1,000W.
(9) For 277/480V grid, it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W.

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CE RoHS

REVISION DATE: 06/15/23 | VERSION: v3.2

CLICKFIT INSTALLATION GUIDE — EcoFasten — For Installers. By Installers.

RATINGS

Fire Rating	Class A* and B** System Fire Rating
Max System Voltage	1500 VDC
Max Fuse Rating	40A
Certification	Conforms to UL STD 2703 and UL SUBJECT 2703A
Warranty	25 Year Material and Workmanship
UL 2703 Markings	Product listing label is located on the End Clamp
Roof Pitch	1/2:12 – 21:12
UL 2703 Allowable Design Load Rating	10 psf downward, 5 psf upward, and 5 psf lateral
Max Module Size	25.6 sqft
Module Orientation	Portrait or Landscape
Multiple use Rated Components (Position Independent)	Mid Clamp, Frame MLPE Mount and MLPE Mount
Conforms to UL SUBJECT 2703A	Smart Foot on Steep Slope Asphalt Shingle Roof

*Class A System fire rating with Steep and Low Slope roofs and Type 1, 2, and 29 PV modules with no skirt required. Class A System fire rating with Steep Slope Roofs and Type 4 and 5 modules with south edge skirt required. Any roof-to-module gap is permitted. This rating is applicable with any roof attachment.
**Class B System fire rating with Steep Slope roofs and Type 4 and 5 modules, no skirt required. Any roof-to-module gap is permitted. This rating is applicable with any roof attachment.

UL 2703 MARKING EXAMPLE:



Intertek
5017913
CONFORMS TO UL STD 2703



MARKINGS LOCATED ON END CLAMP

TORQUE SPECIFICATIONS

Component	Torque (in-lb)	Notes
Lag Screw	N/A	Fully Seat. Use visual indicator of the black EPDM ring around the bonded washer for torquing.
Mid-Clamp	144	
End-Clamp	144	
Rail Clicker Leveling Bolt	144	Pre-torqued upon delivery. Applies to Tile Hook and L-Foot/Clicker
Hook Height Bolt	N/A	Lightly clamp hook to flush with top of next tile row
Ground Lug	N/A	Refer to specific ground lug manufacturer's installation manual
MLPE Clip	144	
MLPE Mount	144	

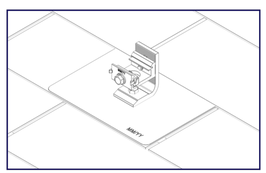
RATINGS

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REVISION DATE: 06/15/23 | VERSION: v3.2

CLICKFIT INSTALLATION GUIDE — EcoFasten — For Installers. By Installers.

ARRAY LAYOUT



- Refer to span tables, local jurisdiction, or engineer of record specifications when determining setbacks from roof edges, attachment spans, etc.
- Mark the perimeter and corners of the array on the roof surface.
  Add 3/4" to account for the gap between modules in each direction
- Draw or snap chalk lines where the rails will be installed, (refer to module manufacturer specs to determine allowable mounting locations).
- Locate rafters within the area of the array. It may be necessary to shift the array East or West on the roof in order to fall within the rail cantilever specs (1/3 of span).
- Stagger rafters every row if required by the local jurisdiction, engineer of record, or company policy.

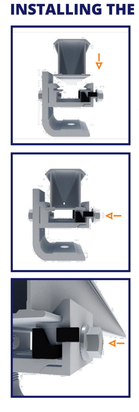
ARRAY LAYOUT

PAGE 07

REVISION DATE: 06/15/23 | VERSION: v3.2

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INSTALLING THE RAIL



1. Place the rail in the Clickers.
2. Ensure the rails extend a minimum of 2" past the last attachments in each row.
3. Push the rail into the L-foot clicker starting on the side with the plastic clips first, then roll the rail into seated position. Verify the rail is sitting flush with both ledges. If attachments are extremely misaligned it may be necessary to loosen the leveling bolt and adjust the height of the L-foot. Tighten the clamping bolt to 144 in-lbs.
4. Level the rail if necessary by loosening the bolt attaching the Clicker to the L-foot or tile hook.

INSTALLATION

PAGE 23

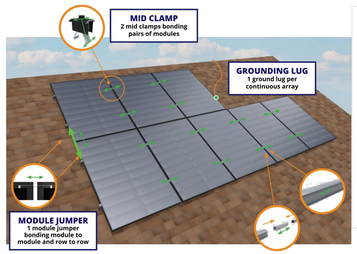
REVISION DATE: 06/15/23 | VERSION: v3.2

CLICKFIT INSTALLATION GUIDE — EcoFasten — For Installers. By Installers.

BONDING AND GROUNDING

BONDING PATHS

Bonding paths are carried throughout the array in a variety of ways. They are carried module-to-module and module-to-rail through mid clamps, carried at rail-to-rail connections through the splices, and carried row-to-row using module jumpers or grounding lugs with bare copper. For easy row to row bonding, EcoFasten recommends using our Module jumper.



GROUNDING

PAGE 27

EcoFasten
An ESDEC Company

Module type (tilt 20-60°)		Module size (up to 25.6 sq ft)																							
Roof zone	Max. spacing	Wind speed	90 mph			100 mph			110 mph			120 mph			130 mph			140 mph			150 mph			160 mph	
		Ground snow load	0 psf	20 psf	40 psf	0 psf	20 psf	40 psf	0 psf	20 psf	40 psf	0 psf	20 psf	40 psf	0 psf	20 psf	40 psf	0 psf	20 psf	40 psf	0 psf	20 psf	40 psf	0 psf	20 psf	40 psf
1	72"	Array Edge	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72

NOTES

1) ALL SYSTEM PIPING AND FITTINGS SHALL BE NEW AND U.L. LISTED. ALL FLEX TUBING IS PEX UNLESS OTHERWISE NOTED. ALL CPVC IS BLAZEMASTER UNLESS NOTED OTHERWISE. ALL COPPER IS TYPE "L" UNLESS NOTED OTHERWISE.
2) A SPARE HEAD BOX SHALL BE PROVIDED WITH 1 HEAD WRENCH AND 1 SPARE HEAD OF EACH TYPE OF SPRINKLER USED IN THE SYSTEM.
3) SECURE PIPING TO TOP OF CEILING JOIST OR BOTTOM CHORD OF TRUSS. USE APPROVED PIPE STRAPS AND #18 X 1-1/2" WOOD SCREWS.
4) SPRINKLERS ARE PERMITTED TO BE PAINTED AT THE FACTORY ONLY. ANY SPRINKLER THAT HAS BEEN PAINTED OUTSIDE THE FACTORY MUST BE REPLACED WITH A NEW LISTED SPRINKLER PER N.F.P.A. 13D.
5) HANGER SPACING SHALL BE IN ACCORDANCE WITH N.F.P.A. 13 & 13R. MAXIMUM OF 6'-0" BETWEEN HANGERS FOR 1" PIPING. MAXIMUM OF 6'-6" FOR 1-1/4" PIPING. MAXIMUM OF 12" FROM SPRINKLER HEADS FOR 1" PIPE. MAXIMUM OF 6" FROM SPRINKLER HEADS FOR 3/4" PIPE.
6) ALL PENETRATIONS THROUGH FIREWALLS AND CEILINGS BETWEEN ATTACHED GARAGES AND RESIDENCE WILL BE SEALED IN AN APPROVED MANNER TO MAINTAIN THE INTEGRITY OF THE FIREWALL.
7) STORAGE IN ATTIC AND CRAWL SPACES IS NOT ALLOWED WHERE NOT PROTECTED WITH SPRINKLERS.
8) SPRINKLERS MUST BE INSTALLED ACCORDING TO THE SPACING PARAMETERS THAT HAVE BEEN HYDRAULICALLY PROVEN, BUT MAY NOT BE IN THE EXACT LOCATIONS SHOWN ON PLAN.
9) CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF A FULLY FUNCTIONAL FIRE PROTECTION SYSTEM, INCLUDING ALL UNDERGROUND PIPING, MEETING ALL APPLICABLE CODES AND AHJ REQUIREMENTS.
10) SYSTEM IS DESIGNED AND INSTALLED PER N.F.P.A. 13D AND THE AUTHORITY HAVING JURISDICTION.
11) FINAL APPROVAL OF SYSTEM PENDING FINAL INSPECTION BY THE AUTHORITY HAVING JURISDICTION.
12) INTERMEDIATE TEMPERATURE RATED SPRINKLERS ARE REQUIRED IN ALL SPACES (ATTIC, GARAGE, MECH RM, ETC) WITH FUEL FIRED EQUIPMENT (SPACE HEATERS, FURNACES, WATER HEATERS, ETC) ARE INSTALLED WHETHER SHOWN ON THE DRAWINGS OR NOT.
13) NAIL PLATES ARE REQUIRED IN ACCORDANCE WITH THE CALIFORNIA PLUMBING CODE.
14) CONTRACTORS FOR ALL TRADES ARE REQUIRED TO COMPLY WITH THE 2022 CALIFORNIA BUILDING CODE WITH PARTICULAR EMPHASIS TO TITLE 25, PART 2.5 AND ALL APPICABLE SECTIONS OF NFPA 2022 CODE CYCLE.
15) CONTRACTOR IS RESPONSIBLE TO INSURE THAT SPRINKLER PIPING IS INSTALLED IN SPACES MAINTAINED AT 40F OR ABOVE. HEAT TRACING IS ALLOWED IF APPROVED BY THE AHJ AND THE PROJECT ARCHITECT.

For multipurpose piping systems a warning sign, with minimum ¼ in. (6 mm) letters, shall be affixed adjacent to the main shutoff valve and shall state the following, as required by NFPA 13D:

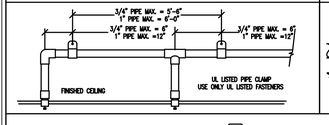
WARNING: The water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or auto-matically shut off the water to the fire sprinkler system, such as water softeners, filtration systems,and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign.

For residences with self-contained fire suppression systems and for manufactured home sprinklered buildings the minimum flow and pressure needed to satisfy the fire sprinkler system design criteria on the system side of the meter (POC) shall be specified on a data plate posted at the building supply point as required by NFPA 13D.

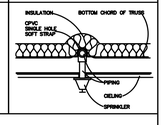
SPRINKLER HEAT ZONES

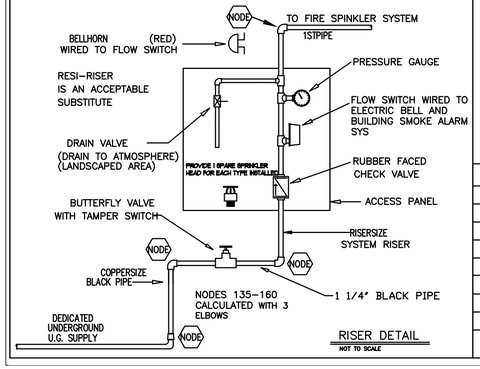
HEAT SOURCE	MINIMUM DISTANCE FROM EDGE OF SOURCE TO ORDINARY TEMP. SPRK.	MINIMUM DISTANCE FROM EDGE OF SOURCE TO INTERMEDIATE TEMP. SPRK.
SIDE OF OPEN OR RECESSED FIREPLACE	3'-0"	1'-0"
FRONT OF RECESSED FIREPLACE	5'-0"	3'-0"
COAL- OR WOOD-BURINING STOVE	3'-6"	1'-0"
KITCHEN RANGE	1'-6"	0'-9"
WALL OVEN	1'-6"	0'-9"
HOT AIR FLUES	1'-6"	0'-9"
INSULATED HEAT DUCTS	1'-6"	0'-9"
UNINSULATED HOT WATER PIPES	1'-0"	0'-6"
SIDE OF CEILING- OR WALL-MOUNTED HOT AIR DIFFUSERS	2'-0"	1'-0"
FRONT OF WALL-MOUNTED HOT AIR DIFFUSERS	3'-0"	1'-6"
HOT WATER HEATER OR FURNACE	0'-6"	0'-3"
LIGHT FIXTURE 0W - 250W	0'-6"	0'-3"
LIGHT FIXTURE 250W - 499W	1'-0"	0'-6"
MINIMUM DISTANCE FROM THE CENTER OF CEILING FANS = 3' MINIMUM DISTANCE FROM SURFACE MOUNTED LIGHTS = 3'		

SUPPORT AND HANGER SPACING



ANCHORING DETAIL





RISER DETAIL
NOT TO SCALE

4" MINIMUM FROM WALLS	
8' MINIMUM BETWEEN HEADS	
COMPARTMENTS WITH ONE HEAD 10' MAXIMUM FROM WALLS	
ALL OTHER COMPARTMENTS 8' MAXIMUM FROM WALLS AND 16' MAXIMUM BETWEEN HEADS	

NOTE: ALL SPACES MUST BE KEPT AT 40F OR HIGHER UNLES ANTIFREEZE OR DRY SPRINKLER SYSTEMS ARE USED.

FLOW THROUGH (STRAIGHT RUN), 4-WAY CROSS FITTINGS, HAVE BEEN CALCULATED AS 2 FITTINGS

ALL PIPE SIZES ARE 1" UNLESS NOTED OTHERWISE

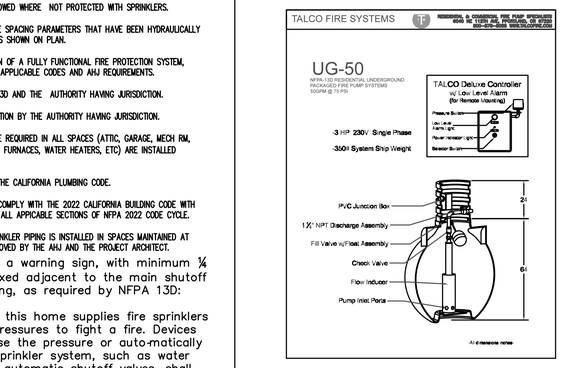
AREA 1 @ 20 X 20	
PSI REQ	28.0
GPM REQ	27.1

FLOW TEST DATA	
DATE	9-30-2022
STATIC	-------
RESIDUAL	-------
GPM	-------

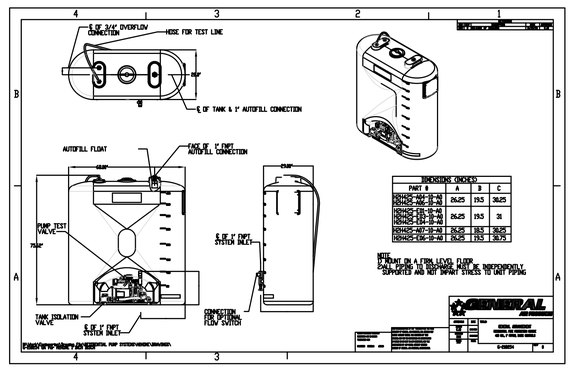
CONTRACTOR TO REF HYD CALC'S FOR MINIMUM WATER SUPPLY DESIGN REQUIREMENTES.

FLOW TEST DATA	
DATE	--/--/--
STATIC	--- psi
RESIDUAL	--- psi
GPM	---- gpm

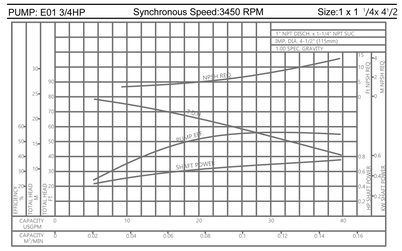
CONTRACTOR TO DETERMINE AVAILABLE WATER SUPPLY AND ADJUST PIPING AS NEEDED.



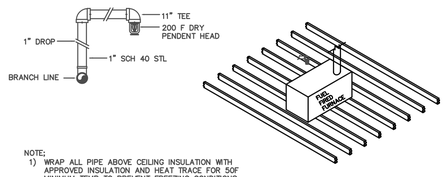
UNDERGROUND SELF-CONTAINED STORAGE TANK AND PUMP.



ABOVE GROUND SELF-CONTAINED STORAGE TANK AND PUMP.



2 SELF-CONTAINED PUMPED NFPA 13D FIRE SUPPRESSION SYSTEMS
SCALE: NTS



NOTE;
1) WRAP ALL PIPE ABOVE CEILING INSULATION WITH APPROVED INSULATION AND HEAT TRACE FOR 50F MINIMUM TEMP TO PREVENT FREEZING CONDITIONS.
2) INSTALL SPRINLERS IN FURNACE AREA PER NFPA 13 AND LOCAL REQUIREMENTS.

3 DRY PENDANT SPKLR INSTALLATION OVER OPTIONAL FURNACE LOCATION
SCALE: NTS

FIRE SPRINKLERS INSTALLED NEAR POTENTIAL HIGH AREA ARE TO BE INSTALLED ACCORDING TO THE FOLLOWING TABLE.

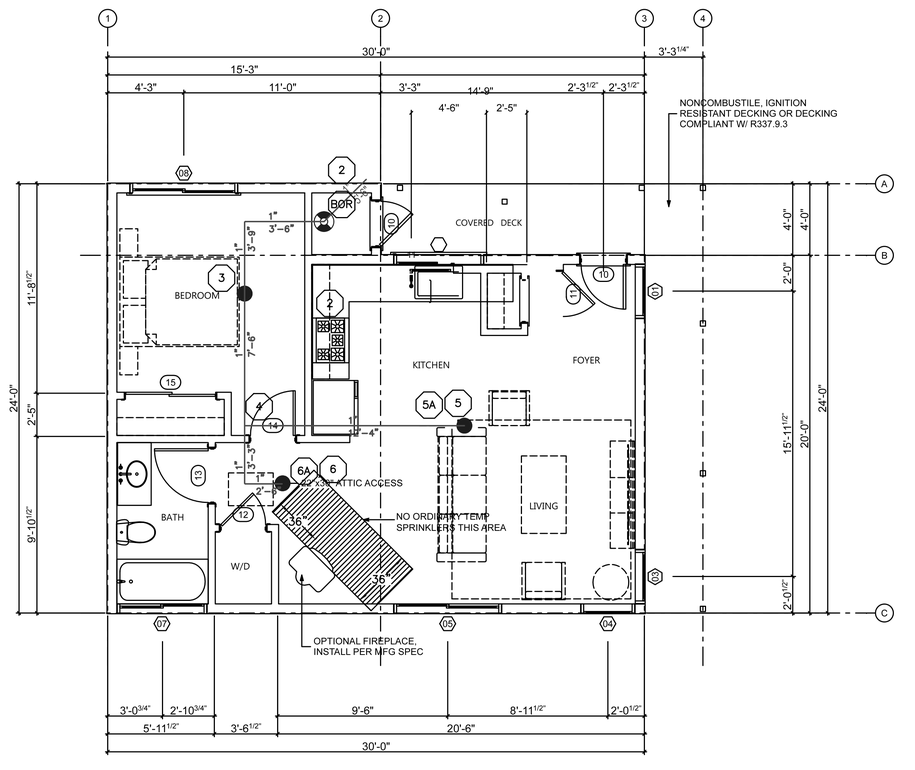
Table 8.3.2.5(c) Temperature Ratings of Sprinklers in Specified Residential Areas

Heat Source	Min. Distance from Edge of Source to Ordinary-Temperature Sprinkler .in	mm	Min. Distance from Edge of Source to Intermediate-Temperature Sprinkler .in	mm
Side of open or recessed fireplace	36	915	12	300
Front of recessed fireplace	60	1525	36	915
Coal- or wood-burning stove	42	1070	12	305
Kitchen range	18	460	9	230
Wall oven	18	460	9	230
Hot air flues	18	460	9	230
Uninsulated heat ducts	18	460	9	230
Uninsulated hot water pipes	12	305	6	155
Side of ceiling- or Wall-mounted hot air diffusers	24	610	12	305
Front of wall-mounted hot air diffusers	36	915	18	460
Hot water heater or furnace	6	155	3	75
Light fixture: 0W-250W	6	155	3	75
250W-499W	12	305	6	155

SYSTEM DESIGN DATA	
OCCUPANCY	RESIDENTIAL
HAZARD	NFPA 13D
DENSITY	0.05 GPM/SF
REMOTE AREA	
PSI DATA	
DATE	------
STATIC	------
AVAILABLE	------
TAKEN BY	CONTRACTOR

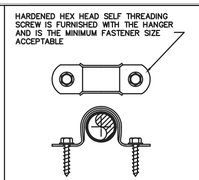
BUILDING AREA	
AREA	SQ. FT.
LOWER	------
1ST FLOOR	1ST
2ND FLOOR	------
OPTIONS	------
DETACHED	DETACHED
TOTAL	TOTAL

SPRINKLER SYMBOL DESCRIPTION									
SYMBOL	S.I.N.	MODEL	MAKE	FINISH	STYLE	TEMP	K-FACTOR	TOTAL
●	R3516	F1RFC49	RELIABLE	PAINTED	PENDENT	155[1]	4.9	3
	SIN	MODEL	MAKE	FINISH	STYLE	TEMP	K	QTY
	SIN	MODEL	MAKE	FINISH	STYLE	TEMP	K	QTY
	SIN	MODEL	MAKE	FINISH	STYLE	TEMP	K	QTY
TOTAL SPRINKLERS FOR THIS PROJECT								3 TOTAL

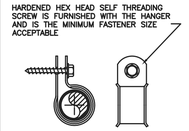


1 1 ST FLOOR PLAN
SCALE: 1/4" = 1'-0"

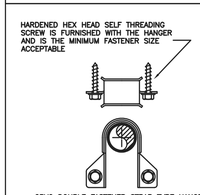
SCALE: 1/4"=1'-0"



DOUBLE FASTENER STRAP TYPE HANGER



SINGLE FASTENER STRAP TYPE HANGER



CPVC DOUBLE FASTENER STRAP TYPE HANGER

RUSSELL DAVIDSON
ARCHITECTURE + DESIGN

A Regional Partnership for Achievable Housing



YOU ASSUME ALL RESPONSIBILITY AND RISK FOR YOUR USE OF THE PLANS. THE PLANS ARE PROVIDED "AS IS" WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF TITLE, NONINFRINGEMENT, OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WITHOUT LIMITATION OF THE FOREGOING, YOU AGREE THAT IT IS YOUR RESPONSIBILITY TO ENSURE, PRIOR TO USE OF ANY PLANS, THAT SUCH PLANS ARE ACCURATE, SUITABLE FOR YOUR PURPOSES AND COMPLIANT WITH ALL APPLICABLE LAWS.

PLANS ONLY VALID WITHIN NEVADA COUNTY, PLACER COUNTY, SIERRA COUNTY, TOWN OF TRUCKEE, CITY OF GRASS VALLEY, AND CITY OF NEVADA CITY. USE OF THESE PLANS OUTSIDE THESE LISTED AREAS WITHOUT ARCHITECT/ENGINEER OF RECORD APPROVAL IS STRICTLY PROHIBITED

1 BEDROOM (661 SF)

OWNER:
ADDRESS:
APN:

ID	NAME	DATE
	SUBMITTAL	3/30/23

AUTOMATIC FIRE PROTECTION

FP1