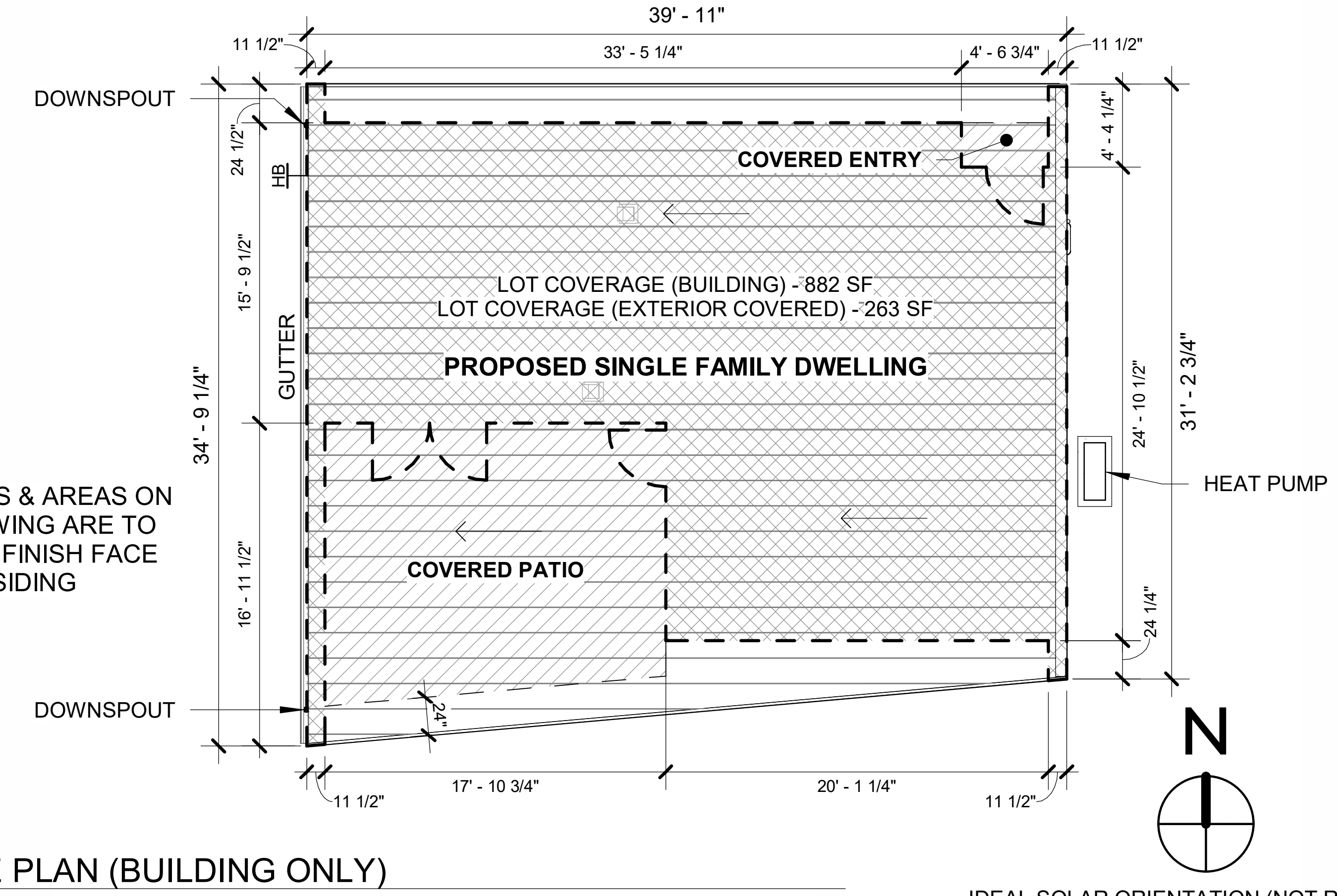
CASCADE COTTAGE

PROJECT ADDRESS



1 SITE PLAN (BUILDING ONLY)
1" = 10'-0"

IDEAL SOLAR ORIENTATION (NOT REQUIRED)
NORTH TO BE DEFINED ON APPLICANT'S SITE PLAN

SITE GENERAL NOTES

1) ALL STORMWATER DRAINAGE TO BE MAINTAINED ON SITE. APPLICANT'S SITE PLAN TO ILLUSTRATE SITE SPECIFIC METHODS.

2) LOTS SHALL BE GRADED TO DRAIN SURFACE WATER AWAY FROM NEW FOUNDATION WALLS. THE GRADE SHALL FALL NOT FEWER THAN 6" WITHIN THE FIRST 10'. WHERE LOT LINES, WALLS, SLOPES OR OTHER PHYSICAL BARRIERS PROHIBIT 6" OF FALL WITHIN 10', DRAINS, SWALES, OR OTHER MEANS SHALL BE PROVIDED AND SHALL BE CONSTRUCTED TO ENSURE DRAINAGE AWAY FROM THE STRUCTURE.

3) IMPERVIOUS SURFACES WITHIN 10' OF THE BUILDING FOUNDATION SHALL BE SLOPED NOT LESS THAN 2 PERCENT (1/4" PER FOOT) AWAY FROM THE BUILDING.

4) THESE MASTER REISSUE DRAWINGS ARE ONLY FOR USE ON SITES THAT DO NOT EXCEED 2' SLOPE ACROSS THE SITE AT THE FOOTING AND SITES WITH TYPICAL LOCAL GEOLOGICAL CONDITIONS.

PROJECT SYMBOLS

N	NORTH ARROW
1 A2.0	EXTERIOR ELEVATION
1 A7.0	INTERIOR ELEVATION
1 A101	BUILDING SECTION
1 A101	ENLARGED PLAN / DETAIL
W1	BUILDING ASSEMBLY TYPE
101	DOOR TAG
1	WINDOW TAG
1	REVISION TAG
℄	CENTER LINE

ABBREVIATIONS

AAMA	AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION
A.F.F.	ABOVE FINISH FLOOR
ALUM.	ALUMINUM
B.O.	BOTTOM OF
CAB.	CABINET
CABS	CABINETS
CFS	CLEAR FLOOR SPACE
C.J.	CONTROL JOINT
C.L.	CENTER LINE
CLG.	CEILING
CLR.	CLEAR
COL.	COLUMN
CONC.	CONCRETE
CONT.	CONTINUOUS
CPT.	CARPET
C.T.	CERAMIC TILE
DBL.	DOUBLE
DF-L	DOUGLAS FIR - LARCH
DIA.	DIAMETER
DIM.	DIMENSION
DW	DISHWASHER
EA.	EACH
E.J.	EXPANSION JOINT
EWF	ENGINEERED WOOD FLOORING
ELEC.	ELECTRICAL
E.O.S.	EDGE OF SLAB
EQ.	EQUAL
(E)	EXISTING
E.J.	EXPANSION JOINT
EXT.	EXTERIOR
F.F.	FINISH FACE OR FINISH FLOOR
F.F.E.	FINISH FLOOR ELEVATION
F.O.S.	FACE OF STRUCTURE / STUD
GLB	GLUE LAMINATED BEAM
G.W.B.	GYPSUM WALL BOARD
INSUL.	INSULATED OR INSULATION
INT.	INTERIOR
LVP	LUXURY VINYL PLANK
MAX.	MAXIMUM
MECH.	MECHANICAL
M.E.P.	MECHANICAL, ELECTRICAL & PLUMBING
MFR.	MANUFACTURER
MIN.	MINIMUM
NFVA	NET FREE VENTILATION AREA
N.I.C.	NOT IN CONTRACT
NOM.	NOMINAL
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
P.T.	PRESSURE TREATED
PTD.	PAINT OR PAINTED
RCP	REFLECTED CEILING PLAN
REC.	RECOMMENDED
REF.	REFRIGERATOR
REQ.	REQUIRED
R.O.	ROUGH OPENING
S.F.	SQUARE FEET
SHGC	SOLAR HEIGHT GAIN COEFFICIENT
IN²	SQUARE INCHES
SIM.	SIMILAR
SPEC.	SPECIFIED OR SPECIFICATION
SSTL.	STAINLESS STEEL
S.T.C.	SOUND TRANSMISSION CLASS
T&G	TONGUE AND GROOVE
T.O.	TOP OF
T.P.D.	TOILET PAPER DISPENSER
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
VERT.	VERTICAL
V.I.F.	VERIFY IN FIELD
W/	WITH
W/O	WITHOUT
W/D	CLOTHES WASHER & DRYER
WD.	WOOD
W.R.B.	WEATHER RESISTANT BARRIER

PLANNING & CODE SUMMARY

APPLICABLE CODES
2023 OREGON RESIDENTIAL SPECIALTY CODE (ORSC)
2022 OREGON MECHANICAL SPECIALTY CODE (OMSC)
2023 OREGON ELECTRICAL SPECIALTY CODE (OESC)
2023 OREGON PLUMBING SPECIALTY CODE (OPSC)
BEND DEVELOPMENT CODE
2017 ICC A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES

CONSTRUCTION TYPE
TYPE V-B, NON SPRINKLED

SETBACKS*
RL (LOW DENSITY RESIDENTIAL)
FRONT 20', REAR 20', SIDE 10'
RS (STANDARD DENSITY RESIDENTIAL)
FRONT 10', REAR 5', SIDE 5'
RM-10, RM & RH
FRONT 10', REAR 5', SIDE 5'

*NORTH SOLAR SETBACK APPLIES TO SITES OVER 5,000 SF & NORTH - SOUTH LOT DIMENSION OVER 80'

SPECIAL SETBACKS & EASEMENTS
APPLICANT TO VERIFY AND SHOW ON SITE PLAN

MAXIMUM LOT COVERAGE

RL	35%
RS & RM-10	45%-60%
RM	45%-60%
RH	NONE

FLOOR AREA RATIO

RL	NONE
RS & RM-10	1.1 FOR 3-STORY RESIDENTIAL USES & ACCESSORY STRUCTURES, NONE FOR ALL OTHER USES
RM	NONE
RH	NONE

ENERGY - BUILDING ENVELOPE
CLIMATE ZONE - 5B (BEND) (ASHRAE STANDARD 169)

ADDITIONAL ENERGY MEASURE
TABLE N1101.1(2)
#5 DUCTLESS HEAT PUMP (DWELLING UNITS WITH ALL-ELECTRIC HEAT)
A) PROVIDE DUCTLESS HEAT PUMP OF MINIMUM HSPF 10.0 OR HSPF2 9.0 IN PRIMARY ZONE REPLACES ZONAL ELECTRIC HEAT SOURCES, AND
B) PROVIDE PROGRAMMABLE THERMOSTAT FOR ALL HEATERS IN BEDROOMS

SITE ACCESSIBLE ROUTE
THE APPLICANT IS RESPONSIBLE TO PROVIDE AN ACCESSIBLE ROUTE TO THE PROPOSED SINGLE FAMILY DWELLING IN COMPLIANCE WITH CHAPTER 4 OF THE 2017 ICC A117.1 AND *"CHANGES IN LEVEL"* DETAILS PER A7.3. (TYPE A)

PROJECT DESCRIPTION

CITY OF BEND PRE-APPROVED SINGLE FAMILY DWELLING

PROJECT GENERAL NOTES

1) DO NOT SCALE PRINTED DRAWINGS. DO NOT SCALE OFF DRAWINGS WITHOUT CONSULTING ARCHITECT FIRST.

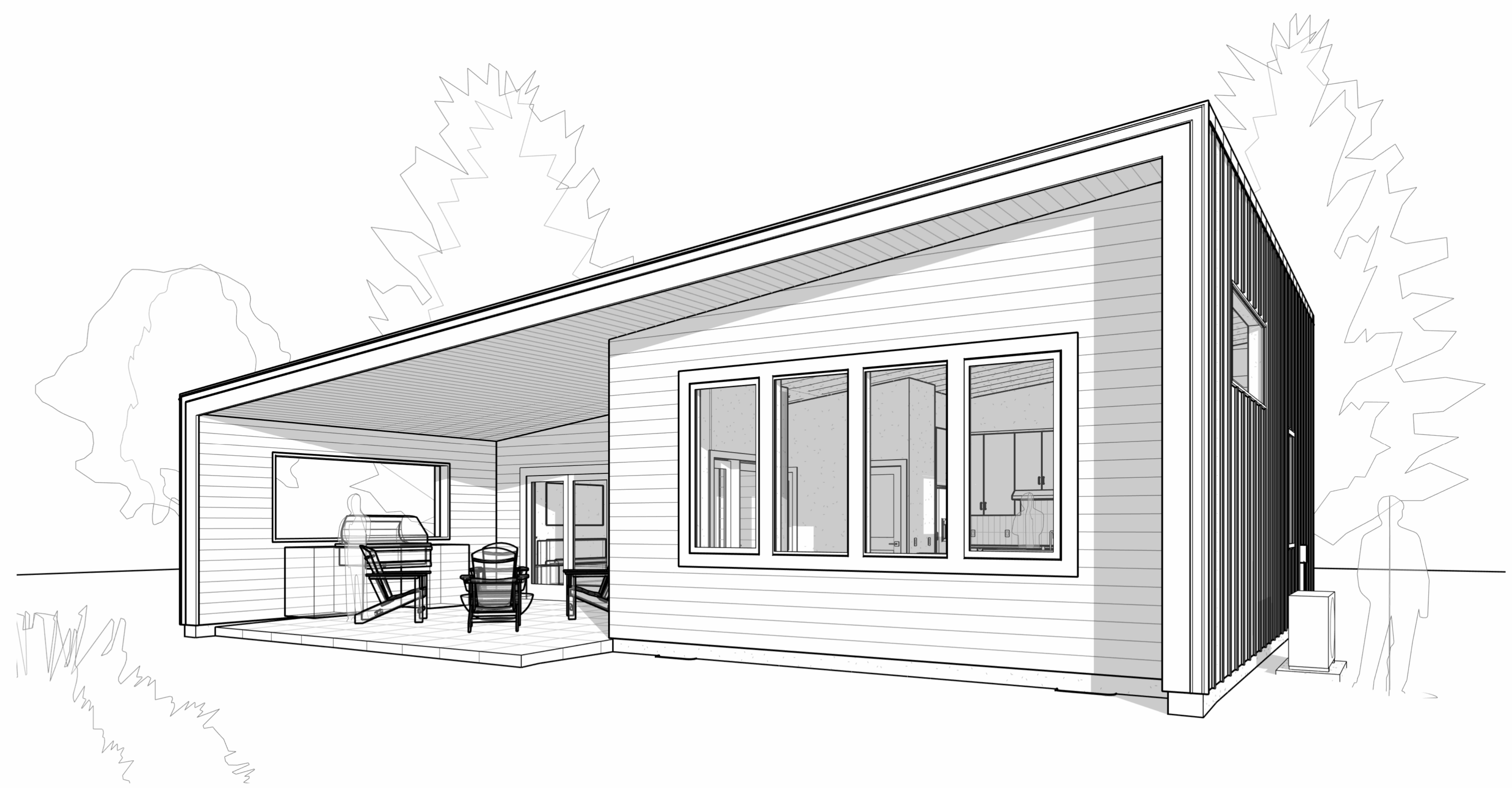
2) DIMENSIONS ARE TO FACE OF STRUCTURE (FRAMING, CONCRETE, ETC.) U.N.O. "CLEAR" OR "CLR" DIMENSIONS ARE TO FINISH FACE.

3) PROJECTS UTILIZING THE MASTER/REISSUE PROGRAM ARE LIMITED TO THOSE THAT WILL BE CONSTRUCTED "EXACTLY" AS SHOWN ON THESE APPROVED "MASTER" APPLICATION PLANS AND LOCATED ON A SITE THAT DOES NOT EXCEED 2' SLOPE ACROSS THE SITE AT THE FOOTING OR REQUIRE MODIFICATIONS TO THE DESIGN CRITERIA OR BUILDING CONSTRUCTION.

4) THESE PLANS COMPLY WITH *"TYPE A"* CRITERIA OF THE *"2017 ICC A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES"* AND HAVE BEEN CERTIFIED AS SUCH BY LIVEABLE HOMES LLC. OPTIONS LABELED *"TYPE A"* ARE REQUIRED IN ORDER TO MEET TYPE A CRITERIA. OPTIONS LABELED *"NONE TYPE A"* DO NOT MEET TYPE A CRITERIA.

SHEET LIST

NUMBER	NAME
ARCHITECTURAL	
A1.0	GENERAL INFORMATION
A1.1	PROPOSED SITE PLAN, N.I.C. (APPLICANT TO PROCURE)
A1.2	FLOOR PLAN & SCHEDULES
A1.3	ROOF PLAN
A1.4	REFLECTED CEILING / ELECTRICAL PLAN
A2.1	EXTERIOR ELEVATIONS
A3.1	BUILDING SECTIONS
A3.2	BUILDING SECTIONS
A5.1	EXTERIOR DETAILS
A7.1	INTERIOR - KITCHEN
A7.2	INTERIOR - BATHROOM
A7.3	ACCESSIBILITY DETAILS
A9.1	3D VIEWS - EXTERIOR
A9.2	3D VIEWS - INTERIOR
STRUCTURAL	
S1	FOUNDATION
S2	SUBFLOOR FRAMING
S3	MAIN LEVEL FRAMING
S4	MAIN LEVEL LATERAL DIAGRAM
S5	DETAILS



JURISDICTION APPROVAL

REGISTERED ARCHITECT
IAN BURGESS
BEND, OREGON
LIC # 6925
STATE OF OREGON
EXPIRES 12/31/2027

SIERRA JAMES

LIVEABLE HOME CERTIFICATION LEVEL 2

GENERAL INFORMATION

MASTER / REISSUE PERMIT
12/12/2025

(541) 306-3775
INFO@SIERRA-JAMES.COM

CASCADE COTTAGE

PROJECT ADDRESS

A1.0

WINDOW SCHEDULE

#	TYPE	SILL	WIDTH	HEIGHT	COMMENTS
01	FIXED	32"	30"	48"	
02	CASEMENT	36"	36"	72"	
03	FIXED	36"	36"	72"	
04	FIXED	36"	36"	72"	
05	CASEMENT	36"	36"	72"	
06	FIXED	96"	96"	36"	DELETE W/ OPTION 5B
07	CASEMENT	36"	30"	60"	DELETE W/ OPTION 4B
08	AWNING / FIXED ABOVE	42 3/4"	30"	66"	SINGLE SILL PLATE
09	AWNING / FIXED ABOVE	39"	54"	54"	AWNING: FROSTED & SAFETY GLASS. FIXED: CLEAR.
10	CASEMENT	39"	30"	54"	DELETE W/ OPTION 2B
11	CASEMENT	39"	24"	48"	
12	CASEMENT	39"	24"	48"	
Grand total: 12					

DOOR SCHEDULE

#	OPERATION	WIDTH	HEIGHT	COMMENTS
Exterior	THRESHOLDS TO COMPLY WITH *"CHANGES IN LEVEL"* DETAILS PER A7.3			
01	DOUBLE OUTSWING	72"	80"	
02	OUTSWING W/ SIDELIGHT	60"	80"	36" DOOR WITH 24" SIDELIGHT
03	INSWING	36"	96"	
Interior				
04	PRE-HUNG SWING	24"	80"	
05	POCKET	36"	80"	
06	POCKET	36"	80"	
07	PRE-HUNG SWING	24"	80"	
08	DOUBLE BIFOLD	48"	80"	
09	DOUBLE BIFOLD	48"	80"	DELETE W/ OPTION 2A

WINDOW & DOOR GENERAL NOTES

1) FRAMING SUBCONTRACTOR TO VERIFY ALL ROUGH OPENING DIMENSIONS WITH WINDOW & DOOR MANUFACTURERS BEFORE FRAMING BEGINS. WINDOW SCHEDULE SIZES ARE ROUGH OPENINGS AND DOOR SCHEDULE SIZES ARE NOMINAL DOOR SIZE, UNLESS NOTED OTHERWISE.

2) EXTERIOR DOORS TO BE U-0.20 OR LESS, EXCEPT A MAXIMUM OF 28 SF OF EXTERIOR DOOR AREA PER DWELLING UNIT CAN HAVE A U-FACTOR OF 0.54 OR LESS

3) WINDOWS TO HAVE A U-FACTOR OF 0.27 OR LESS

4) SKYLIGHTS TO HAVE A U-FACTOR OF 0.50 OR LESS

5) UNSHADED SOUTH AND WEST FACING GLASS TO HAVE A LOW SOLAR HEIGHT GAIN COEFFICIENT (SHGC)

6) WINDOWS TO BE INSTALLED PER AAMA 2400-21 METHOD A OR METHOD B USING BUTYL FLEXIBLE FLASHING TAPE, TYPICAL.

7) DOOR THRESHOLDS SHALL COMPLY WITH *"CHANGES IN LEVEL"* DETAILS PER A7.3

8) DOORWAYS SHALL HAVE A CLEAR OPENING WIDTH OF 32 INCHES MINIMUM. CLEAR OPENING WIDTH OF DOORWAYS WITH SWINGING DOORS SHALL BE MEASURED BETWEEN THE FACE OF DOOR AND STOP, WITH THE DOOR OPEN 90 DEGREES. THERE SHALL BE NO PROJECTIONS INTO THE CLEAR OPENING WIDTH LOWER THAN 34 INCHES ABOVE THE FLOOR. PROJECTIONS INTO THE CLEAR OPENING WIDTH BETWEEN 34 INCHES AND 80 INCHES ABOVE THE FLOOR SHALL NOT EXCEED 4 INCHES.

FLOOR PLAN GENERAL NOTES

1) DIMENSIONS ON THIS SHEET ARE TO FACE OF STRUCTURE (STUD OR CONCRETE) AND CENTER OF OPENING / FIXTURE, U.N.O.

2) DIMENSIONS NOTED "F.F." ARE TO FACE OF FINISH. DIMENSIONS NOTED "CLEAR" OR "CLR" ARE TO FACE OF FINISH.

3) OVERALL ROOM DIMENSIONS ARE TO FINISH FACE OF WALL AND ROUNDED TO NEAREST INCH. DO NOT FRAME FROM THESE DIMENSIONS.

4) DEVIATION FROM THESE DRAWINGS MUST BE APPROVED BY THE CITY OF BEND, ARCHITECT OF RECORD AND ENGINEER OF RECORD.

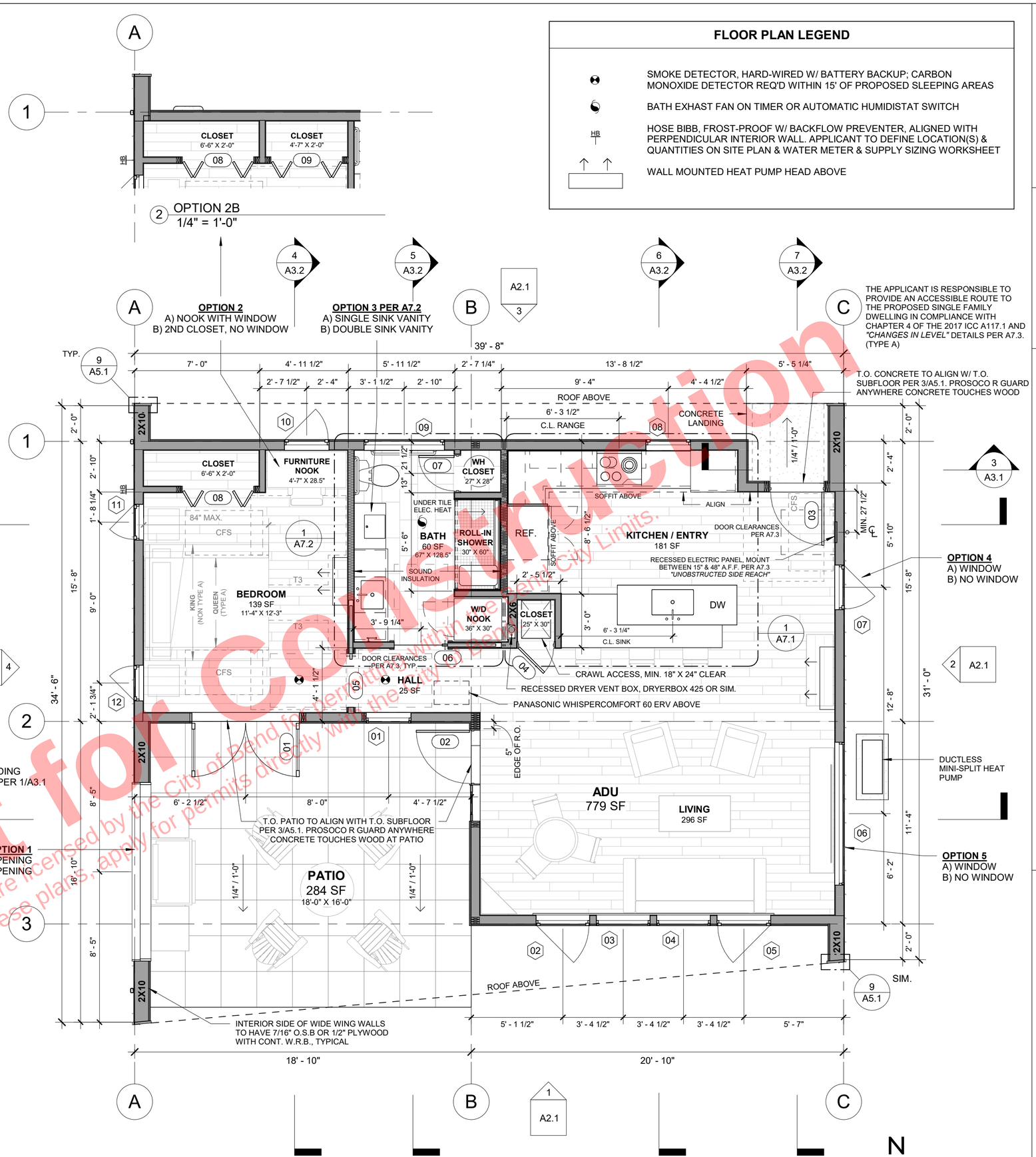
5) SUBCONTRACTORS TO SIZE, SELECT AND VERIFY LOCATION OF ALL PROPOSED M.E.P. EQUIPMENT IN COMPLIANCE WITH LOCAL BEND DEVELOPMENT CODE AND STATE BUILDING CODES.

6) EXTERIOR WALLS ARE 2X6 STUDS @ 24" O.C., U.N.O.
WIDE WING WALLS ARE 2X10 @ 24" O.C.

7) INTERIOR WALLS ARE 2X4 STUDS @ 16" O.C., U.N.O.

FLOOR PLAN LEGEND

- SMOKE DETECTOR, HARD-WIRED W/ BATTERY BACKUP; CARBON MONOXIDE DETECTOR REQ'D WITHIN 15' OF PROPOSED SLEEPING AREAS
- BATH EXHAST FAN ON TIMER OR AUTOMATIC HUMIDISTAT SWITCH
- HB — HOSE BIBB, FROST-PROOF W/ BACKFLOW PREVENTER, ALIGNED WITH PERPENDICULAR INTERIOR WALL. APPLICANT TO DEFINE LOCATION(S) & QUANTITIES ON SITE PLAN & WATER METER & SUPPLY SIZING WORKSHEET
- WALL MOUNTED HEAT PUMP HEAD ABOVE



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

IDEAL SOLAR ORIENTATION (NOT REQUIRED)
NORTH TO BE DEFINED ON APPLICANT'S SITE PLAN

JURISDICTION APPROVAL

REGISTERED ARCHITECT
IAN BURGESS
BEND, OREGON
LIC # 6925
STATE OF OREGON
EXPIRES 12/31/2027

SIERRA JAMES

LIVEABLE HOME CERTIFICATION LEVEL 2

FLOOR PLAN & SCHEDULES

MASTER / REISSUE PERMIT
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(541) 306-3775
INFO@SIERRA-JAMES.COM

CASCADE COTTAGE

PROJECT ADDRESS

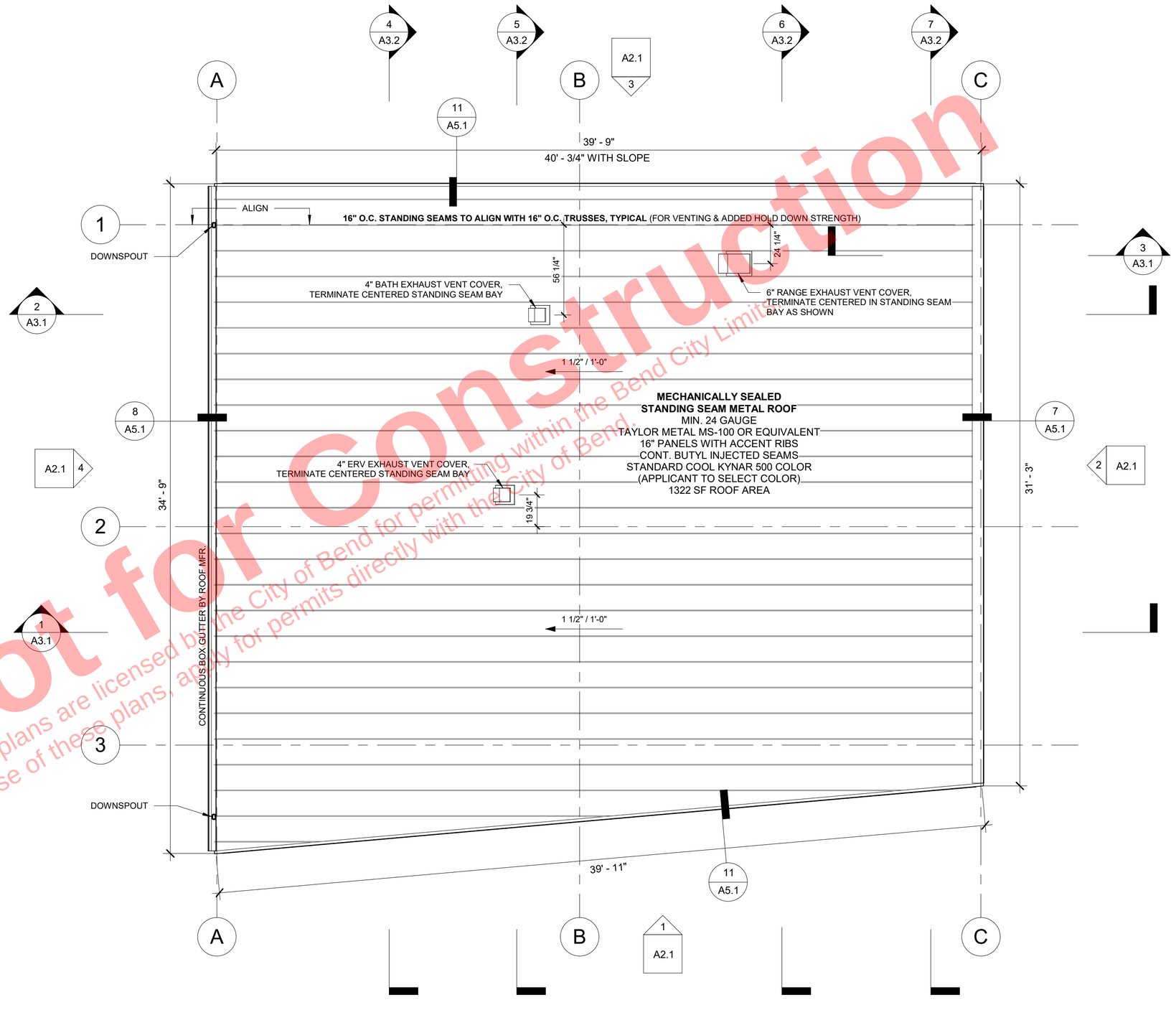
A1.2

ROOF PLAN GENERAL NOTES

1) DIMENSIONS ON THIS SHEET ARE TO EDGE OF ROOF SHEATHING (O.S.B. OR PLYWOOD) AND OUTSIDE FACE OF FASCIA / BARGE.

2) UNDERLAYMENT WATERPROOFING MEMBRANE TO BE APPROVED BY ROOFING MANUFACTURER FOR SLOPE.

3) VENT COVERS SHALL BE MANUFACTURER APPROVED FOR SLOPE AND STANDING SEAM METAL ROOF.



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

JURISDICTION APPROVAL

REGISTERED ARCHITECT
IAN BURGESS
BEND, OREGON
LIC # 6925
STATE OF OREGON
EXPIRES 12/31/2027

SIERRA JAMES

LIVEABLE HOME CERTIFICATION LEVEL 2

ROOF PLAN

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CASCADE COTTAGE

PROJECT ADDRESS

A1.3

EXTERIOR - GENERAL NOTES

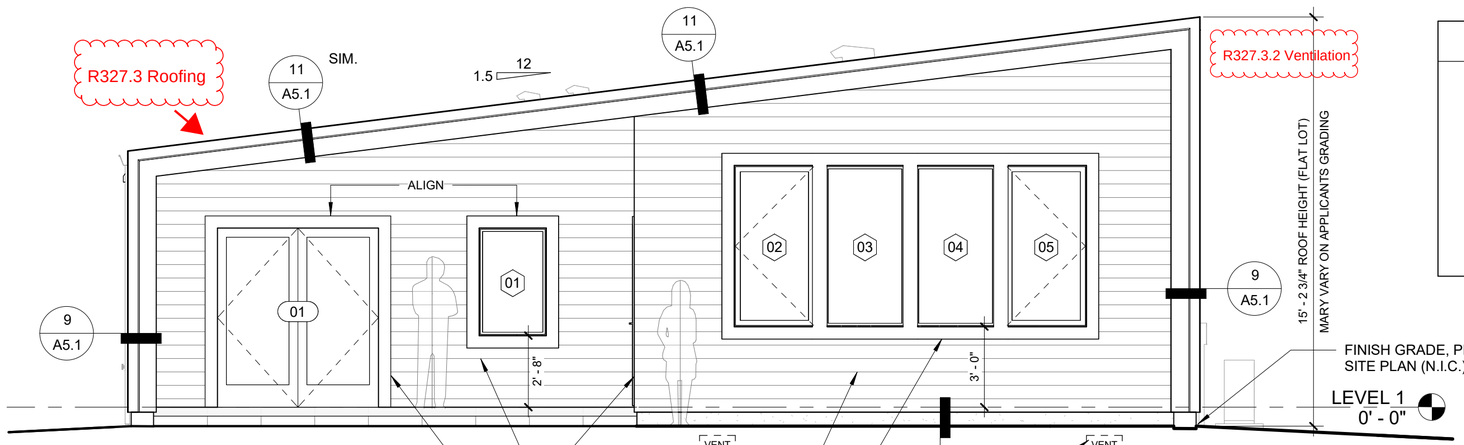
1) SILL DIMENSIONS ARE FROM T.O. SUBFLOOR TO B.O. ROUGH OPENING. WINDOW SHALL BE HUNG CENTERED IN OPENING.

2) WINDOWS TO BE INSTALLED PER AAMA 2400-21 METHOD A OR METHOD B USING BUTYL FLEXIBLE FLASHING TAPE. ALL EXTERIOR OPENINGS TO RECEIVE HEAD FLASHING W/ W.R.B. OVER FLASHING.

3) LOW EXPANSION FOAM TO BE INSTALLED CONTINUOUSLY ON ALL SIDES OF WINDOW & EXTERIOR DOORS.

4) ALL EXTERIOR CAULKING SEALANT TO BE EXTERIOR GRADE POLYURETHANE WITH MINIMUM 25%+ ELASTOMERIC.

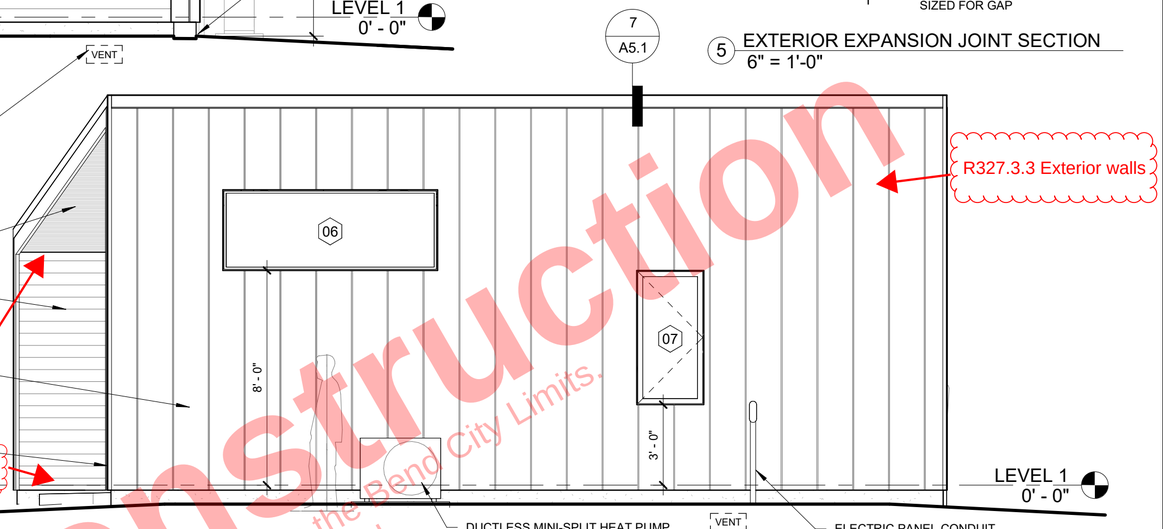
5) ALL METAL TO NON-METAL JOINTS AND WINDOW FRAME TO TRIM / SIDING JOINTS SHALL HAVE AN EXPANSION JOIST PER DETAIL BELOW.

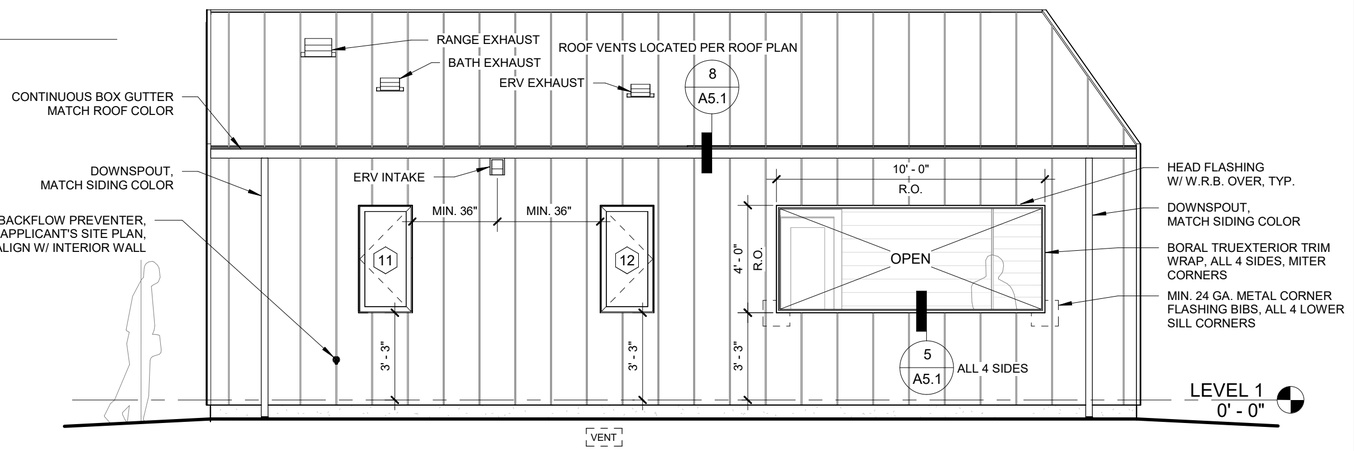


1 FRONT ELEVATION
1/4" = 1'-0"

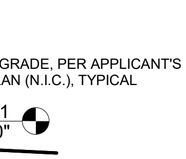
2 RIGHT ELEVATION
1/4" = 1'-0"

3 BACK ELEVATION
1/4" = 1'-0"





4 LEFT ELEVATION
1/4" = 1'-0"



JURISDICTION APPROVAL

REGISTERED ARCHITECT
IAN BURGESS
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SIERRA JAMES

LIVEABLE HOME CERTIFICATION LEVEL 2

EXTERIOR ELEVATIONS

MASTER / REISSUE PERMIT
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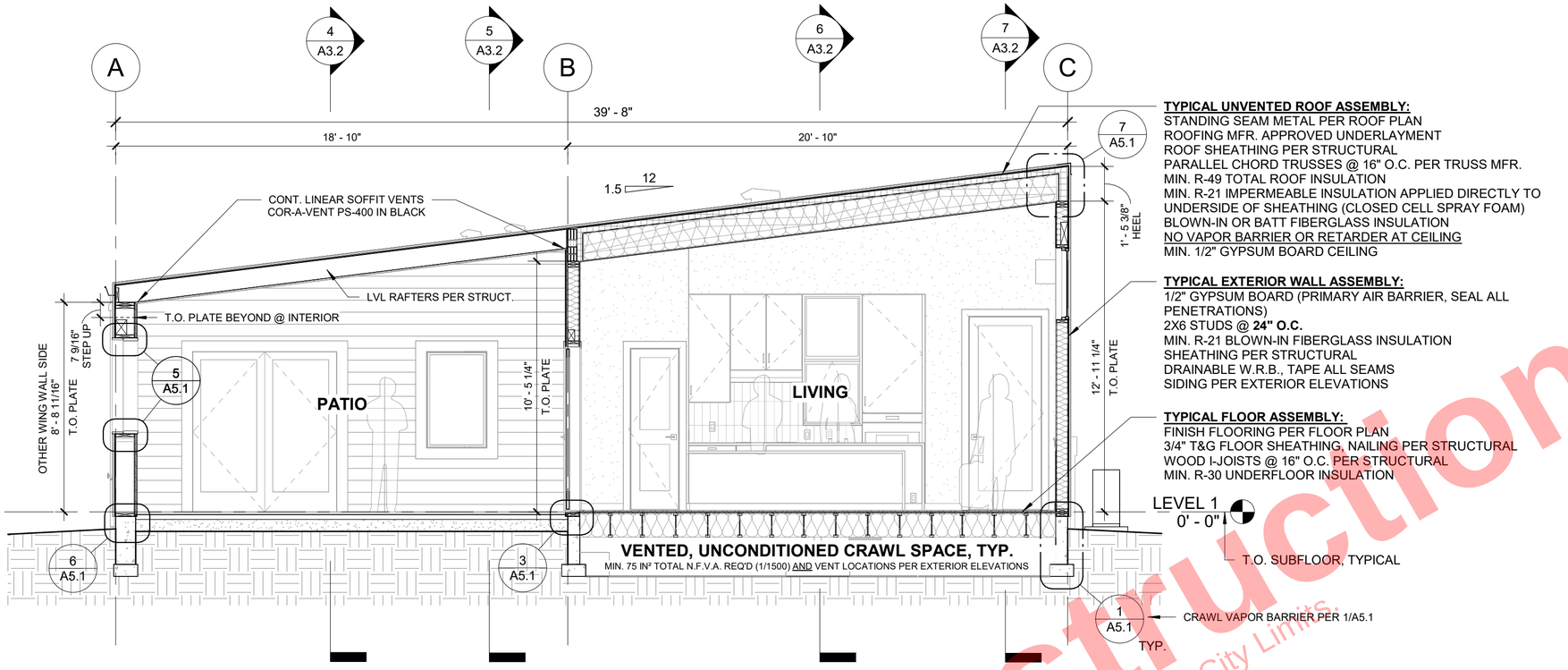
PROJECT ADDRESS

A2.1

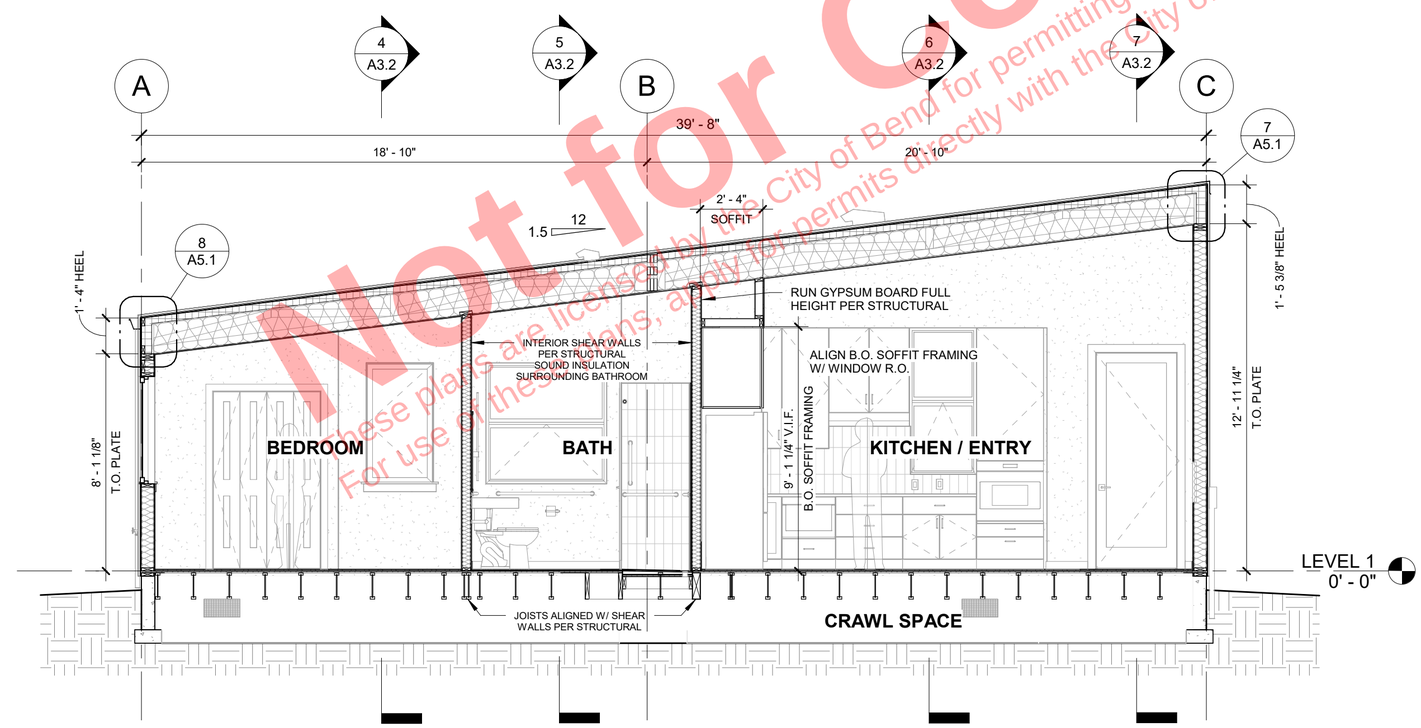


TYPICAL UNVENTED ROOF ASSEMBLY:
STANDING SEAM METAL PER ROOF PLAN
ROOFING MFR. APPROVED UNDERLAYMENT
ROOF SHEATHING PER STRUCTURAL
PARALLEL CHORD TRUSSES @ 16" O.C. PER TRUSS MFR.
MIN. R-49 TOTAL ROOF INSULATION
MIN. R-21 IMPERMEABLE INSULATION APPLIED DIRECTLY TO UNDERSIDE OF SHEATHING (CLOSED CELL SPRAY FOAM)
BLOWN-IN OR BATT FIBERGLASS INSULATION
NO VAPOR BARRIER OR RETARDER AT CEILING
MIN. 1/2" GYPSUM BOARD CEILING

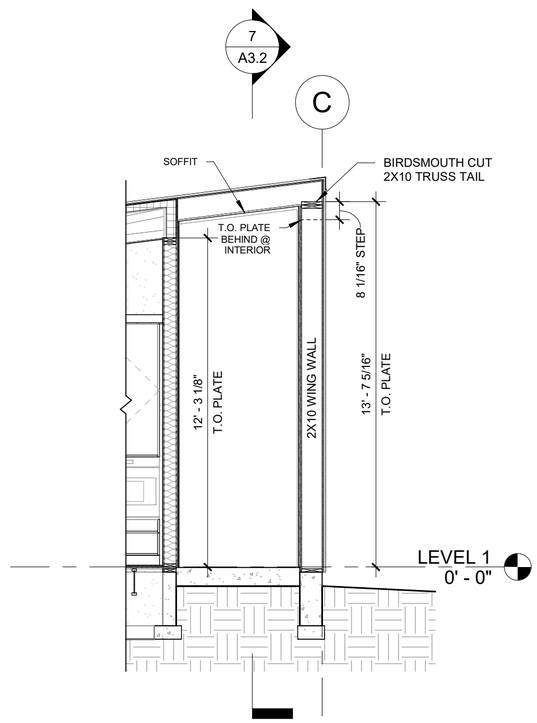
TYPICAL EXTERIOR WALL ASSEMBLY:
1/2" GYPSUM BOARD (PRIMARY AIR BARRIER, SEAL ALL PENETRATIONS)
2X6 STUDS @ **24" O.C.**
MIN. R-21 BLOWN-IN FIBERGLASS INSULATION
SHEATHING PER STRUCTURAL
DRAINABLE W.R.B., TAPE ALL SEAMS
SIDING PER EXTERIOR ELEVATIONS

TYPICAL FLOOR ASSEMBLY:
FINISH FLOORING PER FLOOR PLAN
3/4" T&G FLOOR SHEATHING, NAILING PER STRUCTURAL
WOOD I-JOISTS @ 16" O.C. PER STRUCTURAL
MIN. R-30 UNDERFLOOR INSULATION

1 SECTION 1 (TYPICAL BUILDING ASSEMBLIES)
1/4" = 1'-0"



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



3 SECTION 3
1/4" = 1'-0"

JURISDICTION APPROVAL

REGISTERED ARCHITECT
IAN BURGESS
BEND, OREGON
LIC # 6925
STATE OF OREGON
EXPIRES 12/31/2027

SIERRA JAMES

LIVEABLE HOME CERTIFICATION LEVEL 2

BUILDING SECTIONS

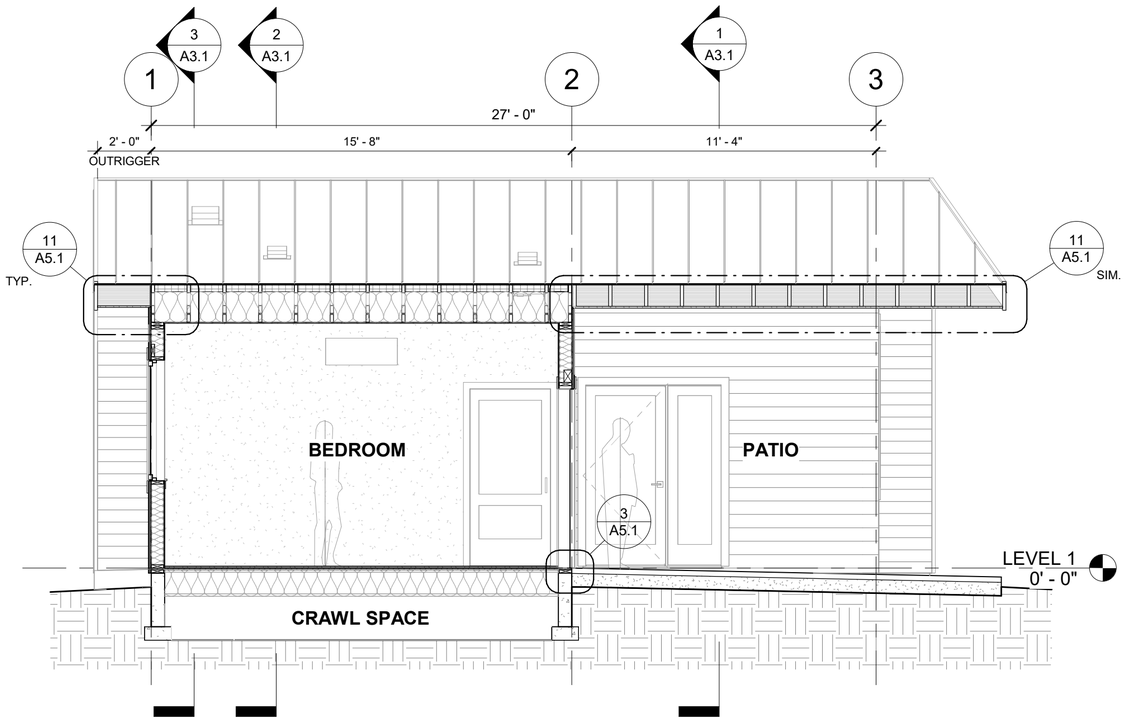
MASTER / REISSUE PERMIT
12/12/2025

(541) 306-3775
INFO@SIERRA-JAMES.COM

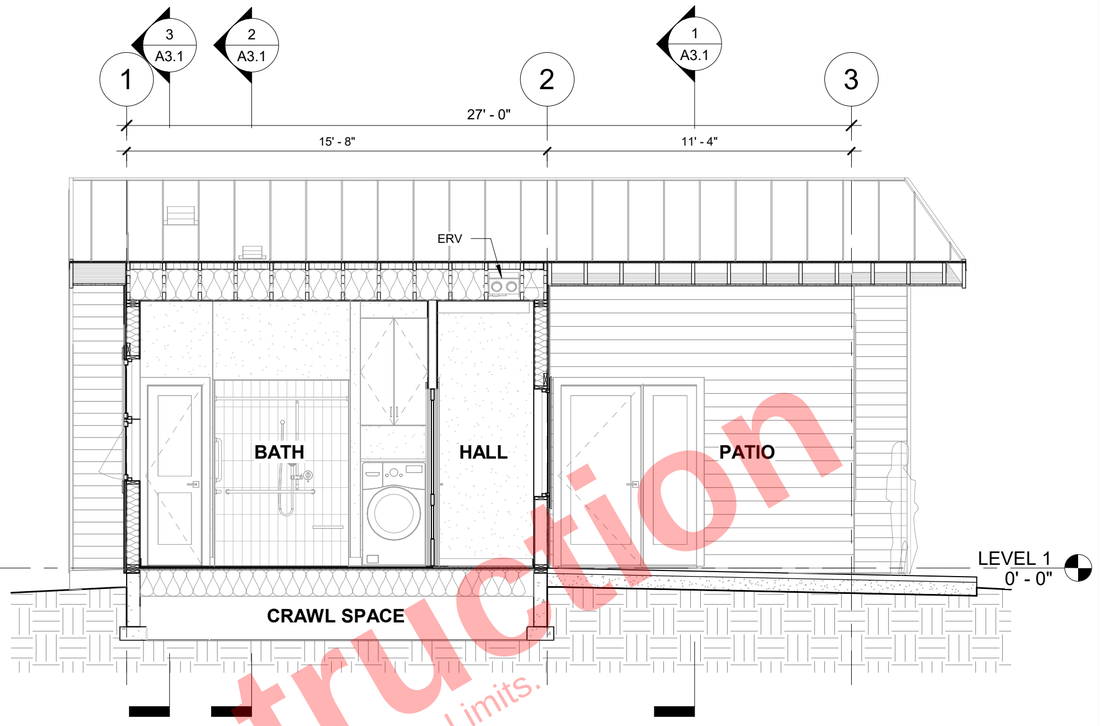
CASCADE COTTAGE

PROJECT ADDRESS

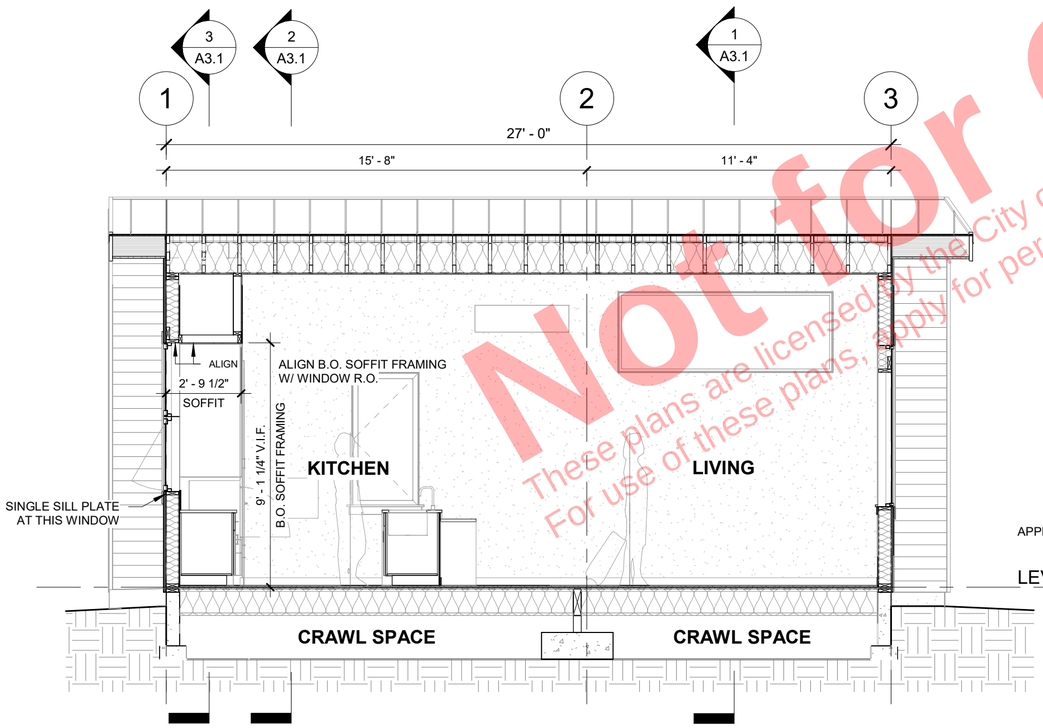
A3.1



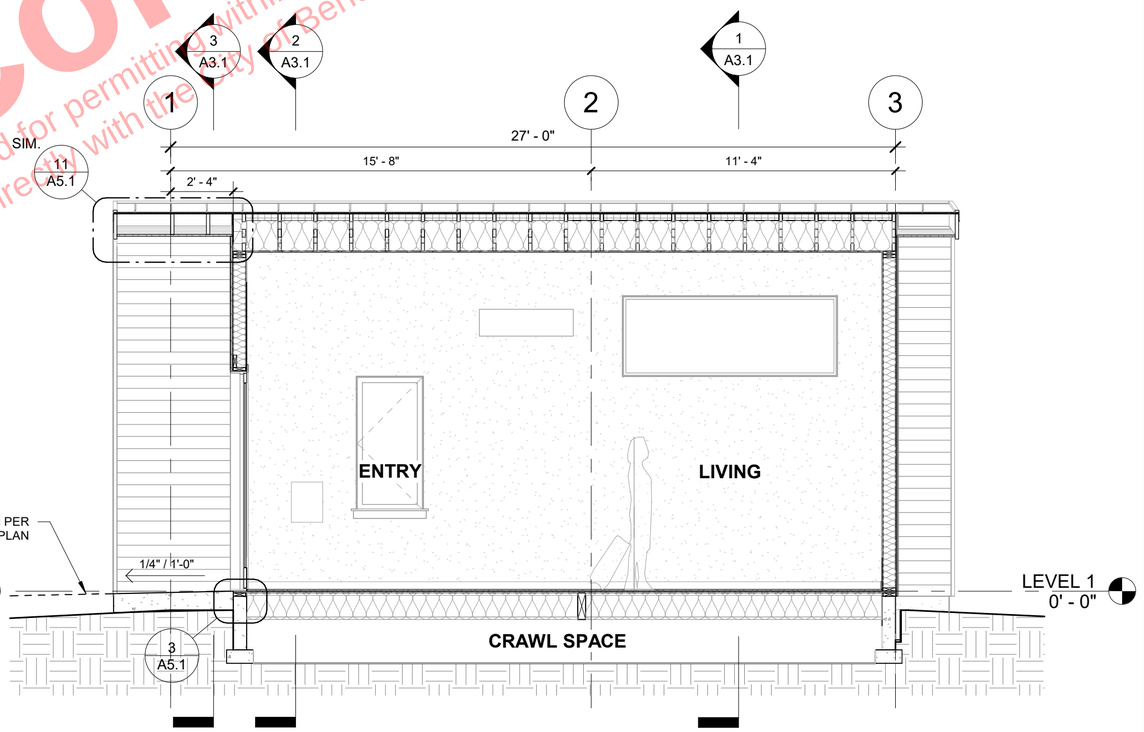
4 SECTION 4
1/4" = 1'-0"



5 SECTION 5
1/4" = 1'-0"



6 SECTION 6
1/4" = 1'-0"



7 SECTION 7
1/4" = 1'-0"

JURISDICTION APPROVAL

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LIVEABLE HOME CERTIFICATION LEVEL 2

BUILDING SECTIONS

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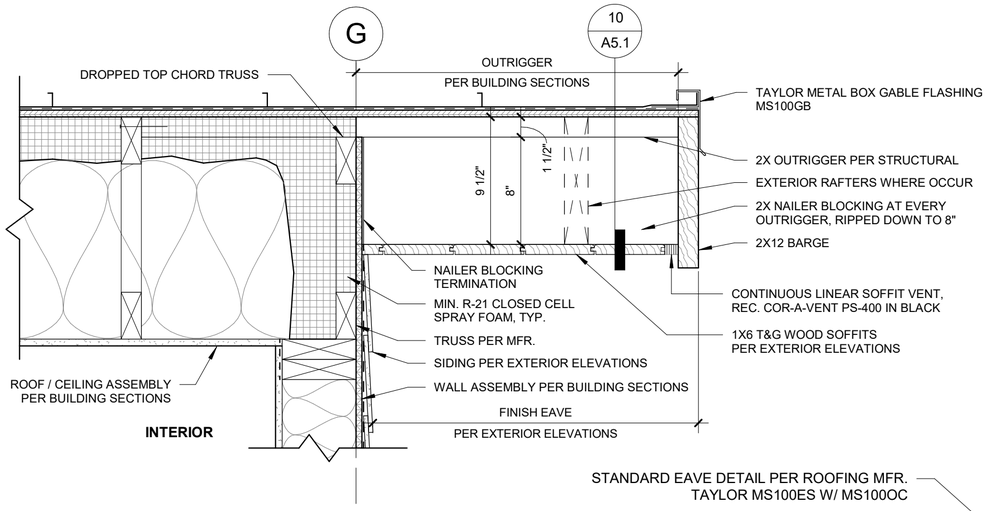
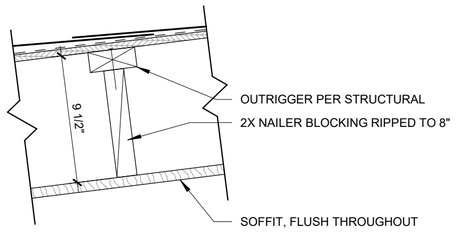
CASCADE COTTAGE

PROJECT ADDRESS

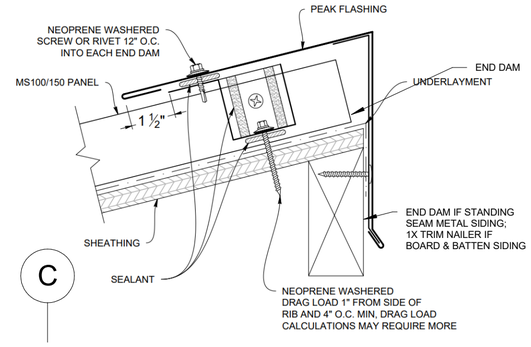
A3.2

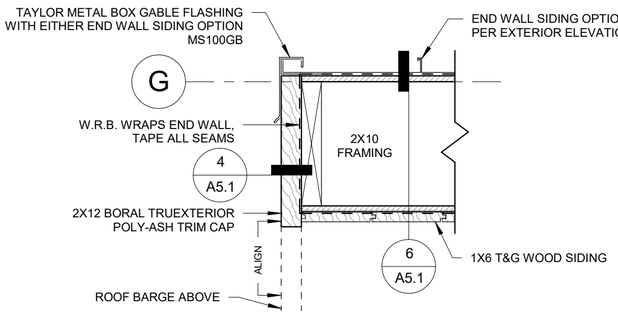


11 GABLE EAVE SECTION
1 1/2" = 1'-0"

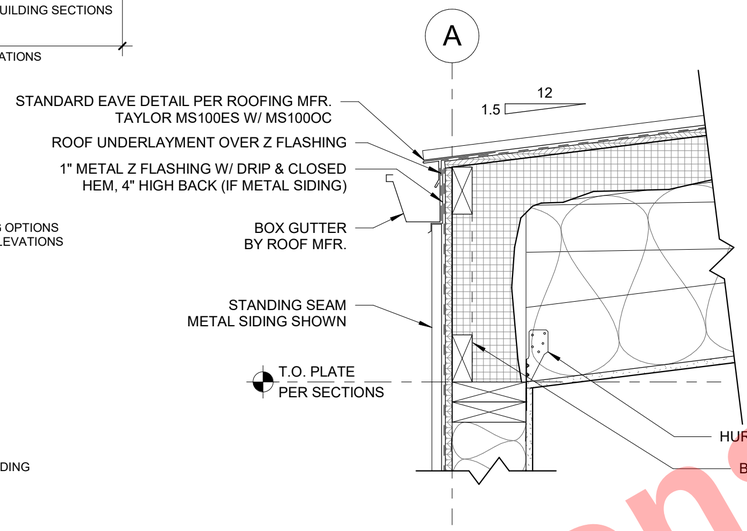


10 OUTRIGGER DETAIL
1 1/2" = 1'-0"

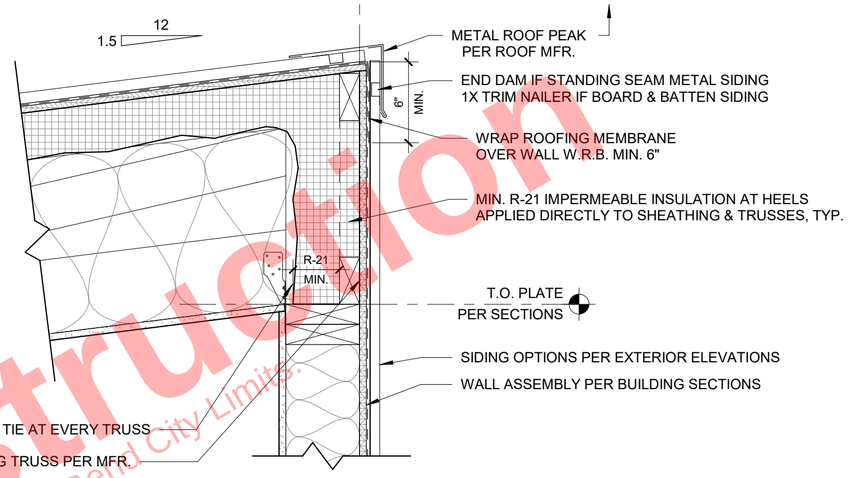




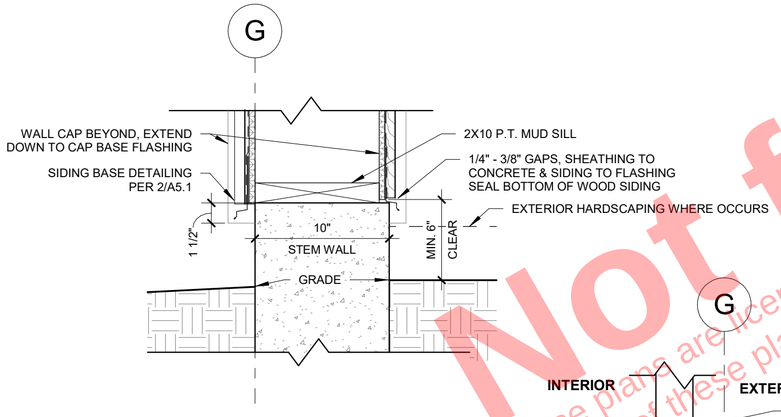
9 WING WALL CAP - PLAN VIEW
1 1/2" = 1'-0"



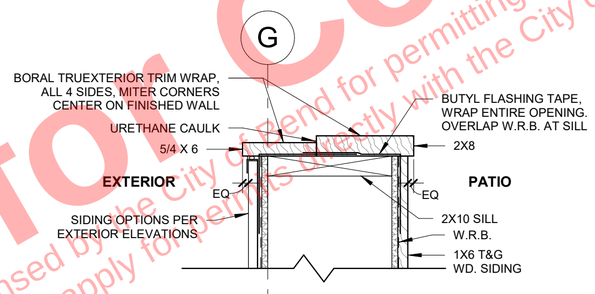
8 SHED ROOF LOWER EAVE DETAIL
1 1/2" = 1'-0"



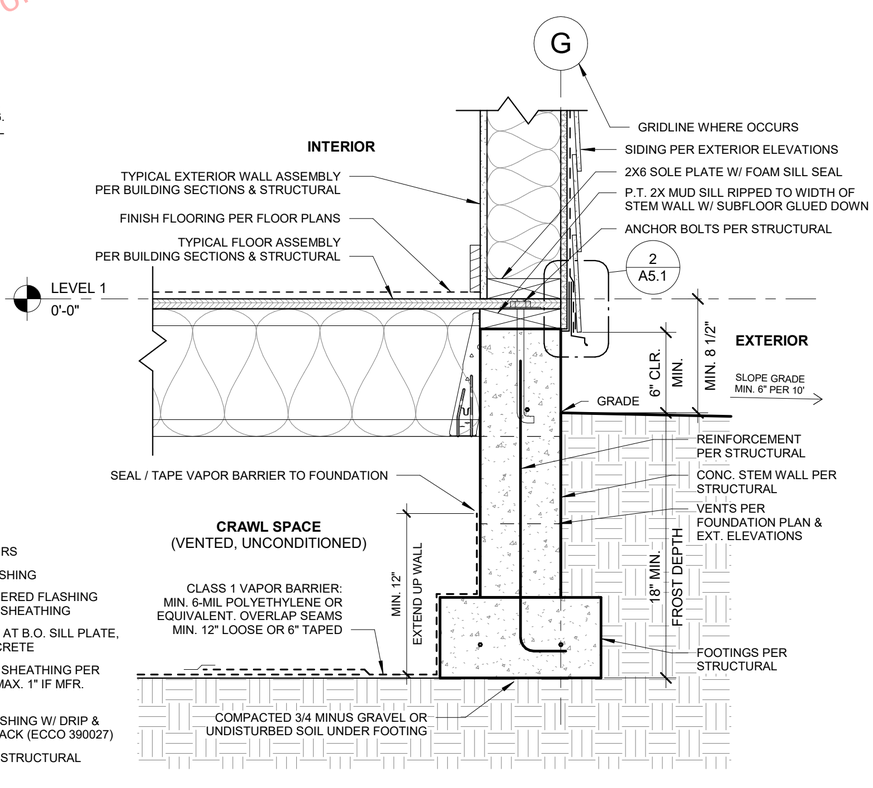
7 SHED ROOF - UPPER EAVE SECTION
1 1/2" = 1'-0"



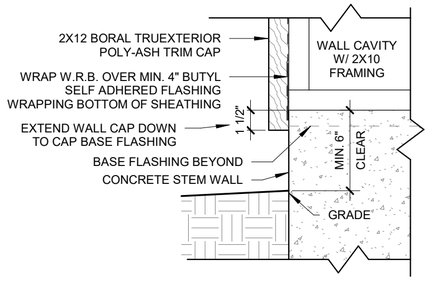
6 WING WALL BASE - SECTION
1 1/2" = 1'-0"



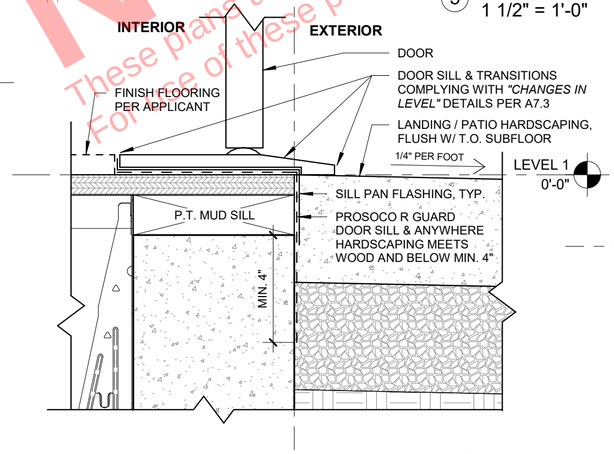
5 PATIO OPENING - SECTION
1 1/2" = 1'-0"



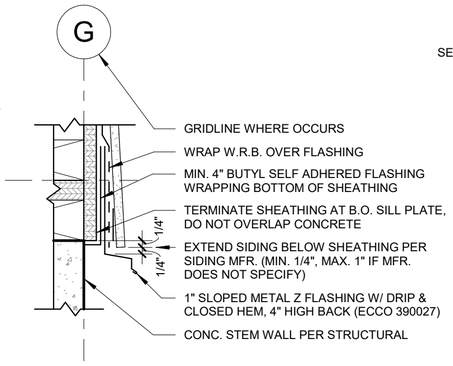
1 TYPICAL STEM WALL DETAIL
1 1/2" = 1'-0"



4 WING WALL BASE END CAP - SECTION
1 1/2" = 1'-0"



3 EXTERIOR DOOR ACCESSIBLE SILL DETAIL
3" = 1'-0"



2 TYPICAL SIDING BASE DETAIL, U.N.O.
3" = 1'-0"

JURISDICTION APPROVAL

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SIERRA JAMES

LIVEABLE HOME CERTIFICATION LEVEL 2

EXTERIOR DETAILS

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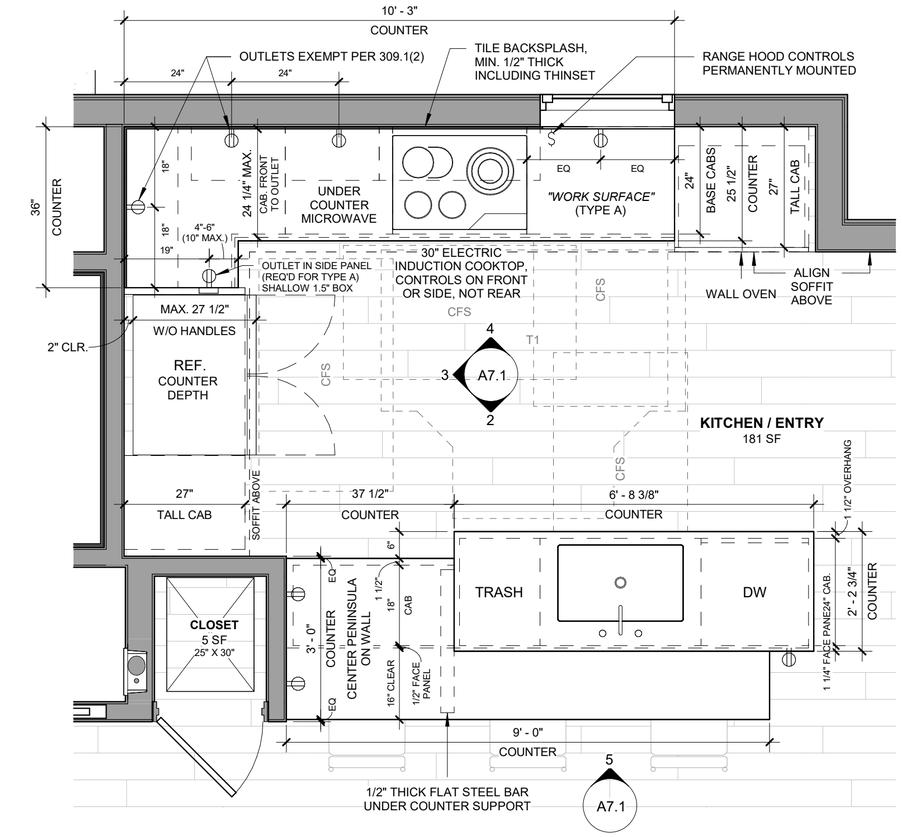
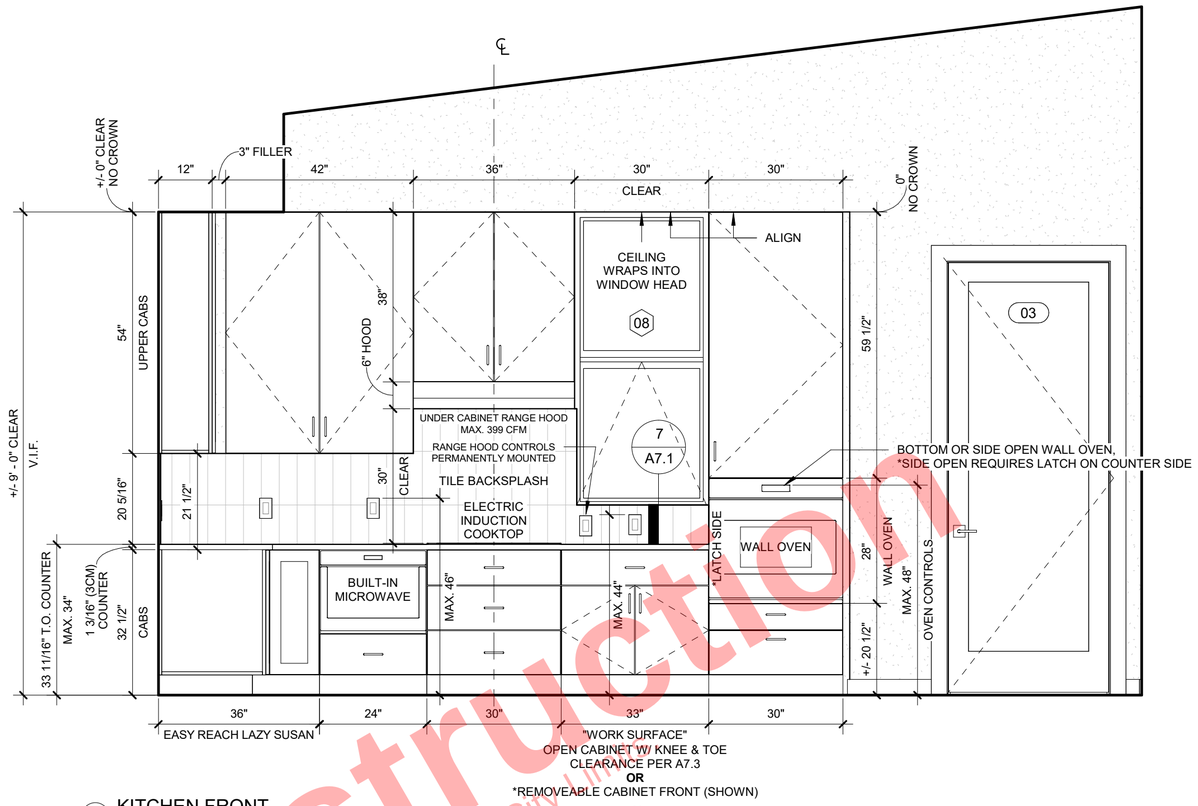
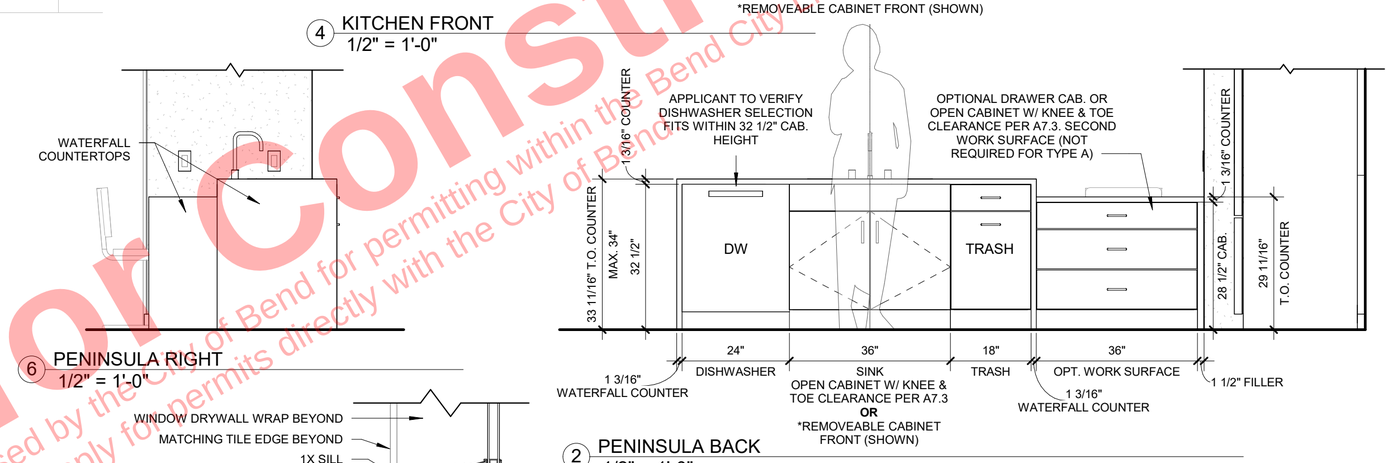
A5.1



1 ENLARGED KITCHEN PLAN
1/2" = 1'-0"

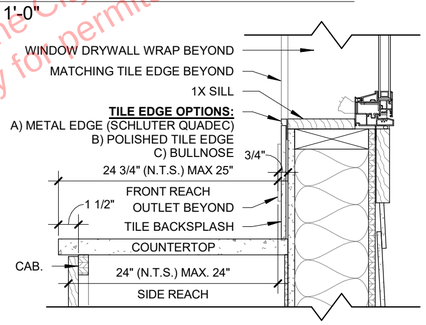


4 KITCHEN FRONT
1/2" = 1'-0"

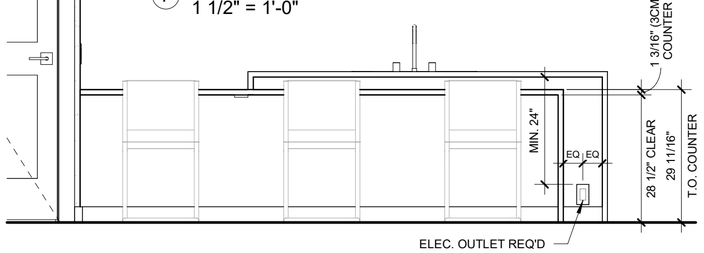


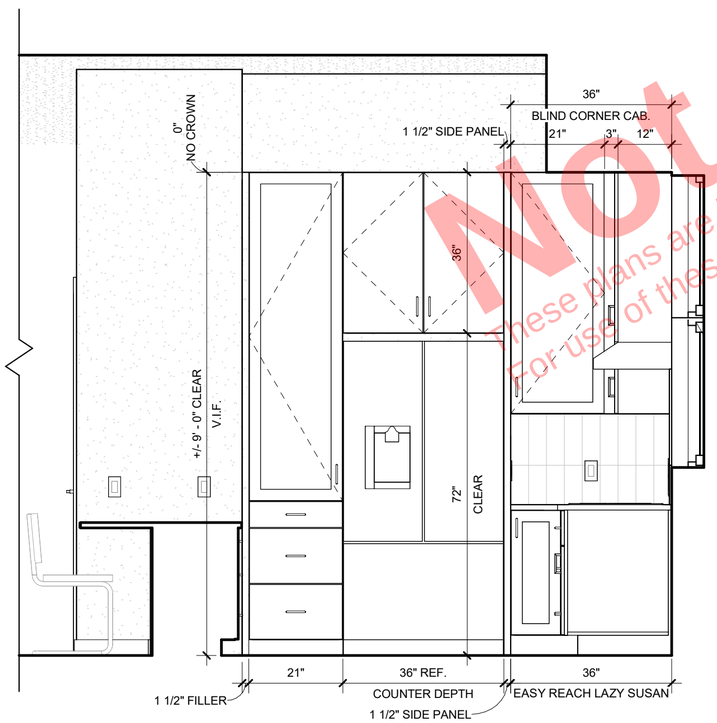
6 PENINSULA RIGHT
1/2" = 1'-0"

2 PENINSULA BACK
1/2" = 1'-0"



7 KITCHEN COUNTER SECTION
1 1/2" = 1'-0"





3 KITCHEN LEFT
1/2" = 1'-0"

5 PENINSULA FRONT
1/2" = 1'-0"

TYPICAL INTERIOR TRIM, U.N.O.

ALL INTERIOR TRIM TO BE PRIMED SOLID WOOD (FINGER JOINTED PINE OR SIM.)
APPLICANT MAY CHOOSE SOLID STAIN GRADE TRIM INSTEAD.
WINDOWS: DRYWALL WRAP AT SIDES AND TOP OF WINDOWS, TYPICAL
1X PROJECTING SILL W/ 1/2"X4 APRON U.N.O. (KITCHEN & BATH WINDOW VARY)
DOORS 1X4 FACE WRAP (TOP & SIDES)
BASEBOARDS 1/2" X 4

*REMOVABLE CABINET FRONT NOTES

REMOVABLE CABINET FRONT MUST MEET THE FOLLOWING FOR TYPE A:

A) THE CABINETRY CAN BE REMOVED WITHOUT REMOVAL OR REPLACEMENT OF THE SINK.

B) THE FLOOR FINISH EXTENDS UNDER THE CABINETRY, AND THE WALLS BEHIND AND SURROUNDING THE CABINETRY ARE FINISHED

C) THE CABINETRY CAN BE REMOVED WITHOUT REMOVAL OR REPLACEMENT OF THE WORK SURFACE (COUNTER) IF APPLICABLE.

D) ONCE REMOVED, KNEE & TOE CLEARANCES PER A7.3 ARE MET

E) WATER SUPPLY AND DRAIN PIPES UNDER SINKS SHALL BE INSULATED OR OTHERWISE CONFIGURED TO PROTECT AGAINST CONTACT. THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER SINKS.

F) THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER THE EXPOSED PORTIONS OF WORK SURFACE COUNTERS.

INTERIOR GENERAL NOTES

1) DIMENSIONS ON THIS SHEET ARE TO FINISH FACE AND/OR CENTER OF FIXTURE, U.N.O.

2) ALL INTERIOR SPACES SHALL COMPLY WITH SHEET A7.3 FOR TYPE A.

3) OUTLETS AND SWITCHES TO BE DECORA WHITE, NYLON PLATE COVERS, TYPICAL

4) INTERIOR DESIGN NOT INCLUDED IN ARCHITECT'S SCOPE OF WORK. APPLICANT IS RESPONSIBLE FOR SELECTING ALL FINISH MATERIALS, HARDWARE, FIXTURES AND APPLIANCES IN COMPLIANCE WITH THESE DRAWINGS. IF NO INTERIOR DESIGNER WILL BE USED, RECOMMEND ARCHITECT DOCUMENT INTERIOR SELECTIONS AS AN ADDITIONAL SERVICE.

5) RECOMMEND CHANGE IN COLOR CONTRAST AT CHANGES IN PLANE FOR VISUAL IMPAIRMENT. CHANGES IN COUNTER HEIGHT, COUNTER TO BACKSPLASH, COUNTER TO SINK, COUNTER TO CABS, ETC.

JURISDICTION APPROVAL

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STATE OF OREGON
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INTERIOR - KITCHEN

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A7.1

*REMOVABLE CABINET FRONT NOTES

REMOVABLE CABINET FRONT MUST MEET THE FOLLOWING FOR TYPE A:

A) THE CABINETRY CAN BE REMOVED WITHOUT REMOVAL OR REPLACEMENT OF THE SINK.

B) THE FLOOR FINISH EXTENDS UNDER THE CABINETRY, AND THE WALLS BEHIND AND SURROUNDING THE CABINETRY ARE FINISHED

C) THE CABINETRY CAN BE REMOVED WITHOUT REMOVAL OR REPLACEMENT OF THE WORK SURFACE (COUNTER) IF APPLICABLE.

D) ONCE REMOVED, KNEE & TOE CLEARANCES PER A7.3 ARE MET

E) WATER SUPPLY AND DRAIN PIPES UNDER SINKS SHALL BE INSULATED OR OTHERWISE CONFIGURED TO PROTECT AGAINST CONTACT. THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER SINKS.

F) THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER THE EXPOSED PORTIONS OF WORK SURFACE COUNTERS.

INTERIOR GENERAL NOTES

1) DIMENSIONS ON THIS SHEET ARE TO FINISH FACE AND/OR CENTER OF FIXTURE, U.N.O.

2) ALL INTERIOR SPACES SHALL COMPLY WITH SHEET A7.3 FOR TYPE A.

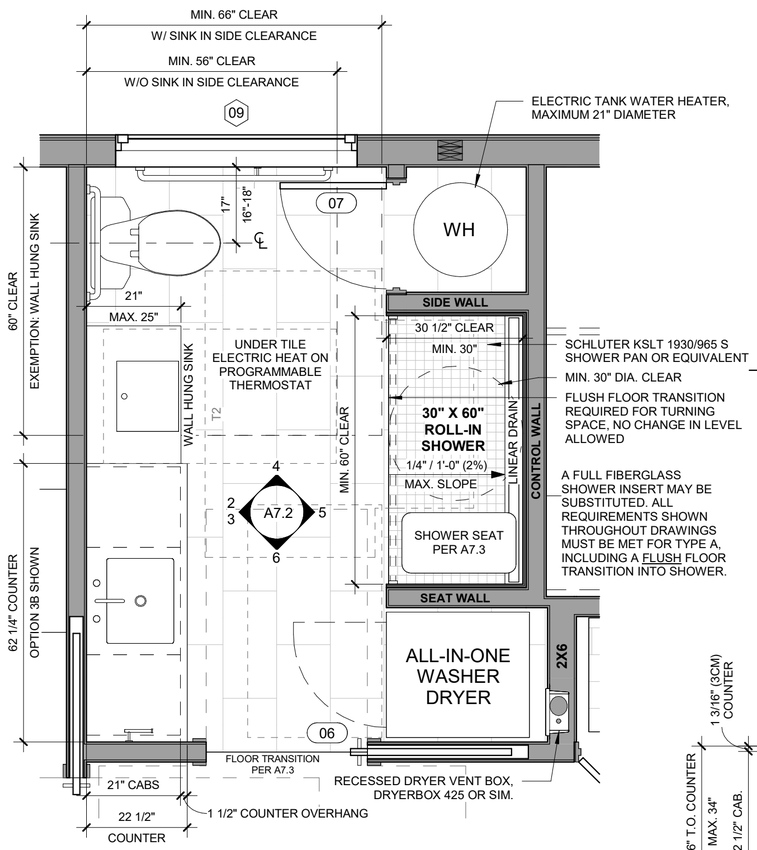
3) OUTLETS AND SWITCHES TO BE DECORA WHITE, NYLON PLATE COVERS, TYPICAL

4) INTERIOR DESIGN NOT INCLUDED IN ARCHITECT'S SCOPE OF WORK. APPLICANT IS RESPONSIBLE FOR SELECTING ALL FINISH MATERIALS, HARDWARE, FIXTURES AND APPLIANCES IN COMPLIANCE WITH THESE DRAWINGS. IF NO INTERIOR DESIGNER WILL BE USED, RECOMMEND ARCHITECT DOCUMENT INTERIOR SELECTIONS AS AN ADDITIONAL SERVICE.

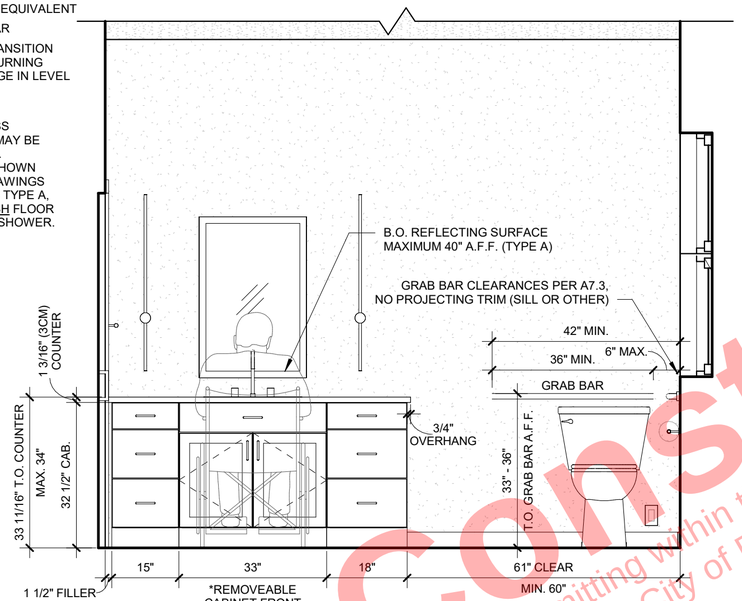
5) RECOMMEND CHANGE IN COLOR CONTRAST AT CHANGES IN PLANE FOR VISUAL IMPAIRMENT. CHANGES IN COUNTER HEIGHT, COUNTER TO BACKSPLASH, COUNTER TO SINK, COUNTER TO CABS, ETC.

TYPICAL INTERIOR TRIM, U.N.O.

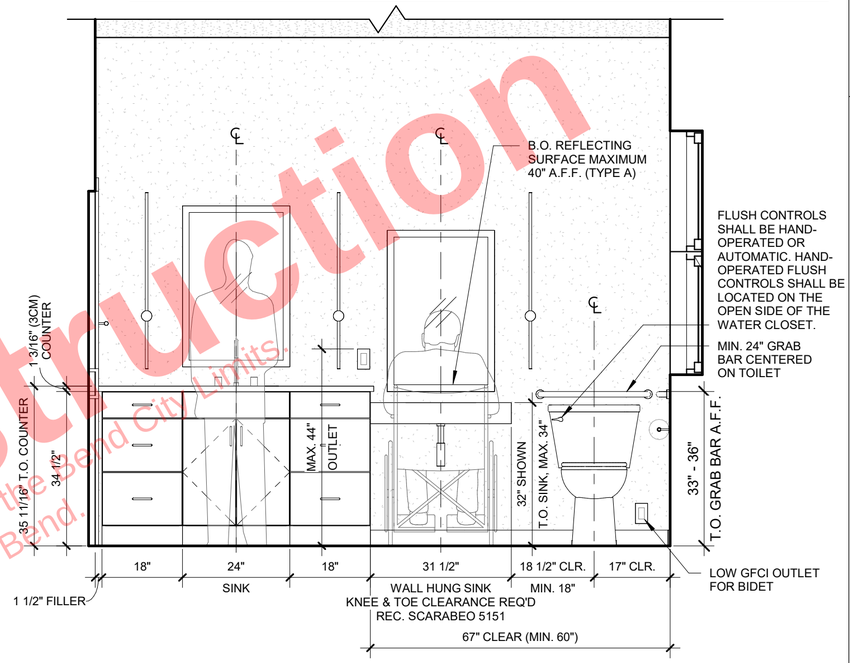
ALL INTERIOR TRIM TO BE PRIMED SOLID WOOD (FINGER JOINTED PINE OR SIM.)
APPLICANT MAY CHOOSE SOLID STAIN GRADE TRIM INSTEAD.
WINDOWS: DRYWALL WRAP AT SIDES AND TOP OF WINDOWS, TYPICAL
1X PROJECTING SILL W/ 1/2"X4 APRON U.N.O. (KITCHEN & BATH WINDOW VARY)
DOORS 1X4 FACE WRAP (TOP & SIDES)
BASEBOARDS 1/2" X 4



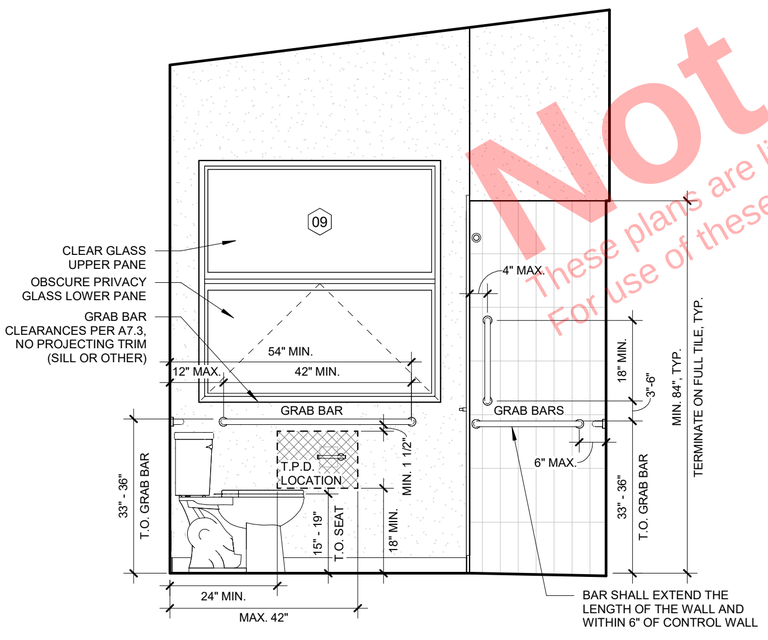
1 ENLARGED BATHROOM PLAN
1/2" = 1'-0"



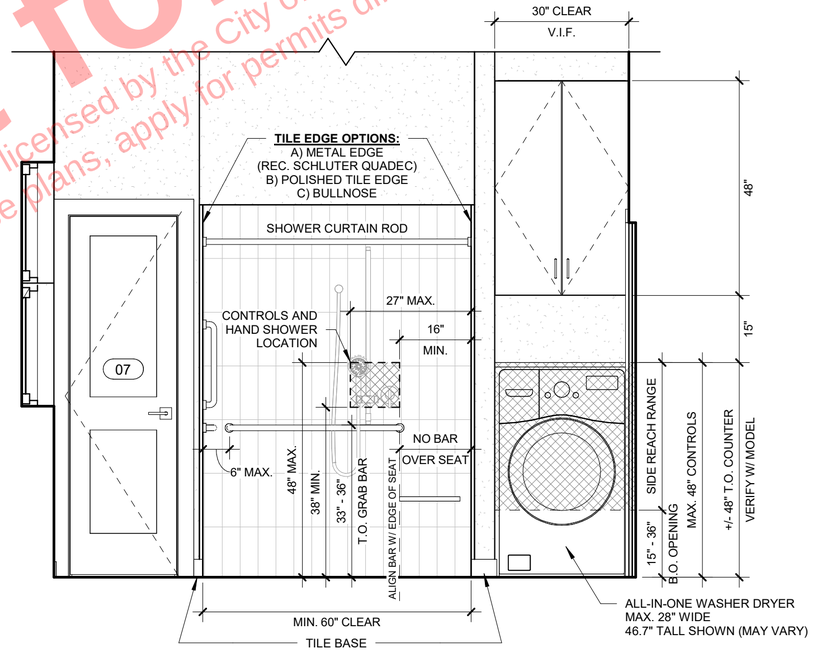
2 BATH LEFT (OPTION 3A - SINGLE SINK)
1/2" = 1'-0"



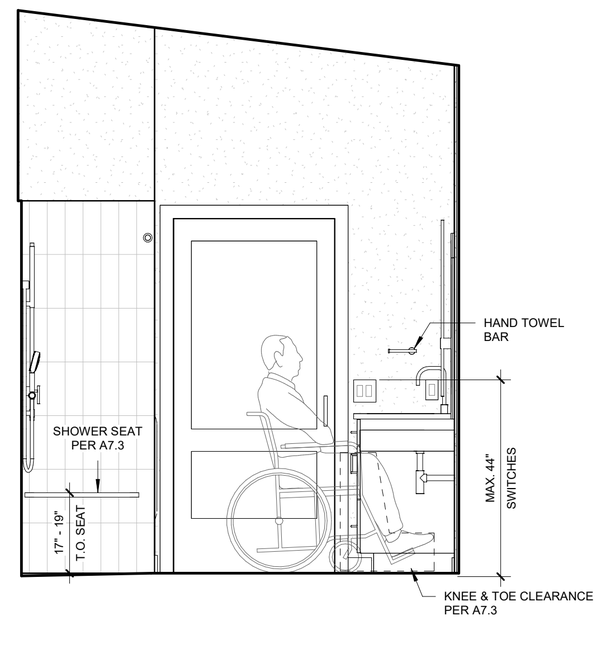
3 BATH LEFT (OPTION 3B - DOUBLE SINK)
1/2" = 1'-0"



4 BATH FRONT
1/2" = 1'-0"



5 BATH RIGHT
1/2" = 1'-0"



6 BATH BACK
1/2" = 1'-0"

JURISDICTION APPROVAL

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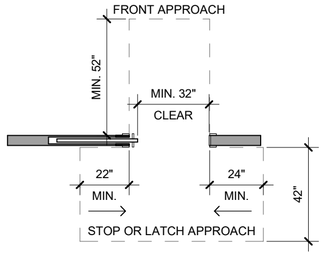
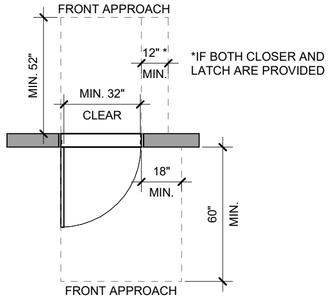
A7.2

SLIDING & POCKET DOORS



SWINGING DOORS



FLOORING GENERAL NOTES

1) FLOOR SURFACES SHALL BE STABLE, FIRM, AND SLIP RESISTANT. FLOORING IN WET AREAS (BATHROOMS, KITCHENS, ENTRYWAYS, ETC.) SHALL HAVE A DYNAMIC COEFFICIENT OF FRICTION (DCOF) OF 0.42 OR HIGHER PER ANSI A137.1.

2) FLOOR TRANSITIONS SHALL COMPLY WITH *"CHANGES IN LEVEL"* DETAILS PER A7.3.

3) CARPET OR CARPET TILE SHALL BE SECURELY ATTACHED AND SHALL HAVE A FIRM CUSHION, PAD, OR BACKING OR NO CUSHION OR PAD. CARPET OR CARPET TILE SHALL HAVE A LEVEL LOOP, TEXTURED LOOP, LEVEL CUT PILE, OR LEVEL CUT/UNCUT PILE TEXTURE. THE PILE SHALL BE 1/2 INCH (13 MM) MAXIMUM IN HEIGHT. EXPOSED EDGES OF CARPET SHALL BE FASTENED TO THE FLOOR AND SHALL HAVE TRIM ALONG THE ENTIRE LENGTH OF THE EXPOSED EDGE. CARPET EDGE TRIM SHALL COMPLY WITH *"CHANGE IN LEVEL"* PER A7.3.

4) OPENINGS IN FLOOR SURFACES SHALL BE OF A SIZE THAT DOES NOT PERMIT THE PASSAGE OF A 1/2-INCH DIAMETER SPHERE. ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE PREDOMINANT DIRECTION OF TRAVEL.

5) RECOMMEND CHANGE IN COLOR CONTRAST AT FLOORING TRANSITIONS FOR VISUAL IMPAIRMENT.

ACCESSIBLE GENERAL NOTES

1) DIMENSIONS ON THIS SHEET ARE IN INCHES AND MILLIMETER, U.N.O.

2) REINFORCEMENT SHALL BE PROVIDED FOR THE INSTALLATION OF ALL GRAB BARS SHOWN WHETHER GRAB BARS WILL BE INSTALLED OR NOT DURING CONSTRUCTION. GRAB BARS ARE NOT REQ'D FOR TYPE A, REINFORCEMENT FOR FUTURE INSTALLATION OF GRAB BARS IS REQUIRED FOR TYPE A.

3) OPERABLE PARTS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE OPERABLE PARTS SHALL BE 5.0 POUNDS (22.2 N) MAXIMUM.

4) OPERABLE PARTS SHALL BE LOCATED WITHIN ONE OF THE *"REACH RANGES"* DETAILED BELOW. THIS INCLUDES BUT IS NOT LIMITED TO LIGHTING CONTROLS, ELECTRICAL PANELBOARDS, ELECTRICAL SWITCHES AND RECEPTACLE OUTLETS, ENVIRONMENTAL CONTROLS, APPLIANCE CONTROLS, PLUMBING FIXTURE CONTROLS, AND USER CONTROLS FOR SECURITY OR INTERCOM SYSTEMS, DOOR HANDLES & LOCKS, OPERABLE WINDOWS REQUIRED FOR NATURAL VENTILATION OR EMERGENCY EGRESS, ETC.
EXCEPTIONS: A) APPLIANCE DOORS AND DOOR LATCHING DEVICES
B) BOTTOM-HINGES APPLIANCE DOORS, WHEN IN THE OPEN POSITION

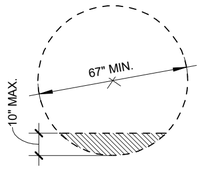
DOOR CLEARANCES
1/4" = 1'-0"

TURNING SPACE & DOOR CLEARANCE NOTES
1) ALL ROOMS SERVED BY AN ACCESSIBLE ROUTE SHALL PROVIDE A TURNING SPACE AND DOOR MANEUVERING CLERANCES. EXCEPTIONS: TURNING SPACE AND MANEUVERING CLEARANCE IS NOT REQUIRED WITHIN CLOSETS OR PANTRIES THAT ARE 48 INCHES MAXIMUM IN DEPTH.

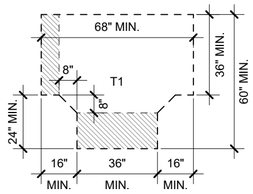
2) CHANGES IN LEVEL SHALL NOT BE PERMITTED WITHIN THE TURNING SPACE. SLOPES NOT STEEPER THAN 1:48 (1/4" PER FOOT OR 2%) SHALL BE PERMITTED.

3) DOORS SHALL BE PERMITTED TO SWING INTO TURNING SPACES, U.N.O.

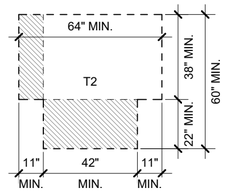
CIRCULAR



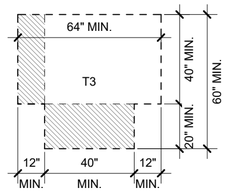
T-SHAPE OPTION 1



T-SHAPE OPTION 2



T-SHAPE OPTION 3

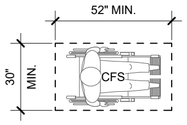


OVERLAP OF KNEE & TOE CLEARANCE ALLOWED

TURNING SPACE (NEW BUILDINGS)
1/4" = 1'-0"

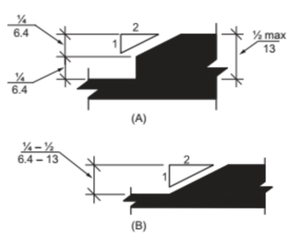
CLEAR SPACE NOTES
1) CLEAR FLOOR SPACE SHALL BE PERMITTED TO INCLUDE KNEE AND TOE CLEARANCE, U.N.O.

2) ONE FULL, UNOBSTRUCTED SIDE OF A CLEAR FLOOR SPACE SHALL ADJOIN OR OVERLAP AN ACCESSIBLE ROUTE OR ADJOIN ANOTHER CLEAR FLOOR SPACE.



CLEAR FLOOR SPACE (NEW BUILDINGS)
N.T.S.

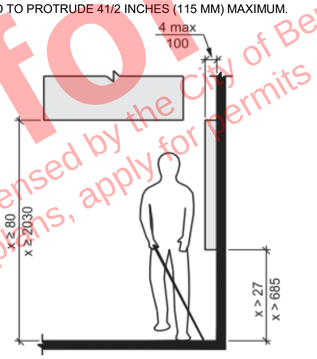
BEVELED CHANGES IN LEVEL
BEVELED CHANGES IN LEVEL GREATER THAN 1/4 INCH IN HEIGHT AND NOT MORE THAN 1/2 INCH MAXIMUM IN HEIGHT SHALL BE BEVELED WITH A SLOPE NOT STEEPER THAN 1:2.



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

CHANGES IN LEVEL
N.T.S.

PROTRUDING OBJECT NOTES
1) OBJECTS WITH LEADING EDGES MORE THAN 27 INCHES AND NOT MORE THAN 80 INCHES ABOVE THE FLOOR SHALL PROTRUDE 4 INCHES MAXIMUM HORIZONTALLY INTO A CIRCULATION PATH. EXCEPTION: HANDRAILS SHALL BE PERMITTED TO PROTRUDE 41/2 INCHES (115 MM) MAXIMUM.

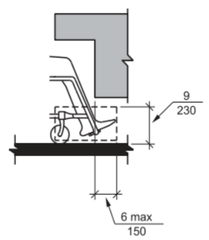


PROTRUDING OBJECTS
N.T.S.

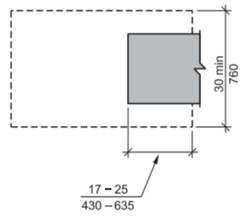
KNEE & TOE SPACE NOTES
1) CLEAR FLOOR SPACE SHALL BE PERMITTED TO INCLUDE KNEE AND TOE CLEARANCE, U.N.O.

2) ONE FULL, UNOBSTRUCTED SIDE OF A CLEAR FLOOR SPACE SHALL ADJOIN OR OVERLAP AN ACCESSIBLE ROUTE OR ADJOIN ANOTHER CLEAR FLOOR SPACE.

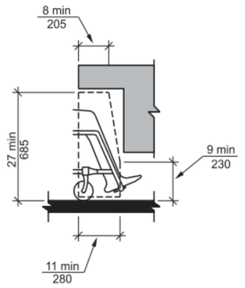
TOE CLEARANCE - ELEVATION



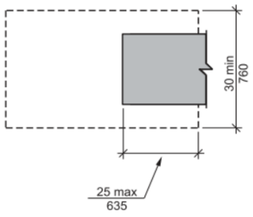
TOE CLEARANCE - PLAN



KNEE CLEARANCE - ELEVATION

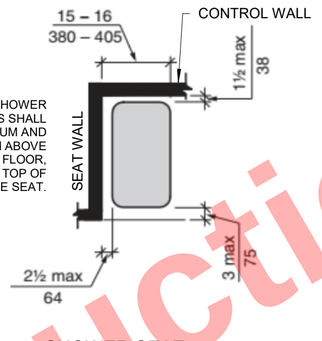


KNEE CLEARANCE - PLAN



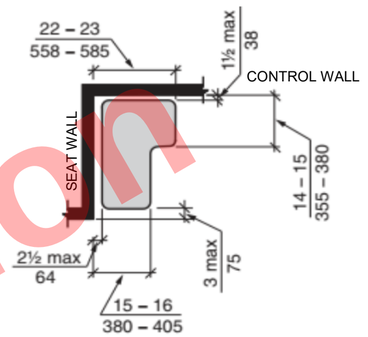
KNEE & TOE CLEARANCE
N.T.S.

RECTANGULAR SEAT



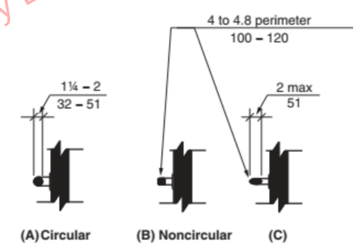
THE HEIGHT OF SHOWER COMPARTMENT SEATS SHALL BE 17 INCHES MINIMUM AND 19 INCHES MAXIMUM ABOVE THE BATHROOM FLOOR, MEASURED TO THE TOP OF THE SEAT.

L-SHAPED SEAT

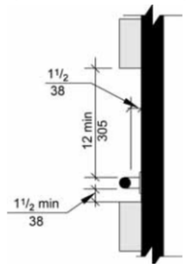


SHOWER SEAT
N.T.S.

SIZE OF GRAB BARS

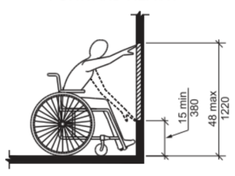


GRAB BAR CLEARANCES

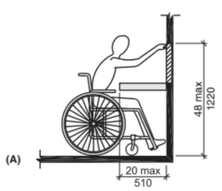


GRAB BARS
1/4" = 1'-0"

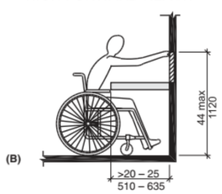
UNOBSTRUCTED FORWARD REACH



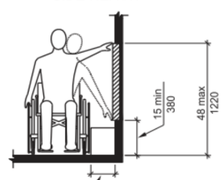
OBSTRUCTED (MAX. 20") HIGH FORWARD REACH



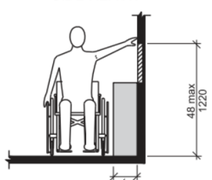
OBSTRUCTED (20"-25") HIGH FORWARD REACH



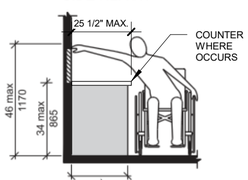
UNOBSTRUCTED SIDE REACH



OBSTRUCTED (MAX. 10") SIDE REACH



OBSTRUCTED (10"-24") SIDE REACH



REACH RANGE
N.T.S.

JURISDICTION APPROVAL

REGISTERED ARCHITECT
IAN BURGESS
BEND, OREGON
LIC # 6925
STATE OF OREGON
EXPIRES 12/31/2025

SIERRA JAMES

ACCESSIBILITY DETAILS
NOT FOR CONSTRUCTION

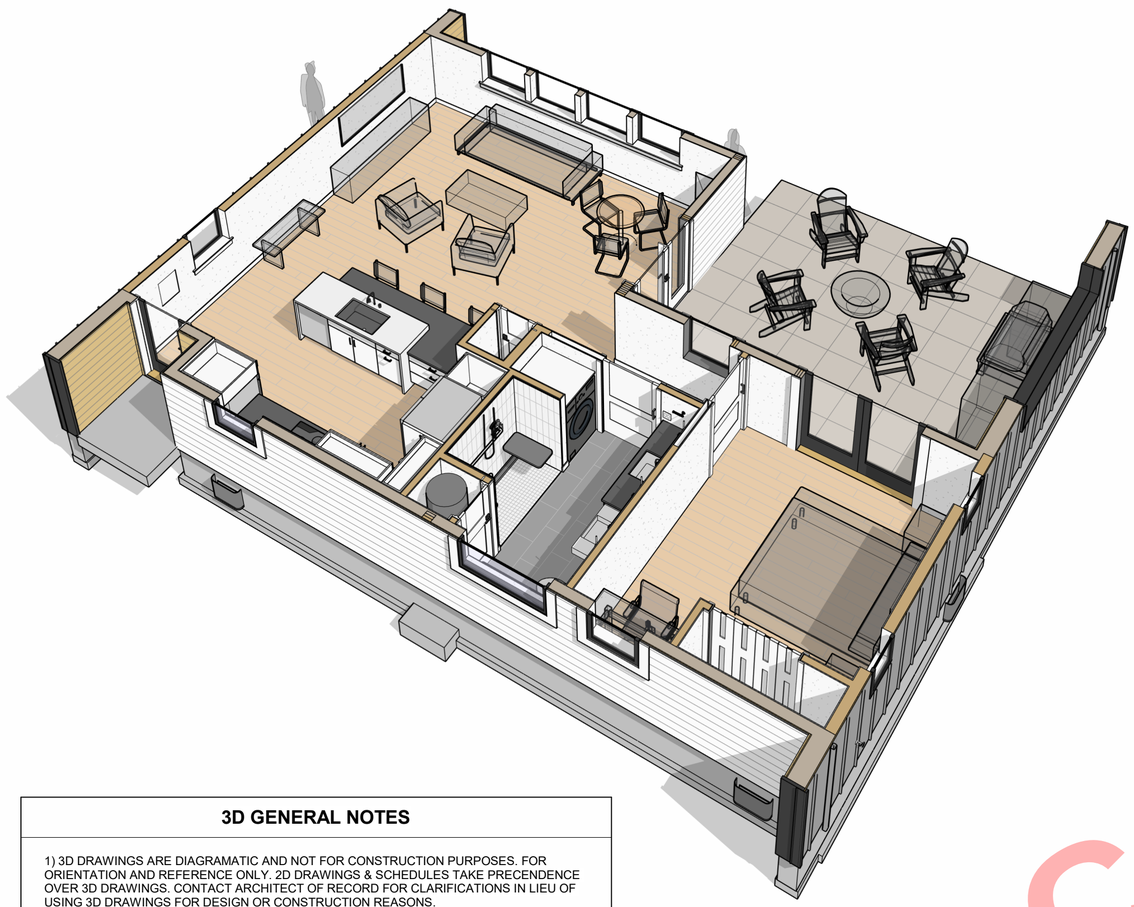
MASTER / REISSUE PERMIT
12/12/2025

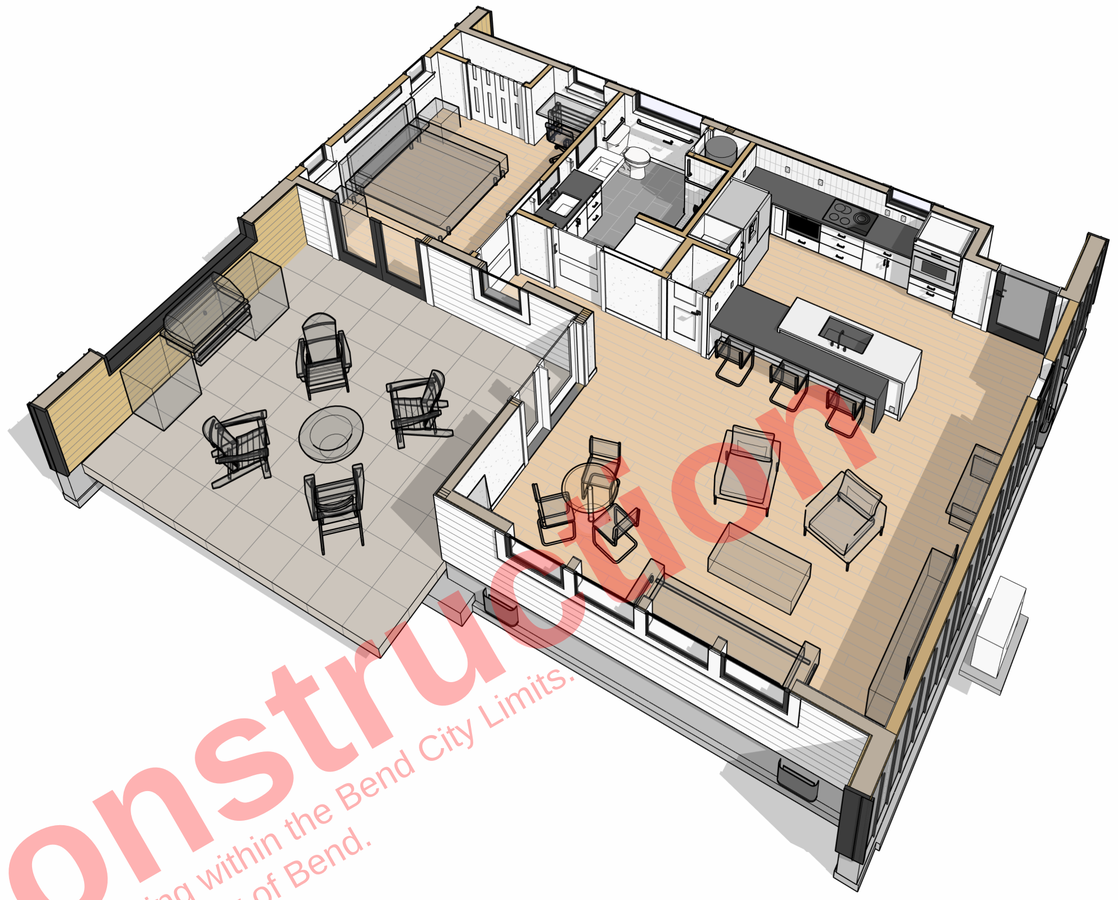
IAN.BURGESS@SIERRA-JAMES.COM

CASCADE COTTAGE
PROJECT ADDRESS

REVISIONS		
#	DESCRIPTION	DATE

A7.3

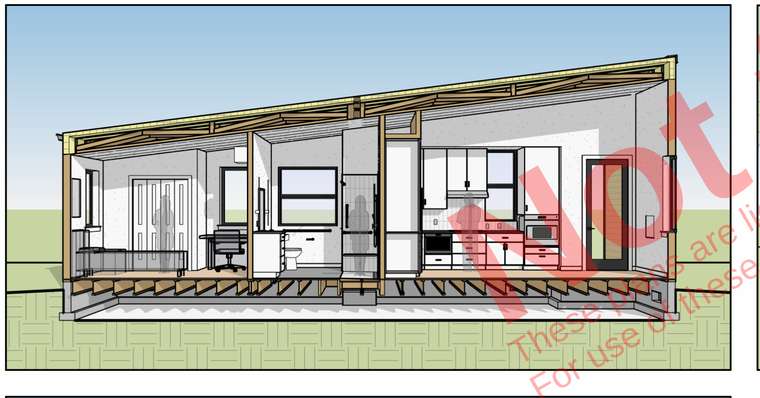


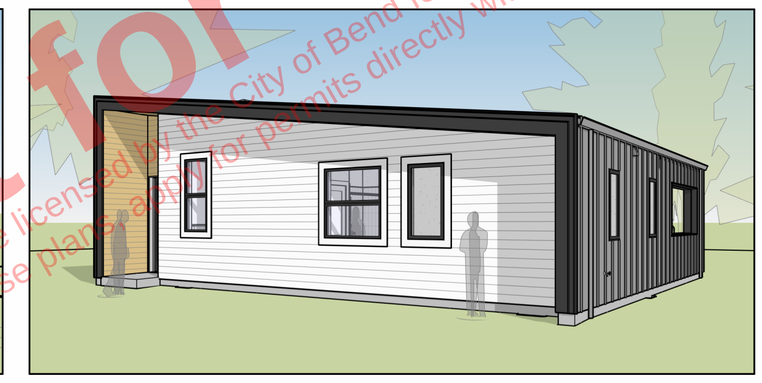


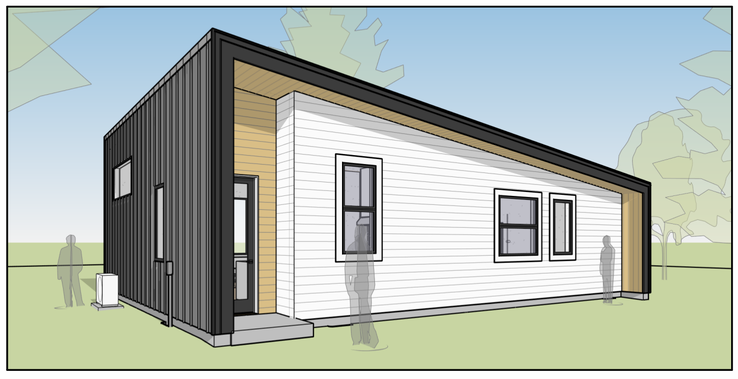
3D GENERAL NOTES

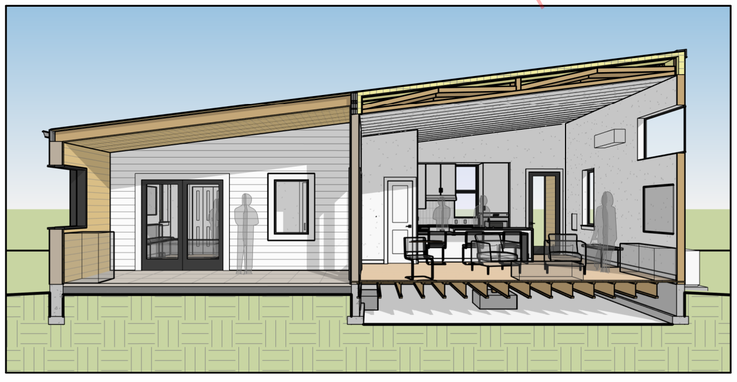
1) 3D DRAWINGS ARE DIAGRAMATIC AND NOT FOR CONSTRUCTION PURPOSES. FOR ORIENTATION AND REFERENCE ONLY. 2D DRAWINGS & SCHEDULES TAKE PRECENDENCE OVER 3D DRAWINGS. CONTACT ARCHITECT OF RECORD FOR CLARIFICATIONS IN LIEU OF USING 3D DRAWINGS FOR DESIGN OR CONSTRUCTION REASONS.

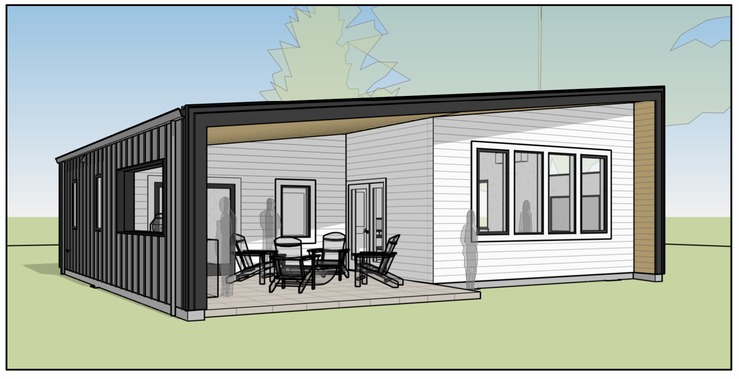
2) 3D MODELING IS TO A LEVEL OF DEVELOPMENT 200 PER THE AIA.

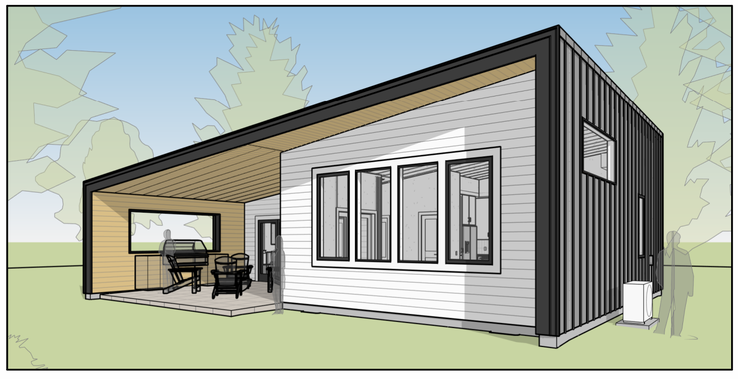












JURISDICTION APPROVAL

REGISTERED ARCHITECT
IAN BURGESS
BEND, OREGON
LIC # 6925
STATE OF OREGON
EXPIRES 12/31/2027

SIERRA JAMES

LIVEABLE HOME CERTIFICATION LEVEL 2

3D VIEWS - EXTERIOR

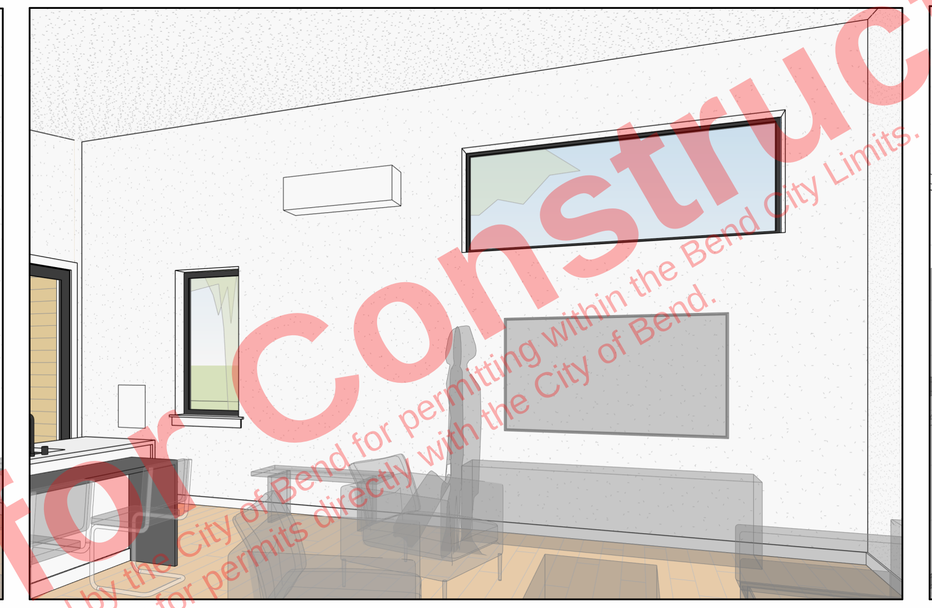
MASTER / REISSUE PERMIT
12/12/2025

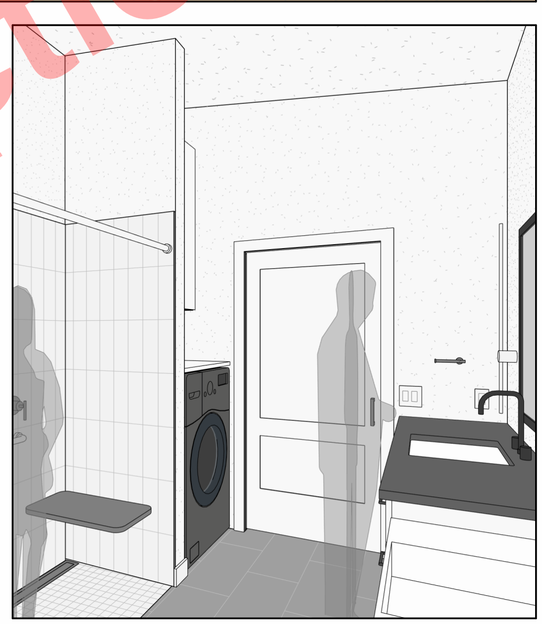
(541) 306-3775
INFO@SIERRA-JAMES.COM

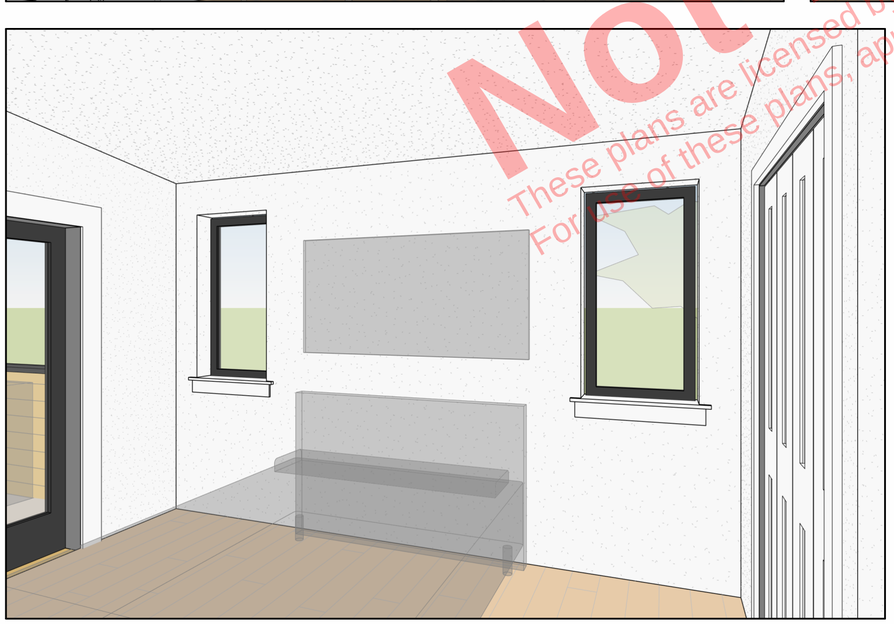
CASCADE COTTAGE

PROJECT ADDRESS

A9.1







JURISDICTION APPROVAL

REGISTERED ARCHITECT
IAN BURGESS
BEND, OREGON
LIC # 6925
STATE OF OREGON

EXPIRES 12/31/2027

SIERRA JAMES

LIVEABLE HOME CERTIFICATION LEVEL 2

3D VIEWS - INTERIOR

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12/12/2025

(541) 306-3775
INFO@SIERRA-JAMES.COM

CASCADE COTTAGE

PROJECT ADDRESS

A9.2

HOLD DOWN SCHEDULE

MARK	HOLD DOWN	ANCHOR	SCREW OPTION	EPOXY ANCHOR OPTION	COUNT
SHB1	HDUE5-SDS3	SABR5/8x24	5/8" TITENHD W/ 4" EMBEDDMENT	5/8" ATR W/ 6" EMBEDDMENT	4

WALL FOOTING SCHEDULE

MARK	WIDTH	FOUNDATION THICKNESS	STEM WIDTH	FOOTING REBAR	STEM REBAR
WF1	12"	6"	6"	2-#4(G40) HORIZ REBAR	1-#4(G40)HORIZ REBAR <6" FROM TOP, 1-#4(G40) VERT REBAR AT 48" O.C.
WF2	12"	6"	10"	2-#4(G40) HORIZ REBAR	1-#4(G40)HORIZ REBAR <6" FROM TOP, 1-#4(G40) VERT REBAR AT 48" O.C.

SITE SLOPE AND FOUNDATION
STEMWALL MAXIMUM HEIGHT IS 4' MEASURED FROM GRADE. STEMWALL UNBALANCED LOAD MAXIMUM HEIGHT IS 4'. IF EITHER CONDITION IS EXCEEDED CONTACT LICENSED STRUCTURAL ENGINEER.

SPREAD FOOTING SCHEDULE

MARK	WIDTH	LENGTH	FOOTING THICKNESS	REBAR SCHEDULE	POST BASE
F1	30"	30"	12"	4-#4(G40) REBAR E.W.	ABU OPT
F2	36"	36"	12"	4-#4(G40) REBAR E.W.	ABU OPT
F3	30"	30"	12"	4-#4(G40) REBAR E.W.	ABU OPT
F4	32"	32"	12"	4-#4(G40) REBAR E.W.	PB46

WIND SPEED, EXPOSURE, SNOW LOAD AND SDS MAY NOT BE EXCEEDED. CONTACT ENGINEER FOR REDESIGN IF LOCATION EXCEEDS THESE VALUES.

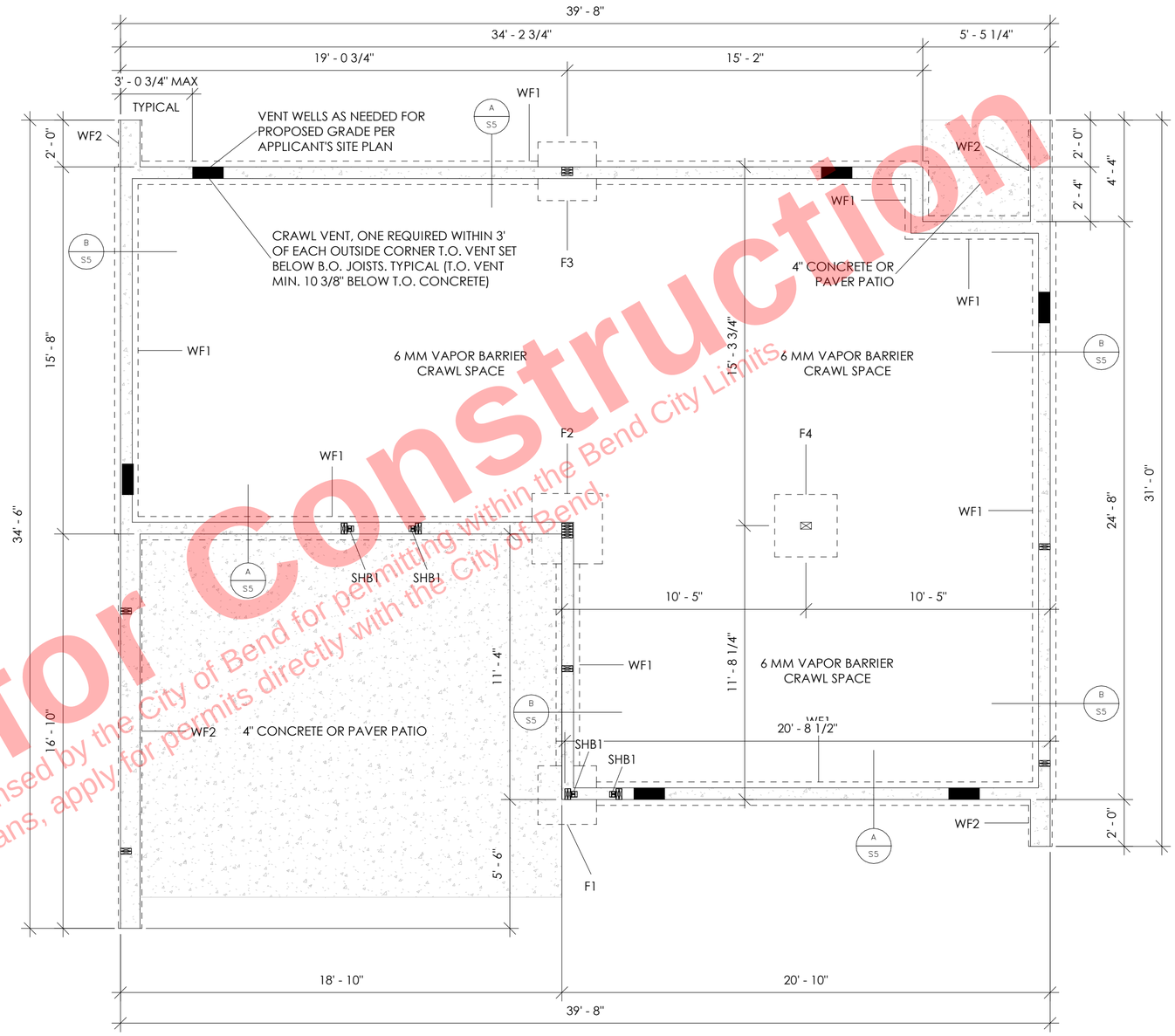
VARIABLE TABLE

VARIABLE	VALUE	CODE REFERENCE
WIND SPEED	99 MPH, EXP C	[IBC-ASCE7-16]
SNOW LOAD	50 PSF	[SEAO-ASCE7-16]
SEISMIC	0.38 g	[ASCE7-16]
FROST DEPTH	18"	[ORSC R301.2]

PLAN EVALUATED: CASCADE ADU (IAN BURGESS - SIERRA JAMES CONSTRUCTION)

FOUNDATION NOTES:

1. BUILDING IS REQUIRED TO MEET MINIMUM SETBACK REQUIREMENTS (SITE PLAN)
2. FINISH GRADE SHALL SLOPE AWAY FROM FOUNDATION WALLS (OR SIDEWALKS AND SLABS ADJACENT TO FOUNDATION WALLS).
3. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OR 2500 PSI (DEFAULT) OR AS SPECIFIED IN THE ENGINEERING.
4. EXTERIOR FOOTINGS SHALL EXTEND BELOW THE FROST DEPTH FOR THE SITE. REF IRC TABLE R301.2(1)
5. FOUNDATION WALLS SHALL EXTEND AT LEAST 6" ABOVE THE FINISHED GRADE.
6. FOUNDATION DESIGN ASSUMES 1500 PSF SOIL BACK PRESSURE (CODE DEFAULT). USE OF SOIL PRESSURES GREATER THAN 1500 PSF REQUIRES SOIL TEST.
7. FOUNDATION REINFORCEMENT AS SPECIFIED ON THIS PLAN.
8. FOUNDATION REBAR SHALL HAVE A MINIMUM 24" LAP SPLICE OR AS SPECIFIED ON THIS PLAN.
9. FOUNDATION FOOTING SIZES AS SPECIFIED ON THIS PLAN.
10. SILL PLATE SHALL BE PRESSURE TREATED AND ANCHORED TO STEM WALL USING ANCHOR BOLTS AS SPECIFIED IN THE SHEAR PLAN.
11. DRAINS SHALL BE PROVIDED AROUND ALL CONCRETE OR MASONRY FOUNDATIONS ENCLOSING HABITABLE OR USABLE SPACES LOCATED BELOW GRADE.
12. FOUNDATION VENTILATION SHALL BE A MINIMUM 1 SF VENT SPACE FOR EACH 150 SF OF UNDERFLOOR AREA AND VENTS SET WITHIN 3' EACH CORNER. (1/1500 W/6 MIL VAPOR BARRIER-IRC R408.1).
13. PROVIDE A MINIMUM 18"X24" CLEAR ACCESS OPENING TO UNDER FLOOR CRAWL SPACE. IF THE FURNACE IS INSTALLED IN THE CRAWL SPACE, THE OPENING MUST BE LARGE ENOUGH TO REMOVE THE LARGEST PIECE OF EQUIP. BUT NOT LESS THAN 30"X30". FLOOR ACCESS SHALL BE WITHIN 20' OF PLUMBING CLEANOUT. NO PIPE OR DUCTWORK SHALL INTERFERE WITH ACCESSIBILITY.
14. FOOTINGS TO BEAR ON UNDISTURBED LEVEL SOIL DEVOID OF ANY ORGANIC MATERIAL AND STEPPED AS REQUIRED TO MAINTAIN A MINIMUM FROST DEPTH BELOW FINISHED GRADE.
15. PROVIDE GROUND COVER OF 6 MIL POLYETHYLENE OR EQUAL LAPPED 12" AT ALL JOINTS AND TURNED UP 12" UP THE FOUNDATION WALL IN THE CRAWL SPACE. PROVIDE 6 MIL POLYETHYLENE UNDER CONCRETE SLABS.
16. PROVIDE SILL SEAL BETWEEN THE WALL AND FOUNDATION WHERE FOUNDATION WALL ENCLOSES HEATED SPACE.
17. PROVIDE ON #4 REBAR TIED TO THE FOUNDATION REBAR AND EXTENDED 12" ABOVE THE STEM WALL FOR GROUND ROD.
18. COLUMN BASES SHALL BE PROTECTED AGAINST DECAY OR CORROSION UNLESS PRESSURE TREATED WOOD IS USED. STEEL POST BASES SHALL BE GALVANIZED AND BE SIZED TO COVER THE ENTIRE BOTTOM OF THE COLUMN.
19. CONCRETE SLABS MIN 2500 PSI W/OPTIONAL W6SX6 10/10WW MESH OR APPROVED FIBER MESH. USE EXPANSION JOINTS OR SAW CUT AT MIN 12' O.C. SLOPE GARAGE SLABS MIN 1/8/12 TOWARD DOORS.
20. ALL EXTERIOR WALLS, BEARING WALLS, COLUMNS AND PIERS SHALL BE SUPPORTED ON CONTINUOUS SOLID MASONRY OR CONCRETE FOOTINGS AND SHALL EXTEND BELOW THE FROST DEPTH. FOOTINGS SHALL BEAR ON UNDISTURBED SOIL OR 4" GRANULAR MATERIAL COMPACTED TO 95%.
21. BEAM POCKETS IN STEM WALLS TO HAVE 1/2" AIR SPACE AT SIDES AND END, AND A MINIMUM BEARING OF 4".
22. REF SHEAR DIAGRAM FOR ANCHOR BOLT SPACING.



FOUNDATION

1/4" = 1'-0"

DEVIATION STATEMENT
ANY DEVIATION FROM ARCHITECTURAL OR STRUCTURAL PLAN REQUIRES REVIEW BY LICENSED ENGINEER.

REGISTERED PROFESSIONAL ENGINEER
87488PE
OREGON
JANUARY 08, 2019
GARRETT J BANTON
EXPIRES: 12/31/2027

Garrett J. Banton, PE
3008 NE Charleston Ct.
Bend, OR 97701
Phone: (541) 306-7893
team@bantonengineering.com

BANTON ENGINEERING, INC.

CASCADECOTTAGE ADU
CITY OF BEND LIMITS

FOUNDATION

FILE:
SCALE: 1/4" = 1'-0"
DATE: 1/23/26

S1

DEVIATION STATEMENT
ANY DEVIATION FROM ARCHITECTURAL OR STRUCTURAL PLAN REQUIRES REVIEW BY LICENSED ENGINEER.

REGISTERED PROFESSIONAL ENGINEER
87488PE
OREGON
JANUARY 08, 2019
GARRETT J BANTON
EXPIRES: 12/31/2027

Garrett J. Banton, PE
3008 NE Charleston Ct.
Bend, OR 97701
Phone: (541) 306-7893
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WIND SPEED, EXPOSURE, SNOW LOAD AND SDS MAY NOT BE EXCEEDED. CONTACT ENGINEER FOR REDESIGN IF LOCATION EXCEEDS THESE VALUES.

VARIABLE TABLE		
VARIABLE	VALUE	CODE REFERENCE
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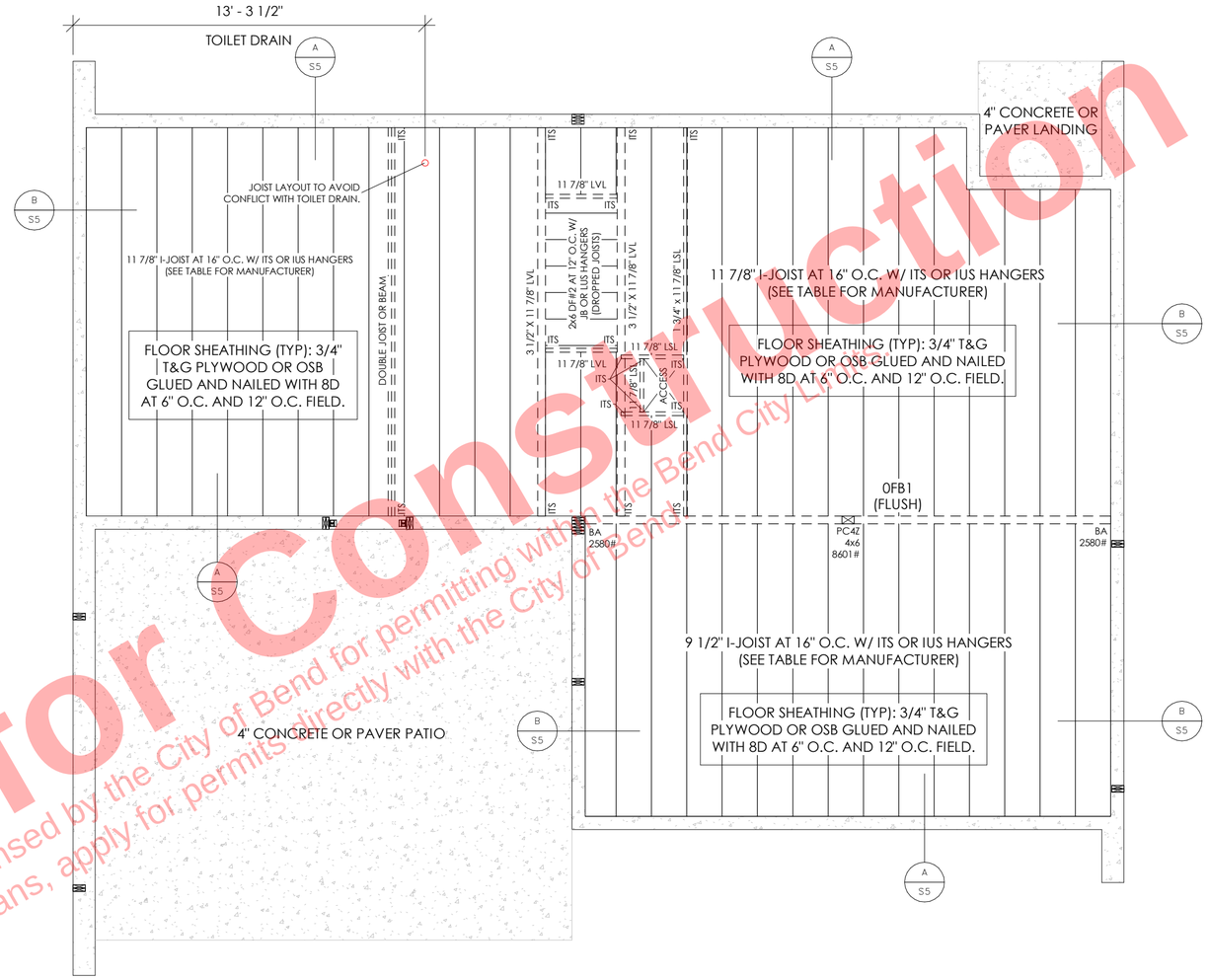
SNOW LOAD	50 PSF	[SEAO-ASCE7-16]
SEISMIC	0.38 g	[ASCE7-16]
FROST DEPTH	18"	[ORSC R301.2]
PLAN EVALUATED: CASCADE ADU (IAN BURGESS - SIERRA JAMES CONSTRUCTION)		

0 LEVEL BEAMS		
MARK	LENGTH	SIZE & MATERIAL
0FB1	20'	3-1/2x11-7/8 LVL 2.1E-3100Fb

FLOOR JOIST SPECIFICATIONS	
MANUFACTURER	TYPE
BOISE CASCADE (BCI)	11-7/8" BCI-4500S1.8 AT 16" O.C.
SIMPSON STRONG-TIE(TJI)	11-7/8" TJI 110 AT 16" O.C.
LP SOLIDSTART (LP)	11-7/8" LPI 18 AT 16" O.C.
ROSEBURG (RFPI)	11-7/8" RFPI 20 AT 16" O.C.
BOISE CASCADE (BCI)	9-1/2" BCI-4500S1.8 AT 16" O.C.
SIMPSON STRONG-TIE(TJI)	9-1/2" TJI 110 AT 16" O.C.
LP SOLIDSTART (LP)	9-1/2" LPI 18 AT 16" O.C.
ROSEBURG (RFPI)	9-1/2" RFPI 20 AT 16" O.C.

FLOOR FRAMING NOTES
1. SILL PLATE SHALL BE PRESSURE TREATED AND ANCHORED TO STEM WALL USING ANCHOR BOLTS AS SPECIFIED IN THE SHEAR PLAN.
2. PROVIDE A MINIMUM 18"X24" CLEAR ACCESS OPENING TO UNDER FLOOR CRAWL SPACE. IF THE FURNACE IS INSTALLED IN THE CRAWL SPACE, THE OPENING MUST BE LARGE ENOUGH TO REMOVE THE LARGEST PIECE OF EQUIPMENT BUT NO LESS THAN 30"X30". FLOOR ACCESS SHALL BE WITHIN 20' OF PLUMBING CLEANOUT. NO PIPE OR DUCTWORK SHALL INTERFERE WITH ACCESSIBILITY.
3. PROVIDE GROUND COVER OF 6 MIL POLYETHYLENE OR EQUAL LAPPED 12" AT ALL JOINTS AND TURNED UP 12" UP THE FOUNDATION WALL IN THE CRAWL SPACE. PROVIDE 6 MIL POLYETHYLENE UNDER CONCRETE SLABS.
4. PROVIDE SILL SEAL BETWEEN THE WALL AND FOUNDATION WHERE THE FOUNDATION WALL ENCLOSES HEATED SPACE.
5. ALL EXTERIOR WALLS, BEARING WALLS, COLUMNS, AND PIERS SHALL BE SUPPORTED ON CONTINUOUS SOLID MASONRY OR CONCRETE FOOTINGS AND SHALL EXTEND BELOW THE FROST DEPTH. FOOTINGS SHALL BEAR ON UNDISTURBED SOIL OR 4" GRANULAR MATERIAL COMPACTED TO 95%.
6. REFERENCE SHEAR DIAGRAM FOR ANCHOR BOLT SPACING.
7. FOLLOW MANUFACTURER'S RECOMMENDATIONS WHEN INSTALLING I JOISTS.
8. CONSTRUCTION ADHESIVE BE USED AT ALL FLOOR CONNECTIONS INCLUDING FLOOR SHEETING TO JOIST, IN JOIST HANGERS, JOIST HANGER PLATES, JOIST TO PONY WALL CONNECTIONS, AND BLOCKING CONNECTIONS.
9. IF FLOOR SHEETING GETS WET DURING CONSTRUCTION, RECOMMENDED THE NAILS GET RE-SET WITH A BALL-PEEN HAMMER.

ENGINEERING NOTES:
1. COLUMN, CONNECTION AND BEAM SIZING ARE MINIMUMS. UPGRADED SIZE OR QUALITY IS ACCEPTABLE.
2. ALTERNATIVE MATERIALS OR SIZES MAY BE FOUND IN THE ENGINEERING CALCULATIONS IF NOT NOTED ON THE DRAWING.
3. UNLESS OTHERWISE NOTED MINIMUM BEAM SUPPORT OR TRIMMER IS A 2x6 DF#2 OR 2x4 DF#2.
4. UNLESS OTHERWISE NOTED EXTERIOR FOOTING OR STRIP FOOTING MEETS MINIMUM LOAD REQUIREMENTS.
5. IF CONNECTION IS UNSPECIFIED USE NAILED FRAMING CONNECTION.
6. BOLTED CONNECTION OR SIMPSON PC POST CAP U.O.N.



SUBFLOOR FRAMING

1/4" = 1'-0"

BANTON ENGINEERING, INC. · team@bantonengineering.com

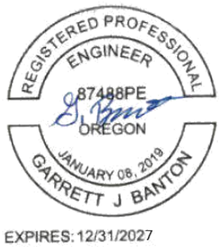
CASCADECOTTAGE ADU
CITY OF BEND LIMITS

SUBFLOOR FRAMING

FILE:
SCALE: 1/4" = 1'-0"
DATE: 1/23/26

S2

DEVIATION STATEMENT
ANY DEVIATION FROM ARCHITECTURAL OR STRUCTURAL PLAN REQUIRES REVIEW BY LICENSED ENGINEER.



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BANTON ENGINEERING, INC.

WIND SPEED, EXPOSURE, SNOW LOAD AND SDS MAY NOT BE EXCEEDED. CONTACT ENGINEER FOR REDESIGN IF LOCATION EXCEEDS THESE VALUES.

VARIABLE TABLE

VARIABLE	VALUE	CODE REFERENCE
WIND SPEED	99 MPH, EXP C	[IBC-ASCE7-16]
SNOW LOAD	50 PSF	[SEAO-ASCE7-16]
SEISMIC	0.38 g	[ASCE7-16]
FROST DEPTH	18"	[ORSC R301.2]
PLAN EVALUATED: CASCADE ADU (IAN BURGESS - SIERRA JAMES CONSTRUCTION)		

FRAMING LEGEND

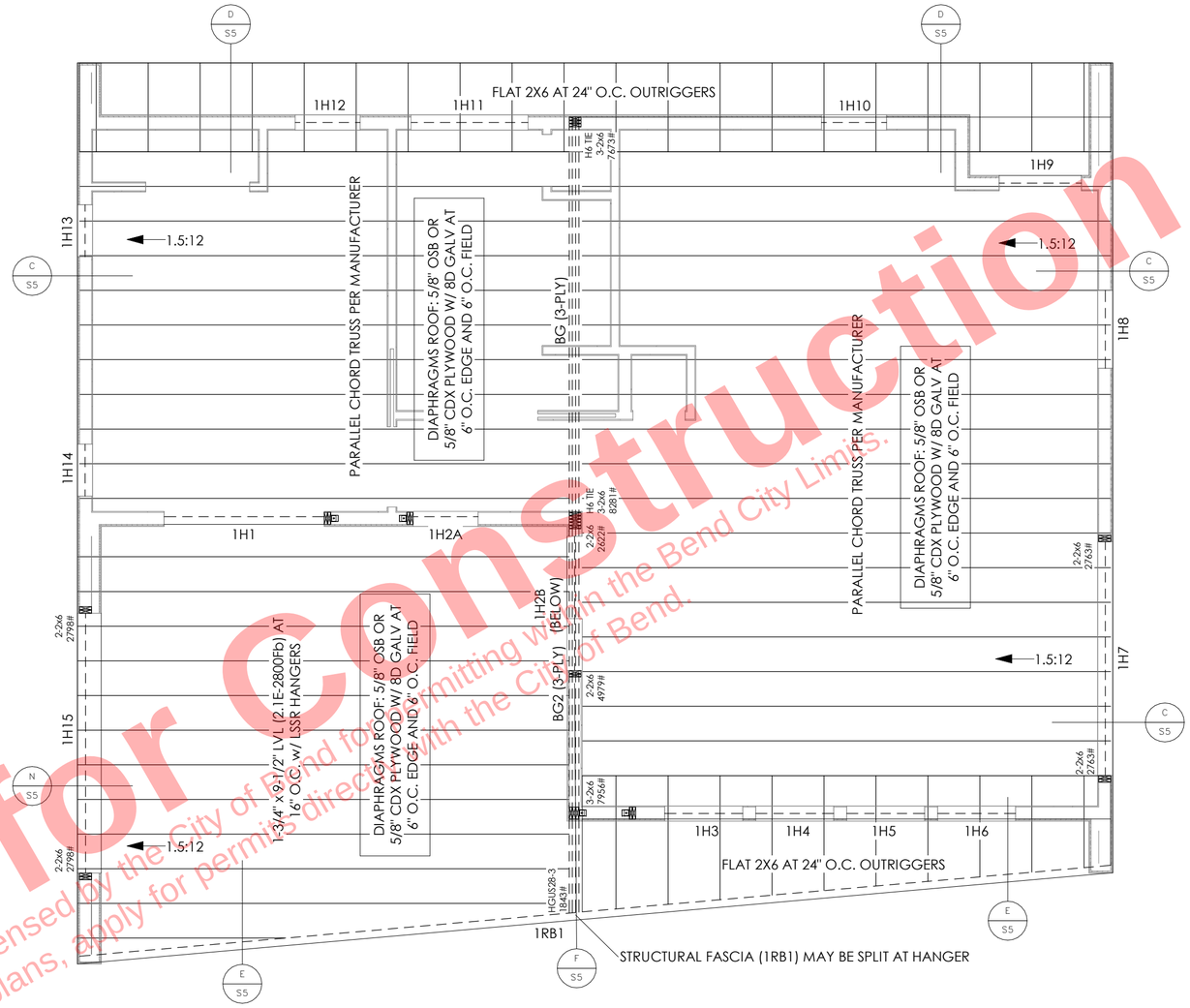
= INTERIOR LOAD BEARING WALL
= FIRE WALL PER ARCH
= ROOF OVERFRAME
= STANDARD EXTERIOR WALL

1 LEVEL BEAMS

MARK	LENGTH	SIZE & MATERIAL
1H1	6.5'	4x6 D.Fir-L No. 2
1H2A	3'	2x6 D.Fir-L No. 2
1H2B	5.5'	4x6 D.Fir-L No. 2
1H3	3.5'	2x6 D.Fir-L No. 2
1H4	3.5'	2x6 D.Fir-L No. 2
1H5	3.5'	2x6 D.Fir-L No. 2
1H6	3.5'	2x6 D.Fir-L No. 2
1H7	9.5'	4x12 D.Fir-L No. 2
1H8	3.5'	2x6 D.Fir-L No. 2
1H9	3.5'	2x6 D.Fir-L No. 2
1H10	3'	2x6 D.Fir-L No. 2
1H11	5'	2x6 D.Fir-L No. 2
1H12	3'	2x6 D.Fir-L No. 2
1H13	2.5'	2x6 D.Fir-L No. 2
1H14	2.5'	2x6 D.Fir-L No. 2
1H15	10.5'	5-1/2x7-1/2 24F-V4 DF
1RB1	40'	3-1/2x9-1/2 LVL 2.1E-3100Fb

WALL FRAMING NOTES
1. ONE STORY WALLS TO BE MINIMUM 2x6 DF#2 OR STUD AT 24" O.C.
2. TWO STORY WALLS TO BE MINIMUM 2x6 DF#2 OR STUD AT 16" O.C.
3. INTERIOR LOAD BEARING WALLS TO BE MINIMUM 2x4 DF#2 AT 16" O.C.
4. WALLS OVER 10' - 0" TALL TO REQUIRE SOLID MID PLANE BLOCKING AND 2x6 DF#2 OR LSL AT 16" O.C.

ENGINEERING NOTES:
1. COLUMN, CONNECTION AND BEAM SIZING ARE MINIMUMS. UPGRADED SIZE OR QUALITY IS ACCEPTABLE.
2. ALTERNATIVE MATERIALS OR SIZES MAY BE FOUND IN THE ENGINEERING CALCULATIONS IF NOT NOTED ON THE DRAWING.
3. UNLESS OTHERWISE NOTED MINIMUM BEAM SUPPORT OR TRIMMER IS A 2x6 DF#2 OR 2x4 DF#2.
4. UNLESS OTHERWISE NOTED EXTERIOR FOOTING OR STRIP FOOTING MEETS MINIMUM LOAD REQUIREMENTS.
5. IF CONNECTION IS UNSPECIFIED USE NAILED FRAMING CONNECTION.
6. BOLTED CONNECTION OR SIMPSON PC POST CAP U.O.N.



MAIN LEVEL FRAMING

1/4" = 1'-0"

ROOF FRAMING NOTES
1. REFERENCE MANUFACTURED TRUSS ENGINEERING.
2. REFERENCE ENGINEER'S GRAVITY LOADS ENGINEERING FOR BEAM ALTERNATIVES.
3. PLYWOOD ROOF SHEATHING SHALL NOT EXCEED THE ALLOWABLE SPANS INDICATED BY THE PANEL ID.
4. ATTIC SPACES HAVING 30" OR GREATER VERTICAL CLEAR HEIGHT ARE REQUIRED TO A MINIMUM OF 22"X30" ATTIC ACCESS.
5. USE SIMPSON H1 OR H2.5A PLATE TIES ON ALL RAFTER AND TRUSS PLATE CONNECTIONS.
6. RAFTER, CEILING JOISTS, AND TRUSSES SHALL BE SUPPORTED LATERALLY AT BEARING POINTS BY SOLID BLOCKING TO PREVENT ROTATION AND LATERAL DISPLACEMENT.
7. THE ROOFING MATERIAL MUST BE AN APPROVED MATERIAL INSTALLED AS SPECIFIED IN ARCH.
8. DIAPHRAGMS ROOF: 5/8" OSB OR 5/8" CDX PLYWOOD W/ 8D GALV AT 6" O.C. EDGE AND 6" O.C. FIELD
9. USE ICE SHIELD 48" ABOVE WALL LINES AND 36" UP VALLEYS.
10. 30# FELT UNDER STANDING SEAM METAL AND COMPOSITE ROOF.

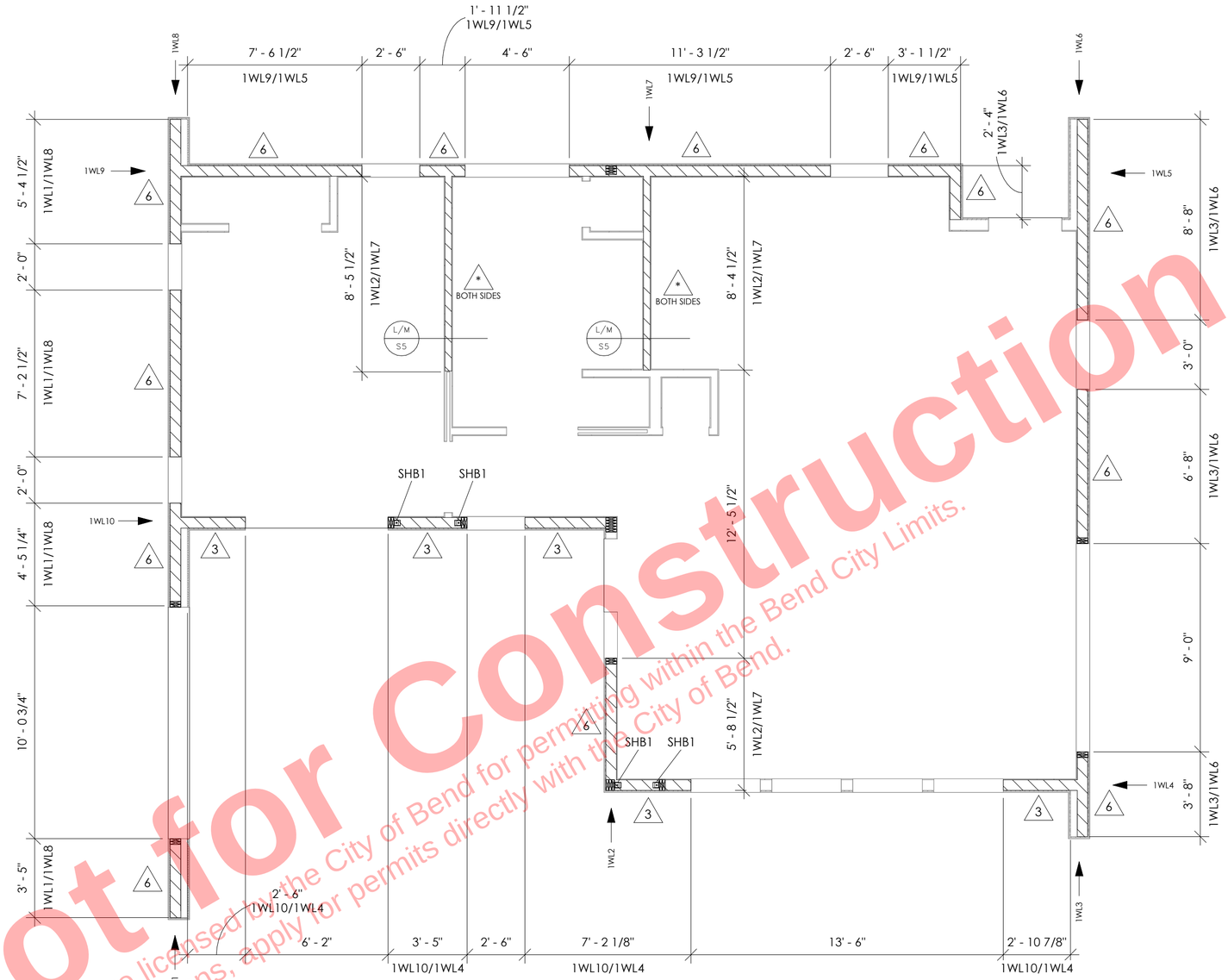
CASCADECOTTAGE ADU
CITY OF BEND LIMITS

MAIN LEVEL FRAMING

FILE:
SCALE: 1/4" = 1'-0"
DATE: 1/23/26

S3

DEVIATION STATEMENT
ANY DEVIATION FROM ARCHITECTURAL OR STRUCTURAL PLAN REQUIRES REVIEW BY LICENSED ENGINEER.



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VARIABLE TABLE

VARIABLE	VALUE	CODE REFERENCE
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FROST DEPTH	18"	[ORSC R301.2]
PLAN EVALUATED: CASCADE ADU (IAN BURGESS - SIERRA JAMES CONSTRUCTION)		

SHEAR WALL SCHEDULE

WARNING: IT IS THE RESPONSIBILITY OF THE USER OF THIS DOCUMENT TO ENSURE THAT ALL THE TECHNICAL INFORMATION IS PROPERLY IMPLEMENTED DURING CONSTRUCTION OF THE STRUCTURE. FAILURE TO INCORPORATE ALL OF THE REQUIREMENTS OF THIS DESIGN MAY INVALIDATE THE LATERAL INTEGRITY OF THE STRUCTURE AND RELEASE RESPONSIBILITY FROM THE ENGINEER OF RECORD.

No.	SHEAR WALL	SILL FASTENER	CONCRETE ANCHOR BOLTS
6	7/16" OSB OR 1/2" CDX W/8D AT 6" O.C. EDGE/12" O.C. FIELD	2x SOLE PLATE TO JOIST, DECK, BLOCKING W/16D AT 6" O.C. (TOP)/8D AT 6" O.C. (EDGE)	5/8" x 10" J BOLTS AT 48" O.C. 1/2" x 10" J BOLTS AT 48" O.C.
	SHEAR VALUES: (240 PLF24)(260 PLF16)(170 PLF Staple)(223 PLF HF)(242 PLF HF)		
4	7/16" OSB OR 1/2" CDX W/8D AT 4" O.C. EDGE/12" O.C. FIELD	2x SOLE PLATE TO JOIST, DECK, BLOCKING W/16D AT 6" O.C. (TOP)/8D AT 4" O.C. (EDGE)	5/8" x 10" J BOLTS AT 40" O.C. 1/2" x 10" J BOLTS AT 24" O.C.
	SHEAR VALUES: (350 PLF24)(380 PLF16)(260 PLF Staple)(326 PLF HF)(354 PLF HF)		
3	7/16" OSB OR 1/2" CDX W/8D AT 3" O.C. EDGE/12" O.C. FIELD	2x SOLE PLATE TO JOIST, DECK, BLOCKING W/16D AT 4" O.C. (TOP)/8D AT 3" O.C. (EDGE)	5/8" x 10" J BOLTS AT 30" O.C. 1/2" x 10" J BOLTS AT 20" O.C.
	SHEAR VALUES: (450 PLF24)(490 PLF16)(345 PLF Staple)(418 PLF HF)(456 PLF HF)		
2	7/16" OSB OR 1/2" CDX W/8D AT 2" O.C. EDGE/12" O.C. FIELD	4x SOLE PLATE TO JOIST, DECK, BLOCKING W/16D AT 4" O.C. (TOP)/8D AT 2" O.C. (EDGE) USE 2"x2" COMMERCIAL WASHERS	5/8" x 12" J BOLTS AT 24" O.C. 1/2" x 12" J BOLTS AT 16" O.C.
	SHEAR VALUES: (585 PLF24)(640 PLF16)(440 PLF Staple)(544 PLF HF)(595 PLF HF)		
*	1/2" GYP W/5D x 1-5/8" COOLER OR #6/1.25" SCREW AT 7" O.C. EDGE/12" O.C. FIELD	2x SOLE PLATE TO JOIST, DECK, BLOCKING W/16D AT 6" O.C. (TOP)/CEILING BLOCKING	1/2" x 10" J BOLTS AT 72" O.C.
	SHEAR VALUES: (100 PLF)		
C	RAKE AND PONY WALLS ABOVE STEM WALL TO USE WALL LINE BRACING REQUIREMENT. SOLID CONCRETE WALL LATERAL RESISTANCE EQUAL OR GREATER TO DESIGNATED WALL LINE REQUIREMENT. ENGINEER TO USE UPGRADED LATERAL RESISTANCE VALUES AT THEIR OWN DISCRETION.		

MAIN LEVEL LATERAL DIAGRAM

1/4" = 1'-0"

SHEAR ANALYSIS
1. MIN. ROOF DIAPHRAGM 5/8" OSB OR 5/8" CDX PLYWOOD W/ 8D GALV AT 6" O.C. EDGE AND 6" O.C. FIELD
2. MINIMUM FLOOR DIAPHRAGM: 3/4" T&G OSB OR PLYWOOD GLUED AND NAILED W/10D RING SHANK AT 6" O.C. EDGE AND 12" O.C. FIELD, 4" CONCRETE.
3. UNLESS SPECIFICALLY NOTED, ALL EXTERIOR WALLS SHALL BE SHEETED ONE SIDE WITH 7/16" OSB OR 1/2" STRUCT. PLYWOOD W/ MIN. NAIL SCHEDULE OF 8D GALV NAILS AT 6" O.C. EDGE AND 12" O.C. FIELD.
4. SIMPSON H1 OR H2.5A HOLD DOWNS AT ALL RAFTER/TRUSS-PLATE CONNECTIONS.
5. ANCHORS, HOLD DOWNS, STRAPS AS SHOWN.
6. BLOCKING REQUIRED ON ALL EXTERIOR SHEETING HORIZONTAL JOINTS.
7. ALL CREDITED INTERIOR SHEAR WALLS REQUIRE BLOCKING AT FLOOR PLATE AND CEILING.
8. ALL SIMPSON HARDWARE INSTALLED PER GUIDELINES.
9. J BOLTS CAN BE REPLACED WITH WEDGE ANCHORS OR TITENHD SCREWS OF THE SAME DIAMETER. MINIMUM LENGTH OF ANCHOR/SCREW TO BE 8" LONG.

HOLD DOWN SCHEDULE

MARK	HOLD DOWN	ANCHOR	SCREW OPTION	EPOXY ANCHOR OPTION	COUNT
SHB1	HDUE5-SDS3	SABR5/8x24	5/8" TITENHD W/ 4" EMBEDDMENT	5/8" ATR W/ 6" EMBEDDMENT	4

REGISTERED PROFESSIONAL ENGINEER
87488PE
OREGON
JANUARY 08, 2019
GARRETT J BANTON
EXPIRES: 12/31/2027

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BANTON ENGINEERING, INC.

CASCADECOTTAGE ADU
CITY OF BEND LIMITS

MAIN LEVEL LATERAL DIAGRAM

FILE:
SCALE: 1/4" = 1'-0"
DATE: 1/23/26

S4

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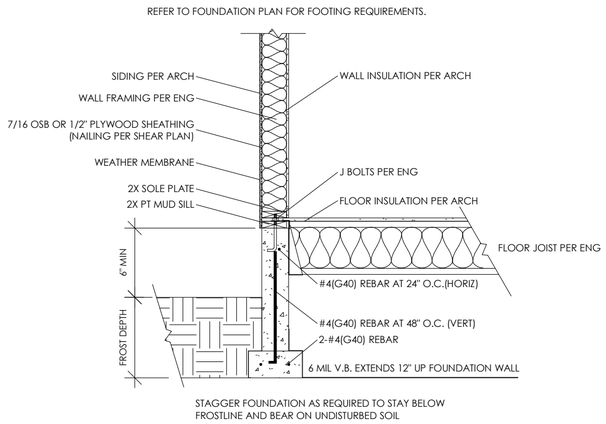
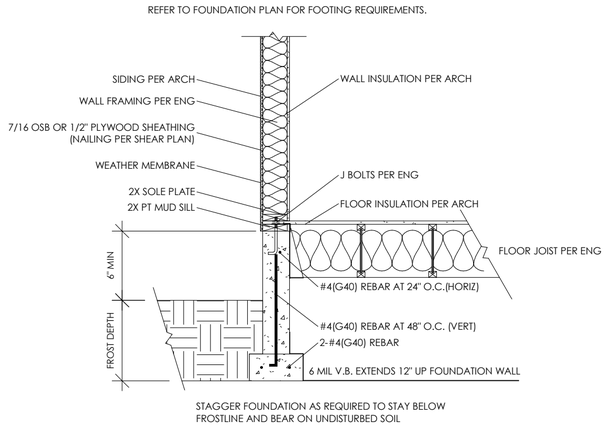
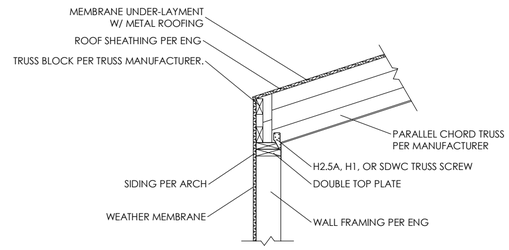


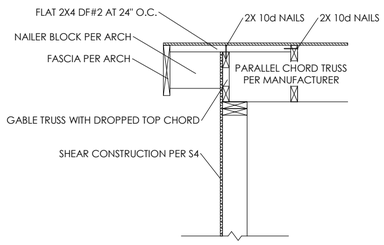
A **EXTERIOR FOUNDATION DETAIL**
1/2" = 1'-0"



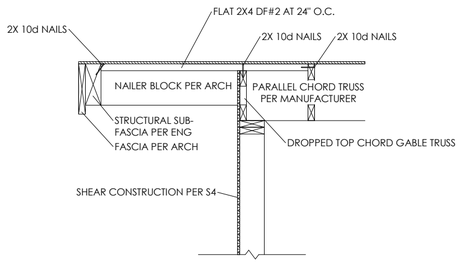
B **EXTERIOR FOUNDATION DETAIL (PERPENDICULAR)**
1/2" = 1'-0"



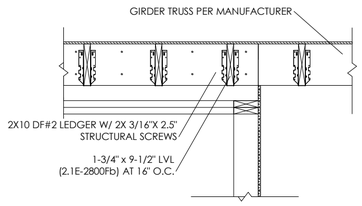
C **PARALLEL CHORD EVE SIDE CONNECTION**
1/2" = 1'-0"



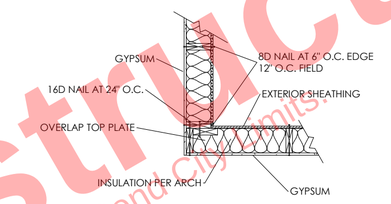
D **PARALLEL CHORD GABLE (TYP)**
1/2" = 1'-0"



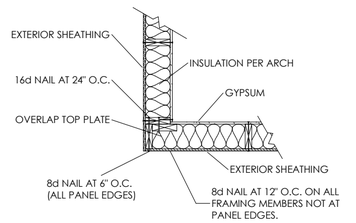
E **PARALLEL CHORD GABLE (STRUCTURAL FASCIA)**
1/2" = 1'-0"



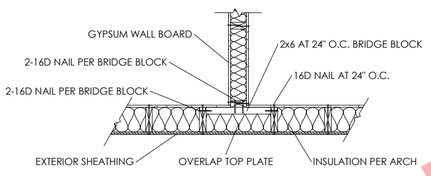
F **PATIO ROOF LEDGER**
1/2" = 1'-0"



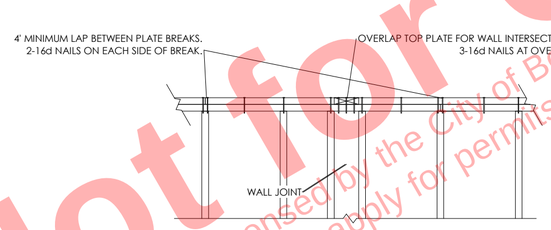
G **EXTERIOR WALL FRAME (INSIDE CORNER)**
1/2" = 1'-0"



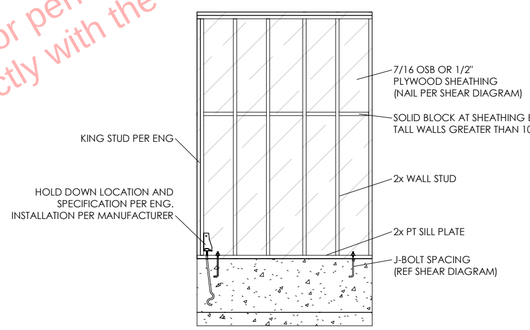
H **EXTERIOR WALL FRAME (OUTSIDE CORNER)**
1/2" = 1'-0"



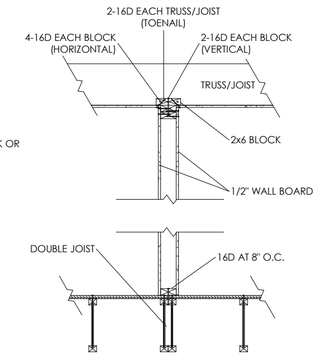
I **EXTERIOR WALL FRAME (WALL JOINT)**
1/2" = 1'-0"



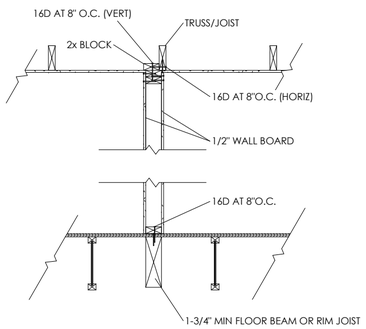
J **TOP PLATE FRAMING**
1/2" = 1'-0"



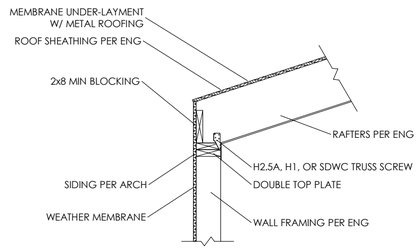
K **SHEAR WALL**
1/4" = 1'-0"



L **INTERIOR SHEAR WALL (TYP) (PARA JOIST OPT)**
1/2" = 1'-0"



M **INTERIOR SHEAR WALL (FLOOR BEAM)**
1/2" = 1'-0"



N **RAFTER EVE SIDE CONNECTION**
1/2" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
87488PE
OREGON
JANUARY 08, 2019
GARRETT J BANTON
EXPIRES: 12/31/2027

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BANTON ENGINEERING, INC.

CASCADECOTTAGE ADU
CITY OF BEND LIMITS

DETAILS

FILE:
SCALE: As indicated
DATE: 1/23/26

S5

Building Safety Division
City of Bend
(541) 388-5580 ext. 3
building@bendoregon.gov
710 NW Wall Street, Bend OR 97703

This submittal form is to be completed as part of your application with the City of Bend. *Download this form before completing fillable fields,* then upload with your application through the Online Permit Center at www.bendoregon.gov/permitcenter.

2023 RESIDENTIAL CODE ENERGY, LIGHTING EFFICIENCY, MOISTURE CONTENT, AND WHOLE-HOUSE VENTILATION CHECKLIST

Instructions: Select the type of construction. If the project is an addition, select the applicable addition type and enter the selected measures accordingly.

☑ **New Construction.** All conditioned spaces within residential buildings shall comply with Table N1101.1(1) and one additional measure from Table N1101.1(2). New buildings using N1105.3 Exception #3, shall select two additional measures from Table N1101.1(2).

☐ **Additions.** Additions to existing buildings or structures may be made without making the entire building or structure comply if the new additions comply with the requirements of this chapter [see ORSC Section N1101.3].

- ☐ **Large Additions.** Additions that are equal to or more than 600 square feet in area are required to select one measure from Table N1101.1(2).
  Enter the selected Table N1101.1(2) additional measure: _____
- ☐ **Small Additions.** Additions that are less than 600 square feet in area are required to select one measure from Table N1101.1(2) or Table N1101.3
  - ☐ Selected Table N1101.1(2) additional measure _____
  - ☐ Selected Table N1101.3 additional measure _____
- ☐ **Exception:** Additions that are less than 225 square feet in area are not required to comply with Table N1101.1(2) or Table N1101.3.

Note: Depending on the additional measure you have selected, there may be sub-options that you will have to specify. Check the appropriate box, if provided.

Table N1101.1(2), Section N1101.3, Table 1104.8, Section N1104.8, and Section N1105.3 are included on the following pages **(Please check all applicable boxes)**

TABLE N1101.1(2) – ADDITIONAL MEASURES		
1	☐	**High efficiency HVAC system[a]** ☐ Gas-fired furnace or boiler AFUE 94 percent, or ☐ Air-source heat pump HSPF 10.0/14.0 SEER cooling, 8.5 HSPF2/ 15.0 SEER2, or ☐ Ground-source heat pump COP 3.5 or Energy Star rated
2	☐	**High-Efficiency Water Heating System** ☐ Natural gas/propane water heater with minimum 0.90 EUF, or ☐ Electric heat pump water heater with minimum 3.45 UEF, or ☐ Natural gas/propane tankless/instantaneous heater with minimum 0.80 UEF and Drain Water Heat Recovery Unit installed on minimum of one shower/tub-shower
3	☐	**Wall Insulation Upgrade** Exterior walls – U-0.045/R-21 conventional framing with R-5.0 continuous insulation
4	☐	**Advanced Envelope** • Windows – U-0.21 (Area weighted average), and • Flat ceiling[b] – U-0.017/R-60, and • Framed floors – ☐ U-0.026/R-38 or ☐ slab edge insulation to F-0.48 or less (R-10 for 48”; R-15 for 36” or R-5 fully insulated slab)
5	☑	**Ductless Heat Pump** For dwelling units with all-electric heat, provide: • Ductless heat pump of minimum HSPF 10 or HSPF2 9.0 in primary zone replaces zonal electric heat sources, and • Programmable thermostat for all heaters in bedrooms
6	☐	**High efficiency thermal envelope UA[c]** Purposed UA is 8 percent lower than the code UA
7	☐	**2.75 ACH Air Leakage Control and Efficient Ventilation** Achieve a maximum of 2.75 ACH50 whole-house air leakage when third-party tested and provide a whole-house ventilation system including heat recovery with a minimum sensible heat recovery efficiency of not less than 66 percent and total fan efficacy of 1.6 CFM/Watt (combined input for supply and exhaust).

For SI: 1 square foot=0.093m^2, 1 watt per square foot=10.8 W/m^2.

Notes *(superscripts)*

a. Appliances located within the building thermal envelope shall have sealed combustion air installed. Combustion air shall be ducted directly from the outdoors.
b. The maximum vaulted ceiling surface area shall not be greater than 50 percent of the total heated space floor area unless vaulted area has a U-factor no greater than U-0.026.
c. In accordance with Table N1104.1(1), the Proposed UA total of the Proposed Alterative Design shall be a minimum of 8 percent less than the Code UA total of the Standard Base Case.

TABLE N1101.3 SMALL ADDITION ADDITIONAL MEASURES (Select One)		
1	☐	Increase the ceiling insulation of the existing portion of the home as specified in Table N1101.2
2	☐	Replace all existing single-pane wood or aluminum windows to the *U*-factor as specified in N1101.2
3	☐	Insulate the existing floor, crawl space, or basement wall systems as specified in Table N1101.2 and install 100 percent of permanently installed lighting fixtures as CFL, LED or linear fluorescent, or a minimum efficacy of 40 lumens per watt as specified in section N1107.2
4	☐	Test the entire dwelling with a blower door and exhibit no more than 4.5 air changes per hour at 50 Pascals
5	☐	Seal and performance test the duct system
6	☐	Replace existing 80-percent AFUE or less gas furnace with a 94-percent AFUE or greater system
7	☐	Replace existing electric radiant space heaters with a ductless mini split system with a minimum HSPF of 10.0 or HSPF2 of 9.0
8	☐	Replace existing electric forced air furnace with an air source heat pump with a minimum HSPF of 9.5 or HSPF2 of 8.1
9	☐	Replace existing water heater with one of the following: A) Natural gas/propane water heater with minimum UEF 0.90, or B) Electrical heat pump water heater with minimum 3.45 UEF

N1104.8 Air Leakage. The building thermal envelope shall be constructed to limit air leakage in accordance with this section.

TABLE N1104.8 AIR BARRIER INSTALLATION AND AIR SEALING REQUIREMENTS	
General Requirements	A continuous air barrier shall be installed in alignment with the building thermal envelope.
	Breaks or joints in the air barrier shall be sealed.
Ceiling/Attic	The air barrier in any dropped ceiling or soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed.
	Access openings, drop-down stairs, or knee wall doors to unconditioned attic spaces shall be gasketed and sealed.
Walls	The junction of the foundation and sill plate shall be sealed.
	The junction of the top plate and the top of walls shall be sealed between wall cavities and windows or door frames
	All penetrations or utility services through the top and bottom plates shall be sealed.
	Knee walls shall be sealed.
Windows, skylights and doors	The space between framing and skylights, and the jambs of windows and doors shall be sealed.
Rim/band joists	Rim/band joists shall be a part of the thermal envelope and have a continuous air barrier.
Floors Including cantilevered floors and floors above garages	The air barrier shall be installed at any exposed edge of insulation
Crawl space walls	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.

Shafts, penetrations	Duct shafts, utility penetrations and flue shafts opening to exterior or unconditioned space shall be sealed.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be sealed to the finished surface.
Shower/tub on exterior walls	The air barrier installed at exterior walls adjacent to showers and tubs shall separate the wall from the shower or tub.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical and communication boxes. Alternatively, air-sealed boxes shall be installed.
HVAC register boots	HVAC supply and return register boots that penetrate building thermal envelope shall be sealed to the subfloor, wall covering or ceiling penetrated by the boot.

INSTALLATION OF DUCTS

N1105.3 Installation of ducts and air handling equipment. For new construction and additions, all new duct systems and air handling equipment and appliances shall be located fully within the building thermal envelope. Exceptions:

1. Ventilation intake ductwork and exhaust ductwork.
2. Up to 10ft of HVAC system ductwork.
3. Where two measures are selected for compliance from Table N1011.1(2) and HVAC supply and return ductwork is installed in accordance with either Section N1105.3.1, N1105.3.2 or N1105.3.3.

N1105.3.1 Deeply buried duct in attic. Ducts deeply buried in attic insulation shall be in accordance with all of the following when using Section N1105.3, Exception 3:

1. Insulation shall be installed to fill gaps and voids between the duct and the ceiling, and a minimum of R19 insulation shall be installed above the duct between the duct and unconditioned attic.
2. All ductwork in the attic shall be insulated to R-8.
3. Insulation depth marker flags shall be installed on the ducts every 10 feet (3048 mm) or as approved by the building official.

Exception: HVAC ductwork shall be permitted to be located outside of the building thermal envelope where the duct is insulated to a minimum of R-27 with a Class II or III vapor retarder.

N1105.3.2 Ducts in unvented crawlspace. Ducts located in unvented crawlspace shall be in accordance with all of the following when using Section N1105.3, Exception 3:

1. In addition to meeting Section R408.3, all seams of the vapor barrier shall overlap a minimum of 12 inches (305 mm) and be sealed with tape or other approved method.
2. All ductwork in the crawlspace shall be insulated to R-8.
3. The floor between the crawlspace and the dwelling shall be insulated with minimum R-30.

N1105.3.3 Deeply buried duct in vented crawlspace. Ducts deeply buried in crawlspace insulation shall be in accordance all of the following when using Section N1105.3, Exception 3:

1. Insulation shall be installed to fill gaps and voids between the duct and the floor above, and a minimum of R-19 insulation shall be installed below the duct and between the duct and unconditioned crawlspace.
2. All ductwork in the crawlspace shall be insulated to R-8.

Exception: HVAC ductwork shall be permitted to be located outside of the building thermal envelope where the duct is insulated to a minimum of R-27 with a Class II or III vapor retarder.

To comply with this requirement (*Please select all applicable boxes).* If using either 3 or 5, select 2 additional measures from Table N101.1(2) on page 1 per N1105.3.

- ☐ **1.** Ducts will be installed in the conditioned space
- ☑ **2.** No heating or cooling ducts are being installed
- ☐ **3.** Ducts in unconditioned attic will have R-19 above and comply with requirements for deeply buried ducts per N1105.3.1
- ☐ **4.** Under-floor space will be conditioned per N1105.3.2 and meet requirements of R408.3 by (choose 1):
  - ☐ Continuously Operated Mechanical Exhaust (Required C.F.M. _____) or
  - ☐ Conditioned Air Supply (Required C.F.M. _____)
- ☐ **5.** Under-floor space will not be conditioned and ducts will have R-19 insulation installed below duct per N1105.3.3
- ☐ **6.** Other method will be used for heating and cooling ducts not in conditioned space. Please specify:

MECHANICAL WHOLE-HOUSE VENTILATION SYSTEM (WHV)(2 steps)

1. M1505.4.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with: (*Choose one*)

☐Equation 15-1. Ventilation rate in cubic feet per minute = (0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)] (Equation 15-1)(0.01x _____)+ [7.5 x (_____)] = _____CFM

OR

☑Table M1505.4.3(1)

Table M 1505.4.3(1)

CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (sq ft)	NUMBER OF BEDROOMS				
	0 to 1	2 to 3	4 to 5	6 to 7	>7
	AIRFLOW in CFM				
<1,500	30	45	60	75	90
1,501-3,000	45	60	75	90	105
3,001-4,500	60	75	90	105	120
4,501-6,000	75	90	105	120	135
6,001-7,500	90	105	120	135	150
>7,500	105	120	135	150	165

For SI: square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719m^3/s

Enter C.F.M. rate here: 30+ CFM

2. Section 1505.4. Enter base C.F.M. rate from equation in M1505.4.3 -OR- Table M1505.4.3(1) here: 30 CFM
Enter intermittent run-time factor from Table M1505.4.3(2) (See next page) here: 1 and multiply it by the base C.F.M. rate to determine calculated C.F.M. rate. Enter calculated C.F.M. here: 30 CFM

TABLE M1505.4.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS [a, b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor [a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

☐ Using M1505.4.3 exception 1 for 30% reduction to required ventilation rate.
(Required ventilation rate from above) x (0.70) = (Total reduced ventilation required)
(_____CFM) x (0.70) = (_____ CFM).

To use M1505.4.3 exception 1, both of the following must be met:
a. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms: Living room, dining room, or kitchen
b. The whole-house ventilation system is a balanced ventilation system.

HIGH EFFICIENCY LIGHTING

Section N1107.2. All permanently installed lighting fixtures shall be high efficiency light sources.
Exception: Two permanently installed lighting fixtures are not required to be high-efficiency light sources when controlled by a dimmer or automatic control.

To conform to the 2023 Oregon Residential Specialty Code (ORSC), Section N1107, I am notifying the Building Official that I am aware of the high-efficiency lighting requirement of ORSC Section N1107.2 and have taken steps to meet this code requirement.

Printed Name	Signature	Date

MOISTURE CONTENT

Section R318.2 Moisture Content. Prior to the installation of interior finishes, the building official shall be notified in writing by the general contractor that all moisture-sensitive wood framing members used in construction have a moisture content of not more than 19 percent of the weight of dry wood framing members.

To conform to the 2023 Oregon Residential Specialty Code (ORSC), Section R318.2, I am notifying the Building Official that I am aware of the moisture content requirement of ORSC Section R318.2 and have taken steps to meet this code requirement.

Printed Name	Signature	Date

Accommodation Information for People with Disabilities
To obtain this information in an alternate format such as Braille, large print, electronic formats, etc., please contact the Building Safety Division at building@bendoregon.gov or 541-388-5580 extension 2. Relay Users Dial 7-1-1.

MXZ-3D24NLHZ
23,600 BTU/H HYPER HEAT PUMP OUTDOOR UNIT

Job Name:

System Reference: Date:

GENERAL FEATURES

- Built-in base pan heater
- Compressor overcurrent detection
- Compressor thermal protection
- Fan motor overheating/voltage protection
- High pressure protection
- Hyper-Heating INVERTER®: Hyper-heating performance offers 100% heating capacity at 5°F and 75% heating capacity at -13°F
- INVERTER-driven compressor: An inverter-driven compressor generates the precise capacity needed to maintain a temperature set point.
- Quiet operation: Outdoor units are as quiet as a typical conversation, and most indoor units are whisper quiet.
- Seacoast protection: Seacoast protection on heat exchanger and base panel (rated for 2,000 hrs. in accordance with ASTM B117 testing)
- Thermal Differential 1°F

Specifications			System
Unit Type			MXZ-3D24NLHZ
Cooling at 95F[1] (Non-Ducted // Mixed // Ducted)	Maximum Capacity	Btu/h	23,600 // 23,600 // 23,600
	Rated Capacity	Btu/h	22,000 // 22,800 // 23,600
	Minimum Capacity	Btu/h	11,600 // 11,600 // 11,600
	Maximum Power Input	W	2,760 // 3,080 // 3,400
	Rated Power Input	W	1,693 // 2,027 // 2,360
	Power Factor (208V)	%	0.99 // 0.99 // 0.99
	Power Factor (230V)	%	0.99 // 0.99 // 0.99
Heating at 47F[2] (Non-Ducted // Mixed // Ducted)	Maximum Capacity	Btu/h	30,600 // 30,600 // 30,600
	Rated Capacity	Btu/h	25,000 // 24,800 // 24,600
	Minimum Capacity	Btu/h	12,800 // 12,800 // 12,800
	Maximum Power Input	W	2,890 // 3,715 // 4,540
	Rated Power Input	W	2,094 // 2,139 // 2,185
	Power Factor (208V)	%	0.99 // 0.99 // 0.99
	Power Factor (230V)	%	0.99 // 0.99 // 0.99
Heating at 17F[3] (Non-Ducted // Mixed // Ducted)	Maximum Capacity	Btu/h	25,000 // 24,800 // 24,600
	Rated Capacity	Btu/h	15,400 // 15,400 // 15,400
	Maximum Power Input	W	3,627 // 3,711 // 3,795
	Rated Power Input	W	1,590 // 1,776 // 2,015
Heating at 5F[4] (Non-Ducted // Mixed // Ducted)	Maximum Capacity	Btu/h	25,000 // 24,800 // 24,600
	Maximum Power Input	W	3,627 // 3,950 // 4,350
Heating at -13F[8] (Non-Ducted // Mixed // Ducted)	Maximum Capacity	Btu/h	20,400 // 20,200 // 20,000
	Maximum Power Input	W	2,955 // 3,317 // 3,678
Efficiency (Non-Ducted // Mixed // Ducted)	SEER2[1]		20 // 17.20 // 14.40
	EER2[1]		13 // 11.50 // 10
	HSPF2 (IV)[2]		10 // 9 // 8
	COP at 47°F[2]		3.50 // 3.40 // 3.30
	COP at 17°F at Maximum Capacity[3]		2.02 // 1.94 // 1.88
	COP at 5°F at Maximum Capacity[4]		2.02 // 1.84 // 1.66
	ENERGY STAR® Certified		Yes // Yes // No
Electrical	Electrical Power Requirements	V AC / V AC, ø, Hz	208 / 230, 1, 60
	Guaranteed Voltage Range	V AC	198 - 253
	Voltage: Indoor - Outdoor, S1-S2	V AC	208/230
	Voltage: Indoor - Outdoor, S2-S3	V DC	24
	Recommended Wire Size (Indoor - Outdoor)	AWG	14
	Short-circuit Current Rating (SCCR)	kA	5
	MCA	A	29
	MOCP	A	49

NOTES
[1]Cooling at 95°F (Indoor: 80°F DB, 67°F WB // Outdoor: 95°F DB, 75°F WB)
[2]Heating at 47°F (Indoor: 70°F DB, 60°F WB // Outdoor: 47°F DB, 43°F WB)
[3]Heating at 17°F (Indoor: 70°F DB, 60°F WB // Outdoor: 17°F DB, 15°F WB)
[4]Heating at 5°F (Indoor: 70°F DB, 60°F WB // Outdoor: 5°F DB, 4°F WB)
[8]Heating at -13°F (Indoor: 70°F DB, 60°F WB // Outdoor: -13°F DB, -14°F WB)
Capacity varies based on the number of indoor units operating and the model of the Multi-zone Outdoor Unit. For reference to connected capacity charts, please refer to Multi-zone Outdoor Unit Operational Performance.
For actual capacity performance based on indoor unit type and number of indoor units connected, please refer to MXZ Operational Performance.
Although the maximum connectable capacity is 130%, the outdoor unit cannot provide more than 100% of the rated capacity.
Please utilize this over capacity capability for load shedding or applications where it is known that all connected units will NOT be operating at the same time.
* Indoor/Outdoor Unit Operating Temperature Range (Cooling Air Temp [Maximum / Minimum]):
• Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.
** Outdoor Unit Operating Temperature Range (Cooling Thermal Lock-out / Re-start Temperatures; Heating Thermal Lock-out / Re-start Temperatures):
• System cuts out in heating mode and automatically restarts at these temperatures.

SPECIFICATIONS: MXZ-3D24NLHZ

Specifications			System
Unit Type			MXZ-3D24NLHZ
Outdoor Unit	Fan Motor Full Load Amperage	A	1.74
	Fan Motor Output	W	88
	Defrost Method		Reverse Cycle
	Blue Fin Heat Exchanger Coating		Yes
	Airflow Rate Cooling/Heating	CFM	2,239 / 2,378
	Sound Pressure Level, Cooling[1]	dB (A)	56
	Sound Pressure Level, Heating[2]	dB (A)	58
	Compressor Type		Twin Rotary
	Compressor Model		SRB280FDRMC
	Compressor Oil Type // Charge	Type // oz	RM68EH // 23.7
	External Finish Color		Munsell 3.0Y 7.8/1.1
	Base Pan Heater		Built-in
	Unit Dimensions (W x D x H)	inch x inch x inch [mm x mm x mm]	37-13/32 x 13 x 31-11/32 [950 x 330 x 796]
	Package Dimensions (W x D x H)	inch x inch x inch [mm x mm x mm]	41-11/32 x 17-5/16 x 38-31/32 [1,050 x 440 x 990]
	Unit Weight	lbs [kg]	152 [69]
	Package Weight	lbs [kg]	178 [81]
ODU Operating Temp. Range	Cooling Intake Air Temp (Maximum / Minimum[C])	°FDB	115 / 14
	Cooling Thermal Lock-out / Re-start Temperatures	°FDB	10 / 14
	Heating Intake Air Temp [Maximum / Minimum]	°FDB, °FWB / °FDB, °FWB	75, 65 / -12, -13
	Heating Thermal Lock-out / Re-start Temperatures**	°FDB	-22.5 / -14
Refrigerant	Type		R454B
	Pre-Charged Refrigerant Amount	lbs, oz	6, 3
	Maximum Pre-Charged Piping Length	ft	230
IDU Connection	Minimum Number of Connected IDU		2
	Maximum Number of Connected IDU		3
	Minimum Connected Capacity	Btu/h	12,000
	Maximum connected capacity	Btu/h	28,000
Piping	Liquid Pipe Size O.D. (Flared)	inch	A: 1/4 B: 1/4 C: 1/4
	Gas Pipe Size O.D. (Flared)	inch	A: 1/2 B: 3/8 C: 3/8
	Total Piping Length	ft [m]	230 [70]
	Farthest Piping Length	ft [m]	82 [25]
	Maximum Height Difference*[B], ODU above IDU	ft [m]	49 [15]
	Maximum Height Difference*[B], ODU below IDU	ft [m]	49 [15]
	Maximum Number of Bends for IDU		70

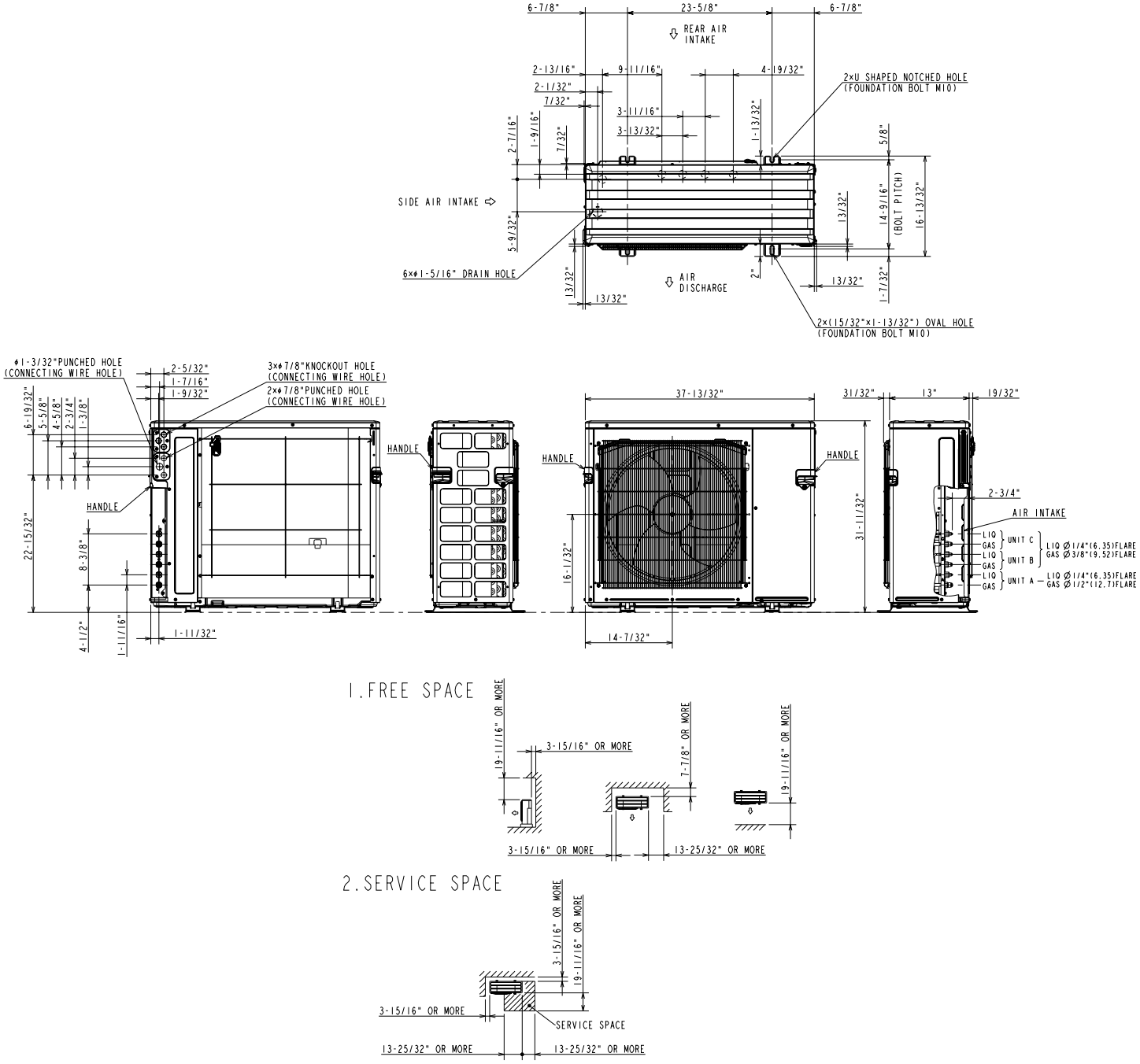
NOTES
[1]Cooling at 95°F (Indoor: 80°F DB, 67°F WB // Outdoor: 95°F DB, 75°F WB)
[2]Heating at 47°F (Indoor: 70°F DB, 60°F WB // Outdoor: 47°F DB, 43°F WB)
[3]Heating at 17°F (Indoor: 70°F DB, 60°F WB // Outdoor: 17°F DB, 15°F WB)
[4]Heating at 5°F (Indoor: 70°F DB, 60°F WB // Outdoor: 5°F DB, 4°F WB)
[8]Heating at -13°F (Indoor: 70°F DB, 60°F WB // Outdoor: -13°F DB, -14°F WB)
Capacity varies based on the number of indoor units operating and the model of the Multi-zone Outdoor Unit. For reference to connected capacity charts, please refer to Multi-zone Outdoor Unit Operational Performance.
For actual capacity performance based on indoor unit type and number of indoor units connected, please refer to MXZ Operational Performance.
Although the maximum connectable capacity is 130%, the outdoor unit cannot provide more than 100% of the rated capacity.
Please utilize this over capacity capability for load shedding or applications where it is known that all connected units will NOT be operating at the same time.
* Indoor/Outdoor Unit Operating Temperature Range (Cooling Air Temp [Maximum / Minimum]):
• Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.
** Outdoor Unit Operating Temperature Range (Cooling Thermal Lock-out / Re-start Temperatures; Heating Thermal Lock-out / Re-start Temperatures):
• System cuts out in heating mode and automatically restarts at these temperatures.

OUTDOOR UNIT ACCESSORIES: MXZ-3D24NLHZ

Mini-Split Wire	14 Gauge 4 wire Armored MiniSplit Cable250 ft roll	SW144-250
	14 Gauge 4 wire Armored MiniSplit Cable50 ft roll	SW144-50
	14 Gauge 4 wire MiniSplit Cable250 ft roll	S144-250
	14 Gauge 4 wire MiniSplit Cable50 ft roll	S144-50
	16 Gauge 4 wire Armored MiniSplit Cable250 ft roll	SW164-250
	16 Gauge 4 wire Armored MiniSplit Cable50 ft roll	SW164-50
	16 Gauge 4 wire MiniSplit Cable250 ft roll	S164-250
	16 Gauge 4 wire MiniSplit Cable50 ft roll	S164-50
Stand	18 Single Fan Stand	QSMS1801M
	24 Single Fan Stand	QSMS2401M
	Condenser Wall Bracket - Stainless Steel Finish	QSWBSS
	Condenser Wall Bracket	QSWB2000M-1
	Outdoor Unit 3-14 inch Mounting Base Pair - Plastic	DSD-400P
	Outdoor Unit Stand 12 High	QSMS1201M
Ball Valve	Refrigeration Ball Valve - 1/2	BV12FFSI2
	Refrigeration Ball Valve - 1/4	BV14FFSI2
	Refrigeration Ball Valve - 3/8	BV38FFSI2
	Refrigeration Ball Valve - 5/8	BV58FFSI2
Control Interface	M-NET Interface for MXZ	PAC-IF01MNT-E
Port Adaptor	Adaptor 1/2 x 3/8	PAC-SK88RJ-E
	Adaptor 1/2 x 5/8	PAC-SK89RJ-E
	Adaptor 1/4 x 3/8	PAC-493PI
	Adaptor 3/8 x 1/2	ADP3812
	Adaptor 3/8 x 5/8	PAC-SK90RJ-E
Snow/Rain Diverter	SnowRain Diverter	SRD-4
Control/Service Tool	Maintenance Tool Interface	PAC-USCMS-MN-1
Mounting Pad	Condensing Unit Mounting Pad 16 x 36 x 3	ULTRILITE1
Hail Guards	Hail Guard	HG-A9
Drain Socket	Drain Socket	PAC-SG60DS-E
Air Outlet Guide	Air Outlet Guide 1 Piece	PAC-SH96SG-E (two pieces are required)
NOTES		

OUTDOOR UNIT DIMENSIONS: MXZ-3D24NLHZ

MXZ-3D24NLHZ-U1
MXZ-3D30NLHZ-U1



1340 Satellite Boulevard Suwanee, GA 30024
Toll Free: 800-433-4822 https://mitsubishicomfort.com

METUS_2025-05_PROPIN

Building Safety Division
City of Bend
(541) 388-5580
building@bendoregon.gov
710 NW Wall Street, Bend OR 97703

This submittal form is to be completed as part of your application with the City of Bend. *Download this form before completing fillable fields,* then upload with your application through the Online Permit Center at www.bendoregon.gov/permitcenter.

RESIDENTIAL MINI-SPLIT WORKSHEET

Oregon Building Codes Division requires that an additional heat source is available when installing mini-split or other heating/cooling absorption unit (heat pump) in Central Oregon; a mini-split system cannot be the sole source of heat for an entire home.

Please indicate the additional heat source for an entire home.

- ☐ Electric Wall Heater (i.e. Cadet heater)
- ☐ Furnace
- ☐ Radiant heat provided throughout residence
- ☐ Electric baseboard provided throughout residence
- ☐ Hydronic heat provided throughout residence
- ☑ * Other: Mini-split as sole heat source

  * Mini-split as the sole heat source: A heat calculation showing the heat load at design conditions and the manufacturer's performance data must be provided for the unit showing heating output of 68°F in conditions of 5°F.
  * Application to be reviewed by Plans Examiner

Every dwelling unit shall be provided with heating facilities capable of maintaining a minimum room temperature of 68°F at a point 3 feet above the floor and 2 feet from exterior walls in all habitable rooms at the design temperature of 5°F.

The following uses are prohibited within all yard setbacks per Bend Development Code 2.1.300.F.7: satellite dishes greater than 18 inches in diameter, heat pumps and other similar objects, unless screened for visual and noise abatement by a solid enclosure 2 feet higher than the object/use being screened. In no instance shall these uses be allowed within the front yard setbacks.

°=degrees F=Fahrenheit

Effective Aug. 5, 2025
(Ref.: ORS 455.610)

2023 Oregon Residential Specialty Code Amendments

BCD Building Codes Division
Department of Consumer and Business Services

Summary: In accordance with Senate Bill 83 (2025) this amendment makes Section R327, *Wildfire Hazard Mitigation*, available for local adoption and applicable to new construction of new ORSC governed buildings.

This code amendment was adopted by temporary rule effective Aug. 5, 2025 through Jan. 2, 2026 and subsequently adopted by permanent rule effective Jan. 1, 2026.

The following amendments are adopted as part of the 2023 Oregon Residential Specialty Code (ORSC).

The changes are denoted as follows:

Blue/underline = Added code language
~~Red/strikethrough~~ = Deleted code language

SECTION R302—FIRE-RESISTANT CONSTRUCTION

R302.2.12 Townhouse roof coverings. In addition to the requirements of Chapter 9, structurally independent townhouses shall be provided with a minimum Class C roof covering, and structurally dependent townhouses shall be provided with a minimum Class B roof covering.

Exceptions:

1. Structurally dependent townhouses may use Class C roof coverings where all of the following conditions are met:
   1.1. The townhouses are not more than two stories in height.
   1.2. The townhouses do not have more than 6,000 square feet (557 m^2) of projected roof area.
   1.3. There is not less than 3 feet (914 mm) from the extremity of the roof to the exterior lot line or an assumed lot line on all sides except for street fronts.
2. Where adopted by the local *municipality*, roof coverings for townhouses located in areas determined by the *municipality* to be "Wildfire Hazard Zones" shall be in accordance with Section R327.

SECTION R327—WILDFIRE HAZARD MITIGATION

R327.1 General. Where adopted by the local *municipality*, the provisions of this section shall apply to new *dwellings* and their *accessory structures* required ~~by a local *municipality* via local ordinance~~ to be protected against *wildfire*.

~~Nothing in the code prevents a local *municipality* from modifying the requirements of this section for any lot, property or *dwelling*, or the remodel, replacement or reconstruction of a *dwelling* within the jurisdiction, as provided in Section R104.10.~~

R327.1.1 Local adoption. The provisions of this section may be adopted in whole by a *municipality* ~~via local ordinance~~ without following ORS 455.040 or OAR 918-020-0370. ~~Where a *municipality* chooses to adopt these provisions locally, the following shall be included in the adopting ordinance:~~

~~1. Identification of areas subject to the additional construction standards of Section R327.~~
~~2. A transition plan or other measures to address subdivisions already under development at the time of local adoption.~~
~~3. A local appeal process for customers to follow. Where a *municipality* has previously adopted the provisions of Section R327 locally, the requirements of Section R327.1.1 do not apply and the existing local ordinance may continue without change, to include those based on prior iterations of this section.~~

R327.1.2 Notification. Where a *municipality* adopts Section R327 locally, ~~or where a *municipality* has previously adopted Section R327 locally,~~ the *municipality* shall notify the State of Oregon, Building Codes Division, and ~~provide a copy of the locally adopted map identifying~~ identify areas of the jurisdiction where the additional construction standards of Section R327 are required.

R327.1.3 Application. Where ~~required~~ adopted by a local *municipality* ~~via local ordinance~~, newly constructed *dwellings*, and their *accessory structures*, ~~and new *additions* to existing *dwellings* and their *accessory structures*~~ located in areas designated by the *municipality* shall be protected against *wildfire* in accordance with this section. ~~Where existing exterior elements that are within the scope of this section are replaced in their entirety, the replacement shall be made in accordance with the provisions of this section.~~

Exceptions:

1. Nonhabitable detached *accessory structures* with a *floor area* of not greater than 400 square feet (37.2 m^2) located not less than 50 feet (15 240 mm) from all ~~other~~ structures on the *lot* that contain habitable space.
2. ~~Partial *repairs* made in accordance with Section R105.2.2.~~
2. Structures exempted by ORS 455.315.
3. Detached accessory *membrane-covered frame structures*

R327.2 Definitions. The following words and terms shall, for purposes of Section R327, have the meanings shown herein. See Chapter 2 for general definitions.

HEAVY TIMBER. For the use in this section, *heavy timber* shall be sawn lumber or glued-laminated wood with the smallest minimum nominal dimension of 4 inches (102 mm). *Heavy timber* walls or floors shall be sawn or glued-laminated planks splined, tongue-and-groove or set close together and well spiked.

IGNITION-RESISTANT MATERIAL. A type of building material that resists ignition or sustained flaming combustion sufficiently so as to reduce losses from wildland urban interface conflagrations under worst-case weather and fuel conditions with *wildfire exposure* of burning embers and small flames. Such materials include any product designed for exterior exposure that, when tested in accordance with ASTM E84 or UL 723 for surface burning characteristics of building materials, extended to a 30-minute duration, exhibits a flame spread index of not more than 25, shows no evidence of significant progressive combustion, and whose flame front does not progress more than $10^1/_2$ feet (3200 mm) beyond the centerline of the burner at any time during the test.

NONCOMBUSTIBLE MATERIAL. Any material that in the form in which it is used and under the conditions anticipated will not ignite, burn, support combustion or release flammable vapors when subjected to fire or heat in accordance with ASTM E136.

WILDFIRE. Any uncontrolled fire spreading through vegetative fuels that threatens to destroy life, property or resources.

WILDFIRE EXPOSURE. One or a combination of circumstances exposing a structure to ignition, including radiant heat, convective heat, direct flame contact and burning embers being projected by a vegetation fire to a structure and its immediate environment.

R327.3 Roofing. Roofing shall be asphalt shingles in accordance with Section R905.2, slate shingles in accordance with Section R905.6, metal roofing in accordance with Section R905.4, tile, clay or concrete shingles in accordance with Section R905.3 or other *approved* roofing that is deemed to be equivalent to a minimum Class B-rated roof assembly. Wood shingle and shake roofs are not permitted on structures ~~in areas designated by the *municipality* that fall within the scope of this section.~~

Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to prevent the intrusion of flames and embers, be fireblocked with *approved* materials, or have one layer of minimum 72-pound (32.6 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D3909 installed over the combustible decking.

Where valley flashing is installed, the flashing shall be not less than 0.019-inch (0.48 mm) No. 26 gage galvanized sheet corrosion-resistant metal installed over not less than one layer of minimum 72-pound (32.6 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D3909 not less than 36-inch-wide (914 mm) running the full length of the valley.

R327.3.1 Gutters and downspouts. Where provided, ~~required, roof~~ gutters and downspouts shall be constructed of *noncombustible materials* and be provided with an *approved* means to prevent accumulation of leaves and debris in the gutter.

R327.3.2 Ventilation. Where provided, the minimum net area of ventilation openings for enclosed attics, enclosed soffit spaces, enclosed rafter spaces and underfloor spaces shall be in accordance with Sections R408 and R806.

All ventilation openings shall be covered with noncombustible corrosion-resistant metal wire mesh, vents designed to resist the intrusion of burning embers and flame, or other *approved* materials or devices.

Ventilation mesh and screening shall be a minimum of $^1/_{16}$-inch (1.6 mm) and a maximum of $^1/_8$-inch (3.2 mm) in any dimension.

R327.3.2.1 Eaves, soffits and cornices. Ventilation openings shall not be installed on the underside of eaves, soffits or cornices.

Exceptions:

1. The *building official* may *approve* eave, soffit or cornice vents that are manufactured to resist the intrusion of flame and burning embers.
2. Ventilation openings complying with the requirements of Section R327.3.2 may be installed on the underside of eaves, soffits or cornices where the opening is located 12 feet (3658 mm) or greater above *grade* or the surface below.

R327.3.3 Exterior walls. The *exterior wall covering* or wall assembly shall comply with one of the following requirements:

1. *Noncombustible material*.
2. *Ignition-resistant* material.
3. *Heavy timber* assembly.
4. Log wall construction assembly.
5. Wall assemblies that have been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707, complying with the conditions of acceptance listed in Section R327.3.3.2.

Exception: Any of the following shall be deemed to meet the assembly performance criteria and intent of this section:

1. One layer of $^5/_8$-inch (15.9 mm) Type X exterior gypsum sheathing applied behind the *exterior wall covering* or cladding on the exterior side of the framing.
2. The exterior portion of a 1-hour fire-resistance-rated *exterior wall* assembly designed for exterior fire exposure, including assemblies using exterior gypsum panel and sheathing products listed in the Gypsum Association *Fire Resistance and Sound Control Design Manual*.

R327.3.3.1 Extent of exterior wall covering. *Exterior wall coverings* shall extend from the top of the foundation to the roof and terminate at 2-inch (50.8 mm) nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves or soffits, shall terminate at the underside of the enclosure.

R327.3.3.2 Conditions of acceptance. ASTM E2707 tests shall be conducted in triplicate and the following conditions of acceptance shall be met. If any one of the three replicates do not meet the conditions of acceptance, three additional tests shall be conducted. All additional tests shall meet the following conditions of acceptance:

1. Absence of flame penetration through the wall assembly at any time during the test.
2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 70-minute test.

R327.3.4 Overhanging projections. All exterior projections (exterior balconies, carports, decks, patio covers, porch ceilings, unenclosed roofs and floors, overhanging buildings and similar architectural appendages and projections) shall be protected as specified in this section.

R327.3.4.1 Enclosed roof eaves, soffits and cornices. The exposed underside of rafter or truss eaves and enclosed soffits, where any portion of the framing is less than 12 feet (3658 mm) above *grade* or similar surface below, shall be protected by one of the following:

1. *Noncombustible material*.
2. *Ignition-resistant* material.
3. One layer of $^5/_8$-inch (15.9 mm) Type X exterior gypsum sheathing applied behind an exterior covering on the underside of the rafter tails, truss tails or soffit.
4. The exterior portion of a 1-hour fire-resistance-rated *exterior wall* assembly applied to the underside of the rafter tails or soffit, including assemblies using exterior gypsum panel and sheathing products listed in the Gypsum Association *Fire Resistance and Sound Control Design Manual*.
5. Soffit assemblies with an underside surface that meets the performance criteria in Section R327.3.4.5 when tested in accordance ASTM E2957.

Exceptions: The following materials do not require protection required by this section:

1. Eaves and soffits where all portions of the framing members are 12 feet (3658 mm) or greater above *grade*, and 2-inch (610 mm) nominal eave fireblocking is provided between roof framing members from the wall top plate to the underside of the roof sheathing.
2. Gable end overhangs and roof assembly projections beyond an *exterior wall* other than at the lower end of the rafter tails.
3. Fascia and other architectural trim boards.

R327.3.4.2 Exterior patio and porch ceilings. The exposed underside of exterior patio and porch ceilings greater than 200 square feet (18.58 m^2) in area and less than 12 feet (3658 mm) above *grade* shall be protected by one of the following:

1. *Noncombustible material*.
2. *Ignition-resistant* material.
3. One layer of $^5/_8$-inch (15.9 mm) Type X exterior gypsum sheathing applied behind the exterior covering on the underside of the ceiling.
4. The exterior portion of a 1-hour fire-resistance-rated *exterior wall* assembly applied to the underside of the ceiling assembly, including assemblies using exterior gypsum panel and sheathing products listed in the Gypsum Association *Fire Resistance and Sound Control Design Manual*.
5. Porch ceiling assemblies with a horizontal underside that meet the performance criteria in Section R327.3.4.5 when tested in accordance with the test procedures set forth in ASTM E2957.

Exception: Architectural trim boards.

R327.3.4.3 Floor projections. The exposed underside of cantilevered floor projections less than 12 feet (3658 mm) above *grade* or the surface below shall be protected by one of the following:

1. *Noncombustible material*.
2. *Ignition-resistant* material.
3. One layer of $^5/_8$-inch (15.9 mm) Type X exterior gypsum sheathing applied behind an exterior covering on the underside of the floor projection.
4. The exterior portion of a 1-hour fire-resistance-rated *exterior wall* assembly applied to the underside of the floor projection, including assemblies using exterior gypsum panel and sheathing products listed in the Gypsum Association *Fire Resistance and Sound Control Design Manual*.
5. An assembly that meets the performance criteria in Section R327.3.4.5 when tested in accordance with ASTM E2957.

Exception: Architectural trim boards.

R327.3.4.4 Underfloor protection. The underfloor area of elevated structures shall be enclosed to *grade* in accordance with the requirements of this section, or the underside of the exposed underfloor shall be protected by one of the following:

1. *Noncombustible material*.
2. *Ignition-resistant* material.
3. One layer of $^5/_8$-inch (15.9 mm) Type X exterior gypsum sheathing applied behind an exterior covering on the underside of the floor assembly.
4. The exterior portion of a 1-hour fire-resistance-rated *exterior wall* assembly applied to the underside of the floor, including assemblies using exterior gypsum panel and sheathing products listed in the Gypsum Association *Fire Resistance and Sound Control Design Manual*.
5. An assembly that meets the performance criteria in Section R327.3.4.5 when tested in accordance with ASTM E2957.

Exception: *Heavy timber* structural columns and beams do not require protection.

R327.3.4.5 Conditions of acceptance. ASTM E2957 tests shall be conducted in triplicate, and the following conditions of acceptance shall be met. If any one of the three replicates do not meet the conditions of acceptance, three additional tests shall be conducted. All additional tests shall meet the following conditions of acceptance:

1. Absence of flame penetration of the eaves or horizontal projection assembly at any time during the test.
2. Absence of structural failure of the eaves or horizontal projection subassembly at any time during the test.
3. Absence of sustained combustion of any kind at the conclusion of the 40-minute test.

R327.3.5 Walking surfaces. Deck, porch and balcony walking surfaces located greater than 30 inches (762 mm) and less than 12 feet (3658 mm) above *grade* or the surface below shall be constructed with one of the following materials:

1. Materials that comply with the performance requirements of Section R327.3.5.1 when tested in accordance with both ASTM E2632 and ASTM E2726.
2. *Ignition-resistant* materials that comply with the performance requirements of Section R327.2 when tested in accordance with ASTM E84 or UL 723.
3. Exterior fire-retardant-treated wood.
4. *Noncombustible material*.
5. Any material that complies with the performance requirements of Section R327.3.5.2 when tested in accordance with ASTM E2632, where the *exterior wall covering* of the structure is noncombustible or *ignition-resistant* material.
6. Any material that complies with the performance requirements of ASTM E2632, where the *exterior wall covering* of the structure is noncombustible or *ignition-resistant* material.

   Exception: *Wall covering* material may be of any material that otherwise complies with this chapter where the decking surface material complies with the performance requirements ASTM E84 with a Class B flame spread rating.

Exception: Walking surfaces of decks, porches and balconies not greater than 200 square feet (18.58 m^2) in area, where the surface is constructed of nominal 2-inch (51 mm) lumber.

R327.3.5.1 Requirements for Section R327.3.5, Item 1. The material shall be tested in accordance with ASTM E2632 and ASTM E2726, and shall comply with the conditions of acceptance in Sections R327.3.5.1.1 and R327.3.5.1.2. The material shall also comply with the performance requirements of Section R327.2 for ignition-resistant material when tested in accordance with ASTM E84 or UL 723.

R327.3.5.1.1 Conditions of acceptance. ASTM E2632 tests shall be conducted in triplicate and the following conditions of acceptance shall be met. If any one of the three replicates do not meet the conditions of acceptance, three additional tests shall be conducted. All additional tests shall meet the following conditions of acceptance:

1. Peak heat release rate of less than or equal to 25 kW/ft^2 (269 kW/m^2).

2. Absence of sustained flaming or glowing combustion of any kind at the conclusion of the 40-minute observation period.
3. Absence of falling particles that are still burning when reaching the burner or floor.

R327.3.5.1.2 Conditions of acceptance. ASTM E2762 tests shall be conducted in triplicate and the following conditions of acceptance shall be met. If any one of the three replicates do not meet the conditions of acceptance, three additional tests shall be conducted. All of the additional tests shall meet the following conditions of acceptance:

1. Absence of sustained flaming or glowing combustion of any kind at the conclusion of the 40-minute observation period.
2. Absence of falling particles that are still burning when reaching the burner or floor.

R327.3.5.2 Requirements for Section R327.3.5, Item 6. The material shall be tested in accordance with ASTM E2632 and shall comply with the following conditions of acceptance. The test shall be conducted in triplicate and the peak heat release rate shall be less than or equal to 25 kW/ft^2 (269 kW/m^2). If any one of the three replicates do not meet the conditions of acceptance, three additional tests shall be conducted. All of the additional tests shall meet the conditions of acceptance.

R327.3.6 Glazing. Exterior windows, windows within exterior doors, and skylights shall be tempered glass, multilayered glazed panels, glass block or have a fire-resistance rating of not less than 20 minutes.

For questions about the 2023 ORSC, visit the division website to contact a building code specialist.

Lateral and Gravity Loads Analysis

(Engineering Design)

1/23/2026

Cascade Cottage ADU (Pre-Approved)
City Limits
Bend, OR

Project Specifications

Plan Evaluated	SJC "CASCADE COTTAGE"	
Design Summary	Occupancy Group R, Construction Type VB	
Structural Drawings	S1 FOUNDATION	(1/23/2026)
	S2 SUBFLOOR FRAMING	(1/23/2026)
	S3 MAIN LEVEL FRAMING	(1/23/2026)
	S4 LATERAL DIAGRAM	(1/23/2026)
	S5 DETAILS	(1/23/2026)

Orientation	See drawings for orientation.		
Design Parameters	Basic Wind Speed	99 MPH, Exp C	[IBC]
	Seismic Design	0.38g	[ASCE7-16 Zip Code]
	Soil Bearing	1500 PSF	[Table R401.4.1]
	Ground Snow Load	50 PSF	[SEAO-ASCE7-16]
	Roof Dead Load	20 PSF	
	Floor Live Load	40 PSF	
	Floor Dead Load	12 PSF	

NOTE: All Specifications are minimums. Upgraded size and quality is acceptable.
WARNING: It is the responsibility of the user of this document to ensure that all the technical information is properly transferred to the applicable construction documents and that it is properly implemented during the construction of the structure. Failure to incorporate all the requirements of this design may invalidate the integrity of the structure and release responsibility from the engineer of record.

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REGISTERED PROFESSIONAL ENGINEER
87488PE
OREGON
JANUARY 08, 2019
GARRETT J BANTON

EXPIRES: 12/31/2027

Wind and Seismic Force Calculation

Based on IBC and ASCE 7-16 Directional Procedure, Chapter 27.2

Wind Pressure Boundary Conditions		
Risk Category	II	
Ultimate Wind Speed	99 Mph	[IBC]
Wind directionality Factor (Kd)	0.85	[ASCE 7-16, Table 26.6-1]
Wind exposure Category	C	[ASCE 7-16, 26.7]
Topographic Factor (Kzt)	1 $\frac{H}{L} < 0.2$	[ASCE 7-16, Figure 26.8-1]
Gust Effect Factor (G)	0.85	[ASCE 7-16, 26.9]
Enclosure Classification	Enclosed	[ASCE 7-16, 26.11]
Internal Pressure Coefficient (Gcpi)	0.18	[ASCE 7-16, 26.11]
Velocity Pressure Exposure Coefficient (Kh)	0.85	[ASCE 7-16, Table 27.3-1]
Velocity Pressure (qh)	18.1 Psf	
External Pressure Coefficients (Cp) [Walls, Roof]	0.8, 0.4	[ASCE 7-16, Table 27.3-1]
Wind Pressure (p)	19.6 Psf	
Flat Walls Use	19.6 Psf	

Direction F/B Wind Pressure

Flat Wall Height	h = 12'	
Wall Horizontal	w = 40'	
Wall Wind Force	19.6 Psf x 12' x 40' = 9408 lb	[ASCE 7-16, 27.1.5]
Slope Roof Height	h = 0' (Pitch: 1.5:12)	
Roof Horizontal	w = 36'	
Roof Wind Force	19.6 Psf x 0' x 36' = 0 lb	
Average Wind Pressure	19.6 Psf (Weighted Average)	
Total Wind Pressure	9408 lb + 0 lb = 9408 lb	

Direction L/R Wind Pressure

Flat Wall Height	h = 15'	
Wall Horizontal	w = 35'	
Wall Wind Force	19.6 Psf x 15' x 35' = 10290 lb	[ASCE 7-16, 27.1.5]
Slope Roof Height	h = 0' (Pitch: 1.5:12)	
Roof Horizontal	w = 16'	
Roof Wind Force	19.6 Psf x 0' x 16' = 0 lb	
Average Wind Pressure	19.6 Psf (Weighted Average)	
Total Wind Pressure	10290 lb + 0 lb = 10290 lb	

Seismic Force Calculation

Design Short-Period Spectral Acceleration (S_{ds})	0.38g	[ASCE 7-16, Ch 11.4.5]
Seismic Response Coefficient (C_s)	0.0588	[ASCE 7-16, Cl 12.8.1.1]

Base Shear: V = Cs x W = 0.0588 x 52542 = 3090 lb

Governing Forces

9408 lb (F/B) - Wind Governs

10290 lb (L/R) - Wind Governs

Wind Force/ Seismic Wall Resistance Summary

1. Wind Force: IBC – ASCE7-16 (Ult wind speed 99 mph, Exposure C)
2. Seismic: IBC – ASCE7-16 (Seismic Design Sds = 0.38g)
3a. Diaphragms Roof: 29 ga Metal roof at 24" OC w/ #9 screws @ 6" O.C. ends and 12" O.C. field
3b. Diaphragms Main Floor 3/4" OSB or Plywood w/ 10d @ " O.C. edge and 12" O.C. Field. 4" concrete

Wall Line	Wind Force (Trib x H x P) [lbs]	Wall Length [ft]	Load [plf]	Shear Wall	Resistance [lbs]	Safety Factor
1WL1 / 1WL8	14' x 12' x 19.6 psf = 3292.8	20	164.6	6	4800	
1WL2 / 1WL7	14' x 12' x 19.6 psf = 3292.8	21	156.8	*2	4200	
1WL3 / 1WL6	14' x 12' x 19.6 psf = 3292.8	21	156.8	6	5040	
Total F/B 1:	9878.4				14040	142%
1WL10 / 1WL4	18' x 15' x 19.6 psf = 5292	14	378.0	3	6300	
1WL9 / 1WL5	18' x 15' x 19.6 psf = 5292	24	220.5	6	5760	
Total L/R 1:	10584				12060	114%
	NOTE 1: Hold downs and anchors required on 1W110/1WL4 in two locations (3'5" and 7'2")					

Roof Snow Load Calculation

Based on 2019 OSSC 1603.1.3, ASCE7-16, Chapter 7, SEAO

Ground Snow Load Adjustment	0.007 psf/ft (East of the Cascades)	[OSSC 1608, Table 7-2]
Exposure Factor (Ce)	1 (Exposure C Part Sheltered)	[ASCE7-16, Table 7-2]
Thermal Factor (Ct)	1 (Heated Structure)	[ASCE7-16, Table 7-3]
Importance Factor (I)	1 (Category II Structure)	[Section 7.3, Table 1.5.2]
Cold Roof Slope Factor (Cs)	1 (Fig 7-2a w/ 1.5:12 pitch)	[ASCE7-16 Section 7.4]

Structure Elevation	4000' ASL	
Ground Snow Load (pg)	50 psf (model at 4000' ASL)	[ASCE7-16, SEAO]
Adjusted Ground Snow Load (pga)	50 psf + 0.007(4000'-4000') = 50 psf	[OSSC 1608, Table 7-2]
Flat Roof Snow Load (pf)	0.7 x 1 x 1 x 1 x 50 = 35 psf	[ASCE7-16 Section 7.3]
Sloped Roof Snow Load (ps)	1 x 35 psf = 35 psf	[ASCE7-16 Section 7.4]
Snow Load Used	**35 psf**	
Unheated Roof Option	**45 psf**	

Foundation Wall Footings

Note: The following footing and stem wall sizes are minimums and were used in the gravity loadings analysis. All rebar to be specified on drawing schedules.

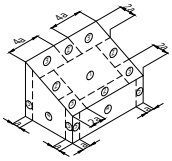
WF1 - 1 Story Exterior Wall Footings (Max)
12"W X 6"D FTG W/ 6"W x 24"D STEM WALL

Stem Wall (6")	150 plf	(0SL/0LL/150DL)
Roof (20X)	1100 plf	(700SL/0LL/400DL)
Floor (2X)	104 plf	(0SL/80LL/24DL)
Wall (12')	120 plf	(0SL/0LL/120DL)
Uncovered Deck (1X)	90 plf	(35SL/40LL/15DL)
Total:	1564 plf	(735SL/120LL/709DL)

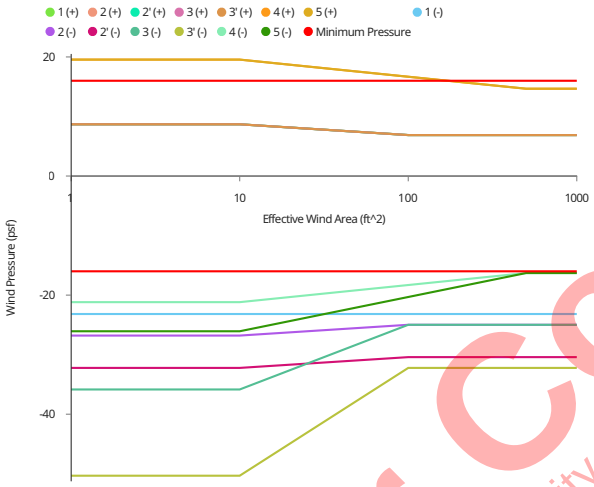
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **WIND** (LATERAL ANALYSIS)
References: ASCE 7-16		

Summary

Zones



Note: Some wind pressures are below 16 psf which is the code-required minimum. The horizontal red lines on the diagram below indicate the minimum positive/ negative wind pressures.



Corner Zone Width $a = 3\ \text{ft}, 6\ \text{in}$

Wind Pressures $p =$

Zone	Positive Wind Pressure p^+ (psf)	Negative Wind Pressure p^- (psf)
1	16	−23.2
2	16	−26.8
2'	16	−32.2
3	16	−35.8
3'	16	−50.3
4	19.6	−21.2
5	19.6	−26.1

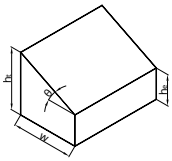
Project Defaults

Building Code	$code =$	International Residential Code (IRC) 2021
Basic Wind Speed	$V =$	$99\ \text{mi/hr}$
Exposure Category		C: Open terrain with scattered obstructions

Key Properties

Basic Wind Speed	$V =$	$99\ \text{mi/hr}$
Exposure Category		C
Effective Roof Member Wind Area	$A_{\text{roof}} =$	$1\ \text{ft}^2$
Effective Wall Member Wind Area	$A_{\text{wall}} =$	$1\ \text{ft}^2$

Building Properties



Roof Pitch	$\alpha =$	$1.5 : 12$
Roof Eave Height	$h_e =$	$10\ \text{ft}, 7.5\ \text{in}$
Roof Mean Height	$h =$	$10\ \text{ft}, 7.5\ \text{in}$
Width (Perpendicular to Ridge)	$w =$	$35\ \text{ft}$
Length (Parallel to Ridge)	$\ell =$	$40\ \text{ft}$
Enclosure Type		Enclosed

Terrain Properties (ASCE 7-16, Cl 26.7-9)

Warning: No address is specified in Project Details. No elevation will be determined and the elevation factor Ke will conservatively be taken as 1.0. This can be changed by setting an address in Project Details or manually entering a ground elevation.

Wind Load Parameters (ASCE 7-16, Cl 26.6-10)

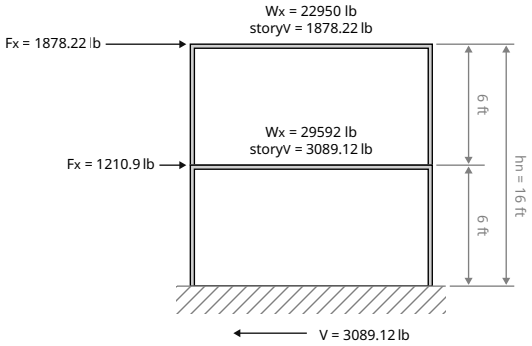
Wind Directionality Factor	$K_d =$	0.85
Topographic Factor	$K_{zt} =$	1
Ground Elevation Factor	$K_e =$	1
Velocity Pressure Exposure Coefficient	$K_h =$	0.849
Velocity Pressure	$q_h =$	$18.1\ \text{psf}$

Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **SEISMIC** (LATERAL ANALYSIS) PASS
References: ASCE 7-16		

Summary

Design Short-Period Spectral Acceleration	$S_{DS} = 0.382$
Design Long-Period Spectral Acceleration	$S_{D1} = 0.44$
Seismic Design Category	$SDC =$ D
Seismic Base Shear	$V = 3089\ \text{lb}$



Project Defaults Override

Override Project Defaults?	Yes
Building Risk Category	II - Regular Building
Site Class	D - Default
Short-Period Spectral Acceleration	$S_{s,input} = 0.384$
Long-Period Spectral Acceleration	$S_{1,input} = 0.2$
Long-Period Transition Period	$T_{L,input} = 16\ \text{s}$

Site Parameters (ASCE 7-16)

Building Risk Category	$RC =$ II
Site Class	$SC =$ D-default
Short-Period Spectral Acceleration	$S_s = 0.384$
Long-Period Spectral Acceleration	$S_1 = 0.2$
Long-Period Transition Period	$T_L = 16\ \text{s}$

Key Building Properties (ASCE 7-16)

Seismic Force-Resisting System	15. Light-frame (wood) walls sheathed with wood structural panels rated for shear resistance

SFRS Properties (ASCE 7-16, Cl 12)

Building System Height Limit (ft)	Height Limit -65

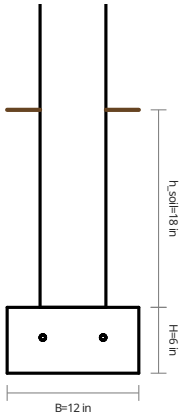
Equivalent Lateral Force (ELF) Procedure (ASCE 7-16, Cl 12.8)

Approximate Fundamental Period	$T_a = 0.129\ \text{s}$
Building Fundamental Period	$T = 0.129\ \text{s}$
Total Structural SFRS Height	$h_n = 12\ \text{ft}, 0\ \text{in}$
Total Effective Seismic Weight	$W_{total} = 52\,542\ \text{lb}$
Seismic Importance Factor	$I_e = 1$
Seismic Response Coefficient	$C_s = 0.0588$
Number of Stories	$n_{story} = 2$

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **WF1** (WALL FOOTINGS) PASS
References: ACI 318-19		

Summary

	Service Soil Bearing Stress	$q_s =$	$1443\ \text{psf}$
96%	Allowable Gross Soil Bearing Stress	$q_a =$	$1500\ \text{psf}$
15%	Factored Moment Capacity	$\phi M_n =$	$400\ \text{lb} \cdot \text{ft/ft}$
0%	Factored One-Way Shear Capacity	$\phi V_n =$	$1920\ \text{plf}$
	Uplift Safety Factor	$FS_u =$	Uplift has not been found
	Stability	$\text{Status} =$	Footing in Total Compression



Footing Properties

Footing Width	$B =$	$1\ \text{ft}$
Footing Thickness	$H =$	$6\ \text{in}$
Wall Type		Concrete
Wall Width	$b =$	$6\ \text{in}$
Concrete Strength	$f'_c =$	$2500\ \text{psi}$
Volume of Concrete	$V_c =$	$0.0185\ \text{yd}^3/\text{ft}$

Soil Properties

Allowable Soil Gross Bearing Capacity	$q_a =$	$1500\ \text{psf}$
Lateral Sliding Coefficient of Friction	$\mu =$	0.3

Bottom Reinforcement

Concrete Cover	$\text{cover} =$	$3\ \text{in}$
Reinforcement Yield Strength	$f_y =$	$40\,000\ \text{psi}$

Design Criteria

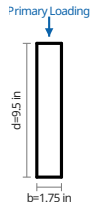
Design Code for Load Combinations		International Residential Code (IRC) 2021
Sliding and Overturning Minimum Factor of Safety	$FS_{\text{min}} =$	1.5

Comments

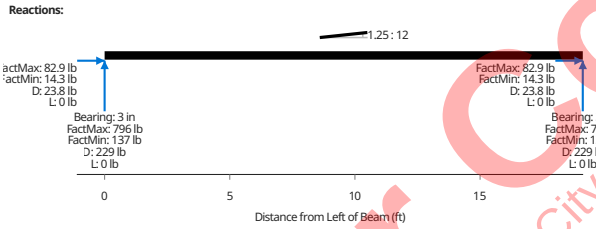
BANTON ENGINEERING, INC.

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **PATIO RAFTERS** (RAFTERS AND JOISTS) PASS
References: NDS 2018 (ASD)		

Summary



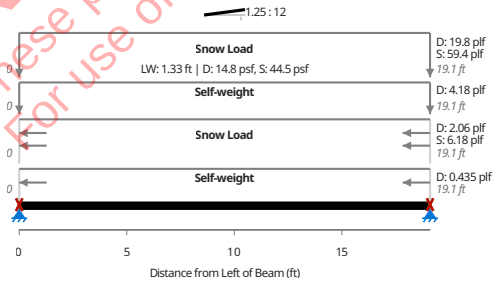
	Member		1-3/4x9-1/2 Versa-Lam LVL 2.1E-2800Fb
50%	Moment Utilization	$M/M' =$	3800 lb*ft* / *7539 lbft*
22%	Shear Utilization	$V/V' =$	796 lb / 3633 lb
20%	Bearing Utilization	$R/R' =$	796 lb / 3937 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$	0.606 in
74%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-0.711 in (L/322)



Key Properties

Beam Plan Length	$L_x =$	19 ft
Enter Support and Load Locations Based on Plan or Inclined length?		Plan
Continuous Bracing for Lateral Torsional Buckling		Top Braced

Loads



Center-to-Center Spacing (= tributary width)	$s =$	16 in

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	16.6 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	125 in^4
Section Modulus	$S =$	26.3 in^3
Base Allowable Bending Stress	$F_b =$	2800 psi
Base Allowable Shear Stress	$F_v =$	285 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	750 psi
True Modulus of Elasticity	$E_{true} =$	2.10×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	2.00×10^6 psi
Modulus of Elasticity for Deflections	$E =$	2.00×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	2.00×10^6 psi

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V =$	1.03

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	1
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	3437 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.376
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1012 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	328 psi

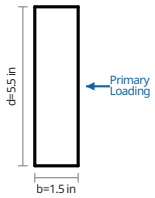
Bearing (NDS 2018 3.10)

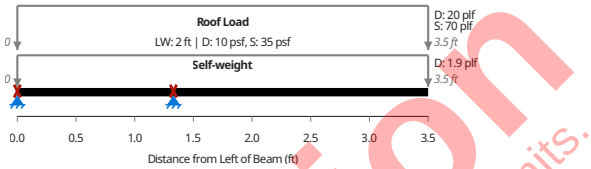
Base Bearing Strength	$F'_{c\perp}/C_b =$	750 psi

Comments

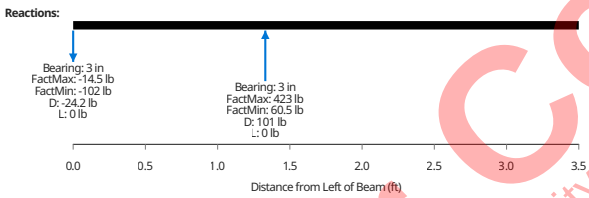
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **FLAT OUTRIGGERS** (RAFTERS AND JOISTS) PASS
References: NDS 2018 (ASD)		

Summary





	Member	2x6 D.Fir-L No. 2
71%	Moment Utilization	$M/M' =$ 216 lb*ft / 306 lb*ft
20%	Shear Utilization	$V/V' =$ 224 lb / 1138 lb
4%	Bearing Utilization	$R/R' =$ 423 lb / 11 602 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.0295 in
	Minimum Bearing Length (Int Supports)	$\ell_{b,min,int} =$ 0.109 in
81%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.236 in (L/110)



Key Properties

Beam Plan Length	$L_X =$ 3.5 ft
Continuous Bracing for Lateral Torsional Buckling	Top Braced

Top and bottom flange bracing corresponds to positive and negative bending respectively, but cantilever spans typically require a brace on the top flange despite being in negative bending.

Loads

Center-to-Center Spacing (= tributary width)	$s =$ 24 in

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$ 8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$ 20.8 in^4
Section Modulus	$S =$ 2.06 in^3
Base Allowable Bending Stress	$F_b =$ 900 psi
Base Allowable Shear Stress	$F_v =$ 180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$ 625 psi
True Modulus of Elasticity	$E_{true} =$ 1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$ 1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$ 1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$ 1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Governing Duration Factor in Bending	$C_{D,b} =$ 1.15
Size Factor	$C_{F,b} =$ 1.3
Incising Factor	$C_{i,b} =$ 1
Beam Stability Factor	$C_L =$ 1
Adjusted Bending Strength	$F'_b =$ 1779 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$ 1.15
Adjusted Shear Strength	$F'_v =$ 207 psi

Bearing (NDS 2018 3.10)

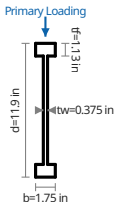
Base Bearing Strength	$F'_{c\perp}/C_b =$ 625 psi

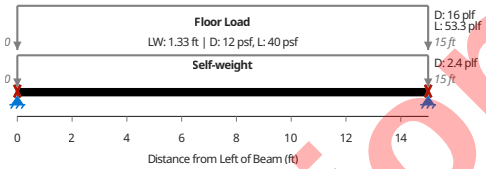
Comments

BANTON ENGINEERING, INC.

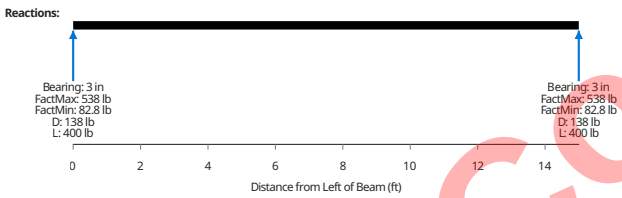
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **11 7/8" FLOOR JOIST (BCI)** (RAFTERS AND JOISTS) PASS
References: NDS 2018 (ASD)		

Summary





	Member		11-7/8" BCI-4500s1.8
67%	Moment Utilization	$M/M' =$	2017 lb*ft* / *3025 lb*ft
33%	Shear Utilization	$V/V' =$	538 lb / 1625 lb
41%	Bearing Utilization	$R/R' =$	538 lb / 1306 lb
52%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-0.258 in (L/699)



Key Properties

Beam Plan Length	$L_X =$	15 ft

Loads

Center-to-Center Spacing (= tributary width)	$s =$	16 in

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Base Allowable Moment	$M_r =$	3025 lb · ft
Base Allowable Shear	$V_r =$	1625 lb
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	0 psi

Section Bending (NDS 2018 3.3)

Governing Duration Factor in Bending	$C_{D,b} =$	1
Beam Stability Factor	$C_L =$	1
Adjusted Allowable Moment	$M_r' =$	3025 lb · ft

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1
Adjusted Allowable Shear	$V_r' =$	1625 lb

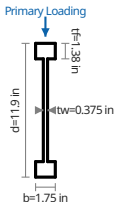
Bearing (NDS 2018 3.10)

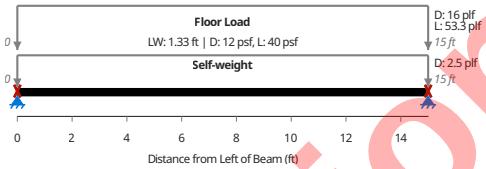
Base Bearing Strength	$F_{c\perp}'/C_b =$	0 psi

Comments

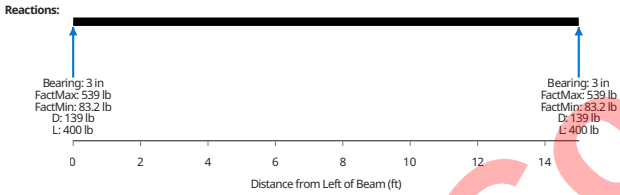
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **11 7/8" FLOOR JOIST (TJI)** (RAFTERS AND JOISTS) PASS
References: NDS 2018 (ASD)		

Summary





	Member	11-7/8" TJI 110
64%	Moment Utilization	$M/M' =$ 2020 lb*ft* / *3160 lb*ft
35%	Shear Utilization	$V/V' =$ 539 lb / 1560 lb
43%	Bearing Utilization	$R/R' =$ 539 lb / 1242 lb
51%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.254 in (L/707)



Key Properties

Beam Plan Length	$L_X =$ 15 ft

Loads

Center-to-Center Spacing (= tributary width)	$s =$ 16 in

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Base Allowable Moment	$M_r =$ 3160 lb · ft
Base Allowable Shear	$V_r =$ 1560 lb
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$ 0 psi

Section Bending (NDS 2018 3.3)

Governing Duration Factor in Bending	$C_{D,b} =$ 1
Beam Stability Factor	$C_L =$ 1
Adjusted Allowable Moment	$M_r' =$ 3160 lb · ft

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$ 1
Adjusted Allowable Shear	$V_r' =$ 1560 lb

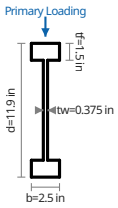
Bearing (NDS 2018 3.10)

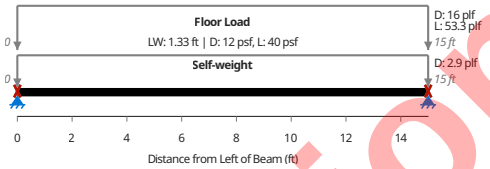
Base Bearing Strength	$F_{c\perp}'/C_b =$ 0 psi

Comments

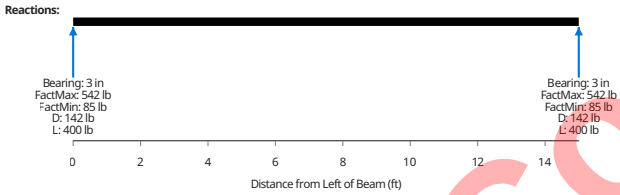
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** 11 7/8" FLOOR JOIST (LPI) (RAFTERS AND JOISTS) PASS
References: NDS 2018 (ASD)		

Summary





	Member		11-7/8" LPI 18
66%	Moment Utilization	$M/M' =$	2032 lb*ft* / *3100 lbft*
41%	Shear Utilization	$V/V' =$	542 lb / 1335 lb
56%	Bearing Utilization	$R/R' =$	542 lb / 972 lb
55%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-0.273 in (L/660)



Key Properties

Beam Plan Length	$L_X =$	15 ft

Loads

Center-to-Center Spacing (= tributary width)	$s =$	16 in

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Base Allowable Moment	$M_r =$	3100 lb · ft
Base Allowable Shear	$V_r =$	1335 lb
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	955 psi

Section Bending (NDS 2018 3.3)

Governing Duration Factor in Bending	$C_{D,b} =$	1
Beam Stability Factor	$C_L =$	1
Adjusted Allowable Moment	$M_r' =$	3100 lb · ft

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1
Adjusted Allowable Shear	$V_r' =$	1335 lb

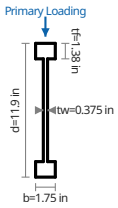
Bearing (NDS 2018 3.10)

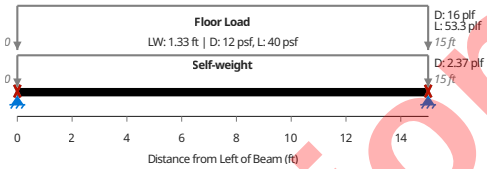
Base Bearing Strength	$F_{c\perp}'/C_b =$	955 psi

Comments

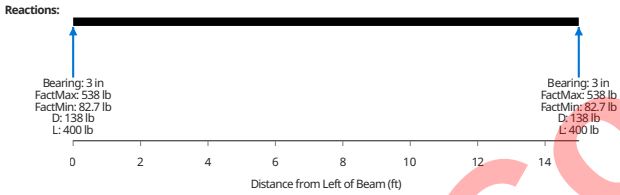
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **11 7/8" FLOOR JOIST (RPI)** (RAFTERS AND JOISTS) PASS
References: NDS 2018 (ASD)		

Summary





	Member		11-7/8" RFPI 20
55%	Moment Utilization	$M/M' =$	2017 lb*ft* / *3640 lb*ft
38%	Shear Utilization	$V/V' =$	538 lb / 1420 lb
44%	Bearing Utilization	$R/R' =$	538 lb / 1211 lb
48%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-0.238 in (L/756)



Key Properties

Beam Plan Length	$L_X =$	15 ft

Loads

Center-to-Center Spacing (= tributary width)	$s =$	16 in

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Base Allowable Moment	$M_r =$	3640 lb · ft
Base Allowable Shear	$V_r =$	1420 lb
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	600 psi

Section Bending (NDS 2018 3.3)

Governing Duration Factor in Bending	$C_{D,b} =$	1
Beam Stability Factor	$C_L =$	1
Adjusted Allowable Moment	$M_r' =$	3640 lb · ft

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1
Adjusted Allowable Shear	$V_r' =$	1420 lb

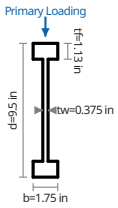
Bearing (NDS 2018 3.10)

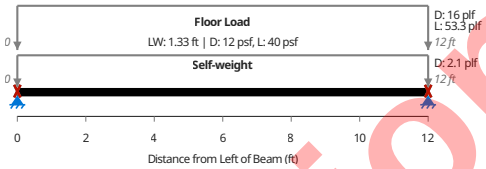
Base Bearing Strength	$F_{c\perp}'/C_b =$	600 psi

Comments

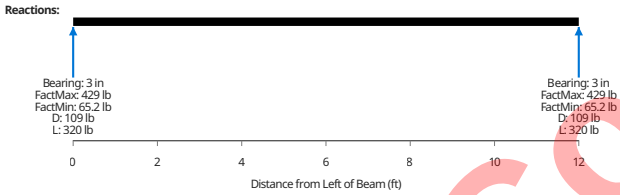
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **9 1/2" FLOOR JOIST (BCI)** (R AFTERS AND JOISTS) PASS
References: NDS 2018 (ASD)		

Summary





	Member	9-1/2" BCI-4500s1.8
54%	Moment Utilization	$M/M' =$ 1286 lb*ft / 2360 lb*ft
29%	Shear Utilization	$V/V' =$ 429 lb / 1475 lb
40%	Bearing Utilization	$R/R' =$ 429 lb / 1081 lb
45%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.179 in (L/805)



Key Properties

Beam Plan Length	$L_X =$ 12 ft
Center-to-Center Spacing (= tributary width)	$s =$ 16 in

Loads

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Base Allowable Moment	$M_r =$ 2360 lb · ft
Base Allowable Shear	$V_r =$ 1475 lb
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$ 0 psi

Section Bending (NDS 2018 3.3)

Governing Duration Factor in Bending	$C_{D,b} =$ 1
Beam Stability Factor	$C_L =$ 1
Adjusted Allowable Moment	$M_r' =$ 2360 lb · ft

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$ 1
Adjusted Allowable Shear	$V_r' =$ 1475 lb

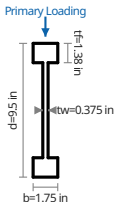
Bearing (NDS 2018 3.10)

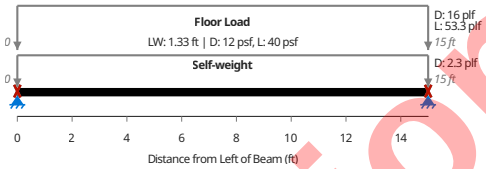
Base Bearing Strength	$F_{c\perp}'/C_b =$ 0 psi

Comments

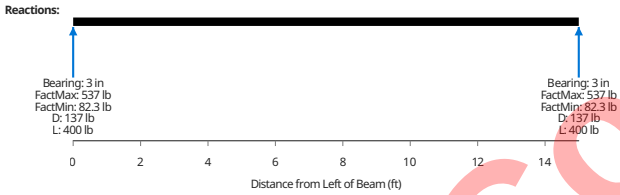
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **9 1/2" FLOOR JOIST (TJI)** (R AFTERS AND JOISTS) PASS
References: NDS 2018 (ASD)		

Summary





	Member		9-1/2" TJI 110
81%	Moment Utilization	$M/M' =$	2015 lb*ft* / 2500 lb*ft*
44%	Shear Utilization	$V/V' =$	537 lb / 1220 lb
47%	Bearing Utilization	$R/R' =$	537 lb / 1131 lb
84%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-0.421 in (L/428)



Key Properties

Beam Plan Length	$L_X =$	15 ft

Loads

Center-to-Center Spacing (= tributary width)	$s =$	16 in

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Base Allowable Moment	$M_r =$	2500 lb · ft
Base Allowable Shear	$V_r =$	1220 lb
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	0 psi

Section Bending (NDS 2018 3.3)

Governing Duration Factor in Bending	$C_{D,b} =$	1
Beam Stability Factor	$C_L =$	1
Adjusted Allowable Moment	$M_r' =$	2500 lb · ft

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1
Adjusted Allowable Shear	$V_r' =$	1220 lb

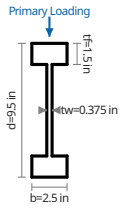
Bearing (NDS 2018 3.10)

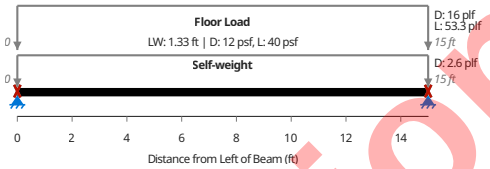
Base Bearing Strength	$F_{c\perp}'/C_b =$	0 psi

Comments

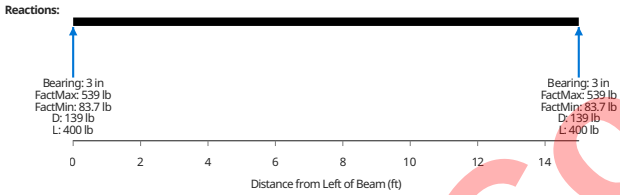
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **9 1/2" FLOOR JOIST (LPI)** (R AFTERS AND JOISTS) PASS
References: NDS 2018 (ASD)		

Summary





	Member		9-1/2" LPI 18
86%	Moment Utilization	$M/M' =$	2023 lb*ft* / *2365 lb*ft
48%	Shear Utilization	$V/V' =$	539 lb / 1130 lb
57%	Bearing Utilization	$R/R' =$	539 lb / 945 lb
92%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-0.462 in (L/390)



Key Properties

Beam Plan Length	$L_X =$	15 ft

Loads

Center-to-Center Spacing (= tributary width)	$s =$	16 in

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Base Allowable Moment	$M_r =$	2365 lb · ft
Base Allowable Shear	$V_r =$	1130 lb
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	955 psi

Section Bending (NDS 2018 3.3)

Governing Duration Factor in Bending	$C_{D,b} =$	1
Beam Stability Factor	$C_L =$	1
Adjusted Allowable Moment	$M_r' =$	2365 lb · ft

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1
Adjusted Allowable Shear	$V_r' =$	1130 lb

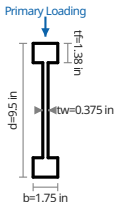
Bearing (NDS 2018 3.10)

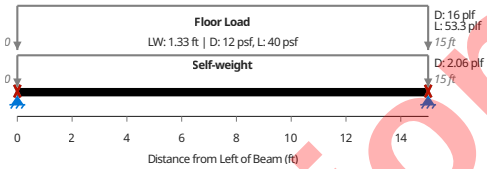
Base Bearing Strength	$F_{c\perp}'/C_b =$	955 psi

Comments

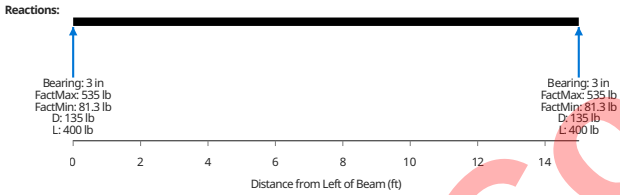
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **9 1/2" FLOOR JOIST (RPI)** (RAFTERS AND JOISTS) PASS
References: NDS 2018 (ASD)		

Summary





	Member		9-1/2" RFPI 20
71%	Moment Utilization	$M/M' =$	2008 lb*ft* / *2820 lb*ft
44%	Shear Utilization	$V/V' =$	535 lb / 1220 lb
49%	Bearing Utilization	$R/R' =$	535 lb / 1082 lb
79%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-0.397 in (L/453)



Key Properties

Beam Plan Length	$L_X =$	15 ft

Loads

Center-to-Center Spacing (= tributary width)	$s =$	16 in

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Base Allowable Moment	$M_r =$	2820 lb · ft
Base Allowable Shear	$V_r =$	1220 lb
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	600 psi

Section Bending (NDS 2018 3.3)

Governing Duration Factor in Bending	$C_{D,b} =$	1
Beam Stability Factor	$C_L =$	1
Adjusted Allowable Moment	$M_r' =$	2820 lb · ft

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1
Adjusted Allowable Shear	$V_r' =$	1220 lb

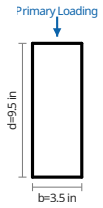
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}'/C_b =$	600 psi

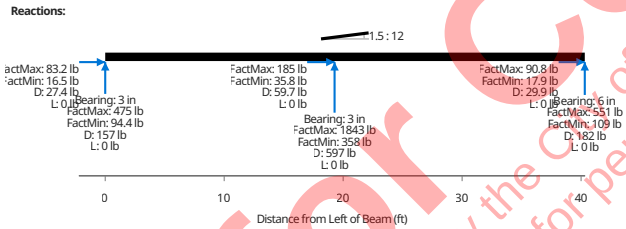
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1RB1 (STRUCTURAL FASCIA)** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



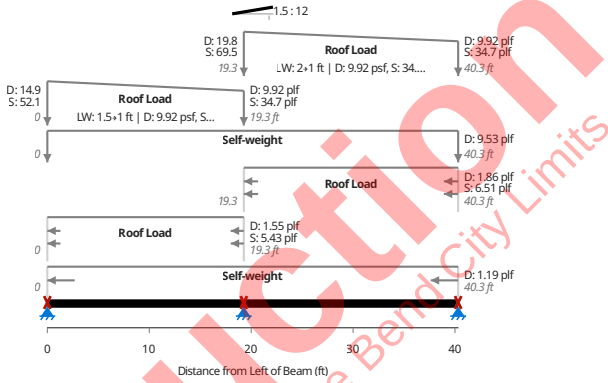
	Member		3-1/2x9-1/2 Versa-Lam LVL 2.1E-3100Fb
25%	Moment Utilization	$M/M' =$	-3685 lb*ft* / *14 964 lb*ft
15%	Shear Utilization	$V/V' =$	1058 lb / 7265 lb
21%	Bearing Utilization	$R/R' =$	1843 lb / 8859 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$	0.181 in
	Minimum Bearing Length (Int Supports)	$\ell_{b,min,int} =$	0.624 in
22%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-0.224 in (L/1126)



Key Properties

Beam Plan Length	$L_X =$	40 ft
Enter Support and Load Locations Based on Plan or Inclined length?		Plan
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	33.2 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	250 in^4
Section Modulus	$S =$	52.6 in^3
Base Allowable Bending Stress	$F_b =$	3100 psi
Base Allowable Shear Stress	$F_v =$	285 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	750 psi
True Modulus of Elasticity	$E_{true} =$	2.10×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	2.00×10^6 psi
Modulus of Elasticity for Deflections	$E =$	2.00×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	2.00×10^6 psi

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V =$	1.03

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^{+} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C_L^{+} =$	0.932
Adjusted Bending Strength - Positive Bending	$F_b'^{+} =$	3411 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^{-} =$	1.15
Governing Beam Stability Factor - Negative Bending	$C_L^{-} =$	0.932
Adjusted Bending Strength - Negative Bending	$F_b'^{-} =$	3411 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15

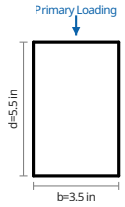
Adjusted Shear Strength	$F'_v = \ 328$ psi	Base Bearing Strength	$F'_{c\perp}/C_b = \ 750$ psi

Bearing (NDS 2018 3.10)

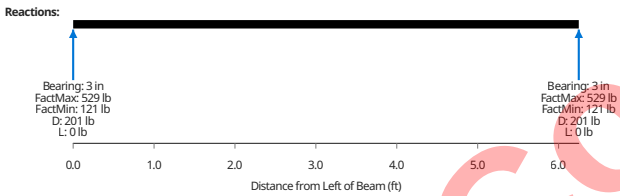
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H1** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



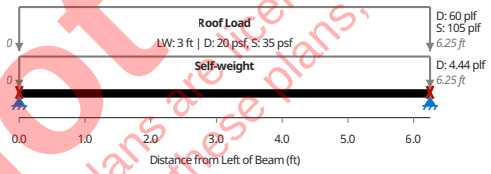
	Member	4x6 D.Fir-L No. 2
42%	Moment Utilization	$M/M' =$ 827 lb*ft* / *1965 lb*ft
20%	Shear Utilization	$V/V' =$ 529 lb / 2656 lb
8%	Bearing Utilization	$R/R' =$ 529 lb / 6562 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.242 in
15%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.0464 in (L/1615)



Key Properties

Beam Plan Length	$L_X =$	6.25 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	19.2 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	48.5 in^4
Section Modulus	$S =$	17.6 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.993
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1336 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.995
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1047 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

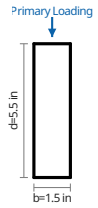
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

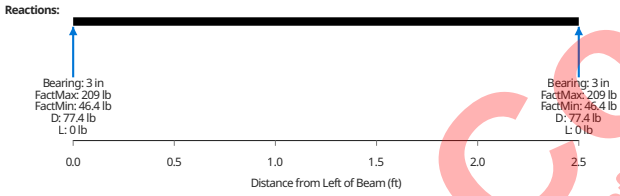
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** 1H2A (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



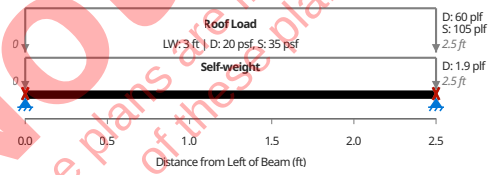
	Member	2x6 D.Fir-L No. 2
16%	Moment Utilization	$M/M' =$ 130 lb*ft* / *827 lb*ft
18%	Shear Utilization	$V/V' =$ 209 lb / 1138 lb
7%	Bearing Utilization	$R/R' =$ 209 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.223 in
2%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.00277 in (L/10 818)



Key Properties

Beam Plan Length	$L_X =$	2.5 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.975
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1313 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.982
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1034 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

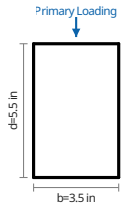
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

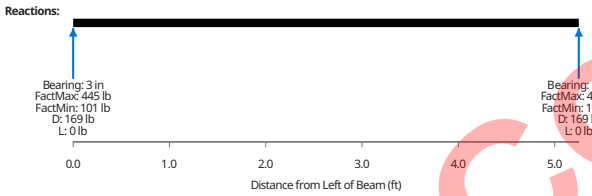
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H2B** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



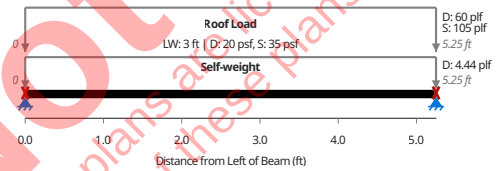
	Member	4x6 D.Fir-L No. 2
30%	Moment Utilization	$M/M' =$ 584 lb*ft* / *1967 lb*ft
17%	Shear Utilization	$V/V' =$ 445 lb / 2656 lb
7%	Bearing Utilization	$R/R' =$ 445 lb / 6562 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.203 in
9%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.0231 in (L/2726)



Key Properties

Beam Plan Length	$L_X =$	5.25 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	19.2 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	48.5 in^4
Section Modulus	$S =$	17.6 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.994
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1337 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.995
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1048 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

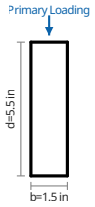
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

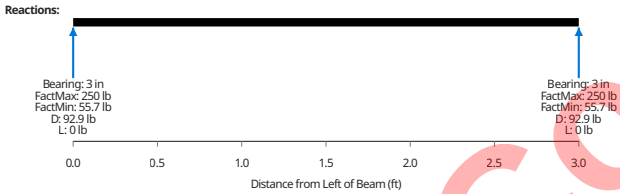
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H3** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



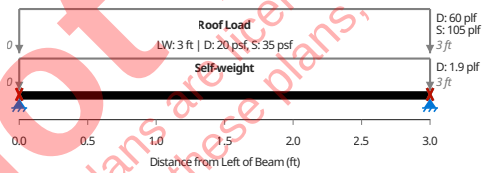
	Member	2x6 D.Fir-L No. 2
23%	Moment Utilization	$M/M' =$ 188 lb*ft* / *823 lb*ft
22%	Shear Utilization	$V/V' =$ 250 lb / 1138 lb
9%	Bearing Utilization	$R/R' =$ 250 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.267 in
4%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.00575 in (L/6260)



Key Properties

Beam Plan Length	$L_X =$	3 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.971
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1306 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.979
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1031 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

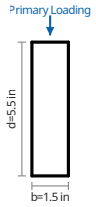
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

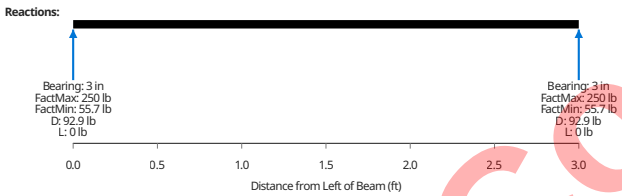
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H4** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



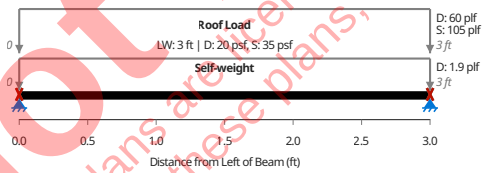
	Member	2x6 D.Fir-L No. 2
23%	Moment Utilization	$M/M' =$ 188 lb*ft* / *823 lb*ft
22%	Shear Utilization	$V/V' =$ 250 lb / 1138 lb
9%	Bearing Utilization	$R/R' =$ 250 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.267 in
4%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.00575 in (L/6260)



Key Properties

Beam Plan Length	$L_X =$	3 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.971
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1306 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.979
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1031 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

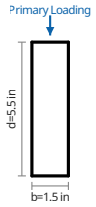
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

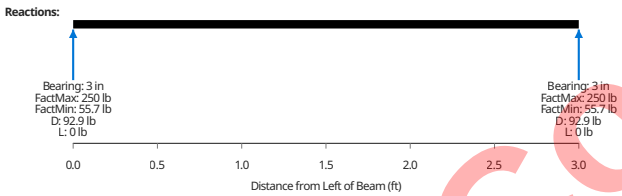
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H5** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



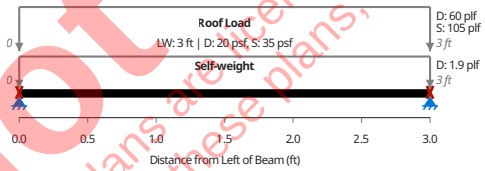
	Member	2x6 D.Fir-L No. 2
23%	Moment Utilization	$M/M' =$ 188 lb*ft* / *823 lb*ft
22%	Shear Utilization	$V/V' =$ 250 lb / 1138 lb
9%	Bearing Utilization	$R/R' =$ 250 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.267 in
4%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.00575 in (L/6260)



Key Properties

Beam Plan Length	$L_X =$	3 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.971
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1306 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.979
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1031 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

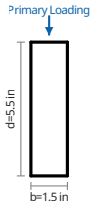
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

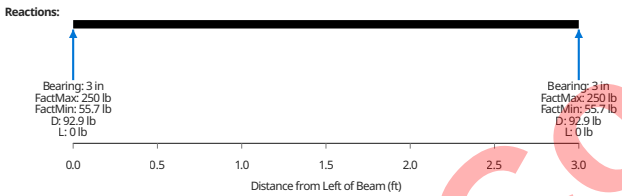
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H6** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



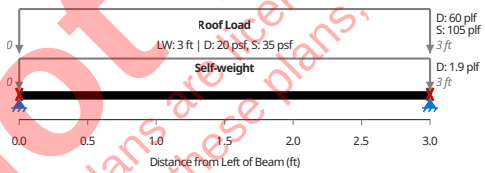
	Member		2x6 D.Fir-L No. 2
23%	Moment Utilization	$M/M' =$	188 lb*ft* / *823 lb*ft
22%	Shear Utilization	$V/V' =$	250 lb / 1138 lb
9%	Bearing Utilization	$R/R' =$	250 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$	0.267 in
4%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-0.00575 in (L/6260)



Key Properties

Beam Plan Length	$L_X =$	3 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.971
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1306 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.979
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1031 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

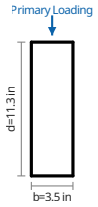
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

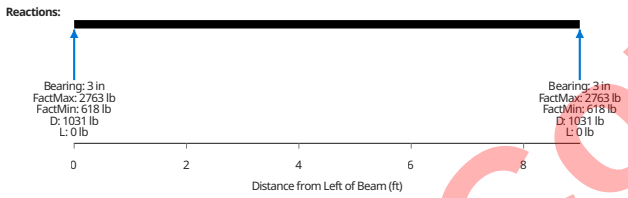
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H7** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



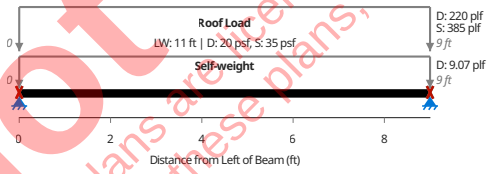
	Member	4x12 D.Fir-L No. 2
91%	Moment Utilization	$M/M' =$ 6217 lb*ft* / *6841 lb*ft
51%	Shear Utilization	$V/V' =$ 2763 lb / 5434 lb
42%	Bearing Utilization	$R/R' =$ 2763 lb / 6562 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 1.26 in
19%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.0855 in (L/1263)



Key Properties

	Beam Plan Length	$L_X =$ 9 ft
	Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	39.4 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	415 in^4
Section Modulus	$S =$	73.8 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.1
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.977
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1112 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.983
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	876 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

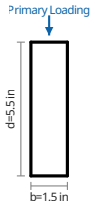
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

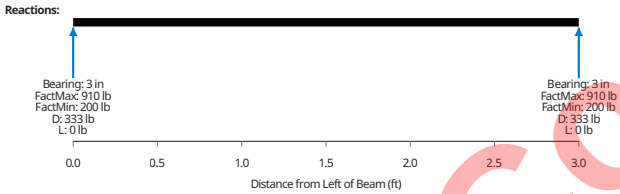
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H8** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



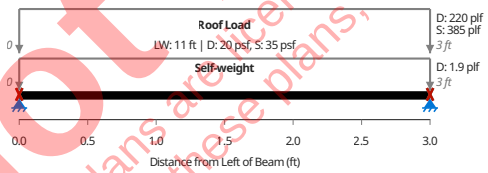
	Member	2x6 D.Fir-L No. 2
83%	Moment Utilization	$M/M' =$ 683 lb*ft* / *823 lb*ft
80%	Shear Utilization	$V/V' =$ 910 lb / 1138 lb
32%	Bearing Utilization	$R/R' =$ 910 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.971 in
14%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.0211 in (L/1707)



Key Properties

Beam Plan Length	$L_X =$	3 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.971
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1306 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.979
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1031 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

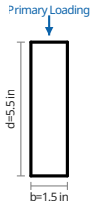
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

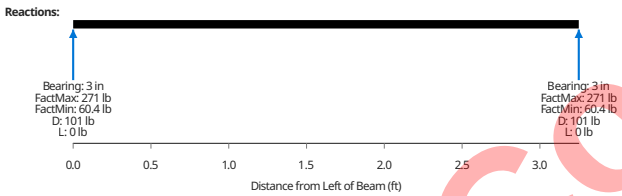
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H9** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



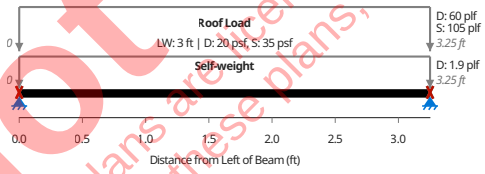
	Member	2x6 D.Fir-L No. 2
27%	Moment Utilization	$M/M' =$ 220 lb*ft / 821 lb*ft
24%	Shear Utilization	$V/V' =$ 271 lb / 1138 lb
10%	Bearing Utilization	$R/R' =$ 271 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.289 in
5%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.00792 in (L/4924)



Key Properties

Beam Plan Length	$L_X =$	3.25 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.968
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1303 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.978
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1030 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

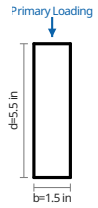
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

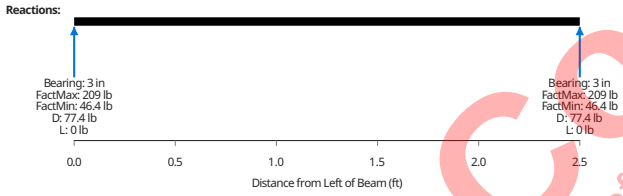
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** 1H10 (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



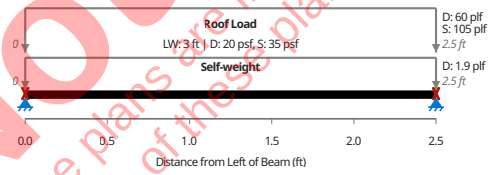
	Member	2x6 D.Fir-L No. 2
16%	Moment Utilization	$M/M' =$ 130 lb*ft* / *827 lb*ft
18%	Shear Utilization	$V/V' =$ 209 lb / 1138 lb
7%	Bearing Utilization	$R/R' =$ 209 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.223 in
2%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.00277 in (L/10 818)



Key Properties

Beam Plan Length	$L_X =$	2.5 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.975
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1313 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.982
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1034 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

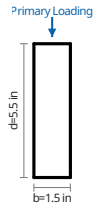
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

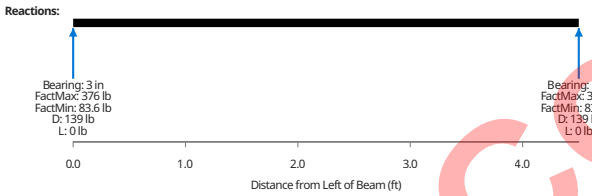
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** 1H11 (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



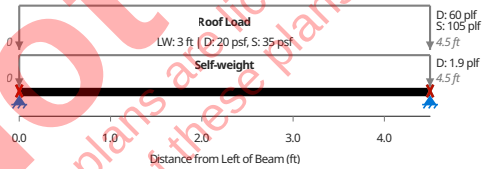
	Member	2x6 D.Fir-L No. 2
52%	Moment Utilization	$M/M' =$ 422 lb*ft* / *808 lb*ft
33%	Shear Utilization	$V/V' =$ 376 lb / 1138 lb
13%	Bearing Utilization	$R/R' =$ 376 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.401 in
13%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.0291 in (L/1855)



Key Properties

Beam Plan Length	$L_X =$	4.5 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.953
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1283 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.969
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1020 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

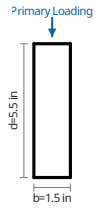
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

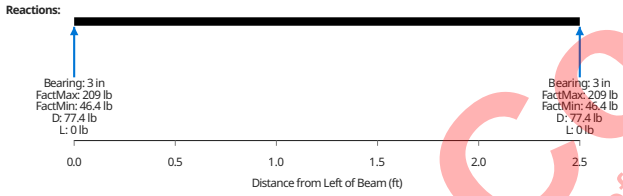
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** 1H12 (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



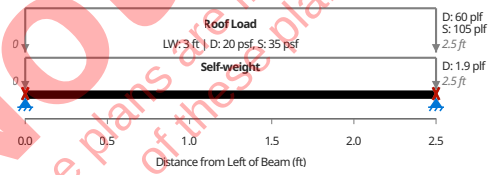
	Member	2x6 D.Fir-L No. 2
16%	Moment Utilization	$M/M' =$ 130 lb*ft* / *827 lb*ft
18%	Shear Utilization	$V/V' =$ 209 lb / 1138 lb
7%	Bearing Utilization	$R/R' =$ 209 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.223 in
2%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.00277 in (L/10 818)



Key Properties

Beam Plan Length	$L_X =$	2.5 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.975
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1313 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.982
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1034 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

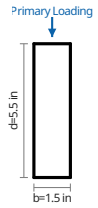
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

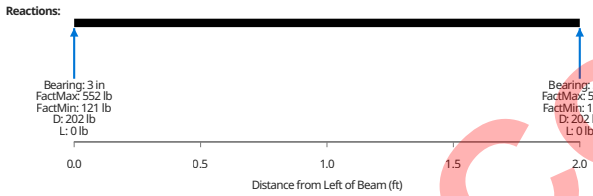
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H13** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



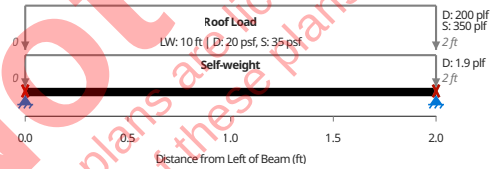
	Member	2x6 D.Fir-L No. 2
33%	Moment Utilization	$M/M' =$ 276 lb*ft / 831 lb*ft
48%	Shear Utilization	$V/V' =$ 552 lb / 1138 lb
20%	Bearing Utilization	$R/R' =$ 552 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.589 in
4%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.00379 in (L/6339)



Key Properties

Beam Plan Length	$L_X =$	2 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.98
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1318 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.985
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1037 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

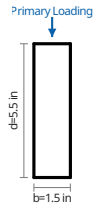
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

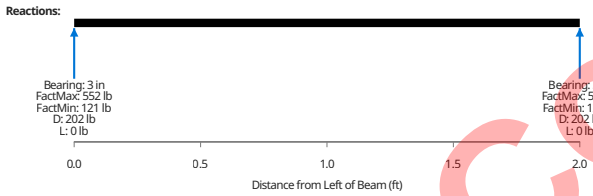
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H14** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



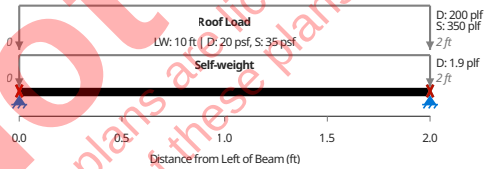
	Member	2x6 D.Fir-L No. 2
33%	Moment Utilization	$M/M' =$ 276 lb*ft / 831 lb*ft
48%	Shear Utilization	$V/V' =$ 552 lb / 1138 lb
20%	Bearing Utilization	$R/R' =$ 552 lb / 2812 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.589 in
4%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.00379 in (L/6339)



Key Properties

Beam Plan Length	$L_X =$	2 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	8.25 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	20.8 in^4
Section Modulus	$S =$	7.56 in^3
Base Allowable Bending Stress	$F_b =$	900 psi
Base Allowable Shear Stress	$F_v =$	180 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	625 psi
True Modulus of Elasticity	$E_{true} =$	1.60×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.60×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.60×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.60×10^6 psi

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} =$	1.3
Incising Factor	$C_{i,b} =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.98
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	1318 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.985
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1037 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	207 psi

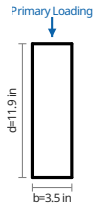
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	625 psi

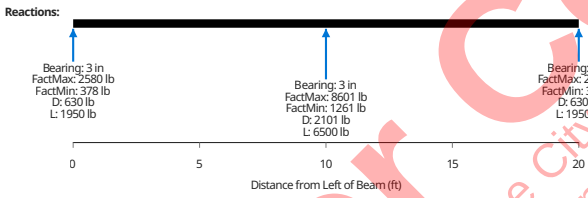
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **0FB1** (0 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



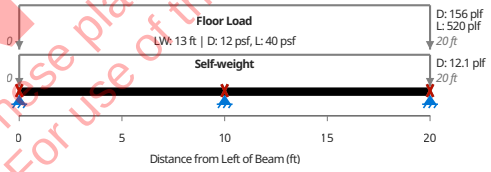
	Member	3-1/2x11-7/8 Versa-Lam LVL 2.1E-3100Fb
41%	Moment Utilization	$M/M' =$ -8601 lb*ft* / *20 834 lb*ft
54%	Shear Utilization	$V/V' =$ 4301 lb / 7897 lb
97%	Bearing Utilization	$R/R' =$ 8601 lb / 8859 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.983 in
	Minimum Bearing Length (Int Supports)	$\ell_{b,min,int} =$ 2.91 in
15%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.0498 in (L/2409)



Key Properties

Beam Plan Length	$L_X =$	20 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	41.6 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	488 in^4
Section Modulus	$S =$	82.3 in^3
Base Allowable Bending Stress	$F_b =$	3100 psi
Base Allowable Shear Stress	$F_v =$	285 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	750 psi
True Modulus of Elasticity	$E_{true} =$	2.10×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	2.00×10^6 psi
Modulus of Elasticity for Deflections	$E =$	2.00×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	2.00×10^6 psi

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.979
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	3039 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	1
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.979
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	3039 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1
Adjusted Shear Strength	$F'_v =$	285 psi

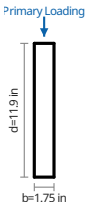
Bearing (NDS 2018 3.10)

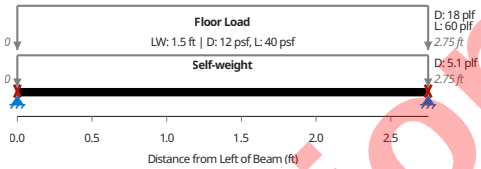
Base Bearing Strength	$F'_{c\perp}/C_b =$	750 psi

Comments

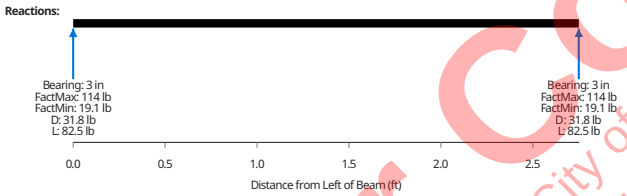
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** Shower Carry LVL 1 (REF) (0 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary





	Member		1-3/4x11-7/8 Versa-Lam LVL 2.1E-2800Fb
1%	Moment Utilization	$M/M' =$	78.6 lb*ft* / *8145 lb*ft
3%	Shear Utilization	$V/V' =$	114 lb / 3948 lb
3%	Bearing Utilization	$R/R' =$	114 lb / 3937 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$	0.0871 in
0%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-158×10^{-6} in (L/ 208 773)



Key Properties

Beam Plan Length	$L_X =$	2.75 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	20.8 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	244 in^4
Section Modulus	$S =$	41.1 in^3
Base Allowable Bending Stress	$F_b =$	2800 psi
Base Allowable Shear Stress	$F_v =$	285 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	750 psi
True Modulus of Elasticity	$E_{true} =$	2.10×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	2.00×10^6 psi
Modulus of Elasticity for Deflections	$E =$	2.00×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	2.00×10^6 psi

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V =$	1

Positive Bending (NDS 2018 2.3)

Adjusted Bending Strength - Positive Bending	$F_b'^+ =$	2376 psi

Negative Bending (NDS 2018 2.3)

Adjusted Bending Strength - Negative Bending	$F_b'^- =$	2221 psi

Shear Design (NDS 2018 3.4)

Adjusted Shear Strength	$F_v' =$	285 psi

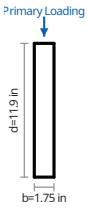
Bearing (NDS 2018 3.10)

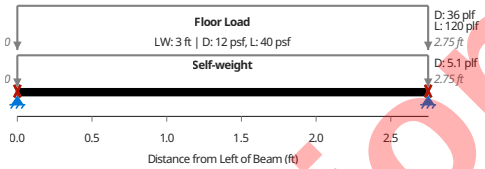
Base Bearing Strength	$F_{c\perp}'/C_b =$	750 psi

Comments

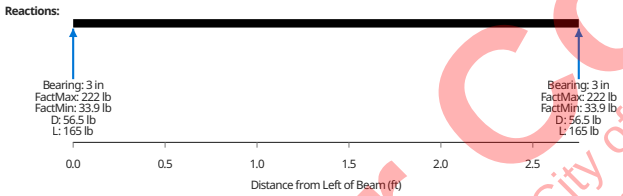
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** Shower Carry LVL 2 (REF) (0 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary





	Member		1-3/4x11-7/8 Versa-Lam LVL 2.1E-2800Fb
2%	Moment Utilization	$M/M' =$	152 lb*ft* / *8145 lb*ft
6%	Shear Utilization	$V/V' =$	222 lb / 3948 lb
6%	Bearing Utilization	$R/R' =$	222 lb / 3937 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$	0.169 in
0%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-316×10^{-6} in (L/ 104 386)



Key Properties

Beam Plan Length	$L_X =$	2.75 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	20.8 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	244 in^4
Section Modulus	$S =$	41.1 in^3
Base Allowable Bending Stress	$F_b =$	2800 psi
Base Allowable Shear Stress	$F_v =$	285 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	750 psi
True Modulus of Elasticity	$E_{true} =$	2.10×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	2.00×10^6 psi
Modulus of Elasticity for Deflections	$E =$	2.00×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	2.00×10^6 psi

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V =$	1

Positive Bending (NDS 2018 2.3)

Adjusted Bending Strength - Positive Bending	$F_b'^+ =$	2376 psi

Negative Bending (NDS 2018 2.3)

Adjusted Bending Strength - Negative Bending	$F_b'^- =$	2221 psi

Shear Design (NDS 2018 3.4)

Adjusted Shear Strength	$F_v' =$	285 psi

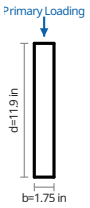
Bearing (NDS 2018 3.10)

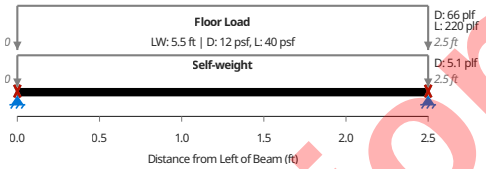
Base Bearing Strength	$F_{c\perp}'/C_b =$	750 psi

Comments

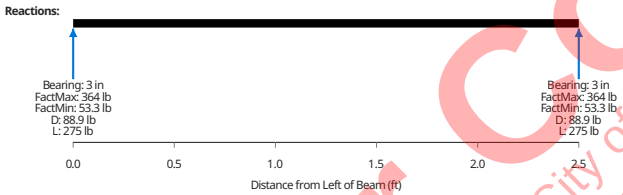
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **ACCESS LSL 1 (REF)** (0 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary





	Member		1-3/4x11-7/8 Versa-Lam LVL 2.1E-2800Fb
3%	Moment Utilization	$M/M' =$	227 lb*ft* / *8261 lb*ft
9%	Shear Utilization	$V/V' =$	364 lb / 3948 lb
9%	Bearing Utilization	$R/R' =$	364 lb / 3937 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$	0.277 in
0%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-396×10^{-6} in (L/ 75 784)



Key Properties

Beam Plan Length	$L_X =$	2.5 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	20.8 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	244 in^4
Section Modulus	$S =$	41.1 in^3
Base Allowable Bending Stress	$F_b =$	2800 psi
Base Allowable Shear Stress	$F_v =$	285 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	750 psi
True Modulus of Elasticity	$E_{true} =$	2.10×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	2.00×10^6 psi
Modulus of Elasticity for Deflections	$E =$	2.00×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	2.00×10^6 psi

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V =$	1

Positive Bending (NDS 2018 2.3)

Adjusted Bending Strength - Positive Bending	$F_b'^{+} =$	2410 psi

Negative Bending (NDS 2018 2.3)

Adjusted Bending Strength - Negative Bending	$F_b'^{-} =$	2244 psi

Shear Design (NDS 2018 3.4)

Adjusted Shear Strength	$F_v' =$	285 psi

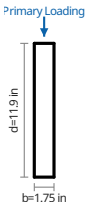
Bearing (NDS 2018 3.10)

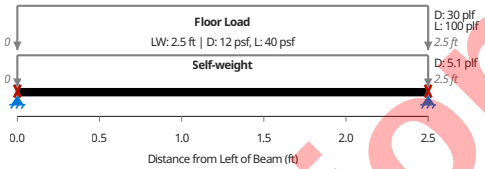
Base Bearing Strength	$F_{c\perp}'/C_b =$	750 psi

Comments

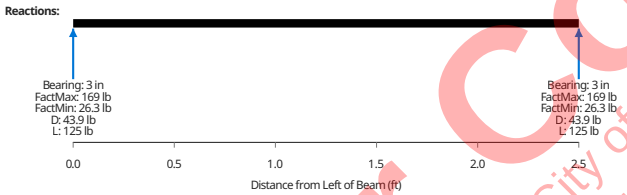
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **ACCESS LSL 2 (REF)** (0 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary





	Member		1-3/4x11-7/8 Versa-Lam LVL 2.1E-2800Fb
1%	Moment Utilization	$M/M' =$	106 lb*ft* / *8261 lb*ft
4%	Shear Utilization	$V/V' =$	169 lb / 3948 lb
4%	Bearing Utilization	$R/R' =$	169 lb / 3937 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$	0.129 in
0%	Governing Live / Short-Term Deflection	$\delta_{ST} =$	-180×10^{-6} in (L/ 166 726)



Key Properties

Beam Plan Length	$L_X =$	2.5 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads

Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	20.8 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	244 in^4
Section Modulus	$S =$	41.1 in^3
Base Allowable Bending Stress	$F_b =$	2800 psi
Base Allowable Shear Stress	$F_v =$	285 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	750 psi
True Modulus of Elasticity	$E_{true} =$	2.10×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	2.00×10^6 psi
Modulus of Elasticity for Deflections	$E =$	2.00×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	2.00×10^6 psi

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V =$	1

Positive Bending (NDS 2018 2.3)

Adjusted Bending Strength - Positive Bending	$F_b'^+ =$	2410 psi

Negative Bending (NDS 2018 2.3)

Adjusted Bending Strength - Negative Bending	$F_b'^- =$	2244 psi

Shear Design (NDS 2018 3.4)

Adjusted Shear Strength	$F_v' =$	285 psi

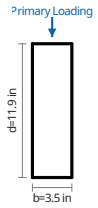
Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}'/C_b =$	750 psi

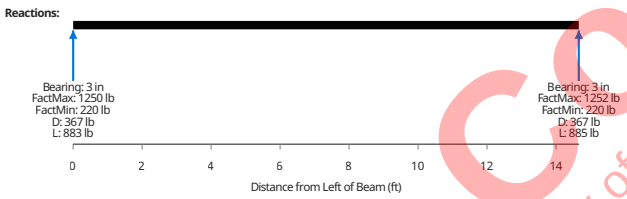
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **0FB2** (0 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



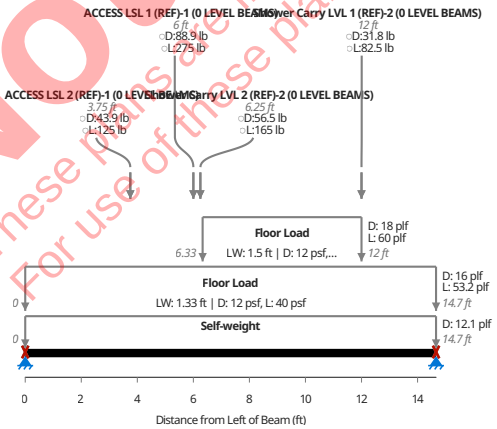
	Member	3-1/2x11-7/8 Versa-Lam LVL 2.1E-3100Fb
29%	Moment Utilization	$M/M' =$ 5711 lb*ft* / *19 367 lbft*
16%	Shear Utilization	$V/V' =$ 1252 lb / 7897 lb
16%	Bearing Utilization	$R/R' =$ 1252 lb / 7875 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.477 in
32%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.155 in (L/1138)



Key Properties

Beam Plan Length	$L_X =$	14.7 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	41.6 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	488 in^4
Section Modulus	$S =$	82.3 in^3
Base Allowable Bending Stress	$F_b =$	3100 psi
Base Allowable Shear Stress	$F_v =$	285 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	750 psi
True Modulus of Elasticity	$E_{true} =$	2.10×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	2.00×10^6 psi
Modulus of Elasticity for Deflections	$E =$	2.00×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	2.00×10^6 psi

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V =$	1

Positive Bending (NDS 2018 2.3)

Adjusted Bending Strength - Positive Bending	$F_b'^{+} =$	2825 psi

Negative Bending (NDS 2018 2.3)

Adjusted Bending Strength - Negative Bending	$F_b'^{-} =$	2589 psi

Shear Design (NDS 2018 3.4)

Adjusted Shear Strength	$F_v' =$	285 psi

Bearing (NDS 2018 3.10)

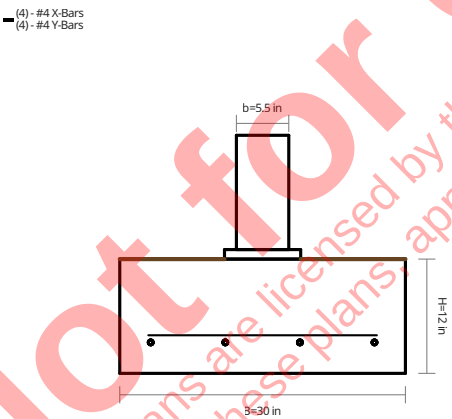
Base Bearing Strength	$F_{c\perp}'/C_b =$	750 psi

Comments

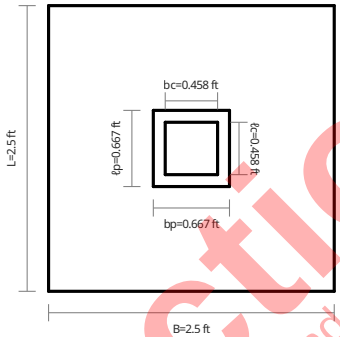
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **F1** (SPREAD FOOTINGS) PASS
References: ACI 318-19		

Summary

	Soil Gross Bearing Stress	$q_s =$	1375 psf
92%	Allowable Gross Soil Bearing Stress	$q_a =$	1500 psf
33%	Factored Moment Capacity about X-Axis	$\phi M_{nx} =$	6250 lb · ft
33%	Factored Moment Capacity about Y-Axis	$\phi M_{ny} =$	6250 lb · ft
10%	Factored One-Way Shear Strength	$\phi V_n =$	12 000 lb
14%	Two-Way Shear Capacity	$\phi v_n =$	80 psi
7%	Concrete Bearing Capacity	$\phi S_n =$	163 200 lb
	Development Length for X-Axis Reinforcement	$\ell_{dx} =$	12 in
	Design Passes as Plain Concrete (X-Axis)?	$PC_x =$	Insufficient development length but passes as plain concrete
	Development Length for Y-Axis Reinforcement	$\ell_{dy} =$	12 in
	Design Passes as Plain Concrete (Y-Axis)?	$PC_y =$	Insufficient development length but passes as plain concrete
	Uplift Safety Factor	$FS_u =$	Uplift has not been found
	Stability	Status =	Footing in Total Compression



Footing Properties



Concrete Strength	$f'_c =$	2500 psi
Volume of Concrete	$V_c =$	0.231 yd³

Soil Properties

Allowable Soil Gross Bearing Capacity	$q_a =$	1500 psf
Lateral Sliding Coefficient of Friction	$\mu =$	0.3

Bottom Reinforcement

Concrete Cover	cover =	3 in
Reinforcement Yield Strength	$f_y =$	40 000 psi
Ends of Reinforcement - X-Axis		Straight
Ends of Reinforcement - Y-Axis		Straight

Bottom Reinforcement Depth & Spacing

Steel Area - X-Axis Bending	$A_{sx} =$	0.8 in²
Steel Area - Y-Axis Bending	$A_{sy} =$	0.8 in²

Applied Loads

Biaxial Moments Applied		Separately
Axial, Shear, & Moment Loads about X-axis	$V, P, M =$	

Label	Location z (ft)	Axial Eccentricity y (in)	Load Magnitudes V, P, M
BG2	0	0	D: 0 lb, 2784 lb, 0 lb ft, S: 0 lb, 4872 lb, 0 lb ft

Design Criteria

Design Code for Load Combinations	International Residential Code (IRC) 2021

Negative Bending Flexural Capacity - X-Axis (ACI 318-19, Cl 22.2)

0%	Factored Negative Moment Capacity	$\phi M_{nx}^- =$	6250 lb · ft

Negative Bending Flexural Capacity - Y-Axis (ACI 318-19, Cl 22.2)

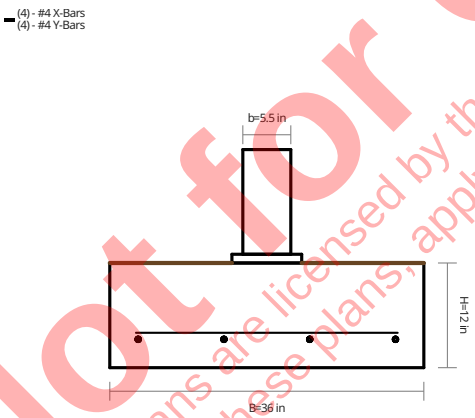
0%	Factored Negative Moment Capacity	$\phi M_{ny}^- =$	6250 lb · ft

Comments

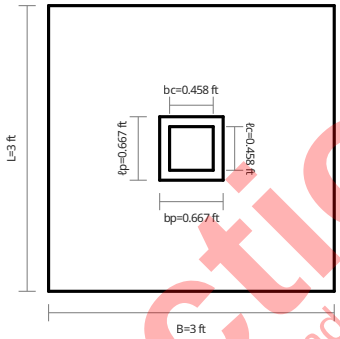
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** F2 (SPREAD FOOTINGS) PASS
References: ACI 318-19		

Summary

	Soil Gross Bearing Stress	$q_s =$	1432 psf
95%	Allowable Gross Soil Bearing Stress	$q_a =$	1500 psf
61%	Factored Moment Capacity about X-Axis	$\phi M_{nx} =$	7500 lb · ft
61%	Factored Moment Capacity about Y-Axis	$\phi M_{ny} =$	7500 lb · ft
23%	Factored One-Way Shear Strength	$\phi V_n =$	14 400 lb
27%	Two-Way Shear Capacity	$\phi v_n =$	80 psi
11%	Concrete Bearing Capacity	$\phi S_n =$	163 200 lb
	Development Length for X-Axis Reinforcement	$\ell_{dx} =$	12 in
	Design Passes as Plain Concrete (X-Axis)?	$PC_x =$	Insufficient development length but passes as plain concrete
	Development Length for Y-Axis Reinforcement	$\ell_{dy} =$	12 in
	Design Passes as Plain Concrete (Y-Axis)?	$PC_y =$	Insufficient development length but passes as plain concrete
	Uplift Safety Factor	$FS_u =$	Uplift has not been found
	Stability	Status =	Footing in Total Compression



Footing Properties



Concrete Strength	$f'_c =$	2500 psi
Volume of Concrete	$V_c =$	0.333 yd³

Soil Properties

Allowable Soil Gross Bearing Capacity	$q_a =$	1500 psf
Lateral Sliding Coefficient of Friction	$\mu =$	0.3

Bottom Reinforcement

Concrete Cover	cover =	3 in
Reinforcement Yield Strength	$f_y =$	40 000 psi
Ends of Reinforcement - X-Axis		Straight
Ends of Reinforcement - Y-Axis		Straight

Bottom Reinforcement Depth & Spacing

Steel Area - X-Axis Bending	$A_{sx} =$	0.8 in²
Steel Area - Y-Axis Bending	$A_{sy} =$	0.8 in²

Applied Loads

Biaxial Moments Applied		Separately
Axial, Shear, & Moment Loads about X-axis	$V, P, M =$	

Label	Location z (ft)	Axial Eccentricity y (in)	Load Magnitudes V, P, M
BG2	0	0	D: 0 lb, 954 lb, 0 lb ft, S: 0 lb, 1669 lb, 0 lb ft
BG	0	0	D: 3012 lb, S: 5270 lb
0FB1-1 (0 LEVEL BEAMS)	0	0	D: 0 lb, 630 lb, 0 lb ft, L: 0 lb, 1950 lb, 0 lb ft

Design Criteria

Design Code for Load Combinations	International Residential Code (IRC) 2021

Negative Bending Flexural Capacity - X-Axis (ACI 318-19, Cl 22.2)

0%	Factored Negative Moment Capacity	$\phi M_{nx}^- =$	7500 lb · ft

Negative Bending Flexural Capacity - Y-Axis (ACI 318-19, Cl 22.2)

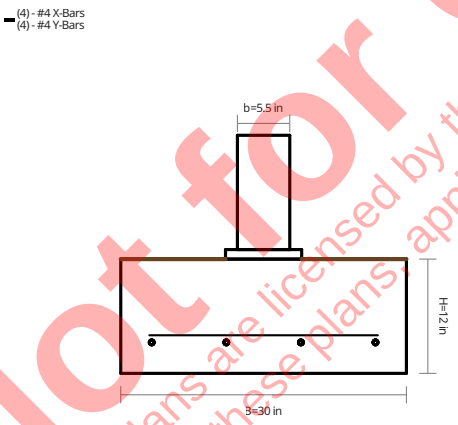
0%	Factored Negative Moment Capacity	$\phi M_{ny}^- =$	7500 lb · ft

Comments

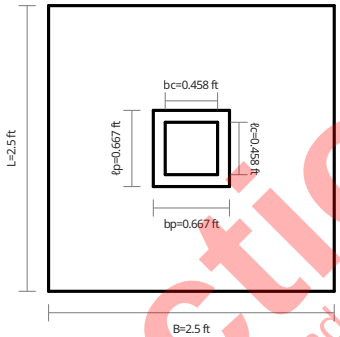
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **F3** (SPREAD FOOTINGS) PASS
References: ACI 318-19		

Summary

	Soil Gross Bearing Stress	$q_s =$	1378 psf
92%	Allowable Gross Soil Bearing Stress	$q_a =$	1500 psf
34%	Factored Moment Capacity about X-Axis	$\phi M_{nx} =$	6250 lb · ft
34%	Factored Moment Capacity about Y-Axis	$\phi M_{ny} =$	6250 lb · ft
10%	Factored One-Way Shear Strength	$\phi V_n =$	12 000 lb
14%	Two-Way Shear Capacity	$\phi v_n =$	80 psi
7%	Concrete Bearing Capacity	$\phi S_n =$	163 200 lb
	Development Length for X-Axis Reinforcement	$\ell_{dx} =$	12 in
	Design Passes as Plain Concrete (X-Axis)?	$PC_x =$	Insufficient development length but passes as plain concrete
	Development Length for Y-Axis Reinforcement	$\ell_{dy} =$	12 in
	Design Passes as Plain Concrete (Y-Axis)?	$PC_y =$	Insufficient development length but passes as plain concrete
	Uplift Safety Factor	$FS_u =$	Uplift has not been found
	Stability	Status =	Footing in Total Compression



Footing Properties



Concrete Strength	$f'_c =$	2500 psi
Volume of Concrete	$V_c =$	0.231 yd³

Soil Properties

Allowable Soil Gross Bearing Capacity	$q_a =$	1500 psf
Lateral Sliding Coefficient of Friction	$\mu =$	0.3

Bottom Reinforcement

Concrete Cover	cover =	3 in
Reinforcement Yield Strength	$f_y =$	40 000 psi
Ends of Reinforcement - X-Axis		Straight
Ends of Reinforcement - Y-Axis		Straight

Bottom Reinforcement Depth & Spacing

Steel Area - X-Axis Bending	$A_{sx} =$	0.8 in²
Steel Area - Y-Axis Bending	$A_{sy} =$	0.8 in²

Applied Loads

Biaxial Moments Applied		Separately
Axial, Shear, & Moment Loads about X-axis	$V, P, M =$	

Label	Location z (ft)	Axial Eccentricity y (in)	Load Magnitudes V, P, M
BG	0	0	D: 2790 lb, S: 4883 lb

Design Criteria

Design Code for Load Combinations	International Residential Code (IRC) 2021

Negative Bending Flexural Capacity - X-Axis (ACI 318-19, Cl 22.2)

0%	Factored Negative Moment Capacity	$\phi M_{nx}^- =$	6250 lb · ft

Negative Bending Flexural Capacity - Y-Axis (ACI 318-19, Cl 22.2)

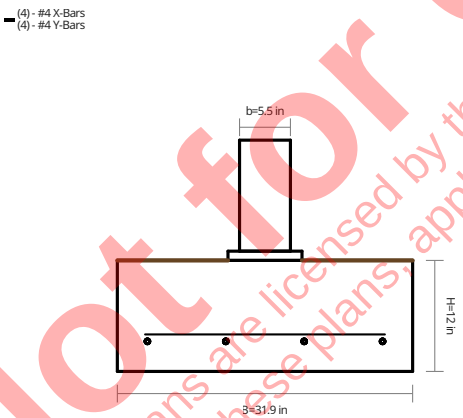
0%	Factored Negative Moment Capacity	$\phi M_{ny}^- =$	6250 lb · ft

Comments

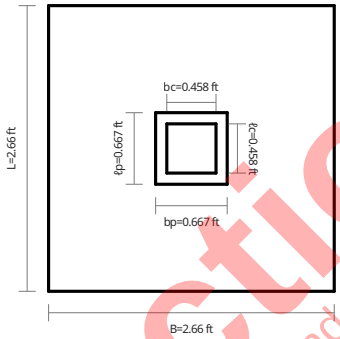
Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **F4** (SPREAD FOOTINGS) PASS
References: ACI 318-19		

Summary

	Soil Gross Bearing Stress	$q_s =$	1366 psf
91%	Allowable Gross Soil Bearing Stress	$q_a =$	1500 psf
40%	Factored Moment Capacity about X-Axis	$\phi M_{nx} =$	6650 lb · ft
40%	Factored Moment Capacity about Y-Axis	$\phi M_{ny} =$	6650 lb · ft
14%	Factored One-Way Shear Strength	$\phi V_n =$	12 768 lb
17%	Two-Way Shear Capacity	$\phi v_n =$	80 psi
8%	Concrete Bearing Capacity	$\phi S_n =$	163 200 lb
	Development Length for X-Axis Reinforcement	$\ell_{dx} =$	12 in
	Design Passes as Plain Concrete (X-Axis)?	$PC_x =$	Insufficient development length but passes as plain concrete
	Development Length for Y-Axis Reinforcement	$\ell_{dy} =$	12 in
	Design Passes as Plain Concrete (Y-Axis)?	$PC_y =$	Insufficient development length but passes as plain concrete
	Uplift Safety Factor	$FS_u =$	Uplift has not been found
	Stability	Status =	Footing in Total Compression



Footing Properties



Concrete Strength	$f'_c =$	2500 psi
Volume of Concrete	$V_c =$	0.262 yd³

Soil Properties

Allowable Soil Gross Bearing Capacity	$q_a =$	1500 psf
Lateral Sliding Coefficient of Friction	$\mu =$	0.3

Bottom Reinforcement

Concrete Cover	cover =	3 in
Reinforcement Yield Strength	$f_y =$	40 000 psi
Ends of Reinforcement - X-Axis		Straight
Ends of Reinforcement - Y-Axis		Straight

Bottom Reinforcement Depth & Spacing

Steel Area - X-Axis Bending	$A_{sx} =$	0.8 in²
Steel Area - Y-Axis Bending	$A_{sy} =$	0.8 in²

Applied Loads

Biaxial Moments Applied		Separately
Axial, Shear, & Moment Loads about X-axis	$V, P, M =$	

Label	Location z (ft)	Axial Eccentricity y (in)	Load Magnitudes V, P, M
0FB1-2 (0 LEVEL BEAMS)	0	0	D: 0 lb, 2101 lb, 0 lb ft, L: 0 lb, 6500 lb, 0 lb ft

Design Criteria

Design Code for Load Combinations	International Residential Code (IRC) 2021

Negative Bending Flexural Capacity - X-Axis (ACI 318-19, Cl 22.2)

0%	Factored Negative Moment Capacity	$\phi M_{nx}^- =$	6650 lb · ft

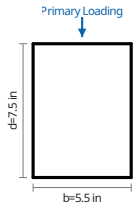
Negative Bending Flexural Capacity - Y-Axis (ACI 318-19, Cl 22.2)

0%	Factored Negative Moment Capacity	$\phi M_{ny}^- =$	6650 lb · ft

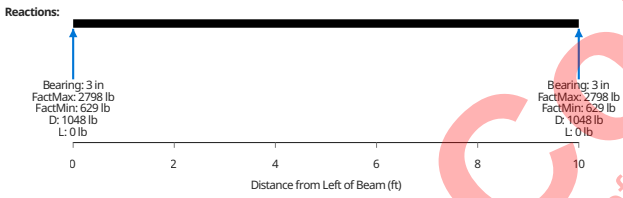
Comments

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** **1H15** (1 LEVEL BEAMS) PASS
References: NDS 2018 (ASD)		

Summary



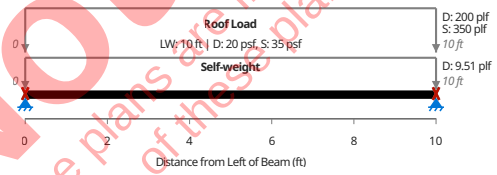
	Member	5-1/2x7-1/2 24F-V4 DF
59%	Moment Utilization	$M/M' =$ 6994 lb*ft* / *11 769 lbft*
33%	Shear Utilization	$V/V' =$ 2798 lb / 8381 lb
26%	Bearing Utilization	$R/R' =$ 2798 lb / 10 725 lb
	Minimum Bearing Length (End Supports)	$\ell_{b,min,end} =$ 0.783 in
45%	Governing Live / Short-Term Deflection	$\delta_{ST} =$ -0.226 in (L/530)



Key Properties

Beam Plan Length	$L_X =$	10 ft
Continuous Bracing for Lateral Torsional Buckling		No Continuous Bracing

Loads



Design Conditions

International Residential Code (IRC) 2021

Member Properties

Cross-Sectional Area	$A =$	41.2 in^2
Strong Axis Moment of Inertia	$I_{xx} =$	193 in^4
Section Modulus	$S =$	51.6 in^3
Base Allowable Bending Stress	$F_b =$	2400 psi
Base Allowable Shear Stress	$F_v =$	265 psi
Base Perpendicular Compression Allowable Stress	$F_{c\perp} =$	650 psi
True Modulus of Elasticity	$E_{true} =$	1.90×10^6 psi
Apparent Modulus of Elasticity	$E_{app} =$	1.80×10^6 psi
Modulus of Elasticity for Deflections	$E =$	1.80×10^6 psi

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' =$	1.80×10^6 psi

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V =$	1

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C^+_{D,b} =$	1.15
Governing Beam Stability Factor - Positive Bending	$C^+_L =$	0.992
Adjusted Bending Strength - Positive Bending	$F'^+_b =$	2739 psi

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C^-_{D,b} =$	0.9
Governing Beam Stability Factor - Negative Bending	$C^-_L =$	0.996
Adjusted Bending Strength - Negative Bending	$F'^-_b =$	1658 psi

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D =$	1.15
Adjusted Shear Strength	$F'_v =$	305 psi

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F'_{c\perp}/C_b =$	650 psi

Comments

BANTON ENGINEERING, INC.

Client: Sierra James Construction	**Author:** Garrett Banton	**Date:** Jan 23, 2026
Project: Cascade Cottage ADU		**Job #:**
Address:		**Subject:** 1WL10/1WL4 Uplift Calculation (3'5" and 7'2" Panel) (LATERAL ANALYSIS) PASS
References: AWC SDPWS 2021, AWC NDS 2018		

Summary

	Governing Wind Shear Load	$V_{0.6W} =$	830 lb
42%	Governing Allowable Wind Shear	$V_{a,W} =$	1977 lb
	Governing Seismic Shear Load	$V_{0.7E} =$	0 lb
0%	Governing Allowable Seismic Shear	$V_{a,E} =$	1412 lb

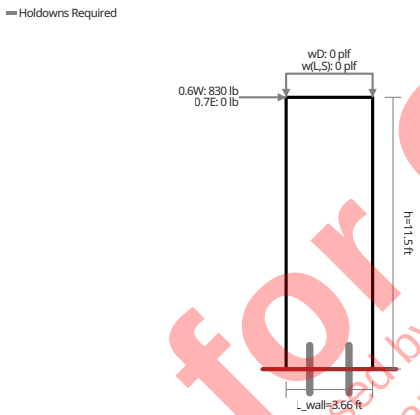
Chord Summary

	Required Number of Plies in Chord	$n_{plies,chords} =$	2
	Maximum Chord Tension Load	$T_{chord} =$	2665 lb
15%	Allowable Chord Tension	$T_a =$	17 940 lb
	Maximum Chord Compression Load	$C_{chord} =$	2915 lb
28%	Allowable Chord Compression	$C_a =$	10 312 lb

Holdown Design

	Holdown Designation		HDUE5-SDS3
50%	Holdown Capacity Check	$HD/HD' =$	2665 lb / 5375 lb
	Required Wood Fasteners	$WF =$	(10) 0.25 x 3 SDS

Shear Wall Diagram



Shear Wall Type (SDPWS 2021, Cl 4.3.2)

Shear Wall Type		Segmented

Sheating

Sheathing & Nail Pattern		7/16" OSB/Plywood, 8d@3"
Sheathed Sides		One Side
Blocking at Panel Edges		Blocked
Nail Spacing in Field of Panels	$s_{field} =$	12 in

Studs

Stud Size & Grade		2x6 D.Fir-L No. 2
Stud Spacing	$s_{stud} =$	24 in
Default Number of Plies in Chord	$n_{plies,default} =$	2

Design Criteria

Service Condition	Service? =	Dry
Studs are Incised?	Incised? =	No

Stud Properties

Depth	$d_{stud} =$	5.5 in
Gross Cross-Sectional Area of One Stud	$A_{g,stud} =$	8.25 in²
Net Cross-Sectional Area of One Stud	$A_{n,stud} =$	7.5 in²
Base Compression Parallel to Grain Allowable Stress	$F_{c,stud} =$	1350 psi
Base Compression Perpendicular to Grain Allowable Stress	$F_{c\perp,stud} =$	625 psi
Base Tension Parallel to Grain Allowable Stress	$F_{t,stud} =$	575 psi
Base Minimum Elastic Modulus	$E_{min,stud} =$	580 000 psi
Base Modulus of Elasticity	$E_{stud} =$	1.60×10^6 psi

Stud Elastic Modulus (NDS 2018 2.3)

Adjusted Minimum Elastic Modulus (X-axis)	$E'_{min} =$	580 000 psi
Adjusted Modulus of Elasticity	$E'_{stud} =$	1.60×10^6 psi

Chord Tension Design (NDS 2018 3.8)

Duration Factor	$C_{D,t} =$	1.6
Size Factor	$C_{F,t} =$	1.3
Adjusted Tension Strength	$F'_t =$	1196 psi

Capacity in Pure Axial Loading (NDS 2018 Section 3.7)

Critical Duration Factor - Pure Axial Loading	$C_{D,c} =$	1.6
Size Factor	$C_{F,c} =$	1.1
Fully Braced Compression Strength	$F^*_c =$	2376 psi
Governing Slenderness	$(\ell_e/d) =$	25.1
Adjusted Compression Strength	$F'_c =$	699 psi

Bearing Perpendicular to Stud (NDS 2018 Section 3.10)

Adjusted Bearing Design Value	$F'_{c\perp} =$	625 psi

Holdown Capacity

Holdown Capacity	$Holdown_{capacity} =$	5375 lb

Comments

MiTek®

MiTek, Inc.
400 Sunrise Ave., Suite 270
Roseville, CA 95661
916.755.3571

Re: 4962428
Sierra James - Cascade Cottage

The truss drawing(s) referenced below have been prepared by MiTek USA, Inc. under my direct supervision based on the parameters provided by Builders FirstSource (Beaverton, OR).

Pages or sheets covered by this seal: R92118410 thru R92118421

My license renewal date for the state of Oregon is December 31, 2026.

January 13,2026

Reinmuth, Dustin

IMPORTANT NOTE: The seal on these truss component designs is a certification that the engineer named is licensed in the jurisdiction(s) identified and that the designs comply with ANSI/TPI 1. These designs are based upon parameters shown (e.g., loads, supports, dimensions, shapes and design codes), which were given to MiTek or TRENCO. Any project specific information included is for MiTek's or TRENCO's customers file reference purpose only, and was not taken into account in the preparation of these designs. MiTek or TRENCO has not independently verified the applicability of the design parameters or the designs for any particular building. Before use, the building designer should verify applicability of design parameters and properly incorporate these designs into the overall building design per ANSI/TPI 1, Chapter 2.

Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage	
4962428	A01	Monopitch Supported Gable	1	1	Job Reference (optional)	R92118410

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005,

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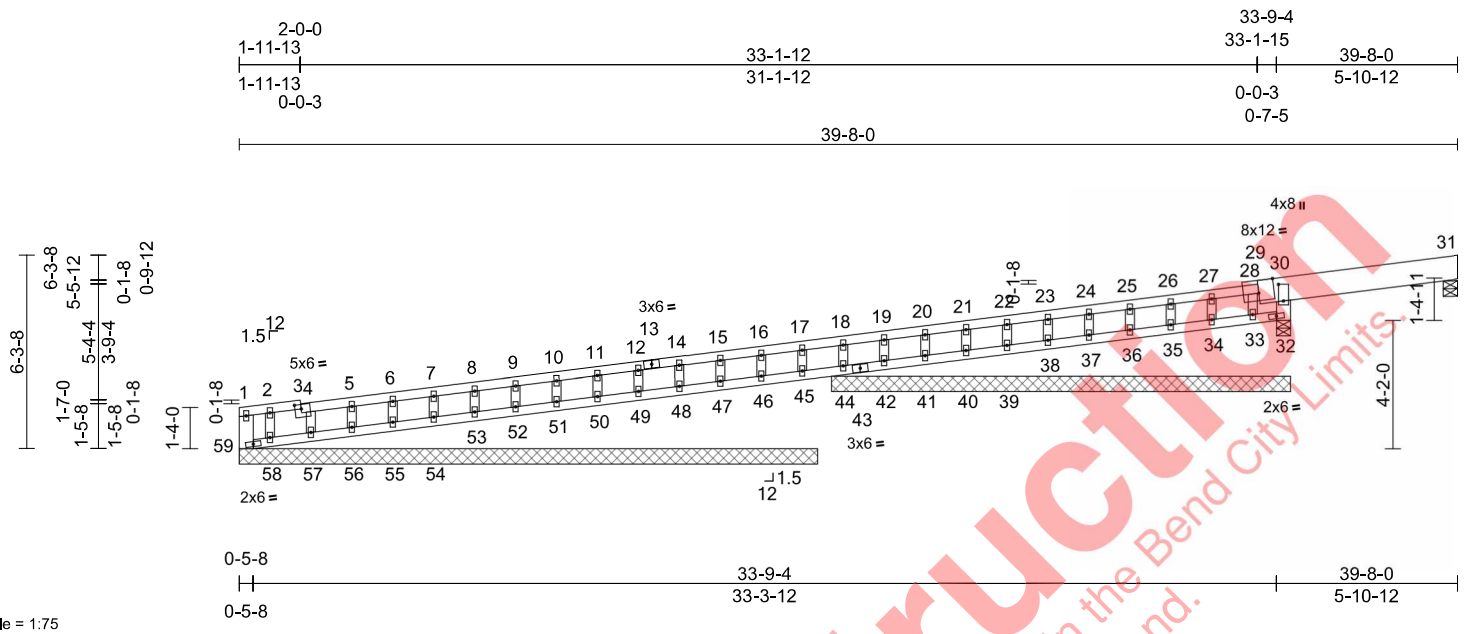

Scale = 1:75

Plate Offsets (X, Y): [3:0-2-8,0-1-12], [28:0-6-0,Edge], [30:0-6-8,0-2-0]

Loading	(psf)	Spacing	1-4-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.06	Vert(LL)	0.00	58-59	>999	240	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.06	Vert(CT)	0.00	58-59	>999	180		
BCLL	0.0*	Rep Stress Incr	YES	WB	0.03	Horz(CT)	-0.01	31	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-SH							Weight: 143 lb	FT = 10%

LUMBER

TOP CHORD 2x4 DF No.2 *Except* 29-13:2x4 DF No.1&Btr, 31-29:2x10 DF SS

BOT CHORD 2x4 DF No.2 *Except* 43-59:2x4 DF No.1&Btr

WEBS 2x6 DF No.2

OTHERS 2x4 DF Stud/Std

BRACING

TOP CHORD Structural wood sheathing directly applied or 6-0-0 oc purlins, except end verticals.

BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing, Except:
6-0-0 oc bracing: 56-57,46-47,44-45,42-44.

REACTIONS (size) 30=14-11-4, 31=0-5-8, 32=14-11-4, 33=14-11-4, 34=14-11-4, 35=14-11-4, 36=14-11-4, 37=14-11-4, 38=14-11-4, 39=14-11-4, 40=14-11-4, 41=14-11-4, 42=14-11-4, 44=14-11-4, 45=18-10-0, 46=18-10-0, 47=18-10-0, 48=18-10-0, 49=18-10-0, 50=18-10-0, 51=18-10-0, 52=18-10-0, 53=18-10-0, 54=18-10-0, 55=18-10-0, 56=18-10-0, 57=18-10-0, 58=18-10-0, 59=18-10-0

Max Horiz 59=88 (LC 12)

Max Uplift 30=-46 (LC 8), 31=-42 (LC 8), 33=-11 (LC 8), 34=-11 (LC 8), 35=-10 (LC 8), 36=-10 (LC 8), 37=-10 (LC 8), 38=-10 (LC 8), 39=-10 (LC 8), 40=-10 (LC 8), 41=-10 (LC 8), 42=-10 (LC 8), 44=-11 (LC 8), 45=-8 (LC 8), 46=-10 (LC 8), 47=-10 (LC 8), 48=-10 (LC 12), 49=-10 (LC 8), 50=-10 (LC 12), 51=-10 (LC 8), 52=-10 (LC 12), 53=-10 (LC 8), 54=-10 (LC 12), 55=-9 (LC 8), 56=-12 (LC 12), 58=-185 (LC 12)

Max Grav 30=187 (LC 1), 31=163 (LC 1), 32=13 (LC 3), 33=89 (LC 1), 34=101 (LC 1), 35=97 (LC 1), 36=98 (LC 1), 37=98 (LC 1), 38=98 (LC 1), 39=98 (LC 1), 40=98 (LC 1), 41=98 (LC 1), 42=98 (LC 1), 44=96 (LC 1), 45=100 (LC 1), 46=97 (LC 1), 47=98 (LC 1), 48=98 (LC 1), 49=98 (LC 1), 50=98 (LC 1), 51=98 (LC 1), 52=98 (LC 1), 53=98 (LC 1), 54=98 (LC 1), 55=98 (LC 1), 56=97 (LC 1), 57=101 (LC 1), 58=84 (LC 1), 59=163 (LC 12)

FORCES (lb) - Maximum Compression/Maximum Tension

TOP CHORD 1-59=-85/44, 1-2=-105/56, 2-4=-93/49, 4-5=-92/49, 5-6=-89/47, 6-7=-86/45, 7-8=-82/44, 8-9=-79/42, 9-10=-75/40, 10-11=-72/38, 11-12=-68/36, 12-14=-65/35, 14-15=-61/33, 15-16=-58/31, 16-17=-54/29, 17-18=-51/27, 18-19=-48/25, 19-20=-44/24, 20-21=-41/22, 21-22=-37/20, 22-23=-34/18, 23-24=-30/16, 24-25=-27/14, 25-26=-23/13, 26-27=-20/11, 27-28=-16/9, 28-30=-14/7, 30-31=-17/16

BOT CHORD 58-59=-12/7, 57-58=-2/2, 56-57=-2/2, 55-56=-2/2, 54-55=-2/2, 53-54=-2/2, 52-53=-2/2, 51-52=-2/2, 50-51=-2/2, 49-50=-2/2, 48-49=-2/2, 47-48=-2/2, 46-47=-2/2, 45-46=-2/2, 44-45=-3/1, 42-44=-2/2, 41-42=-2/2, 40-41=-2/2, 39-40=-2/2, 38-39=-2/2, 37-38=-2/2, 36-37=-2/2, 35-36=-2/2, 34-35=-2/2, 33-34=-2/2, 32-33=-1/1

WEBS 28-33=-74/20, 27-34=-83/21, 26-35=-79/20, 25-36=-80/20, 24-37=-80/20, 23-38=-80/20, 22-39=-80/20, 21-40=-80/20, 20-41=-80/20, 19-42=-80/20, 18-44=-80/20, 17-45=-80/20, 16-46=-80/20, 15-47=-80/20, 14-48=-80/20, 12-49=-80/20, 11-50=-80/20, 10-51=-80/20, 9-52=-80/20, 8-53=-80/20, 7-54=-80/20, 6-55=-80/21, 5-56=-79/19, 4-57=-83/8, 2-58=-68/107, 30-32=0/0

NOTES

1) Unbalanced roof live loads have been considered for this design.

EXPIRES: 12/31/2026

January 13,2026

Continued on page 2

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400 Sunrise Ave., Suite 270
Roseville, CA 95661
916.755.3571 / MiTek-US.com

2) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Corner(3E) 0-2-12 to 4-2-6, Exterior(2N) 4-2-6 to 39-5-4 zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
3) Truss designed for wind loads in the plane of the truss only. For studs exposed to wind (normal to the face), see Standard Industry Gable End Details as applicable, or consult qualified building designer as per ANSI/TPI 1.
4) All plates are 2x4 (||) MT20 unless otherwise indicated.
5) Truss to be fully sheathed from one face or securely braced against lateral movement (i.e. diagonal web).
6) Gable studs spaced at 1-4-0 oc.
7) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
8) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
9) Bearing at joint(s) 59, 32, 30 considers parallel to grain value using ANSI/TPI 1 angle to grain formula. Building designer should verify capacity of bearing surface.
10) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 11 lb uplift at joint 33, 11 lb uplift at joint 34, 10 lb uplift at joint 35, 10 lb uplift at joint 36, 10 lb uplift at joint 37, 10 lb uplift at joint 38, 10 lb uplift at joint 39, 10 lb uplift at joint 40, 10 lb uplift at joint 41, 10 lb uplift at joint 42, 11 lb uplift at joint 44, 8 lb uplift at joint 45, 10 lb uplift at joint 46, 10 lb uplift at joint 47, 10 lb uplift at joint 48, 10 lb uplift at joint 49, 10 lb uplift at joint 50, 10 lb uplift at joint 51, 10 lb uplift at joint 52, 10 lb uplift at joint 53, 10 lb uplift at joint 54, 9 lb uplift at joint 55, 12 lb uplift at joint 56, 185 lb uplift at joint 58, 46 lb uplift at joint 30 and 42 lb uplift at joint 31.

11) Beveled plate or shim required to provide full bearing surface with truss chord at joint(s) 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 44, 30, 31.

LOAD CASE(S) Standard

Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage	
4962428	A02	Roof Special	11	1	Job Reference (optional)	R92118411

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005,

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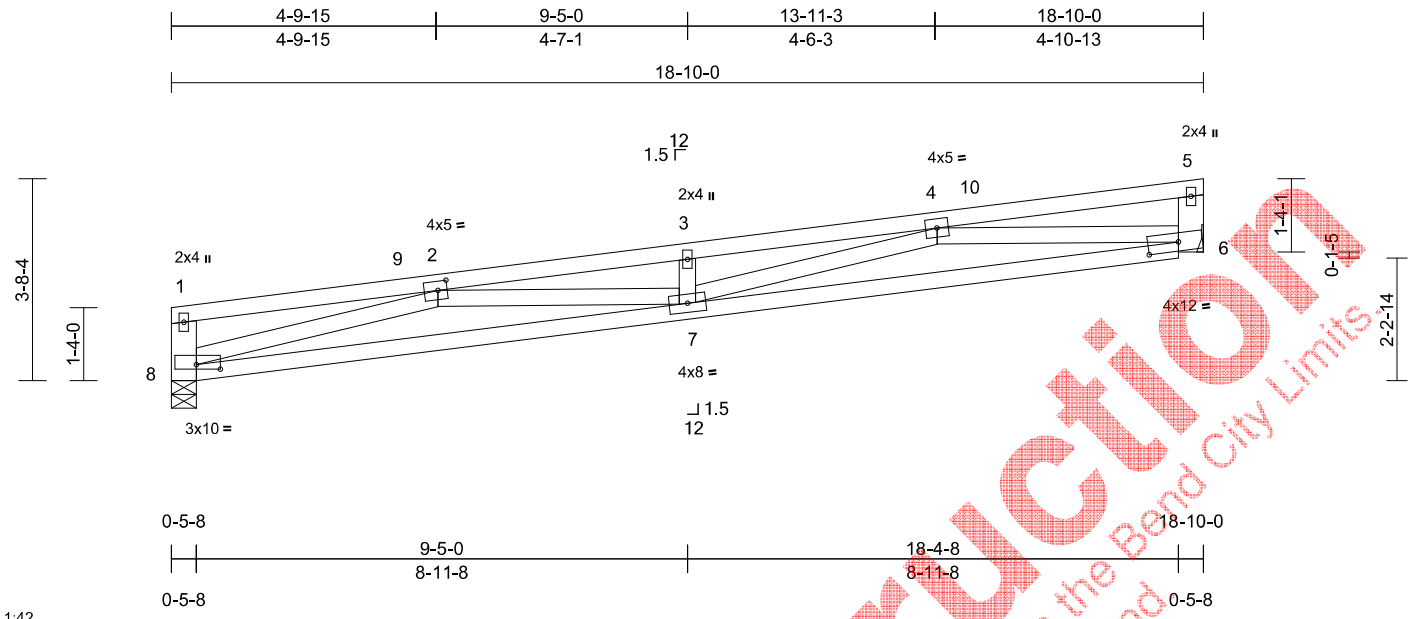

Scale = 1:42

Plate Offsets (X, Y): [2:0-2-0,0-2-0], [6:0-6-11,0-2-0], [8:0-5-4,0-1-0]

Loading	(psf)	Spacing	1-4-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.26	Vert(LL)	-0.22	7	>999	240	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.43	Vert(CT)	-0.35	7-8	>630	180		
BCLL	0.0*	Rep Stress Incr	YES	WB	0.91	Horz(CT)	0.05	6	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-SH							Weight: 80 lb	FT = 10%

LUMBER
TOP CHORD 2x4 DF No.1&Btr
BOT CHORD 2x4 DF No.1&Btr
WEBS 2x4 DF Stud/Std *Except* 8-1,5-6:2x6 DF No.2

BRACING
TOP CHORD Structural wood sheathing directly applied or 3-8-1 oc purlins, except end verticals.
BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing.

REACTIONS (size) 6= Mechanical, 8=0-5-8
Max Horiz 8=49 (LC 9)
Max Uplift 6=-68 (LC 12), 8=-60 (LC 8)
Max Grav 6=674 (LC 1), 8=674 (LC 1)

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-8=-164/56, 1-2=-170/12, 2-3=-2940/232, 3-4=-2930/241, 4-5=-164/2, 5-6=-127/58
BOT CHORD 7-8=-306/2116, 6-7=-318/2145
WEBS 2-7=0/813, 3-7=-263/72, 4-6=-1987/299, 2-8=-2066/291, 4-7=0/821

NOTES
1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Exterior(2E) 0-2-12 to 4-2-6, Interior (1) 4-2-6 to 18-7-4 zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
3) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
4) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
5) Refer to girder(s) for truss to truss connections.
6) Bearing at joint(s) 8 considers parallel to grain value using ANSI/TPI 1 angle to grain formula. Building designer should verify capacity of bearing surface.
7) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 60 lb uplift at joint 8 and 68 lb uplift at joint 6.

LOAD CASE(S) Standard

REGISTERED PROFESSIONAL ENGINEER
97587PE
OREGON
SEPTEMBER 14, 2021
DUSTIN REINMUTH

EXPIRES: 12/31/2026
January 13,2026

MiTek®
400 Sunrise Ave., Suite 270
Roseville, CA 95661
916.755.3571 / MiTek-US.com

Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage
4962428	A02A	Monopitch Supported Gable	1	1	R92118412 Job Reference (optional)

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005,

Run: 8.83 S Sep 3 2025 Print: 8.830 S Sep 3 2025 MiTek Industries, Inc. Mon Jan 12 18:12:44 Page: 1

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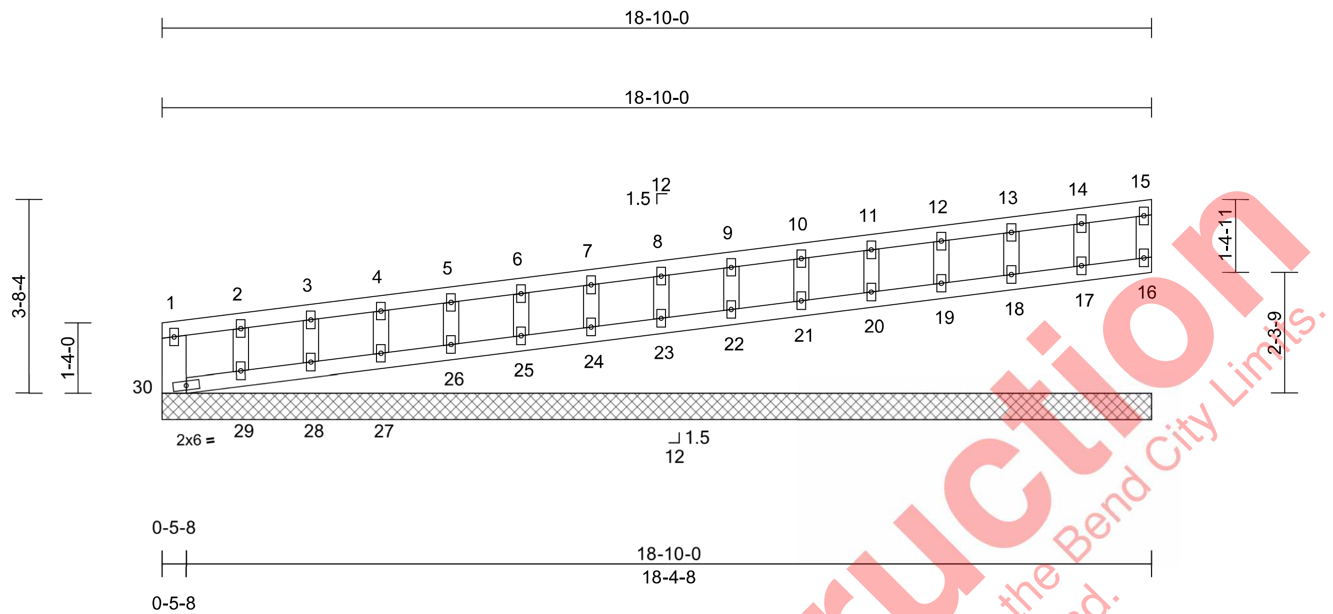

Scale = 1:43.9

Loading	(psf)	Spacing	2-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.10	Vert(LL)	n/a	-	n/a	999	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.04	Vert(TL)	n/a	-	n/a	999		
BCLL	0.0*	Rep Stress Incr	YES	WB	0.03	Horiz(TL)	0.00	16	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-R							Weight: 69 lb	FT = 10%

LUMBER

TOP CHORD 2x4 DF No.1&Btr
BOT CHORD 2x4 DF No.1&Btr
WEBS 2x6 DF No.2
OTHERS 2x4 DF Stud/Std

BRACING

TOP CHORD Structural wood sheathing directly applied or 6-0-0 oc purlins, except end verticals.
BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing.

REACTIONS (size) 16=18-10-0, 17=18-10-0, 18=18-10-0, 19=18-10-0, 20=18-10-0, 21=18-10-0, 22=18-10-0, 23=18-10-0, 24=18-10-0, 25=18-10-0, 26=18-10-0, 27=18-10-0, 28=18-10-0, 29=18-10-0, 30=18-10-0

Max Horiz 30=73 (LC 9)

Max Uplift 16=-29 (LC 12), 18=-21 (LC 12), 19=-13 (LC 8), 20=-15 (LC 12), 21=-14 (LC 8), 22=-15 (LC 12), 23=-15 (LC 12), 24=-15 (LC 8), 25=-15 (LC 12), 26=-14 (LC 8), 27=-17 (LC 12), 28=-4 (LC 8), 29=-61 (LC 12)

Max Grav 16=56 (LC 1), 17=148 (LC 1), 18=147 (LC 1), 19=147 (LC 1), 20=147 (LC 1), 21=147 (LC 1), 22=147 (LC 1), 23=147 (LC 1), 24=147 (LC 1), 25=147 (LC 1), 26=147 (LC 1), 27=147 (LC 1), 28=146 (LC 1), 29=154 (LC 1), 30=70 (LC 20)

FORCES (lb) - Maximum Compression/Maximum Tension

TOP CHORD 1-30=-51/8, 15-16=-45/37, 1-2=-61/27, 2-3=-48/22, 3-4=-43/19, 4-5=-36/17, 5-6=-29/14, 6-7=-22/12, 7-8=-17/10, 8-9=-16/8, 9-10=-14/11, 10-11=-13/18, 11-12=-12/25, 12-13=-14/31, 13-14=-16/39, 14-15=-18/43

BOT CHORD 29-30=-65/44, 28-29=-58/41, 27-28=-60/42, 26-27=-59/41, 25-26=-59/41, 24-25=-59/41, 23-24=-59/41, 22-23=-59/41, 21-22=-59/41, 20-21=-59/41, 19-20=-59/41, 18-19=-60/41, 17-18=-58/41, 16-17=-63/43

WEBS 14-17=-121/26, 13-18=-120/49, 12-19=-120/43, 11-20=-120/44, 10-21=-120/44, 9-22=-120/44, 8-23=-120/44, 7-24=-120/44, 6-25=-120/44, 5-26=-120/44, 4-27=-120/46, 3-28=-120/39, 2-29=-125/95

NOTES

1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Corner(3E) 0-2-12 to 3-2-12, Exterior(2N) 3-2-12 to 18-8-4 zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
3) Truss designed for wind loads in the plane of the truss only. For studs exposed to wind (normal to the face), see Standard Industry Gable End Details as applicable, or consult qualified building designer as per ANSI/TPI 1.
4) All plates are 2x4 (||) MT20 unless otherwise indicated.
5) Gable requires continuous bottom chord bearing.
6) Truss to be fully sheathed from one face or securely braced against lateral movement (i.e. diagonal web).
7) Gable studs spaced at 1-4-0 oc.
8) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
9) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
10) Bearing at joint(s) 30 considers parallel to grain value using ANSI/TPI 1 angle to grain formula. Building designer should verify capacity of bearing surface.
11) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 29 lb uplift at joint 16, 21 lb uplift at joint 18, 13 lb uplift at joint 19, 15 lb uplift at joint 20, 14 lb uplift at joint 21, 15 lb uplift at joint 22, 15 lb uplift at joint 23, 15 lb uplift at joint 24, 15 lb uplift at joint 25, 14 lb uplift at joint 26, 17 lb uplift at joint 27, 4 lb uplift at joint 28 and 61 lb uplift at joint 29.
12) Beveled plate or shim required to provide full bearing surface with truss chord at joint(s) 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29.

LOAD CASE(S) Standard

EXPIRES: 12/31/2026

January 13,2026

Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage
4962428	A03	Jack-Closed	1	1	R92118413 Job Reference (optional)

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005, Run: 8.83 S Sep 3 2025 Print: 8.830 S Sep 3 2025 MiTek Industries, Inc. Mon Jan 12 18:12:44 Page: 1

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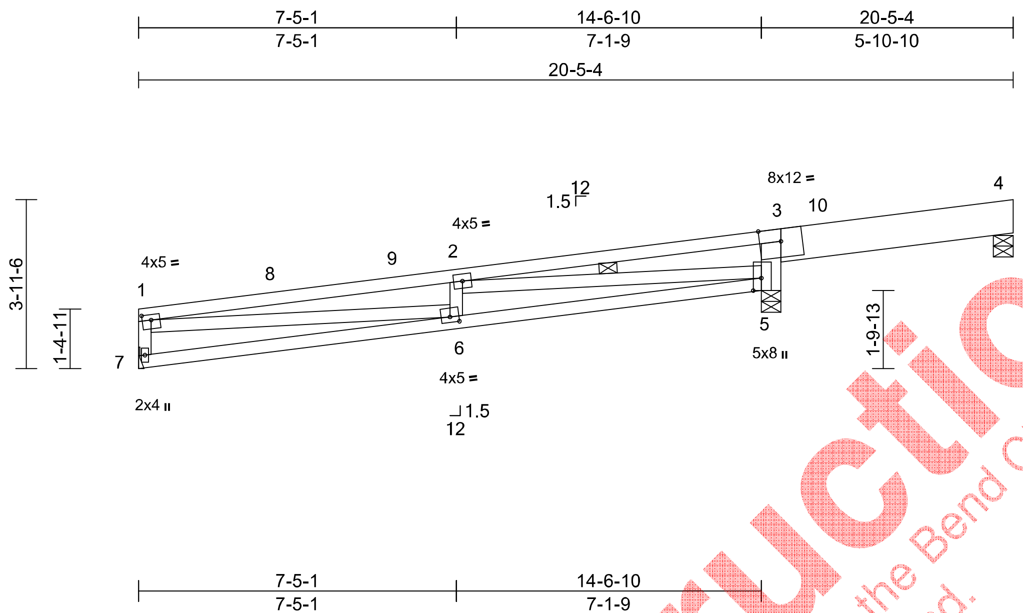

Scale = 1:53.8

Plate Offsets (X, Y): [1:0-2-8,0-1-8], [5:0-3-8,0-2-4], [6:0-2-8,0-1-8]

Loading	(psf)	Spacing	1-4-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.70	Vert(LL)	-0.16	5-6	>999	240	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.50	Vert(CT)	-0.25	5-6	>680	180		
BCLL	0.0*	Rep Stress Incr	YES	WB	0.66	Horz(CT)	0.02	5	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-SH							Weight: 84 lb	FT = 10%

LUMBER
TOP CHORD 2x10 DF SS *Except* 3-1:2x4 DF No.2
BOT CHORD 2x4 DF No.2
WEBS 2x4 DF Stud/Std *Except* 3-5:2x6 DF No.2

BRACING
TOP CHORD Structural wood sheathing directly applied or 3-2-10 oc purlins, except end verticals.
BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing.
WEBS 1 Row at midpt 2-5

REACTIONS (size) 4=0-5-8, 5=0-5-8, 7= Mechanical
Max Horiz 7=39 (LC 9)
Max Uplift 4=-24 (LC 8), 5=-124 (LC 8), 7=-36 (LC 8)
Max Grav 4=81 (LC 1), 5=821 (LC 1), 7=494 (LC 1)

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-7=-462/108, 1-2=-1735/193, 2-4=-94/253
BOT CHORD 6-7=-93/208, 5-6=-237/1714
WEBS 3-5=-554/163, 1-6=-147/1493, 2-6=-138/95, 2-5=-1921/289

NOTES
1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Exterior(2E) 0-1-12 to 3-1-12, Interior (1) 3-1-12 to 20-2-8 zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
3) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
4) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
5) Refer to girder(s) for truss to truss connections.
6) Bearing at joint(s) 5 considers parallel to grain value using ANSI/TPI 1 angle to grain formula. Building designer should verify capacity of bearing surface.
7) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 36 lb uplift at joint 7, 24 lb uplift at joint 4 and 124 lb uplift at joint 5.
8) Beveled plate or shim required to provide full bearing surface with truss chord at joint(s) 4.

LOAD CASE(S) Standard

EXPIRES: 12/31/2026

January 13,2026

Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage
4962428	A04	Jack-Closed	10	1	R92118414 Job Reference (optional)

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005, Run: 8.83 S Sep 3 2025 Print: 8.830 S Sep 3 2025 MiTek Industries, Inc. Mon Jan 12 18:12:44 Page: 1

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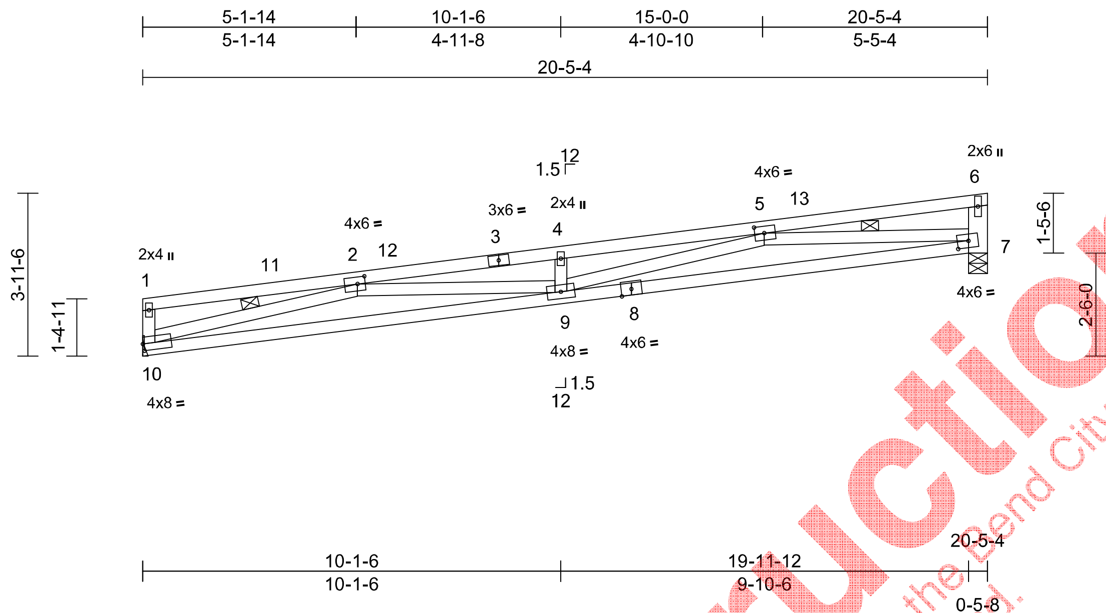

Scale = 1:55.7

Plate Offsets (X, Y): [2:0-2-4,0-2-0], [5:0-2-12,0-2-0], [7:0-3-4,0-2-0], [10:0-0-4,0-2-0]

Loading	(psf)	Spacing	1-4-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.44	Vert(LL)	-0.34	9-10	>703	240	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.77	Vert(CT)	-0.58	9-10	>414	180		
BCLL	0.0*	Rep Stress Incr	YES	WB	0.61	Horz(CT)	0.07	7	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-SH							Weight: 87 lb	FT = 10%

LUMBER

TOP CHORD 2x4 DF No.2
BOT CHORD 2x4 DF No.2
WEBS 2x4 DF Stud/Std *Except* 7-6:2x6 DF No.2

BRACING

TOP CHORD Structural wood sheathing directly applied or 2-11-4 oc purlins, except end verticals.
BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing.
WEBS 1 Row at midpt 5-7, 2-10

REACTIONS (size) 7=0-5-8, 10= Mechanical
Max Horiz 10=40 (LC 8)
Max Uplift 7=-74 (LC 8), 10=-66 (LC 8)
Max Grav 7=736 (LC 1), 10=735 (LC 1)

FORCES (lb) - Maximum Compression/Maximum Tension

TOP CHORD 1-2=-12/21, 2-4=-3518/270, 4-5=-3506/280, 5-6=-190/1, 6-7=-140/56
BOT CHORD 9-10=-356/2524, 7-9=-351/2602
WEBS 1-10=-130/48, 4-9=-273/76, 5-9=0/942, 2-9=0/980, 5-7=-2413/331, 2-10=-2639/328

NOTES

1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Exterior(2E) 0-1-12 to 3-1-12, Interior (1) 3-1-12 to 20-2-8 zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
3) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
4) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
5) Refer to girder(s) for truss to truss connections.
6) Bearing at joint(s) 7 considers parallel to grain value using ANSI/TPI 1 angle to grain formula. Building designer should verify capacity of bearing surface.
7) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 66 lb uplift at joint 10 and 74 lb uplift at joint 7.

LOAD CASE(S) Standard

EXPIRES: 12/31/2026

January 13,2026

MiTek®
400 Sunrise Ave., Suite 270
Roseville, CA 95661
916.755.3571 / MiTek-US.com

Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage	
4962428	A05	Jack-Closed	8	1	Job Reference (optional)	R92118415

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005,

Run: 8.83 S Sep 3 2025 Print: 8.830 S Sep 3 2025 MiTek Industries, Inc. Mon Jan 12 18:12:45 Page: 1
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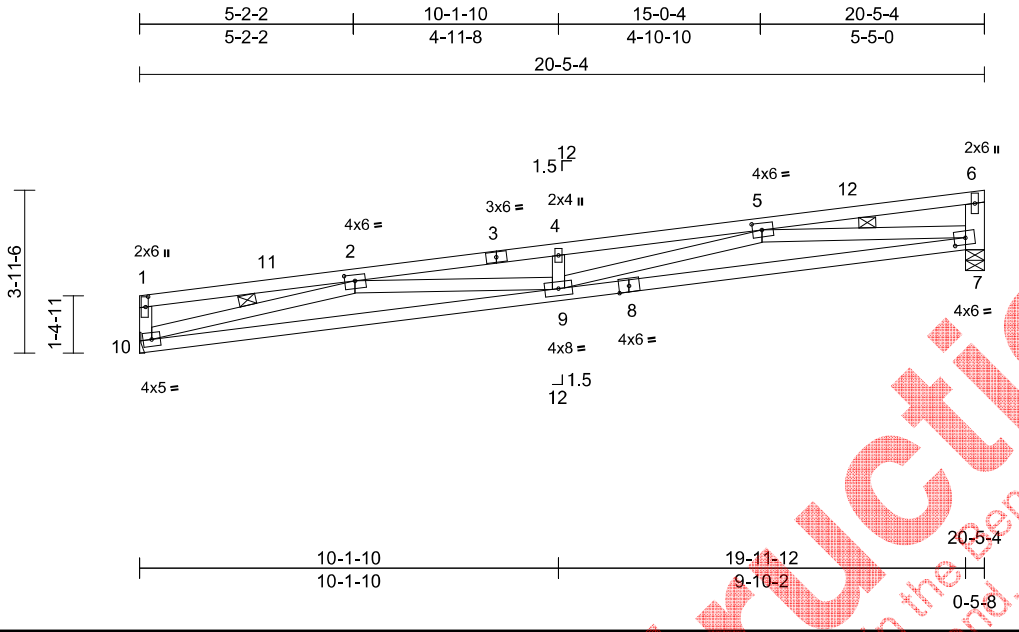

Scale = 1:55.7

Plate Offsets (X, Y): [1:0-3-0,0-0-12], [2:0-3-0,0-1-12], [5:0-2-12,0-2-0], [7:0-3-4,0-2-0]

Loading	(psf)	Spacing	1-4-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.45	Vert(LL)	-0.34	9	>707	240	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.71	Vert(CT)	-0.54	9-10	>443	180		
BCLL	0.0*	Rep Stress Incr	YES	WB	0.57	Horz(CT)	0.07	7	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-SH							Weight: 87 lb	FT = 10%

LUMBER
TOP CHORD 2x4 DF No.2
BOT CHORD 2x4 DF No.2
WEBS 2x4 DF Stud/Std
OTHERS 2x6 DF No.2

BRACING
TOP CHORD Structural wood sheathing directly applied or 2-10-15 oc purlins, except end verticals.
BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing.
WEBS 1 Row at midpt 2-10, 5-7

REACTIONS (size) 7=0-5-8, 10= Mechanical
Max Horiz 10=51 (LC 9)
Max Uplift 7=-74 (LC 12), 10=-66 (LC 8)
Max Grav 7=736 (LC 1), 10=735 (LC 1)

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-10=-174/53, 1-2=-177/9, 2-4=-3507/275, 4-5=-3496/285, 5-6=-193/0, 6-7=-139/58
BOT CHORD 9-10=-344/2532, 7-9=-337/2588
WEBS 2-10=-2482/325, 4-9=-282/77, 2-9=0/960, 5-9=0/946, 5-7=-2395/330

NOTES
1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Exterior(2E) 0-1-12 to 3-1-12, Interior (1) 3-1-12 to 20-2-8 zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
3) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
4) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
5) Refer to girder(s) for truss to truss connections.
6) Bearing at joint(s) 7 considers parallel to grain value using ANSI/TPI 1 angle to grain formula. Building designer should verify capacity of bearing surface.
7) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 66 lb uplift at joint 10 and 74 lb uplift at joint 7.

LOAD CASE(S) Standard

EXPIRES: 12/31/2026
January 13,2026

MiTek®
400 Sunrise Ave., Suite 270
Roseville, CA 95661
916.755.3571 / MiTek-US.com

Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage
4962428	A05A	Jack-Closed Supported Gable	1	1	R92118416 Job Reference (optional)

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005, Run: 8.83 E Dec 31 2024 Print: 8.830 E Dec 31 2024 MiTek Industries, Inc. Tue Jan 13 14:45:23 Page: 1
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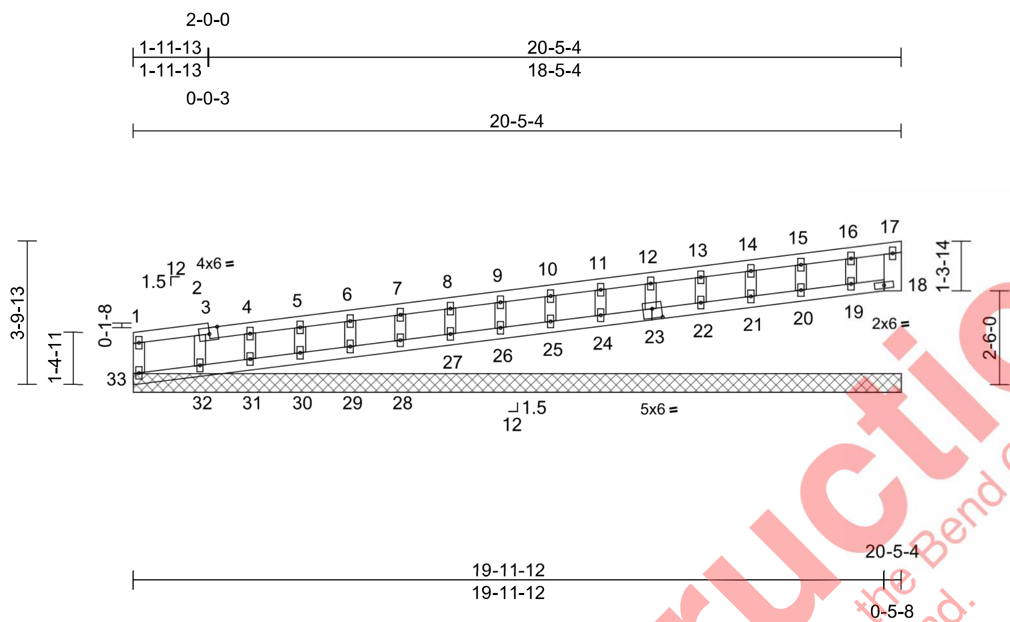

Scale = 1:53.9

Plate Offsets (X, Y): [3:0-2-12,Edge], [23:0-3-0,0-3-0]

Loading	(psf)	Spacing	2-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.09	Vert(LL)	n/a	-	n/a	999	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.04	Vert(TL)	n/a	-	n/a	999		
BCLL	0.0*	Rep Stress Incr	YES	WB	0.03	Horiz(TL)	0.00	18	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-R							Weight: 72 lb	FT = 10%

LUMBER
TOP CHORD 2x4 DF Stud/Std *Except* 17-3:2x4 DF No.1&Btr
BOT CHORD 2x4 DF No.2
WEBS 2x4 DF Stud/Std *Except* 17-18:2x6 DF No.2
OTHERS 2x4 DF Stud/Std

BRACING
TOP CHORD Structural wood sheathing directly applied or 6-0-0 oc purlins, except end verticals.
BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing.

REACTIONS All bearings 20-5-4.
(lb) - Max Horiz 33=73 (LC 9)
Max Uplift All uplift 100 (lb) or less at joint(s) 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32
Max Grav All reactions 250 (lb) or less at joint (s) 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33

FORCES (lb) - Max. Comp./Max. Ten. - All forces 250 (lb) or less except when shown.

NOTES
1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Corner(3E) 0-1-12 to 3-1-4, Exterior(2N) 3-1-4 to 20-2-8 zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
3) Truss designed for wind loads in the plane of the truss only. For studs exposed to wind (normal to the face), see Standard Industry Gable End Details as applicable, or consult qualified building designer as per ANSI/TPI 1.
4) All plates are 2x4 (||) MT20 unless otherwise indicated.
5) Gable requires continuous bottom chord bearing.
6) Truss to be fully sheathed from one face or securely braced against lateral movement (i.e. diagonal web).
7) Gable studs spaced at 1-4-0 oc.
8) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
9) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
10) Bearing at joint(s) 18 considers parallel to grain value using ANSI/TPI 1 angle to grain formula. Building designer should verify capacity of bearing surface.
11) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 100 lb uplift at joint (s) 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32.
12) Beveled plate or shim required to provide full bearing surface with truss chord at joint(s) 33, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32.

LOAD CASE(S) Standard

EXPIRES: 12/31/2026
January 13,2026

Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage
4962428	BG	Flat Girder	1	3	R92118417 Job Reference (optional)

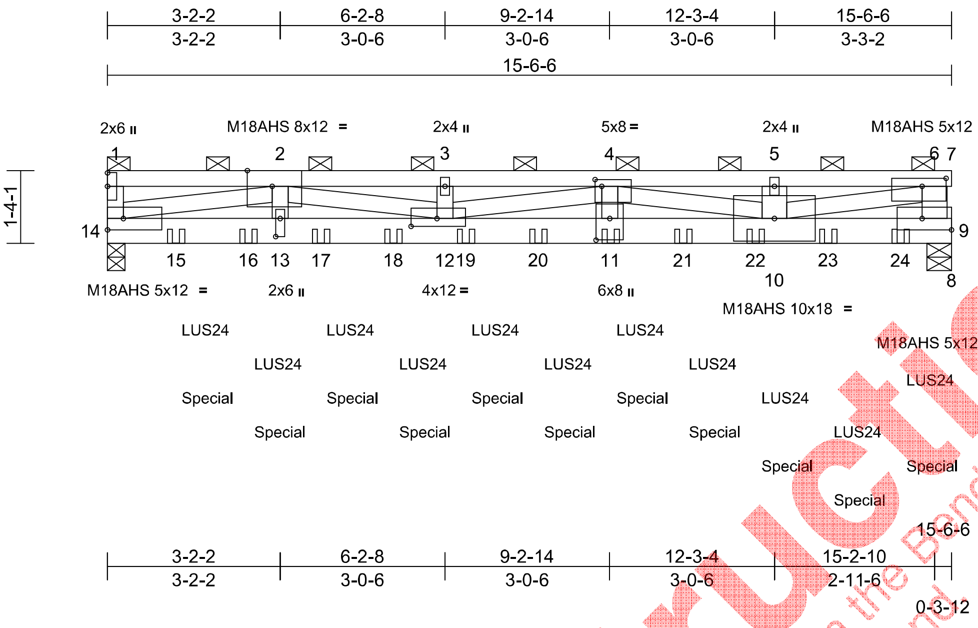

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Plate Offsets (X, Y): [2:0-5-8,Edge], [4:0-1-8,0-1-8], [6:0-5-4,0-1-12], [9:Edge,0-2-8], [11:0-4-12,0-3-0], [12:0-5-12,0-1-12], [13:0-4-0,0-1-0]

Loading	(psf)	Spacing	1-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.99	Vert(LL)	-0.41	11-12	>445	240	M18AHS	169/162
TCDL	10.0	Lumber DOL	1.15	BC	0.93	Vert(CT)	-0.63	11-12	>285	180	MT20	220/195
BCLL	0.0*	Rep Stress Incr	NO	WB	0.78	Horz(CT)	0.08	9	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-SH							Weight: 235 lb	FT = 10%

LUMBER
TOP CHORD 2x4 DF 2400F 2.0E
BOT CHORD 2x6 DF 2400F 2.0E
WEBS 2x4 DF No.2 *Except* 6-9,10-5:2x6 DF No.2, 6-10:2x4 DF No.1&Btr, 13-2,12-3,11-4,10-4:2x4 DF Stud/Std

BRACING
TOP CHORD 2-0-0 oc purlins (2-7-9 max.): 1-7, except end verticals.
BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing.

REACTIONS (size) 9=0-5-8, 14=0-3-14
Max Horiz 14=-14 (LC 10)
Max Uplift 9=-844 (LC 9), 14=-766 (LC 8)
Max Grav 9=8339 (LC 1), 14=7620 (LC 25)

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-14=-307/62, 1-2=-1272/155, 2-3=-28944/3306, 3-4=-28944/3306, 4-5=-18999/2172, 5-6=-18999/2172, 6-7=0/0, 6-9=-5785/694
BOT CHORD 13-14=-2278/19830, 12-13=-2278/19830, 11-12=-3422/29876, 10-11=-3422/29876, 9-10=-329/2809, 8-9=0/0
WEBS 6-10=-1943/17037, 2-13=-285/3040, 2-14=-19478/2224, 2-12=-1093/9566, 3-12=-43/117, 4-11=-339/3497, 4-10=-11416/1308, 5-10=-57/318, 4-12=-977/118

NOTES
1) 3-ply truss to be connected together with 10d (0.131"x3") nails as follows:
Top chords connected as follows: 2x4 - 1 row at 0-6-0 oc, 2x6 - 2 rows staggered at 0-9-0 oc.
Bottom chords connected as follows: 2x6 - 2 rows staggered at 0-8-0 oc.
Web connected as follows: 2x4 - 1 row at 0-9-0 oc, 2x6 - 2 rows staggered at 0-9-0 oc.
2) All loads are considered equally applied to all plies, except if noted as front (F) or back (B) face in the LOAD CASE(S) section. Ply to ply connections have been provided to distribute only loads noted as (F) or (B), unless otherwise indicated.
3) Unbalanced roof live loads have been considered for this design.
4) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Corner (3) zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
5) Provide adequate drainage to prevent water ponding.
6) All plates are MT20 plates unless otherwise indicated.
7) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
8) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
9) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 766 lb uplift at joint 14 and 844 lb uplift at joint 9.
10) Graphical purlin representation does not depict the size or the orientation of the purlin along the top and/or bottom chord.
11) Use Simpson Strong-Tie LUS24 (4-10d Girder, 2-10d Truss) or equivalent spaced at 1-4-0 oc max. starting at 1-3-2 from the left end to 14-7-2 to connect truss(es) to front face of bottom chord.
12) Fill all nail holes where hanger is in contact with lumber.

LOAD CASE(S) Standard
1) Dead + Roof Live (balanced): Lumber Increase=1.15, Plate Increase=1.15
Uniform Loads (lb/ft)
Vert: 1-6=-45, 6-7=-45, 8-14=-10
Concentrated Loads (lb)
Vert: 11=-1396 (F=-667, B=-729), 15=-1154 (F=-667, B=-487), 16=-1396 (F=-667, B=-729), 17=-1396 (F=-667, B=-729), 18=-1396 (F=-667, B=-729), 19=-1396 (F=-667, B=-729), 20=-1396 (F=-667, B=-729), 21=-1396 (F=-667, B=-729), 22=-1396 (F=-667, B=-729), 23=-1396 (F=-667, B=-729), 24=-1396 (F=-667, B=-729)

REGISTERED PROFESSIONAL ENGINEER
97587PE
OREGON
SEPTEMBER 14, 2021
DUSTIN REINMUTH
EXPIRES: 12/31/2026
January 13,2026

MiTek®
400 Sunrise Ave., Suite 270
Roseville, CA 95661
916.755.3571 / MiTek-US.com

Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage
4962428	BG2	Flat Girder	1	3	R92118418
					Job Reference (optional)

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005,

Run: 8.83 S Sep 3 2025 Print: 8.830 S Sep 3 2025 MiTek Industries, Inc. Mon Jan 12 18:12:46
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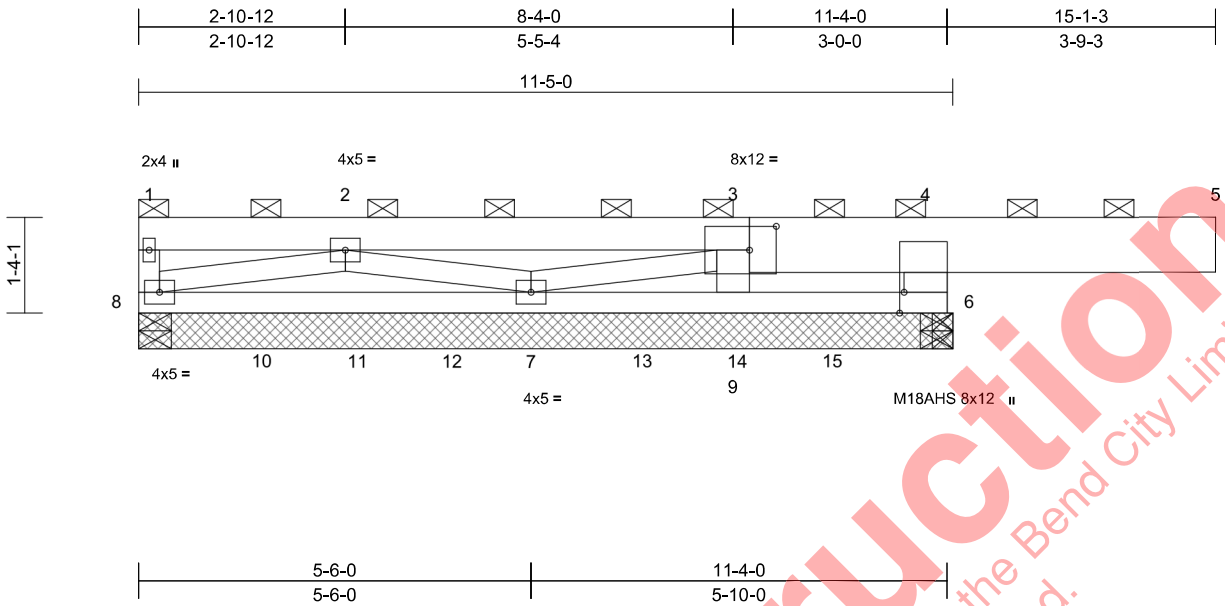

Scale = 1:32.3

Plate Offsets (X, Y): [3:0-4-8,0-4-0], [6:0-3-8,Edge]

Loading	(psf)	Spacing	2-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.94	Vert(LL)	-0.07	6-7	>889	240	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.92	Vert(CT)	-0.12	6-7	>562	180	M18AHS	169/162
BCLL	0.0*	Rep Stress Incr	NO	WB	0.31	Horz(CT)	0.01	7	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-SH							Weight: 212 lb	FT = 10%

LUMBER
TOP CHORD 2x10 DF SS *Except* 3-1:2x6 DF No.2
BOT CHORD 2x4 DF No.1&Btr
WEBS 2x4 DF Stud/Std *Except* 4-6:2x8 DF No.2
OTHERS 2x6 DF No.2

BRACING
TOP CHORD 2-0-0 oc purlins (6-0-0 max.): 1-5, 3-9, except end verticals.
BOT CHORD Rigid ceiling directly applied or 6-0-0 oc bracing.

REACTIONS (size) 6=0-5-8, 7=11-5-0, 8=0-5-8
Max Horiz 8=-39 (LC 31)
Max Grav 6=8522 (LC 1), 7=5269 (LC 25), 8=2819 (LC 1)

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-8=-536/0, 1-2=-637/63, 2-4=-1829/3250, 4-5=0/0, 3-9=0/0, 4-6=-7500/544
BOT CHORD 7-8=0/2731, 6-7=-3246/1854
WEBS 2-8=-2220/0, 2-7=-4679/0, 3-7=-2620/2066

NOTES
1) 3-ply truss to be connected together with 10d (0.131"x3") nails as follows:
Top chords connected as follows: 2x4 - 1 row at 0-9-0 oc, 2x6 - 2 rows staggered at 0-8-0 oc, 2x10 - 5 rows staggered at 0-4-0 oc, 2x8 - 2 rows staggered at 0-9-0 oc.
Bottom chords connected as follows: 2x4 - 1 row at 0-4-0 oc.
Web connected as follows: 2x4 - 1 row at 0-9-0 oc.
2) All loads are considered equally applied to all plies, except if noted as front (F) or back (B) face in the LOAD CASE(S) section. Ply to ply connections have been provided to distribute only loads noted as (F) or (B), unless otherwise indicated.
3) Unbalanced roof live loads have been considered for this design.
4) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Corner (3) zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
5) Provide adequate drainage to prevent water ponding.
6) All plates are MT20 plates unless otherwise indicated.
7) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
8) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
9) TBE4 Simpson Strong-Tie connectors recommended to connect truss to bearing walls due to UPLIFT at jt(s) 6. This connection is for uplift only and does not consider lateral forces.
10) Load case(s) 1 has/have been modified. Building designer must review loads to verify that they are correct for the intended use of this truss.
11) Graphical purlin representation does not depict the size or the orientation of the purlin along the top and/or bottom chord.
12) Hanger(s) or other connection device(s) shall be provided sufficient to support concentrated load(s) 1843 lb down and 779 lb up at 15-1-3 on top chord, and 726 lb down and 71 lb up at 0-1-12, 722 lb down and 74 lb up at 1-8-12, 722 lb down and 74 lb up at 3-0-12, 722 lb down and 74 lb up at 4-4-12, 722 lb down and 74 lb up at 5-8-12, 722 lb down and 74 lb up at 7-0-12, and 722 lb down and 74 lb up at 8-4-12, and 722 lb down and 74 lb up at 9-8-12 on bottom chord. The design/selection of such connection device(s) is the responsibility of others.
13) Special hanger(s) or other connection device(s) shall be provided at 0-4-12 from the left end sufficient to connect trusses to back face of bottom chord, skewed 0.0 deg. to the left, sloping 7.1 deg up.. The design/selection of such special connection device(s) is the responsibility of others.

LOAD CASE(S) Standard
1) Dead + Roof Live (balanced): Lumber Increase=1.15, Plate Increase=1.15
Uniform Loads (lb/ft)
Vert: 1-3=-543 (F=-453), 3-4=-543 (F=-453), 4-5=-543 (F=-453), 6-8=-20
Concentrated Loads (lb)
Vert: 8=-726 (B), 5=-1843 (F), 7=-722 (B), 10=-722 (B), 11=-722 (B), 12=-722 (B), 13=-722 (B), 14=-722 (B), 15=-722 (B)

EXPIRES: 12/31/2026
January 13,2026

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Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage
4962428	BP1	Blocking Supported Gable	11	1	R92118419
					Job Reference (optional)

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005,

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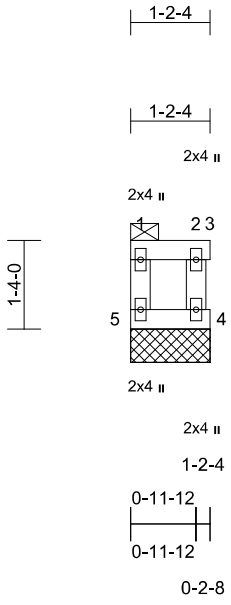

Scale = 1:34.6

Loading	(psf)	Spacing	2-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.34	Vert(LL)	n/a	-	n/a	999	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.14	Vert(TL)	n/a	-	n/a	999		
BCLL	0.0*	Rep Stress Incr	NO	WB	0.00	Horiz(TL)	0.00	3	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-R							Weight: 5 lb	FT = 10%

LUMBER
TOP CHORD 2x4 DF No.2
BOT CHORD 2x4 DF No.2
WEBS 2x4 DF Stud/Std

BRACING
TOP CHORD 2-0-0 oc purlins: 1-3, except end verticals.
BOT CHORD Rigid ceiling directly applied or 6-0-0 oc bracing.

REACTIONS (size) 3=1-2-4, 4=1-2-4, 5=1-2-4
Max Horiz 5=-78 (LC 29)
Max Uplift 3=-170 (LC 32), 4=-117 (LC 32), 5=-284 (LC 29)
Max Grav 3=167 (LC 33), 4=119 (LC 49), 5=287 (LC 36)

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-5=-139/136, 1-2=-115/119, 2-3=-48/48, 2-4=-61/70
BOT CHORD 4-5=-161/147

NOTES
1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Corner (3) zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
3) Truss designed for wind loads in the plane of the truss only. For studs exposed to wind (normal to the face), see Standard Industry Gable End Details as applicable, or consult qualified building designer as per ANSI/TPI 1.
4) Provide adequate drainage to prevent water ponding.
5) Gable requires continuous bottom chord bearing.
6) Truss to be fully sheathed from one face or securely braced against lateral movement (i.e. diagonal web).
7) Gable studs spaced at 2-0-0 oc.
8) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
9) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
10) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 284 lb uplift at joint 5, 170 lb uplift at joint 3 and 117 lb uplift at joint 4.
11) This truss has been designed for a total drag load of 275 lb. Lumber DOL=(1.33) Plate grip DOL=(1.33) Connect truss to resist drag loads along bottom chord from 0-0-0 to 1-2-4 for 231.6 plf.
12) Graphical purlin representation does not depict the size or the orientation of the purlin along the top and/or bottom chord.

LOAD CASE(S) Standard

REGISTERED PROFESSIONAL ENGINEER
97587PE
OREGON
SEPTEMBER 14, 2021
DUSTIN REINMUTH

EXPIRES: 12/31/2026
January 13,2026

MiTek®
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Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage
4962428	BP2	Blocking Supported Gable	20	1	R92118420 Job Reference (optional)

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005,

Run: 8.83 S Sep 3 2025 Print: 8.830 S Sep 3 2025 MiTek Industries, Inc. Mon Jan 12 18:12:46

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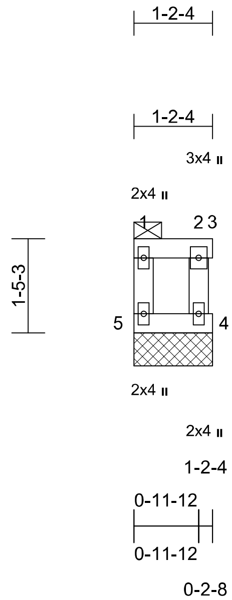

Scale = 1:35

Loading	(psf)	Spacing	2-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.37	Vert(LL)	n/a	-	n/a	999	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.15	Vert(TL)	n/a	-	n/a	999		
BCLL	0.0*	Rep Stress Incr	NO	WB	0.00	Horiz(TL)	-0.01	3	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-R							Weight: 6 lb	FT = 10%

LUMBER
TOP CHORD 2x4 DF No.2
BOT CHORD 2x4 DF No.2
WEBS 2x4 DF Stud/Std

BRACING
TOP CHORD 2-0-0 oc purlins: 1-3, except end verticals.
BOT CHORD Rigid ceiling directly applied or 6-0-0 oc bracing.

REACTIONS (size) 3=1-2-4, 4=1-2-4, 5=1-2-4
Max Horiz 5=81 (LC 32)
Max Uplift 3=-184 (LC 32), 4=-132 (LC 32), 5=-313 (LC 29)
Max Grav 3=181 (LC 33), 4=134 (LC 33), 5=316 (LC 36)

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-5=-152/145, 1-2=-116/119, 2-3=-48/48, 2-4=-62/69
BOT CHORD 4-5=-163/148

NOTES
1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Corner (3) zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
3) Truss designed for wind loads in the plane of the truss only. For studs exposed to wind (normal to the face), see Standard Industry Gable End Details as applicable, or consult qualified building designer as per ANSI/TPI 1.
4) Provide adequate drainage to prevent water ponding.
5) Gable requires continuous bottom chord bearing.
6) Truss to be fully sheathed from one face or securely braced against lateral movement (i.e. diagonal web).
7) Gable studs spaced at 2-0-0 oc.
8) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
9) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
10) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 313 lb uplift at joint 5, 184 lb uplift at joint 3 and 132 lb uplift at joint 4.
11) This truss has been designed for a total drag load of 275 lb. Lumber DOL=(1.33) Plate grip DOL=(1.33) Connect truss to resist drag loads along bottom chord from 0-0-0 to 1-2-4 for 231.6 plf.
12) Graphical purlin representation does not depict the size or the orientation of the purlin along the top and/or bottom chord.

LOAD CASE(S) Standard

EXPIRES: 12/31/2026
January 13,2026

MiTek®
400 Sunrise Ave., Suite 270
Roseville, CA 95661
916.755.3571 / MiTek-US.com

Job	Truss	Truss Type	Qty	Ply	Sierra James - Cascade Cottage
4962428	BP3	Blocking Supported Gable	1	1	R92118421
					Job Reference (optional)

Builders FirstSource (Beaverton, OR), Beaverton, OR - 97005,

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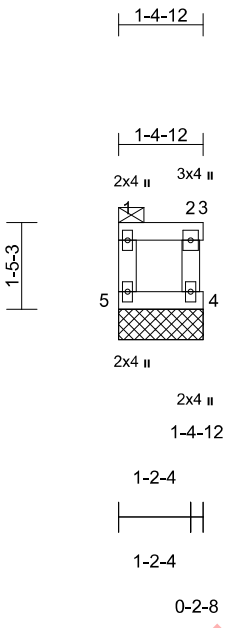

Scale = 1:38.1

Loading	(psf)	Spacing	2-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL (roof)	35.0	Plate Grip DOL	1.15	TC	0.39	Vert(LL)	n/a	-	n/a	999	MT20	220/195
TCDL	10.0	Lumber DOL	1.15	BC	0.15	Vert(TL)	n/a	-	n/a	999		
BCLL	0.0*	Rep Stress Incr	NO	WB	0.00	Horiz(TL)	-0.01	3	n/a	n/a		
BCDL	10.0	Code	IRC2021/TPI2014	Matrix-R							Weight: 6 lb	FT = 10%

LUMBER
TOP CHORD 2x4 DF No.2
BOT CHORD 2x4 DF No.2
WEBS 2x4 DF Stud/Std

BRACING
TOP CHORD 2-0-0 oc purlins: 1-3, except end verticals.
BOT CHORD Rigid ceiling directly applied or 6-0-0 oc bracing.

REACTIONS (size) 3=1-4-12, 4=1-4-12, 5=1-4-12
Max Horiz 5=-74 (LC 33)
Max Uplift 3=-185 (LC 32), 4=-76 (LC 32), 5=-257 (LC 29)
Max Grav 3=184 (LC 33), 4=82 (LC 49), 5=261 (LC 36)

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-5=-131/133, 1-2=-118/122, 2-3=-41/41, 2-4=-92/102
BOT CHORD 4-5=-167/151

NOTES
1) Unbalanced roof live loads have been considered for this design.
2) Wind: ASCE 7-16; Vult=100mph (3-second gust) Vasd=79mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; Cat. II; Exp C; Enclosed; MWFRS (envelope) exterior zone and C-C Corner (3) zone; cantilever left and right exposed ; end vertical left and right exposed;C-C for members and forces & MWFRS for reactions shown; Lumber DOL=1.60 plate grip DOL=1.60
3) Truss designed for wind loads in the plane of the truss only. For studs exposed to wind (normal to the face), see Standard Industry Gable End Details as applicable, or consult qualified building designer as per ANSI/TPI 1.
4) Provide adequate drainage to prevent water ponding.
5) Gable requires continuous bottom chord bearing.
6) Truss to be fully sheathed from one face or securely braced against lateral movement (i.e. diagonal web).
7) Gable studs spaced at 2-0-0 oc.
8) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
9) * This truss has been designed for a live load of 20.0psf on the bottom chord in all areas where a rectangle 3-06-00 tall by 2-00-00 wide will fit between the bottom chord and any other members.
10) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 257 lb uplift at joint 5, 185 lb uplift at joint 3 and 76 lb uplift at joint 4.
11) This truss has been designed for a total drag load of 275 lb. Lumber DOL=(1.33) Plate grip DOL=(1.33) Connect truss to resist drag loads along bottom chord from 0-0-0 to 1-4-12 for 197.0 plf.
12) Graphical purlin representation does not depict the size or the orientation of the purlin along the top and/or bottom chord.

LOAD CASE(S) Standard

EXPIRES: 12/31/2026
January 13,2026

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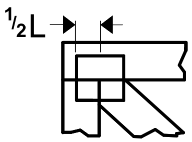
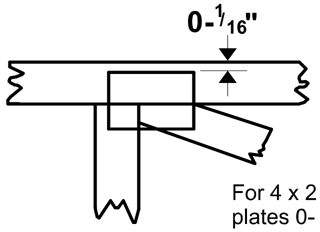
Roseville, CA 95661
916.755.3571 / MiTek-US.com

Symbols

PLATE LOCATION AND ORIENTATION



Center plate on joint unless x, y offsets are indicated. Dimensions are in ft-in-sixteenths. Apply plates to both sides of truss and fully embed teeth.



For 4 x 2 orientation, locate plates 0- 1/16" from outside edge of truss.

This symbol indicates the required direction of slots in connector plates.

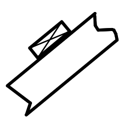
* Plate location details available in MiTek software or upon request.

PLATE SIZE

4 x 4

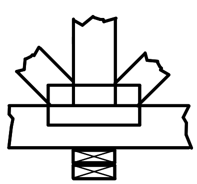
The first dimension is the plate width measured perpendicular to slots. Second dimension is the length parallel to slots.

LATERAL BRACING LOCATION



Indicated by symbol shown and/or by text in the bracing section of the output. Use T or I bracing if indicated.

BEARING



Indicates location where bearings (supports) occur. Icons vary but reaction section indicates joint number/letter where bearings occur. Min size shown is for crushing only.

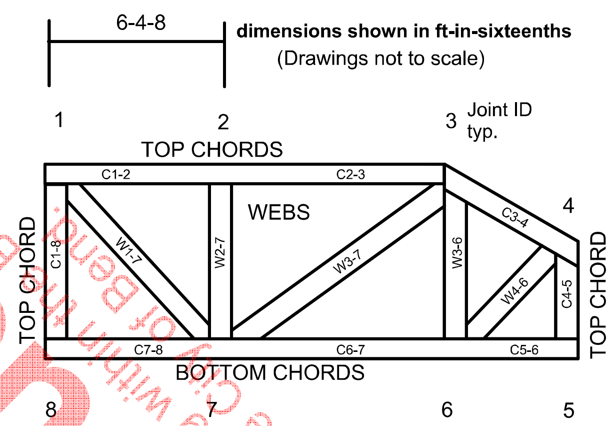
Industry Standards:

ANSI/TPI1: National Design Specification for Metal Plate Connected Wood Truss Construction.

DSB-22: Design Standard for Bracing.

BCSI: Building Component Safety Information, Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses.

Numbering System



JOINTS ARE GENERALLY NUMBERED/LETTERED CLOCKWISE AROUND THE TRUSS STARTING AT THE JOINT FARTHEST TO THE LEFT.

CHORDS AND WEBS ARE IDENTIFIED BY END JOINT NUMBERS/LETTERS.

Product Code Approvals

ICC-ES Reports:

ESR-1988, ESR-2362, ESR-2685, ESR-3282
ESR-4722, ESL-1388

Design General Notes

Trusses are designed for wind loads in the plane of the truss unless otherwise shown.

Lumber design values are in accordance with ANSI/TPI 1 section 6.3 These truss designs rely on lumber values established by others.

MiTek®

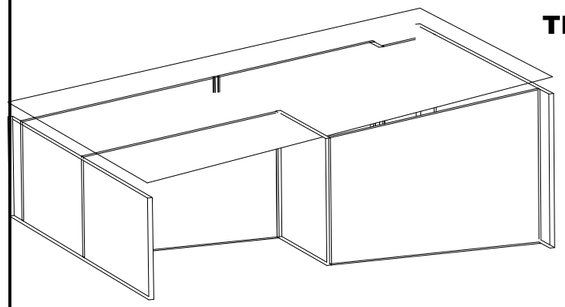
MiTek Engineering Reference Sheet: MII-7473 rev. 1/2/2023

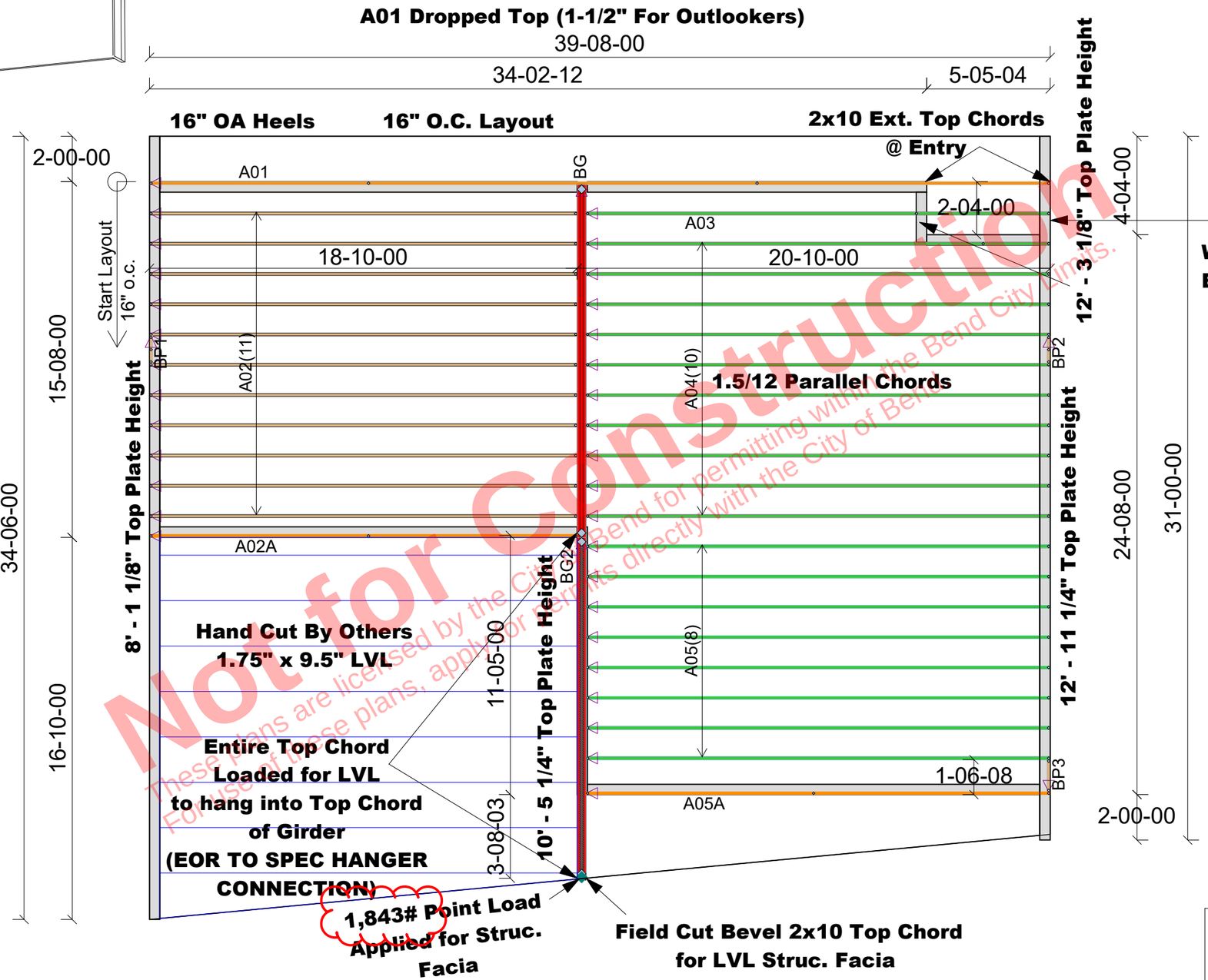
General Safety Notes

Failure to Follow Could Cause Property Damage or Personal Injury

1. Additional stability bracing for truss system, e.g. diagonal or X-bracing, is always required. See BCSI.
2. Truss bracing must be designed by an engineer. For wide truss spacing, individual lateral braces themselves may require bracing, or alternative Tor I bracing should be considered.
3. Never exceed the design loading shown and never stack materials on inadequately braced trusses.
4. Provide copies of this truss design to the building designer, erection supervisor, property owner and all other interested parties.
5. Cut members to bear tightly against each other.
6. Place plates on each face of truss at each joint and embed fully. Knots and wane at joint locations are regulated by ANSI/TPI 1.
7. Design assumes trusses will be suitably protected from the environment in accord with ANSI/TPI 1.
8. Unless otherwise noted, moisture content of lumber shall not exceed 19% at time of fabrication.
9. Unless expressly noted, this design is not applicable for use with fire retardant, preservative treated, or green lumber.
10. Camber is a non-structural consideration and is the responsibility of truss fabricator. General practice is to camber for dead load deflection.
11. Plate type, size, orientation and location dimensions indicated are minimum plating requirements.
12. Lumber used shall be of the species and size, and in all respects, equal to or better than that specified.
13. Top chords must be sheathed or purlins provided at spacing indicated on design.
14. Bottom chords require lateral bracing at 10 ft. spacing, or less, if no ceiling is installed, unless otherwise noted.
15. Connections not shown are the responsibility of others.
16. Do not cut or alter truss member or plate without prior approval of an engineer.
17. Install and load vertically unless indicated otherwise.
18. Use of green or treated lumber may pose unacceptable environmental, health or performance risks. Consult with project engineer before use.
19. Review all portions of this design (front, back, words and pictures) before use. Reviewing pictures alone is not sufficient.
20. Design assumes manufacture in accordance with ANSI/TPI 1 Quality Criteria.
21. The design does not take into account any dynamic or other loads other than those expressly stated.

TRIANGLE SHAPE ▲ INDICATES LEFT END ON LAYOUT AND TRUSS DRAWING ON STAMPED ENGINEERING PAGE





TC LL = 35
TC DL = 10
BC LL = 0
BC DL = 10
Total Load = 55
Wind Speed = 100 mph
Exposure = C
Roof pitch = 1.5/12
Overhang = 0'-0"

Jurisdiction Stamp

DO NOT CUT, DRILL, NOTCH OR MODIFY TRUSS MEMBERS WITHOUT PRIOR APPROVAL FROM BUILDERS FIRSTSOURCE TRUSS

DATE : 1/12/2026
SCALE: NTS
SALESMAN : Tyler Campbell
PROJECT #: **4962428**
DESIGNER : BFS

THIS IS A TRUSS PLACEMENT DIAGRAM ONLY. These trusses are designed as individual building components to be incorporated into the building design at the specification of the building designer. See the individual design sheets for each truss design identified on the placement drawing. The building designer is responsible for temporary and permanent bracing of the roof and floor system and for the overall structure. The design of the truss support structure including headers, beams, walls, and columns is the responsibility of the building designer. For general guidance regarding bracing, consult "Bracing of wood trusses" available from the Truss Plate Institute, 583 D'Onifrio Drive; Madison, WI 53179

Builders FirstSource
SW Washington and Oregon Components
Woodland Office: 360-841-5900
Beaverton Office: 971-371-5971

BUILDER : Sierra James
PROJECT : Cascade Cottage
ADDRESS : Bend, OR.