

GENERAL STRUCTURAL NOTES

(The following apply unless shown otherwise on the plans)

CRITERIA

1. **ALL MATERIALS WORKMANSHIP, DESIGN, AND CONSTRUCTION SHALL CONFORM TO THE DRAWINGS, SPECIFICATIONS, AND THE 2018 INTERNATIONAL BUILDING CODE (IBC) INCLUDING WASHINGTON STATE MODIFICATIONS.**

2. **DESIGN LOADING CRITERIA**
SNOW LOAD

ROOF SNOW LOAD, $P_f = 25$ PSF

WIND (MAIN WIND FORCE RESISTING SYSTEM)

**BASIC WIND SPEED = MPH
IMPORTANCE FACTOR, $I_w = 1.0$
RISK CATEGORY = II
TOPOGRAPHIC FACTOR, $K_{zt} = 1.0$
EXPOSURE CATEGORY = C
INTERNAL PRESSURE COEFFICIENT, $(GC_{pi}) = 0.18/-0.18$**

EARTHQUAKE (EQUIVALENT LATERAL FORCE PROCEDURE)

**$S_s = 1.39$
 $S_{ds} = 0.93$
 $S_1 = 0.48$
 $S_{d1} = 0.56$
IMPORTANCE FACTOR, $I_e = 1.0$
SITE CLASS D
SEISMIC DESIGN CATEGORY = D
RISK CATEGORY = II
 $R = 6.5$ FOR WOOD STRUCTURAL PANEL SHEAR WALLS
OVER STRENGTH FACTOR, $\Omega_o = 3.0$
DEFLECTION AMPLIFICATION FACTOR, $C_d = 4.0$
REDUNDANCY FACTOR = 1.0
SEISMIC RESPONSE COEFFICIENT, $C_s = 0.14$
SEISMIC BASE SHEAR = 0.59 KIPS
SEISMIC BASE SHEAR = 1.22 KIPS**

**ADDITION-
EXISTING -**

3. **STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS FOR BIDDING AND CONSTRUCTION. CONTRACTOR SHALL VERIFY DIMENSIONS AND CONDITIONS FOR COMPATIBILITY AND SHALL NOTIFY**

ARCHITECT OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. ALL DIMENSIONS SHOWN ON THE STRUCTURAL DRAWINGS ARE INTENDED FOR REFERENCE ONLY. REFER TO ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS.

4. **CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS, MEMBER SIZES, AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE STRUCTURAL DRAWINGS ARE INTENDED AS GUIDELINES ONLY AND MUST BE VERIFIED.**
5. **CONTRACTOR SHALL PROVIDE TEMPORARY BRACING FOR THE STRUCTURE AND STRUCTURAL COMPONENTS UNTIL ALL FINAL CONNECTIONS HAVE BEEN COMPLETED IN ACCORDANCE WITH THE PLANS.**
6. **CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS AND THE METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES REQUIRED TO PERFORM THE WORK. THE STRUCTURAL ENGINEER HAS NO OVERALL SUPERVISORY AUTHORITY OR ACTUAL AND/OR DIRECT RESPONSIBILITY FOR THE SPECIFIC WORKING CONDITIONS AT THE SITE AND/OR FOR ANY HAZARDS RESULTING FROM THE ACTIONS OF ANY TRADE CONTRACTOR. THE STRUCTURAL ENGINEER HAS NO DUTY TO INSPECT, SUPERVISE, NOTE, CORRECT, OR REPORT ANY HEALTH OR SAFETY DEFICIENCIES OF THE OWNER, CONTRACTORS, OR OTHER ENTITIES OR PERSONS AT THE PROJECT SITE.**
7. **CONTRACTOR-INITIATED CHANGES SHALL BE SUBMITTED IN WRITING TO THE ARCHITECT AND STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO FABRICATION OR CONSTRUCTION. CHANGES SHOWN ON SHOP DRAWINGS ONLY WILL NOT SATISFY THIS REQUIREMENT.**
8. **DRAWINGS INDICATE GENERAL AND TYPICAL DETAILS OF CONSTRUCTION. WHERE CONDITIONS ARE NOT SPECIFICALLY INDICATED, BUT ARE OF SIMILAR CHARACTER TO DETAILS SHOWN, SIMILAR DETAILS OF CONSTRUCTION SHALL BE USED, SUBJECT TO REVIEW AND APPROVAL BY THE ARCHITECT AND THE STRUCTURAL ENGINEER.**
9. **ALL STRUCTURAL SYSTEMS WHICH ARE TO BE COMPOSED OF COMPONENTS TO BE FIELD ERECTED SHALL BE SUPERVISED BY THE SUPPLIER DURING MANUFACTURING, DELIVERY, HANDLING, STORAGE, AND ERECTION IN ACCORDANCE WITH INSTRUCTIONS PREPARED BY THE SUPPLIER.**
10. **STATEMENT SPECIAL INSPECTIONS:
THE FOLLOWING CONSTRUCTION TYPES ARE TO BE REVIEWED BY A SPECIAL INSPECTOR DESIGNATED BY THE OWNER OR ARCHITECT. THE SPECIAL INSPECTOR SHALL BE A QUALIFIED PERSON WHO SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE BUILDING OFFICIAL, FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION. SPECIAL INSPECTION SHALL CONFORM TO SECTION 1704 OF THE 2018 INTERNATIONAL BUILDING CODE. SPECIAL INSPECTION AGENCY SHALL BE RESPONSIBLE FOR KEEPING RECORDS OF SPECIAL INSPECTIONS AND TESTS. THE ARCHITECT, STRUCTURAL ENGINEER, AND BUILDING DEPARTMENT SHALL BE FURNISHED WITH COPIES OF ALL INSPECTION REPORTS AND TEST RESULTS.**

SOILS: SHALL BE SPECIAL INSPECTED AS REQUIRED IN THE INTERNATIONAL BUILDING CODE SECTION 1705.6 AND AS DIRECTED IN THE GEOTECHNICAL REPORT.

GEOTECHNICAL

11. **FOUNDATION NOTES: SUBGRADE PREPARATION INCLUDING DRAINAGE, EXCAVATION, COMPACTION, AND FILLING REQUIREMENTS, SHALL CONFORM STRICTLY WITH RECOMMENDATIONS GIVEN IN THE SOILS REPORT OR AS DIRECTED BY THE SOILS ENGINEER. FOOTINGS SHALL BEAR ON SOLID UNDISTURBED EARTH (CONTROLLED, COMPACTED STRUCTURAL FILL OR BOTH) AT LEAST 18" BELOW LOWEST ADJACENT FINISHED GRADE. FOOTING DEPTHS/ELEVATIONS SHOWN ON PLANS (OR IN DETAILS) ARE MINIMUM AND FOR GUIDANCE ONLY; THE ACTUAL ELEVATIONS OF FOOTINGS MUST BE ESTABLISHED BY THE CONTRACTOR IN THE FIELD WORKING WITH THE TESTING LAB AND SOILS ENGINEER. BACKFILL BEHIND ALL RETAINING WALLS WITH FREE DRAINING GRANULAR FILL AND PROVIDE FOR SUBSURFACE DRAINAGE AS NOTED IN THE SOILS REPORT.**

ALLOWABLE SOIL PRESSURE	4,000 PSF
LATERAL EARTH PRESSURE (RESTRAINED/UNRESTRAINED)	45 PCF+ 10 PSF/45 PCF
LATERAL EARTH PRESSURE (SEISMIC)	9H (ULTIMATE LOAD)
PASSIVE EARTH PRESSURE	300 PCF
COEFFICIENT OF FRICTION	0.5

PILE CAPACITY (COMPRESSION/TENSION/LATERAL)

SOILS REPORT REFERENCE: REPORT NUMBER JN 21122, PREPARED BY GEOTECH CONSULTANTS, INC. DATED MARCH 22ND, 2021.

CONCRETE

12. **CONCRETE SHALL BE MIXED, PROPORTIONED, CONVEYED, AND PLACED IN ACCORDANCE WITH ACI 318-14 AND ACI 301-16. CONCRETE SHALL ATTAIN A 28-DAY STRENGTH (f'c) OF 3500 PSI BASED ON EXPOSURE CLASS F1, SHALL CONTAIN NO LESS THAN 5-1/2 SACKS OF CEMENT, HAVE A MAXIMUM WATER/CEMENT RATIO OF 0.45, MAXIMUM AGGREGATE OF 3/4-INCH, AND A SLUMP OF 5 INCHES OR LESS. CONCRETE HAS BEEN DESIGNED BASED ON A CONCRETE STRENGTH (f'c) OF 2500 PSI PER INTERNATIONAL BUILDING CODE SECTION 1705.3 EXCEPTION 2.3 TO AVOID SPECIAL INSPECTIONS AND MATERIAL TESTING.**

ALL CONCRETE WITH SURFACES EXPOSED TO STANDING WATER SHALL BE AIR-ENTRAINED WITH AN AIR-ENTRAINING AGENT CONFORMING TO ASTM C260, C494M, AND C618. UNLESS OTHERWISE NOTED THE TOTAL AIR CONTENT SHALL BE 5%. AIR

CONTENT SHALL BE SAMPLED IN ACCORDANCE WITH ASTM C172 AND AIR CONTENT MEASURED IN ACCORDANCE WITH ASTM C231 OR C173.

13. **REINFORCING STEEL** SHALL CONFORM TO ASTM A615 (INCLUDING SUPPLEMENTS S1), GRADE 60, $F_y = 60,000$ PSI. EXCEPTIONS: ANY BARS SPECIFICALLY SO NOTED ON THE DRAWINGS SHALL BE GRADE 40, $F_y = 40,000$ PSI.

WELDED WIRE FABRIC SHALL CONFORM TO ASTM A-185

14. **DETAILING OF REINFORCING STEEL** (INCLUDING HOOKS AND BENDS) SHALL BE IN ACCORDANCE WITH ACI SP-66-04 AND ACI 318-14 CHAPTER 25. LAP ALL REINFORCEMENTS AS FOLLOWS:

BAR SIZE	MINIMUM LAP LENGTH	MINIMUM HOOK EMBEDDMENT
#3	24-INCHES	6-INCHES
#4	31-INCHES	8-INCHES
#5	39-INCHES	11-INCHES

PROVIDE CORNER BARS AT ALL WALL AND FOOTING INTERSECTIONS. LAP ADJACENT MATS OF WELDED WIRE FABRIC A MINIMUM OF 8" AT SIDES AND ENDS.

NO BARS PARTIALLY EMBEDDED IN HARDENED CONCRETE SHALL BE FIELD BENT UNLESS SPECIFICALLY SO DETAILED OR APPROVED BY THE STRUCTURAL ENGINEER. FIELD BENDING OF GRADE 60 REINFORCEMENT SHALL NOT BE ALLOWED.

15. **CONCRETE PROTECTION (COVER) FOR REINFORCING STEEL** SHALL BE AS FOLLOWS:

FOOTINGS AND OTHER UNFORMED SURFACES CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH
ALL OTHER CASES

3"
1-1/2"

16. **SLABS-ON-GRADE:** UNLESS NOTED OTHERWISE SHALL BE 4" CONCRETE, REINFORCED WITH 6X6 W1.4XW1.4 WELDED WIRE FABRIC CENTERED IN SLAB. UNLESS OTHERWISE DIRECTED BY SOILS REPORT PROVIDE MINIMUM 10 MIL VAPOR BARRIER OVER 4" OF COMPACTED SAND OR GRAVEL.

17. **CAST-IN-PLACE CONCRETE:** SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS AND DIMENSIONS OF DOOR AND WINDOW OPENINGS IN ALL CONCRETE WALLS. SEE MECHANICAL DRAWINGS FOR SIZE AND LOCATION OF MISCELLANEOUS MECHANICAL OPENINGS THROUGH CONCRETE WALLS. SEE ARCHITECTURAL DRAWINGS FOR ALL GROOVES, NOTCHES, CHAMFERS, FEATURE

STRIPS, COLOR, TEXTURE, AND OTHER FINISH DETAILS AT ALL EXPOSED CONCRETE SURFACES. TOLERANCES FOR ALL STRUCTURAL CONCRETE AND REINFORCEMENT SHALL BE IN ACCORDANCE WITH ACI 117-10 AND ACI 117.1R-14.

18. **NON-SHRINK GROUT** SHALL BE FURNISHED BY AN APPROVED MANUFACTURER AND SHALL BE MIXED AND PLACED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED RECOMMENDATIONS. GROUT STRENGTH SHALL BE AT LEAST EQUAL TO THE MATERIAL ON WHICH IT IS PLACED (3,000 PSI MINIMUM).

POST INSTALLED ANCHORS

19. **POST-INSTALLED ANCHORS** SHALL ONLY BE USED WHERE SPECIFIED ON THE CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER-OF-RECORD PRIOR TO INSTALLING POST-INSTALLED ANCHORS IN PLACE OF MISSING OR MISPLACED CAST-IN-PLACE ANCHORS. CARE SHALL BE TAKEN IN PLACING POST-INSTALLED ANCHORS TO AVOID CONFLICTS WITH EXISTING REINFORCEMENT. HOLES SHALL BE DRILLED AND CLEANED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS AND ICC-ES REPORT. SUBSTITUTION REQUESTS, FOR PRODUCTS OTHER THAN THOSE SPECIFIED BELOW, SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER-OF-RECORD ALONG WITH CALCULATIONS THAT ARE PREPARED & SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF WASHINGTON. THE CALCULATIONS SHALL DEMONSTRATE THAT THE SUBSTITUTED PRODUCT IS CAPABLE OF ACHIEVING EQUIVALENT PERFORMANCE VALUES (MINIMUM) OF THE SPECIFIED PRODUCT USING THE APPROPRIATE DESIGN PROCEDURE AND/OR STANDARD(S) AS REQUIRED BY THE INTERNATIONAL BUILDING CODE. SUBSTITUTIONS SHALL HAVE CURRENT ICC-ES APPROVAL.

A. CONCRETE ANCHORS

1. **MECHANICAL ANCHORS FOR USE IN CRACKED AND UNCRACKED CONCRETE SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ACI 355.2 AND ICC-ES AC193. PRE-APPROVED MECHANICAL ANCHORS INCLUDE:**
 - a. SIMPSON STRONG-TIE "STRONG-BOLT 2" (ICC-ES ESR-3037)
 - b. SIMPSON STRONG-TIE "TITEN-HD" (ICC-ES ESR-2713)
 - c. HILTI "KWIK BOLT TZ" (ICC-ES ESR-1917)

2. **ADHESIVE ANCHORS FOR USE IN CRACKED AND UNCRACKED CONCRETE SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC308. PRE-APPROVED ADHESIVE ANCHORS INCLUDE:**
 - a. SIMPSON STRONG-TIE "SET-XP" (ICC-ES ESR-2508)
 - b. SIMPSON STRONG-TIE "AT-XP" (IAPMO UES ER-263)
 - c. HILTI "HIT-RE 500-V3" (ICC-ES ESR-3814)
 - d. HILTI "HIT-HY 200" (ICC-ES ESR-3187)
 - e.

WOOD

20. FRAMING LUMBER SHALL BE KILN DRIED OR MC-19, AND GRADED AND MARKED IN CONFORMANCE WITH WCLIB STANDARD GRADING RULES FOR WEST COAST LUMBER NO. 17, LATEST EDITION. FURNISH TO THE FOLLOWING MINIMUM STANDARDS.

JOISTS:
(2X, 3X, AND 4X MEMBERS)

HEM-FIR NO. 2
MINIMUM BASE VALUE, $F_b = 850$ PSI

BEAM AND STRINGERS:
(6 X AND LARGER MEMBERS)

DOUGLAS FIR LARCH NO. 1
MINIMUM BASIC DESIGN STRESS, $F_b = 1,350$ PSI

POSTS AND TIMBERS:
(6 X AND LARGER MEMBERS)

DOUGLAS FIR LARCH NO. 1
MINIMUM BASIC DESIGN STRESS, $F_b = 1,200$ PSI, $F_c = 1,000$

PSI

STUDS PLATES & MISCELLANEOUS LIGHT FRAMING

DOUGLAS FIR LARCH OR HEM-FIR NO. 2,
MINIMUM BASIC DESIGN STRESS $F_b = 850$ PSI, $F_c = 1,300$ PSI

2X AND 3X TONGUE AND GROOVE DECKING

HEM-FIR COMMERCIAL DEX, $F_b = 1,350$ PSI

21. PLYWOOD SHEATHING SHALL BE GRADE C-D, EXTERIOR GLUE OR STRUCTURAL II, EXTERIOR GLUE IN CONFORMANCE WITH DOC PS 1-09 OR PS 2-18 AND AMERICAN PLYWOOD ASSOCIATION PERFORMANCE STANDARD PRP-108. ORIENTED STRAND BOARD OF EQUIVALENT THICKNESS, EXPOSURE RATING AND PANEL INDEX MAY BE USED IN LIEU OF PLYWOOD. SEE PLANS FOR THICKNESS, PANEL IDENTIFICATION INDEX AND NAILING REQUIREMENTS. EACH PANEL SHALL BE IDENTIFIED FOR GRADE AND GLUE TYPE BY THE TRADEMARKS OF AN APPROVED TESTING AND GRADING AGENCY.

22. ALL WOOD PLATES IN DIRECT CONTACT WITH CONCRETE OR MASONRY SHALL BE PRESSURE-TREATED WITH AN APPROVED PRESERVATIVE, PROVIDE 2 LAYERS OF ASPHALT IMPREGNATED BUILDING PAPER BETWEEN UNTREATED LEDGERS, BLOCKING, ETC. AND CONCRETE OR MASONRY.

PRESSURE TREATED LUMBER SHALL COMPLY WITH THE AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) STANDARD U1, COMMODITY SPECIFICATION A AS INDICATED BELOW OR HAVE EQUIVALENT ICC-ES APPROVAL.

PROPOSED USE		AWPA USE CATEGORY
RESIDENTIAL DECKS	DECKING	3B
	JOISTS ABOVE GROUND	3B

	JOISTS IN CONTACT WITH GROUND	4A
	POSTS	4A
	RAILING	3B
	LEDGERS	3B
SAWN LUMBER	ABOVE GROUND	3B
	GROUND CONTACT	4A
PLYWOOD	DAMP ABOVE GROUND	2
	EXTERIOR ABOVE GROUND	3B
	GROUND CONTACT	4A
POLES	ROUND	4B
	SAWN	3B
FENCING	PICKETS, SLATS, AND TRIM	3B
	SAWN POSTS	4A
	ROUND POSTS	4A
	RAILS	3B
SILL PLATES	IN CONTACT WITH CONCRETE OR MASONRY	2
INTERIOR LEDGERS	IN CONTACT WITH CONCRETE OR MASONRY	2

ALL TREATED LUMBER SHALL BEAR THE QUALITY MARK OF AN ACCREDITED INSPECTION AGENCY. THE QUALITY MARK SHALL INCLUDE:

- A. IDENTIFICATION OF TREATING MANUFACTURER
- B. TYPE OF PRESERVATIVE USED
- C. MINIMUM PRESERVATIVE RETENTION (PCF)
- D. END USE FOR WHICH THE PRODUCT IS TREATED
- E. IDENTITY OF THE ACCREDITED INSPECTION AGENCY
- F. STANDARD TO WHICH THE PRODUCT IS TREATED

23. **TIMBER CONNECTORS** CALLED OUT BY LETTERS AND NUMBERS SHALL BE "STRONG-TIE" BY SIMPSON COMPANY, AS SPECIFIED IN THEIR CATALOG NUMBER C-C-2019. EQUIVALENT DEVICES BY OTHER MANUFACTURERS MAY BE SUBSTITUTED, PROVIDED THEY HAVE ICC-ES APPROVAL FOR EQUAL OR GREATER LOAD CAPACITIES. PROVIDE NUMBER AND SIZE OF FASTENERS AS SPECIFIED BY MANUFACTURER TO ACHIEVE THE MAXIMUM PUBLISHED ALLOWABLE LOAD. ALL CONNECTORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. WHERE CONNECTOR STRAPS CONNECT TWO MEMBERS, PLACE ONE-HALF OF THE NAILS OR BOLTS IN EACH MEMBER. SHIMS, WHERE REQUIRED, SHALL BE SEASONED AND DRIED AND THE SAME GRADE (MINIMUM) AS MEMBERS CONNECTED.

ALL BOLTS IN WOOD MEMBERS SHALL CONFORM TO ASTM A307. PROVIDE WASHERS UNDER THE HEADS AND NUTS OF ALL BOLTS AND LAG SCREWS BEARING ON WOOD. ALL LAG SCREWS SHALL BE INSTALLED IN PRE-DRILLED HOLES.

UNLESS NOTED OTHERWISE ALL SAWN LUMBER JOISTS SHALL BE CONNECTED TO FLUSH BEAMS WITH "LUS" SERIES JOIST HANGERS AND ALL PREFABRICATED PLYWOOD WEB JOISTS SHALL BE CONNECTED TO FLUSH BEAMS WITH "IUS" SERIES JOIST HANGERS.

ALL CONNECTIONS/FASTENERS IN CONTACT WITH PRESERVATIVE-TREATED OR FIRE-RETARDANT-TREATED WOOD, SHALL BE OF HOT DIPPED ZINC-COATED GALVANIZED STEEL OR STAINLESS STEEL. HOT DIPPED GALVANIZED FASTENERS SHOULD CONFORM TO ASTM STANDARD 153, AND HOT DIPPED GALVANIZED CONNECTORS SHOULD CONFORM TO ASTM STANDARD A653 (CLASS G-185). STAINLESS STEEL FASTENERS AND CONNECTORS SHOULD BE TYPE 304 OR 316. NOTE: ELECTROPLATED GALVANIZED FASTENERS AND CONNECTORS ARE NOT TO BE USED WITH PRESSURE TREATED WOOD. SIMPSON PRODUCT FINISHES CORRESPONDING TO THE ABOVE REQUIREMENTS ARE ZMAX (HOT DIPPED GALVANIZED) AND SST300 (STAINLESS STEEL). STAINLESS STEEL HARDWARE AND FASTENERS SHALL NOT BE COMBINED WITH UNTREATED OR GALVANIZED MATERIAL.

24. **WOOD FASTENERS:**

A. **NAIL SIZES SPECIFIED ON DRAWINGS ARE BASED ON THE FOLLOWING SPECIFICATIONS:**

<u>SIZE</u>	<u>LENGTH</u>	<u>DIAMETER</u>
6d	2"	0.113"
8d	2-1/2"	0.131"
10d	3"	0.148"
12d	3-1/4"	0.148"
16d	3-1/2"	0.162"

DESIGN IS BASED ON COMMON STEEL WIRE NAILS MEETING THE REQUIREMENTS OF ASTM F1667. USE OF ALTERNATE FASTENERS MUST BE SUBMITTED FOR REVIEW AND APPROVAL BY THE STRUCTURAL ENGINEER PRIOR TO THE START OF CONSTRUCTION.

B. **NAILS – PLYWOOD (APA RATED SHEATHING) FASTENERS TO FRAMING SHALL BE DRIVEN FLUSH TO FACE OF SHEATHING WITH NO COUNTERSINKING PERMITTED.**

25. **WOOD FRAMING NOTES – THE FOLLOWING APPLY UNLESS OTHERWISE SHOWN ON THE PLANS:**

A. ALL WOOD FRAMING DETAILS NOT SHOWN OTHERWISE SHALL BE CONSTRUCTED TO THE MINIMUM STANDARDS OF THE INTERNATIONAL BUILDING CODE. MINIMUM NAILING, UNLESS OTHERWISE NOTED, SHALL CONFORM TO TABLE 2304.10.1 OF THE INTERNATIONAL BUILDING CODE. UNLESS NOTED OTHERWISE, ALL NAILS SHALL BE AS SPECIFIED ABOVE. COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS WITH MECHANICAL AND ARCHITECTURAL DRAWINGS. PROVIDE WASHERS UNDER THE HEADS AND NUTS OF ALL BOLTS AND LAG SCREWS BEARING ON WOOD. INSTALLATION OF BOLTS AND LAG SCREWS SHALL CONFORM TO SECTIONS 12.1.3 AND 12.1.4 OF THE 2018 NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. NATURALLY DURABLE OR PRESSURE TREATED WOOD SHALL BE PROVIDED WHERE REQUIRED BY SECTION 2304.12 OF THE INTERNATIONAL BUILDING CODE.

B. WALL FRAMING: ALL STUD WALLS SHOWN AND NOT OTHERWISE NOTED SHALL BE 2X6 AT 16" O.C. TWO STUDS MINIMUM SHALL BE PROVIDED AT THE END OF ALL WALLS AND AT EACH SIDE OF ALL OPENINGS. TWO 2 x 8 HEADERS SHALL BE PROVIDED OVER ALL OPENINGS NOT OTHERWISE NOTED AND SHALL BEAR FULLY ON A MINIMUM OF TWO STUDS. SOLID BLOCKING FOR WOOD COLUMNS SHALL BE PROVIDED THROUGH FLOORS TO SUPPORTS BELOW. PROVIDE SOLID BLOCKING BETWEEN STUDS AT MIDHEIGHT OF ALL STUD WALLS OVER 10' IN HEIGHT.

STUDS MAY BE NOTCHED, CUT, OR PENETRATED WITH ROUND BORED HOLES AS FOLLOWS:

STUD SIZE	MAXIMUM NOTCH / CUT	MAXIMUM BORED HOLE
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2X4	7/8"	1-3/8"
2X6	1-3/8"	2-1/8"

BORED HOLES SHALL NOT BE LOCATED WITH 5/8" FROM THE EDGE OF THE STUD OR AT THE SAME LOCATION AS A NOTCH OR CUT.

WALLS SHALL HAVE A SINGLE BOTTOM PLATE AND A DOUBLE TOP PLATE. END NAIL TOP PLATE TO EACH STUD WITH TWO 16d NAILS, AND TOENAIL OR END NAIL EACH STUD TO BOTTOM PLATE WITH TWO 16d NAILS. FACE NAIL DOUBLE TOP PLATE WITH 16d AT 12" O.C. AND LAP MINIMUM 4'-0" AT JOINTS AND PROVIDE EIGHT 16d NAILS AT 4" O.C. EACH SIDE OF JOINT.

ALL STUD WALLS SHALL HAVE THEIR LOWER WOOD PLATES ATTACHED TO WOOD FRAMING BELOW WITH 16d NAILS AT 12" O.C. STAGGERED OR BOLTED TO CONCRETE WITH 5/8" DIAMETER ANCHOR BOLTS (WITH 7" MINIMUM EMBEDMENT) @ 4'-0" O.C. UNLESS INDICATED OTHERWISE. PROVIDE 3"x3" x1/4" HOT-DIPPED GALVANIZED PLATE WASHERS AT ALL ANCHOR BOLTS. INDIVIDUAL MEMBERS OF BUILTUP POSTS SHALL BE NAILED TO EACH OTHER WITH 16d NAILS @ 12" O.C. STAGGERED. REFER TO THE PLANS AND SHEAR WALL SCHEDULE FOR REQUIRED SHEATHING AND NAILING. WHEN NOT OTHERWISE NOTED, PROVIDE GYPSUM WALLBOARD ON INTERIOR SURFACES NAILED TO ALL STUDS, TOP AND BOTTOM PLATES AND BLOCKING WITH NAILS AT 7" O.C. USE 5d COOLER NAILS FOR 1/2" GWB AND 6d COOLER NAILS FOR 5/8" GWB. PROVIDE 15/32" APA RATED SHEATHING (SPAN RATING 24/0) ON EXTERIOR SURFACES NAILED AT ALL PANEL EDGES (BLOCK UNSUPPORTED EDGES), TOP AND BOTTOM PLATES WITH 8d NAILS @ 6" O.C. AND TO ALL INTERMEDIATE STUDS AND BLOCKING WITH NAILS @ 12" O.C. ALLOW 1/8" SPACING AT ALL PANEL EDGES AND ENDS.

C. FLOOR AND ROOF FRAMING: PROVIDE DOUBLE JOISTS UNDER ALL PARALLEL PARTITIONS THAT EXTEND OVER MORE THAN HALF THE JOIST LENGTH AND AROUND ALL OPENINGS IN FLOORS OR ROOFS UNLESS OTHERWISE NOTED. PROVIDE SOLID BLOCKING AT ALL BEARING POINTS.

NOTCHES AT THE END OF JOISTS AND RAFTERS SHALL NOT EXCEED 1/4 THE DEPTH OF THE MEMBER. NOTCHES IN THE TOP OR BOTTOM SHALL NOT EXCEED 1/6 THE DEPTH OF THE MEMBER AND SHALL NOT BE LOCATED WITHIN THE MIDDLE 1/3 OF THE SPAN. THE DIAMETER OF ROUND HOLES BORED IN JOISTS AND RAFTERS SHALL NOT EXCEED 1/3 OF THE DEPTH OF THE MEMBER AND SHALL NOT BE LOCATED WITHIN 2" FROM THE TOP OR BOTTOM EDGE.

TOENAIL JOISTS TO SUPPORTS WITH TWO 16d NAILS. ATTACH TIMBER JOISTS TO FLUSH HEADERS OR BEAMS WITH SIMPSON METAL JOIST HANGERS IN ACCORDANCE WITH NOTES ABOVE. NAIL ALL MULTIJOIST BEAMS TOGETHER WITH TWO ROWS OF 16d @ 12" O.C. ATTACH RAFTERS AND ROOF TRUSSES AT BEARING LINES WITH H2.5 @ 24" O.C. UNLESS OTHER METAL CONNECTIONS ARE INDICATED.

UNLESS OTHERWISE NOTED ON THE PLANS, APA RATED ROOF AND FLOOR SHEATHING SHALL BE LAID UP WITH STRENGTH AXIS PERPENDICULAR TO SUPPORTS AND ATTACHED WITH 10d NAILS @ 6" O.C. TO FRAMED PANEL EDGES AND OVER STUD WALLS AS SHOWN ON PLANS AND @ 12" O.C. TO INTERMEDIATE SUPPORTS. PROVIDE APPROVED

PLYWOOD EDGE CLIPS CENTERED BETWEEN JOISTS/TRUSSES AT UNBLOCKED ROOF SHEATHING EDGES. ALL FLOOR SHEATHING EDGES SHALL HAVE APPROVED TONGUEANDGROOVE JOINTS OR SHALL BE SUPPORTED WITH SOLID BLOCKING. ALLOW 1/8" SPACING AT ALL PANEL EDGES AND ENDS OF ALL ROOF AND FLOOR SHEATHING. TOENAIL BLOCKING TO SUPPORTS WITH 16d NAILS @ 12" O.C. UNLESS OTHERWISE NOTED. AT BLOCKED FLOOR AND ROOF DIAPHRAGMS PROVIDE FLAT 2X BLOCKING AT ALL UNFRAMED PANEL EDGES AND FASTEN SHEATHING TO FRAMING/ BLOCKING AS SPECIFIED.

TONGUE AND GROOVE STRUCTURAL ROOF AND FLOOR DECKING SHALL BE INSTALLED AS FOLLOWS:

- A. 2X DECKING SHALL BE TOENAILED THROUGH THE TONGUE AND FACE NAILED WITH ONE 16d NAIL PER PIECE PER SUPPORT.**
- B. 3X AND 4X DECKING SHALL BE TOENAILED WITH ONE 40d NAIL AND FACE NAILED WITH ONE 60d NAIL PER SUPPORT. COURSES SHALL BE SPIKED TOGETHER WITH 8" SPIKES AT 30" O.C. (MAXIMUM) AND AT 10" (MAXIMUM) FROM EACH END OF EACH PIECE. SPIKES SHALL BE INSTALLED IN PREDRILLED EDGE HOLES.**

STRUCTURAL CALCULATIONS

Johnson Garage Addition
4907 East Mercer Way
Mercer Island, WA 98040

June 3rd, 2021



ATC Hazards by Location

Search Information

Address: 8456 N Mercer Way, Mercer Island, WA 98040, USA

Coordinates: 47.5854124, -122.2241204

Elevation: 40 ft

Timestamp: 2021-06-03T16:52:49.624Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: II

Site Class: D



Basic Parameters

Name	Value	Description
S_S	1.391	MCE_R ground motion (period=0.2s)
S_1	0.484	MCE_R ground motion (period=1.0s)
S_{MS}	1.391	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	0.927	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

0.837 per ASCE 7-16 Eq. 11.4-2

0.558 per ASCE 7-16 Eq. 11.4-4

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.903	Coefficient of risk (0.2s)
CR_1	0.897	Coefficient of risk (1.0s)
PGA	0.595	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.654	Site modified peak ground acceleration

1.847 per ASCE 7-16, Table 11.4-2

T _L	6	Long-period transition period (s)
SsRT	1.391	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.54	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	3.299	Factored deterministic acceleration value (0.2s)
S1RT	0.484	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.54	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.346	Factored deterministic acceleration value (1.0s)
PGAd	1.138	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey [Seismic Design Web Services](#).

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BASE SHEAR CALCULATION

Seismic Design Parameters		From USGS
Risk Category	III	
R	6.50	
I_e	1.00	
S_{ds}	0.93	
S_{d1}	0.56	
S_s	1.39	
S_1	0.48	
F_a	1.00	
F_v	1.85	
$S_{ms} (g)$	1.39	
$S_{m1} (g)$	0.84	
C_s	0.14	
k	1.00	
V (k) (Ultimate)	1.80	
V (k) (Allowable)	1.26	

Areas (ft ²)	
(N)Roof	274
(E)Roof	569

Loads	
DL-Roof (psf)	15.00

	Height (ft)	Weight (k)	$w_x h_x^k$	C_{vx}	F_x	F_x
(N)Roof	10.00	4.11	41.10	0.33	0.586149231	0.41
(E)Roof	10.00	8.54	85.35	0.67	1.217222308	0.85
TOTAL	10.00	12.65	126.45	1.00		1.26

WIND PRESSURE CALCULATION

Building Parameters				
	Height (ft)	Trib. Height (ft)	N/S	E/W
Above Roof				
Roof	10.00	5.00	26.5	34
Total	10.00	-	-	-

Wind Load Parameters	
Exposure	C
Risk Category	II
Site Class	D
θ	0.0
a	3
K_{zt}	1
K_d	0.85
K_z	0.779429038
V (mph)	97
q_h (psf)	15.95801766

DETERMINE WIND PRESSURE

$p = q_h [(GC_{pf}) - (GC_{pi})]$ per ASCE 7-16 Eqn. 28.3-1

G _{C_{pi}} Values per ASCE 7-10 Figure 28.4-1		
	Case A (Trans)	Case B (Long)
Roof	0.370	
corners	0.530	
Walls	0.690	0.690
corners	1.040	1.040

	A*G _{C_{pf}}	Wind Direction - Plan N/S				Wind Direction - Plan E/W				
		F (k)	Total (Ultimate)	Min. Load	Total (Allowable)	F (k)	Total (Ultimate)	Min. Load	Total (Allowable)	
Roof		106.95	1.71	1.96	2.72	81.08	1.29	1.54	3.19	2.00
corner		15.60	0.25			15.60	0.25			

West Wall

Level	Story Height (ft)	Seismic (k)	Wind (k)	Wall Length
Roof	9.25	0.21	0.33	21.83

Roof	Wall	Width (ft)	H:W Ratio	Increase Factor ¹	Shear		Weight (k)	Hold Down	
					Seismic (plf)	Wind (plf) ²		Seismic (k)	Wind (k)
	1	21.83	0.4	1.00	9.40	14.89	2.02	-0.52	-0.47

¹ Increase per SDPWS-2015 4.3.4.2.

² Per IBC 2306.2 When wind governs, wind capacities for shearwalls may be increased by 40%

South Wall

Level	Story Height (ft)	Seismic (k)	Wind (k)	Wall Length
Roof	9.25	0.41	1.64	12.50

Roof	Wall	Width (ft)	H:W Ratio	Increase	Shear		Hold Down		
				Factor ¹	Seismic (plf)	Wind (plf) ²	Weight (k)	Seismic (k)	Wind (k)
	1	12.50	0.7	1.00	32.82	131.49	1.16	-0.04	0.87

¹ Increase per SDPWS-2015 4.3.4.2.

² Per IBC 2306.2 When wind governs, wind capacities for shearwalls may be increased by 40%

East Wall

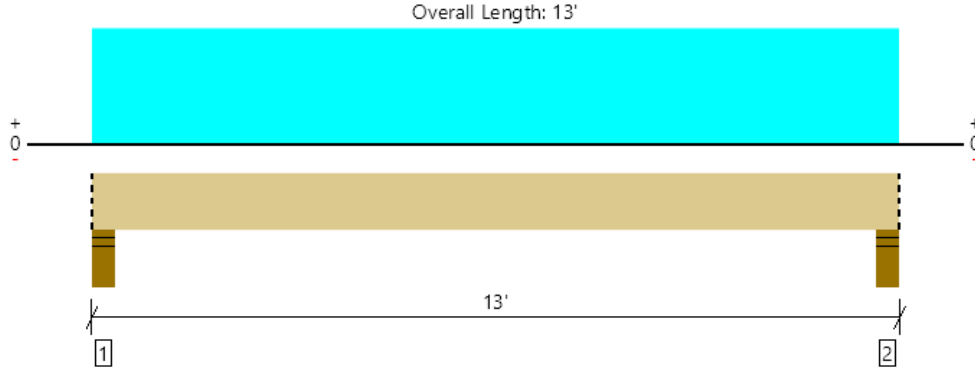
Level	Story Height (ft)	Seismic (k)	Wind (k)	Wall Length
Roof	9.25	0.63	0.85	13.00

Roof	Wall	Width (ft)	H:W Ratio	Increase Factor ¹	Shear		Weight (k)	Hold Down	
					Seismic (plf)	Wind (plf) ²		Seismic (k)	Wind (k)
	1	13.00	0.7	1.00	48.55	65.38	1.20	0.09	0.24

¹ Increase per SDPWS-2015 4.3.4.2.

² Per IBC 2306.2 When wind governs, wind capacities for shearwalls may be increased by 40%

Level, Roof: Joist
1 piece(s) 2 x 10 HF No.2 @ 24" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	520 @ 4 1/2"	3341 (5.50")	Passed (16%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	422 @ 1' 2 3/4"	1596	Passed (26%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1501 @ 6' 6"	2204	Passed (68%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.197 @ 6' 6"	0.408	Passed (L/746)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.315 @ 6' 6"	0.613	Passed (L/466)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - SPF	5.50"	5.50"	1.50"	195	325	520	Blocking
2 - Stud wall - SPF	5.50"	5.50"	1.50"	195	325	520	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 1" o/c	
Bottom Edge (Lu)	13' o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 13'	24"	15.0	25.0	Default Load

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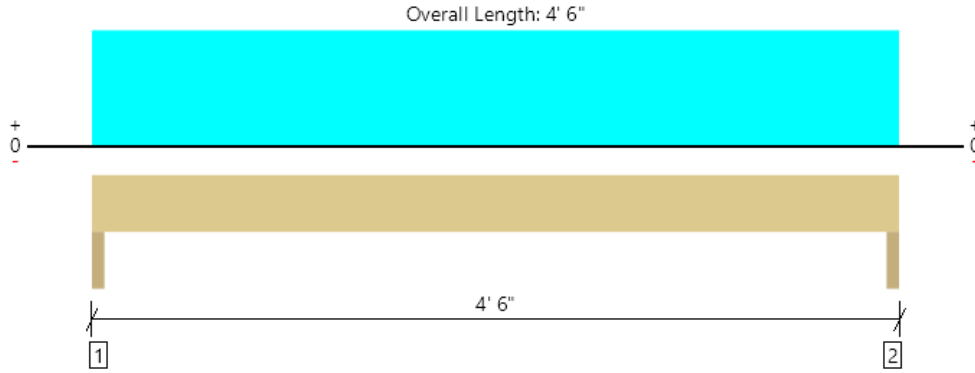
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Ri Han Bykonen Carter Quinn (206) 264-7784 wrh@bcq-se.com	



Level, Wall: Header
2 piece(s) 2 x 8 HF No.2



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	597 @ 1 1/2"	3645 (3.00")	Passed (16%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	371 @ 10 1/4"	2501	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	599 @ 2' 3"	2569	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.010 @ 2' 3"	0.142	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.016 @ 2' 3"	0.213	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - SPF	3.00"	3.00"	1.50"	232	366	598	None
2 - Trimmer - SPF	3.00"	3.00"	1.50"	232	366	598	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 6" o/c	
Bottom Edge (Lu)	4' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 6"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 4' 6"	6' 6"	15.0	25.0	Default Load

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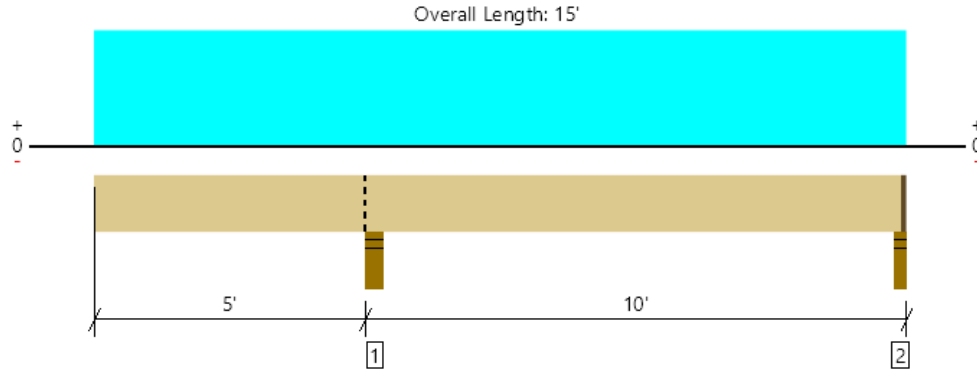
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Ri Han Bykonen Carter Quinn (206) 264-7784 wrh@bcq-se.com	



Level, Roof: Flush Beam

1 piece(s) 3 1/2" x 9 1/2" 1.55E TimberStrand® LSL



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4915 @ 5' 2 1/4"	6694 (4.50")	Passed (73%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2261 @ 6' 2"	7902	Passed (29%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-5791 @ 5' 2 1/4"	11985	Passed (48%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.271 @ 0	0.519	Passed (2L/460)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.370 @ 0	0.692	Passed (2L/336)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2015
 Design Methodology : ASD
 Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Left cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - SPF	4.50"	4.50"	3.30"	1917	2998	4915	Blocking
2 - Stud wall - SPF	3.00"	1.75"	1.50"	600	1122	1722	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 11" o/c	
Bottom Edge (Lu)	14' 11" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 14' 10 3/4"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 15' (Front)	10' 6"	15.0	25.0	Default Load

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Cantilevered Retaining Wall

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 BYKONEN CARTER QUINN

Lic. #: KW-06003456

DESCRIPTION: 4' Landscape Wall - Seismic

Calculations per ACI 318-11, ACI 530-11, IBC 2012,
 CBC 2013, ASCE 7-10

Criteria

Retained Height	=	4.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	2.00 : 1
Height of Soil over Toe	=	4.00 in
Water height over heel	=	0.0 ft
Vertical component of active Lateral soil pressure options:		
NOT USED for Soil Pressure.		
NOT USED for Sliding Resistance.		
NOT USED for Overturning Resistance.		

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	45.0 psf/ft
Toe Active Pressure	=	45.0 psf/ft
Passive Pressure	=	300.0 psf/ft
Soil Density, Heel	=	125.00 pcf
Soil Density, Toe	=	125.00 pcf
Friction Coeff btwn Ftg & Soil	=	0.500
Soil height to ignore for passive pressure	=	6.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	36.0 plf
...Height to Top	=	4.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Wind on Exposed Stem = 0.0 psf

Design Summary

Wall Stability Ratios		
Overturning	=	2.86 OK
Sliding	=	1.21 Ratio < 1.5!
Total Bearing Load	=	1,346 lbs
...resultant ecc.	=	3.61 in
Soil Pressure @ Toe	=	429 psf OK
Soil Pressure @ Heel	=	180 psf OK
Allowable	=	4,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	515 psf
ACI Factored @ Heel	=	216 psf
Footing Shear @ Toe	=	7.2 psi OK
Footing Shear @ Heel	=	4.3 psi OK
Allowable	=	75.0 psi
Sliding Calcs (Vertical Component NOT Used)		
Lateral Sliding Force	=	694.8 lbs
less 100% Passive Force	= -	166.7 lbs
less 100% Friction Force	= -	670.8 lbs
Added Force Req'd	=	0.0 lbs OK
...for 1.5 : 1 Stability	=	202.8 lbs NG

Stem Construction

Design Height Above Ftg	ft =	0.00
Wall Material Above "H"	=	Concrete
Thickness	in =	8.00
Rebar Size	=	# 4
Rebar Spacing	in =	12.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	0.195
Total Force @ Section	lbs =	716.0
Moment....Actual	ft-l =	1,055.6
Moment.....Allowable	ft-l =	5,412.6
Shear.....Actual	psi =	9.5
Shear.....Allowable	psi =	75.0
Wall Weight	psf =	100.0
Rebar Depth 'd'	in =	6.25
Lap splice if above	in =	12.00
Lap splice if below	in =	6.00
Hook embed into footing	in =	6.00
Concrete Data		
f'c	psi =	2,500.0
Fy	psi =	

Top Stem

Load Factors

Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

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BYKONEN CARTER QUINN

DESCRIPTION: 4' Landscape Wall - Seismic

Footing Dimensions & Strengths

Toe Width	=	3.25 ft
Heel Width	=	1.17
Total Footing Width	=	4.42
Footing Thickness	=	10.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft
f'_c =	2,500 psi	F_y = 60,000 psi
Footing Concrete Density	= 150.00 pcf	
Min. As %	= 0.0018	
Cover @ Top	2.00	@ Btm. = 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	515	216 psf
M_u : Upward	=	0	0 ft-lb
M_u : Downward	=	0	97 ft-lb
M_u : Design	=	1,056	97 ft-lb
Actual 1-Way Shear	=	7.17	4.27 psi
Allow 1-Way Shear	=	75.00	75.00 psi
Toe Reinforcing	=	# 7 @ 16.00 in	
Heel Reinforcing	=	# 6 @ 16.00 in	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings

Toe: Not req'd, $M_u < S * Fr$
 Heel: Not req'd, $M_u < S * Fr$
 Key: No key defined

Summary of Overturning & Resisting Forces & Moments

ItemOVERTURNING.....			RESISTING.....				
	Force lbs	Distance ft	Moment ft-lb		Force lbs	Distance ft	Moment ft-lb		
Heel Active Pressure	=	581.4	1.69	985.3	Soil Over Heel	=	250.2	4.17	1,042.4
Surcharge over Heel	=				Sloped Soil Over Heel	=	7.8	4.25	33.2
Toe Active Pressure	=	-30.6	0.39	-11.9	Surcharge Over Heel	=			
Surcharge Over Toe	=				Adjacent Footing Load	=			
Adjacent Footing Load	=				Axial Dead Load on Stem	=			
Added Lateral Load	=	144.0	2.83	408.0	* Axial Live Load on Stem	=			
Load @ Stem Above Soil	=				Soil Over Toe	=	135.4	1.63	220.1
					Surcharge Over Toe	=			
					Stem Weight(s)	=	400.0	3.58	1,433.3
					Earth @ Stem Transitions	=			
					Footing Weight	=	552.1	2.21	1,219.4
					Key Weight	=			
					Vert. Component	=			
					Total =	1,345.5 lbs	R.M. =		3,948.4
Total	=	694.8	O.T.M. =	1,381.3					
Resisting/Overturning Ratio			=	2.86					
Vertical Loads used for Soil Pressure	=			1,345.5 lbs					
Vertical component of active pressure NOT used for soil pressure									

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

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Lic. #: KW-06003456

DESCRIPTION: 4' Landscape Wall

Calculations per ACI 318-11, ACI 530-11, IBC 2012,
 CBC 2013, ASCE 7-10

Criteria

Retained Height	=	4.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	2.00 : 1
Height of Soil over Toe	=	4.00 in
Water height over heel	=	0.0 ft
Vertical component of active Lateral soil pressure options:		
NOT USED for Soil Pressure.		
NOT USED for Sliding Resistance.		
NOT USED for Overturning Resistance.		

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	45.0 psf/ft
Toe Active Pressure	=	45.0 psf/ft
Passive Pressure	=	300.0 psf/ft
Soil Density, Heel	=	125.00 pcf
Soil Density, Toe	=	125.00 pcf
Friction Coeff btwn Ftg & Soil	=	0.500
Soil height to ignore for passive pressure	=	6.00 in

Design Summary

Wall Stability Ratios		
Overturning	=	4.06 OK
Sliding	=	1.52 OK
Total Bearing Load	=	1,346 lbs
...resultant ecc.	=	0.03 in
Soil Pressure @ Toe	=	304 psf OK
Soil Pressure @ Heel	=	306 psf OK
Allowable	=	4,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	364 psf
ACI Factored @ Heel	=	367 psf
Footing Shear @ Toe	=	5.2 psi OK
Footing Shear @ Heel	=	4.3 psi OK
Allowable	=	75.0 psi
Sliding Calcs (Vertical Component NOT Used)		
Lateral Sliding Force	=	550.8 lbs
less 100% Passive Force	= -	166.7 lbs
less 100% Friction Force	= -	670.0 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Stem Construction

		Top Stem
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Thickness	in =	8.00
Rebar Size	=	# 4
Rebar Spacing	in =	12.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	0.142
Total Force @ Section	lbs =	572.0
Moment.....Actual	ft-l =	767.6
Moment.....Allowable	ft-l =	5,412.6
Shear.....Actual	psi =	7.6
Shear.....Allowable	psi =	75.0
Wall Weight	psf =	100.0
Rebar Depth 'd'	in =	6.25
Lap splice if above	in =	12.00
Lap splice if below	in =	6.00
Hook embed into footing	in =	6.00
Concrete Data		
f'c	psi =	2,500.0
Fy	psi =	

Load Factors

Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Title Block Line 1
 You can change this area
 using the "Settings" menu item
 and then using the "Printing &
 Title Block" selection.
 Title Block Line 6

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Printed: 3 JUN 2021, 9:44AM

Cantilevered Retaining Wall

File: Retaining Wall.ec6
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BYKONEN CARTER QUINN

DESCRIPTION: 4' Landscape Wall

Footing Dimensions & Strengths

Toe Width	=	3.25	ft
Heel Width	=	1.17	
Total Footing Width	=	4.42	
Footing Thickness	=	10.00	in
Key Width	=	0.00	in
Key Depth	=	0.00	in
Key Distance from Toe	=	0.00	ft
f'c =	2,500	psi	Fy = 60,000
Footing Concrete Density	=	150.00	pcf
Min. As %	=	0.0018	
Cover @ Top	2.00	@ Btm. =	3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	364	367 psf
Mu' : Upward	=	0	0 ft-lb
Mu' : Downward	=	0	97 ft-lb
Mu: Design	=	768	97 ft-lb
Actual 1-Way Shear	=	5.15	4.27 psi
Allow 1-Way Shear	=	75.00	75.00 psi
Toe Reinforcing	=	# 7 @ 16.00	in
Heel Reinforcing	=	# 6 @ 16.00	in
Key Reinforcing	=	None Spec'd	

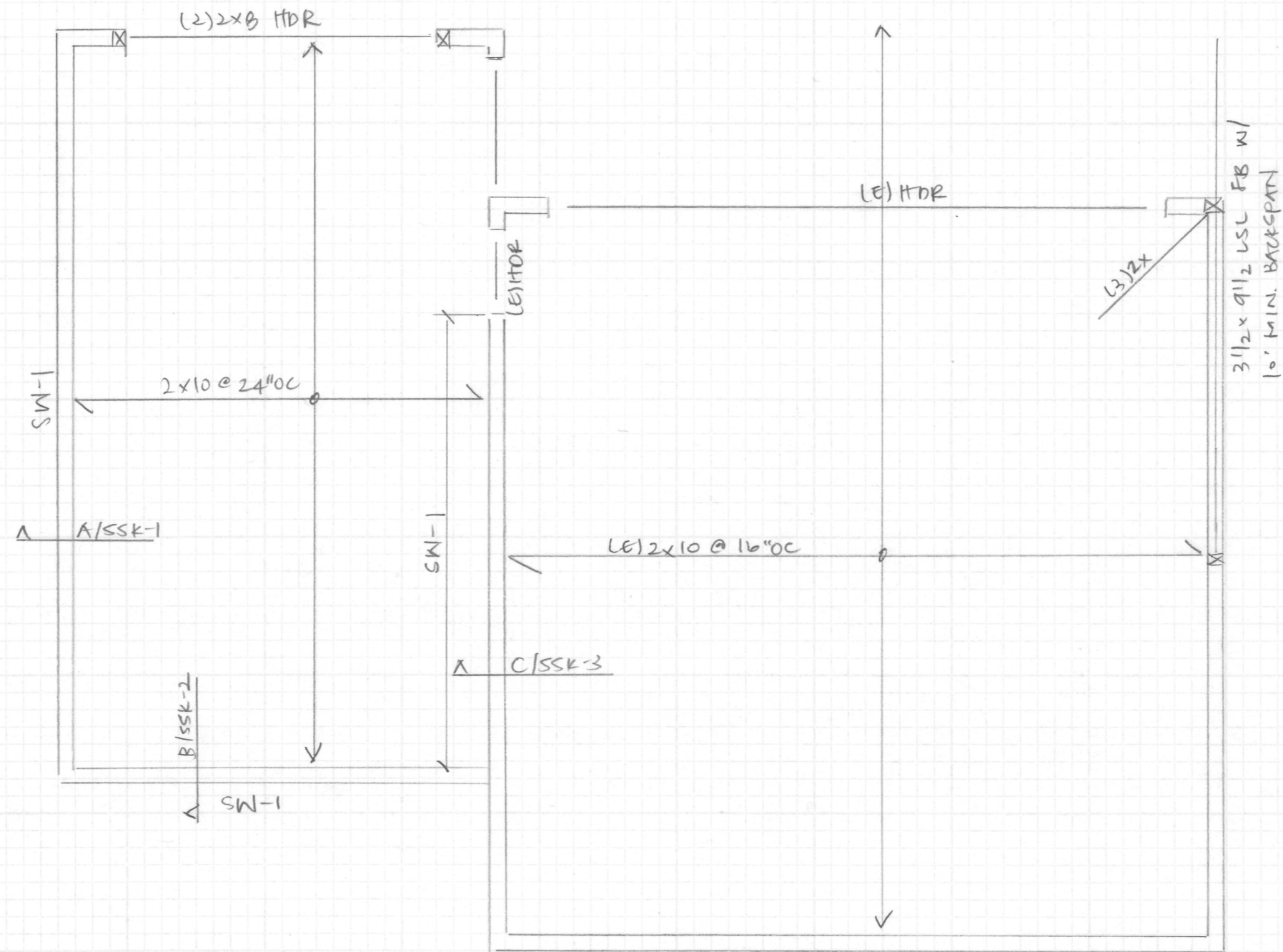
Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
 Heel: Not req'd, Mu < S * Fr
 Key: No key defined

Summary of Overturning & Resisting Forces & Moments

ItemOVERTURNING.....		RESISTING.....					
	Force lbs	Distance ft	Moment ft-lb	Force lbs	Distance ft	Moment ft-lb			
Heel Active Pressure	=	581.4	1.69	985.3	Soil Over Heel	=	250.2	4.17	1,042.4
Surcharge over Heel	=				Sloped Soil Over Heel	=	7.8	4.25	33.2
Toe Active Pressure	=	-30.6	0.39	-11.9	Surcharge Over Heel	=			
Surcharge Over Toe	=				Adjacent Footing Load	=			
Adjacent Footing Load	=				Axial Dead Load on Stem	=			
Added Lateral Load	=				* Axial Live Load on Stem	=			
Load @ Stem Above Soil	=				Soil Over Toe	=	135.4	1.63	220.1
					Surcharge Over Toe	=			
					Stem Weight(s)	=	400.0	3.58	1,433.3
					Earth @ Stem Transitions	=			
					Footing Weight	=	552.1	2.21	1,219.4
					Key Weight	=			
					Vert. Component	=			
Total	=	550.8	O.T.M. =	973.3	Total	=	1,345.5	lbs R.M. =	3,948.4
Resisting/Overturning Ratio	=	4.06							
Vertical Loads used for Soil Pressure	=	1,345.5 lbs							
Vertical component of active pressure NOT used for soil pressure									

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

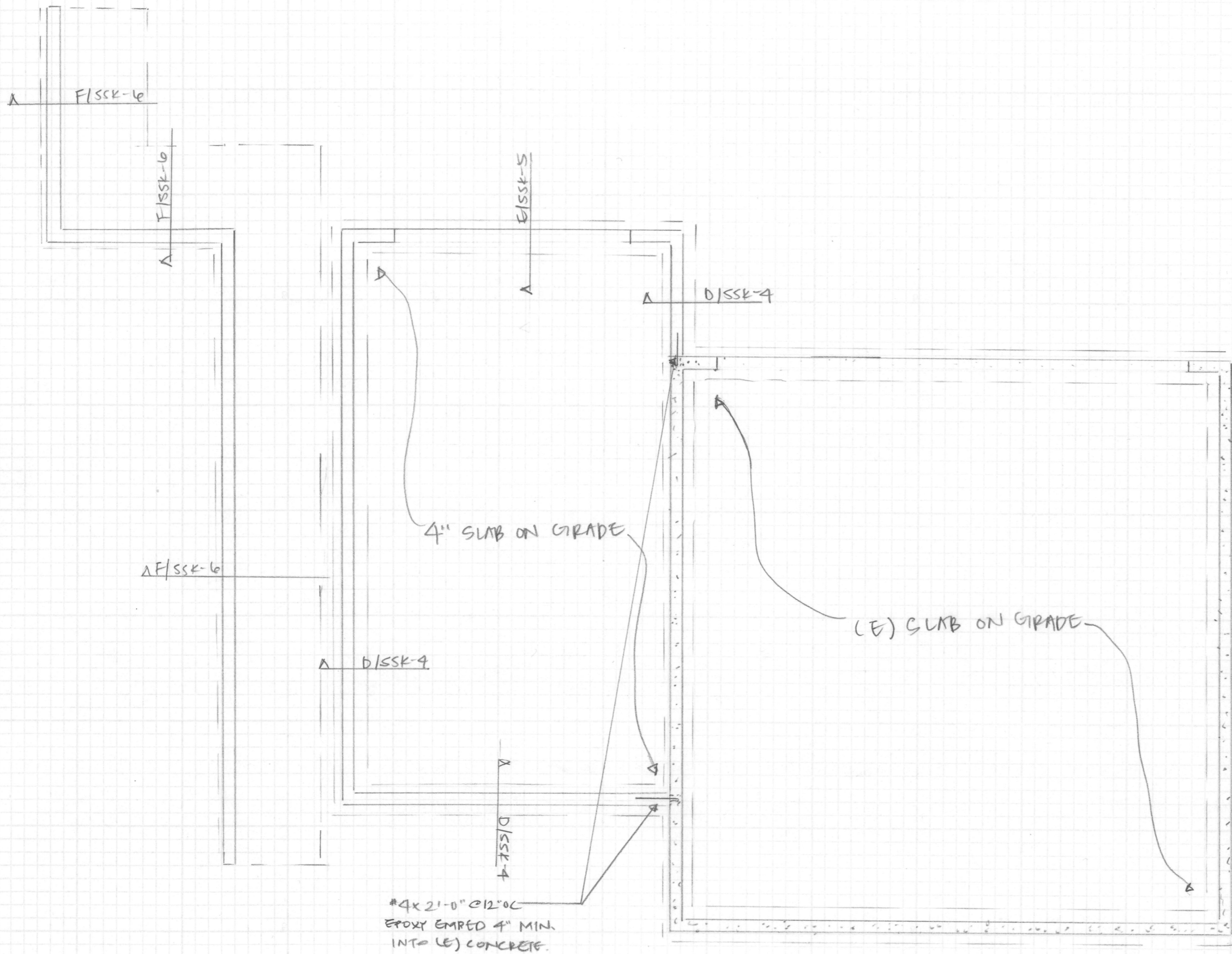


ROOF FRAMING PLAN
 1/4" = 1'-0"

JOHNSON GARAGE ADDITION

DATE: 6/3/21

S2.1



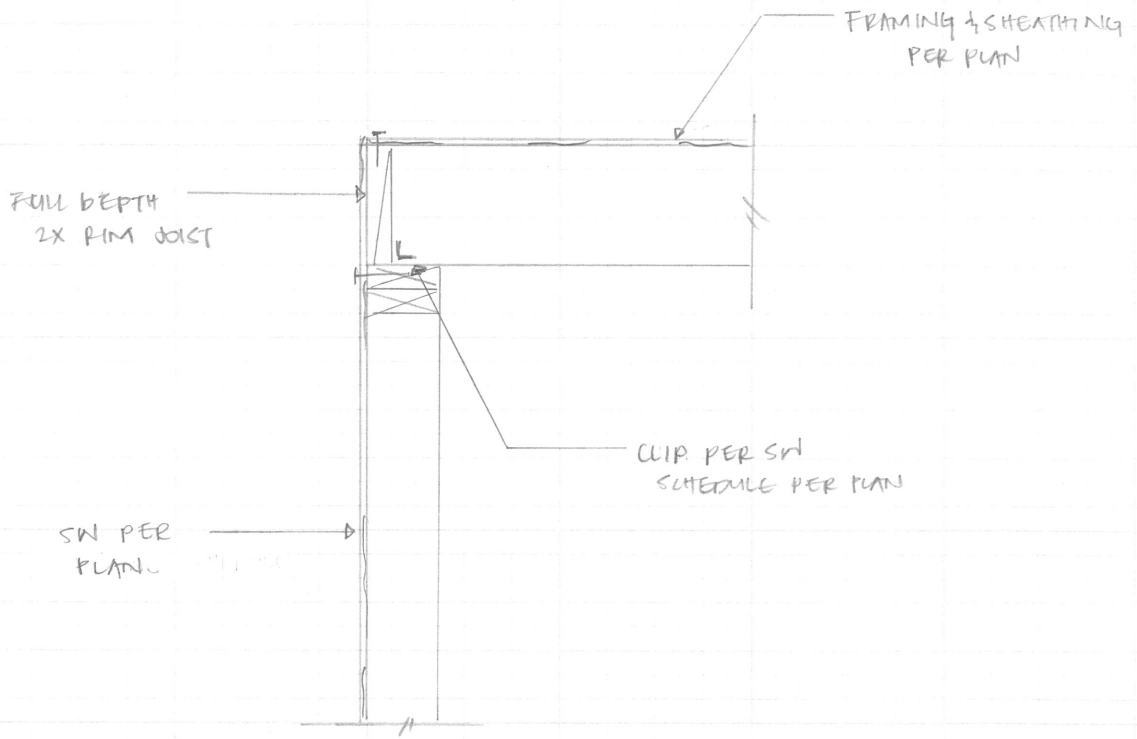
#4x21'-0" @ 12" OC
 EPOXY EMBED 4" MIN.
 INTO (E) CONCRETE.

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

JOHNSON GARAGE ADDITION

DATE: 6/3/21

S2.0



DETAIL "A"
 $\frac{3}{4}'' = 1'-0''$

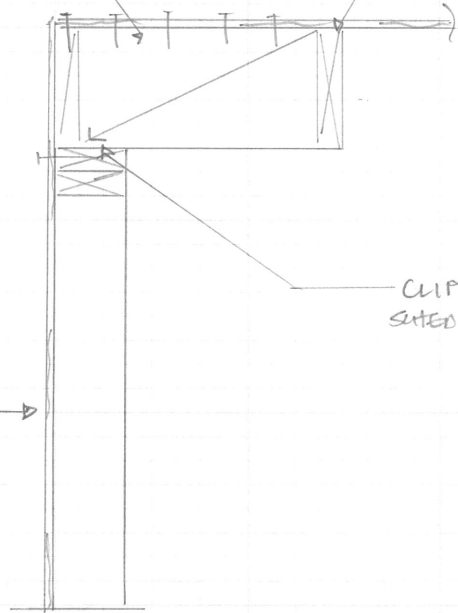


FULL DEPTH
BLK'G @ 48" OC

FRAMING & SHEATHING
PER PLAN

CLIP PER SW
SCHEDULE PER PLAN

SW PER
PLAN



DETAIL "B"
3/4" = 1'-0"



FRAMING & SHEATHING PER PLAN

(E) FRAMING & SHEATHING

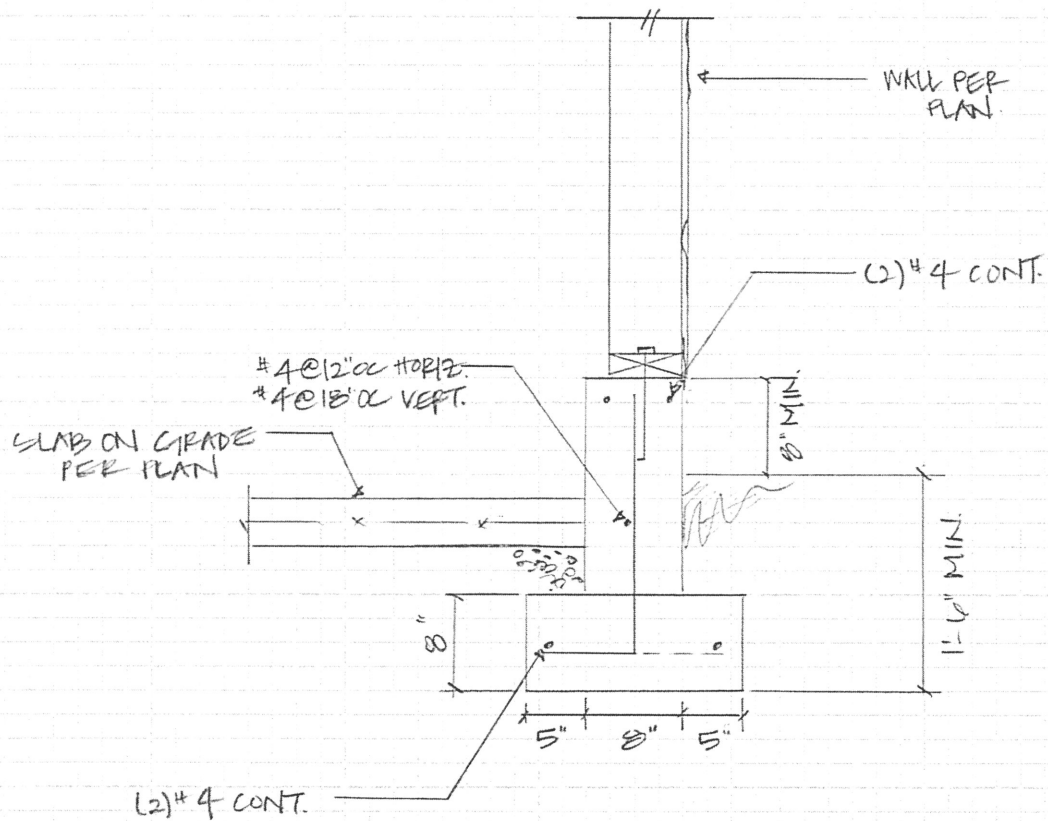
FULL DEPTH 2X BLK'G

SW PER PLAN

CLIP PER SW SCHEDULE PER PLAN

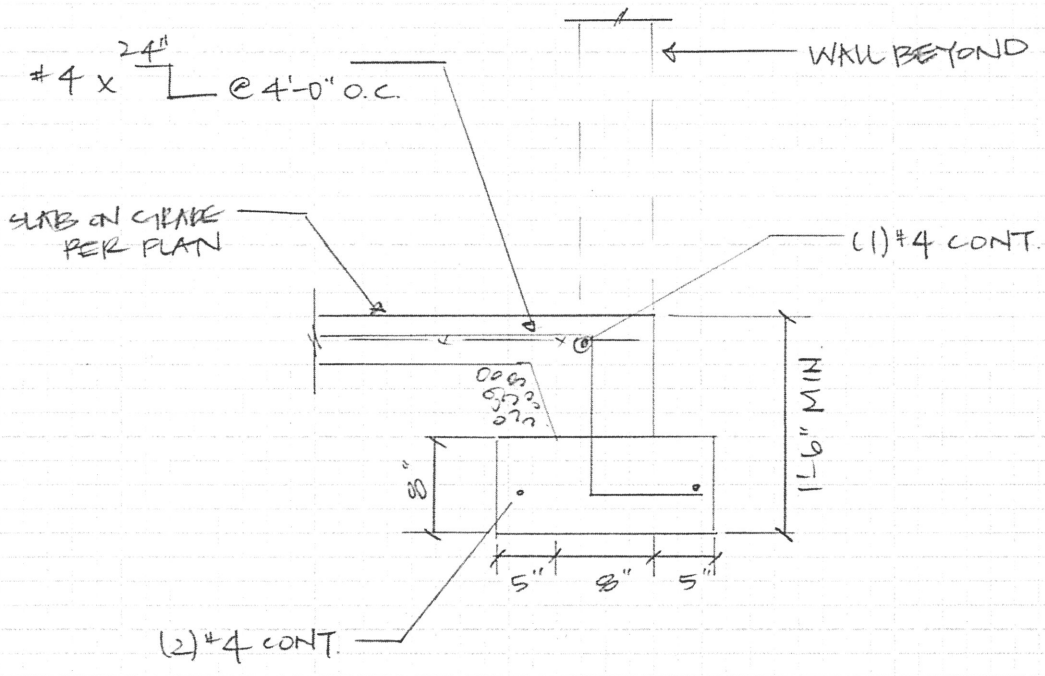
DETAIL "C"
3/4" = 1'-0"



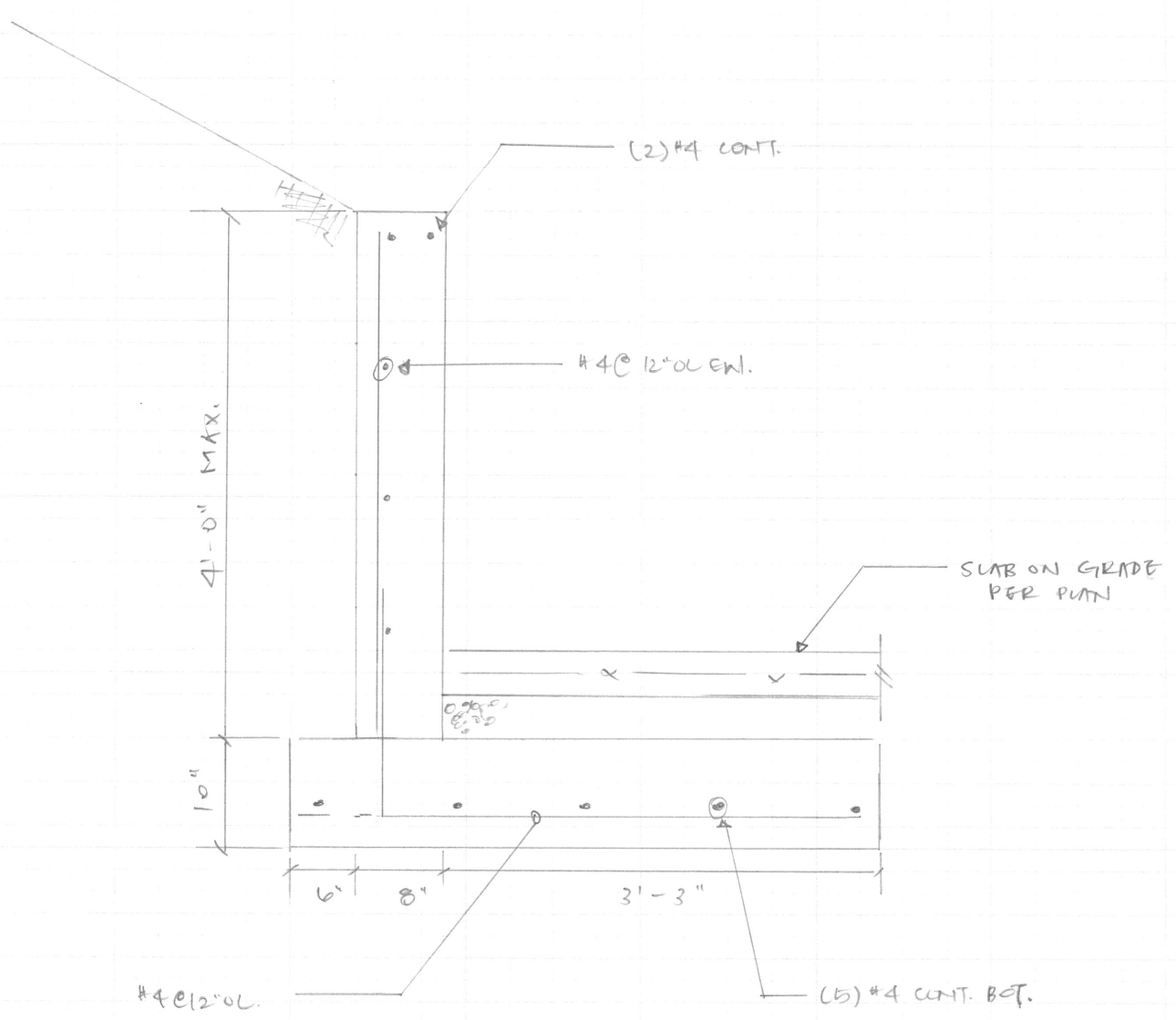


DETAIL "D"
 $\frac{3}{4}'' = 1'-0''$





DETAIL "E"
 $\frac{3}{4}'' = 1'-0''$



DETAIL "F"
 3/4" = 1'-0"

Roof Framing Plan Notes

1. Roof sheathing shall be 15/32" APA Rated sheathing with a panel index of 24/0. Nail to framing with 8d common nails at 6" oc at panel edges and 12" oc in field unless noted otherwise on plans. Where noted on the plans all panel edges shall be block with minimum 2x material.
2. All headers and beams shall be (2) 2x8 minimum, u.n.o. Refer to note 3 for support requirements.
3. All columns shall be double stud minimum, u.n.o., with the beam or header bearing fully on the column. Individual studs shall be nailed together per the general structural notes.

Foundation Plan Notes

1. All slabs-on-on-grade shall be 4" reinforced with WWF6x6 W1.4xW1.4 u.n.o. Provide minimum 6-mil visqueen vapor barrier under all slabs. Slabs shall be supported on a minimum 4 inches of free draining material.

Mark	Sheathing	Blocking	Panel Nailing ¹	Attachment to Top Plate ²	Bottom Plate Attachment ⁴		Capacity (plf) Seismic
					Nailing to Wood Below ³	A. Bolts to Concrete Below	
SW 1	15/32" APA Sheathing	Yes	8d @ 6"oc	CLIP @ 24"oc	16d @ 6"oc	5/8" @ 48" oc	242

¹ Nails shall be 8d common. Nailing applies to all panel edges (block all unsupported panel edges), top & bottom plates and blocking. Nail to intermediate framing members w/ 8d @ 12"oc.

² Clip shall be A35, or LTP4

³ Nails shall be 16d box (0.135Øx3") or 10d common (0.148Øx3")
Screws shall be Simpson SDS25300 (1/4"Øx3"min)

⁴ At 2x6 plates the edge of the plate washer shall be a maximum 1/2" from the face of sheathing.