# ADDENDUM NO. 2

# Skagit County Public Works May 21, 2025

# 2025 Waste Storage Facility Construction

# NOTICE TO PROSPECTIVE BIDDERS

NOTICE IS HEREY GIVEN that the Contract Provision and Plans have been modified as follows:

# THE FOLLOWING CHANGES HAVE BEEN MADE TO THE CONTRACT PROVISIONS:

<u>Appendix F – Vicinity Maps and Plans is supplemented to include</u> template designs created by Peterson Structural Engineers that were shared with us from Skagit Conservation District to be used in supplement with the Fitzgerald WSF Roof Drainage and Concrete Apron Designs, produced by Skagit County. The supplemental documents include "Stock Agricultural Waste Storage Facility – Design Criteria Memorandum," "Fitzgerald 2024-02-09 Stock Agricultural WSF Stamped Structural Drawings," and stamped "Structural Design Calculations." Please note the structural drawings detail construction for up to four (4) storage bins, but our project will only entail two (2) storage bins. Documents attached.



Tacoma Office 708 Broadway Suite 110 Tacoma, WA 98402 253.830.2140

February 9, 2024

Emmett Wild Skagit Conservation District 2021 E. College Way Suite 203 Mount Vernon, WA 98273 360.428.4313

Project #: 2302-0069

#### RE: Stock Agricultural Waste Storage Facility – Design Criteria Memorandum

To Whom it May Concern -

The following memorandum has been generated by Peterson Structural Engineers (PSE) to summarize the structural design criteria and loading considered for the 10-Foot Bin Waste Storage Facility (WSF) Stock Structure Standard Design. The following memorandum, in conjunction with the provided structural drawings and structural design calculations (dated February 9, 2024 and collectively referred to as the "design documents"), may be used by Skagit, Whatcom, Whidbey Island, and San Juan Island Conservation Districts to determine project design applicability in the subject counties.

The subject WSF structural design as detailed in the structural drawings shall only be constructed in regions where all of the criteria outlined herein are met. The structural design shall not be implemented where any of the criteria outlined herein are not met, unless otherwise reviewed and approved by a Professional Engineer licensed in Washington State. The structural design is a standard design that may require adaptation for a specific use or site. Any design alterations or deviations from the design documents shall be reviewed and approved by a Professional Engineer by a Professional Engineer licensed in Washington State.

Appended to this memorandum are design criteria references as provided by the Skagit, Whatcom, Whidbey Island, and San Juan Island Counties as well as excerpts from the American Society of Civil Engineers Standard 7-16 (ASCE 7-16), *Minimum Design Loads for Buildings and Other Structures*. The provided excerpts may be used as an aid in determining project design applicability in the subject counties.

#### **General Standards**

All work shall be in strict conformance with the 2021 International Building Code (2021 IBC) as amended by the State of Washington as well as the applicable United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS) Standards. The subject WSF structural design is only applicable under the 2021 IBC and is not permitted for use under future code adoption cycles without written approval by PSE. Following future building code adoption, PSE may be consulted to review, update, and reissue the design for use.

The subject WSF structural design is considered a Risk Category I structure per the 2021 IBC and ASCE 7-16. Per Section C1.5.1 of ASCE 7-16, "Risk Category I structures generally encompass buildings and structures that normally are unoccupied and that would result in negligible risk to the public should they fail." Uses and occupancies of the structure which conform to higher Risk Categories are not permitted.

### Location

The subject WSF structural design shall only be applicable to regions within Skagit, Whatcom, Whidbey Island, and San Juan Island Counties in Washington State where in conformance with the criteria outlined herein.

#### **Bin Types**

Per the structural drawings, the owner/contractor are provided the following options for bin construction:

- Reinforced Concrete Walls
  - Height: 4'-0"
  - Thickness: 0'-6"
  - Reinforcing: See structural drawings
  - Precast Ecology Block Walls
    - Height: 4'-0"
    - Block geometry:
      - Width: 2'-0"
      - Height: 2'-0"
      - Length: 4'-0" (full block) and 2'-0" (half block). Block types shall be as noted in the structural drawings.

#### **General Requirements**

Per the structural drawings, the owner/contractor are provided the option of using a 2-bin, 3-bin, or 4-bin configuration. This subject design is not applicable to layouts or bin configurations other than those detailed in the structural drawings. Summarized below are the primary geometric requirements for the structure:

- Internal bin size: 10'-0" x 10'-0" clear
- Retained exterior backfill height: Up to 3" below the top of wall
- Front beam soffit elevation (vertical entry clearance): 10'-0" above top of slab (6'-0" above top of wall)
- Roof slope: 2V:12H (approximately = 9.46°)
- Slab slope: 2% to back wall
- Foundation thickness:
  - At footing edges: 1'-0" minimum
  - Interior slab region: 0'-6" minimum
- Geometry: See structural drawings

#### Maintenance of Structure

Portions of the structure will be exposed to weather, contact with stored waste, and other conditions that promote material deterioration. The owner should routinely observe material conditions and perform maintenance as needed to ensure structural soundness. When material deterioration occurs, owner shall repair or replace impacted members. Furthermore, structural damages that result from storage operations or machinery should be reviewed by a Professional Engineer licensed in the State of Washington to determine repairs. Alternatively, the member may be replaced in kind and connected as detailed in the design documents. The owner or contractor is responsible for any shoring required to support the structure during member placement.

#### Live Loads

The subject WSF structural design shall only be applicable to the following live loads:

- Floor Distributed Load: Shall not exceed 250psf
- Flood Concentrated Load: Shall not exceed 8,000lb
- Retaining Wall Vertical Surcharge Load: Shall not exceed 250psf

#### Snow Loads

The subject WSF structural design shall only be applicable to regions that meet the following snow load criteria:

- Ground Snow Loads: Shall not exceed 40.0-psf
- Flat Roof Snow Loads: Shall not exceed 30.0-psf

#### Wind Loads

The subject WSF structural design shall only be applicable to regions that meet the following wind load criteria:

- Wind Exposure: Exposures B through D are acceptable
- Basic Wind Speed per ASCE 7-16: Shall not exceed 100-mph
- Topographic Factor: K<sub>zt</sub> shall not exceed 1.5

#### Seismic Loads

The subject WSF structural design shall only be applicable to regions that meet the following seismic load criteria:

- Site Class: Class A through D are permitted. Structural design has assumed Site Class D. Design is not valid for Site Class E and Site Class F.
- Mapped Short Spectral Response,  $S_s \le 1.50g$
- Mapped Spectral Response at 1-second,  $S_1 \le 0.60g$
- Design Short Spectral Response,  $S_{DS} \le 1.30g$
- Design Spectral Response at 1-second,  $S_{D1} \le 0.8$
- Seismic Response Coefficient,  $C_s \le 0.80$

For more information on site-specific loading, refer to ASCE 7-16 and <u>ATC Hazard Maps<sup>1</sup></u>.

The design criteria outlined herein may not capture all load scenarios across the applicable regions. PSE is not responsible for the regulation or oversight of design implementation and construction for the subject WSF design. Applicability of the subject WSF structural design shall be regulated by the Conservation Districts in strict conformance with the provided design documents.

Site civil, architectural (including waterproofing and flashing), and any other nonstructural elements are outside of PSE's scope of work. All construction shall be in strict conformance with the 2021 IBC and USDA NRCS standards.

<sup>&</sup>lt;sup>1</sup> https://hazards.atcouncil.org/

Please don't hesitate to contact us if you have any questions.

Sincerely,

William J. Im

Bill Sandbo, PE, SE, LEED AP Principal Peterson Structural Engineers, Inc.

Sent via email to Emmett Wild on 2/9/2024 <emmett@skagitcd.org>



#### STOCK AGRICULURAL WASTE STORAGE FACILITY – DESIGN CRITERIA MEMORANDUM

Skagit, Whatcom, Whidbey Island, and San Juan Island Conservation Districts

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# Appendix A - County Provided Design Criteria

Skagit County



Figure 1: Skagit Roof Snow Load Map - URL: https://www.skagitcounty.net/Maps/iMap/?mapid=8fe801e1318643c9bfef288efb64c85f

#### Whatcom County

	SNOW LOA	D REVISION	
Whatcom County	Approx. Average Elevation	Revised Ground Snow Load	Revised Roof Snow Load
Acme	310	22	25
Bellingham	100	15	25
Blaine	45	16	25
Deming	210	24	25
Diablo	910	100	100
Ferndale	60	20	25
Glacier	900	74	74
Lawrence	145	24	25
Lynden	103	24	25
Maple Falls	643	77	77
Mt. Baker Ski Area	4200	588	588
Newhalem	510	129	129
Nooksack	84	24	25
Sumas	36	24	25
Wickersham	310	28	28
Kendall	460		50
Paradise	460		50
Pt. Roberts	120		25

Essential facilities, Group A and other applicable occupancies, will require engineering.

Any proposal can challenge the above design load with engineer or architect stamped and signed calculations and criteria.

Buildings where the roof snow load exceeds 70 PSF will require engineering.

Recommendations are valid for the recognized central area of each regional designation. Building Services reserves the right to adjust the roof snow load based on building location and/or criteria per the currently adopted version of the IBC and/or the Snow Load Analysis for Washington.

Seismic Design Category D1.

Basic wind speed – 85 MPH (verify exposure rating with Building Services Division.) Tax Parcel Number required.

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Figure 2: Whatcom County Climatic and Geographic Design Criteria - URL: https://www.whatcomcounty.us/542/Snow-Loads

### Island County

2021)		i MEAN ANNUAL TEMPERATURE	49.7°		remperature erence				
ve Feb 1,		AIR FREEZING INDEX	1500		HEATING T DIFF				
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ISLA		SPEED (mph)	110		ELEV	46 F	OLING TE DIFFEI		
		ROOF SNOW LOAD	25				0		

Figure 3: Island County 2018 Table 301.2(1) Climatic and Geographic Design Criteria – URL: https://www.islandcountywa.gov/547/Building-Codes

Figure notes:

- 1. Design criteria shown above is for the 2018 IBC and ASCE 7-16. Some design criteria may be updated under the 2021 IBC. PSE recommends contacting the local Building Department for more information.
- 2. Wind loads generated per the 2021 IBC and ASCE 7-16 are based on the basic wind speed. Ultimate wind speed as listed above is applicable to the 2021 International Residential Code (IRC). Subject design is based on the 2021 IBC/ASCE 7-16 design criteria and loads.

#### San Juan Island County



Figure 4: San Juan County Construction Regulations and Design Criteria - URL: https://www.sanjuancountywa.gov/DocumentCenter/View/11661/Construction-Regulations--Local-Design-Criteria---PDF?bidId=

Figure note: Wind loads generated per the 2021 IBC and ASCE 7-16 are based on the basic wind speed. Ultimate wind speed as listed above is applicable to the 2018 International Residential Code (IRC). Subject design is based on the 2021 IBC/ASCE 7-16 design criteria and loads.

### STOCK AGRICULURAL WASTE STORAGE FACILITY – DESIGN CRITERIA MEMORANDUM

Skagit, Whatcom, Whidbey Island, and San Juan Island Conservation Districts



Wind Speed Map



Figure 5: Basic Wind Speed Map for Risk Category I Buildings and Other Structures, Excerpt from Figure 26.5-1A of ASCE 7-16.

#### STOCK AGRICULURAL WASTE STORAGE FACILITY – DESIGN CRITERIA MEMORANDUM

Skagit, Whatcom, Whidbey Island, and San Juan Island Conservation Districts

#### Ground Snow Loads

Table 1: Ground Snow Loads for Selected Locations in Washington, Excerpt from Table 7.2-5 of ASCE 7-16.

Table 7.2-5 Ground Snow Loads for Selected Locations in Washington			
City/Town	County	Ground Snow Load (lb/ft <sup>2</sup> )	Elevation (ft)
Arlington	Snohomish	17	120
Auburn	King	20	85
Bainbridge Island	Kitsap	15	100
Bellevue	King	20	100
Bellingham	Watcom	15	100
Bonney Lake	Pierce	18	40
Bothell	King	20	90
Bremerton	Kitsap	15	100
Burien	King	10	323
Covington Countral Ma	King	20	4 280
Crystal Mt.	Fierce	438	4,580
Edmonds	King	18	250
Ellanshura	Vittitas	20	1.540
Everat	Snohomich	15	1,540
Evered Federal Way	Kine	20	85
Issamah	King	20	100
Kenmore	King	20	90
Kennewick	Benton	15	400
Kent	King	20	50
Kirkland	King	20	180
Lacev	Thurston	15	200
Lake Stevens	Snohomish	15	250
Lakewood	Pierce	15	235
Longview	Cowlitz	18	21
Lynnwood	Snohomish	22	435
Maple Valley	King	23	440
Marysville	Snohomish	16	20
Mercer Island	King	16	320
Mt. Baker	Whatcom	588	4,200
Mt. Spokane	Spokane	151	5,800
Mt. Vernon	Skagit	15	180
Oak Harbor	Island	17	120
Olympia	Thurston	15	130
Pasco	Franklin	15	383
Pullman	Whitman	30	2,400
Puyallup	Pierce	18	40
Reamona	King	20	120
Righland	Renton	20	250
Sommanich	Ving	10	530
SanTac	King	20	440
Seattle	King	20	350
Shoreline	King	22	450
Snormalmie Pass	Kittitas	433	3.000
Spokane	Snokane	39	2.000
Spokane Valley	Spokane	39	2,000
Stevens Pass	Chelan	400	4.060
Tacoma	Pierce	21	380
Tukwila	King	16	325
Univ. Place	Pierce	20	400
Vancouver	Clark	20	150
Walla Walla	Walla Walla	18	1,000
Wenatchee	Chelan	22	780
White Pass	Yakima	244	4,720
Yakima	Yakima	19	1,066

Statutory requirements of the Authority Having Jurisdiction are not included in this state ground snow load table.
 For locations where there is substantial change in altitude over the jurisdiction, the load applies at and below the cited elevation, with a tolerance of 100 ft (30 m).
 For other locations in Washington, see Structural Engineers Associa-tion of Washington (1995). "Snow Load Analysis for Washington," Seattle, WA, www.seaw.org, for ground snow load values.

#### Seismic Ground Motions



Figure 6: S<sub>S</sub> Risk Targeted Maximum Considered Earthquake (MCE<sub>R</sub>) Ground Motion Parameter from the Conterminous United States for 0.2-s Spectral Response Acceleration (5% of Critical Damping), Excerpt from Figure 22-1 of ASCE 7-16

#### STOCK AGRICULURAL WASTE STORAGE FACILITY – DESIGN CRITERIA MEMORANDUM

Skagit, Whatcom, Whidbey Island, and San Juan Island Conservation Districts



Figure 7: S<sub>1</sub> Risk-Targeted Maximum Considered Earthquake (MCE<sub>R</sub>) Ground Motion Parameters for the Conterminous United States for 1.0-s Spectral Response Acceleration (5% of Critical Damping), Excerpt from Figure 22-2 of ASCE 7-16.

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SHALL BE HARD ROCK CONCRETE MEETING REQUIREMENTS OF ACI-301, "SPECIFICATIONS AL CONCRETE FOR BUILDINGS". MIX PROPORTIONS SHALL BE PER ACI-301, METHOD 2 OR PROCEDURE.

ONCRETE SHALL ATTAIN THE FOLLOWING MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS:

f'c		SLUMP	w/c	AIR
ONCRETE 4,000	psi	1-4"	0.45	6%

CTION IS NOT REQUIRED. SEE EXCEPTIONS TO SPECIAL INSPECTION INCLUDED IN IBC 3. 4,000 psi COMPRESSIVE STRENGTH IS SPECIFIED FOR WEATHERING PROTECTION. ESIGN OF CONCRETE BASED ON 2,500 psi COMPRESSIVE STRENGTH.

EXPOSED TO WEATHER SHALL CONTAIN 6%  $(\pm)$  1% AIR ENTRAINMENT BY VOLUME. AIR SHALL BE IN CONFORMANCE WITH ASTM C260.

PLACEMENT SHALL CONFORM TO ACI-306. HOT WEATHER PLACEMENT SHALL CONFORM TO HANICALLY VIBRATE ALL FORMED CONCRETE. DO NOT OVER-VIBRATE. PLACE CONCRETE BETWEEN CONSTRUCTION OR CONTROL JOINTS. PROTECT ALL CONCRETE FROM PREMATURE

EXTERIOR CORNERS 1/2" UNLESS SHOWN OTHERWISE.

MAY BE INCREASED BY ADDITION OF ADMIXTURES PROVIDED THAT THE WATER/CEMENT RATIO JAL MIX DESIGN IS NOT EXCEEDED. WATER REDUCING ADMIXTURE SHALL BE IN WITH ASTM494, USED IN CONFORMANCE WITH MANUFACTURER'S INSTRUCTIONS. SUBMIT O ENGINEER FOR REVIEW PRIOR TO CONSTRUCTION.

BE TYPE I OR II IN CONFORMANCE WITH ASTM C150. AGGREGATES SHALL BE IN WITH ASTM C33 AND USE CRUSHED (NOT ROUND) GRAVEL OR STONE. COARSE HALL NOT EXCEED 3/4". WATER SHALL BE CLEAN AND POTABLE.

STEEL SHALL CONFORM TO ASTM A615, GRADE 60. GRADE 40 MAY BE USED FOR #3 AND AND STIRRUPS. DETAIL AND PLACE ACCORDING TO ACI MANUAL SP-66. BENDS SHALL BE A PIN HAVING A DIAMETER NOT LESS THAN SIX TIMES THE MINIMUM THICKNESS OF THE NG OR STRAIGHTENING OF REINFORCING OR BENDING OF REINFORCING STEEL CAST INTO NOT ALLOWED.

WISE NOTED, MINIMUM COVER SHALL BE 1 1/2" FOR #5 AND SMALLER BARS, 2" FOR #6 BARS AND 3" WHEN POURED AGAINST EARTH. SUPPORT REINFORCEMENT WITH APPROVED ERS, OR TIES.

WISE NOTED, PROVIDE MINIMUM 48 BAR DIAMETERS AT SPLICES. NO MORE THAN 50% OF SHALL BE SPLICED AT ANY LOCATION. UNLESS OTHERWISE NOTED, BEND ALL HORIZONTAL MINIMUM OF 2'-0" AT CORNERS AND WALL/FOOTING INTERSECTIONS WITH MIN. EMBEDMENT FACE PER DEVELOPMENT LENGTH SPECIFIED IN ACI 318.

ALL BE IN ACCORDANCE WITH ACI-347 "GUIDE TO FORMWORK FOR CONCRETE". FORMS IGNED BY THE CONTRACTOR. BRACING SHALL BE PROVIDED AS REQUIRED OR UNTIL THE REACHED ITS SPECIFIED 28-DAY STRENGTH. ALL SHORING SHALL BE THE RESPONSIBILITY ACTOR. FORMWORK, SUPPORTS, AND SHORING SHALL PROVIDE FINISHED CONCRETE ALL FACES: LEVEL, PLUMB, AND TRUE TO DIMENSIONS AND ELEVATIONS SHOWN IN THE

RISTICS HAVE BEEN ASSUMED PER THE 2021 IBC WITH WASHINGTON AMENDMENTS SECTION PTIVE LOAD—BEARING VALUES OF SOILS CONSISTENT WITH CLAY, SANDY CLAY, SILTY CLAY, SILT AND SANDY SILT (CL, ML, MH AND CH) SOIL TYPES. THE CONTRACTOR SHALL VERIFY SOIL TYPES PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER AND ARCHITECT OF ING IN-SITU CONDITIONS IF PRESENT BEFORE PROCEEDING.

ONS TO BEAR ON UNDISTURBED NATIVE MATERIAL, OR GRANULAR COMPACTED FILL.

RITERIA, PER 2021 IBC SECTION 1806:

ARING — 1,500 PSF ASE ALLOWED FOR SHORT TERM LOADS

OFILE – D

COEFFICIENT - 0.35 (GRANULAR COMPACTED SUBGRADE)

NS SHALL BE PROPERLY BACKFILLED. DO NOT PLACE BACKFILL BEHIND RETAINING WALLS ICRETE WALL HAS ATTAINED THE 80% DESIGN STRENGTH. WHERE A SLAB ON GRADE IS RAIN THE BOTTOM OF A RETAINING WALL, DO NOT PLACE BACKFILL BEHIND THE WALL UNTIL AVE BEEN CAST AND ATTAINED FULL DESIGN STRENGTH.

# CONCRETE ANCHORS:

HESIVE ANCHORS SHALL BE INSTALLED BY QUALIFIED PERSONNEL TRAINED TO INSTALL HESIVE ANCHORS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND WITH STRICT HERENCE TO THE PROVISIONS WITHIN THE MANUFACTURER'S PRINTED INSTALLATION TRUCTIONS.

THE TIME OF ANCHOR INSTALLATION, IN ACCORDANCE WITH ACI 318-19 SECTION 17.1.2, HESIVE ANCHORS SHALL BE INSTALLED IN CONCRETE HAVING A MINIMUM AGE OF 21 DAYS.

MECHANICAL ANCHORS SHALL BE INSTALLED BY QUALIFIED PERSONNEL TRAINED TO INSTALL CHANICAL ANCHORS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND WITH STRICT HERENCE TO THE PROVISIONS WITHIN THE MANUFACTURER'S PRINTED INSTALLATION TRUCTIONS.

# SOLID SAWN LUMBER:

- 1. UNLESS NOTED OTHERWISE, STRUCTURAL LUMBER SHALL BE DOUGLAS FIR OR HEM FIR CONFORMING TO WWPA GRADING RULES.
- 2. MINIMUM GRADES ARE, EXCEPT AS NOTED OTHERWISE:

STRUCTURAL JOISTS & PLANKS – #2BEAMS & STRINGERS - #2 POSTS & TIMBERS – #1

- 3. NOTCHING IS NOT PERMITTED IN JOISTS, RAFTERS, BEAMS, LINTELS, COLUMNS, TRUSSES, AND BRACING MEMBERS UNLESS NOTED OTHERWISE.
- EXTERIOR EXPOSURE. OWNER SHALL ROUTINELY OBSERVE MATERIAL CONDITIONS, AND MAINTAIN AS NEEDED. WHEN MATERIAL DETERIORATION OCCURS, MEMBERS SHOULD BE REPLACED.
- 5. PRESSURE TREATED LUMBER SHALL CONFORM TO THE AWPA AND SHALL BEAR THE QUALITY MARK OF AN AS FOLLOWS:

APPLICATION	ACQ/ACZA	С
ABOVE GROUND	0.25	0
GROUND CONTACT	0.40	0
FRESH WATER IMMERSION	0.40	0
IN GROUND (STRUCTURAL)	0.60	0
SILL PLATES	0.25	0

- 6. TREAT ALL CUT ENDS OF TREATED WOOD FOR EXTERIOR EXPOSURE.
- 7. NAILING SHALL BE IN CONFORMANCE WITH THE 2021 IBC AS AMENDED WITH WASHINGTON AMENDMENTS UNLESS NOTED OTHERWISE. FASTENERS FOR PRESERVATIVE-TREATED WOOD SHALL BE OF HOT-DIPPED ZINC-COATED GALVANIZED STEEL, STAINLESS STEEL, SILICON BRONZE OR COPPER. THE COATING WEIGHTS FOR ZINC-COATED FASTENERS SHALL BE IN ACCORDANCE WITH ASTM A-153. 5/8-INCH DIAMETER STEEL ANCHOR BOLTS & LARGER NEED NOT BE GALVANIZED, UNLESS NOTED OTHERWISE.
- 8. USE STANDARD WASHERS FOR ALL BOLT HEADS AND NUTS IN CONTACT WITH WOOD.

# PREMANUFACTURED CONNECTION HARDWARE:

- 1. CONNECTION HARDWARE IS BY THE SIMPSON COMPANY OF SAN LEANDRO, CA. ALL STEEL CONNECTORS SHALL BE GALVANIZED OR BY SOME METHOD MADE CORROSION RESISTANT, UNLESS OTHERWISE INDICATED.
- 2. PROVIDE BOLTED OR NAILED CONNECTIONS FOR THE MAXIMUM CAPACITY UNLESS NOTED OTHERWISE.
- 3. CONNECTORS IN CONTACT WITH PRESSURE TREATED WOOD SHALL BE EITHER POST HOT-DIP GALVANIZED OR STAINLESS STEEL. FASTENERS SHALL BE OF THE SAME MATERIAL OR PROTECTIVE COATING AS THE CONNECTORS, DO NOT MIX DIFFERING METALS IN THE SAME CONNECTION.
- 4. ALL HARDWARE SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS, UNLESS NOTED OTHERWISE.

# SHEATHING:

- 1. WOOD STRUCTURAL PANELS SHALL BE APA RATED EXPOSURE 1 PLYWOOD, AND COVERED IN DOC PS 1 AND PS 2, UNLESS NOTED OTHERWISE.
- 2. MINIMUM PANEL THICKNESS SHALL BE  ${}^{15}_{32}$ ", OR AS INDICATED IN THESE PLANS. PARTICLEBOARD IS NOT PERMITTED.
- 3. MINIMUM NAILING IS 8d@6" AT PANEL EDGES AND 8d@12" IN THE FIELD. ALL NAILS SHALL BE COMMON OR GALVANIZED BOX NAILS. BLOCKING IS REQUIRED WHERE NOTED ON THE PLANS.

NOTE REGARDING BIN OPTIONS: THE FOLLOWING DESIGN INCLUDES OPTIONS FOR CAST-IN-PLACE (CIP) BIN CONSTRUCTION AND ECOLOGY BLOCK BIN CONSTRUCTION. WHERE CIP BINS ARE BEING USED. SHEETS S1-S4 AND S8-S9 ARE APPLICABLE. WHERE ECOLOGY BLOCK BINS ARE BEING USED, SHEETS S1 AND S5-S9 ARE APPLICABLE. IT IS NOT PERMITTED TO INTERMIX CIP WALLS AND ECOLOGY BLOCK WALLS IN THE DESIGN.

AT OWNER/CONTRACTOR'S OPTION, THESE PLANS MAY BE USED FOR THE CONSTRUCTION OF EITHER A 2-BIN, 3-BIN, OR 4-BIN CONFIGURATION. OTHER CONFIGURATIONS ARE NOT INCLUDED AS PART OF THIS DESIGN.





				O IF THI MEASURE NO	NOTICE		OHN WASH OT DO DU DU DU DU DU DU DU DU DU DU DU DU DU
							<b>NGINEERS</b>
		CIP WSF FO	JNDATION SCH	EDULE			<b>RAL EN</b> Suite 2 9840
NT N 6	CON	CIP BIN FIGURATION	TOTAL FOUNDATION LENGTH	TOTAL FOUNDATION WIDTH			ISON STRUCTU B Broadway, Tacoma, W/ (253)830
S4		CIP 2-BIN	23'-6"	12'-6"		▏▐▙▋	
		CIP 3-BIN	34 -0 44'-6"	12-6"		*	
SURFA	.ce —	SHEET NOTES: 1. CONTRACTON 2-BIN, 3-BIN 2. TREAT ALL C FOR EXTERIC 3. GUTTERS, DF OTHERS. NO DIN FR/ ROOF F PLAN C OF FRAMIN NOTE: DI HORIZON ON ANGL	R/OWNER'S OPTION OR 4-BIN CONFIGU UT ENDS OF TREAT OR EXPOSURE. RIP EDGE, AND FLA T SHOWN FOR CLAI AND FOR CLAI AMING PLAN FRAMING PLAN FRAMING PLAN FRAMING PLAN OR MENSIONS TAKEN TAL PROJECTIONS E OF ROOF SUBFAC	A TO USE URATION. ED LUMBER SHING BY RITY.		STOCK AGRICULTURAL WSF	PROJECT SITE:       CLIENT INF         Skagit conservation district whatcom conservation district whidber island conservation district san juan islands conservation district       SKAGIT CONSERVATION DISTRIC         Skagit conservation district whidber island conservation district san juan islands conservation district       2021 E. COLLEGE WAY, SUITE 2
		CIP ROOF F CIP BIN FIGURATION CIP 2-BIN CIP 3-BIN CIP 4-BIN	FRAMING SCHEI ROOF PLAN LENGTH 24'-5"1/2 34'-11"1/2 45'-5"1/2	DULE ROOF PLAN WIDTH 12'-7"3/4 12'-7"3/4 12'-7"3/4			
	— a –	bb	C C	d -		CIP BIN OPTION AND	ROOF PLAN
		POST SPA	CING GEOM	ETRY NTS		JOB NO. 2302 DRAWN RLKC	2-0069 checked NRW
		CIP POST S		DULE	_	DATE 2/9	/24
		CIP 2-BIN	CIP 3-BIN	CIP 4-BIN	-	REVISIONS	
	a h	10'-6" 10'-6"	10'-6"	10'-6" 10'-6"	-		
	C	-	10'-6"	10'-6"	-		
	d	-	-	10'-6"		SHEET	
	е	9'-5"	9'-5"	9'-5"			S2 of 9









DETAIL NOTE: CONTROL JOINT AND LOCATION PER DETAIL, 4 TYP. 57

ECOLOGY BLOCK WSF FOUNDATION SCHEDULE					
CONFIGURATION	LENGTH	WIDTH			
EB 2-BIN	28'-0"	15'-0"			
EB 3-BIN	40'-0"	15'-0"			
EB 4-BIN	52'-0"	15'-0"			

	<ol> <li>CONTRACTOR/OWNER'S OPTION TO USE 2-BIN, 3-BIN OR 4-BIN CONFIGURATION.</li> <li>TREAT ALL CUT ENDS OF TREATED LUMBER FOR EXTERIOR EXPOSURE.</li> <li>GUTTERS, DRIP EDGE, AND FLASHING BY OTHERS. NOT SHOWN FOR CLARITY.</li> </ol>
	DIM. PER ROOF
JRFACE	FRAMING PLAN ROOF FRAMING PLAN ORIENTATION 2 12
ROOF	FRAMING PLAN ORIENTATION
	NOTE: DIMENSIONS TAKEN AS HORIZONTAL PROJECTIONS BASED ON ANGLE OF ROOF SURFACE

ECOLOGY BLOCK	ROOF FRAMING	SCHEDULE

BIN	ROOF PLAN LENGTH	ROOF PLAN WIDTH
EB 2-BIN	26'-5"1/2	14'-1"1/2
EB 3-BIN	38'-5"1/2	14'-1"1/2
EB 4-BIN	50'-5"1/2	14'-1"1/2

	EC	OLOGY BLOCK F	POST SPACING	SCHEDULE
		EB 2-BIN	EB 3-BIN	EB 4-BIN
	а	11'-0"	11'-0"	11'-0"
DT   GY	b	12'-0"	13'-0"	13'-0"
тц	С	-	11'-0"	11'-0"
	d	-	-	12'-0"
	е	10'-8"	10'-8"	10'-8"

IS	BROKESSIO	OHN WASH IC IN B 3224 IN AL ENGINE AL ENGINE
		PETERSON STRUCTURAL ENGINEERS 708 Broadway, Suite 110 Tacoma, WA 98402 (253)830 - 2140
	<b>FURAL WSF</b>	CLIENT INFO: SKAGIT CONSERVATION DISTRICT 2021 E. COLLEGE WAY, SUITE 203 MOUNT VERNON, WA 98273
	STOCK AGRICULT	PROJECT SITE: SKAGIT CONSERVATION DISTRICT WHATCOM CONSERVATION DISTRICT WHIDBEY ISLAND CONSERVATION DISTRICT SAN JUAN ISLANDS CONSERVATION DISTRICT
	SHEET CONTENT ECOLOGY BLOCK OPTION - FOUNDATION AND	ROOF PLAN
J	JOB No. 2302 DRAWN RLKC DATE 2/9/ REVISIONS	снескер NRW 24
	SHEET	

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- ROOF ASSEMBLIES, UNDERLAYMENT, AND ATTACHMENT SHALL BE IN CONFORMANCE WITH CHAPTER 15 OF THE
- ROOF ASSEMBLIES SHALL BE CAPABLE OF RESISTING THE
- DESIGN LOADS SUMMARIZED ON SHEET S1.
- UNDERLAYMENT, INSTALLATION, AND ATTACHMENT SHALL BE PER MANUFACTURE INSTALLATION INSTRUCTIONS



NOTICE

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Tacoma Office 708 Broadway Suite 110 Tacoma, WA 98402 253.830.2140

# **Structural Design Calculations**

Stock Agricultural WSF Whatcom County, Skagit County, Whidbey Island, and San Juan Island, WA

<u>Client Information</u> Emmett Wild Skagit Conservation District 2021 E. College Way Suite 203 Mount Vernon, WA 98273 (360) 899-8761

<u>Prepared By</u> Peterson Structural Engineers February 9, 2024 Project No. 2302-0069 <u>Project Site</u> Whatcom County Skagit County Whidbey Island San Juan Island

**Endorsement** 



# <u>Scope</u>

To provide structural calculations for a stock structure standard design waste storage facility (WSF) to be implemented at various locations within Whatcom County, Skagit County, Whidbey Island, and San Juan Island, WA. Elements under review include the foundation, retaining walls, and roof framing. Any other elements not specifically referenced in these calculations are outside the purview of these calculations and are designed by others.

# **References**

- 1. 2021 International Building Code with Washington Amendments (IBC)
- 2. United States Department of Agriculture National Resources Conservation Service, Conservation Practice Standard (NRCS CPS)
- 3. United States Department of Agriculture National Resource Conservation Service, National Engineering Manual with Washington State Supplements (NRCS NEM)
- 4. ASCE/SEI 7-16, Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers (ASCE)
- 5. 2019 Building Code Requirements for Structural Concrete, ACI 318-19, and Commentary (ACI)
- 6. 2018 National Design Specification for Wood Construction, ANSI/AWC (NDS)
- 7. 2015 Special Design Provisions for Wind and Seismic ANSI/AWC (SDPWS)
- 8. ATC Hazards Website, <u>https://hazards.atcouncil.org/</u>, (ATC)
- 9. Design Criteria as Provided by Whatcom County, Skagit County, Whidbey Island, and San Juan Island.



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# Design Criteria

Risk Category I Importance Factors

Per ASCE 7-16, Table 1.5-2

Snow,  $I_s = 0.8$ Seismic,  $I_E = 1.00$ 

### <u>Geometry</u>

Retaining Wall Height = 4'-0"

Eave Height = 10'-0'' max (6'-0'' above top of retaining wall) Foundation:

CIP WSF FC	UNDATION SCH	EDULE
CIP BIN CONFIGURATION	TOTAL FOUNDATION LENGTH	TOTAL FOUNDATION WIDTH
CIP 2-BIN	23'-6"	12'-6"
CIP 3-BIN	34'-0"	12'-6"
CIP 4-BIN	44'-6"	12'-6"
ECOLOGY BLOCK	WSF FOUNDA	TION SCHEDULE
ECOLOGY BLOCK BIN CONFIGURATION	TOTAL FOUNDATIO LENGTH	N FOUNDATION WIDTH
EB 2-BIN	28'-0"	15'-0*
EB 3-BIN	40'-0"	15'-0*
FB 4-BIN	52'-0"	15'-0"

#### Roof Framing:

Note: Roof dimensions taken as horizontal projections based on angle of roof surface



ROOF FRAMING PLAN ORIENTATION

CIP ROOF	FRAMING SCHE	DULE
CIP BIN CONFIGURATION	ROOF PLAN LENGTH	ROOF PLAN WIDTH
CIP 2-BIN	24'-5*1/2	12'-7"3/4
CIP 3-BIN	34'-11"1/2	12'-7"3/4
CIP 4-BIN	45'-5*1/2	12'-7"3/4
ECOLOGY BLOCK	ROOF FRAMING	S SCHEDULE
ECOLOGY BLOCK BIN CONFIGURATION	ROOF PLAN LENGTH	ROOF PLAN WIDTH
EB 2-BIN	26'-5"1/2	14'-1"1/2
EB 3-BIN	38'-5"1/2	14'-1"1/2
EB 4-BIN	50'-5"1/2	14"-1"1/2



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# **Deflection Criteria**

Deflection criteria is per IBC Table 1604.3. The most stringent deflection between the span ratio and total deflection shown below shall be used.

	L or L <sub>r</sub>	S & W	D + L
Roof Members L	./360 in	L/360 in	L/240 in
Gravity Loading			
<u>Dead Load</u>			
Roof Dead Load;	q <sub>DLr</sub> = 12 psf;		
Exterior Conc. Wall Dead Load;	q <sub>DLew</sub> = 100 psf;		Concrete wall in elevation
Partition Wall Dead load;	q <sub>DLpw</sub> = 100 psf;		Concrete wall in elevation
See Soil Design Values for stored was	te loads.		
<u>Live Load</u>			
Roof Live Load (area);	q <sub>LLr</sub> = 20 psf;		per IBC Table 1607.1
Roof Live Load (concentrated);	P <sub>LLr</sub> = 300 lb;		per IBC Table 1607.1
Floor Vehicle Live Load (area);	q <sub>LLf</sub> = 250 psf;		per IBC Table 1607.1
Floor Vehicle Live Load (concentrated	); P <sub>LLr</sub> = 8,000 lb;		per IBC Table 1607.1
Backfill Surcharge Load $ ightarrow$ See retaini	ng wall design		
<u>Snow Load</u>			
Snow Importance Factor;	l <sub>s</sub> = 0.8; per ASCI	E Table 1.5-2	
Snow Exposure Factor;	C <sub>e</sub> = 1.1; cat. C, s	heltered	conservative per ASCE Table 7.3-1
Snow Thermal Factor;	C <sub>t</sub> = 1.20; unhea	ted	per ASCE Table 7.3-2
Snow Slope Factor;	C <sub>sl</sub> = 1.0;	pe	r ASCE 7.4.1 – 7.4.4, & Figure 7.4-1
Minimum Roof Snow Load;	$P_{min}$ = (25 psf) $\times$	l <sub>s</sub> = 20 psf;	per ASCE Section 7.3.4
Ground Snow Load;	p <sub>g</sub> = 40.0 psf;		maximum in considered regions
Balanced Snow Load;	p <sub>B</sub> = 29.6psf;	See follow	wing page for balanced snow loads.



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Soil Design Values (Assumed) Backfill Soil Active Lateral Pressure; Infill Waste Active Lateral Pressure;	γ <sub>ab</sub> = 45 psf/ft; γ <sub>ai</sub> = 60 psf/ft;	per IBC Table 1610.1, NRCS CPS Code 313 Conservative, accounts for stored waste
Coefficient of Sliding Friction; per IBC Table 1	μ <sub>s</sub> = 0.35; 1806.2, NRCS CPS Code	e 313, Assumes GW/GP prepped subgrade
Allowable Soil Bearing;	P <sub>b,a</sub> = 1,500 psf;	per IBC Table 1806.2, NRCS CPS Code 313
<u>Wind Loading</u> Wind Exposure C Basic Wind Speed; Topographic Factor, Ground Elevation; Component and Cladding Trib. Area;	V = 100; mph $K_{zt}$ = 1.5; Oft Typical: 9ft <sup>2</sup> Roof Beams: 31.5ft <sup>2</sup>	Per ASCE 7 Conservative Conservative Conservative Controlling trib. area

See following pages for wind load generation.



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# <u>Roof Loads</u>

### Main Wind Force Resisting System (MWFRS) Loading

MWFRS is defined as an assembly of structural elements assigned to provide support and stability to the overall system.





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# Components & Cladding (C&C) Loading

Components and Cladding wind loads shall be used for structural items that are not a part of the MWFRS. Roof rafters, sheathing, roof joists, wall studs, wall headers, and their connection to the structure shall be designed for C&C loading.

### Typical C&C





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Seismic Loading		
Seismic Importance Factor; Soil Class D – Default	l <sub>e</sub> = 1.0;	per ASCE 7 Table 1.5-2 assumed
Seismic Design Category D		per ASCE 7 Table 11.6-1 and 11.6-2
Spectral Response (short);	S <sub>s</sub> = 1.50; g	per ASCE 7 Figure 22-1
Spectral Response (1s);	S <sub>1</sub> = 0.600; g	per ASCE 7 Figure 22-2
Spectral Acceleration (short);	S <sub>DS</sub> = 1.3; g	See following pages
Spectral Acceleration (1s);	S <sub>D1</sub> = 0.800; g	See following pages

Seismic Force Resisting System: Cantilevered Column Systems Detailed to Conform to the Requirements for Timber Frames

Seismic Response Coefficient; Vertical Seismic Coefficient;  $C_s = 0.8;$  $0.2 \times S_{DS} = 0.16$  See following pages

Building Code Information							
Risk Category =	1						
S <sub>s</sub> =	1.500	Fig. 22-1, 22-3,& 22-5 to 22-8					
S <sub>1</sub> =	0.600	Fig. 22-2, 22-4, & 22-5 to 22-8					
Long Transition Period, T <sub>L</sub> =	16	Fig. 22-14 to 22-17					
Soil Site Class =	D (defau	ult) See Section 11.4.4 for mininmum Fa					

Design Spectral Acceleration Parameters - ASCE 7-16 Chapter 11						
hort-Period Site Coefficient, F <sub>a</sub> =	1.2	Tbl. 11.4-1, min. of 1.2 per 11.4.4				
Long-Period Site Coefficient, F <sub>v</sub> =	1.7	Table 11.4-2				
S <sub>MS</sub> =	1.800	$S_{MS} = F_a \cdot S_s$ , Eq. 11.4-1				
S <sub>M1</sub> =	1.020	S <sub>M1</sub> = F <sub>v</sub> ·S <sub>1</sub> , Eq. 11.4-2				
S <sub>DS</sub> =	1.200	S <sub>DS</sub> = 2/3·S <sub>MS</sub> , Eq. 11.4-3				
S <sub>D1</sub> =	0.680	S <sub>D1</sub> = 2/3·S <sub>M1</sub> , Eq. 11.4-4				
T <sub>s</sub> =	0.567	$T_s = S_{D1}/S_{DS}$ , Sect. 11.4.6				

Seismic Des	sign Ca	tegory - ASCE 7-16 Chapter 11	
Seismic Design Category for S <sub>DS</sub> =	D	Table 11.6-1	
Seismic Design Category for S <sub>D1</sub> =	D	Table 11.6-2	
Seismic Design Category =	D	Most critical of the cases above	

Exception 2 of section 11.4.8 is applicable



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_		5 - 940-12					-
	Seismic Base She	ear - Buildi	ng Str	uctures - ASCE 7	7-16 Chapter 12		
	Importance Factor, I	l <sub>e</sub> = 1.0	0	Table 1.5-2			
	Structure Height, h	n <sub>n</sub> = 12.9	90	ft			-
	Seismic Force Resisting Systen	n = G.T	imber	frames			
	Response Modification Coef., R	R = 1.5	5	Table. 12.2-1			
	Overstrength Factor, Ω	Q <sub>o</sub> = 1.5	5	Table. 12.2-1			
	Deflection Amplification Fact., C	C <sub>d</sub> = 1.9	5	Table 12.2-1			
	Building Height Limi	it = 35	5	Table 12.2-1			
	Building Heig	ght Okay fo	or Seis	mic Force Resist	ting System		
		Fund	lamen	tal Period			
	Actual Calc'd Period, T <sub>c</sub> =		from	n analysis (calcul	ated if blank)		
	Period Coefficient, C <sub>T</sub> =	0.020	Tab	e 12.8-2			
	Period Exponent, x =	0.75	Tabl	e. 12.8-2			
	Approximate Period, T <sub>a</sub> =	0.14	sec.	$T_a = C_t \cdot h_n^x$ , Eq.	12.8-7		
	Upper Limit Coefficient, C <sub>u</sub> =	1.40	Tab	e. 12.8-1			
	Max Period, T <sub>max</sub> =	0.19	sec.	$T_{max} = C_u \cdot T_{ar}$ Se	ction 12.8.2		
	Fundamental Period, T =	0.14	sec.				
	Horizontal	Compone	nt - Se	eismic Design Co	efficients		
	C <sub>s</sub> =	0.800	Cs =	SDS/(R/Ie), Eqn.	12.8-2 per 11.4.8 E	exception 2	_
	C <sub>s,max</sub> =	3.330	Cs,n	nax = SD1/(T·R/le	e), Eq. 12.8-3		
	C <sub>s,min</sub> =	0.200	Cs,n	nin = 0.5-S1/(R/Ie	e), Eq. 12.8-6		
		Seisn	nic Co	efficients			
	Base Shear Coeff., Cs,design =	0.800	g's	$E_h = C_s W$			
	Vert. Seismic Coeff., $0.2 \cdot S_{DS} =$	0.240	g's	$E_v = 0.2S_{DS}W$			
	-						
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# Gravity Design

Design Result Summary (Controlling Actions Shown)

Member	Utilization
Roof Sheathing	DCR = 0.75
Rafters	DCR = 0.86
Girder Beams	DCR = 0.87
Slab on Grade	FS = 11.59

Note: By inspection, there is a reserve capacity in the gravity force resisting system to resist 30psf design snow loads (calculations included considered 29.6psf)

### Roof Design

Demands:

•

- Dead = 8-12psf
  - Live = 20psf
- Snow = 29.6psf
- Wind:
  - MWFRS:
    - Applicable to elements not considered components and cladding.
    - Controlling Downward = 42.66psf
    - Controlling Uplift = 21.33psf
    - o C&C:
      - Applicable to roof sheathing, and rafters
        - Controlling Downward: Clear Wind Flow
          - o Zone 1 = 38.96psf
          - Zone 2 = 58.45psf
          - Zone 3 = 77.93psf
        - Controlling Uplift: Obstructed Wind Flow
          - Zone 1 = 21.33psf
          - o Zone 2 =32.00sf
          - o Zone 3 = 42.66psf
      - Applicable to roof girder beams
        - Controlling Downward: Clear Wind Flow
          - Zone 1 = 38.96psf
          - Zone 2 = 58.45psf
          - o Zone 3 = 58.45psf
          - Controlling Uplift: Obstructed Wind Flow
            - o Zone 1 = 21.33psf
            - o Zone 2 =32.00psf
            - o Zone 3 = 32.00psf





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# <u>Sheathing</u>

Evaluate the roof sheathing for out-of-plane load effects. Try 15/32 sheathing with 32/16 span rating. Sheathing spans 24" (rafter spacing) Demands:

- Dead = 1.6psf (sheathing weight)
- Live = 20psf
- Snow = 29.6psf
- Wind: C&C
  - o Down = 77.93psf
  - Up = -114.72psf
- By inspection, 0.6D+0.6W<sub>UP</sub> controls
- Demand, P = 0.6\*(1.6) + 0.6\*(-114.72)psf = 69.79psf (up)

### Capacity:

- Nominal out-of-plane capacity, P<sub>n</sub> = 155psf (SDPWS Table 3.2.2)
- ASD reduction factor,  $\Omega = 1.67$
- ΩP<sub>n</sub> = 92.81psf > P ✓

# 15/32 APA rated sheathing with 32/16 span rating is adequate (DCR = 0.29)

<u>Rafters: 2x8 DF/L #2 @24" o.c.</u>

Spans:

- Span 1 ≈ 2' (cantilever end)
- Span 2 ≈ 10.67' (interior)
- Span 3 ≈ 2' (cantilever end)

Spacing = 2'-0" o.c.

Demands:

- Dead = 8psf
- Live = 20psf
- Snow = 29.6psf
  - Note, additional partial snow load cases were considered per ASCE 7 section 7.5.1 and are included in the Enercalc calculations appended to this report.
- Wind (Zone 3) = 77.93psf (downward)





# Lateral Design

### Design Result Summary (Controlling Actions Shown)

Member	Utilization
Post	DCR = 0.72
Corner Post Anchorage	Varies (All DCR <1.0, see design)
Brace	DCR = 0.7
Wall Sill Plate	DCR = 0.43
Wall Sill Plate Anchorage	Varies (All DCR <1.0, see design)
Retaining Wall	Varies (All DCR <1.0, see design)

### Assumptions:

- The primary lateral force resisting system are the braced cantilevered posts supporting the roof framing.
- Evaluate the structure for horizontal seismic load effects in the two orthogonal principal directions: transverse and longitudinal (per ASCE 7, Section 12.14.4.2.1).
- In the transverse direction, the diaphragm will have flexible behavior.
- In the longitudinal direction, the diaphragm will behave as a cantilever/3-sided diaphragm and is idealized as rigid in the analysis.
- Because there are not vertical elements of the lateral force resisting system on both sides in the longitudinal direction (i.e. cantilever/3-sided diaphragm), a redundancy factor of 1.3 is used per ASCE 7 Section 12.3.4.2.
- Flat roof snow load is less than 30 psf (see snow load generation). As such, roof snow loads do not need to be considered in the effective seismic weight of the structure per Section 12.7.2 of ASCE 7-16.



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# Load Generation

Generate gravity and lateral seismic demands for each post. By inspection, seismic demands control over wind. By inspection, the ecology block option will control over the CIP option because the thicker walls result in greater tributary widths. Also, by inspection, the 3 or 4-bin option will control because of the staggering of columns. For example, Bin 2 has the largest width to accommodate the offset post base from the interlocking notch in the middle of the ecology block. Thus, the posts on the ecology block layout are furthest apart and support a larger tributary area and load which will govern the post design.

		Trib Area	Dead	Live Roof	Snow
Post Mark	Description	(ft²)	(kip)	(kip)	(kip)
1	Side Back	41.25	0.495	0.825	1.221
2	Side Front	41.25	0.495	0.825	1.221
3	Interior Back	90	1.08	1.8	2.664
4	Interior Front	90	1.08	1.8	2.664

Note: Tributary areas are approximate.



	2-Bin	3-Bin	4-Bin	units
0	1.5	1.5	1.5	ft
В	15	15	15	ft
L	27	39	51	ft
а	11	11	11	ft
b	12	13	13	ft
С	0	11	11	ft
d	0	0	12	ft
е	6.75	6.75	6.75	ft

# Example Calculations: Post Mark 1

- Tributary Width, W = 5.5' (estimated from CAD, all posts support gravity loads)
- Tributary Length, L = 7.5' (estimated from CAD, all posts support gravity loads)
- Tributary Area, A = W\*L = 41.25ft<sup>2</sup>
- Dead Load = D\*A = 12psf\*41.25ft<sup>2</sup>= 0.495kip
- Live Roof = L<sub>r</sub>\*A = 20psf\*41.25ft<sup>2</sup>= 0.825kip
- Snow Load = S\*A = 29.6psf\*41.25ft<sup>2</sup> = 1.221kip



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# <u>Seismic Demands</u>

Inputs		
Roof Dead	12	psf
ρCs	1.04	-
Bin Width	10	ft
Bin Length	10	ft
Wall Thickness	2	ft
Overhang, o	1.5	ft

### Case 1 – Transverse Seismic Loading



W

# **Diaphragm Forces**

	2-Bin	3-Bin	4-Bin	units
W1	187	187	187	plf
R <sub>A</sub>	1310	1310	1310	lb
R <sub>B</sub>	2153	2246	2246	lb
R <sub>c</sub>	1310	2246	2246	lb
R <sub>D</sub>	0	1310	2153	lb
R <sub>E</sub>	0	0	1404	lb
Max Diaphragm Shear	144	150	150	plf

Example Calculations: R<sub>A</sub>

- Transverse seismic loading,  $W_1 = DL^*\rho C_s^*B = 12psf^*1.04^*15ft = 187plf$
- Force along line  $R_A = W_1^*((a)+o) = 187plf^*((11ft)+1.5ft) = 1,310lbs$



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Transverse Seismic Loa	d Imposed or	Braces and	Posts ner	reactions R <sub>4</sub>	through R
Transverse Seisinic Lua	u iiiiposeu oi	i biaces anu	rusis per	reactions NA	through NE

Reactions	2-Bin	3-Bin	4-Bin	units
R <sub>AX</sub>	655	655	655	lb
R <sub>AZ</sub>	655	655	655	lb
R <sub>BX</sub>	1076	1123	1123	lb
R <sub>BZ</sub>	1076	1123	1123	lb
R <sub>CX</sub>	655	1123	1123	lb
R <sub>cz</sub>	655	1123	1123	lb
R <sub>DX</sub>	0	655	1076	lb
R <sub>DZ</sub>	0	655	1076	lb
R <sub>EX</sub>	0	0	702	lb
R <sub>EZ</sub>	0	0	702	lb
Controlling Back				
Post/Brace Demand	1076	1123	1123	lb
Controlling Front				
Post/Brace Demand	1076	1123	1123	lb



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### Case 2 – Transverse Seismic Loading

Note: Reactions A-E are calculated assuming cantilever diaphragm behavior. These braces are responsible for resisting torsional effects. Demands along interior brace lines are expected to effectively cancel out within each bin zone due to positive and negative contributions from each adjacent bin zone (slight differences in bin geometry produce a non-zero reaction value). Exterior brace lines develop the reactions required to resist the torsional demands within the subject bin zone.



### **Diaphragm Forces**

	2-Bin	3-Bin	4-Bin	units
W <sub>2</sub>	306	437	568	plf
W <sub>2</sub> /No. Bins	153	146	142	plf
R <sub>A</sub>	87	83	81	lb
R <sub>B</sub>	0	0	0	lb
Rc	87	0	0	lb
R <sub>D</sub>	0	83	0	lb
R <sub>E</sub>	0	0	81	lb
R <sub>x</sub>	4128	5897	7666	lb
Max Diaphragm Shear	168	168	168	plf



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Reactions	2-Bin	3-Bin	4-Bin	units
R <sub>AX</sub>	52	50	49	lb
R <sub>AZ</sub>	52	50	49	lb
R <sub>BX</sub>	4	8	8	lb
R <sub>BZ</sub>	4	8	8	lb
R <sub>cx</sub>	47	-8	-8	lb
R <sub>cz</sub>	47	-8	-8	lb
R <sub>DX</sub>	0	50	4	lb
R <sub>DZ</sub>	0	50	4	lb
R <sub>EX</sub>	0	0	45	lb
R <sub>EZ</sub>	0	0	45	lb
R <sub>XA</sub>	1264	1217	1193	lb
R <sub>xB</sub>	1264	1217	1193	lb
R <sub>xc</sub>	1264	1217	1193	lb
R <sub>XD</sub>	1264	1217	1193	lb
R <sub>XE</sub>	1264	1217	1193	lb
Controlling Back				
Post/Brace Demand	1264	1217	1193	lb
Controlling Front				
Post/Brace Demand	52	50	49	lb

# **Demand Summary**

Controlling Back Longitudinal Demand	1264	lb
Controlling Back Transverse Demand	1123	lb
Controlling Front Demand	1123	lb

### Interior Back Post and Longitudinal Brace

Maximum height above wall = 4'-3" Intermediate bracing at 3'-0" above base

Gravity Demands:

- Dead = 1.08 kip
- Live Roof = 1.8 kip
- Snow = 2.664 kip

Lateral Demands:

• Seismic = 1.264kip

Per RISA (see appendix) P.T. 6x6 HF/L #1 posts are adequate (DCR = 0.41) Per RISA (see appendix) DBL P.T. 2x6 HF/L #2 braces are adequate (DCR = 0.48)



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# Knee Brace Nailing Design

Evaluate the Nailing on the brace to sill plate connection for the maximum axial force in the brace. Per RISA Front Post brace RISA model, the maximum brace reaction for a single Brace Axial Load in Single Shear= 1.36 kip (1.0E). See Appendix A for brace demand forces.

American Wood Council Connection Results – Capacity for (12) 10D Nails = 2.09 kip (12) 10D Nails on each Brace/Sill Plate Connection is adequate (DCR = 0.65)

Design Method	Load & Resistance Factor Design (LRFD)	~
Connection Type	Lateral loading	~
Fastener Type	Nail	~
Loading Scenario	Single Shear	~
	Submit Initial Values	

Main Member Type	Hem-Fir	~
Main Member Thickness	3.5 in.	~
Side Member Type	Hem-Fir	~
Side Member Thickness	1.5 in.	~
Nail Type	Box	~
Nail Size	10d (D = 0.128 in.; L = 3 in.)	~
Time Effect Factor	= 1.0	~
Wet Service Factor	C_M = 1.0	~
End Grain Factor	C_eg = 1.0	~
Temperature Factor	C_t = 1.0	~
Diaphragm Factor	C_di = 1.0	~

Connection field Mil	ode Descriptions	Limits of Use
Diaphragm Factor Help	Load Duration Factor Help	Technical Help

# **Connection Yield Modes**

Im	660 Ibs.	
Is	660 lbs.	P
II	273 Ibs.	
IIIm	242 Ibs.	
IIIs	242 lbs.	
IV	174 Ibs.	

Adjusted LRFD Capacity 174 lbs.



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# Sill Plate Anchorage Design

### Case 1:

Evaluate the sill plate anchorage for the lateral and vertical reaction from the brace. Demands per RISA output for load combination [( $0.9-0.2S_{DS}$ )D+ $\Omega_0E$ ] Vertical component of demand, P = 2,002lb Horizontal component of demand, V = 2,002lb



## <u>Case 2</u>

Evaluate the sill plate anchorage for the lateral and vertical reaction at the base of the front post. Edge condition – Anchor is 5.5" from front of wall Demands per RISA output for load combination [( $0.9-0.2S_{DS}$ )D+ $\Omega_0E$ ] Vertical component of demand, P = 1590lb Horizontal component of demand, V = 840lb





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Provide anchorage designs compatible with either hot dipped galvanized threaded rods or 304/316SS threaded rods. By inspection, HDG Gr 36 threaded rods will control.

Provide anchorage designs for the following epoxy options:

- Hilti HIT-RE 500 V3
- Simpson SET-3G
- Dewalt Pure 110+

Provide anchorage designs for the following mechanical options:

- Hilti KH-EZ
- Titen HD
- Dewalt Screw Bolt+

Per Dewalt Design Assist Anchorage Software and Simpson Anchorage Software, the following anchors are adequate to resist tension loads

BRACE AND COLUMN ANCHORAGE OPTIONS: EPOXY: -HILTI HIT-RE 500 V3 3/4"Ø THREADED ROD ASTM F1554 GR36/A36 W/ 6" EMBEDMENT -SIMPSON SET 3G 3/4"Ø THREADED ROD ASTM F1554 GR36 W/ 6" EMBEDMENT -DEWALT PURE110+ 3/4"Ø THREADED ROD ASTM F1554 GR36/A36 W/ 6" EMBEDMENT

MECHANICAL: -DEWALT SCREW-BOLT+ 3/4"Ø W/ 4.25" NOMINAL EMBEDMENT -HILTI KH-EZ 3/4"Ø W/ 4" NOMINAL EMBEDMENT -TITEN HD 3/4"Ø W/ 4" NOMINAL EMBEDMENT



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# Retaining Wall Design

CIP Wall Properties:

- Wall Thickness = 6"
- Wall Height = 4'-0" (max)
- Retained backfill height = Wall height 3"
- Retained infill height = Wall Height
- Concrete Compressive Strength, f'<sub>c</sub> = 2,500psi
- Reinforcing Info:
  - Vertical Reinforcing = #5@16" o.c. OR #4 @ 12" o.c.
  - Horizontal Reinforcing = #5@16" o.c. OR #4 @ 10" o.c.
  - Reinforcing Yield,  $f_y = 60,000$  psi

# Footing Properties:

- Footing Thickness = 12"
- Footing width = Enercalc calculation considers the whole footing width, including the tapered portion. Note that the analysis is inherently conservative as it idealizes the wall as a cantilevered condition, though it is also supported on the side by the back wall. Further, the soil backfill is tapered to the front of the bins, so average demands are less than approximated by Enercalc.
- Reinforcing Info:
  - o Rebars size and spacing match slab reinforcing

# **Ecology Block Properties:**

- Ecology Block Wall Thickness = 2'-0"
- Ecology Block Wall Height = 2'-0" (max)
- Retained backfill height = Wall height 3"
- Retained infill height = Wall Height

Surcharge Loads: NRCS does not prescribe surcharge design loads for agricultural storage structures. As such, this design conservatively assumes the following: For wall strength checks: Design for a 250psf surcharge load. Note that this is conservative and is representative of if a heavy vehicle load was placed behind a portion of the wall. The intent of this check is to evaluate the strength of the wall for high localized demands as a result of heavy vehicular loads.

Design Cases:

- Case 1 (Wall Design): Backfill + Surcharge with Empty Bin Governs Design by Inspection
- Case 2 (Wall Design): Infill without Backfill
- Case 3 (Wall Design): Wind on an Empty Bin Without Backfill
- Case 4 (Beam Design): Back Wall Horizontally Spanning



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# Case 4: Back Wall Horizontally Spanning

Idealize the back wall as horizontally spanning. Is assumed as a simple support beam supported at the interior and side walls. Analysis assumes the lowest 12" of the wall is effectively fixed by the footing below rather than horizontally spanning. Evaluate the region directly above as horizontally spanning. Note that the analysis is inherently conservative.

Demands:

- By inspection, stem demands for Case 1 controls.
- Active Pressure Demands:
  - Active Pressure, p<sub>a</sub> = 45psf/ft
  - Average Depth  $H_1 = 3$  ft
  - Uniform Load =  $p_a * H_1 = 135 plf/ft$
  - In Enercalc, consider active pressures as dead loads since they have the same load factor
- Backfill Surcharge = 250psf
  - Soil Density = 12 pcf
  - $\circ$  Surcharge pressure width H<sub>2</sub> = 250psf /125pcf = 2 ft of additional surcharge
  - $\circ$  Uniform Load =  $p_a * H_2 = 90 plf/ft$
  - o In Enercalc, consider surcharge pressures as a live load



By inspection, case 1 governs the design.



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Ecology Block Overturning and Sliding Check		
Backfill Surcharge	250	psf
Soil Density	120	pcf
Active Soil Pressure	45	psf/ft
Surcharge OT Load Height Above Wall	2.08	ft
Surcharge OT Load at Top of Wall	93.75	psf
Surcharge OT Load at Bot of Wall	304.69	psf
Triangular OT Load at Bot of Wall	240	psf
Backfill Height	3.25	ft
OT Moment	752.58	lb*ft/ft
Conc Density	150	pcf
Ecology Block width	2	ft
Ecology Block height	4	ft
Ecology Block Wt.	1200	lb/ft
Resist Moment	1200	lb*ft/ft
<b>Overturning Safety Factor</b>	1.59	
coeff. Friction	0.7	
Sliding Resistance	840	lb/ft
Sliding Force	542.34	lb/ft
Sliding Safety Factor	1.55	





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<b>Multiple Sin</b>	nple Beam					Project File: F	loof Girder and	Rafter 230	2-0069.ec6	1
LIC# : KW-06014167	, Build:20.23.08.01		PETERSO	ON STRUCTUR	AL ENGINEEP	RS	(c)	ENERCALC	INC 1983-20	23
Description :	2v8 Pafter DE/	1 #2 @ 24	"							
Wood Beam De	esign : 2x8	Rafter DF	L #2							-
BEAM Size :	2x8 Sawn Ful	ly Braced				Calculation	ns per NDS 20	18, IBC 202	21, ASCE 7	-1
Wood Species :	Using Allowable S Douglas Fir-Larch	tress Design	with ASCE 7-1	6 Load Comb	vinations, Ma Wood Grad	jor Axis Bending e: No.2				
Fb - Tension Fb - Compr	900.0 psi 900.0 psi	Fc - Prll Fc - Perp	1,350.0 psi 625.0 psi	Fv Ft	180.0 psi 575.0 psi	Ebend- xx Eminbend - xx	1,600.0 ksi 580.0 ksi	Density	31.210 p	cf
Wood Beam De	esign: 2x8	Rafter DF	'L #2			Calaulatia		49 100 20	A	_
BEAM Size :	2x8, Sawn, Ful	ly Braced				Calculation	ns per NDS 20	18, IBC 202	I, ASCE	•1
Wood Species :	Using Allowable S Douglas Fir-Larch	tress Design	with ASCE 7-1	6 Load Comt	Wood Grade	jor Axis Bending e : No.2				
Fb - Tension Fb - Compr	900.0 psi 900.0 psi	Fc - Prll Fc - Perp	1,350.0 psi 625.0 psi	Fv Ft	180.0 psi 575.0 psi	Ebend- xx Eminbend - xx	1,600.0 ksi 580.0 ksi	Density	31.210 p	cf
Applied Loads										
Beam self weig Unif Load: D =	nt calculated and a 0.0080, Lr = 0.025	dded to loads 0, S = 0.030	, W = 0.07790	k/ft, Trib= 2.0	) ft					
Design Summary	= 0.863	1		[	D	0.0160) Lr(0.050) S	(0.060) W(0.1	558)		
fb : Actual : Fb : Allowable :	1,490.75 psi 1,728.00 psi	at 5.335 ft	in Span # 2	101 101	No. Contraction		all sources and	Stump	2.0	
Load Comb :	+D+0.750S+	0.450W		2x8 2.0 ft	h	2x8	ont		2x8 2.0 ft	
fv : Actual :	= 0.341: 98.21 psi	at 10.670 ft	in Span # 2	+	t				+	-
Load Comb :	+D+0.750S+	0.450W		Ma	x Deflections					-
Max Reactions ( Left Support	k) <u>D</u> <u>Lr</u> 0.13 0.37	L <u>S</u> 0.44	<u>W</u> <u>E</u> 1.14	н	Transient Do Ratio	wnward 0.501 in 255 <	0 Ratio	nward	0.429 in 298	
Right Support	0.13 0.37	0.44	1.14		-	LC: W Only	LC: +D	+0.750S+0	450W	
					Transient Up Ratio	ward -0.275 in 174 <	Total Upw Ratio	ard	-0.236 in 202	
						LC: W Only	LC: +D	+0.750S+0	450W	
	Dotoro Cit		incore las	project		2302-0069	) dat	:e 2/	9/2024	

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IC# : KW-06014167, Bu	ild:20.23.08.01		PETERSO	N STRUCTUR	RAL ENGINEER	Project File: F	(c) E	NERCALC	2-0069.ec6	23
escription : 6	12 Roof Girde	er DF/L #2								
lood Beam Desi	gn: Root	Girder DF/	L #2			Calculatio	ns per NDS 201	8, IBC 202	1, ASCE 7	-10
BEAM Size : 6x	12, Sawn, Def	ined Brace	Spacing, 1s	t at ft an	d spaced at	t 2.0 ft				_
Wood Species : Do	uglas Fir-Larch	Ec. Dell	600.0 oci	Ev	Wood Grad	e : No.2	1 300 0 kei	Descitu	21 210 0	4
Fb - Compr	875.0 psi	Fc - Perp	625.0 psi	Ft	425.0 psi	Eminbend - xx	470.0 ksi	Density	51.210 pt	
ood Beam Desi	gn: Roof	Girder DF/	L #2			Calculatio	ne ner NDS 201	9 IBC 202	ASCE 7	
EAM Size : 6	12, Sawn, Def	ined Brace	Spacing, 1s	t at ft an	d spaced at	t 2.0 ft	na per 1100 201	0, 100 202	II, ABOL /	- 11
Nood Species : Do	ung Allowable Stro ouglas Fir-Larch	ess Design w	th ASCE 7-16	Load Com	Wood Grad	ijor Axis Bending e : No.2				
Fb - Tension Fb - Compr	875.0 psi 875.0 psi	Fc - Prll Fc - Perp	600.0 psi 625.0 psi	Fv Ft	170.0 psi 425.0 psi	Ebend- xx Eminbend - xx	1,300.0 ksi 470.0 ksi	Density	31.210 pc	f
plied Loads			5							
Beam self weight of Unif Load: D = 0.0	calculated and add $120$ . Lr = 0.0250	ded to loads $S = 0.030$ .	W = 0.0320 k/	ft. Trib= 8.0	ft					
sign Summary			1	10 110 0.0		000001	0.0400 0000 0000			
lax fb/Fb Ratio = fb : Actual :	0.867 : 1 697.05 psi 4	at 6.630 ft i	in Span # 2	Bernin with	-	0.0960) Er(0.20) S(	0.240) W(0.2560	and the second second	No. of Concession	r.
Fb : Allowable : Load Comb :	803.60 psi +D+S			6x12	A Real Property lies		6x12		A Real Property lies	2
lax fv/FvRatio =	0.305:1	2 000 8	Cose # 1	2.0 ft	1		13.0 ft			
Fv : Allowable :	156.40 psi	at 2.000 it i	in Span # 1		w Defections				1	
lax Reactions (k)		<u>s</u>	<u>W</u> <u>E</u>	H Ma	Transient Do	wnward 0.173 in	Total Down	ward	0.273 in	
Right Support	0.95 1.73 0.70 1.27	2.08	2.22 1.62		Ratio	904	Ratio	0 7505+0	571 450W	
					Transient Up	ward -0.080 in	Total Upwa	rd	-0.126 in	
					Ratio	600	Ratio		378	
				projec	t	2302-006	9 dat	e 2/	9/2024	
	Peterson Sti	uctural Eng	gineers, Inc.	design		BLKC	she	_t 30	) of	
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Point L	oad on SI	ab						Project File: Slab.ec6
LIC# : KW-0	6014167, Build:20.	23.08.01	PETER	SON STRUCTU	IRAL ENGINEERS		(c) E	NERCALC INC 1983-2023
DESCR	IPTION: SIa	b on Grade						
Code Ref	ferences							
Calculatio	ons per IBC 20	21, ASCE 7-16						
Analytic	al Values	U. ASCE 7-10						
d - Slab	Thickness		6.0 in		Ks - Soil Modulus of	Suborade Re	eac	50.0 pci
FS - Re	q'd Factor of S	afety	5.0 : 1		Ec - Concrete Elastic	Modulus	oth	2,850.0 ksi
					μ - Poisson's Ratio	essive ouen	901	0.150
						Valance		10.010
Analycie	Formulae				Min. Adjacent Load L	Distance		48.012 in
Analysis Da = 4	70 1 // 011	(Ea) 10 000 + 2	61 E- 4/	Min Adias	ant Column Distance	- 4 5 + / / 5	- 442 / /4	0 * / 4 AD \ Ko 1 A
Ks =	Soil modulus	of subgrade rea	ction	Min Adjac Ec	= Concrete elastic m	odulus	c a-37 (1	12 ° ( 1- u~2 ) Ks ] ^
R1 =	50% plate ave	erage dimension	i = sqrt( PIWid *	PILer d	Slab Thickness			
Ec =	Concrete elas	tic modulus	7.5 * sart( fc )	u · Ks	<ul> <li>Poisson's ratio</li> <li>a = Soil modulus of sul</li> </ul>	barade react	ion	
d - S	lab Thickness		1.0 04.(10)			ogrado readi		
Load & C	Capacity Tab	le						
Di beo I	Plate (in) Wid Len	R1 Applied Con	Icentrated Load or	W F	Governing Ld Comb	Pu (kip)	Pn (kip)	Check
Point Loac	4.50 4.50	2.25	8.00		L Only	8.0	92.8	Pass_ES=11.59 >=

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### Back Longitudinal Post and Brace

#### Node Coordinates

_	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	0	4.22	0	
3	N3	0	3	0	
4	N4	3	0	0	

#### Wood Section Sets

	Label	Shape	Туре	Design List	Material	Design Rule	Area [in <sup>2</sup> ]	lyy [in*]	Izz [in*]	J [in*]
1	Post	6X6	Column	Rectangular	HF/L #1	Typical	30.25	76.26	76.26	128.87
2	Brace	6X6	Column	Rectangular	HF/L #2	Typical	30.25	76.26	76.26	128.87
3	Brace Alt	2X6	Column	Rectangular	HF/L #2	Typical	8.25	1.55	20.8	5.12

#### Member Primary Data

	Label	I Node	J Node	Section/Shape	Туре	Design List	Material	Design Rule
1	M1	N1	N2	Post	Column	Rectangular	HF/L #1	Typical
2	M2	N3	N4	Brace Alt	Column	Rectangular	HF/L #2	Typical
3	M3	N3	N4	Brace Alt	Column	Rectangular	HF/L #2	Typical

### Node Loads and Enforced Displacements (BLC 1 : Dead)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N2	L	Y	-1.08

#### Node Loads and Enforced Displacements (BLC 2 : Live Roof)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N2	L	Y	-1.8

#### Node Loads and Enforced Displacements (BLC 3 : Snow)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N2	L L	Y	-2,66

#### Node Loads and Enforced Displacements (BLC 4 : Seismic Horiz)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N2	L	Х	1.26

#### Load Combinations

	Description	Solve	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	D	Yes	DL	[ 1	NL	1				
2	D+Lr	Yes	DL	1	RLL	1				
3	D+S	Yes	DL	1	SL	1				
4	D+0.7Ev+0.7Eh	Yes	DL	1	Sds*DL	0.17	EL	0.7		
5	D+0.7Ev-0.7Eh	Yes	DL	1	Sds*DL	0.17	EL	-0.7	-	
6	D+0.7Ev+(0.7OmEh)	Yes	DL	1	Sds*DL	0.17	Om*EL	0.7		
7	D+0.7Ev-(0.7OmEh)	Yes	DL	1	Sds*DL	0.17	Om*EL	-0.7		
8	D+0.525Ev+0.525Eh+0.1S	Yes	DL	1	Sds*DL	0.13	EL	0.53	SL	0.1
9	D+0.525Ev-0.525Eh+0.1S	Yes	DL	1	Sds*DL	0.13	EL	-0.53	SL	0.1
10	D+0.525Ev+0.525(OmEh)+0.1S	Yes	DL	1	Sds*DL	0.13	Om*EL	0.53	SL	0.1
11	D+0.525Ev-0.525(OmEh)+0.1S	Yes	DL	1	Sds*DL	0.13	Om*EL	-0.53	SL	0.1
12	0.6D-0.7Ev+0.7Eh	Yes	DL	0.6	Sds*DL	-0.17	EL	0.7		
13	0.6D-0.7Ev-0.7Eh	Yes	DL	0.6	Sds*DL	-0.17	EL	-0.7		
14	0.6D-0.7Ev+0.7(OmEh)	Yes	DL	0.6	Sds*DL	-0.17	Om*EL	0.7		
15	0.6D-0.7Ev-0.7(OmEh)	Yes	DL	0.6	Sds*DL	-0.17	Om*EL	-0.7	1	

#### Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
0	N3	max	0	13	0	13	0	13	0	13	0	13	0	13
1		min	0	1	0	1	0	1	0	1	0	1	0	1
2	N4	max	1.24	5	1.24	4	0	13	0	13	0	13	0	13
3		min	-1.24	4	-1.24	13	0	1	0	1	0	1	0	1
4	N1	max	0.36	4	3.74	3	0	13	0	13	0	13	0	13
5		min	-0.36	5	-0.81	12	0	1	0	1	0	1	0	1
6	Totals:	max	0.88	5	3.74	3	0	13						
7		min	-0.88	4	0.43	12	0	1		0				



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	Load Co	mbination: Envelope	Code check:	0.405 (LC 12)	
		Input Data			
		Shape:	6X6 (nominal)	I Node:	N1
<b>↑</b> <sup>×</sup>	<b>↑</b> <sup>×</sup>	Member Type:	Column	J Node:	N2
	1	Length (ft):	4.22	I Release:	Fixed
		Material Type:	Wood	J Release:	Fixed
		Design Rule:	Typical	I Offset:	N/A
		Internal Sections:	97	J Offset:	N/A
		Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way
Material Propert	ies				
Material:	HF/L #1	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	Yes	Alpha (1e <sup>50</sup> F <sup>-1</sup> ):	0.3
Database:	Visually Graded	Ci:	Yes	Density (k/ft <sup>3</sup> ):	0.04
Species:	Hem-Fir	Emod:	1		
Shape Properties					
Fb (ksi):	0.98	E (ksi):	1300	b (actual) (in):	5.5
Ft (ksi):	0.65	Emod:	1	d (actual) (in):	5.5
F <sub>v</sub> (ksi):	0.14	COV <sub>E</sub> (Table F1):	0.25		
F <sub>c</sub> (ksi):	0.85	E <sub>min</sub> (ksi):	474.9		
Design Propertie	s				
le2 (ft):	4.22	y sway:	No	Cfu:	1
le1 (ft):	4.22	z sway:	No	Cp:	0.93
le-bend top:	Lbyy	Co:	1.6	Max Defl Ratio:	L/1041
le-bend bot (ft):	4.22	Ra:	3.03	Max Defl Location:	4.22
K <sub>y-y</sub> :	1	CL:	1	Span:	N/A
K <sub>z-z</sub> :	1	Cr:	1		
			м		



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Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	12				
Applied Loading - Shear + Torsion	5				•
Axial Compression Analysis		0 ksi	0.92 ksi		-
Axial Tension Analysis	-	-0.03 ksi	0.83 ksi		-
Flexural Analysis, Fb1'	-	0.47 ksi	1.25 ksi		
Flexural Analysis, Fb2'		0 ksi	1.25 ksi		
Bending & Axial Compression Analysis				0.37	PASS
Bending & Axial Tension Analysis	-		-	0.41	PASS
Shear Analysis	-	0.04 ksi	0.18 ksi	0.24	PASS



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Imput DataShape:206 (nomina)Node:NaNade:NaLangsh (ft):206 (nomina)Node:NaLangsh (ft):206 (nomina)Node:NaLangsh (ft):Alexate:Release:Release:Release:Release:NoOffse:NADesign Code:Nic:0.3Alpha (to <sup>5</sup> s <sup>2</sup> ):0.3Alpha (to <sup>5</sup> s <sup>2</sup> ):0.5(to colspan="4">Alpha (to <sup>5</sup> s <sup>2</sup> ):0.5Alpha (to <sup>5</sup> s <sup>3</sup> ):1.5 <td colspa<="" th=""><th></th><th>Load Co</th><th>mbination: Envelope</th><th>Code check</th><th>c: 0.477 (LC 4)</th><th></th></td>	<th></th> <th>Load Co</th> <th>mbination: Envelope</th> <th>Code check</th> <th>c: 0.477 (LC 4)</th> <th></th>		Load Co	mbination: Envelope	Code check	c: 0.477 (LC 4)	
NameNa			Input Data				
Member Type:         Column         J Node:         M           Length (t):         4.24         I Release:         BenPN           Material Type:         Wood         J Release:         Fixed           Design Rule:         Typical         I Offset:         N/A           Design Code:         AWCNDS-18 / SDPWS-15 ASD         J Offset:         N/A           Atterial Properties         Grade:         NOC         Nic:         0.3           Atterial Properties         Grade:         NOC         Nic:         0.3           Atterial Social         Grade:         NOC         Nic:         0.3           Atterial Social         Grade:         NOC         Nic:         0.3           Atterials:         Visually Graded         Ci:         Yes         Density (k/ft):         0.04           Specie:         Hem-File         Emod:         1         dectual) (in):         1.5         discual) (in): <td< th=""><th></th><th></th><th>Shape:</th><th>2X6 (nominal)</th><th>I Node:</th><th>N3</th></td<>			Shape:	2X6 (nominal)	I Node:	N3	
Length (ft:         4.24         I Release:         BenPIN           Material Type:         Wood         J Release:         Fixed           Design Rule:         77         J Offset:         N/A           Design Code:         AJVCND5-18/J         J Offset:         N/A           Material Properties/         Grade:         No2         Nu:         0.3           Anterial Sections:         97         J Offset:         N/A           Material Section:         No:         Color         0.3           Material Section:         1         Denity (V/T):         0.04           Material Section:         1         Denity (V/T):         0.04           Material Section:         1         Ci:         0.5         Scor           V(Bip:	AV.	N	Member Type:	Column	J Node:	N4	
Material Type:       Wood       J Release:       Fixed         Design Rule:       Typical       I Offsee:       N/A         Design Code:       307       J Offsee:       N/A         Material Type:       Spipal Code:       M/A       J Offsee:       N/A         Material Type:       Items/E       Items/E       M/A       J Offsee:       Items/E         Material Type:       Items/E       Items/E       Items/E       Items/E		-	Length (ft):	4.24	I Release:	BenPIN	
Pesign Rule:TypicalI Offset:NAInternal Section:97J Offset:NADesign Code:AUC NDS-18/ SDPWS-15 ASDJ Offset:NAWaterial Properties:Material Code:AUC NDS-18/ SDPWS-15 ASDT/C Only:Borth WayMaterial:H/J, H2Grade:NoNic:0.3Apatabase:Visually GradedCi:YesAlpha (1e <sup>5</sup> 8 <sup>-1</sup> ):0.3Apatabase:Visually GradedCi:YesDensity (Vrft):0.04ipecies:Hem-FirEmod:1d (actual) (in):1.5ipecies:0.85E (isi):1300b (actual) (in):5.5ipecies:1.3Euro (isi):474.9visib:0.15CocyCi:1d (actual) (in):5.5ipecies:1.3Euro (isi):474.9visib:0.15CocyTable F1:0.25ipecies:1.3Euro (isi):474.9visib:0.15Cocy1.6Max Defl Ratio:1/10000ipecied bot:LibyyCo:1.6Max Defl Ratio:1/10000ipecied bot:1.0Ci:0.955ipic1.1Ci:1.1ipic1.2Ci:0.96Span:N/Aipic1.1Ci:1.1ipic <td></td> <td></td> <td>Material Type:</td> <td>Wood</td> <td>J Release:</td> <td>Fixed</td>			Material Type:	Wood	J Release:	Fixed	
Internal Sections: Design Code:97 AUC NDS-187 SDPWS-15 ASDJ Offset: NA T/C Only:NA HA HA Besign Code:97 AUC NDS-187 SDPWS-15 ASDJ Offset: NA T/C Only:NA HA HA HA HA HA HA HA HA HA HA Properties: Weigh: Material Code:97 C Only:J Offset: NA HA T/C Only:NA HA <td></td> <td><math>\sim</math></td> <td>Design Rule:</td> <td>Typical</td> <td>I Offset:</td> <td>N/A</td>		$\sim$	Design Rule:	Typical	I Offset:	N/A	
Design Code:AWC NDS-18 / SDPWS-15 ASDT/C Only:Both WayMaterial Properties:5Grade:No.2Nu:0.3Apple:Solid SawnCm:YesAlpha (te <sup>5</sup> b <sup>2</sup> ):0.3Materials:Youly GradedCE:YesDensity (k/t <sup>2</sup> ):0.04Bigerices:Hem-FirEmode:11Stape Properties:Emode:11.55V (ki):0.52Emod:10.255V (ki):0.15COVe (Table F1):0.2555V (ki):1.3Ema (ki):474.951Properties:E1Ce:0.1515Properties:E1.6Max Defl Ratio:1.15Properties:1Ci:0.96Span:1/0000Pelend top:LbyQ:1.6Max Defl Ratio:1.15Verig:1Ci:0.96Span:N/AVerig:1Ci:0.96Span:N/AVerig:1Ci:0.96Span:N/AVerig:1Ci:0.96Span:N/AVerig:1Ci:0.96Span:N/AVerig:1Ci:0.96Span:N/AVerig:1Ci:0.96Span:N/AVerig:1Ci:0.96Span:N/AVerig:1Ci:0.96Span:N/AVerig:1Ci:1V			Internal Sections:	97	J Offset:	N/A	
Material Properties         Material for parties         Material for parties         Material for parties         No.2         Nu:         0.3           yppe:         Solid Sawn         Gr:         Yes         Alpha (1e <sup>5</sup> p <sup>-</sup> );         0.3           ytatabase:         Visually Graded         Gr         Yes         Density (k/ft <sup>3</sup> );         0.4           ippecies:         Hem-Fir         Emod:         1			Design Code:	AWC NDS-18 /	T/C Only:	Both Way	
Material PropertiesNo 2Nu colspan="4" Solid SawnGrade:No 2Nu colspan="4" Solid SawnCru:Solid SawnCru:Solid SawnCru:No 2Nage Solid SawnCru:Solid SawnSolid Sa				SDPWS-15 ASD			
Atterial:         HF/L #2         Grade:         No.2         Nu::         0.3           type:         Solid Sawn         Cm:         Yes         Alpha (1e <sup>5</sup> F <sup>1</sup> ):         0.3           Database:         Visually Graded         Ci:         Yes         Density (k/f <sup>1</sup> ):         0.04           bigscies:         Hem:Fir         Emod:         1         Density (k/f <sup>1</sup> ):         0.04           Stape Properties:         Isono:         1         descualt (in):         1.5           id(si):         0.85         E (ksi):         1300         b (actual) (in):         5.5           id(si):         0.15         COVe (Table F1):         0.25         Use         Use           beign Properties         Solid Sawny:         No         Cs.:         1           e2 (ft):         4.24         yswy:         No         Cs.:         1           ebend top:         Upy         Cp:         1.16         Max Defl Ratioc:         U/10000           isono:         I         Cp:         N/A         Span:         N/A           isono:         I         Span:         N/A         Span:         N/A           isono:         I         Span:         N/A         Span:	Material Propert	ies					
type:         Solid Sawn         Cm:         Yes         Alpha (te <sup>5</sup> e <sup>-1</sup> ):         0.3           Database:         Visually Graded         CE:         Yes         Density (k/t <sup>2</sup> ):         0.04           species:         Hem-Fir         Emod:         1         Usually Graded         CE:         Yes         Density (k/t <sup>2</sup> ):         0.04           species:         Hem-Fir         Emod:         1         Density (k/t <sup>2</sup> ):         0.04           species:         Hem-Fir         Emod:         1         Density (k/t <sup>2</sup> ):         0.04           species:         Hem-Fir         Emod:         1         Density (k/t <sup>2</sup> ):         0.04           species:         Usually Graded         E (ksi):         1300         b (actual) (in):         1.5           v (ksi):         0.52         Emod:         1         d (actual) (in):         5.5           v (ksi):         1.3         Emod (ssi):         47.9         T         Solid         Solid         Max Defl Ratio:         1.0000           beaber bot;         Ubyy         Cp:         16.6         Max Defl Ratio:         1.0000         Max Defl Ratio:         1.0000           species:         1         Cp:         1.5         Solid         Soli	Material:	HF/L #2	Grade:	No.2	Nu:	0.3	
Database:         Visually Graded         Ci:         Yes         Density (k/ft <sup>3</sup> ):         0.04           ippecies:         Hem-Fir         Enod:         1	Type:	Solid Sawn	Cm:	Yes	Alpha (1e <sup>So</sup> F <sup>-1</sup> ):	0.3	
species:         Hem-Fir         Enod:         1           shape Properties (skis):         0.85         E (ksi):         130         b (actual) (in):         1.5           s (ski):         0.52         Enod:         1         d (actual) (in):         5.5           s (ski):         0.15         COV <sub>E</sub> (Table F1):         0.25         -         -           v (ski):         1.3         Emod:         4749         -         -         -           v (ski):         4.24         y sway:         No         Cs:         1         -           v (ski):         4.24         y sway:         No         Cs:         1.5           v = bend top:         Upy         Cp:         1.6         Max Defl Ratio:         1/10000           species:         I         G:         Span:         N/A           species:         I         Span:         N/A	Database:	Visually Graded	Ci:	Yes	Density (k/ft <sup>3</sup> ):	0.04	
Shape Properties         Image of the state of the	Species:	Hem-Fir	Emod:	1			
Image: Section of the sectio	Shape Properties						
0.000         0.000 <th< td=""><td>F. (ksi):</td><td>0.85</td><td>F (ksi):</td><td>1300</td><td>b (actual) (in):</td><td>15</td></th<>	F. (ksi):	0.85	F (ksi):	1300	b (actual) (in):	15	
(100)         0.15         COVE (Table F1):         0.25           (ski):         1.3         Emix (ksi):         474.9           Design Properties         sway:         No         C <sub>fu</sub> :         1           e1 (f1):         4.24         x sway:         No         C <sub>fu</sub> :         1           e1 (f1):         4.24         x sway:         No         C <sub>fu</sub> :         1           e-bend top:         Ubyy         C <sub>f2</sub> :         1.6         Max Defl Ratio:         1/1000           e-bend top(f1):         4.24         R <sub>g</sub> :         11.16         Max Defl Location:         0           (s_st:         1         C <sub>1</sub> :         0.95         Span:         N/A           (s_st:         1         C <sub>1</sub> :         1         1         1	F. (ksi):	0.52	E (iss):	1	d (actual) (in):	55	
Vices         6.15         Conj (Mark 1)         0.02           is (Ksi):         1.3         Emin (Ksi):         474.9           Design Properties         state         1           e2 (ft):         4.24         y sway:         No         Cn:         1           e1 (ft):         4.24         z sway:         No         Cn:         0.15           e-bend top:         Lbyy         Cp:         1.6         Max Defl Ratio:         1/10000           e-bend bot (ft):         4.24         Rg:         11.16         Max Defl Location:         0           (sg:         1         Cg:         0.96         Span:         N/A           (sg:         1         Cg:         1              M2         M2         M2         M4         M4         M4         M4	F., (ksi)*	0.15	COVe (Table F1):	0.25	a factory (i.i.).	5.5	
Coup         Coup         Coup         Coup           Design Properties         e2 (ft):         4.24         y sway:         No         Cn:         1           e1 (ft):         4.24         z sway:         No         Cn:         0.15           e-bend top:         Ubyy         Co:         1.6         Max Defl Ratio:         U/10000           e-bend bot (ft):         4.24         Re:         11.16         Max Defl Location:         0           (py:         1         Cu:         0.96         Span:         N/A           (bait         1         Cu:         1         U         U           M2         M2         M2         M4         M4         M4	F. (ksi):	13	Emin (ksi):	474.9			
Jossign Properties         424         y sway:         No         Cn:         1           e1 (ft):         4.24         z sway:         No         Cp:         0.15           e-bend top:         Ubyy         Cp:         1.6         Max Defl Ratio:         U/10000           e-bend bot (ft):         4.24         Rs:         11.16         Max Defl Location:         0           g-yri:         1         Ct:         0.96         Span:         N/A           G-act         1         Ct:         1          Span:         N/A		-					
e2 (ft): 4.24 y sway: No C <sub>4</sub> .: 1 e1 (ft): 4.24 z sway: No C <sub>6</sub> : 0.15 e-bend top: Ubyy C <sub>0</sub> : 1.6 Max Defl Ratio: U/1000 e-bend bot (ft): 4.24 Rg: 11.16 Max Defl Location: 0 y-y: 1 C_1: 0.96 Span: N/A (g-g: 1 C_1: 1 M2 N3 N4	Design Propertie	s					
et (ft):         4.24         z sway:         No         Cr:         0.15           e-bend top:         Ubyy         Cg:         1.6         Max Defl Ratio:         U/1000           e-bend bot (ft):         4.24         Rg:         11.16         Max Defl Location:         0           (ry:):         1         Ct:         0.96         Span:         N/A           (ry:):         1         Ct:         1         Span:         N/A	le2 (ft):	4.24	y sway:	No	C <sub>fu</sub> :	1	
e-bend top: Ubyy Co: 1.6 Max Defi Ratio: U/10000 e-bend bot (ft): 4.24 Rg: 11.16 Max Defi Location: 0 5y-y: 1 CL: 0.96 Span: N/A (a-a: 1 Cr: 1 M2 N3 N4	e1 (ft):	4.24	z sway:	No	C <sub>P</sub> :	0.15	
e-bend bot (ft): 4.24 Rg: 11.16 Max Defi Location: 0 (y-y: 1 C_i: 0.96 Span: N/A (e-si 1 C_i: 1 M2 N3 N4	le-bend top:	Lbyy	C <sub>D</sub> :	1.6	Max Defl Ratio:	L/10000	
Gray:         1         C:         0.96         Span:         N/A           Kew:         1         C:         1	le-bend bot (ft):	4.24	R <sub>8</sub> :	11.16	Max Defl Location:	0	
Get 1 G: 1 M2 N3 N4	Ку-у:	1	Ci:	0.96	Span:	N/A	
M2 N3	K <sub>2-2</sub> :	1	C <sub>r</sub> :	1			
N3 N4				M2			
	● <del>O</del> N3					• Nid	



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# AWC NDS-18 / SDPWS-15 ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	4			-	
Applied Loading - Shear + Torsion	13				
Axial Compression Analysis		0.11 ksi	0.22 ksi		
Axial Tension Analysis		0 ksi	0.87 ksi		
Flexural Analysis, Fb1'	-	0 ksi	1.36 ksi		
Flexural Analysis, Fb2'	-	0 ksi	1.41 ksi		•
Bending & Axial Compression Analysis	-			0.48	PASS
Bending & Axial Tension Analysis	-		-	0	PASS
Shear Analysis		0 ksi	0.19 ksi	0	PASS



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	Load Co	ombination: Envelope	Code check	c: 0.477 (LC 4)	
		Input Data			
		Shape:	2X6 (nominal)	I Node:	N3
1×	1×	Member Type:	Column	J Node:	N4
	7×	Length (ft):	4.24	I Release:	BenPIN
		Material Type:	Wood	J Release:	Fixed
		Design Rule:	Typical	I Offset:	N/A
		Internal Sections:	97	J Offset:	N/A
		Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way
Material Propert	ies				
Material:	HF/L #2	Grade:	No.2	Nu:	0.3
lype:	Solid Sawn	Cm:	Yes	Alpha (1e <sup>50</sup> F <sup>-1</sup> ):	0.3
Database:	Visually Graded	Ci:	Yes	Density (k/ft <sup>3</sup> ):	0.04
Species:	Hem-Fir	Emod:	1		
Shape Properties	5				
F <sub>b</sub> (ksi):	0.85	E (ksi):	1300	b (actual) (in):	1.5
fı (ksi):	0.52	Emod:	1	d (actual) (in):	5.5
F <sub>v</sub> (ksi):	0.15	COV <sub>E</sub> (Table F1):	0.25		
F <sub>e</sub> (ksi):	1.3	E <sub>min</sub> (ksi):	474.9		
Design Propertie	s				
e2 (ft):	4.24	y sway:	No	C <sub>fu</sub> :	1
e1 (ft):	4.24	z sway:	No	Cp:	0.15
e-bend top:	Lbyy	C <sub>D</sub> :	1.6	Max Defl Ratio:	L/10000
e-bend bot (ft):	4.24	R <sub>8</sub> :	11.16	Max Defl Location:	0
<b>с<sub>у-у</sub>:</b>	1	CL:	0.96	Span:	N/A
( <sub>2-2</sub> :	1	Cr:	1		
••			мз		
N3					N4



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# AWC NDS-18 / SDPWS-15 ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	4				
Applied Loading - Shear + Torsion	13				
Axial Compression Analysis		0.11 ksi	0.22 ksi	•	•
Axial Tension Analysis	-	0 ksi	0.87 ksi		
Flexural Analysis, Fb1'		0 ksi	1.36 ksi		
Flexural Analysis, Fb2'		0 ksi	1.41 ksi		
Bending & Axial Compression Analysis				0.48	PASS
Bending & Axial Tension Analysis	-	-		0	PASS
Shear Analysis		0 ksi	0.19 ksi	0	PASS



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### Back Transverse Post and Brace

#### Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	0	4.22	0	
3	N3	0	2.5	0	
4	N4	2.5	0	0	

#### Wood Section Sets

	Label	Shape	Туре	Design List	Material	Design Rule	Area [in <sup>2</sup> ]	lyy [in*]	Izz [in*]	J [in*]
1	Post	6X6	Column	Rectangular	HF/L #1	Typical	30.25	76.26	76.26	128.87
2	Brace	6X6	Column	Rectangular	HF/L #2	Typical	30.25	76.26	76.26	128.87
3	Brace Alt	2X6	Column	Rectangular	HF/L #2	Typical	8.25	1.55	20.8	5.12

#### Member Primary Data

	Label	I Node	J Node	Section/Shape	Туре	Design List	Material	Design Rule
1	M1	N1	N2	Post	Column	Rectangular	HF/L #1	Typical
2	M2	N3	N4	Brace Alt	Column	Rectangular	HF/L #2	Typical
3	M3	N3	N4	Brace Alt	Column	Rectangular	HF/L #2	Typical

### Node Loads and Enforced Displacements (BLC 1 : Dead)

Node La	bel L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1 N2	[ L	Y	-1.08

#### Node Loads and Enforced Displacements (BLC 2 : Live Roof)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]				
1	N2	L	Y	-1.8				

### Node Loads and Enforced Displacements (BLC 3 : Snow)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N2	L L	Y	-2.66

#### Node Loads and Enforced Displacements (BLC 4 : Seismic Horiz)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N2	L	X	1.12

#### Load Combinations

	Description	Solve	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	D	Yes	DL	1	NL	1				
2	D+Lr	Yes	DL	1	RLL	1				
3	D+S	Yes	DL	1	SL	1				
4	D+0.7Ev+0.7Eh	Yes	DL	1	Sds*DL	0.17	EL	0.7		
5	D+0.7Ev-0.7Eh	Yes	DL	1	Sds*DL	0.17	EL	-0.7		
6	D+0.7Ev+(0.7OmEh)	Yes	DL	1	Sds*DL	0.17	Om*EL	0.7		
7	D+0.7Ev-(0.7OmEh)	Yes	DL	1	Sds*DL	0.17	Om*EL	-0.7		
8	D+0.525Ev+0.525Eh+0.1S	Yes	DL	1	Sds*DL	0.13	EL	0.53	SL	0.1
9	D+0.525Ev-0.525Eh+0.1S	Yes	DL	[ 1	Sds*DL	0.13	EL	-0.53	SL	0.1
10	D+0.525Ev+0.525(OmEh)+0.1S	Yes	DL	1	Sds*DL	0.13	Om*EL	0.53	SL.	0.1
11	D+0.525Ev-0.525(OmEh)+0.1S	Yes	DL	1	Sds*DL	0.13	Om*EL	-0.53	SL	0.1
12	0.6D-0.7Ev+0.7Eh	Yes	DL	0.6	Sds*DL	-0.17	EL	0.7		
13	0.6D-0.7Ev-0.7Eh	Yes	DL	0.6	Sds*DL	-0.17	EL	-0.7	-	
14	0.6D-0.7Ev+0.7(OmEh)	Yes	DL	0.6	Sds*DL	-0.17	Om*EL	0.7		
15	0.6D-0.7Ev-0.7(OmEh)	Yes	DL	0.6	Sds*DL	-0.17	Om*EL	-0.7		

#### Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
0	N4	max	1.33	13	1.33	12	0	13	0	13	LOCKED		0	13
1		min	-1.33	4	-1.33	5	0	1	0	1	LOCKED		0	1
2	N1	max	0.54	12	3.74	3	0	13	0	13	0	13	0	13
3		min	-0.54	5	-0.9	12	0	1	0	1	0	1	0	1
4	N3	max	NC	1	NC		NC	4	LOCKED	3	NC		NC	-
5		min	NC		NC		NC		LOCKED	-	NC		NC	
6	Totals:	max	0.79	13	3.74	3	0	13						
7		min	-0.79	4	0.43	13	0	1						



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	Load Co	mbination: Envelope	Code check	: 0.497 (LC 12)	
		Input Data			
		Shape:	6X6 (nominal)	I Node:	N1
<b>A</b> <sup>¥</sup>	<b>₽</b> <sup>v</sup>	Member Type:	Column	J Node:	N2
		Length (ft):	4.22	I Release:	Fixed
		Material Type:	Wood	J Release:	Fixed
		Design Rule:	Typical	I Offset:	N/A
		Internal Sections:	97	J Offset:	N/A
		Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way
Material Proper	ties				
Material:	HF/L #1	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	Yes	Alpha (1e <sup>50</sup> F <sup>-1</sup> ):	0.3
Database:	Visually Graded	Ci:	Yes	Density (k/ft <sup>3</sup> ):	0.04
Species:	Hem-Fir	Emod:	1		
Shape Propertie	s				
F <sub>b</sub> (ksi):	0.98	E (ksi):	1300	b (actual) (in):	5.5
Fe (ksi):	0.65	Emod:	1	d (actual) (in):	5.5
F <sub>v</sub> (ksi):	0.14	COV <sub>E</sub> (Table F1):	0.25		
F <sub>e</sub> (ksi):	0.85	E <sub>min</sub> (ksi):	474.9		
Design Properti	es				
e2 (ft):	4.22	y sway:	No	Cfu:	1
e1 (ft):	4.22	z sway:	No	Cp:	0.93
e-bend top:	Lbyy	Co:	1.6	Max Defl Ratio:	L/664
e-bend bot (ft):	4.22	Ra:	3.03	Max Defl Location:	4.22
Ку.у:	1	CL:	1	Span:	N/A
K <sub>2-2</sub> :	1	Cr:	1		
			M1		



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Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	12				-
Applied Loading - Shear + Torsion	12				
Axial Compression Analysis		0 ksi	0.92 ksi		-
Axial Tension Analysis	-	-0.03 ksi	0.83 ksi	-	-
Flexural Analysis, Fb1'	-	0.58 ksi	1.25 ksi		
Flexural Analysis, Fb2'		0 ksi	1.25 ksi		
Bending & Axial Compression Analysis				0.46	PASS
Bending & Axial Tension Analysis	-			0.5	PASS
Shear Analysis	-	0.04 ksi	0.18 ksi	0.22	PASS



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	Load Co	mbination: Envelope	Code check:	0.360 (LC 12)	
		Input Data			
		Shape:	2X6 (nominal)	I Node:	N3
1×	1	Member Type:	Column	J Node:	N4
	1	Length (ft):	3.54	I Release:	BenPIN
		Material Type:	Wood	J Release:	Fixed
		Design Rule:	Typical	I Offset:	N/A
_		Internal Sections:	97	J Offset:	N/A
		Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way
Material Propert	ties				
Material:	HF/L #2	Grade:	No.2	Nu:	0.3
Type:	Solid Sawn	Cm:	Yes	Alpha (1e <sup>5°</sup> F <sup>-1</sup> ):	0.3
Database:	Visually Graded	Ci:	Yes	Density (k/ft <sup>3</sup> ):	0.04
Species:	Hem-Fir	Emod:	1		
Shape Properties	5				
F <sub>b</sub> (ksi):	0.85	E (ksi):	1300	b (actual) (in):	1.5
Ft (ksi):	0.52	Emod:	1	d (actual) (in):	5.5
F <sub>v</sub> (ksi):	0.15	COV <sub>E</sub> (Table F1):	0.25		
F <sub>c</sub> (ksi):	1.3	E <sub>min</sub> (ksi):	474,9		
Design Propertie	15				
le2 (ft):	3.54	y sway:	No	Cfu:	1
le1 (ft):	3.54	z sway:	No	Cp:	0.22
e-bend top:	Lbyy	C <sub>D</sub> :	1.6	Max Defl Ratio:	L/10000
e-bend bot (ft):	3.54	Rs:	10.18	Max Defl Location:	0
Ку-у:	1	CL:	0.97	Span:	N/A
K <sub>z-z</sub> :	1	C <sub>r</sub> :	1		
• •			M2		



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Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	12	-	•	-	
Applied Loading - Shear + Torsion	4				
Axial Compression Analysis		0.11 ksi	0.32 ksi		•
Axial Tension Analysis		0 ksi	0.87 ksi		•
Flexural Analysis, Fb1'		0 ksi	1.37 ksi		
Flexural Analysis, Fb2'		0 ksi	1.41 ksi		
Bending & Axial Compression Analysis				0.36	PASS
Bending & Axial Tension Analysis		-		0	PASS
Shear Analysis		0 ksi	0.19 ksi	0	PASS



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	Load Co	mbination: Envelope	Code check:	0.360 (LC 12)	
		Input Data			
		Shape:	2X6 (nominal)	I Node:	N3
1	1	Member Type:	Column	J Node:	N4
	1 ×	Length (ft):	3.54	I Release:	BenPIN
		Material Type:	Wood	J Release:	Fixed
		Design Rule:	Typical	I Offset:	N/A
_		Internal Sections:	97	J Offset:	N/A
		Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way
Material Propert	ies				
Material:	HF/L #2	Grade:	No.2	Nu:	0.3
Type:	Solid Sawn	Cm:	Yes	Alpha (1e <sup>5°</sup> F <sup>-1</sup> ):	0.3
Database:	Visually Graded	Ci:	Yes	Density (k/ft <sup>3</sup> ):	0.04
Species:	Hem-Fir	Emod:	1		
Shape Propertie					
F <sub>b</sub> (ksi):	0.85	E (ksi):	1300	b (actual) (in):	1.5
Ft (ksi):	0.52	Emod:	1	d (actual) (in):	5.5
F <sub>v</sub> (ksi):	0.15	COV <sub>E</sub> (Table F1):	0.25		
F <sub>c</sub> (ksi):	1.3	E <sub>min</sub> (ksi):	474.9		
Design Propertie	15				
le2 (ft):	3.54	y sway:	No	Cfu:	1
le1 (ft):	3.54	z sway:	No	Cp:	0.22
le-bend top:	Lbyy	C <sub>D</sub> :	1.6	Max Defl Ratio:	L/10000
le-bend bot (ft):	3.54	R <sub>8</sub> :	10.18	Max Defl Location:	0
Ку-у:	1	CL:	0.97	Span:	N/A
Kz-z:	1	Cr:	1		
•			мз		



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Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	12		•		
Applied Loading - Shear + Torsion	4				
Axial Compression Analysis		0.11 ksi	0.32 ksi	•	•
Axial Tension Analysis		0 ksi	0.87 ksi	÷	
Flexural Analysis, Fb1'	-	0 ksi	1.37 ksi		
Flexural Analysis, Fb2'		0 ksi	1.41 ksi		•
Bending & Axial Compression Analysis			*	0.36	PASS
Bending & Axial Tension Analysis			-	0	PASS
Shear Analysis		0 ksi	0.19 ksi	0	PASS



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## Front Post and Transverse Brace

#### Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	0	6	0	
3	N3	0	3.5	0	
4	N4	3.5	0	0	

#### Wood Section Sets

	Label	Shape	Туре	Design List	Material	Design Rule	Area [in <sup>2</sup> ]	lyy [in*]	Izz [in*]	J [in*]
1	Post	6X6	Column	Rectangular	HF/L #1	Typical	30.25	76.26	76.26	128.87
2	Brace	6X6	Column	Rectangular	HF/L #2	Typical	30.25	76.26	76.26	128.87
3	Brace Alt	2X6	Column	Rectangular	HF/L #2	Typical	8.25	1.55	20.8	5.12

#### Member Primary Data

	Label	I Node	J Node	Section/Shape	Туре	Design List	Material	Design Rule
1	M1	N1	N2	Post	Column	Rectangular	HF/L #1	Typical
2	M2	N3	N4	Brace Alt	Column	Rectangular	HF/L #2	Typical
3	M3	N3	N4	Brace Alt	Column	Rectangular	HF/L #2	Typical

## Node Loads and Enforced Displacements (BLC 1 : Dead)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N2	L	Y	-1.08

#### Node Loads and Enforced Displacements (BLC 2 : Live Roof)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N2	L	Y	-1.8

#### Node Loads and Enforced Displacements (BLC 3 : Snow)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	N2	L	Y	-2.66

#### Node Loads and Enforced Displacements (BLC 4 : Seismic Horiz)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]	
1	N2	L	X	1.12	

#### Load Combinations

	Description	Solve	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	D	Yes	DL	[ 1	NL	1				
2	D+Lr	Yes	DL	1	RLL	1				
3	D+S	Yes	DL	1	SL	1				
4	D+0.7Ev+0.7Eh	Yes	DL	1	Sds*DL	0.17	EL	0.7		
5	D+0.7Ev-0.7Eh	Yes	DL	1	Sds*DL	0.17	EL	-0.7		
6	D+0.7Ev+(0.7OmEh)	Yes	DL	1	Sds*DL	0.17	Om*EL	0.7		
7	D+0.7Ev-(0.7OmEh)	Yes	DL	1	Sds*DL	0.17	Om*EL	-0.7		
8	D+0.525Ev+0.525Eh+0.1S	Yes	DL	1	Sds*DL	0.13	EL	0.53	SL	0.1
9	D+0.525Ev-0.525Eh+0.1S	Yes	DL	1	Sds*DL	0.13	EL	-0.53	SL	0.1
10	D+0.525Ev+0.525(OmEh)+0.1S	Yes	DL	1	Sds*DL	0.13	Om*EL	0.53	SL	0.1
11	D+0.525Ev-0.525(OmEh)+0.1S	Yes	DL	1	Sds*DL	0.13	Om*EL	-0.53	SL	0.1
12	0.6D-0.7Ev+0.7Eh	Yes	DL	0.6	Sds*DL	-0.17	EL	0.7		
13	0.6D-0.7Ev-0.7Eh	Yes	DL	0.6	Sds*DL	-0.17	EL	-0.7		
14	0.6D-0.7Ev+0.7(OmEh)	Yes	DL	0.6	Sds*DL	-0.17	Om*EL	0.7		
15	0.6D-0.7Ev-0.7(OmEh)	Yes	DL	0.6	Sds*DL	-0.17	Om*EL	-0.7	1	

#### Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
0	N4	max	1.35	13	1.35	12	0	13	0	13	LOCKED		0	13
1		min	-1.35	4	-1.35	13	0	1	0	1	LOCKED		0	1
2	N1	max	0.56	12	3.74	3	0	13	0	13	0	13	0	13
3		min	-0.56	13	-0.92	12	0	1	0	1	0	1	0	1
4	N3	max	NC		NC		NC		LOCKED		NC		NC	
5		min	NC		NC		NC		LOCKED		NC		NC	
6	Totals:	max	0.79	5	3.74	3	0	13						
7		min	-0.79	4	0.43	12	0	1						



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_	Envelope N	ode Rea	ctions - O	verstrer	ngth or C	apacity l	imit							
_	Node Label	ų —	X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
0	N4	max	2.02	7*	2.02	14*	0	15*	0	15*	LOCKED	-	0	15*
1		min	-2.02	14*	-2.02	7*	0	6*	0	6*	LOCKED		0	6*
2	N1	max	0.84	6*	3.32	7*	0	15*		15*	0	15*	0	15*
3		min	-0.84	7*	-1.59	14*	0	6*	0	6*	0	6*	0	6*
4	N3	max	NC		NC		NC		LOCKED		NC		NC	
5		min	NC		NC		NC		LOCKED		NC		NC	
6	Totals:	max	1.18	7*	1.51	11*	0	15*						
7		min	-1.18	14*	0.43	14*	0	6*						





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	Load Co	mbination: Envelope	Code check:	0.718 (LC 12)	
		Input Data			
		Shape:	6X6 (nominal)	I Node:	N1
1×	1	Member Type:	Column	J Node:	N2
		Length (ft):	6	I Release:	Fixed
		Material Type:	Wood	J Release:	Fixed
		Design Rule:	Typical	I Offset:	N/A
		Internal Sections:	97	J Offset:	N/A
		Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way
Material Propert	ies				
Material:	HF/L #1	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	Yes	Alpha (1e <sup>50</sup> F <sup>-1</sup> ):	0.3
Database:	Visually Graded	G:	Yes	Density (k/ft <sup>3</sup> ):	0.04
Species:	Hem-Fir	Emod:	1		
Shape Properties	6				
Fb (ksi):	0.98	E (ksi):	1300	b (actual) (in):	5.5
Ft (ksi):	0.65	Emod:	1	d (actual) (in):	5.5
F <sub>v</sub> (ksi):	0.14	COV <sub>E</sub> (Table F1):	0.25		
F <sub>c</sub> (ksi):	0.85	E <sub>min</sub> (ksi):	474.9		
Design Propertie	s				
le2 (ft):	6	y sway:	No	C <sub>fu</sub> :	1
le1 (ft):	3.5	z sway:	No	C <sub>P</sub> :	0.84
le-bend top:	Lbyy	C <sub>D</sub> :	1.6	Max Defl Ratio:	L/353
le-bend bot (ft):	б	Rs:	3.62	Max Defl Location:	6
К <sub>у-у</sub> :	1	CL:	1	Span:	N/A
K <sub>z-z</sub> :	1	Cr:	1		
			12123		



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Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	12	-	-		-
Applied Loading - Shear + Torsion	5			•	•
Axial Compression Analysis	-	0 ksi	0.83 ksi	•	•
Axial Tension Analysis	-	-0.03 ksi	0.83 ksi		-
Flexural Analysis, Fb1'	-	0.85 ksi	1.25 ksi	•	
Flexural Analysis, Fb2'		0 ksi	1.25 ksi		
Bending & Axial Compression Analysis				0.68	PASS
Bending & Axial Tension Analysis				0.72	PASS
Shear Analysis		0.04 ksi	0.18 ksi	0.22	PASS



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	Load Co	mbination: Envelope	Code check:	0.696 (LC 12)	
		Input Data			
		Shape:	2X6 (nominal)	I Node:	N3
1	1	Member Type:	Column	J Node:	N4
	7	Length (ft):	4.95	I Release:	BenPIN
		Material Type:	Wood	J Release:	Fixed
		Design Rule:	Typical	I Offset:	N/A
5 <b></b> 5		Internal Sections:	97	J Offset:	N/A
		Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way
Material Propert	ies				
Material:	HF/L #2	Grade:	No.2	Nu:	0.3
Type:	Solid Sawn	Cm:	Yes	Alpha (1e <sup>50</sup> F <sup>-1</sup> ):	0.3
Database:	Visually Graded	Ci:	Yes	Density (k/ft <sup>3</sup> ):	0.04
Species:	Hem-Fir	Emod:	1		
Shape Properties					
F <sub>b</sub> (ksi):	0.85	E (ksi):	1300	b (actual) (in):	1.5
Ft (ksi):	0.52	Emod:	1	d (actual) (in):	5.5
F <sub>v</sub> (ksi):	0.15	COV <sub>E</sub> (Table F1):	0.25		
F <sub>c</sub> (ksi):	1.3	E <sub>min</sub> (ksi):	474.9		
Design Propertie	15				
le2 (ft):	4.95	y sway:	No	Cfu:	1
le1 (ft):	4.95	z sway:	No	Cp:	0.11
le-bend top:	Lbyy	C <sub>D</sub> :	1.6	Max Defl Ratio:	L/10000
le-bend bot (ft):	4.95	R <sub>8</sub> :	12.05	Max Defl Location:	0
Ky.y:	1	CL:	0.95	Span:	N/A
K <sub>2-2</sub> :	1	C <sub>r</sub> :	1		
• •			M2		



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Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	12	-	-		•
Applied Loading - Shear + Torsion	13				
Axial Compression Analysis		0.12 ksi	0.17 ksi		-
Axial Tension Analysis		0 ksi	0.87 ksi	-	-
Flexural Analysis, Fb1'	-	0 ksi	1.35 ksi		
Flexural Analysis, Fb2*		0 ksi	1,41 ksi		
Bending & Axial Compression Analysis				0.7	PASS
Bending & Axial Tension Analysis	-	-		0	PASS
Shear Analysis		0 ksi	0.19 ksi	0	PASS



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	Load Co	mbination: Envelope	Code check:	0.696 (LC 12)	
		Input Data			
		Shape:	2X6 (nominal)	I Node:	N3
1	1º	Member Type:	Column	J Node:	N4
	7	Length (ft):	4.95	I Release:	BenPIN
		Material Type:	Wood	J Release:	Fixed
		Design Rule:	Typical	I Offset:	N/A
		Internal Sections:	97	J Offset:	N/A
		Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way
Material Propert	ies				
Material:	HF/L #2	Grade:	No.2	Nu:	0.3
Type:	Solid Sawn	Cm:	Yes	Alpha (1e <sup>So</sup> F <sup>-1</sup> ):	0.3
Database:	Visually Graded	Ci:	Yes	Density (k/ft <sup>3</sup> ):	0.04
Species:	Hem-Fir	Emod:	1		
Shape Properties					
F <sub>b</sub> (ksi):	0.85	E (ksi):	1300	b (actual) (in):	1.5
Ft (ksi):	0.52	Emod:	1	d (actual) (in):	5.5
F <sub>v</sub> (ksi):	0.15	COV <sub>E</sub> (Table F1):	0.25		
F <sub>c</sub> (ksi):	1.3	E <sub>min</sub> (ksi):	474,9		
Design Propertie	s				
le2 (ft):	4.95	y sway:	No	Cfu:	1
le1 (ft):	4.95	z sway:	No	Cp:	0.11
le-bend top:	Lbyy	Co:	1.6	Max Defl Ratio:	L/10000
e-bend bot (ft):	4.95	Rs:	12.05	Max Defl Location:	0
Ку.у:	1	CL:	0.95	Span:	N/A
K <sub>2-2</sub> :	1	C <sub>r</sub> :	1		
			мз		



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Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	12	-	-	•	
Applied Loading - Shear + Torsion	13			•	
Axial Compression Analysis	-	0.12 ksi	0.17 ksi		•
Axial Tension Analysis	-	0 ksi	0.87 ksi		•
Flexural Analysis, Fb1'	-	0 ksi	1.35 ksi		
Flexural Analysis, Fb2'		0 ksi	1.41 ksi		
Bending & Axial Compression Analysis				0.7	PASS
Bending & Axial Tension Analysis	-			0	PASS
Shear Analysis		0 ksi	0.19 ksi	0	PASS

# Wood Beam

LIC#: KW-06014167, Build:20.23.08.01 PETERSON STRUCTURAL ENGINEERS
DESCRIPTION: Sill Plate Weak Axis Bending

/ertical Reactions		Support notation : Far left is #1			Values in KIPS		
Load Combination	Support 1	Suppo	xt 2				
Max Upward from all Load Conditions	0.967	0.	963				
Max Upward from Load Cases	0.967	7 0.	963				
E Only * 0.70	0.677	7 0.	674				
E Only * 0.5250	0.507	7 0.	506				
E Only	0.967	0.	963				



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Project File: Sill Plate.ec6

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Concentration         Description         Description         Description           Description         Statistics         Statistics         Statistics         Statistics           Cold Combination Set: IBC 2021         Fb +         B50.0 ppi         E: Modulus of Elasticity           Load Combination Set: IBC 2021         Fb +         B50.0 ppi         Element-acc         Tember 4.5           Void Grade         No.2         Fb +         B50.0 ppi         Element-acc         Tember 4.5           Wood Species         Henrifit         Fc - Perpi         150.0 ppi         Element-acc         Tember 4.5         470.0 ksi           Wood Grade         No.2         Fc - Perpi         150.0 ppi         Element-acc         470.0 ksi           Beam Bracing         Completely Unbraced         Element-acc         Fc - Perpi         150.0 ppi         Element-acc         470.0 ksi           Position         Service loads entered. Load Factors will be applied for calculations.         Element-acc         470.0 ksi         Fc - Pri         150.0 ppi         Element-acc         470.0 ksi           Position Not (B = 0.116.1         Maximum Shear Stress Ratio         0.431.1         0.431.1         0.444         Element-acc         0.431.1         Element-acc         0.432.1         1.0 0.001         1.0 0.00	10.8 JOH 00044407 D. 1400.00	00.01				00110	-	1041 F		500			( ) F	CONTRE. 0	m Plate.	
Code REFERENCES           Calculations per NDS 2018, IBC 2021, ASCE 7-16           Load Combination Set : IBC 2021           Ladard Combination IBC 2021, ASCE 7-16           Load Combination IBC 2021           Ladard Entransity           Ladard Combination IBC 2021           Ladard Combination IBC 2021           Ladard Combination IBC 2021           Wood Species : Hem-Fir           Wood Grade : No.2           Beam Bracing : Completely Unbraced           Et 1 98)           Estimate Intervention IBC 2021           Estimate Intervention IBC 2021           Estimate IBC 2021	DESCRIPTION: Sill Pl	ate Weak	Axis E	Bendin		SON S	RUCI	JRAL EI	NGINE	EKS			(c) E/	NERCALC	INC 1983	-2023
ODE REFERENCES           Concentination Set: IBC 2021           Laterial Properties           Analysis Method: 2021           Lad Combination Set: IBC 2021           Model Species : Hem-Fir           Wood Species : Hem-Fir           Wood Species : Hem-Fir           Wood Species : Hem-Fir           Fc - Parp           400 Species : Hem-Fir           Fc - Parp           400 Species : Hem-Fir           Fc - Parp           Fc - Parp           400 Species : Hem-Fir           Fc - Parp           Fc - Parp           400 Species : Hem-Fir           Fc - Parp           Fc - Parp           Fc - Parp           400 Species : No 2           Fr           Fc - Status           Fr - Status           Fc - Nation Status           Fc - Nation Status           Fc - Nation Status           For - Actual           E = 1.930 kG 00 330 ft           For - Actual           For - Actual           E = 1.930 kG 00 330 ft           For - Actual           For - Actual           For - Actual           For - Beation Ofmaxion on span           For - Actu		and mount			9											
Calculations per NDS 2016, IBC 2021, NBC 2021           Laterial Properties           Analysia Method           Analysia Method           Analysia Method           Analysia Method           Mad Combination: IBC 2021           Wood Species : Hem-Fir           Wood Species : No.2           Beam Bracing : Completely Unbraced           Et 193           Septied Loads           Beam Bracing : Completely Unbraced           Et 193           Septied Loads           Beam Set ing 20 kg 0 x330 ft           Design OK           Maximum Bending Stress Ratio Point Load : E = 1,930 k @ 0.3330 ft           Design OK           Beam off weight NOT Internally calculated and added Point Load : E = 1,930 k @ 0.3330 ft           Design OK           Beam off weight NOT internally calculated and added Point Load : E = 1,930 k @ 0.3330 ft           Design OK           Beam off weight NOT internally calculated and added Point Load : E = 1,930 k @ 0.3330 ft           Design OK           Beam off weight NOT internally calculated and added           Pb = 1,632.00psi           Load Combination Load Combination           E ONY 0.70 Location of maximum on span           Span # 1           Max Dowmward Transier Deflection Max Upward Transier Deflection Max	ODE REFERENCES		1001													
Idaterial Properties           Analysis Method:: Allowable Stress Design Load Combination : IBC 2021         Fb + 850.0 psi Fc - Pirt 1.300.0 psi Ft 525.0 psi         £ : Modulus of Elasticity Eminbend - xx         1.300.0 ksi Eminbend - xx         1.300.0 ksi From 1.300.0 ksi Eminbend - xx         1.300.0 ksi Eminbend - xx         1.300.0 ksi Eminbend - xx         470.0 ksi 470.0 ksi           Wood Grade :: No.2         Ft         525.0 psi         Density         26.840 pcf           Beam Bracing :: Completely Unbraced         E(1.93)         E(1.93)         E(1.93)         Density         26.840 pcf           Splied Loads         Service loads entered. Load Factors will be applied for calculations.         Beam self weight NOT internally calculated and added Point Load : E = 1.930 k @ 0.3300 ft         Design OK           DESIGN SUMMARY         E         1.832.00 psi Fb         Fv         E         1.92.00 psi Load Combination         E 0.0hy ° 0.70 Load Combination         E 0.0hy ° 0.70 Load Combination         E 0.0hy ° 0.70 Location of maximum on span         E 0.000 ft         Load Combination         E 0.000 ft         Load Combination         E 0.000 ft         Span # 1           Maximum Beding Stress For Load         Out of this span         Max Commark Traine Deflection         0 in Rato =         0 <120 frá	Load Combination Set : IB	C 2021	, ASCE	: 7-16												
Analysis Method :       Allowable Stress Design Land Combination: IBC 2021       Fb +       850.0 psi       E: Modulus of Elasticity         Load Combination: IBC 2021       Fb -       850.0 psi       E: Modulus of Elasticity         Wood Species :: Hem-Fir       Fc - Pril       1,300.0 psi       E: Modulus of Elasticity         Beam Bracing :: Completely Unbraced       Fc - Pril       1,300.0 psi       E: Modulus of Elasticity         Species :: Hem-Fir       Fv       150.0 psi       Etherd-xx       470.0 ksi         Ename Set in the species :: Hem-Fir       Fv       150.0 psi       Density       26.840 pcf         Species :: Hem-Fir       Fv       150.0 psi       Density       26.840 pcf         Species :: Hem-Fir       Set in the species :: Hem-Fir       Set in the species :: Hem-Fir       Set in the species :: Hem-Fir       1.30.0 kgi         Species :: Hem-Fir       First :: Species :: Hem-Fir       Set in the species :: Hem-Fir       Hem-Fir       Se	laterial Properties															
Wood Space         Product	Analysis Method : Allowable Load Combination : IBC 2021	Stress Desi	gn					Fb + Fb - Fc - Pri Fc - Pe	1	1.	850.0 psi 850.0 psi 300.0 psi 405.0 psi	E : M Eb En	odulus of E end- xx ninbend - x	lasticity 1, x	300.0ksi 470.0ksi	i
Beam Bracing         : Completely Unbraced         Ft         523.0 psi         Density         20.840 pci           Beam Bracing         : Completely Unbraced         E(1.93)	Wood Grade : No.2						1	Fv	ιp.		150.0 psi					
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Beam Bracing : Complete	ly Unbraced						Ft.			525.0 psi	De	insity	2	6.840 pc	
							E(1.9	(3)								
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				1111												
Service loads entered. Load Pactors will be applied for calculations.Service loads entered. Load Pactors will be applied for calculations.Beam self weight NOT internally calculated and addedPoint Load : E = 1.930 k @ 0.3330 ftDesign OKMaximum Bending Stress Ratio=0.116 1Maximum Shear Stress Ratio=0.431 : 1Section used for this span $4x4$ Section used for this span $4x4$ fb=1.632.00 psiFv=192.00 psiLoad CombinationE Only * 0.70Load CombinationE Only * 0.70Load Combination of maximum on span=0.000 ftLocation of maximum occurs=Span # 1Span # where maximum occurs=Span # 1Maximum Deflection0 in Ratio =0<120n/aMax Downward Total Deflection0 in Ratio =0<120n/aMax Downward Total Deflection0.000 in Ratio =0<120n/aMax Downward Total Deflection0.000 in Ratio =0<120n/aCoad CombinationMax Stress RatiosShear ValuesSegment Length Span #NCo C M Ct Ct Ct Cc Ct Ct C i C i C rMoment ValuesShear ValuesShear ValuesShear ValuesShear ValuesShear ValuesShear ValuesShear ValuesS				R	-	s	4x4 pan = 0	6667 ft			1				4	
Beam self weight NOT internally calculated and added Point Load : E = 1.930 k @ 0.3330 ft ESIGN SUMMARY Maximum Bending Stress Ratio = 0.116 1 fc: Actual = 189.27 psi fc: Actual = 0.431 : 1 fc: Actual = 189.27 psi fc: Actual = 0.431 : 1 fc: Actual = 1.632.00 psi fc: Actual = 0.420 m/a Fb = 1,632.00 psi Fv = 192.00 psi Load Combination E Only * 0.70 Location of maximum on span = 0.000ft Span # where maximum occurs = Span # 1 Max imum Deflection Max Downward Transient Deflection 0 in Ratio = 0 <120 n/a Max Downward Transient Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Transient Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Stress Ratios for Load Combination 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Max Downward Total Deflection 0.000 in Ratio = 0 <120 n/a Di in Ratio = 0 <120 n/a Max Stress Ratios 0.000 0.00 0.00 0.00 0.00 0.00 0.00 0	pplied Loads		late d		4.4			Serv	ICE IOS	ads ent	ered. Load	1 Factors	will be appl	lied for ca	lculation	15.
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Beam self weight NOT inte	imally calcu	liated a	and ad	aea											
$\begin{array}{l c c c c c c c c c c c c c c c c c c c$	Point Load : E = 1.930	k @ 0.3330	) ft													
fb: Actual       =       189.27 psi       fv: Actual       =       82.34 psi         Fb       =       1,632.00 psi       Fv       =       192.00 psi         Load Combination       E Only * 0.70       Load Combination       E Only * 0.70       Load Combination       E Only * 0.70         Load Combination       Span # under the maximum on span       =       0.000 ft       Location of maximum on span       =       0.000 ft         Span # where maximum occurs       =       Span # 1       Span # where maximum occurs       =       Span # 1         Maximum Deflection       0 in Ratio =       0 <120	Point Load : E = 1.930 ESIGN SUMMARY	k @ 0.333	O ft											Desig	an OK	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress I Section used for this span	k @ 0.3330 Ratio =	D ft		0.11	6 1	Ma	aximur Sec	n She	ear Str sed for	ess Ratio	>	-	Desig	gn OK 0.431 : 4x4	1
Location of maximum on span       =       0.000 ft       Location of maximum on span       =       0.000 ft         Span # where maximum occurs       =       Span # 1       Span # where maximum occurs       =       Span # 1         Maximum Deflection Max Downward Transient Deflection Max Upward Transient Deflection Max Upward Total Deflection       0 in Ratio =       0 <120 n/a       n/a         Maximum Forces & Stresses for Load Combination Max Upward Total Deflection       0.000 in Ratio =       0 <120 n/a       Moment Values       Shear Values         Segment Length       Span #       M       V       CD       CM       Ct       CLx       CF       Cfu       C       C       Moment Values       Shear Values         Segment Length       Span #       M       V       CD       CM       Ct       CLx       CF       Cfu       C       C       Moment Values       Shear Values       Shear Values         Longth = 0.6667 ft 1       0.90       1.00       1.00       1.00       0.00	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress F Section used for this span fb: Actual	k @ 0.3334 Ratio = =	0 ft 1		0.11 4) 189.2	6 1 4 27 psi	Ma	aximur Sec	n She tion u	ear Str sed for fv: A	ress Ratio this span	>	-	Desig	gn OK 0.431 : 4x4 82.84 p	1 si
Span # where maximum occurs         =         Span # 1         Span # where maximum occurs         =         Span # 1           Maximum Deflection Max Downward Transient Deflection Max Downward Transient Deflection Max Downward Total Deflection Max Dupward Total Deflection         0 in Ratio = $0 < 120$ n/a $0 < 120$ n/a           Maximum Forces & Stresses for Load Combination Max Dipward Total Deflection         Max Stress Ratios 0 in Ratio = $0 < 120$ n/a         Moment Values         Shear Values           Segment Length         Span #         M         V         CD         CM         Ct         CLx         C <sub>F</sub> Cfu         C <sub>1</sub> C         Moment Values         Shear Values           Segment Length         Span #         M         V         CD         CM         Ct         CLx         C <sub>F</sub> Cfu         C <sub>1</sub> C         T         Monent Values         Shear Values           Segment Length         Span #         M         V         CD         CM         Ct         CLx         C <sub>F</sub> Cfu         C         N         Mo         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress F Section used for this span fb: Actual Fb Load Combination	k @ 0.333( Ratio = = =	0 ft : :	1,	0.11 4) 189.2 632.0	6 1 4 7 psi 0 psi	Ma	aximur Sec	n She tion u	ear Str sed for fv: A F'v	ress Ratio this span ctual	>	-	Desig 1	9n OK 0.431 : 4x4 82.84 p 92.00 p	1 si si
Maximum Deflection Max Downward Transient Deflection Max Upward Transient Deflection Max Upward Total Deflection Max Upward Total Deflection         0 in Ratio = 0 (120)         0 (120)         n/a           Max Upward Total Deflection Max Upward Total Deflection         0.000 in Ratio = 0.000 in Ratio = 0 (120)         34291 >= 120 0 (120)         Span: 1 : E Only * 0.70           Maximum Forces & Stresses for Load Combinations         Max Stress Ratios         Shear Values           Load Combination         Max Stress Ratios         Shear Values         Shear Values           Segment Length         Span #         M         V         CD         CM         Ct         CLx         Cr         Moment Values         Shear Values           Length = 0.6667 ft 1         0.90         1.00         1.00         1.500         1.00         0.80         1.00         918.0         0.00         0.0           Length = 0.6667 ft 1         0.116         0.431         1.60         1.00         1.00         1.500         1.00         0.80         1.00         0.	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress F Section used for this span fb: Actual Fb Load Combination Location of maximum on sp	k @ 0.3334 Ratio = = = pan =	D ft	1, E Onl	0.11 4) 189.2 632.0 y * 0.1 0.0	16:1 (4) 27 psi 00 psi 70 00 ft	Ma	Eca Loa Loc	n She tion u	ear Str sed for fv: A F'v mbinatio	ress Ratio this span ctual on imum on s	pan	-	Desig 1 E Only	gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft	1 si si
Maximum Forces & Stresses for Load Combinations           Max Stress Ratios         Moment Values         Shear Values           Segment Length         Span #         M         V         CD         CM         Ct         CLx         Cp         Cfu         Ci         C         M         fb         F'b         Shear Values           Segment Length         Span #         M         V         CD         CM         Ct         CLx         Cp         Cfu         Ci         C         r         M         fb         F'b         V         fv         Fv           Length = 0.6667 ft         1         0.90         1.00         1.00         1.500         1.00         0.80         1.00         0.00 <t< th=""><th>Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress I Section used for this span fb: Actual Fb Load Combination Location of maximum on sy Span # where maximum or</th><th>k @ 0.3334 Ratio = = = pan = :curs =</th><th>D ft</th><th>1. E Onl</th><th>0.11 4) 189.2 632.0 ly * 0.1 0.00 pan #</th><th>16:1 (4) 27 psi 00 psi 70 00 ft 1</th><th>Ma</th><th>Loa Sec Loa Spa</th><th>n She tion u d Con ation o in # w</th><th>ear Str sed for fv: A F'v mbinatio of maxi here m</th><th>ress Ratio this span ctual on imum on s laximum o</th><th>pan</th><th>-</th><th>Desig 1 E Only Sp</th><th>gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1</th><th>1 si si</th></t<>	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress I Section used for this span fb: Actual Fb Load Combination Location of maximum on sy Span # where maximum or	k @ 0.3334 Ratio = = = pan = :curs =	D ft	1. E Onl	0.11 4) 189.2 632.0 ly * 0.1 0.00 pan #	16:1 (4) 27 psi 00 psi 70 00 ft 1	Ma	Loa Sec Loa Spa	n She tion u d Con ation o in # w	ear Str sed for fv: A F'v mbinatio of maxi here m	ress Ratio this span ctual on imum on s laximum o	pan	-	Desig 1 E Only Sp	gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1	1 si si
Max Stress Ratios         Moment Values         Shear Values           Segment Length         Span #         M         V         CD         CM         Ct         CLx         CF         Cfu         Ci         Cr         Moment Values         Shear Values           Segment Length         Span #         M         V         CD         CM         Ct         CLx         CF         Cfu         Ci         Cr         Moment Values         Shear Values         V         fv         Fv         Fv         V         fv         Fv </td <td>Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress R Section used for this span fb: Actual Fb Load Combination Location of maximum or Span # where maximum or Maximum Deflection Max Downward Transient D Max Downward Total Deflection Max Upward Total Deflection</td> <td>k @ 0.3334 Ratio = = pan = ccurs = t Deflection eflection flection tion</td> <td>0 ft</td> <td>1, E Onl S 0 0.000 0</td> <td>0.11 45 189.2 632.0 by * 0.3 0.00 pan # in R in R in R in R</td> <td>16: 1 (4 27 psi 00 psi 70 00 ft 1 atio = atio = atio =</td> <td>Ma 3429</td> <td>Coa Loa Loc Spa 0&lt;12( 0&lt;12( 0&lt;12) 0&lt;12( 0&lt;12(</td> <td>d Con ation u in # w 0 20</td> <td>ear Str sed for fv: A F'v mbinatio of maxi here m n/a Span: ' n/a</td> <td>ress Ratio this span ctual on imum on s aximum o</td> <td>pan ccurs * 0.70</td> <td>-</td> <td>Desig 1 E Only Sp</td> <td>gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1</td> <td>1 si si</td>	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress R Section used for this span fb: Actual Fb Load Combination Location of maximum or Span # where maximum or Maximum Deflection Max Downward Transient D Max Downward Total Deflection Max Upward Total Deflection	k @ 0.3334 Ratio = = pan = ccurs = t Deflection eflection flection tion	0 ft	1, E Onl S 0 0.000 0	0.11 45 189.2 632.0 by * 0.3 0.00 pan # in R in R in R in R	16: 1 (4 27 psi 00 psi 70 00 ft 1 atio = atio = atio =	Ma 3429	Coa Loa Loc Spa 0<12( 0<12( 0<12) 0<12( 0<12(	d Con ation u in # w 0 20	ear Str sed for fv: A F'v mbinatio of maxi here m n/a Span: ' n/a	ress Ratio this span ctual on imum on s aximum o	pan ccurs * 0.70	-	Desig 1 E Only Sp	gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1	1 si si
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Length = 0.6667 ft         1         0.90         1.00         1.00         1.00         1.00         1.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         0.00         0.01         0.00	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress B Section used for this span fb: Actual Fb Load Combination Location of maximum or sy Span # where maximum or Maximum Deflection Max Downward Transien Max Upward Total Deflect Max Upward Total Deflect Max Upward Total Deflect Maximum Forces & Si coad Combination	k @ 0.3334 Ratio = = pan = ccurs = t Deflection eflection flection tresses fo lax Stress Ro	r Loa	1, E Onl S 0 0.000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.11 45 189.2 632.0 by * 0.1 0.00 pan # in R in R in R in R	16: 1 (4 27 psi 00 psi 70 00 ft 1 atio = atio = atio = atio	Ma 3429 15	Loa Loc Spa 0 <12( 0 <12( 0 <12(	d Con ation u ation o an # w 0 20 0	ear Str sed for fv: A F'v mbinatio of maxi here m n/a Span: n/a	ress Ratio this span ctual on imum on s iaximum o 1 : E Only Momen	pan ccurs * 0.70	= = = =	Desig 1 E Only Sp	gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1	1 si ues
Only * 0.70         1.00         1.00         1.00         1.00         1.00         1.00         0.00	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress F Section used for this span fb: Actual Fb Load Combination Location of maximum or Span # where maximum or Maximum Deflection Max Downward Transient D Max Downward Transient D Max Downward Total Deflect Max Upward Total Deflect Max Upward Total Deflect Max Downward Total Deflect Maximum Forces & St Segment Length Span #	k @ 0.3334 Ratio = = ccurs = t Deflection eflection flection tresses for lax Stress Ri M V	r Loa atlos CD	1, Е Onl S 0 0.000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.111 4) 189.2 632.0 0.00 pan # in R in R in R nbin Ct (	<b>16</b> 1 <b>4</b> <b>27</b> psi <b>00</b> psi <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>10</b> <b>1</b>	Ma 3429 15 C <sub>F</sub>	Cfu	m She d Con ation d n # w 0 0 0 20 0	ear Str sed for fr: A F'v mbinatio of maxi here m n/a Span: n/a C r	ress Ratio this span ctual imum on s aximum o 1 : E Only <u>Momen</u> M	pan ccurs * 0.70 t Values fb	= = = =	Desig 1 E Only Sp SF V	gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1	1 si FV
Length = 0.6667 ft         1         0.116         0.431         1.60         1.00         1.00         1.500         1.00         0.80         1.00         0.11         189.3         1.632.0         0.68         82.8         192           Only * 0.5250         1.00         1.00         1.00         1.00         1.00         0.00         0.80         1.00         0.00 <t< td=""><td>Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress R Section used for this span fb: Actual Fb Load Combination Location of maximum or Span # where maximum or Maximum Deflection Max Downward Transient D Max Downward Transient D Max Downward Total Deflect Max Upward Total Deflect Max Upward Total Deflect Max Downward Total Deflect Maximum Forces &amp; St coad Combination Segment Length Span #</td><td>k @ 0.3334 Ratio = = pan = ccurs = t Deflection flection flection tresses fo fax Stress Ri M V</td><td>oft</td><td>1, E Onl S 0 0.000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td>0.111 4) 189.2 632.0 0.0 pan # in R in R in R in R Ct ( 1.00</td><td>16: 1 14 27 psi 100 psi 70 00 ft 1 1 atio = atio = atio = atio = atio = 2Lx</td><td>Ma 3429 15 C<sub>F</sub></td><td>Loa Loc Spa 0 &lt;12( 0 ) ) ) &lt;12( 0 ) ) &lt;12( 0 ) ) )</td><td>m She d Con ation ( ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) )</td><td>ear Str sed for fr: A F'v mbinatio of maxi here m n/a Span: n/a C r 1.00</td><td>ress Ratio this span ctual on imum on s aximum o 1 : E Only <u>Momen</u> M</td><td>pan ccurs * 0.70 t Values fb</td><td>= = = = F'b 0.0 918.0</td><td>Desig 1 E Only Sp SP V 0.00 0.00</td><td>gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1</td><td>1 si si <u>Fv</u> 0.</td></t<>	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress R Section used for this span fb: Actual Fb Load Combination Location of maximum or Span # where maximum or Maximum Deflection Max Downward Transient D Max Downward Transient D Max Downward Total Deflect Max Upward Total Deflect Max Upward Total Deflect Max Downward Total Deflect Maximum Forces & St coad Combination Segment Length Span #	k @ 0.3334 Ratio = = pan = ccurs = t Deflection flection flection tresses fo fax Stress Ri M V	oft	1, E Onl S 0 0.000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.111 4) 189.2 632.0 0.0 pan # in R in R in R in R Ct ( 1.00	16: 1 14 27 psi 100 psi 70 00 ft 1 1 atio = atio = atio = atio = atio = 2Lx	Ma 3429 15 C <sub>F</sub>	Loa Loc Spa 0 <12( 0 ) ) ) <12( 0 ) ) <12( 0 ) ) )	m She d Con ation ( ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) )	ear Str sed for fr: A F'v mbinatio of maxi here m n/a Span: n/a C r 1.00	ress Ratio this span ctual on imum on s aximum o 1 : E Only <u>Momen</u> M	pan ccurs * 0.70 t Values fb	= = = = F'b 0.0 918.0	Desig 1 E Only Sp SP V 0.00 0.00	gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1	1 si si <u>Fv</u> 0.
Conly * 0.5250         1.00         1.00         1.00         1.00         0.000         0.000	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress B Section used for this span fb: Actual Fb Load Combination Location of maximum on sy Span # where maximum or Maximum Deflection Max Downward Transient D Max Downward Transient D Max Downward Total Deflection Max Upward Total Deflection Max Upward Total Deflection Max Upward Total Deflection Max Downward Total Deflection Max	k @ 0.3334 Ratio = = pan = ccurs = t Deflection eflection flection tresses fo lax Stress Ri M V	o ft	1, Е Onl S 0 0.000 0 <b>d Cor</b> <u>CM</u> 1.00	0.11 4) 189.2 632.0 y * 0.7 0.00 pan # in R in R in R in R <b>nbin</b> C <sub>t</sub> ( 1.00	16. 1 44 27 psi 00 psi 70 00 ft 1 atio = atio = atio = atio = atio = 1.00 1.00 1.00	Ma 3429 15 C <sub>F</sub> 1.500 1.500	Loa Loc Spa 0 <12( 0 ) )<12( 0 ) <12( 0) ) <12( 0) ) <12( 0) ) <12( 0) ) <12( 0) )	m She tion u d Con ation ( n # w 0 ) 20 ) 0 ( 0,80 0,80 0,80	ear Str sed for fv: A F'v mbinatio of maxi here m n/a Span: n/a C r 1.00 1.00	ress Ratio this span ctual imum on s laximum o 1 : E Only <u>Momen</u> M	pan ccurs * 0.70 tValues fb	= = = = <u>F</u> 'b 0.0 918.0 0.0	Desig 1 E Only Sp Sł V 0.00 0.00 0.00	gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1	1 si si <u>Fv</u> 0. 108. 0.
Length = 0.6667 ft         1         0.087         0.324         1.60         1.00         1.00         1.00         0.80         1.00         0.08         142.0         1.632.0         0.51         62.1         192           Verall Maximum Deflections         Load Combination         Max. "-" Defl         Location in Span         Load Combination         Max. "+" Defl         Location in Span           E Only         1         0.0003         0.333         0.0000         0.000	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress B Section used for this span fb: Actual Fb Load Combination Location of maximum on sy Span # where maximum or Maximum Deflection Max Downward Transient D Max Downward Transient D Max Downward Total Deflection Max Upward Total Deflect	k @ 0.3334 Ratio = = pan = ccurs = t Deflection eflection flection tresses fo iax Stress Ri M V	o ft 	1, E Onl S 0,000 0 d Cor CM 1.00 1.00 1.00	0.11 4) 189.2 632.0 y * 0.1 0.00 pan # in R in R in R <b>nbin</b> C <sub>t</sub> C 1.00 1.00	16: 1 44 27 psi 00 psi 70 00 ft 1 atio = atio = atio = atio = 1.00 1.00 1.00 1.00	Ma 3429 15 1.500 1.500 1.500	Loa Loc Spa 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0<12( 0)))<0))))))))))))))))))))))))))))))))	m She tion u ation o in # w 0 0 20 0 20 0 0 20 0 0 20 0 0 20 0 0 20 0 0 20 0 0 20 0 0 20 0 0 20 0 0 20 0 0 0 20 0 0 0 1 1 1 1	ear Str sed for fv: A F'v mbinatio of maxi here m n/a Span: n/a C r 1.00 1.00 1.00	ess Ratio this span ctual on imum on s laximum o 1 : E Only Momen M	pan ccurs * 0.70 t Values fb 189.3	= = = = = F'b 0.0 918.0 0.0 1,632.0	Desig 1 E Only Sp Sh V 0.00 0.00 0.00 0.00 0.68	gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1 hear Valu fv 0.0 0.0 0.0 0.0 82.8	1 si si F∨ 0. 108. 0. 192.
Deverall Maximum Deflections           Load Combination         Span         Max. "-" Defl         Location in Span         Load Combination         Max. "+" Defl         Location in Span           E Only         1         0.0003         0.333         0.0000         0.000	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress I Section used for this span fb: Actual Fb Load Combination Location of maximum on sy Span # where maximum of Maximum Deflection Max Downward Transient D Max Downward Transient D Max Upward Transient D Max Upward Total Deflection Max Upward Total Deflection Ma	k @ 0.3334 Ratio = = ccurs = t Deflection eflection flection tresses for lax Stress Ri M V	o ft 	1, E Onl S 0 0.000 0 d Cor CM 1.00 1.00 1.00 1.00	0.11 4) 189.2 632.0 y*0.3 0.00 pan # in R in R in R nbin Ct ( 1.00 1.00 1.00	16: 1 44 27 psi 10 psi 70 00 ft 1 atio = atio = atio = ation 1.00 1.00 1.00 1.00	Ma 3429 15 C <sub>F</sub> 1.500 1.500 1.500 1.500	Loa Loc Spa 0 <12( 0 <12( 1 >=1) 0 <12( 1 >)	m She tion u ation o an # w 0 0 20 0 20 0 20 0 20 0 20 0 20 0 20	ear Str sed for fv: A F'v mbinatio of maxi here m n/a Span: n/a C r 1.00 1.00 1.00 1.00	ress Ratio this span ctual on imum on s iaximum o 1 : E Only Momen M	pan ccurs * 0.70 tValues fb 189.3	= = = = = F <sup>*</sup> b 0.0 918.0 0.0 1,632.0 0.0	Desig 1 E Only Sp SF V 0.00 0.00 0.00 0.00 0.68 0.00	gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1 hear Valu fv 0.0 0.0 0.0 82.8 0.0	1 si si <u>Fv</u> 0. 108. 0. 192. 0.
Load Combination         Span         Max. "-" Defl         Location in Span         Load Combination         Max. "+" Defl         Location in Span           E Only         1         0.0003         0.333         0.0000         0.000	Point Load : E = 1.930 ESIGN SUMMARY Maximum Bending Stress B Section used for this span fb: Actual Fb Load Combination Location of maximum or Span # where maximum or Maximum Deflection Max Downward Transient D Max Downward Transient D Max Downward Total Deflect Max Upward Total Deflect Max Upward Total Deflect Max Downward Total Deflect Down Downward Total Deflect Max Downward Total Deflect Max Downward Total Deflect Max Downward Total Deflect Max Downward Total Deflect Down Downward Total Deflect Down Downward Total Deflect Down Downward Total Deflect Max Downward Total Deflect Down Down Downward Total Deflect	k @ 0.3334 Ratio = = pan = ccurs = t Deflection flection flection tresses fo Iax Stress Ri M V 116 0.431 .087 0.324	o ft	1, E Onl S 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.11 4) 189.2 632.0 10.00 pan # in R in R in R nbin Ct ( 1.00 1.00 1.00 1.00	16. 1 44 27 psi 00 psi 70 00 ft 1 atio = atio = atio = atio = atio = 1.00 1.00 1.00 1.00 1.00	Ma 3429 15 C <sub>F</sub> 1.500 1.500 1.500 1.500	Loa Loc Spa 0 <12( 0 ) <12( 0) ) <12( 0) ) <12( 0) ) <12() ) <12()	m She tion u ation a in # w 0 0 20 0 20 0 20 0 20 0 20 0 20 0 20	ear Str sed for fr: A F'v mbinatio of maxi here m n/a Span: n/a C r 1.00 1.00 1.00 1.00 1.00	ess Ratio this span ctual on imum on s aximum o 1 : E Only <u>Momen</u> M 0.11 0.08	pan ccurs * 0.70 t <u>Values</u> fb 189.3 142.0	= = = = = = F <sup>*</sup> b 0.0 918.0 0.0 1,632.0 1,632.0	Desig 1 E Only Sp V 0.00 0.00 0.00 0.68 0.00 0.51	gn OK 0.431 : 4x4 82.84 p 92.00 p * 0.70 0.000 ft an # 1 hear Valu fv 0.0 0.0 0.0 82.8 0.0 62.1	1 si si <u>Fv</u> 0. 108. 0. 192. 0. 192.
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	project	2302-0069	date	2/9/2	024	
Peterson Structural Engineers, Inc.						
www.psengineers.com	designer	RLKC	sheet	65	of	118

Project File: Cantilevered Wall.ec6

LIC# : KW-06014167, Build:20.23.08.01

PETERSON STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023

DESCRIPTION: Retaining Wall - Case 1 UPDATE (Wall Design): Backfill+Surcharge with Empty Tank

Soil Data

#### **Code Reference:**

Calculations per IBC 2021 1807.3, ASCE 7-16

## Criteria

Potningd Height	=	2 75 8
Wall height above soil	-	0.25 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water table above		
bottom of footing	=	0.0 ft

# Surcharge Loads

Surcharge Over Heel Used To Resist Sliding		250.0 psf Overturning
Surcharge Over Toe	=	0.0
NOT Used for Sliding 8	C	Verturning

## Axial Load Applied to Stem

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

Allow Soil Bearing	=	1,500.0	psf
Equivalent Fluid Pressur	e Meth	bot	
Active Heel Pressure	=	45.0	psf/ft
	=		
Passive Pressure	=	200.0	psf/ft
Soil Density, Heel	=	125.00	pcf
Soil Density, Toe	=	125.00	pcf
Footing  Soil Friction	=	0.400	
Soil height to ignore for passive pressure	=	12.00	in

## Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
Height to Top	=	0.00 ft
Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem	_	0.0 psf

(Strength Level)

	-	
 :	:	

## 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		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300



	project	2302-0069	date	2/9/2024		
Peterson Structural Engineers, Inc.	_				-	
www.psengineers.com	designer	RLKC	sheet	66	of	118

Project File: Cantilevered Wall.ec6

# LIC# : KW-06014167, Build:20.23.08.01 PETERSON STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023 DESCRIPTION: Retaining Wall - Case 1 UPDATE (Wall Design): Backfill+Surcharge with Empty Tank

## Design Summary

Wall Stability Ratios Overturning	=	1.65 OK
Slab Resis	ts All S	Sliding !
Global Stability	=	1.65
Total Bearing Load	=	1,469 lbs
resultant ecc.	=	8.38 in
Eccentricity outsi	ide mic	Idle third
Soil Pressure @ Toe	=	1,221 psf OK
Soil Pressure @ Heel	=	0 psf OK
Allowable	=	1,500 psf
Soil Pressure Less	<b>Than</b>	Allowable
ACI Factored @ Toe	=	1,710 psf
ACI Factored @ Heel	=	0 psf
Footing Shear @ Toe	=	9.7 psi OK
Footing Shear @ Heel	=	10.6 psi OK
Allowable	=	75.0 psi
Sliding Calcs		
Lateral Sliding Force	=	935.2 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

### Load Factors

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

em Construction		Bottom			
Design Height Above Ftg	ft =	Stem OK 0.00			
Wall Material Above "Ht"	=	Concrete			
Design Method	=	SD	SD	SD	
Thickness	=	6.00			
Rebar Size	=	# 5			
Rebar Spacing	=	16.00			
Rebar Placed at	=	3.3 in			
Design Data	-				
fb/FB + fa/Fa	=	0.519			
Total Force @ Section					
Service Level	lbs =				
Strength Level	lbs =	1,046.3			
MomentActual					
Service Level	ft-# =				
Strength Level	ft-#=	1,645.3			
MomentAllowable	=	3,165.6			
ShearActual					
Service Level	psi =				
Strength Level	psi=	26.4			
Shear Allowable	nsi =	54.1			
Anet (Masonry)	in2 =				
Wall Weight	nsf =	75.0			
Rebar Depth 'd'	in =	3.30			
Masonry Data					
fm	nei =				
Fs	osi =				
Solid Grouting	=				
Modular Ratio 'n'	=				
Equiv, Solid Thick.	=				
Masonry Block Type	=				
Masonry Design Method	=	ASD			
Concrete Data		01000 0000			
fc	psi =	2,500.0			
Fy	psi =	60,000.0			



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Project File: Cantilevered Wall.ec6

# LIC# : KW-06014167, Build:20.23.08.01 PETERSON STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023 DESCRIPTION: Retaining Wall - Case 1 UPDATE (Wall Design): Backfill+Surcharge with Empty Tank

Vertical Reinforcing

0.1226 in2/ft

0.1296 in2/ft

0.1296 in2/ft

0.2325 in2/ft

0.447 in2/ft

-----

#### **Concrete Stem Rebar Area Details**

Bottom Stem As (based on applied moment) : 0.0018bh : 0.0018(12)(6) :

Required Area : Provided Area : Maximum Area :

#### Footing Data

Toe Width		=	1	.50 ft
Heel Width		=	1	.50
Total Footing Widt	th	=	3	.00
Footing Thickness	Ę.	=	12	.00 in
Key Width		=	0	.00 in
Key Depth		=	0	.00 in
Key Distance from	Toe	=	0	.00 ft
fc = 2,500 p	osi l	Fy =	60,0	000 psi
Footing Concrete	Density	=	150	.00 pcf
Min. As %		=	0.00	18
Cover @ Top	3.00	@	Btm.=	3.00 in

		Toe	Heel	
Factored Pressure	=	1,710	0 psf	
Mu' : Upward	=	1,523	8 ft-#	
Mu': Downward	=	203	571 ft-#	
Mu: Design	=	1,321 OK	563 ft-#	OK
phiMn	=	11,610	11,610 ft-#	
Actual 1-Way Shear	=	9.69	10.63 psi	
Allow 1-Way Shear	=	75.00	75.00 psi	
Toe Reinforcing	=	# 5 @ 12.00 in		
Heel Reinforcing	=	# 5 @ 12.00 in		
Key Reinforcing	=	None Spec'd		
Footing Torsion, Tu		=	0.00 ft-lbs	
Footing Allow. Torsio	n, p	hi Tu =	0.00 ft-lbs	

Horizontal Reinforcing

#5@ 28.70 in

#6@ 40.74 in

Horizontal Reinforcing Options : One layer of : Two layers of :

#4@ 18.52 in #4@ 37.04 in

#5@ 57.41 in

#6@ 81.48 in

#### If torsion exceeds allowable, provide supplemental design for footing torsion.

## Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area	0.78	in2
Min footing T&S reinf Area per foot	0.26	in2 ift
f one layer of horizontal bars:	If two lay	vers of horizontal bars:
#4@ 9.26 in	#4@ 1	8.52 in
#5@ 14.35 in	#5@ 2	8.70 in
#6@ 20.37 in	#6@ 4	0.74 in



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Project File: Cantilevered Wall.ec6

# LIC# : KW-06014167, Build:20.23.08.01 PETERSON STRUCTURAL ENGINEERS (c) ENERCALC INC 1983-2023 DESCRIPTION: Retaining Wall - Case 1 UPDATE (Wall Design): Backfill+Surcharge with Empty Tank

#### Summary of Overturning & Resisting Forces & Moments

		OV	ERTURNIN	IG			RE	SISTING	
Item		Force Ibs	Distance ft	Moment ft-#			Force Ibs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl) HL Act Pres (be water tbl) Hydrostatic Force	)	507.7	1.58	803.8	Soil Over HL (ab. water Soil Over HL (bel. water Water Table	tbi) tbl)	468.8	2.50 2.50	1,171.9 1,171.9
Buoyant Force	=				Sloped Soil Over Heel	=			
Surcharge over Heel	=	427.5	2.38	1,015.3	Surcharge Over Heel	=	250.0	2.50	625.0
Surcharge Over Toe	=				Adjacent Footing Load	=			
Adjacent Footing Load	=				Axial Dead Load on Ster	m =			
Added Lateral Load	=				* Axial Live Load on Stem	=			
Load @ Stem Above Soil	=				Soil Over Toe	=			
<b>e</b>	=				Surcharge Over Toe	=			
					Stem Weight(s)	=	300.0	1.75	525.0
					Earth @ Stem Transition	ns =			
Total	=	935.2	O.T.M. =	1,819.1	Footing Weight	=	450.0	1.50	675.0
					Key Weight	=			
Resisting/Overturning	Rat	io	=	1.65	Vert. Component	=			
Vertical Loads used for	or Soi	I Pressure	= 1,46	8.8 lbs	Tot	al =	1,468.8	s R.M.=	2,996.9

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

0.1320 in2/ft

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

#### Tilt

## Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	100.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.113	in
The above calculation is not valid if the heel soil bearing	pressure e	exceeds that of the toe.

because the wall would then tend to rotate into the retained soil.

<b>Cantilevered</b>	Retaining Wa	II P	roject File: Cantilevered Wall.ec6
LIC# : KW-06014167, Bu	ild:20.23.08.01	PETERSON STRUCTURAL ENGINEERS	(c) ENERCALC INC 1983-2023
DESCRIPTION:	Retaining Wall -	Case 1 UPDATE (Wall Design): Backfill+Surcharge with	Empty Tank

## **Rebar Lap & Embedment Lengths Information**

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stern design segment (25.4.2.4a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	10.50 in
As Provided =	0.2325 in2/ft





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# Dewalt Design Assist Anchorage Design Software

	DEWALT DESIGN ASSIST 1.7.0.0	Page 1
<u>DEWALT</u>	2024_01_26 Post Anchorage 2302-0069	
		1/26/2024
Project Information		
Company:		
Project Engineer:		
Address:	Oregon 97201	
Phone:	M: - P: -	
Email:	rachelle.child@psengineers.com	
Project Name:	Untitled	
Project Address:	Untitled	
Notes:		
Selected Anchor Informatio	n	
Selected Anchor :	Pure110+	
Brand:	DEWALT	-83
Material:	3/4" Ø Threaded Rod ASTM F1554 GR36/A36	1
Embedment:	h <sub>ef</sub> 6.00 in h <sub>nom</sub> 6 in	
Approval:	ICC-ES ESR-3298	
Issued/Revision:	Jul.2023 -	
Drill method:	Hammer Drilled	
Design Principles		
Design Method:	ACI 318-19	
Load Combinations:	Section 5.3 User Defined Loads	
<b>Base Material Information</b>		
Concrete:	A 1 1 1 1 1 A	
Type:	Cracked Normal Weight Concrete	
Strength Reinforcement:	2500 psi	
Edge Reinforcement	None or < #4 Rebar	
Spacing	Tension No (Condition B) Shear No (Condition B)	
Controls Breakout	Tension False Shear False	
Base Plate:	Thistern 0.26 in Lands 2.6 in Wilds 12	1
Sizing	Thickness 0.25 in Length 3.5 in Width 12	in
Standoff	None Height 0 in	
Strength	36000 psi	
rrome:	None	
Hole Condition:	Dry Hole	
Man Cand- The	Long term: 110 °F Short term: 130 °F	
Strength Profile: Hole Condition:	36000 psi None Dry Hole Long Term: 110 °F Short Term: 130 °F	



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	_	DEWAL	T DESIG	N ASSI	ST 1.7.0.0		Page 2
DEWAL		2024_01	_26 Post A	nchora	ge 2302-0069		1/26/202
Geometric Conditions	í					Page 2 1/26/2024  Status Critical OK OK Controls OK	
h <sub>slab</sub> 24 Edge Cx-∞	in	h <sub>min</sub>	7.750	in in	<b>.</b>		
Edge Cx+ 55	in	c <sub>min</sub>	1.750	in			
Edge Cx+ 5.5	in	esc	8.772	in			
Edge Cy+ 3	in	s <sub>min</sub>	3.750	in			
Euge Cy+ 5	10						
summary Results							
ension Loading	Domar	d(lb)	Canacit	othy	Litilization	Status	Critical
teel Strength:	795.00	)	14551.0	9007 90	0.055	OK	Critical
oncrete Breakout Streng	th: 1590.0	00	3156.00	)	0.504	ок	Controls
Bond Strength	1590.0	00	3629.0	0	0.438	OK	
hear Loading							
esign Proof	Deman	d(lb)	Capacit	y(lb)	Utilization	Status	Critical
teel Strength	420.00	)	7566.00	)	0.056	OK	
oncrete Breakout Streng	th: 840.00	)	1723.00	0	0.488	OK	Controls
ryout Strength	840.00	)	6798.00	0	0.124	OK	



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Peterson Structural Engineers, Inc.	docignor	DIKC	choot	74	of	110
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Load	Conditi	ion								
Desig	n Loads	/ Action	<u>s</u>						Z	
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Muz	0	in-lb	Mux	0	in-lb	Muy	0	in-lb	the second	. V.,
Consid	der Load	Reversal	Х	Direction	100%	YD	irection	100%		K,
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DEWALT	
	2024 01 26 Knos Brace Anchorage 2202 0060
	1/26/2024
Project Information	
Company:	
Project Engineer:	
Address:	Oregon 97201
Phone:	M: - P: -
Email:	rachelle.child@psengineers.com
Project Name:	Untitled
Project Address:	Untitled
Notes:	
Selected Anchor Informatio	
Selected Anchor :	Purel10+
Brand:	DEWALT
Material:	3/4" Ø Threaded Rod ASTM F1554
	GR36/A36
Embedment:	h <sub>ef</sub> 6.00 in h <sub>nom</sub> 6 in
Linotunitini	
Approval:	ICC-ES ESR-3298
Approval: Issued/Revision:	ICC-ES ESR-3298 Jul,2023 -
Approval: Issued/Revision: Drill method:	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled
Approval: Issued/Revision: Drill method: Design Principles	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled
Approval: Issued/Revision: Drill method: Design Principles Design Method:	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19
Approval: Issued/Revision: Drill method: 5.Design Principles Design Method: Load Combinations:	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads
Approval: Issued/Revision: Drill method: 3.Design Principles Design Method: Load Combinations: 4.Base Material Information	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads
Approval: Issued/Revision: Drill method: Design Principles Design Method: Load Combinations: Base Material Information Concrete: Type:	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads
Approval: Issued/Revision: Drill method: Design Principles Design Method: Load Combinations: Base Material Information Concrete: Type: Strength	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi
Approval: Issued/Revision: Drill method: Design Principles Design Method: Load Combinations: Base Material Information Concrete: Type: Strength Reinforcement:	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi
Approval: Issued/Revision: Drill method: Design Principles Design Method: Load Combinations: Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar
Approval: Issued/Revision: Drill method: 5.Design Principles Design Method: Load Combinations: 1.Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Control Product	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition B) Tension False Shear Tentio
Approval: Issued/Revision: Drill method: Design Principles Design Method: Load Combinations: Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Blate:	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition B) Tension False Shear False
Approval: Issued/Revision: Drill method: 3.Design Principles Design Method: Load Combinations: 4.Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or < #4 Rebar Tension No (Condition B) Shear No (Condition B) Tension False Shear False Thickness 0.25 in Length 3.5 in Width 12 in
Approval: Issued/Revision: Drill method: Design Principles Design Method: Load Combinations: Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition B) Tension False Shear False Thickness 0.25 in Length 3.5 in Width 12 in None Height 0 in
Approval: Issued/Revision: Drill method: 5.Design Principles Design Method: Load Combinations: 6.Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition B) Tension False Shear False Thickness 0.25 in Length 3.5 in Width 12 in None Height 0 in 36000 psi
Approval: Issued/Revision: Drill method: 5.Design Principles Design Method: Load Combinations: 6.Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile:	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition B) Tension False Shear False Thickness 0.25 in Length 3.5 in Width 12 in None Height 0 in 36000 psi None
Approval: Issued/Revision: Drill method: 3.Design Principles Design Method: Load Combinations: 4.Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile: Hole Condition:	ICC-ES ESR-3298 Jul,2023 - Hammer Drilled ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition B) Tension False Shear False Thickness 0.25 in Length 3.5 in Width 12 in None Height 0 in 36000 psi None Dry Hole



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	1	A China	and the second s	C			
24	in		7.750				
24	in	<sup>10</sup> min	1.750	in			
ac	in	c <sub>min</sub>	1.750	in			
00	in	cac	8.772	in			
3	10	s <sub>min</sub>	3.750	m			
3	in						
ts							
	Deman	d(lb)	Capacit	y(lb)	Utilization	Status	Critical
Store ath .	1001.0	0	14551.0	00	0.069	OK	Controla
Suengin:	2002.0	0	4206.0	0	0.476	OK	Controls
	Deman	d(lb)	Capacit	v(lb)	Utilization	Status	Critical
	1001.0	0	7566.0	)	0.132	OK	ernien
Strength:	2002.0	10	6183.0	D	0.324	OK	Controls
	2002.0	0	6737.0	0	0.297	OK	
be checked for	agreement w	ith the existin	ig conditions	, the stand	ards and guidelines ar	id must be check	ed for plausibility
	24 24 ∞ 3 3 ts Strength: Strength:	Ititions         Ititions         24       in         ∞       in         ∞       in         3       in         3       in         Strength:       2002.0         Demand       1001.0         Strength:       2002.0         Demand       1001.0         Strength:       2002.0	DEWAL 2024_01 Ittions Ittions 24 in $h_{min}$ $\infty$ in $c_{min}$ $\infty$ in $c_{min}$ $\infty$ in $s_{min}$ 3 in $s_{min}$ 3 in $ts$ Demand(lb) Strength: 2002.00 2002.00 1001.00 Strength: 2002.00 2002.00	DEWALT DESIGN 2024_01_26 Kneel         Initions         Initions         Inition $m_{min}$ 24 in $h_{min}$ 24 in $c_{min}$ 202.00	DEWALT DESIGN ASSIS         2024_01_26 Knee Brace A         Itions         Itions         Itions         Itions         Quarter of the second of the s	DEWALT DESIGN ASSIST 1.7.0.0         2024_01_26 Knee Brace Anchorage 2302-0         Ititions         Image: Colspan="2">Image: Colspan="2">Colspan="2"Co	DEWALT DESIGN ASSIST 1.7.0.0         2024_01_26 Knee Brace Anchorage 2302-0069         Ititons         Ititons         24       in $h_{min}$ 7.750       in $\infty$ in $c_{min}$ 1.750       in $\infty$ in $c_{min}$ 1.750       in $\infty$ in $c_{min}$ 3.750       in $3$ in $c_{ac}$ 8.772       in         Strength:       2002.00       3128.00       0.640       0K         Strength:       2002.00       3128.00       0.640       0K $2002.00$ 3128.00       0.640       0K $2002.00$ 3128.00       0.324       0K $2002.00$ 6183.00       0.324       0K $2002.00$ 6737.00       0.297       0K



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Ľ	DEV	<b>VA</b>			2024 01	26 Knee Brace	Anchorase	2302-0069					
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War	ninge an	d Doma	eke										
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	2024 01 26 Post Apchorage 2302-0069
	1/26/202
Project Information	
Company:	
Project Engineer:	
Address:	Oregon 97201
Phone:	M: - P: -
Email:	rachelle.child@psengineers.com
Project Name:	Untitled
Project Address:	Untitled
Notes:	
Selected Anchor Informatio	
Selected Anchor :	HIT-RE 500 V3
branu: Materiali	2/4" (A Threaded Red ASTM E1554
viateriai:	GR36/A36
Embedment:	h <sub>ef</sub> 6.00 in h <sub>nom</sub> 6 in
Approval:	ICC-ES ESR-3814
Issued/Revision:	Jan.2023 Mar.2023
Drill method:	Hammer Drilled
Design Principles	
Design Method:	ACI 318-19
Load Combinations:	Section 5.3 User Defined Loads
<b>Base Material Information</b>	
Concrete:	Crucked Normal Weight Concrete
Type:	2500 pei
Strength	2500 psi
Reinforcement:	None or < #4 Rebar
Reinforcement: Edge Reinforcement	
Reinforcement: Edge Reinforcement Spacing	Tension No (Condition B) Shear No (Condition B)
Reinforcement: Edge Reinforcement Spacing Controls Breakout	Tension         No (Condition B)         Shear         No (Condition B)           Tension         False         Shear         False
Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate:	Tension     No (Condition B)     Shear     No (Condition B)       Tension     False     Shear     False       Thickness     0.25     in     Length 3.5     in
Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing	Tension     No (Condition B)     Shear     No (Condition B)       Tension     False     Shear     False       Thickness     0.25     in     Length     3.5     in       Water     Width     12     in
Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength	Tension     No (Condition B)     Shear     No (Condition B)       Tension     False     Shear     False       Thickness     0.25     in     Length     3.5     in       None     Height     0     in       36000     resi
Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile:	Tension     No (Condition B)     Shear     No (Condition B)       Tension     False     Shear     False       Thickness     0.25     in     Length     3.5     in       None     Height     0     in       36000     psi       None
Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile:	Tension     No (Condition B)     Shear     No (Condition B)       Tension     False     Shear     False       Thickness     0.25     in     Length     3.5     in       None     Height     0     in       36000     psi       None     Dri: Hele



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	2024 01 26 Knee Brace Anchorage 2302-0069
	1/26/2024
Project Information	
Company:	
Project Engineer:	
Address:	Oregon 97201
Phone:	M: - P: -
Email:	rachelle.child@psengineers.com
Project Name:	Untitled
Project Address: Notes:	Untitled
Selected Anchor Information	on
Selected Anchor :	HIT-RE 500 V3
Brand:	Hilow
Material:	3/4" Ø Threaded Rod ASTM F1554 GR36/A36
Embedment:	h <sub>ef</sub> 6.00 in h <sub>nom</sub> 6 in
Approval:	ICC-ES ESR-3814
Issued/Revision:	Jan 2023 Mar 2023
Drill method:	Hammer Drilled
Design Principles	
Design Method:	ACI 318-19
Load Combinations:	Section 5.3 User Defined Loads
<b>Base Material Information</b>	
Concrete:	Cracked Named Weight Conserve
Type:	Cracked Normal Weight Concrete
Reinforcement:	2500 psi
Edge Reinforcement	None or < #4 Rebar
C	Tension No (Condition B) Shear No (Condition B)
Spacing	Tension False Shear False
Spacing Controls Breakout	
Spacing Controls Breakout Base Plate:	Thickness 0.25 in Length 3.5 in Width 12 in
Spacing Controls Breakout Base Plate: Sizing	Thickness 0.25 in Length 3.5 in Width 12 in
Spacing Controls Breakout Base Plate: Sizing Standoff Stewarth	Thickness 0.25 in Length 3.5 in Width 12 in None Height 0 in
Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile:	Thickness 0.25 in Length 3.5 in Width 12 in None Height 0 in 36000 psi None
Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile:	Thickness 0.25 in Length 3.5 in Width 12 in None Height 0 in 36000 psi None



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	project	2302-0069	date	2/9/	2024	
www.psengineers.com	designer	RLKC	sheet	83	of	118

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	DEWALT DESIGN ASSIST 1.7.0.0	Page 1
DEWALI.	2024_01_26 Post Anchorage 2302-0069	1/26/2024
Project Information		
Company:		
Project Engineer:		
Address:	Oregon 97201	
Phone:	M: - P: -	
Email:	rachelle.child@psengineers.com	
Project Name:	Untitled	
Project Address: Notes:	Untitled	
Selected Anchor Informat	ion	
Selected Anchor :	KH-EZ	
Brand:	Hil68	Jaho Martin
Material:	3/4" Ø Medium Carbon Steel	
Embedment:	h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in	
Approval:	ICC-ES ESR-3027	
Issued/Revision:	Dec,2021 Apr,2022	
Drill method:	Hammer Drilled	
.Design Principles		
Design Method:	ACI 318-19	
Design Method: Load Combinations:	ACI 318-19 Section 5.3 User Defined Loads	
Design Method: Load Combinations: .Base Material Information	ACI 318-19 Section 5.3 User Defined Loads	
Design Method: Load Combinations: .Base Material Information Concrete:	ACI 318-19 Section 5.3 User Defined Loads n Cracked Normal Weight Concrete	
Design Method: Load Combinations: .Base Material Information Concrete: Type: Strength	ACI 318-19 Section 5.3 User Defined Loads n Cracked Normal Weight Concrete 2500 psi	
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Design Method: Load Combinations: .Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate:	ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or < #4 Rebar Tension No (Condition B) Shear No (Condition Tension False Shear False	B)
Design Method: Load Combinations: .Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing	ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or < #4 Rebar Tension No (Condition B) Shear No (Condition I Tension False Shear False Thickness 0.25 in Length 3.5 in Width 1	B) 2 in
Design Method: Load Combinations: .Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff	ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition I Tension False Shear False Thickness 0.25 in Length 3.5 in Width 1 None Height 0 in	B) 12 in
Design Method: Load Combinations: .Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength	ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition I Tension False Shear False Thickness 0.25 in Length 3.5 in Width I None Height 0 in 36000 psi	B) 12 in
Design Method: Load Combinations: Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile:	ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or < #4 Rebar Tension No (Condition B) Shear No (Condition B) Tension False Shear False Thickness 0.25 in Length 3.5 in Width 1 None Height 0 in 36000 psi None	B) 2 in
Design Method: Load Combinations: .Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile:	ACI 318-19 Section 5.3 User Defined Loads  Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition D) Tension False Shear False Thickness 0.25 in Length 3.5 in Width D None Height 0 in 36000 psi None	B) 12 in
Design Method: Load Combinations: .Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile:	ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition I) Tension False Shear False Thickness 0.25 in Length 3.5 in Width 1 None Height 0 in 36000 psi None	B) 12 in
Design Method: Load Combinations: .Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile:	ACI 318-19 Section 5.3 User Defined Loads Cracked Normal Weight Concrete 2500 psi None or < #4 Rebar Tension No (Condition B) Shear No (Condition E) Tension False Shear False Thickness 0.25 in Length 3.5 in Width E None Height 0 in 36000 psi None	B) 2 in
Design Method: Load Combinations: .Base Material Information Concrete: Type: Strength Reinforcement: Edge Reinforcement Spacing Controls Breakout Base Plate: Sizing Standoff Strength Profile:	ACI 318-19 Section 5.3 User Defined Loads  Cracked Normal Weight Concrete 2500 psi None or <#4 Rebar Tension No (Condition B) Shear No (Condition I) Tension False Shear False Thickness 0.25 in Length 3.5 in Width 1 None Height 0 in 36000 psi None	B) 12 in ed for plausibility



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loput dəta Hilti€ is i	a and results n a registered tr	aast be cha	ecked for	agreement wi	th the existi aft ("Hilti A	ng conditi G")	ocus, the stan	datels and gai	idelines and must be	checked for	plausibility		
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aput data	a and results n a registered tr Petersor	aast be chi ademark o	ecked for of Hillsi AM	ngineers,	th the existi aft ("Hilti A , Inc.	ng conditio G") Drojec design	oes, the stan	dards and gui	idelines and must be 2302-0069 RLKC	checked for	plausibility date sheet	2/9	9/2024

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Project Information		
Company:		
Project Engineer:		
Address:	Oregon 97201	
Phone:	M: - P: -	
Email:	rachelle.child@psengineers.com	
Project Name:	Untitled	
Project Address:	Untitled	
Notes:		
Selected Anchor Informati	on	_
Selected Anchor :	KH-EZ	
Brand:	Hilti®	
Material:	3/4" Ø Medium Carbon Steel	
Embedment:	h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in	
Approval:	ICC-ES ESR-3027	
Issued/Revision:	Dec 2021 Apr. 2022	
Drill method:	Hammer Drilled	
Design Principles		
Design Method:	ACI 318-19	
Load Combinations:	Section 5.3 User Defined Loads	
<b>Base Material Information</b>	I	
Concrete:		
Type:	Cracked Normal Weight Concrete	
Strength Reinforcement:	2500 psi	
Edge Reinforcement	None or < #4 Rebar	
Spacing	Tension No (Condition B) Shear No (Condition B)	
Controls Breakout	Tension False Shear False	
Base Plate:	This was and the found of the sector	
Sizing	mickness 0.25 in Length 3.5 in Width 12	in
Standoff	None Height 0 in	
C for the could	None	



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7.Warnings an	d Remar	rks							
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8.Load Condi	tion								
Design Load	s / Action	IS						z	
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Input data and result Hilbi& is a registeree	ts must be ch	ucked for a	upreement wi	th the existi	ing condit	icces, the stan	dards and gnidelines	and must be checked	for plausibility
Input data and result Hilti& is a registeree	ts næst be ch d trademark o	uecked for a	agreement wir	th the existi aft ("Hilti A	ing condit	ions, the stan	dards and guidelines	and must be checked	for plansibility
Input data and result Hilti& is a registere	ts natast be ch d trademark o	secked for a	agreement wi	th the existi aft ("Hilti /	ing condit	ions, the stan	dards and guidelines	and must be checked	for plausibility
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Input data and resul Hilti& is a registere	ts naust be ch d trademark o	ecked for a	ışreement wi	th the exist aft ("Hilhi )	ing condit (G")	icers, the stan	dards and guidelines	and must be checked	for plausibility
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input data and restah Hilti® is a registeree	ts must be ch d trademark o	tecked for a	igreement wi	th the existi aft ("Hilti J	ing condit	ions, the stan	dards and guidelines	and must be checked	for plausibility



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DEWALT	2024 01 26 Post Anchorage 2302-0069	
		1/26/2024
Project Information		
ompany:		
roject Engineer:		
ddress:	Oregon 97201	
hone:	M: - P: -	
mail:	rachelle.child@psengineers.com	
roject Name:	Untitled	
roject Address: lotes:	Untitled	
elected Anchor Information	on	
elected Anchor :	Screw-Bolt+	
rand:	DEWALT	ép.
laterial:	3/4" Ø	
mbedment:	h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in	
pproval:	ICC-ES ESR-3889	
ssued/Revision:	Nov,2023 -	
rill method:	Hammer Drilled	
Design Principles		
Design Method:	ACI 318-19	
oad Combinations:	Section 5.3 User Defined Loads	
<b>Base Material Information</b>		
Concrete:		
Type:	Cracked Normal Weight Concrete	
Strength Reinforcement:	2500 psi	
Edge Reinforcement	None or < #4 Rebar	
Spacing	Tension No (Condition B) Shear No (Condition B)	
Controls Breakout	Tension False Shear False	
Base Plate:		
Sizing	Thickness 0.25 in Length 3.5 in Width 12	m
Standoff	None Height 0 in	
Strength	36000 psi	
rome:	None	
ut data and results nuest be checked for	agreement with the existing conditions, the standards and guidelines and must be checked for pla	usibility



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"slab Edge Cx.	24	in	<sup>11</sup> min	1.750	in			
Edge Cx+		in	c <sub>min</sub>	1.750	in			
Edge Cx+	5.5	in	c sc	10.900	in			
Edge Cy-	3	in	s <sub>min</sub>	3.000	in			
Edge Cy+	3	in						
Summary Res	sults							
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Design Proof		Demand 705 00	(10)	Capacity	(10)	O 022	OK	Critical
Concrete Breako	wit Strength:	1590.00		3271.00	·	0.052	OK	
concrete break	an outengun.	1550.00		2271.00		0.100		
Shear Loading								
Design Proof		Demand	(lb)	Capacity	(lb)	Utilization	Status	Critical
Steel Strength	. 6	420.00		11556.0	0	0.036	OK	
Concrete Break	out Strength:	840.00		7046.00		0.546	OK	
		340.00		7040.00		0.119		
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rryout Strength								
rryout Strength								
rryout Strength								
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put data and results n	uust be checked fo	r agreement wit	h the existin	g conditions,	the stand	ards and guidelines an	d must be check	ed for plausibility



	project	2302-0069	date	2/9/	2024	
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pro for gua	fessional/ your spec rantee as t	engineer, p ific project to the abse	articularly t. The DD nee of em	with regard A Software ors, the con	rd to comp serves onl rectness ar	suits of the calcula liance with applicab y as an aid to interp d the relevance of t	tion checked ble standards pret standard he results of	and cleared by an design, norms and permits, priss, norms and permits wi suitability for a specific	n for to using them thout any application.		
Load	Condit	tion								÷.	
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Muz	0	in-lb	Mux	0	in-lb	Muy 0	in-lb				
Consid	ler Load	Reversal	х	Direction	100%	Y Direction	100%	1.6	S <sub>R2</sub>		
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input data	and results	s must be ch	recked for a	agreement wi	th the existi	ng conditions, the stan	dards and gmi	delines and must be checke	d for plausibility		
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nput data	and results	s mest be ch	ecked for a	igreement wi	th the existi	ng conditions, the stan	dards and gui	delines and must be checke	d for plausibility		
input data	and results	s ment be ch	ecked for a	ignocrateat wi	th the existi	ng conditions, the stan	dards and gmi	delines and must be checke	d for plausibility	2/9/	2024
nput data	and results	s meast be ch	tural Er	agreement wi	th the existi	ng conditions, the stan	dards and gmi	delines and must be checke 2302-0069 RLKC	d for plausibility date sheet	2/9/	2024 of

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Project Information         Company:         Project Engineer:         Mdress:         mail:         robelle child@psengineers.com         Project Name:         Untitled         Selected Anchor Information         Selected Selected Anchor Information         Selected Anchor Information         Now, 2023 -         Drill method:       Hammer Drilled         Design Method:       ACI 318-19         Load Combinations:       Section 5.3         Upper Cracked       Normal We	DEWALT	202	01.26	Knoo B	race Ar-	chorage ?	302-0060		
Project Information         Company:         Project Engineer:            Vidress:            Enail:         rachelle.child@psengineers.com         Project Ame:         Unitiled         Project Address:         Unitiled         Notes:         Selected Anchor Information         Selected Anchor :         Screw-Bolt+         Brand:         DEWALT         Material:         3/4" Ø         Embedment:         hef 2.92 in haem 4 in         Approval:         ICC-ES ESR-3889         Issued/Revision:         Nov.2023         Poill method:         Hammer Drilled         Design Principles         Design Method:       ACI 318-19         Load Combinations:       Section 5.3       User Defined Loads         Base Material Information       Conservet:       Type:       Cracked       Normal Weight Concrete         Strength       2500       psi       Reinforcement:       Edge Reinforcement       None or ≠#4 Rebar       Specing         Edge Reinforcement:       None       Height 0       in		202	_01_20	conce b	nave All	chorage 2			1/26/
Company: Project Engineer: Address: Oregon 97201 Phone: M: - P: - Email: rachelle.child@psengineers.com Project Address: Unitiled Project Address: Unitiled Project Address: Unitiled Notes: Selected Anchor Information Selected Anchor : Screw-Bolt+ Brand: DEWALT Vaterial: 3/4" Ø Embedment: h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in Approval: ICC-ES ESR-3889 Sued/Revision: Nov.2023 - Drill method: Hammer Drilled Design Principles Design Method: ACI 318-19 Load Combinations: Section 5.3 User Defined Loads Base Material Information Concrete: Type: Cracked Normal Weight Concrete Strength 2500 psi Reinforcement: None or ≤#4 Rebar Spacing Tension No (Condition B) Shear No (Condition B) Controls Breakout Tension False Shear False Base Plate: Sizing Thickness 0.25 in Length 3.5 in Width 12 in Strength 30000 psi Profile: None Height 0 in Strength 30000 psi Profile: None	Project Information								
Project Engineer: Address: Oregon 97201 Phone: M: - P: - Email: nachelle-child@psengineers.com Project Address: Unitled Project Address: Unitled Project Address: Unitled Notes: Selected Anchor Information Selected Anchor : Screw-Bolt+ Brand: DEWALT Vaterial: 3/4* Ø Embedment: h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in Approval: ICC-ES ESR-3889 Sucud/Revision: Nov.2023 - Drill method: Hammer Drilled Design Principles Design Method: ACI 318-19 Load Combinations: Section 5.3 User Defined Loads Base Material Information Concrete: Type: Cracked Normal Weight Concrete Strength 2500 psi Reinforcement None or ≤#4 Rebar Spacing Tension No (Condition B) Shear No (Condition B) Controls Breakout Tension False Shear False Base Plate: String Thickness 0.25 in Length 3.5 in Width 12 in Strength 36000 psi Profile: None	Company:								
Address: Oregon 97201   Phone: M: - P: -   Email: rachelle.child@psengineers.com   Project Address: Unitled   Project Address: Unitled   Selected Anchor Information   Selected Anchor : Screw-Bolt*   Brand: DEWALT   Vaterial: 34* 0   Embedment: h of 2.92 in hnom 4 in   Approval: ICC-ES ESR-3889   Issued/Revision: Nov.2023 -   Drill method: Hammer Drilled   Design Principles   Dosign Method: ACI 318-19   Load Combinations: Section 5.3   Base Material Information   Concrete:   Type: Cracked   Strength 2500   psi<	Project Engineer:								
Prone: M: - P: - Email: rachelle.child@psengineers.com Project Name: Unitled Project Address: Unitled Notes: Selected Anchor Information Selected Anchor : Screw-Bolt* Brand: DEWALT Material: 3/4* Ø Embedment: h_ef 2.92 in h_nom 4 in Approval: ICC-ES ESR-3889 Issued/Revision: Nov.2023 - Drill method: Hammer Drilled Design Principles Design Method: ACI 318-19 Load Combinations: Section 5.3 User Defined Loads Base Material Information Concrete: Type: Cracked Normal Weight Concrete Strength 2500 psi Reinforcement Edge Reinforcement None or ≤ #4 Rebar Spacing Tension No (Condition B) Shear No (Condition B) Controls Breakout Tension False Shear False Base Plate: Sizing Thickness 0.25 in Length 3.5 in Width 12 in Strength 36000 psi Profile: None	Address:	Oregon	97201						
Email: rachelle.child@psengineers.com Project Name: Unitiled Project Address: Unitiled Notes:  Selected Anchor Information Selected Anchor : Screw-Bolt* Brand: DEWALT Waterial: 3/4" Ø Embedment: h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in Approval: ICC-ES ESR-3889 Issued/Revision: Nov.2023 - Drill method: Hammer Drilled Design Principles Design Method: ACI 318-19 Load Combinations: Section 5.3 User Defined Loads Base Material Information Concret: Type: Cracked Normal Weight Concrete Strength 2500 psi Reinforcement: Edge Reinforcement None or <#4 Rebar Spacing Cancer <= Shear False Base Plate: String Cancer Succer S	Phone:	M: - P: -							
Project Name:       Untilled         Project Address:       Untilled         Notes:       Selected Anchor Information         Selected Anchor :       Screw-Bolt+         Brand:       DEWALT         Waterial:       3/4" Ø         Embedment:       h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in         Approval:       ICC-ES ESR-3889         Issued/Revision:       Nov,2023 -         Drill method:       Hammer Drilled         Design Principles       Design Method:         Concrete:       Type:         Type:       Cracked         Strength       2500 psi         Reinforcement:       None or <#4 Rebar	Email:	rachelle.chi	ld@psen	gineers	.com				
Project Address:       Untilled         Notes:       Selected Anchor Information         Selected Anchor :       Screw-Bolt+         Brand:       DEWALT         Waterial:       34" Ø         Embedment:       h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in         Approval:       ICC-ES ESR-3889         Issued/Revision:       Nov,2023 -         Drill method:       Hammer Drilled         Design Principles	Project Name:	Untitled	01						
Notes:          Selected Anchor Information         Selected Anchor :       Screw-Bolt+         Brand:       DEWALT         Material:       3/4" Ø         Embedment:       h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in         Approval:       ICC-ES ESR-3889         Issued/Revision:       Nov.2023 -         Drill method:       Hammer Drilled         Design Principles       Design Method:         Design Method:       ACI 318-19         Load Combinations:       Section 5.3         User Defined Loads         Base Material Information         Reinforcement:         Edge Reinforcement         None or <#4 Rebar	Project Address:	Untitled							
Selected Anchor Information         Selected Anchor :       Screw-Bolt+         Brand:       DEWALT         Material:       3/4" Ø         Embedment:       h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in         Approval:       ICC-ES ESR-3889         Issued/Revision:       Nov.2023 -         Drill method:       Hammer Drilled         Design Principles       Design Method:         Load Combinations:       Section 5.3         User Defined Loads       Base Material Information         Concrete:       Type:         Type:       Cracked       Normal Weight Concrete         Strength       2500 psi         Reinforcement:       Edge Reinforcement       None or <#4 Rebar	Notes:								
Selected Anchor Information         Selected Anchor :       Screw-Bolt+         Brand:       DEWALT         Material:       3/4" O         Embedment: $h_{ef}$ 2.92 in $h_{nom}$ 4 in         Approval:       ICC-ES ESR-3889         Issued/Revision:       Nov.2023 -         Drill method:       Hammer Drilled         Design Principles       Design Method:         Base Material Information       Section 5.3         Concrete:       Type:         Type:       Cracked         Strength       2500 psi         Reinforcement:       Edge Reinforcement         Edge Reinforcement       None or <#4 Rebar									
Selected Anchor :       Screw-Bolt+         Brand:       DEWALT         Material: $34^{a}$ Ø         Embedment: $h_{ef}$ 2.92 in $h_{nom}$ 4 in         Approval:       ICC-ES ESR-3889         Issued/Revision:       Nov,2023 -         Drill method:       Hammer Drilled         Design Principles       User Defined Loads         Base Material Information:       Section 5.3       User Defined Loads         Base Material Information:       Cracked       Normal Weight Concrete         Strength       2500       psi         Reinforcement:       Cracked       Normal Weight Concrete         Spacing       Tension       No (Condition B)       Shear         Controls Breakout       Tension       False       Shear       No (Condition B)         Controls Breakout       Tension       False       Shear       False         Base Plate:       Sizing       Thickness       0.25       In Length       3.5       in Width       12       in Strength       36000       psi         Profile:       None       Height       in       Strength       36000       psi	Selected Anchor Informatio	n							
Brand:       DEWALT         Material:       3/4" Ø         Embedment:       h <sub>ef</sub> 2.92 in h <sub>nom</sub> 4 in         Approval:       ICC-ES ESR-3889         Issued/Revision:       Nov.2023 -         Drill method:       Hammer Drilled         Design Principles	Selected Anchor :	Screw-Bolt	-						
Material: $3/4" 0$ Embedment: $h_{ef}$ 2.92 in $h_{nom}$ 4 in         Approval:       ICC-ES ESR-3889         Issued/Revision:       Nov,2023 -         Drill method:       Hammer Drilled         Design Principles       Design Method:         Load Combinations:       Section 5.3         User Defined Loads       Base Material Information         Concrete:       Type:         Type:       Cracked       Normal Weight Concrete         Strength       2500       psi         Reinforcement:       Edge Reinforcement       None or <#4 Rebar	Brand:	DEWALT					at-		
Embedment: $h_{ef}$ 2.92       in $h_{nom}$ 4       in         Approval:       ICC-ES ESR-3889       ICC-ES ESR-3889       ICC-ES ESR-3889       Icc-ES ESR-3889         Issued/Revision:       Nov,2023       -       Icc-ES ESR-3889       Icc-ES ESR-3889         Dorill method:       Hammer Drilled       Hammer Drilled       Icc-ES ESR-3889       Icc-ES ESR-3889         Design Principles       Icc-ES ESR-3889       User Defined Loads       Icc-ES ESR-3889       Icc-ES ESR-3889         Doad Combinations:       Section 5.3       User Defined Loads       Icc-ES ESR-3889       Icc-ES ESR-3889         Base Material Information       Section 5.3       User Defined Loads       Icc-ES ESR-3889       Icc-ES ESR-3889         Base Material Information       Section 5.3       User Defined Loads       Icc-ES ESR-3889       Icc-ES ESR-3889         Base Material Information       Stong for Ession No (Condition B)       Norreal Weight Concrete       Stora False         Storage       Tension False       Shear       No (Condition B)       Shear       No (Condition B)         Controls Breakout       Tension False       Shear       False       Icc-Ession       Icc-Ession       Icc-Ession       Icc-Ession       Icc-Ession       Icc-Ession       Icc-Ession	Material:	3/4" Ø					·		
Approval:       ICC-ES ESR-3889         Issued/Revision:       Nov,2023         Drill method:       Hammer Drilled         Design Principles	Embedment:	h <sub>ef</sub> 2.92	in	hnom	4	in			
Issued/Revision: Nov,2023 - Drill method: Hammer Drilled Design Principles Design Method: ACI 318-19 Load Combinations: Section 5.3 User Defined Loads Base Material Information Concrete: Type: Cracked Normal Weight Concrete Strength 2500 psi Reinforcement: Edge Reinforcement None or #4 Rebar Spacing Tension No (Condition B) Shear No (Condition B) Controls Breakout Tension False Shear False Base Plate: Sizing Thickness 0.25 in Length 3.5 in Width 12 in Strength 36000 psi Profile: None	Approval:	ICC-ES ESI	R-3889						
Drill method:       Hammer Drilled         Design Principles         Design Method:       ACI 318-19 Section 5.3         Load Combinations:       Section 5.3       User Defined Loads         Base Material Information       Concrete:       View Principles         Concrete:       Cracked       Normal Weight Concrete         Strength       2500       psi         Reinforcement:       Edge Reinforcement       None or <#4 Rebar         Spacing       Tension       No (Condition B)       Shear       No (Condition B)         Controls Breakout       Tension       False       Shear       False         Base Plate:       Sizing       Thickness       0.25       in       Length       3.5       in       Width       12       in         Standoff       None       Height       0       in       Strength       36000       psi         Profile:       None       Height       0       in       Strength       Stone	Issued/Revision:	Nov 2023							
Design Principles         Design Method:       ACI 318-19         Load Combinations:       Section 5.3       User Defined Loads         Base Material Information       Base Material Information         Concrete:       Type:       Cracked       Normal Weight Concrete         Strength       2500       psi         Reinforcement:       Edge Reinforcement       None or <#4 Rebar	Drill method:	Hammer Dr	illed						
Design Method:       ACI 318-19         Load Combinations:       Section 5.3       User Defined Loads         Base Material Information       Concrete:       View Defined Loads         Concrete:       Type:       Cracked       Normal Weight Concrete         Strength       2500       psi         Reinforcement:       Edge Reinforcement       None or <#4 Rebar	Design Principles								
Load Combinations:       Section 5.3       User Defined Loads         Base Material Information       Base Material Information         Concrete:       Type:       Cracked       Normal Weight Concrete         Strength       2500       psi         Reinforcement:       Edge Reinforcement       None or <#4 Rebar         Spacing       Tension       No (Condition B)       Shear       No (Condition B)         Controls Breakout       Tension       False       Shear       False         Base Plate:       Thickness       0.25       in       Length       3.5       in       Width       12       in         Standoff       None       Height       0       in       Strength       36000       psi         Profile:       None       Height       0       in       Strength       None	Design Method:	ACI 318-19	)						
Base Material Information         Concrete: Type: Cracked Normal Weight Concrete Strength 2500 psi         Reinforcement: Edge Reinforcement: None or <#4 Rebar Spacing Tension No (Condition B) Shear No (Condition B) Controls Breakout Tension False Shear False         Base Plate: Sizing Thickness 0.25 in Length 3.5 in Width 12 in Standoff None Height 0 in Strength 36000 psi         Profile: None	Load Combinations:	Section 5.3			User D	efined L	oads		
Concrete:       Type:       Cracked       Normal Weight Concrete         Strength       2500       psi         Reinforcement:       Edge Reinforcement       None or < #4 Rebar         Spacing       Tension       No (Condition B)         Controls Breakout       Tension       False         Base Plate:       Sizing       Thickness       0.25       in       Length       3.5       in       Width       12       in         Standoff       None       Height       0       in         Strength       36000       psi         Profile:       None       None	Base Material Information								
Type:     Cracked     Normal Weight Concrete       Strength     2500 psi       Reinforcement:     Edge Reinforcement     None or <#4 Rebar       Spacing     Tension     No (Condition B)       Controls Breakout     Tension     False       Base Plate:     Sizing     Thickness     0.25     in       Standoff     None     Height     0     in       Strength     36000     psi       Profile:     None	Concrete:	<u> </u>					511 <b>4</b> 15		
Strength     2500     psi       Reinforcement:     Edge Reinforcement     None or < #4 Rebar	Type:	Cracked		Non	mal Weig	ght Conci	rete		
Edge Reinforcement       None or < #4 Rebar	Strength Reinforcement:	2500 p	51						
Spacing     Tension     No (Condition B)     Shear     No (Condition B)       Controls Breakout     Tension     False     Shear     False       Base Plate:     Sizing     Thickness     0.25     in     Length     3.5     in       Standoff     None     Height     0     in       Strength     36000     psi       Profile:     None	Edge Reinforcement	None or < #	4 Rebar						
Controls BreakoutTensionFalseShearFalseBase Plate:Thickness0.25inLength3.5inWidth12inSizingNoneHeight0inStandoffStrength36000psiProfile:NoneNoneNoneStandoffStandoffStandoff	Spacing	Tension	No (Co	ndition	B)	Shear	No (Co	ndition B	)
Base Plate:     Sizing     Thickness     0.25     in     Length     3.5     in     Width     12     in       Standoff     None     Height     0     in       Strength     36000     psi       Profile:     None	Controls Breakout	Tension	False			Shear	False		
Sizing     Thickness     0.25     in     Length     3.5     in     Width     12     in       Standoff     None     Height     0     in     Strength     36000     psi       Profile:     None     None     None     None     None     None	Pass Blatar								
Standoff     None     Height 0     in       Strength     36000     psi       Profile:     None	base riate:	Thickness	0.25	in	Length	3.5	in W	idth 12	in
Strength 36000 psi Profile: None	Sizing				Height	0	in		
Frome: None	Sizing Standoff	None	2						
	Sizing Standoff Strength	None 36000 p	osi						
	Sizing Standoff Strength Profile:	None 36000 p None	si						
put data and results numt be checked for agreement with the existing conditions, the standards and guidelines and must be checked for plausibility	Base Frate: Sizing Standoff Strength Profile:	None 36000 p None greement with the	existing co	nditions,	the standar	ds and gmide	clines and mus	t be checked	for plausibility



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		No.	C	<b>.</b>		
in	b	6.000	in			
in	¢in	1.750	in			
in	C	10.900	in			
in	- 3C S	3.000	in			
in	min					
Dem	and(lb)	Canacity	(db)	Utilization	Status	Critical
100	1.00	24807.0	0	0.040	OK	stated
ength: 2002	2.00	3271.00		0.612	OK	
Dem	and(lb)	Capacity	(lb)	Utilization	Status	Critical
1001	.00	11556.0	0	0.087	ОК	
ength: 2002	2.00	5525.00	1	0.362	OK	
		101010		01807		
	in in in in in in in in in in in in in i	in h <sub>min</sub> in c <sub>min</sub> in c <sub>ac</sub> in s <sub>min</sub> in Demand(lb) 1001.00 mgth: 2002.00 Demand(lb) 1001.00 mgth: 2002.00 2002.00	in h <sub>min</sub> 6.000 in c <sub>min</sub> 1.750 in c <sub>ac</sub> 10.900 in s <sub>min</sub> 3.000 in <u>Demand(lb)</u> Capacity 1001.00 24807.0 mgth: 2002.00 3271.00 <u>Demand(lb)</u> Capacity 1001.00 11556.0 mgth: 2002.00 5525.00 2002.00 7046.00	in         hmin         6.000         in           in         cmin         1.750         in           in         cmin         1.750         in           in         cac         10.900         in           in         cac         10.900         in           in         smin         3.000         in           in         smin         smin         smin           in         smin         smin         smin           in         smin         smin         smin           in         smin         smin         smin           in         smin         s	in         hmin         6.000         in           in         cmin         1.750         in           in         cmin         1.750         in           in         cmin         1.750         in           in         cac         10.900         in           in         smin         3.000         0.040           agth:         2002.00         3271.00         0.612           ingth:         2002.00         5525.00         0.362           agth:         2002.00         5525.00         0.362           2002.00         7046.00         0.284	in         hmin         6.000         in           in         cmin         1.750         in           in         cmin         1.750         in           in         cmin         1.750         in           in         cmin         1.750         in           in         cmin         3.000         in           in         smin         smin         Status           in         smin         smin         smin           in         smin         smin         smin           in         smin         smin         smin           in         smin         smin         smin           in         smin <t< td=""></t<>



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www.psengineers.com	designer	RLKC	sneet	95	OT	118

DEWALE.       2024_01_26 Knee Brace Anchorage 2302-0069         Warnings and Remarks       ANCHOR DESIGN CRITERIA IS SATISFIED         • The results of the calculations carried out by means of the DDA Software are based essentially on the data you put in	1/26/2024
• The results of the calculations carried out by means of the DDA Software are based essentially on the data you put in	1/26/2024
Warnings and Remarks ANCHOR DESIGN CRITERIA IS SATISFIED  The results of the calculations carried out by means of the DDA Software are based essentially on the data you put in	
ANCHOR DESIGN CRITERIA IS SATISFIED     O     The results of the calculations carried out by means of the DDA Software are based essentially on the data you put in	
ANCHOR DESIGN CRITERIA IS SATISFIED	
you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in b Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an design professional/engineer, particularly with regard to compliance with applicable standards, norms and permits, prior to u for your specific project. The DDA Software serves only as an aid to interpret standards, norms and permits without a guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific applie	a. Therefore, by you. using them any cation.
Load Condition	
Design Loads / Actions Z	
Nu 2002 lb Vux 2002 lb Vuy 0 lb	,
Muz 0 in-lb Mux 0 in-lb Muy 0 in-lb	
Consider Load Reversal X Direction 100% Y Direction 100%	-x
sput data and results must be checked for agreement with the existing conditions, the standards and guidelines and must be checked for pl	ausibility
nput data and results must be checked for agreement with the existing conditions, the standards and guidelines and must be checked for pl	ausibility

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# Simpson Strong Tie Anchorage Design Software

# SIMPSON Strong Tie

Anchor Designer™ Software Version 3.1.2209.3

Company:	Date: 9/8/2022
Engineer:	Page: 1/6
Project:	
Address:	
Phone:	
E-mail:	

# 1.Project information

Customer company: Customer contact name: Customer e-mail: Comment

# 2. Input Data & Anchor Parameters

General Design method:ACI 318-19 Units: Imperial units

# Anchor Information:

Anchor type: Bonded anchor Material: F1554 Grade 36 Diameter (inch): 0.750 Effective Embedment depth, her (inch): 6.000 Code report: ICC-ES ESR-4057 Anchor category: -Anchor ductility: Yes hris (inch): 7.75 Cac (inch): 8.77 Cmm (inch): 1.75 Sree (inch): 3.00

Recommended Anchor Anchor Name: SET-3G • SET-3G w/ 3/4\*Ø F1554 Gr. 36 Code Report: ICC-ES ESR-4057



Project description: Location: Fastening description:

### **Base Material**

Concrete: Normal-weight Concrete thickness, h (inch): 48.00 State: Uncracked Compressive strength, f < (psi): 2500 Ψev: 1.4 Reinforcement condition: Supplementary reinforcement not present Supplemental edge reinforcement: No Reinforcement provided at corners: No Ignore concrete breakout in tension: No Ignore concrete breakout in shear: No Hole condition: Dry concrete Inspection: Continuous Temperature range, Short/Long: 150/110°F Ignore 6do requirement: Not applicable Build-up grout pad: No

**Base Plate** 

Length x Width x Thickness (inch): 3.50 x 12.00 x 0.25

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard. Pleasanton, CA 94588. Phone: 925.560.9000. Fax: 925.847.3871. www.strongtie.com



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2	795.0	0.0	420.0	420.0	
1	190.0				
	705.0	0.0	420.0	420.0	
Anchor	Tension load, Nue (Ib)	Shear load x, Vux (lb)	Shear load y, V <sub>sity</sub> (lb)	Shear load cor v(Vsas)2+(Vsay)2	mbined, (lb)
3. Resulting A	Version 3.1.2209.3	Address: Phone: E-mail:			
Stremontal Software		Engineer	;	Page:	4/6
SIMPSON Anchor Designer™		Company	f:	Date:	9/8/2022

<Figure 3>

Maximum concrete compression strain (%): 0.00 Maximum concrete compression stress (psi): 0 Resultant tension force (lb): 1590

Resultant compression force (lb): 0

Eccentricity of resultant tension forces in x-axis, e^vers (inch): 0.00 Eccentricity of resultant tension forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in x-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e^vers (inch): 0.00 Eccentricit



# 4. Steel Strength of Anchor in Tension (Sec. 17.6.1)

Nas (Ib)	\$	(NVse (lb)	
19370	0.75	14528	

# 5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.6.2)

No = k 2017 cha15 (Eq. 17.6.2.2.1)

kε	20	f's (psi)	h <sub>*</sub> r (in	) N <sub>b</sub>	(lb)			
24.0	1.00	2500	3.667	84	25			
AL ALA	1 A		/Sec 17.5.1	28 En 176	24-1			
1 4000 -0. (va	NOT MNOOT WORK	OF N & CAR & CEVER	10001 11:01	2 0 E4. 11.0	.∠.1a)			
Ano (in <sup>2</sup> )	Anco (in <sup>2</sup> )	Care (in)	Y'een	Your Your	.2.10) <i>V</i> e.N	$\Psi_{q_k,N}$	N <sub>b</sub> (lb)	\$ ØNoty (lb)

# 6. Adhesive Strength of Anchor in Tension (Sec. 17.6.5)

Truce = Trunel	stor and Karffel	2,500)*							
Dunor (psi)	Labort lares	Kxat	f'c (psi)	n		Tearer (psi)			
2064	1.00	1.00	2500	0.35		2064			
$N_{\rm bu} = \lambda_{\rm A} \tau_{\rm ancr} \lambda$	d.h.r (Eq. 17.6	.5.2.1)							
2.0	Tana (psi)	d., (in)	her (in)	Nov (	b)				
1.00	2064	0.75	6.000	2917	9	-			
$\phi N_{sg} = \phi (A_{Ns})$	/ AND Yec. No Ve	the Pop Na Nas (	Sec. 17.5.1.2	& Eq. 17.6.5	1b)				
Any (in <sup>2</sup> )	Asso (in <sup>2</sup> )	crie (in)	Camin (in)	Y'es the	Pred.No	$\Psi_{cp,Na}$	N <sub>As</sub> (lb)	ø	¢N₀₀ (lb)
142.64	422.18	10.27	3.00	1.000	0.788	1.000	29179	0.65	5047

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925:560.9000 Fax: 925:847.3871 www.strongtie.com



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	Tie Sol	ion 3.1.2209.3		Proje	ct:				
	d	0.10118800.0		Addre	055:				
				E-ma	e. it				
-									
8 Steel Str	enoth of And	hor in Shear (	Sec 1771)						
Vm (lb)	Anut	ø	dynedV.	, (lb)					
11625	1.0	0.65	7556						
9. Concrete	Breakout S	trength of And	tion in Shear	(Sec. 17.7.2)					
Viv = mini7(	la/datalada	trants girls	cuon: cu <sup>15</sup> I (Eq. 17.)	7 2 2 1a & Eo	177221b)				
4 (in)	da (in)	i.	fc (psi)	Cut (in)	Vty	(lb)			
6.00	0.750	1.00	2500	13.50	223	21	-		
$\partial V_{cty} = \phi \langle A \rangle$	ro / Aveo) Yozy 4	e.v. Wher Voy (Sec.	17.5.1.2 & Eq	17.7.2.1a)					
Ave (in <sup>2</sup> )	Avco (in2)	$\Psi_{\mathrm{ed},V}$	Y'ev	$\Psi_{AV}$	Voy	(lb)	ø	¢V <sub>cty</sub> (lb)	
121.50	820.13	0.744	1.400	1.000	223	21	0.70	2413	
Viv = mini7/	la / d. 12-1d. 2	fronts of de	Gu <sup>10</sup> (Eq. 17)	7221a.8 Fo	1772216				
1. (in)	d. (in)	ha ha	f'c (psi)	Cut (in)	Vty	(lb)			
6.00	0.750	1.00	2500	3.00	233	8	-		
$\partial V_{copy} = \phi(2$	(Ave / Aveo) P	er Petr Var VAV	Vay (Sec. 17.5.	1.2, 17.7.2.1(	) & Eq. 17.7.	2.1b)			
$A_{Vc}$ (in <sup>2</sup> )	Auco (in <sup>2</sup> )	$\Psi_{e\in\mathcal{X}}$	$\Psi_{min}$	$\Psi_{a,V}$	$\Psi_{n,v}$		V <sub>ky</sub> (lb)	ø	∳V <sub>shgs</sub> (lb)
	40.50	1.000	1,000	4 400	* 0/	10	0000	0.70	9657
76.50	te Pryout Str	ength of Anch	or in Shear (	Sec. 17.7.3)	1.00	0	2336	0.70	6657
76.50 <u>10. Concre</u> ∂V <sub>ag</sub> = φ mi	te Pryout Str	ength of Anch	nor in Shear ()	1.400 Sec. 17.7.3) а Ужела Удола Ма	1.00	10 11co)Уес.ПУ.	2338 han 4an 4an 1001	(Sec. 17.5.1.2	2 & Eq. 17.7.3.1b)
76.50 <b>10. Concre</b> ØV <sub>qq0</sub> = Ø mi k <sub>φ</sub> 2.0	te Pryout Str n kq:Nig: kq:N Asa (in <sup>2</sup> ) 142.64	ength of Anch $a_{ij} = \phi min k_{ej}($ $A_{Auo} (in^2)$ 422.18	nor in Shear () Ana / Anao) V <sub>ist</sub> n VetNa 0.788	1.400 Sec. 17.7.3) α Ψιετλα ΨοριλαΝα Ψιετλα 1.000	1.04 ha; kq(Anc/A , 97	№ мсо)¥есл¥ 2000	2338 <sup>(ad,N</sup> Ψ <sub>4,N</sub> Ψ <sub>40,N</sub> N <sub>0</sub>   <u>N<sub>hs</sub> (lb)</u> 29179	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765	2 & Eq. 17.7.3.1b)
76.50 <b>10. Concre</b> $\phi V_{qq0} = \phi \min \frac{k_{qq}}{2.0}$	te Pryout Str n k <sub>cp</sub> N <sub>np</sub> ; k <sub>cp</sub> N A <sub>Na</sub> (in <sup>2</sup> ) 142.64	ength of Anch mg] = \$min]kq( Anw (in <sup>2</sup> ) 422.18	ног in Shear (: Алы / Алыс) Уюсл Уедла 0.788	1.400 Sec. 17.7.3) α Ψ <sub>κε.Να</sub> Ψ <sub>φ.Να</sub> Νι Ψ <sub>κε.Να</sub> 1.000	1.04 ha ; kop(Anc/A y y ; ) 1.0	ло №с)¥есл¥ 25.№ 2000	2338 <sup>(nd, W</sup> 4, N <sup>W</sup> 4, NNe  Nos (lb) 29179	(Sec. 17.5.1.2 N <sub>a</sub> (Ib) 7765	2 & Eq. 17.7.3.1b)
76.50 10. Concre $\partial V_{cyc} = \phi \min \frac{k_{cp}}{2.0}$ $A_{Ne} (in^2)$	te Pryout Str n k <sub>cr</sub> N <sub>ng</sub> ; k <sub>cr</sub> N A <sub>Na</sub> (in <sup>2</sup> ) 142.64 A <sub>Nco</sub> (in <sup>2</sup> )	ength of Anch $a_{0} = \phi \min[k_{\phi}(A_{Auo} (in^{2}))]$ 422.18 $Y_{ecN}$	nor in Shear ( Ana / Anac) Ψ <sub>et.N</sub> Ψ <sub>et.Na</sub> Ψ <sub>et.N</sub>	1.400 Sec. 17.7.3) »Ψ <sub>w270</sub> Ψ <sub>qc200</sub> Ψ <sub>w270</sub> 1.000 Ψ <sub>c.10</sub>	1.00 ha; kap(Anc/A , <u>Y</u> ) 1.0 Y <sub>00,N</sub>	ло <sub>Neo</sub> )У <sub>чел</sub> уУ, <sub>20.Na</sub> 000 Na (lb)	2338 <sup>(d,N</sup> Y <sup>c,N</sup> Y <sup>c</sup> q,NN0  <u>Nas (lb)</u> 29179 Nct (lb)	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765	2 & Eq. 17.7.3.1b)
76.50 <b>10. Concre</b> $\phi V_{eq0} = \phi \min \frac{k_{e0}}{k_{e0}}$ 2.0 $A_{Nc} (in^2)$ 114.00	<u>te Pryout Str</u> n kφNng ; kφN Ana (in <sup>2</sup> ) 142.64 Anco (in <sup>2</sup> ) 121.00	ength of Anch $a_{0} = \phi \min[k_{ep}($ $A_{Auo} (in^{2})$ 422.18 $Y_{ec,N}$ 1.000	1000 nor in Shear ( Ava/ Avad) VestNe 0.788 VestNe 0.864	1.400 Sec. 17.7.3) <sup>10</sup> Ψ <sub>sc/Ns</sub> Ψ <sub>qpNo</sub> Ni Ψ <sub>sc/Ns</sub> 1.000	$k_{sp}(A_{Nc}/A) = \frac{V_{sp}(A_{Nc}/A)}{V_{sp,N}}$	Noo) Yee, 19 Ye 30.568 2000 No (1b) 8425	2338 <sup>(ad,N</sup> <sup>(V</sup> <sub>4</sub> ,N <sup>(V</sup> <sub>40,N</sub> Na) <u>Nas</u> (Ib) <u>29179</u> <u>Nas</u> (Ib) 6855	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765	2 & Eq. 17.7.3.1b)
76.50 <b>10. Concre</b> $\phi V_{eq0} = \phi \min \frac{k_{e0}}{2.0}$ <u>A<sub>NC</sub> (in<sup>2</sup>)</u> <b>114.00</b>	<u>te Pryout Str</u> n kφN <sub>1</sub> φ ; kφN A <sub>N0</sub> (in <sup>2</sup> ) 142.64 A <sub>N00</sub> (in <sup>2</sup> ) 121.00	ength of Anch $m_{elg} = \phi min k_{ep}($ $A_{Nu0} (in^2)$ 422.18 $\Psi_{ec,N}$ 1.000	1000 nor in Shear ( Ava/ Avae) Vech Vech 0.788 Vech 0.864	Sec. 17.7.3)           N Ψ <sub>iechi</sub> Ψ <sub>quba</sub> Ni           Ψ <sub>iechi</sub> 1.000           Ψ <sub>ieni</sub> 1.000	$K_{\rm sp}(A_{\rm Nc}/A_{\rm Nc})$ $\frac{V_{\rm sp}(A_{\rm Nc}/A_{\rm Nc})}{1.0}$	No Nec)Ψec.NΨ 30Na 000 No (lb) 8425	2338 <sup>(ad,N</sup> $\Psi_{4,N} \Psi_{40,N} N_0$   <u>Nas (lb)</u> 29179 <u>Nas (lb)</u> 6855	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765 Ø 0.70	8 Eq. 17.7.3.1b)
76.50 10. Concre $\phi V_{equ} = \phi \min \frac{k_{eq}}{2.0}$ $A_{her} (in^2)$ 114.00 $\phi V_{eqg} (ib)$	40.00 te Pryout Str η k <sub>0</sub> N <sub>10</sub> ; k <sub>10</sub> N A <sub>300</sub> (in <sup>2</sup> ) 142.64 A <sub>N00</sub> (in <sup>2</sup> ) 121.00	ength of Anch $m_{0} = \phi \min[k_{ep}($ $A_{Ne0} (in^{2})$ 422.18 $\Psi_{ec,N}$ 1.000	1.000 <u>mor in Shear (</u> Δ <sub>ha</sub> / Ana) Ψ <sub>eth</sub> <u>Ψ<sub>eth</sub></u> 0.788 <u>Ψ<sub>eth</sub></u> 0.864	Sec. 17.7.3)           α Ψ <sub>ieths</sub> Ψ <sub>goba</sub> N           Ψ <sub>ieths</sub> Ψ <sub>ieths</sub> 1.000	$k_{\rm sp}(A_{\rm Ne}/A_{\rm NE}/A$	No No No (lb) 8425	2338 <sup>(nd,N'</sup> $\Psi_{4,N'} \Psi_{4p,N} N_{0}$ <u>Nta</u> (lb) 29179 <u>Nta</u> (lb) 6855	(Sec. 17.5.1.2 Na (lb) 7765 Ø 0.70	6637 2 & Eq. 17.7.3.1b)
76.50 <b>10. Concre</b> $\phi V_{qq0} = \phi \min \frac{k_{cr}}{k_{cr}}$ <b>2.0</b> <b>A</b> <sub>NC</sub> (in <sup>2</sup> ) <b>114.00</b> $\phi V_{cry}$ (ib) <b>9598</b>	<u>te Pryout Str</u> <u>A<sub>Na</sub></u> (in <sup>2</sup> ) 142.64 <u>A<sub>Na</sub></u> (in <sup>2</sup> ) 121.00	ength of Anch $a_{reg} = \phi \min[k_{eg}($ $A_{reg}(n^2)$ 422.18 $\frac{Y_{ecN}}{1.000}$	1.000 <u>mor in Shear ((</u> Axa / Axae) W <sub>elc</sub> N <u>W<sub>el</sub> N</u> 0.788 <u><u></u>W<sub>el</sub> N 0.864</u>	Yes         Yes           Ψes         Ψes           Ψes         Ψes           Ψes         1.000           Ψes         1.000	$K_{\rm ep}(A_{\rm Ac}/A_{\rm Ac}/A$	NO NoD)Ψec.NΨ 2000 No (Ib) 8425	2338 <sup>(nd,N'</sup> $\Psi_{4,N} \Psi_{4p,N} N_0$   <u>Na</u> (lb) 29179 <u>Na</u> (lb) 6855	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765	2 & Eq. 17.7.3.1b)
76.50 <b>10. Concre</b> $\phi V_{qq0} = \phi \min k_{c0}$ 2.0 A <sub>NE</sub> (in <sup>5</sup> ) 114.00 $\phi V_{cog}$ (ib) 9598	<u>te Pryout Str</u> n k <sub>G</sub> N <sub>P0</sub> ; k <sub>G</sub> N A <sub>306</sub> (in <sup>2</sup> ) 142.64 A <sub>NC0</sub> (in <sup>2</sup> ) 121.00	ength of Anch $a_{reg} = \phi \min[k_{ep}($ $A_{reg}(n^2)$ 422.18 $Y_{ecN}$ 1.000	1.000 nor in Shear (f Axa / Axao) Weith Weith 0.788 <u>Weith</u> 0.864	1.400 Sec. 17.7.3) η Ψ <sub>iet No</sub> Ψ <sub>cp,No</sub> Ni Ψ <sub>ee No</sub> 1.000	$\frac{1.00}{1.00}$	NO Netto)Ψec.NΨe 32.Na 000 No (lb) 8425	2338 (d,N,Y,t,N,Y,q,tNNe) Nba (lb) 29179 Ntb (lb) 6855	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765	2 & Eq. 17.7.3.1b)
76.50 <b>10. Concre</b> $ $	<u>te Pryout Str</u> n kφN <sub>10</sub> ; kφN A <sub>306</sub> (in <sup>2</sup> ) 142.64 A <sub>NES</sub> (in <sup>2</sup> ) 121.00	ength of Anch $a_{0} = \phi \min[k_{ep}($ $A_{Nu0} (in^2)$ 422.18 $\Psi_{ec,N}$ 1.000	1.000 <u>nor in Shear (</u> A <sub>Na</sub> / A <sub>Na</sub> / A <sub>Na</sub> / <u>V<sub>et</sub>Na</u> 0.788 <u>V<sub>et</sub>N</u> 0.864	1.400 <u>Sec. 17.7.3)</u> h <sup>1</sup> Ψ <sub>sc/hs</sub> Ψ <sub>qphoN</sub> <u>Ψ<sub>sc/hs</sub></u> 1.000 <u>Ψ<sub>c,h</sub></u> 1.000	$k_{sp}(A_{Nc}/A_{sp}) = \frac{Y_{cp}(A_{Nc}/A_{sp})}{1.00}$	No.)Ψ <sub>rc.</sub> NΨ <sub>30,Na</sub> 3000 No (lb) 8425	2338 Max, Ya, NY qa, MNa   Nas (lb) 29179 Nas (lb) 6855	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765	2 & Eq. 17.7.3.1b)
76.50 <b>10. Concre</b> $\phi V_{ave} = \phi \min k_{av}$ 2.0 $A_{Ne} (\ln^2)$ 114.00 $\phi V_{opg} (lb)$ 9598 <b>11. Results</b> <b>Interaction</b>	te Pryout Str n k@Nig : k@N Axe (in <sup>2</sup> ) 142.64 Axe (in <sup>2</sup> ) 121.00 of Tensile ar	ength of Anch $a_{ing} = \phi \min[k_{ep}(M_{ing})] + \frac{1}{422.18}$ $\frac{\Psi_{ec,N}}{1.000}$	1.000 <u>nor in Shear (</u> <u>Asa</u> / Asa/ <u>Asa</u> / <u>Petha</u> 0.788 <u><u>Y</u>edN</u> 0.864 <u>es (Sec. 17.8)</u>	Sec. 17.7.3)           N Ψ <sub>int</sub> Na W           Ψ <sub>int</sub> Na           Ψ <sub>int</sub> Na           1.000           Ψ <sub>int</sub> Na           1.000	$k_{sp}(A_{Nc}/A_{sp}) = \frac{Y_{cp}(A_{Nc}/A_{sp})}{1.000}$	NO Noc)Ψ <sub>ec,N</sub> Ψ <sub>ec,N</sub> Ψ <sub>go,Na</sub> 000 No (ib) 8425	2338 <sub>od.x</sub> $\Psi_{4,N} \Psi_{44,N} N_0$   <u>Nav (Ib)</u> 29179 <u>Nav (Ib)</u> 6855	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765	2 & Eq. 17.7.3.1b)
76.50 <b>10. Concre</b> ¢V <sub>qu0</sub> = ¢ mi k <sub>c0</sub> 2.0 A <sub>NC</sub> (in <sup>2</sup> ) 114.00 ¢V <sub>crg</sub> (lb) 9598 <b>11. Results</b> Interaction Tension Stool	te Pryout Str n k@Nig : k@N Ass (in <sup>2</sup> ) 142.64 Asso (in <sup>2</sup> ) 121.00	ength of Anch $m_{el} = \phi \min[k_{el}(A_{heo} (in^2) + 422.18)$ $\Psi_{ec,N}$ 1.000 1.000 hd Shear Forc Factored Lo	1.000 <u>mor in Shear (</u> <u>Vata</u> /Anac) <u>Vata</u> <u>Vata</u> 0.788 <u><u>Vata</u> 0.864 <u>es (Sec. 17.8)</u> ad, Nat (lb)</u>	1.400 <u>Sec. 17.7.3</u> ) <i>ν</i> Ψ <sub>sc/hs</sub> Ψ <sub>gp/ha</sub> /k <u>Ψ<sub>sc/h</sub></u> 1.000 <u>Ψ<sub>c,N</sub></u> 1.000 <u>Ψ<sub>c,N</sub></u> 1.000	1.00 ha ; k <sub>ip</sub> (A <sub>Nc</sub> /A <u>γ</u> <sub>cp,N</sub> 1.000 ngth, øN <sub>8</sub> (lb)	No No 2000 No (lb) 8425	2338 <sup>(ad,N,</sup> $\Psi_{4,N} \Psi_{40,N} N_0$   <u>Nas (lb)</u> 29179 <u>Nas (lb)</u> 6855	(Sec. 17.5.1.2 N <sub>a</sub> (lb) 7765 Ø 0.70 Statu	s odd r
76.50 <b>10. Concre</b> <i>A</i> <sub>N</sub> <sub>C</sub> = <i>φ</i> mi <i>k</i> <sub>G</sub> 2.0 <i>A</i> <sub>N</sub> <sub>C</sub> (in <sup>2</sup> ) 114.00 <i>φV</i> <sub>GP</sub> (lb) 9598 <b>11. Results</b> <b>Interaction</b> Tension Steel <b>Concrete</b>	te Pryout Str Asso (in <sup>2</sup> ) 142.64 Asso (in <sup>2</sup> ) 121.00 of Tensile ar	ength of Anch ing  = ¢min k <sub>q</sub> ( A <sub>Na0</sub> (in <sup>2</sup> ) 422.18 <u>Ψ<sub>ec.N</sub></u> 1.000 1.000 nd Shear Forc Factored Lo 795 1590	1.000 <u>mor in Shear (</u> <u>V</u> <sub>etN</sub> 0.788 <u>Y</u> <sub>etN</sub> 0.864 <u>es (Sec. 17.8)</u> ad, N <sub>20</sub> (lb)	1,400 <u>Sec. 17.7.3)</u> <i>μ</i> Ψ <sub>sc/hs</sub> Ψ <sub>gp/ha/k</sub> <u>Ψ<sub>sc/hs</sub></u> 1.000 <u>Ψ<sub>sc/h</sub></u> <u>1.000</u> <u>1.000</u> <u>1.000</u> <u>1.000</u> <u>1.000</u> <u>1.000</u>	ngth, $\sigma N_{h}$ (Ib)	No No 200 No (Ib) 8425 0.05 0.35	2338 http://www.anternal Nota (Ib) 29179 Nota (Ib) 6855	(Sec. 17.5.1.2 Na (lb) 7765 Ø 0.70 Statur Pass Pass	s
76.50 <b>10. Concree</b> <i>A</i> V <sub>qu0</sub> = <i>φ</i> mir <i>k</i> <sub>c0</sub> 2.0 <i>A</i> <sub>NC</sub> (in <sup>2</sup> ) 114.00 <i>φ</i> V <sub>σg</sub> (lb) 9598 <b>11. Results</b> Interaction Tension <u>Steel</u> <b>Concrete</b> Adhesive	te Pryout Str Asso (in <sup>2</sup> ) 142.64 Asso (in <sup>2</sup> ) 121.00 of Tensile ar breakout	ength of Anch ine = ¢min ke( Aneo (in <sup>2</sup> ) 422.18 <u>Ψec.N</u> 1.000 nd Shear Forc Factored Loc 795 1590	1.000 <u>mor in Shear (f</u> Axa / Axae) Ψ <sub>ect</sub> <u>Ψ<sub>ect</sub></u> 0.788 <u>Ψ<sub>ect</sub></u> 0.864 <u>es (Sec. 17.8)</u> ad, N <sub>20</sub> (lb)	Sec. 17.7.3)           ν Ψ <sub>scAu</sub> Ψ <sub>goAa</sub> N           Ψ <sub>scAu</sub> 1.000           Φ <sub>scAu</sub> 1.000	1.00 ha ; k <sub>ip</sub> (A <sub>NC</sub> /A , Ψ <sub>20.N</sub> 1.000 ngth, øN <sub>h</sub> (lb)	No Noc) Ψ <sub>ec.N</sub>	2338 htts: Max (Ib) 29179 Nat (Ib) 6855	(Sec. 17.5.1.2 Na (lb) 7765 Ø 0.70 Statur Pass Pass Pass Pass	s (Governs)
76.50 <b>10. Concree</b> <i>d</i> V <sub>ave</sub> = <i>d</i> mir <i>k</i> <sub>ca</sub> 2.0 <i>A</i> <sub>bec</sub> (in <sup>2</sup> ) 114.00 <i>d</i> V <sub>avy</sub> (lb) 9598 <b>11. Results</b> <b>Interaction</b> Tension Steel <b>Concrete</b> Adhesive	te Pryout Str Asso (in <sup>2</sup> ) 142.64 Asso (in <sup>2</sup> ) 121.00 of Tensile ar breakout	ength of Anch angl = \$\$min k_{qi}( Anu0 (in <sup>2</sup> ) 422.18 <u>Y'ecN</u> 1.000 1.000 Ad Shear Forc Factored Lo 795 1590 1590	1.000 <u>mor in Shear ((</u> <u>WetN</u> 0.788 <u><u>WetN</u> 0.864 <u>es (Sec. 17.8)</u> ad, N<sub>22</sub> (lb)</u>	1,400 Sec. 17.7.3) <i>n V</i> <sub>sc/Ne</sub> <i>V</i> <sub>gc/Ne</sub> <i>V</i> <sub>sc/Ne</sub> <i>V</i> <sub>sc/Ne</sub> 1.000 <i>Y</i> <sub>a.N</sub> 1.000 1.000 1.000 1.000 1.000 1.000 1.000	1.00 ten ; Kap(Anc/A , Y' ) 1.0 <u>Y'<sub>20.N</sub></u> 1.000 ngth, øN <sub>h</sub> (lb)	No Nec) Ψ <sub>rec</sub> NΨ <sub>rec</sub> NΦ <sub>rec</sub> N	2338 htts: \V_{4,N} \V_{40,N} N_{0}   N_{00} (lb) 29179 N_{00} (lb) 6855	(Sec. 17.5.1.2 N= (lb) 7765 Ø 0.70 Statu: Pass Pass Pass	s (Governs)
76.50  10. Concree	te Pryout Str Assa (in <sup>2</sup> ) 142.64 Assa (in <sup>2</sup> ) 142.00 121.00 of Tensile ar breakout	ength of Anch angl = \$\$\phimin k_q(\$\$ Anao (in <sup>2</sup> ) 422.18 Yec.N 1.000 nd Shear Forc Factored Lo 795 1590 Factored Lo	1.000 nor in Shear (f Asa / Asao) Weith Weith 0.788 <u>Weith</u> 0.864 es (Sec. 17.8) ad, Nas (lb)	1,400 Sec. 17.7.3) <i>P V</i> <sub><i>acNa</i></sub> <i>V V</i> <sub><i>acNa</i></sub> 1.000 <i>Y</i> <sub><i>a</i>,N</sub> 1.000 <i>Y</i> <sub><i>a</i>,N</sub> <i>Y</i> <sub><i>b</i>,N</sub> <i>Y</i> <sub><i>b</i></sub> ,N <i>Y</i> <sub><i>b</i>,N</sub> <i>Y</i> <sub><i>b</i>,N</sub>	ngth, øVa (lb)	No (Ib) No (Ib) 8425 0.05 0.36 0.32 0 Ratio	2338 Max Y <sub>6,N</sub> Y <sub>6,N</sub> Y <sub>6,N</sub> N <sub>0</sub>   Na (lb) 29179 Na (lb) 6855	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765 Ø 0.70 Status Pass Pass Pass Status	s s
76.50 <b>10. Concree</b> <i>d</i> V <sub>ave</sub> = <i>φ</i> mi <i>k</i> <sub>cs</sub> 2.0 <i>A</i> <sub>hc</sub> (in <sup>2</sup> ) 114.00 <i>φ</i> V <sub>ave</sub> (ib) 9598 <b>11. Results</b> <b>Interaction</b> Tension Steel <b>Concrete</b> Adhesive Shear Steel	te Pryout Str Assa (in <sup>2</sup> ) 142.64 Assa (in <sup>2</sup> ) 142.00 121.00 of Tensile ar breakout	ength of Anch angl = \$\$min k_q( Anao (in <sup>2</sup> ) 422.18 Y <sub>ec.N</sub> 1.000 nd Shear Forc Factored Lo 795 1590 Factored Lo 420 420	1.000 nor in Shear (f Axa / Axao) Weith Weith 0.788 <u>Weith</u> 0.864 <u>9</u> es (Sec. 17.8) ad, Naa (lb)	1,400 Sec. 17.7.3) <i>w V</i> <sub>ict</sub> <i>the V</i> <sub>20</sub> <i>thaN</i> <i>V</i> <sub>ict</sub> <i>the</i> 1.000 <i>V</i> <sub>c.N</sub> 1.000 <i>V</i> <sub>c.N</sub> 1.000 <i>Stree</i> 14528 4456 5047 Design Stree 7556 2443	1.00 te ; kop(Anc/A , Y'cont 1.000 1.000 ngth, øNs (lb)	No Nece) Ψ <sub>rec.N</sub> Ψ <sub>rec.N</sub> Ψ <u>p.Na</u> 000 Nb (lb) 8425 0.05 0.36 0.32 0.06 0.06	2338 Max V (MV (m, MNa) Na (lb) 29179 Na (lb) 6855	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765 Ø 0.70 Status Pass Pass Status Pass Status Pass	s (Governs)
76.50  10. Concree  ¢V <sub>n00</sub> = ¢mi k <sub>00</sub> 2.0  A <sub>NE</sub> (in <sup>2</sup> )  114.00  ¢V <sub>n00</sub> (ib)  9598  11. Results Interaction Tension Steel Concrete Adhesive Shear Steel T Concret	te Pryout Str Assa (in <sup>2</sup> ) 142.64 Assa (in <sup>2</sup> ) 142.64 Assa (in <sup>2</sup> ) 121.00 of Tensile ar breakout te breakout y	ength of Anch angl = \$\$min]k_{e}( Aneo (in <sup>2</sup> ) 422.18 Yec.N 1.000 nd Shear Force Factored Loc 795 1590 Factored Loc 420 + 840	1.000 nor in Shear (f Axa / Axae) V <sub>et.N</sub> V <sub>et.N</sub> 0.788 <u>V<sub>et.N</sub></u> 0.788 <u>V<sub>et.N</sub></u> 0.864 es (Sec. 17.8) ad, N <sub>eb</sub> (lb)	1,400 Sec. 17.7.3) In Vector Vector Vector Vector Vector 1.000 Vector Vector Vector Vector 1.000 Vector V	1.00 ha ; k <sub>ip</sub> (A <sub>Nc</sub> /A <u>Y<sub>GLN</sub></u> ) 1.0 <u>Y<sub>GLN</sub></u> 1.000 ngth, øN <sub>1</sub> (lb)	Acc) Vec.NV p.Ne 000 No (ib) 8425 0.05 0.36 0.32 0.06 0.35	2338 htts: Max (lb) 29179 Nat (lb) 6855	(Sec. 17.5.1.2 N <sub>s</sub> (lb) 7765 Ø 0.70 Status Pass Pass Pass Status Pass Pass Pass	s (Governs) (Governs)
76.50  10. Concree  ¢V <sub>n00</sub> = ¢mi k <sub>00</sub> 2.0  A <sub>NE</sub> (in <sup>2</sup> )  114.00  ¢V <sub>c92</sub> (ib)  9598  11. Results Interaction Tension Steel Concrete Adhesive Shear Steel T Concret	te Pryout Str Assa (in <sup>2</sup> ) 142.64 Assa (in <sup>2</sup> ) 142.64 Assa (in <sup>2</sup> ) 121.00 of Tensile ar breakout breakout	ength of Anch angl = \$\$min]k_{qi}( A_{Auo} (in <sup>2</sup> ) 422.18 Y' <sub>ec.N</sub> 1.000 nd Shear Forc Factored Lo 795 1590 Factored Lo 420 + 840 s must be checked	1.000 100 in Shear (( Nata / Assa) Vec.n Vect.Ne 0.788 <u>Vect.Ne</u> 0.788 <u>Vect.Ne</u> 0.864 es (Sec. 17.8) ad, Nes (Ib) ad, Ven (Ib)	1,400 Sec. 17.7.3) In Vector	ngth, øVn (lb)	Acc) 9/ec.11 9/ p.Na 000 Na (lb) 8425 0.05 0.36 0.32 0.36 0.32 0.35 .the standar	2338	(Sec. 17.5.1.2 N <sub>a</sub> (lb) 7765 Ø 0.70 0.70 Status Pass Pass Pass Pass Pass Pass Pass	s (Governs) s (Governs) ed for plausibility.
76.50  10. Concree  ¢V <sub>1400</sub> = ¢ mi k <sub>a</sub> 2.0  A <sub>NE</sub> (in <sup>2</sup> )  114.00  ¢V <sub>140</sub> (ib)  9598  11. Results Interaction Tension Steel Concrete Adhesive Shear Steel T Concret Inpu Simpson Stro	te Pryout Str n/kg/Naj : kg/N Asa (in <sup>2</sup> ) 142.64 Asa (in <sup>2</sup> ) 121.00 of Tensile ar breakout breakout t data and result ng-Tie Compan	ength of Anch ength of Anch (a) = \$\$min[kap( Anao (in <sup>2</sup> ) 422.18	wor in Shear (           Ava/ Avae) Ψ <sub>ect</sub> N           V <sub>ect</sub> N           0.788           Ψ <sub>ect</sub> N           0.864           es (Sec. 17.8)           ad, N <sub>eb</sub> (lb)           ad, V <sub>es</sub> (lb)           d for agreement:           Las Positas Boui	1.400 Sec. 17.7.3) In Viethie Vigona Ni Viethie	ngth, øVn (lb)	No Nec) Yee, NY, 50/18 000 No (Ib) 8425 0.36 0.35 0.36 0.32 0.06 0.35 0.35 	2338 http: Max (Ib) 29179 Nat (Ib) 6855 6855 rds and guidelines 560,9000 Fax: 92	(Sec. 17.5.1.2 N <sub>a</sub> (lb) 7765 ø 0.70 0.70 0.70 Statur Pass Pass Pass Statur Pass Pass Statur Pass Pass Statur Pass	s (Governs) ed for plausibility. w.stronglie.com
76.50  10. Concree  ¢V <sub>ave</sub> = φ mi k <sub>a</sub> 2.0  A <sub>hic</sub> (in <sup>2</sup> )  114.00  ¢V <sub>ave</sub> (lb)  9598  11. Results Interaction Tension Steel Concrete Adhesive Shear Steel T Concret Inpu Simpson Stro	te Pryout Str n/kc_rNng ; kc_rN Ana (in <sup>2</sup> ) 142.64 Anco (in <sup>2</sup> ) 121.00 of Tensile ar breakout breakout y t data and result ng-Tie Company	ength of Anch ength of Anch (a) = \$	es (Sec. 17.8) ad, V <sub>ist</sub> (lb) d for agreement Las Positas Boui	1,400 Sec. 17.7.3) in Vischie Vigohalk Vischie Vischi	1.00 ha ; k <sub>0</sub> (A <sub>NC</sub> /A <u>Y</u> <sub>CDN</sub> 1.000 ngth, ØN <sub>1</sub> (Ib) ngth, ØV <sub>1</sub> (Ib) circumstances on, CA 94588 F	NO No (Vec.NV) No (Ib) 8425 000 0.05 0.36 0.32 0.35 0.35 . the standar	2338 http://file.org	(Sec. 17.5.1.2 Na (lb) 7765 ø 0.70 0.70 Statur Pass Pass Pass Statur Pass Pass Statur Pass	s (Governs) s (Governs) ad for plausibility. westronglie.com
76.50  10. Concret  ¢V <sub>av0</sub> = φ mi  k <sub>a</sub> 2.0  A <sub>NC</sub> (in <sup>2</sup> )  114.00  ¢V <sub>avg</sub> (lb)  9598  11. Results Interaction Tension Steel Concrete Adhesive Shear Steel T Concret Inpu Simpson Stre	te Pryout Str n/kg/Nag : kg/N Assa (in <sup>2</sup> ) 142.64 Assa (in <sup>2</sup> ) 121.00 of Tensile ar breakout t data and result ng-Tie Compan	ength of Anch ength of Anch (a) = \$\$\$\$\$\$\$\$\$\$\$\$\$\$ Ana0 (in <sup>2</sup> ) 422.18 <u>Y</u> <sub>ec,N</sub> 1.000 1.000 Add Shear Forc Factored Loc 795 1590 1590 Factored Loc 420 + 840 s must be checke y line 5956 W.1	es (Sec. 17.8) ad, V <sub>us</sub> (lb) d for agreement: Las Positas Boui	1,400 Sec. 17.7.3) a Vector	1.00 ha ; k <sub>0</sub> (A <sub>26</sub> /A <u>Y</u> <sub>202N</sub> 1.000 ngth, øN <sub>8</sub> (lb) ngth, øV <sub>9</sub> (lb) circumstances on, CA 94588 F	NO No (Vec.NV) No (Ib) 8425 0 0 0.05 0.36 0.32 0 Ratio 0.05 0.35 0.35 . the standar Phone: 925.5	2338 http://file.org/ //file.com/ 29179 //file.com/ 6855 6855 //file.com/ 6855	(Sec. 17.5.1.2 N <sub>a</sub> (lb) 7765 Ø 0.70 0.70 Statur Pass Pass Pass Pass Statur Pass Pass Statur Pass	s (Governs) (Governs) ed for plausibility. weistronglie.com



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SIMPSON	Anchor Design	OrTM	Co	mpany:			Date:	9/8/2022
	Anchor Designer			gineer:			Page:	6/6
Strong Tie	Software		Project:					
	Version 3.1.2209.3		Ad	dress:				
			Ph	one:				
			E-r	mail:				
Concrete break	out x- 840		8657		0.10	)	Pass (G	overns)
Pryout	840		9598		0.05	9	Pass	
Interaction check	Nut dNa	ValoVo		Combined Rati	0	Permissible	Status	
Sec. 17.8.1	0.36	0.00		35.7%		1.0	Pass	

SET-3G w/ 3/4"Ø F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.

# 12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925:560.9000 Fax: 925:847.3871 www.strongfie.com



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# SIMPSON Strong Tie

Anchor Designer™ Software

Version 3.1.2209.3

Company:	Date: 9/8/2022
Engineer:	Page: 1/6
Project:	
Address:	
Phone:	
E-mail:	

**1.Project information** 

Customer company: Customer contact name: Customer e-mail: Comment

## 2. Input Data & Anchor Parameters

General Design method:ACI 318-19 Units: Imperial units

# Anchor Information:

Anchor type: Bonded anchor Material: F1554 Grade 36 Diameter (inch): 0.750 Effective Embedment depth, her (inch): 6.000 Code report: ICC-ES ESR-4057 Anchor category: -Anchor ductility: Yes hris (inch): 7.75 Cac (inch): 8.77 Cmn (inch): 1.75 Smit (inch): 3.00

Recommended Anchor Anchor Name: SET-3G - SET-3G w/ 3/4"Ø F1554 Gr. 36 Code Report: ICC-ES ESR-4057



Project description: Location: Fastening description:

### **Base Material**

Concrete: Normal-weight Concrete thickness, h (inch): 48.00 State: Uncracked Compressive strength,  $f_{c}$  (psi): 2500  $\Psi_{eVC}$  1.4 Reinforcement condition: Supplementary reinforcement not present Supplemental edge reinforcement: No Reinforcement provided at corners: No Ignore concrete breakout in tension: No Ignore concrete breakout in shear: No Hole condition: Dry concrete Inspection: Continuous Temperature range, Short/Long: 150/110°F Ignore 6do requirement: Not applicable Build-up grout pad: No

**Base Plate** 

Length x Width x Thickness (inch): 3.50 x 12.00 x 0.25

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925:560.9000 Fax: 925:847.3871 www.strongtie.com



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Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Poeitas Boulevard Pleasanton, CA 94588 Phone: 925:560.9000 Fax: 925:847.3871 www.strongtie.com



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	Anchor Designe	er M	Engineer:		Dago	4/6
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Strong-Tie	Version 3.1.2209.3		Address'			
d			Phone:			
			E-mail:			
Besulting And	har Farcer			•		
3. Resulting Anchor Forces           Anchor         Tension load, Nue (Ib)         Shear lo Vux (Ib)		ad x,	Shear load y, V <sub>uity</sub> (Ib)	Shear load o	ombined, P (lb)	
1	1001.0	0.0		1001.0	1001.0	
2	1001.0	0.0		1001.0	1001.0	
Sum	2002.0	0.0		2002.0	2002.0	
Maximum concrete Maximum concrete Resultant tension fr Resultant compress Eccentricity of resu	compression strain (%); ( compression stress (psi); orce (Ib); 2002 sion force (Ib); 0 Itant tension forces in x-axi Itant tension forces in y-axi Itant shear forces in x-axis	0.00 0 is, e' <sub>Ne</sub> (inch): 0.00 is, e' <sub>Ne</sub> (inch): 0.00 i, e' <sub>Yx</sub> (inch): 0.00	0	<figure 3=""></figure>	1 <u>Y</u>	<u>)</u> 2

N <sub>ns</sub> (lb)	ø	(NVse (lb)
19370	0.75	14528

# 5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.6.2)

No = Kchail	che <sup>15</sup> (Eq. 17.6	6.2.2.1)							
Kc	2a	fc (psi)	har (in	n) Na	(lb)				
24.0	1.00	2500	6.000	) 17	636				
¢Nobg =¢ (A	Ne / ANEO) Pec.N	Pasn Yen Pront	6 (Sec. 17.5.	1.2 & Eq. 17.6	5.2.1a)				
Ano (in <sup>2</sup> )	Anco (in <sup>2</sup> )	c <sub>area</sub> (in)	Y'ec.N	Post	$\Psi_{0,N}$	$\Psi_{q_kN}$	N <sub>0</sub> (lb)	ø	Notes (Ib)
156.00	324.00	3.00	1.000	0.800	1.00	1.000	17636	0.65	4416

# 6. Adhesive Strength of Anchor in Tension (Sec. 17.6.5)

nuner = nuner	stortonsKoar(Fc/	2,500)*							
Dunor (psi)	Lano ento	Kaat	fc (psi)	n		Tiuner (psi)			
2064	1.00	1.00	2500	0.35		2064	ų.		
Non = A a Tance A	d.h.r (Eq. 17.6	.5.2.1)							
2.0	row (psi)	d= (in)	her (in)	N <sub>2+</sub> (It	)				
1.00	2064	0.75	6.000	29179	3	-			
$\phi N_{sg} = \phi (A_{Ns})$	/ Anas) Yes. No Ye	the PostaNa (	Sec. 17.5.1.2	& Eq. 17.6.5.1	1b)				
Any (in <sup>2</sup> )	Anso (in <sup>2</sup> )	cne (in)	Causis (in)	4'es. the	$\Psi_{\rm ed,Na}$	$\Psi_{cp,Na}$	Nhs(lb)	ø	¢₩ <sub>ep</sub> (lb)
171.28	422.18	10.27	3.00	1.000	0.788	1.000	29179	0.65	6060

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com



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$\frac{1}{11625} \frac{1}{10.0} \frac{1}{0.055} \frac{1}{7556} \frac{1}{1000} \frac{1}{1000} \frac{1}{1000} \frac{1}{2338} \frac{1}{1000} \frac{1}{10$	$\frac{\text{Stell Strength of Anchor in Shear (Sec. 17.7.1)}}{1025 1 10 0 0.65 7556}$ $\frac{\text{Stell Strength of Anchor in Shear (Sec. 17.7.2)}}{1025 1 10 0 0.65 7556}$ $\frac{\text{Stell Strength of Anchor in Shear (Sec. 17.7.2)}}{1025 1 10 0 0.65 7556}$ $\frac{\text{Stell Strength of Anchor in Shear (Sec. 17.7.2.2.16)}}{100 0 0.750 0 0 0.00 0 0.00 0 2336}$ $\frac{\text{Stell Strength of Anchor in Shear (Sec. 17.7.2.2.16)}}{100 0 0.750 0 0 0.00 0 0.00 0 2338}$ $\frac{\text{Stell Strength of Anchor in Shear (Sec. 17.7.2.2.16)}}{100 0 0 0.00 0 0 0 0.00 0 0 0.00 0 $				E-mail:				
Steel Strength of Anchor in Shear (Sec. 17.2.1)         Concrete Breakout Strength of Anchor in Shear (Sec. 17.2.2)         Shear parallel to edge in x-direction: $f_{10} = min[7(k), d_{1}]^{12} \sqrt{d_{1}} \sqrt{k_{1}} ext^{1/5}}; g_{1,4} \sqrt{k_{1}} ext^{1/5}; ext^{1/5}} ([G, 17,7.2.2.1a & Eq. 17,7.2.2.1b)         k_{10} m in d_{10} d_{1} (m) d_{10} ($	$\frac{\text{Steel Strength of Anchor in Shear (Sec. 17.7.2)}{100 0.65 7556}$ $\frac{\text{Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2)}{100 0.65 7556}$ $\frac{\text{Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2.1)}{100 0.7$								
110       0.65       7556         Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2)         Shear parallel to edge in x-direction: $I_{00} = \frac{1}{2} N_{00} x_{0}^{1/2} c_{0}^{-1/5} ([0, 17.7.2.2.1a & Eq. 17.7.2.2.1b)$ $I_{00} = \frac{1}{2} N_{00} x_{0}^{1/2} c_{0}^{-1/5} ([0, 17.7.2.2.1a & Eq. 17.7.2.1b)$ $I_{00} = \frac{1}{2} N_{00} x_{0}^{1/2} v_{0}^{1/2} v_{0$	Second Strength of Anchor in Shear (Sec. 17.7.2)         bear parallel to edge in x-direction: $y_{a} = min(TyL, dy)^{1/2}(d_x, d_y^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}^{1/2}(x_{a}, t_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a}^{1/2}(x_{a$	Vra (Ib) Vra (Ib)	chor in Shear (S	Sec. 17.7.1) April Visi	(lb)				
Output: Decay is a subject of Anchor in Shear (Sec. 17.7.2)         Shear parallel to edge in s-direction: $q = min([v_1/r, d_1^{1/2}, d_2^{1/2}, d$		11625 1.0	0.65	7556					
$\frac{h(m)}{6.00} \frac{d_{1}(m)}{0.750} \frac{A_{n}}{1.00} \frac{r_{1}(psl)}{2500} \frac{c_{1}(m)}{3.00} \frac{V_{1}(m)}{2338}$ $\frac{h(m)}{2338} \frac{d_{2}(2)(A_{1}, A_{2m})V_{ne}, V_{ne}V_{ne}V_{ne}V_{ne}V_{ne}V_{ne}(lb)}{2500} \frac{2338}{3.00} \frac{V_{1}(b)}{2338}$ $\frac{A_{2}(m)}{1.00} \frac{V_{1}(w)}{1.00} \frac{V_{1}(w)}{1.000} \frac{V_{1}(w)}{1.000} \frac{V_{1}(w)}{1.000} \frac{V_{1}(b)}{2338} \frac{\delta}{0.70} \frac{\delta}{8657}$ $\frac{O Concrete Provet Strength of Anchor In Shear (Sec. 17.7.3)}{1.000} \frac{V_{1}(w)}{1.000} \frac{V_{1}(w)}{1.000} \frac{V_{1}(w)}{2338} \frac{V_{1}(w)}{0.00} \frac{\delta}{2338} \frac{\delta}{0.70} \frac{\delta}{8657}$ $\frac{O Concrete Provet Strength of Anchor In Shear (Sec. 17.7.3)}{1.000} \frac{V_{1}(w)}{1.000} \frac{V_{1}(w)}{1.000} \frac{V_{1}(w)}{2338} \frac{V_{1}(w)}{V_{1}(w)} V_{$	(m)         (m) <th>). Concrete Breakout S Shear parallel to edge Are = minl7(b/d-y<sup>22</sup>/d-2</th> <th>itrength of Ancl in x-direction:</th> <th>hor in Shear</th> <th>(Sec. 17.7.2)</th> <th>7.2.2.1b)</th> <th></th> <th></th> <th></th>	). Concrete Breakout S Shear parallel to edge Are = minl7(b/d-y <sup>22</sup> /d-2	itrength of Ancl in x-direction:	hor in Shear	(Sec. 17.7.2)	7.2.2.1b)			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$500$ $0.750$ $1.00$ $2500$ $3.00$ $2338$ $V_{aw} = \phi(2)(A_{vx}, A_{vw})V_{av}, V_{uv}, V$	<i>l<sub>e</sub></i> (in) <i>d<sub>a</sub></i> (in)	Àa	fo (psi)	Cet (in)	V <sub>ty</sub> (lb)			
$\begin{aligned} & \mathcal{H}_{OD} = \phi \left( 2 \left( A_{ex} / A_{ex0} \right) \mathcal{Y}_{exv} / V_{evv} / V_{evv} / V_{evv} / V_{evv} / V_{evv} / V_{ev} (b) & \phi & \phi V_{obs} (b) \\ A_{ev} (n^2) & A_{evo} (n^2) & \mathcal{Y}_{evv} / V_{evv} / V_{evv} / V_{evv} / V_{ev} (b) & \phi & \phi V_{obs} (b) \\ \hline P = 0 & 1000 & 1.000 & 1.400 & 1.000 & 2338 & 0.70 & 8657 \\ \hline 0. \text{ Concrete Provet Strength of Anchor in Shear (Sec. 17.7.3)} \\ & \mathcal{H}_{evv} = \phi \min[k_{ev}N_{ev}] : k_{ev}N_{evs} = \phi \min[k_{ev}(A_{ev} / A_{evo}) V_{evv} V_{evv} V_{evv} N_{evv} V_{evv} $	$V_{avv} = \phi^2(2)(Av_v, (Av_{avv})^{W_{avv}}, V'_{avv}, V'_{avv},$	6.00 0.750	1.00	2500	3.00	2338			
Are (In <sup>2</sup> )         Area (In <sup>2</sup> ) $Y_{w,V}$ $Y_{w,V}$ $Y_{w,V}$ $V_{w}$ (Ib) $\phi$ $\phi V_{oast}$ (Ib)           76.50         40.50         1.000         1.000         1.400         1.000         2338         0.70         8657           9. Concrete Pryout Strength of Anchor in Shear (Sec. 17.3) $V_{way}$ = $\phi min[k_w A_w; k_w A_{wa}]$ $\phi min[k_w (A_w, A_{way}] V_{way} A_{way}] V_{way} A_{way} V_{wayw} V_{wayw} A_{way} V_{wayw} V_{wayw} A_{way} (Ib)         A_{way} (Ib)         A_{way} (In2)         A_{way} (In2)         V_{wayw} A_{way} V_{wayw} V_{way$	Area (In*)       Area (In*) $\Psi_{ww}$ $\Psi_{w}$ $\Psi_{ww}$ <	$\delta V_{colgr} = \phi(2) (A_{Ve} / A_{Veo}) Y$	oc. V Ved V Vav Vav	/ay (Sec. 17.5.	1.2, 17.7.2.1(c) 8	Eq. 17.7.2.1b)			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	<b>1.000</b> 1.000 1.0	Ave (in <sup>2</sup> ) Aveo (in <sup>2</sup> )	1 000	4 000	Ψ <sub>α</sub> ν	1 000	V <sub>1y</sub> (lb)	Ø 0.70	ØVebgx (lb)
0. Concrete Pryout Strength of Anchor In Shear (Sec. 17.7.3)         Way = $\phi$ min/ka/kay: ka/kas/a = $\phi$ min/ka/kay. Asay Yachy Y	9. Concrete Pryout Strength of Anchor In Shear (Sec. 17.7.3)         W <sub>10</sub> # \$min k <sub>10</sub> M <sub>10</sub> ; k <sub>10</sub> M <sub>10</sub> ; k <sub>10</sub> M <sub>10</sub> M <sub>20</sub> (M <sub>200</sub> ) V <sub>100</sub> M <sup>1</sup>	10.00	1.000	1.000	1.100	1.000	2000	0,10	0001
Anc (in <sup>2</sup> )         Auco (in <sup>2</sup> )         Vec.N         Vec.N         Vec.N         Vec.N         Vec.N         Vec.N         No (lb)         No (lb)         As (lb)         Ø           156.00         324.00         1.000         0.800         1.000         1.000         17636         6793         0.70           #Vecy (lb) 9511	Ase (n <sup>2</sup> )         Ase (n <sup>2</sup> )         V <sub>ex</sub> X         V <sub>ex</sub> X         V <sub>ex</sub> X         V <sub>ex</sub> X         N <sub>10</sub> (b)         N <sub>10</sub> (b)         Ø           156.00         324.00         1.000         0.800         1.000         1.000         17636         6793         0.70           AV <sub>eyr</sub> (b) 9511	2.0 171.28	422.18	0.788	1.000	1.000	29179	9324	
156.00       324.00       1.000       0.800       1.000       17636       6793       0.70         Advage (b) 9511 <b>1. Results</b> Interaction of Tensile and Shear Forces (Sec. 17.8) Tension         Factored Load, Nax (b)       Design Strength, eNx (b)       Ratio       Status         Steel       1001       14528       0.07       Pass         Concrete breakout       2002       4416       0.45       Pass (Governs)         Adhesive       2002       6060       0.33       Pass         Shear       Factored Load, Vux (b)       Design Strength, eVx (b)       Ratio       Status         Steel       1001       7556       0.13       Pass         Joint Total       7556       0.13       Pass (Governs)         Pryout       2002       8657       0.23       Pass (Governs)         Pryout       2002       9511       0.21       Pass         Interaction check       Nue/WMx       Vue/WVn       Combined Ratio       Permissible       Status         Status         Status         Status         Status <td< td=""><td>156.00       324.00       1.000       0.800       1.000       17636       6793       0.70         #V<sub>cer</sub>(lb) 9511      </td><td><math>A_{NC}</math> (in<sup>2</sup>) <math>A_{NCO}</math> (in<sup>2</sup>)</td><td><math>\Psi_{ec,N}</math></td><td><math>\Psi_{ed,N}</math></td><td><math>\Psi_{LN}</math></td><td>P<sub>cp,N</sub> No (</td><td>Ib) Not (lb)</td><td>ø</td><td></td></td<>	156.00       324.00       1.000       0.800       1.000       17636       6793       0.70         #V <sub>cer</sub> (lb) 9511	$A_{NC}$ (in <sup>2</sup> ) $A_{NCO}$ (in <sup>2</sup> )	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{LN}$	P <sub>cp,N</sub> No (	Ib) Not (lb)	ø	
97/100           1. Results           Iteraction of Tensile and Shear Forces (Sec. 17.8)           Tension         Factored Load, N=x (lb)         Design Strength, eN=x (lb)         Ratio         Status           Steel         1001         14528         0.07         Pass           Concrete breakout         2002         4416         0.45         Pass (Governs)           Adhesive         2002         6060         0.33         Pass           Shear         Factored Load, V=x (lb)         Design Strength, eV=x (lb)         Ratio         Status           Steel         1001         7556         0.13         Pass           Il Concrete breakout x-         2002         8657         0.23         Pass (Governs)           Pryout         2002         9511         0.21         Pass           Interaction check         N=x/dV_A         V=x/dV_B         Combined Ratio         Permissible         Status           Sec. 17.8.1         0.45         0.00         45.3%         1.0         Pass	PVvor (lb) 9511         1. Results teraction of Tensile and Shear Forces (Sec. 17.6) Tension       Factored Load, N <sub>ax</sub> (lb)       Design Strength, eN <sub>x</sub> (lb)       Ratio         Steel       0.07       Pass (Governs)         Concrete breakout       2002       6050       0.33       Pass (Governs)         Shear       Factored Load, Vus (lb)       Design Strength, eVn (lb)       Ratio       Status         Shear       Factored Load, Vus (lb)       Design Strength, eVn (lb)       Ratio         Shear       Factored Load, Vus (lb)       Design Strength, eVn (lb)       Ratio         Shear       Factored Load, Vus (lb)       Design Strength, eVn (lb)       Ratio         Shear       Factored Load, Vus (lb)       Design Strength, eVn (lb)       Ratio         Shear       Factored Load, Vus (lb)       Design Strength, eVn (lb)       Ratio         Interaction check       Nus/WW       Combined Ratio       Permissible       Status <tr< th=""><th>156.00 324.00</th><th>1.000</th><th>0.800</th><th>1.000</th><th>1.000 176</th><th>6793</th><th>0.70</th><th></th></tr<>	156.00 324.00	1.000	0.800	1.000	1.000 176	6793	0.70	
Notion         Passive Cost, Ni (b)         Design Contrain, even (b)         Nation         Control           Steel         1001         14528         0.07         Pass           Concrete breakout         2002         4416         0.45         Pass (Governs)           Adhesive         2002         6060         0.33         Pass           Shear         Factored Load, Voir (lb)         Design Strength, eVn (lb)         Ratio         Status           Steel         1001         7556         0.13         Pass           Il Concrete breakout x-         2002         8657         0.23         Pass (Governs)           Pryout         2002         9511         0.21         Pass           Interaction check         Nov/Wr         Voir/Wr         Combined Ratio         Permissible         Status           Sec. 17.8.1         0.45         0.00         45.3%         1.0         Pass	Notices       Notices       Concrete       Design Control (b)       Nate (c)       Nate (c)       Nate (c)	1. Results Interaction of Tensile a	nd Shear Force	es (Sec. 17.8)	Design Strengt	haN-(b) Ba	tin	Status	
Concrete breakout Adhesive         2002         4416         0.45         Pass (Governs)           Adhesive         2002         6060         0.33         Pass           Shear         Factored Load, Vus (lb)         Design Strength, eVn (lb)         Ratio         Status           Steel         1001         7556         0.13         Pass           II Concrete breakout x- Pryout         2002         8657         0.23         Pass (Governs)           2002         9511         0.21         Pass           Interaction check         Nus/Mi         Vus/MV         Combined Ratio         Permissible         Status           Sec. 17.8.1         0.45         0.00         45.3%         1.0         Pass	Concrete breakout       2002       4416       0.45       Pass (Governs)         Adhesive       2002       6060       0.33       Pass         Shear       Factored Load, Vux (lb)       Design Strength, eVn (lb)       Ratio       Status         Steel       1001       7556       0.13       Pass (Governs)         Il Concrete breakout x-       2002       8657       0.23       Pass (Governs)         Pryout       2002       9511       0.21       Pass         Interaction check       Nue/MVx       Vue/MVn       Combined Ratio       Permissible       Status         Sec. 17.8.1       0.45       0.00       45.3%       1.0       Pass         Imput data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.         Impoor Strong-Tie Company Inc.       5956 W. Las Poeitas Boulevard       Pleasanton, CA 94588       Phone: 925.590.9000       Fax: 925.847.3871       www.strongtie.com	Steel	1001	0,100	14528	0.0	7	Pass	
Adhesive         2002         6060         0.33         Pass           Shear         Factored Load, V <sub>us</sub> (lb)         Design Strength, eV <sub>n</sub> (lb)         Ratio         Status           Steel         1001         7556         0.13         Pass           II Concrete breakout x-         2002         8657         0.23         Pass (Governs)           Pryout         2002         9511         0.21         Pass           Interaction check         Nue/Mu         Vue/MV         Combined Ratio         Permissible         Status           Sec. 17.8.1         0.45         0.00         45.3%         1.0         Pass	Adhesive       2002       6060       0.33       Pass         Shear       Factored Load, Vux (Ib)       Design Strength, eVx (Ib)       Ratio       Status         Steel       1001       7556       0.13       Pass         II Concrete breakout x-       2002       8657       0.23       Pass (Governs)         Pryout       2002       9511       0.21       Pass         Interaction check       N.ed/eWx       Vwe/eWx       Combined Ratio       Permissible       Status         Sec. 17.8.1       0.45       0.00       45.3%       1.0       Pass         iET-3G w/ 3/4"Ø F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.       Interaction check design criteria.       Interaction check design criteria.	Concrete breakout	2002		4416	0.4	5	Pass (C	Governs)
Shear         Factored Load, Vus (lb)         Design Strength, øVn (lb)         Ratio         Status           Steel         1001         7556         0.13         Pass           II Concrete breakout x-         2002         8657         0.23         Pass (Governs)           Pryout         2002         9511         0.21         Pass           Interaction check         Nue/dW.         Vue/dW.         Combined Ratio         Permissible         Status           Sec. 17.8.1         0.45         0.00         45.3%         1.0         Pass	Shear         Factored Load, Vus (lb)         Design Strength, eV. (lb)         Ratio         Status           Steel         1001         7556         0.13         Pass           If Concrete breakout x- Pryout         2002         8657         0.23         Pass (Governs)           Interaction check         N.ex/Wit         V.ex/Wit         Combined Ratio         Permissible         Status           Interaction check         N.ex/Wit         V.ex/Wit         Combined Ratio         Permissible         Status           ET-3G w/ 3/4"Ø         0.45         0.00         45.3%         1.0         Pass	Adhesive	2002		6060	0.3	3	Pass	
Steel         1001         7556         0.13         Pass           II Concrete breakout x-         2002         8657         0.23         Pass (Governs)           Pryout         2002         9511         0.21         Pass           Interaction check         Nue/W/r         Vue/W/r         Combined Ratio         Permissible         Status           Sec. 17.8.1         0.45         0.00         45.3%         1.0         Pass	Steel       1001       7556       0.13       Pass         II Concrete breakout x-       2002       8657       0.23       Pass (Governs)         Pryout       2002       9511       0.21       Pass         Interaction check       Nue/WK       Vue/WV       Combined Ratio       Permissible       Status         Sec. 17.8.1       0.45       0.00       45.3%       1.0       Pass         iET-3G w/ 3/4"Ø F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.       Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.         Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.         Impson Strong-Tie Company Inc.       5956 W. Las Positas Boulevard Plausanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com	Shear	Factored Loa	id, V <sub>uii</sub> (lb)	Design Strengt	h, eV <sub>n</sub> (lb) Ra	tio	Status	
II Concrete breakout x- Pryout         2002         8657         0.23         Pass (Governs)           Interaction check         Nue/Mi         Vue/Mi         Combined Ratio         Permissible         Status           Sec. 17.8.1         0.45         0.00         45.3%         1.0         Pass           SET-3G w/ 3/4"Ø F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.         Sec. 17.8.1	II Concrete breakout x- 2002       2002       8657       0.23       Pass (Governs)         Pryout       2002       9511       0.21       Pass         Interaction check       Nue/WK       Vue/WV       Combined Ratio       Permissible       Status         Sec. 17.8.1       0.45       0.00       45.3%       1.0       Pass         IET-3G w/ 3/4"Ø       F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.         Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.         Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.       Impson Strong-Tie Company Inc.       5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871       www.strongtie.com	Steel	1001		7556	0.1	3	Pass	
Interaction check         N_ee/@V_e         Combined Ratio         Permissible         Status           Sec. 17.8.1         0.45         0.00         45.3%         1.0         Pass           SET-3G w/ 3/4"@ F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.         Sec. 17.8.1	Pryout       2002       3511       0.21       Pass         Interaction check       N.e/MV.       V.e/MV.       Combined Ratio       Permissible       Status         Sec. 17.8.1       0.45       0.00       45.3%       1.0       Pass         IET-3G w/ 3/4"Ø       F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.       Pass         Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.       Impoor Strong-Tie Company Inc.       5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871       www.strongtie.com	Concrete breakout >	- 2002		8657	0.2	3	Pass (G	Governs)
Interaction check         Nue/dN/s         V ve/dV/s         Combined Ratio         Permissible         Status           Sec. 17.8.1         0.45         0.00         45.3%         1.0         Pass           SET-3G w/ 3/4"Ø F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.         F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.         F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.	Interaction check N.e/@Wi V.e Combined Ratio Permissible Status Sec. 17.8.1 0.45 0.00 45.3% 1.0 Pass iET-3G w/ 3/4"Ø F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria. Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Impson Strong-Tie Company Inc. 5956 W. Las Poeitas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com	riyou	2002		3311	0.2		F 855	
Sec. 17.8.1 0.45 0.00 45.3% 1.0 Pass	Sec. 17.8.1       0.45       0.00       45.3%       1.0       Pass         iET-3G w/ 3/4"Ø F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.         Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.         impson Strong-Tie Company Inc.       5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com	Interaction check N	ud ØNa	Vvs/ØVo	Co	mbined Ratio	Permissible	Status	
SET-3G w/ 3/4"Ø F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.	BET-3G w/ 3/4"Ø F1554 Gr. 36 with hef = 6.000 inch meets the selected design criteria.         Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.         Impson Strong-Tie Company Inc.       5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com	Sec. 17.8.1 0.	45	0.00	45.	3%	1.0	Pass	
	Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Impson Strong-Tie Company Inc. 5956 W. Las Poeitas Boulevard Pleasanton, CA 94588 Phone: 925:560.9000 Fax: 925.847.3871 www.strongtie.com	Interaction check N Sec. 17.8.1 0. SET-3G w/ 3/4"Ø F155	.∞/¢N/₀ 45 4 Gr. 36 with he	V <sub>x0</sub> ∕¢V₀ 0.00 f = 6.000 incl	Co 45. h meets the sele	mbined Ratio 3% acted design cri	Permissible 1.0 teria.	Status Pass	
	Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility, impson Strong-Tie Company Inc. 5956 W. Las Poeitas Boulevard. Pleasanton, CA 94588. Phone: 925.560.9000. Fax: 925.847.3871. www.strongtie.com								
	impson Strong-Tie Company Inc. 5955 W. Las Positas Bourevard. Pleasanton, CA 94588. Phone: 925.560.9000. Fax: 925.847.3871. www.strongtie.com			for agreement v	with the existing circ	umstances, the star	dards and guidelines	must be checked	for plausibility.
Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.		Input data and resu	ts must be checked			A 04699 DB-664 0	25 E62 0000 E44 03	5 847 3871 HANNEY	
Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com		Input data and resul Simpson Strong-Tie Compar	ts must be checked ty line. 5956 W. L	as Positas Boule	ward Pleasanton, 0	A 94000 Phone: 8	25.300.9000 FBX: 82	2.047.3071 WWW.	strongtie.com



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SIMPSON Anchor Designer™ Software Version 3.1.2209.3

Company:	Date:	9/8/2022
Engineer:	Page:	6/6
Project:		
Address:		
Phone:		
E-mail:		

# 12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

Input data and results must be checked for egreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.strongtie.com



	project	2302-0069	date	2/9/2024	
Peterson Structural Engineers, Inc.					
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# SIMPSON Strong-Tie

# Anchor Designer™ Software

Version 3.1.2209.3

### Company: Date: 9/8/2022 Page: 1/5 Engineer Project: Address: Phone E-mail:

1.Project information

Customer company: Customer contact name: Customer e-mail: Comment

## 2. Input Data & Anchor Parameters General

Design method:ACI 318-19 Units: Imperial units

# Anchor Information:

Anchor type: Concrete screw Material: Carbon Steel Diameter (inch): 0.750 Nominal Embedment depth (inch): 4.000 Effective Embedment depth, het (inch): 2.940 Code report: ICC-ES ESR-2713 Anchor category: 1 Anchor ductility: No hein (inch): 6.00 Can (inch): 6.00 Can (inch): 1.75 Srin (inch): 2.75

Recommended Anchor Anchor Name: Titen HD® - 3/4\*Ø Titen HD, hnom:4\* (102mm) Code Report: ICC-ES ESR-2713



Project description: Location: Fastening description:

### **Base Material**

Concrete: Normal-weight Concrete thickness, h (inch): 48.00 State: Uncracked Compressive strength, fc (psi): 2500  $\Psi_{eV}$  1.4 Reinforcement condition: Supplementary reinforcement not present Supplemental edge reinforcement: No Reinforcement provided at corners: No Ignore concrete breakout in tension: No Ignore concrete breakout in shear: No Ignore 6do requirement: Not applicable Build-up grout pad: No

## **Base Plate**

Length x Width x Thickness (inch): 3.50 x 12.00 x 0.25

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925:560.9000 Fax: 925:847.3871 www.strongtie.com



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**PSE** PETERSON STRUCTURAL ENGINEERS

	project	2302-0069	date	2/9/2024	
Peterson Structural Engineers, Inc. www.psengineers.com	designer	RLKC	sheet	110 of	118



Phone:         Phone:           E-mail:         E-mail:           3. Resulting Anchor Forces         Archor           Archor         Tension load,         Shear load x,         Shear load y,         Shear lo	nbined, (b) ○2 AVery (b) 3813
E-mail:           E-mail:           Shear load x, Shear load x, Var (b) Var (b	mbined, (ib) ○2 AWcty (ib) 3813
3. Resulting Anchor Forces Anchor Tension load, Shear load x, Shear load y, Shear load y, $(V_{exp}(k), V_{exp}(k), V_{exp}$	mbined, (b) ○2 AWcty (b) 3813
Anchor         Tension load, No.         Shear load X, Shear load X, Shear load Y, Yung Y, Y	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2 
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2 AWcty (lb) 3813
Sum 1590.0 0.0 840.0 840.0 840.0 840.0 400.0 Maximum concrete compression stress (9): 0 Maximum concrete compression stress (9): 0 Resultant tension force (b): 1590 Resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension forces in x-axis, e <sup>1</sup> / <sub>20</sub> (inch): 0.00 Eccentricity of resultant tension force in x-axis, e <sup>1</sup> / <sub>20</sub> (inch):	()2 ≪Vcty (lb) 3813
Maximum concrete compression stress (pi): 0.00 Resultant tension force (b): 1500 Resultant tension forces (p): 0: 0 Eccentricity of resultant tension forces in x-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in x-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in x-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Eccentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Excentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Excentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Excentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Excentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Excentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Excentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Excentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Excentricity of resultant shear forces in y-axis, e <sup>t</sup> w, (inch): 0.00 Excent	2 ∧Weag (lb) 3813
A. Steel Strength of Anchor in Tension (Sec. 17.6.1) $\frac{N_{wi} (lb)}{45540} \xrightarrow{\phi} \frac{\phi N_{wi} (lb)}{29601}$ 5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.6.2) $N_{b} = k_{0}\lambda_{a}\sqrt{t}c_{b}m^{15} (Eq. 17.6.2.2.1)$ $\frac{k}{k} \xrightarrow{\lambda_{a}} \frac{f_{c}(ps)}{k} \frac{h_{w}(n)}{k} (sec. 17.5.1.2 & Eq. 17.6.2.1a)$ $A_{00}(n^{2}) \xrightarrow{A_{00}}(n^{2}) \xrightarrow{C_{0,0}w}(ln)}{C_{0,0}w} \frac{y_{c,N}}{y_{c,N}} \frac{y_{c,N}}{y_{c,N}} \frac{y_{c,N}}{y_{c,N}} \frac{N_{b}(lb)}{\phi}$ 3. Steel Strength of Anchor in Shear (Sec. 17.7.1) $\frac{V_{w}(lb)}{14950} \frac{\phi_{avet}}{1.0} \frac{\phi}{0.80} \frac{\phi_{avex}\phi V_{w}(lb)}{8970}$ 5. Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2) Shear perpendicular to edge in y-direction: $V_{y} = \min[7(l_{y}/d_{y})^{2-1}d_{y}\lambda_{y}^{-1}c_{c,x^{1-1}}; 9\lambda_{y}\sqrt{t}c_{x^{1-1}}; 9\lambda_{y}\sqrt{t}c_{x^{1-1}}; 9\lambda_{y}\sqrt{t}c_{x^{1-1}}; 9\lambda_{y}\sqrt{t}c_{x^{1-1}}; 12.1 a \\ 2.94 0.750 1.00 2500 13.50 19759$ $\frac{A_{V_{0}}(n^{2})}{A_{V_{0}}(n^{2})} \frac{V_{w_{0}}W}{V_{w_{0}}V_{w_{0}}(Sec. 17.5.1.2 & Eq. 17.7.2.1a)}$ $\frac{A_{V_{0}}(n^{2})}{A_{V_{0}}(n^{2})} \frac{A_{v_{0}}(n^{2})}{Y_{v_{0}}V_{v_{0}}V_{v_{0}}(Sec. 17.5.1.2 & Eq. 17.7.2.1a)}$ $\frac{A_{V_{0}}(n^{2})}{A_{V_{0}}(n^{2})} \frac{A_{v_{0}}(n^{2})}{Y_{w_{0}}V_{w_{0}}V_{w_{0}}V_{w_{0}}V_{w_{0}}V_{w_{0}}V_{w_{0}}W(b)}{121.50 820.13 0.744 1.400 1.000 19759 0.70 2136$	AN <sub>ety</sub> (lb) 3813
$\frac{1}{46540} \frac{\psi}{0.65} \frac{\psi}{29601}$ 5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.6.2) $N_0 = k_0\lambda_0 V_{c}h_{0}^{-1/2} (h_{c}^{-1/2}) \frac{k_c}{k_c} \frac{\lambda_a}{f_c} \frac{f_c(ps)}{ps} \frac{h_{ar}(n)}{k_c} \frac{N_b(b)}{6805}$ $\frac{1}{27.0} \frac{1.00}{1.00} \frac{2500}{2500} \frac{2.940}{2.940} \frac{6805}{6805}$ $\frac{1}{60.5} \frac{1}{60.5} \frac{1}{60.5} \frac{1}{60.5} \frac{1}{100.92} \frac{1}{77.79} \frac{1}{3.00} \frac{1}{1.000} \frac{1}{0.904} \frac{1}{1.00} \frac{1}{0.735} \frac{1}{6805} \frac{1}{6805} \frac{1}{0.65}$ 8. Steel Strength of Anchor in Shear (Sec. 17.7.1) $\frac{V_{m}(b)}{14950} \frac{\phi_{brad}}{1.0} \frac{\phi}{0.60} \frac{\phi_{brad}}{8970}$ 9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2) Shear perpendicular to edge in y-direction: $V_{ty} = \min[7(l_0/d_3)^{2/2} d_0\lambda_0^2 v_{f_0}c_{s1}^{-1/2}] (Eq. 17.7.22.1a \& Eq. 17.7.2.2.1b) \frac{1}{b} \frac{h(n)}{a_s(n)} \frac{\lambda_a}{a_s} \frac{f_c(ps)}{c_{cs}} \frac{1}{15!} \frac{9\lambda_0 \sqrt{f_c}c_{s1}^{-1/2}}{100} \frac{1}{2500} \frac{1}{1.50} \frac{1}{150} \frac{1}{100} \frac{1}{$	∳N <sub>etg</sub> (lb) 3813
5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.6.2) $N_0 = k_0\lambda_0\sqrt{t}/c_{0}he^{1/2}(E_Q, 17.6.2.2.1)$ $\frac{k_c}{27.0}$ $\frac{\lambda_a}{1.00}$ $\frac{f_c(psi)}{2500}$ $\frac{h_{w}(n)}{2.940}$ $\frac{h_b(lb)}{6805}$ $\frac{h_{w_{0}}(in^2)}{4N_{w_0}}\frac{N_{w_{0}}N_{w_{0}}N_{w_{0}}}{N_{w_{0}}N_{w_{0}}N_{w_{0}}}(Sec. 17.5.1.2 & Eq. 17.6.2.1a)$ $\frac{A_{N_{0}}(in^2)}{100.92}$ $\frac{A_{N_{0}}(in^2)}{77.79}$ $\frac{A_{N_{0}}(in)}{3.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{1.00}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $\frac{A_{N_{0}}(in)}{2.500}$ $A_{N_{$	<i>ф</i> Ке <sub>бу</sub> (Ib) 3813
<b>5.</b> Concrete Breakout Strength of Anchor in Tension (Sec. 17.6.2) $N_{0} = k_{c}\lambda_{0}\sqrt{t}c_{hw}^{1.0} (Eq. 17.6.2.2.1)  \frac{k_{c}}{27.0} \frac{\lambda_{a}}{1.00} \frac{f_{c}(\text{psi})}{2500} \frac{hw}{2.940} \frac{N_{b}(\text{lb})}{6805}  \frac{N_{hag} = \phi(A_{Nc}/A_{Nco})V_{wc,N}V_{wc,N}V_{wc,N}V_{b}(Sec. 17.5.1.2 \& Eq. 17.6.2.1a)  A_{Nco}(in^{2}) A_{Nco}(in^{2}) C_{u,nav}(in) \frac{V_{vc,N}}{V_{wc,N}} \frac{V_{wc,N}}{V_{wc,N}} \frac{V_{wc,N}}{V_{wc,N}} \frac{V_{c_{u,N}}}{N_{c}(N} \frac{V_{c_{u,N}}}{N_{c}(N} \frac{N_{b}(\text{lb})}{0.904} \frac{\phi}{1.00} 0.735 \frac{6805}{0.65} 0.65 \\ \hline 100.92 77.79 3.00 1.000 0.904 1.00 0.735 \frac{6805}{0.65} 0.65 \\ \hline \frac{N_{reg}}{14950} \frac{\phi}{1.0} \frac{\phi}{0.60} \frac{\phi_{yrax}\phi_{Vac}}{8970} \frac{V_{ac}}{N} \frac{V_{c}}{N_{c}} \frac{V_{c}}{N} \frac{V_{c}}{N_{c}} V$	ØNosy (lb) 3813
$\frac{k_{c}}{27.0} - \frac{\lambda_{a}}{100} - \frac{f_{c}(ps)}{2500} - \frac{h_{w}(n)}{2.940} - \frac{N_{b}(b)}{6805}$ $\frac{27.0}{27.0} - \frac{1.00}{2500} - \frac{2500}{2.940} - \frac{2500}{6805}$ $\frac{27.0}{2500} - \frac{\lambda_{a}}{2.940} - \frac{V_{c}}{6805} - \frac{V_{c}}{2.8} - \frac{V_{c}}{2.8} - \frac{V_{c}}{2.8} - \frac{V_{c}}{2.8} - \frac{N_{b}(b)}{2.940} - \frac{N_{b}(b)}{6805} - \frac{N_{b}(b)}{2.940} - N_{b$	фКсау (lb) 3813
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	¢W <sub>cty</sub> (lb) 3813
$\frac{M_{dag} = \phi(A_{Nc} / A_{Ncg}) \mathcal{W}_{ecN} \mathcal{W}_{ecN} \mathcal{W}_{ecN} \mathcal{W}_{ecN} \mathcal{W}_{ecN}}{100.92} \frac{A_{Ncg} (in^2)}{100.92} \frac{c_{avals} (in)}{10.00} \frac{\mathcal{Y}_{ecN}}{1.000} \frac{\mathcal{Y}_{ecN}}{0.904} \frac{\mathcal{Y}_{ecN}}{1.00} \frac{\mathcal{Y}_{ecN}}{0.735} \frac{\mathcal{Y}_{ecN}}{6805} \frac{\mathcal{N}_{0} (b)}{0.65}$ <b>8. Steel Strength of Anchor in Shear (Sec. 17.7.1)</b> $\frac{V_{10} (b)}{14950} \frac{\phi_{prod}}{1.0} \frac{\phi}{0.60} \frac{\phi_{prod} \mathcal{P}_{ecN}}{8970}$ <b>9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2)</b> <b>Shear perpendicular to edge in y-direction:</b> $V_{1y} = \min[7(l_0 / d_1)^{2.2\sqrt{l}} d_0 \lambda_0 \sqrt{l_c} c_{st}^{1.5}; 9 \lambda_0 \sqrt{l_c} c_{st}^{1.5}] (Eq. 17.7.2.2.1a \& Eq. 17.7.2.2.1b) \\ \frac{L}{(in)} \frac{d_n}{d_n} (in) \frac{\lambda_n}{\lambda_n} \frac{r_e (psi)}{r_e c_{st}^{1.5}} \frac{c_{wt} (in)}{r_e (psi)} \frac{V_{tw} (b)}{r_{st}}$ 2.94 0.750 1.00 2500 13.50 19759 $\frac{\mathcal{P}_{ety} = \phi(A_{Wc} / A_{Wc}) \mathcal{V}_{ect} \mathcal{V}_{ect} \mathcal{V}_{ect} \mathcal{V}_{ect}}{r_{ect} \mathcal{V}_{ect}} \frac{\mathcal{V}_{ect}}{V_{ect}} \frac{\mathcal{V}_$	ØVceg (lb) 3813
Ance (in <sup>n</sup> )       Acco (in <sup>n</sup> )       Carnee (in) $Y_{ecN}$ $Y_{ec$	3813
1.000       0.001       0.001       0.001         Steel Strength of Anchor in Shear (Sec. 17.7.1)         Vm (lb) $\phi_{proof}$ $\phi$	3013
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	
14950       1.0       0.60       8970         9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2)         Shear perpendicular to edge in y-direction: $V_{ty} = \min[7(l_0/d_3)^2 2\sqrt{d_0} \lambda_0 \sqrt{f_0} C_{23} 1^{5}]$ ; $9\lambda_0 \sqrt{f_0} C_{23} 1^{5}]$ (Eq. 17.7.2.2.1a & Eq. 17.7.2.2.1b)         Is (in) $d_a$ (in) $\lambda_a$ $f_c$ (psi) $c_{br}$ (in) $V_{ty}$ (ib)         2.94       0.750       1.00       2500       13.50       19759 $gV_{cty} = \phi(A_{Ve}/A_{Ve0})V_{ec}V_{F_c}V_{F_b}V_{by}$ (Sec. 17.5.1.2 & Eq. 17.7.2.1a)       Ave (in <sup>3</sup> ) $V_{exV}$ $Y_{cv}$ $Y_{bv}$ $V_{by}$ (ib) $\phi$ $\phi V_{cty}$ (ib)         121.50       820.13       0.744       1.400       1.000       19759       0.70       2136	
By Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2)           Shear perpendicular to edge in y-direction: $V_{by} = min[7(l_0/d_y)^{2/3}(d_y\lambda_0)(r_0c_y)^{1/2}; 9\lambda_0)(r_0c_y)^{1/2}] (Eq. 17.7.2.2.1a & Eq. 17.7.2.2.1b)$ Is (in) $d_s(in)$ $\lambda_s$ $\Gamma_c$ (psi) $C_{wt}$ (in) $V_{by}$ (lb)           2.94         0.750         1.00         2500         13.50         19759 $\varphi V_{sty} = \varphi (A_{Vc}/A_{Vvy}) V_{wc}V_{F_{V}}V_{F_{V}}V_{by}$ (Sec. 17.5.1.2 & Eq. 17.7.2.1a) $A_{Vc}$ (in <sup>2</sup> ) $V_{c_V}$ $Y_{c_V}$ $Y_{c_V}$ $V_{c_V}$ (lb) $\phi$ $\phi V_{cty}$ (lb)           121.50         820.13         0.744         1.400         1.000         19759         0.70         2136	
Shear perpendicular to edge in y-direction: $V_{ty} = min[7(l_0/d_3)^2 2\sqrt{d_0} \lambda_0 \sqrt{t_0} C_{23} + 15]$ ; $9\lambda_0 \sqrt{t_0} C_{25} + 15]$ (Eq. 17.7.2.2.1a & Eq. 17.7.2.2.1b) $I_0$ (in) $\Delta_n$ $f_c$ (psi) $c_{vt}$ (in) $V_{ty}$ (b)           2.94         0.750         1.00         2500         13.50         19759 $gV_{cty} = \phi(A_{Vc}/A_{Vvo}) V_{vet} v V_{cv} V_{bv}$ (Sec. 17.5.1.2 & Eq. 17.7.2.1a) $A_{Vc}$ (in <sup>2</sup> ) $V_{ctv}$ $Y_{h,v}$ $V_{ty}$ (b) $\phi$ $\phi V_{cty}$ (lb)           121.50         820.13         0.744         1.400         1.000         19759         0.70         2136	
$\begin{split} & \mathcal{V}_{ty} = \min[7(l_0/d_y)^2 2^{v} d_y \lambda_0 \sqrt{r}_0 c_{y} t^{15}] \cdot 9 \lambda_0 \sqrt{r}_0 c_{y} t^{15}] \cdot [\text{Eq. 17.7.2.2.1a & Eq. 17.7.2.2.1b)} \\ & I_0(\text{in}) & d_0(\text{in}) & \lambda_0 & \Gamma_0(\text{psi}) & c_{wt}(\text{in}) & V_{ty}(\text{lb}) \\ \hline 2.94 & 0.750 & 1.00 & 2500 & 13.50 & 19759 \\ & \theta V_{ty} = \phi (A_{Ve}/A_{Vey}) V_{eeV} V_{e_V} V_{h_V} V_{h_V} \text{ (Sec. 17.5.1.2 & Eq. 17.7.2.1a)} \\ & A_{Ve}(\text{in}^2) & A_{Veo}(\text{in}^2) & V_{exV} & V_{h_V} & V_{h_V} & V_{h_V} \text{ (lb)} & \phi & \phi V_{ety} \text{ (lb)} \\ \hline 121.50 & 820.13 & 0.744 & 1.400 & 1.000 & 19759 & 0.70 & 2136 \\ \end{split}$	
$M_{e}(m)$ $D_{a}(m)$ $A_{a}$ $T_{e}(ps)$ $C_{et}(m)$ $V_{ey}(b)$ 2.94       0.750       1.00       2500       13.50       19759 $\delta V_{ety} = \phi(A_{Ve}/A_{Ve})V_{ety}V_{ey}V_{ey}V_{ey}(Sec. 17.5.1.2 & Eq. 17.7.2.1a)$ $A_{Ve}(in^2)$ $A_{ve}(in^2)$ $V_{exv}$ $Y_{bv}$ $V_{by}$ (ib) $\phi$ $\phi V_{oby}$ (ib)         121.50       820.13       0.744       1.400       1.000       19759       0.70       2136	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	
A <sub>VV</sub> (in <sup>2</sup> )         Y <sub>6V</sub> Y <sub>6V</sub> Y <sub>5V</sub> V <sub>ty</sub> (lb)         Ø         ØV <sub>ty</sub> (lb)           121.50         820.13         0.744         1.400         1.000         19759         0.70         2136	
121.50 820.13 0.744 1.400 1.000 19759 0.70 2136	
	-8
Shear parallel to edge in x-direction:	
Viv = min[7(le/de) <sup>22</sup> (de)e <sup>2</sup> (cet <sup>15</sup> ; 92e) <sup>4</sup> (cet <sup>15</sup> ] (Eq. 17.7.2.2.1a & Eq. 17.7.2.2.1b)	
Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked	for plausibility.
Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard Pleasanton, CA 94588 Phone: 925.560.9000 Fax: 925.847.3871 www.s	trongfie.com



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Strong	Tie Soft	ware		Projec	z:					
	Versi	on 3.1.2209.3	k	Addre	\$8:					
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				E-mai	b i i i					
Ia (in)	da (in)	ha	fc (psi)	Cet (in)	V <sub>ty</sub> (ib	)	_			
2.94	0.750	1.00	2500	3.00	2070		-			
$\beta V_{cogs} = \phi (i$	2)(Ave / Avoo)\$Poo	WPodv Vav VA	Vby (Sec. 17.5	.1.2, 17.7.2.1(c	& Eq. 17.7.2.	1b)				
Ave (in <sup>2</sup> )	Aveo (in2)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{a,V}$	$\Psi_{n,\nu}$		V <sub>ty</sub> (lb)	ø		¢V <sub>abge</sub> (Ib)
76.50	40.50	1.000	1.000	1.400	1.000		2070	0.70		7663
Wagg = ¢Kas Kap 2 0	$N_{ctg} = \phi K_{cp} (A_{Nc} / A_{Nc} /$	(Anco) Vec.11 Vec Anco (in <sup>2</sup> )	ох Фан Фан No ( Фисл 1.000	Sec. 17.5.1.2 &	Eq. 17.7.3.1b) <i>V<sub>CN</sub></i>	Ψ <sub>(0.N</sub>	N₂ (lb)	4	¢	¢Vφ3 (lb) 8212
$\theta V_{\alpha \mu \mu} = \phi k_{\alpha \mu}$ $k_{\alpha \mu}$ 2.0	$N_{ctop} = \frac{\partial K_{cp}(A_{Nc})}{A_{Nc} (in^2)}$ 100.92	/ Α <sub>ΝCD</sub> )Ψ <sub>sc,II</sub> Ψ <sub>ec</sub> Α <sub>ΝCD</sub> (in <sup>2</sup> ) 77.79	ωΨενΨανΝь( Ψ <sub>κεΝ</sub> 1.000	Sec. 17.5.1.2 8 <i>Y<sub>et/l</sub></i> 0.904	Eq. 17.7.3.1b) <i>Y<sub>cN</sub></i> 1.000	Ψ <sub>αι.N</sub> 0.735	N₀ (lb) 6805	0	¢ 0.70	<i>∳V₀₀</i> ₂ (lb) 8213
W <sub>aq</sub> = φ <sub>Ka</sub> k <sub>φ</sub> 2.0 11. Results nteraction Tension	$\frac{N_{clig} = \phi K_{cp}(A_{Nc}/A_{Nc})}{A_{Nc}(in^2)}$ 100.92	(ANCO) Vec.n Vec Anco (in <sup>2</sup> ) 77.79 d Shear Ford Factored Lo	см У <sub>сл</sub> , У <sub>ссл</sub> , Ио У <sub>исл</sub> 1.000 ces (Sec. R17 хаd, Nas (lb)	Sec. 17.5.1.2 & <u>Y<sub>et/l</sub></u> 0.904	Eq. 17.7.3.1b) <u>Y<sub>CN</sub></u> 1.000 ngth, øN <sub>8</sub> (ib)	Ψ <sub>αιN</sub> 0.735 Ratio	N <sub>2</sub> (lb) 6805	d	0.70 Status	¢V₀₂ (lb) 8213
W <sub>app</sub> = φk <sub>ap</sub> k <sub>ap</sub> 2.0 II. Results nteraction Tension Steel	$\frac{N_{clig} = \phi K_{cp}(A_{Nc}/A_{Nc})}{A_{Nc}(in^2)}$ 100.92	(ANCO) V SC //	<u>Ψ<sub>KN</sub>Ψ<sub>GN</sub>Ψ<sub>GN</sub>M<sub>0</sub>()</u> <u>Ψ<sub>KCN</sub></u> 1.000 ces (Sec. R17, bad, N <sub>s2</sub> (lb)	Sec. 17.5.1.2 & <u>Y<sub>et/l</sub></u> 0.904 <u>8</u> ) Design Street 29601	Eq. 17.7.3.1b) Y <sub>CN</sub> 1.000 hgth, eN <sub>8</sub> (ib)	P <sub>GLN</sub> 0.735 Ratio 0.03	N <sub>2</sub> (lb) 6805	6	0.70 Status Pass	¢V₀₂ (lb) 8213
N <sub>app</sub> = M <sub>ap</sub> <u>kap</u> 2.0 11. Results nteraction Tension Steel Concrete	$N_{ctop} = \phi K_{cp} (A_{Nc}) A_{Nc} (in^2)$ 100.92 a of Tensile and breakout	(ANKO) (Vec.1) Vec. ANKO (in <sup>2</sup> ) 77.79 d Shear Fors Factored Lo 795 1590	<sub>ол</sub> Ф <sub>ел</sub> Ф <sub>ел</sub> N <sub>b</sub> ( <u>Ч<sub>ес</sub> N</u> 1.000 <u>сев (Sec. R17</u> хад. N <sub>s3</sub> (Ib)	8ec. 17.5.1.2 & <u>Yet//</u> 0.904 8) Design Street 29601 3813	Eq. 17.7.3.1b) $\frac{\Psi_{EN}}{1.000}$ high, $\phi N_h$ (lb)	Ψ <sub>ctr.N</sub> 0.735 Ratio 0.03 0.42	N₀ (lb) 6805	0	o D.70 Status Pass Pass (G	φV <sub>φ9</sub> (lb) 8213
N <sub>ap</sub> = M <sub>ap</sub> <u>kap</u> 2.0 11. Results nteraction Tension Steel Concrete Shear	N <sub>ctop</sub> = <i>φ</i> K <sub>cp</sub> (A <sub>Nc</sub> ) A <sub>Nc</sub> (in <sup>2</sup> ) 100.92 to of Tensile an breakout	(ANNO) Yesch	ол Фели Фели Мо ( <u>Чесли</u> 1.000 ces (Sec. R17) bad, N <sub>60</sub> (Ib)	Sec. 17.5.1.2 & <u>Y<sub>et</sub>()</u> 0.904 <u>B</u> <u>Design Street</u> 29601 3813 Design Street	Eq. 17.7.3.1b) <u>YEN</u> 1.000 hgth, eN <sub>1</sub> (ib)	P <sub>GEN</sub> 0.735 Ratio 0.03 0.42 Ratio	N₀ (lb) 6805	đ	5 0.70 Status Pass Pass (G Status	øV <sub>ωσ</sub> (lb) 8213 soverns)
W <sub>qup</sub> = M <sub>for</sub> k <sub>op</sub> 2.0 1. Results nteraction Tension Steel Concrete Shear Steel	$N_{clip} = \phi K_{cp} (A_{Nc} / A_{Nc})$ $A_{Nc} (in^2)$ 100.92 a of Tensile and breakout	(Aska) Vectri Vec Aska) (in <sup>2</sup> ) 77.79 d Shear Forc Factored Lo 795 1590 Factored Lo 420	<sub>6N</sub> Ф <sub>сн</sub> V <sub>qun</sub> N <sub>b</sub> ( <u>V<sub>scN</sub></u> 1.000 <u>Ces (Sec. R17</u> xad, N <sub>sb</sub> (Ib)	8ec. 17.5.1.2 & 9/ec// 0.904 8) Design Stree 29601 3813 Design Street 8970	Eq. 17.7.3.1b) $\frac{\Psi_{CN}}{1.000}$ hight, $\sigma N_{h}$ (ib)	P <sub>GEN</sub> 0.735 Ratio 0.03 0.42 Ratio 0.05	N₀ (lb) 6805	đ	5 D.70 Status Pass Pass (G Status Pass	øV <sub>og</sub> (lb) 8213 koverns)
W <sub>qup</sub> = K <sub>for</sub> k <sub>rp</sub> 2.0 1. Results nteraction Tension Steel Concrete Shear Steel T Concret	$N_{clip} = \phi K_{cp} (A_{Nc} / A_{Nc}) \frac{A_{Nc} (ln^2)}{100.92}$ a of Tensile and breakout te breakout y+	(Aska) Vectri Vec Aska) (in <sup>2</sup> ) 77.79 d Shear Forc Factored Lc 795 1590 Factored Lc 420 840	<sub>60</sub> , <i>Ψ<sub>en</sub>W<sub>anNa</sub></i> ( <u><i>Ψ<sub>en</sub>N</i></u> 1.000 <u>Ces (Sec. R17</u> Sad, N <sub>ea</sub> (Ib) Sad, V <sub>oa</sub> (Ib)	8ec. 17.5.1.2 & <u>Y<sub>ect</sub></u> 0.904 <u>B</u> Design Street 29601 3813 Design Street 8970 2136	Eq. 17.7.3.1b) $\frac{\Psi_{CN}}{1.000}$ hight, $\sigma N_{h}$ (ib) hight, $\sigma V_{h}$ (ib)	P <sub>cs.N</sub> 0.735 Ratio 0.03 0.42 Ratio 0.05 0.39	N₀ (lb) 6805	4 (	5 D.70 Status Pass Pass (G Status Pass (G Pass (G	φV <sub>op</sub> (lb) 8213 coverns)
W <sub>qup</sub> = K <sub>for</sub> k <sub>rp</sub> 2.0 1. Results nteraction Tension Steel Concrete Shear Steel T Concrete II Concrete	N <sub>ctop</sub> = <i>φ</i> K <sub>cp</sub> (A <sub>Nc</sub> / A <sub>Nc</sub> (in <sup>2</sup> ) 100.92 a of Tensile an breakout te breakout y+ te breakout x-	(Aska) Vectri Vec Aska (in <sup>2</sup> ) 77.79 d Shear Forc Factored Lc 795 1590 Factored Lc 420 840 840	<sub>0N</sub> Ф <sub>сн</sub> V <sub>qun</sub> N <sub>b</sub> ( <u>V<sub>sc</sub> N</u> 1.000 <u>Ces (Sec. R17</u> Dad, N <sub>s0</sub> (Ib)	Sec. 17.5.1.2 & <u>Y<sub>et</sub>//</u> 0.904 <u>Design Street</u> 29601 3813 <u>Design Street</u> 8970 2136 7663	Eq. 17.7.3.1b) $\frac{\Psi_{CN}}{1.000}$ hgth, $\sigma N_{h}$ (ib) hgth, $\sigma V_{h}$ (ib)	P <sub>GEN</sub> 0.735 Ratio 0.03 0.42 Ratio 0.05 0.39 0.11	N₀ (lb) 6805	¢ (	o D.70 Status Pass (G Status Pass (G Pass (G Pass (G Pass (G	φV <sub>op</sub> (lb) 8213 loverns) loverns)
W <sub>qup</sub> = K <sub>fice</sub> k <sub>ce</sub> 2.0 1. Results nteraction Tension Steel Concrete Shear Steel T Concrete II Concrete Pryout	N <sub>ctop</sub> = <i>φ</i> K <sub>op</sub> ( <i>A</i> <sub>Nc</sub> / <i>A</i> <sub>Nc</sub> (in <sup>2</sup> ) 100.92 a of Tensile an breakout te breakout y+ te breakout x-	(ANNO) (In <sup>2</sup> ) 77.79 d Shear Force Factored Lc 795 1590 Factored Lc 420 840 840 840	ол Фел Исал Ма ( <u>Укс. М</u> 1.000 2005 (Sec. R17 xad, Nea (Ib) xad, Voa (Ib)	Sec. 17.5.1.2 & <u>Yeth</u> 0.904 Design Street 29601 3813 Design Street 8970 2136 7663 8213	Eq. 17.7.3.1b) <u>YEN</u> 1.000 hgth, øN <sub>1</sub> (lb)	Ψ <sub>GBN</sub> 0.735 0.03 0.03 0.42 Ratio 0.05 0.39 0.11 0.10	N₀ (lb) 6805	6	o D.70 Status Pass Pass (G Pass (G Pass (G Pass (G Pass (G Pass (G	øV <sub>ωσ</sub> (lb) 8213 ioverns) ioverns)
W <sub>app</sub> = M <sub>ap</sub> <u>kap</u> 2.0 11. Results <u>nteraction</u> Tension Steel Concrete Shear Steel T Concrete Pryout Interaction II Concrete II Concrete II Concrete	Nctop = ¢K <sub>4</sub> p(Anc./ Anc (in <sup>2</sup> ) 100.92 a of Tensile an breakout te breakout y+ te breakout y+ te breakout x- n check (Na	(Aska) Vector Ve	(V <sub>40</sub> V <sub>40</sub> NA) ( <u>V<sub>40</sub>N</u> 1.000 2005 (Sec. R17 33d, N <sub>40</sub> (lb) 33d, V <sub>40</sub> (lb)	Sec. 17.5.1.2 & <u>Vec//</u> 0.904 <u>Design Street</u> 29601 3813 <u>Design Street</u> 8970 2136 7663 8213 	Eq. 17.7.3.1b) $Y_{EN}^{c}$ 1.000 hgth, $\sigma N_h$ (lb) hgth, $\sigma V_h$ (lb)	Ψ <sub>GEN</sub> 0.735 0.735 0.03 0.03 0.42 Ratio 0.05 0.39 0.11 0.10	N₀ (lb) 6805	6	o D.70 Status Pass Pass (G Pass (G Pass (G Pass Status Status	ملابهو (الح) 8213 loverns) loverns) loverns)

3/4"Ø Titen HD, hnom:4" (102mm) meets the selected design criteria.

# 12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W, Las Positas Boulevard Pleasanton, CA 94588. Phone: 925:560.9000. Fax: 925:847.3871. www.strongfie.com



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# SIMPSON Strong-Tie

Anchor Designer™ Software

Version 3.1.2209.3

Company:	Date:	9/8/2022
Engineer:	Page:	1/5
Project:		
Address:		
Phone:		
E-mail:		

1.Project information

Customer company: Customer contact name: Customer e-mail: Comment:

# 2. Input Data & Anchor Parameters

General Design method:ACI 318-19 Units: Imperial units

# Anchor Information:

Anchor type: Concrete screw Material: Carbon Steel Diameter (inch): 0.750 Nominal Embedment depth (inch): 4.000 Effective Embedment depth, her (inch): 2.940 Code report: ICC-ES ESR-2713 Anchor category: 1 Anchor ductility: No hrin (inch): 6.00 ca: (inch): 6.00 Cnn (inch): 1.75 Srit (inch): 2.75

Recommended Anchor Anchor Name: Titen HD® - 3/4\*Ø Titen HD, hnom:4\* (102mm) Code Report: ICC-ES ESR-2713



Project description: Location: Fastening description:

# **Base Material**

Concrete: Normal-weight Concrete thickness, h (inch): 48.00 State: Uncracked Compressive strength, fc (psi): 2500 Ψex: 1.4 Reinforcement condition: Supplementary reinforcement not present Supplemental edge reinforcement: No Reinforcement provided at corners: No Ignore concrete breakout in tension: No Ignore concrete breakout in shear: No Ignore 6do requirement; Not applicable Build-up grout pad: No

# Base Plate

Length x Width x Thickness (inch): 3.50 x 12.00 x 0.25

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Positas Boulevard. Pleasanton, CA 94588. Phone: 925.560.9000. Fax: 925.847.3871. www.strongtie.com



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			E-mail:				
3. Resulting An	chor Forces					<b>Ch</b>	
Anchor	Tension load, Nue (Ib)	Shear Vox (Ib	oad x, )	Shear load V <sub>uty</sub> (lb)	у,	V(Vaas)2+(Vaay)	ombined, )² (lb)
1	1001.0	0.0		1001.0		1001.0	
2 Sum	1001.0	0.0		1001.0		1001.0	
Maximum concre Maximum concre Resultant tension Resultant compre Eccentricity of res Eccentricity of res Eccentricity of res	te compression strain ( te compression stress ( force (Ib): 2002 ession force (Ib): 0 sultant tension forces in sultant tension forces in x sultant shear forces in y	ω): 0.00 psi): 0 x-axis, e <sup>*</sup> № (inch): 0 y-axis, e <sup>*</sup> № (inch): 0 axis, e <sup>*</sup> № (inch): 0.0 axis, e <sup>*</sup> № (inch): 0.0	00 00 0	<figure :<="" td=""><td><u>_</u>1</td><td>×</td><td><u></u>2</td></figure>	<u>_</u> 1	×	<u></u> 2
N <sub>14</sub> (lb)	n of Anchor in Tensio	n (Sec. 17.6.1)					
45540 0	.65 29601						
$N_{b} = k_{c}\lambda_{a}\sqrt{r_{c}h_{c}}^{1.5}$ $\frac{k_{c}}{27.0}$ $\frac{\lambda}{100.92} = \phi (A_{Nc}/A_{N})$ $\frac{A_{Nc} (m^{2})}{100.92}$ $\frac{A_{Nc}}{77}$ $\frac{8. Steel Strengt}{V_{Mc} (lb)} \neq \frac{1}{14950}$ $1$	(Eq. 17.6.2.2.1) a fc (psi) .00 2500 bo) Yec.N Yec.N Yec.N YouNN .00 (in <sup>2</sup> ) C <sub>2.N</sub> ew (in) .79 3.00 h of Anchor in Shear broad Ø .0 0.60	$\frac{h_{sr}(in)}{2.940}$ (Sec. 17.5.1.2 & Ec $\Psi_{ecN} = \Psi_{sd}$ 1.000 0.96 (Sec. 17.7.1) $\phi_{pour}\phi V_{ss}$ (Ib) 8970	N₂ (lb)           6805           µ. 17.6.2.1a)           №	Ψ <sub>α.N</sub> 0 0.735	N₀ (lb) 6805	¢ 0.65	/Wetg (lb) 3813
0 Concrete Bro	akout Strength of An o edge in x-direction: ) <sup>32</sup> า่ป <sub>ี่ต</sub> ัลว่ารั <sub>ว Ca</sub> าร์: 9มัลาร์ร (a (in) มือ	chor in Shear (Sec cr1 <sup>15</sup>   (Eq. 17.7.2.2 fc (psi)	17.7.2) 1a & Eq. 17.7. <sub>Cet</sub> (in)	2.2.1b) V <sub>ty</sub> (lb)	_		
Shear parallel to Shear parallel to V <sub>ty</sub> = min 7( <i>l<sub>a</sub></i> / <i>d</i> , <i>l<sub>a</sub></i> (in) d	100	2500 Var (Sec. 17.5.1.2	3.00 17.7.2.1(c) & F	2070 g. 17.7.2.1b)			
Shear parallel to $V_{ty} = min[7(l_a/d_a)]$ $l_a$ (in) d 2.94 0 $\partial V_{char} = \partial (2)(A_{corr})$	/ Avec) Yes v Yes v Yes v Yes		100	46	V <sub>zy</sub> (Ib)	0	¢V <sub>shar</sub> (lb)
Shear parallel to $V_{tyr} = min[7(l_e)/d_e]$ $l_e$ (in) d 2.94 0 $\phi V_{copr} = \phi (2)(A_{Ve})$ $A_{Ve}$ (in <sup>2</sup> ) A	$/A_{V00}$ ) $\Psi_{ec,V}\Psi_{et,V}\Psi_{ec,V}\Psi_{h}$ were (in <sup>2</sup> ) $\Psi_{ec,V}$	Post	Tev	100			7663
Sciencies between parallel t       Shear parallel t $V_{1y} = \min[7(l_a/d_s)]$ $l_s$ (in)     d $2.94$ d $\delta V_{cops} = \phi(2)(A_{Vis})$ $A_{Vic}$ (in <sup>2</sup> )     A $76.50$ 4	$(A_{V00}) Y_{ec, V} Y_{et, V} Y_{ec, V} Y_{et, V} Y_{ec, V}$ $(Vec, (in^2) Y_{ec, V}$ (1.000)	9 <sup>2</sup> ec.v 1.000	1.400	1.000	2070	0.70	1000

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IMPSON Anchor Designer M	Company:	Date:	9/8/2022
Anchor Designer	Engineer:	Page:	5/5
Software Version 3.1.2209.3	Project:		
	Address:		
	Phone:		
	E-mail:		

# 10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.7.3)

$\delta V_{QQ} = \delta \kappa_Q N_{GQ} = \delta \kappa_Q (A_{NC}/A_{NC}) V_{\pi CN} V_{QN} V_{QN} N_0 (Sec. 17.5.1.2 & Eq. 17.7.3.1b)$										
Ka	Ane (in <sup>2</sup> )	Ane (in2)	Y'ecN	Y'ec.N	$\Psi_{c,N}$	$\Psi_{cn,N}$	N <sub>b</sub> (lb)	ø	øVws (lb)	
2.0	100.92	77.79	1.000	0.904	1.000	0.735	6805	0.70	8213	

# 11. Results

# Interaction of Tensile and Shear Forces (Sec. 17.8)

Tension		Factored Los	id, Naa (lb)	Design S	trength, øNn (lb)	Ratik	0	Status	
Steel		1001		29601		0.03		Pass	
Concrete breakout		2002		3813		0.53		Pass (Governs)	
Shear		Factored Loa	id, V <sub>ω</sub> (lb)	Design S	itrength, øV₀ (lb)	Rati	0	Status	
Steel		1001		8970		0.11		Pass	
Concrete breako	ut x-	2002		7663		0.26		Pass (Governs)	
Pryout		2002		8213		0.24		Pass	
Interaction check	Nuels	W.	VultVo		Combined Ratio	0	Permissible	Status	
Sec. 17.8.1	0.53	k.	0.00		52.5%		1.0	Pass	

3/4"Ø Titen HD, hnom:4" (102mm) meets the selected design criteria.

# 12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility. Simpson Strong-Tie Company Inc. 5956 W. Las Poeitas Boulevard Pleasanton, CA 94588 Phone: 925:560.9000 Fax: 925:847.3871 www.strongtie.com



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# END OF ADDENDUM NO. 2

# Receipt of Addendum No. 2 must be acknowledged on page 4 of the "Proposal for Bidding Purposes" where indicated.

DATE OF BID OPENING REMAINS THE SAME: Wednesday, May 28, 2025, at 4:00 p.m., or soon thereafter

leanne Angman

Leanne Ingman<sup>()</sup> Natural Resources Technician