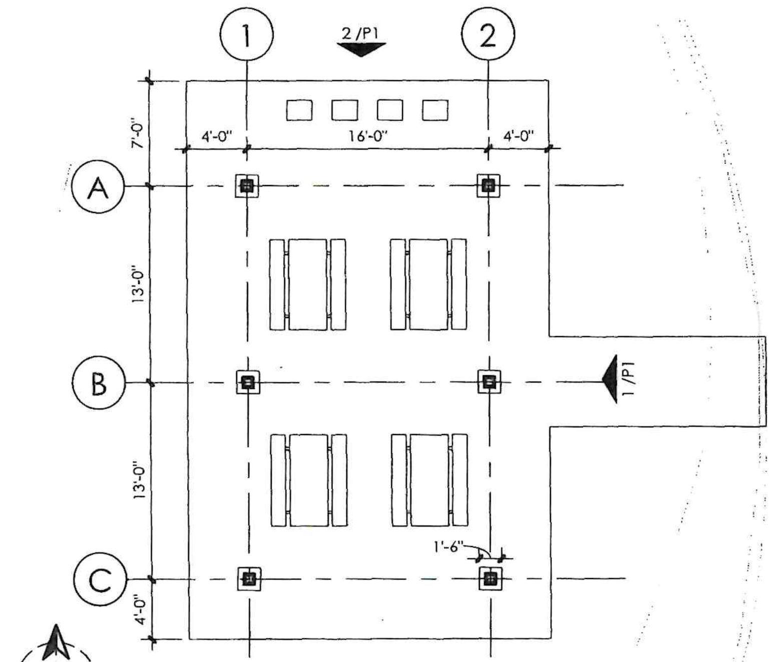
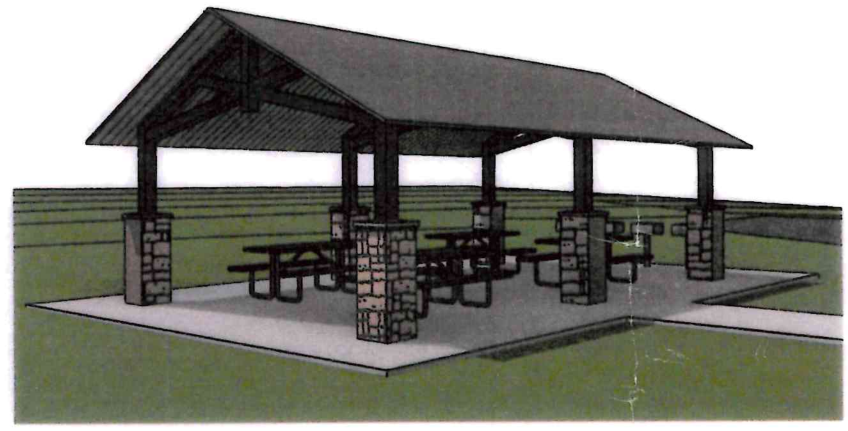
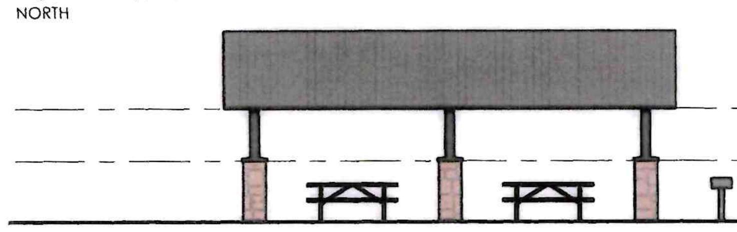
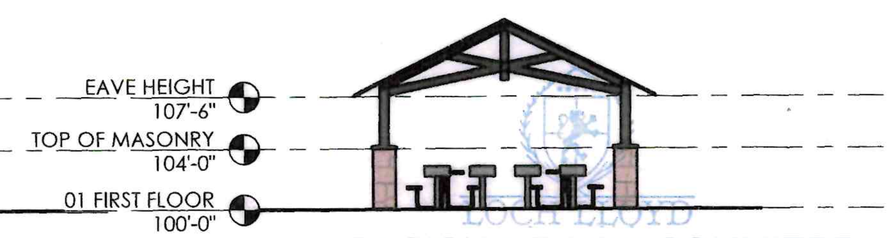


FIRST FLOOR PLAN
1/8" = 1'-0"





EAST ELEVATION
1/8" = 1'-0"



NORTH ELEVATION
1/8" = 1'-0"

LOCH LLOYD
... COMMITEE
FINAL APPROVAL
These plans submitted for PICNIC SHELTER
construction of a home on lot# LAKE, plat, are
are approved as of 3-13-23 by:
Architect:
Board Member:

F, Inc © 2022 LOCH LLOYD SHELTER OPTION 3-2 - 18" MASONRY

WSKF ARCHITECTS

01 / 18 / 23

Architectural Metal Roofing and Siding

COLOR CHART

AEP SPAN

STANDARD COLORS

DURA TECH™ *5000* - Premium 70% Fluoropolymer (PVDF) Coating

- **ZINCALUME® Plus*** — SRI: 64 • LRV: 67 • GA: 24, 22, & 20
- *Cool* **REGAL WHITE** — SRI: 88 • LRV: 75 • GA: 24 & 22
- *Cool* **PARCHMENT** — SRI: 58 • LRV: 40 • GA: 24 & 22
- *Cool* **SIERRA TAN** — SRI: 55 • LRV: 34 • GA: 24 & 22
- *Cool* **PEBBLE** — SRI: 48 • LRV: 27 • GA: 24 & 22
- *Cool* **WALNUT** — SRI: 38 • LRV: 18 • GA: 24 & 22
- *Cool* **WEATHERED COPPER** — SRI: 34 • LRV: 11 • GA: 24 & 22
- *Cool* **DARK BRONZE** — SRI: 32 • LRV: 8 • GA: 24 & 22
- *Cool* **TERRA-COTTA** — SRI: 41 • LRV: 15 • GA: 24 & 22
- *Cool* **COLONIAL RED** — SRI: 35 • LRV: 9 • GA: 24 & 22
- *Cool* **OLD TOWN GRAY** — SRI: 43 • LRV: 27 • GA: 24 & 22
- *Cool* **ZINC GRAY** — SRI: 39 • LRV: 20 • GA: 24 & 22
- *Cool* **SLATE GRAY** — SRI: 33 • LRV: 12 • GA: 24 & 22
- *Cool* **MIDNIGHT BRONZE** — SRI: 27 • LRV: 7 • GA: 24 & 22
- *Cool* **MATTE BLACK** — SRI: 29 • LRV: 5 • GA: 24 & 22
- *Cool* **TAHOE BLUE** — SRI: 33 • LRV: 14 • GA: 24 & 22
- *Cool* **REGAL BLUE** — SRI: 29 • LRV: 10 • GA: 24 & 22
- *Cool* **SAGE GREEN** — SRI: 41 • LRV: 21 • GA: 24 & 22

PREMIUM COLOR[1]

(Subject to upcharge)

- **VINTAGE®[1]** — SRI: 22 • LRV: 20 • GA: 24

Vintage coated metal is an innovative coating process over a TruZinc® G90 metallic coated steel surface producing a beautiful, durable, aged-metallic finish.

METALLIC COLORS[1]

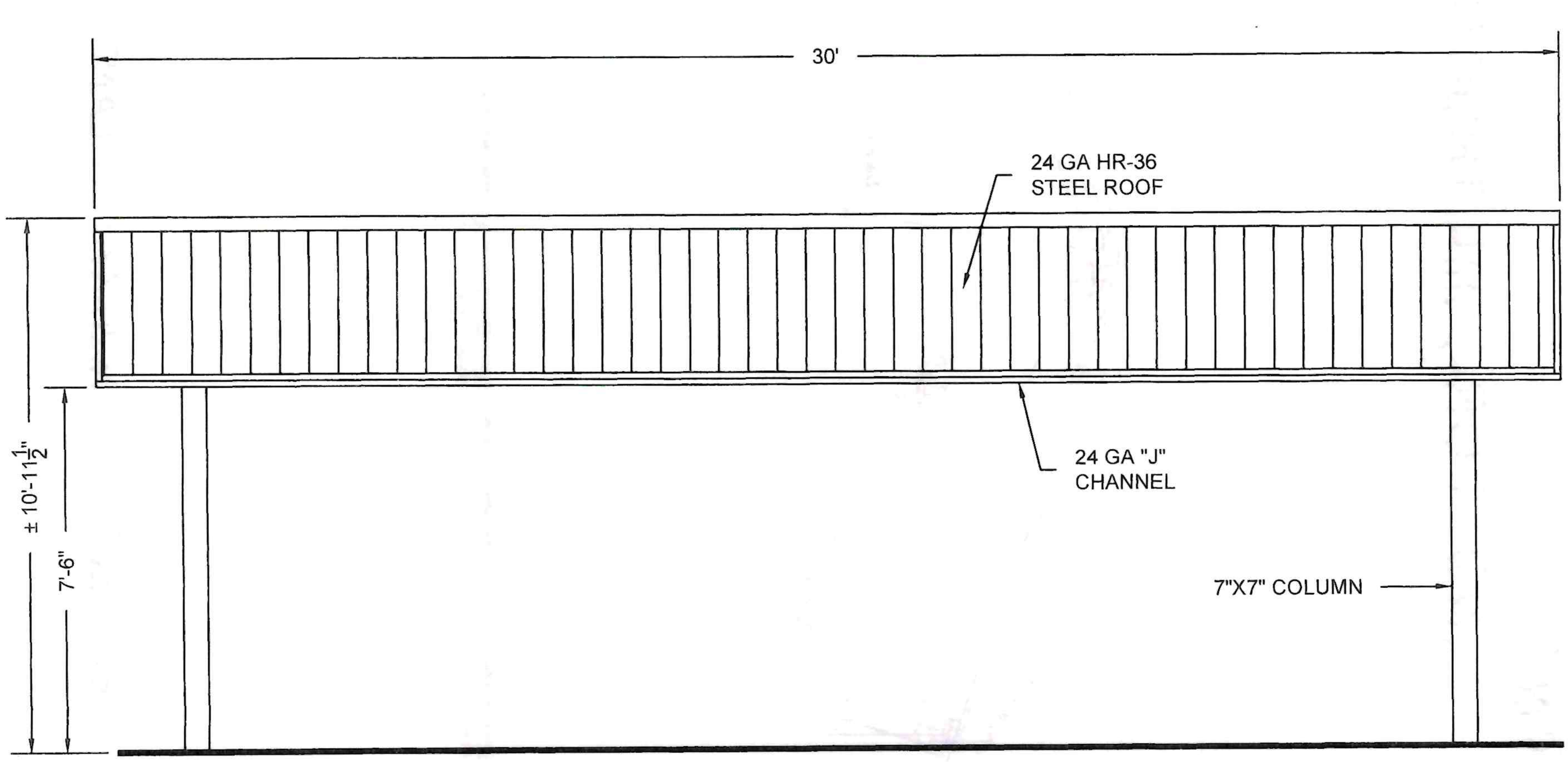
DURA TECH™ *mx* - Premium Fluoropolymer (PVDF) Pearlescent Coating (Subject to upcharge)

- *Cool* **METALLIC SILVER[1]** — SRI: 65 • LRV: 50 • GA: 24 & 22
- *Cool* **SILVERSMITH[1]** — SRI: 58 • LRV: 54 • GA: 24 & 22
- *Cool* **ZACtique® II[1]** — SRI: 39 • LRV: 22 • GA: 24 & 22
- *Cool* **METALLIC CHAMPAGNE[1]** — SRI: 54 • LRV: 33 • GA: 24 & 22

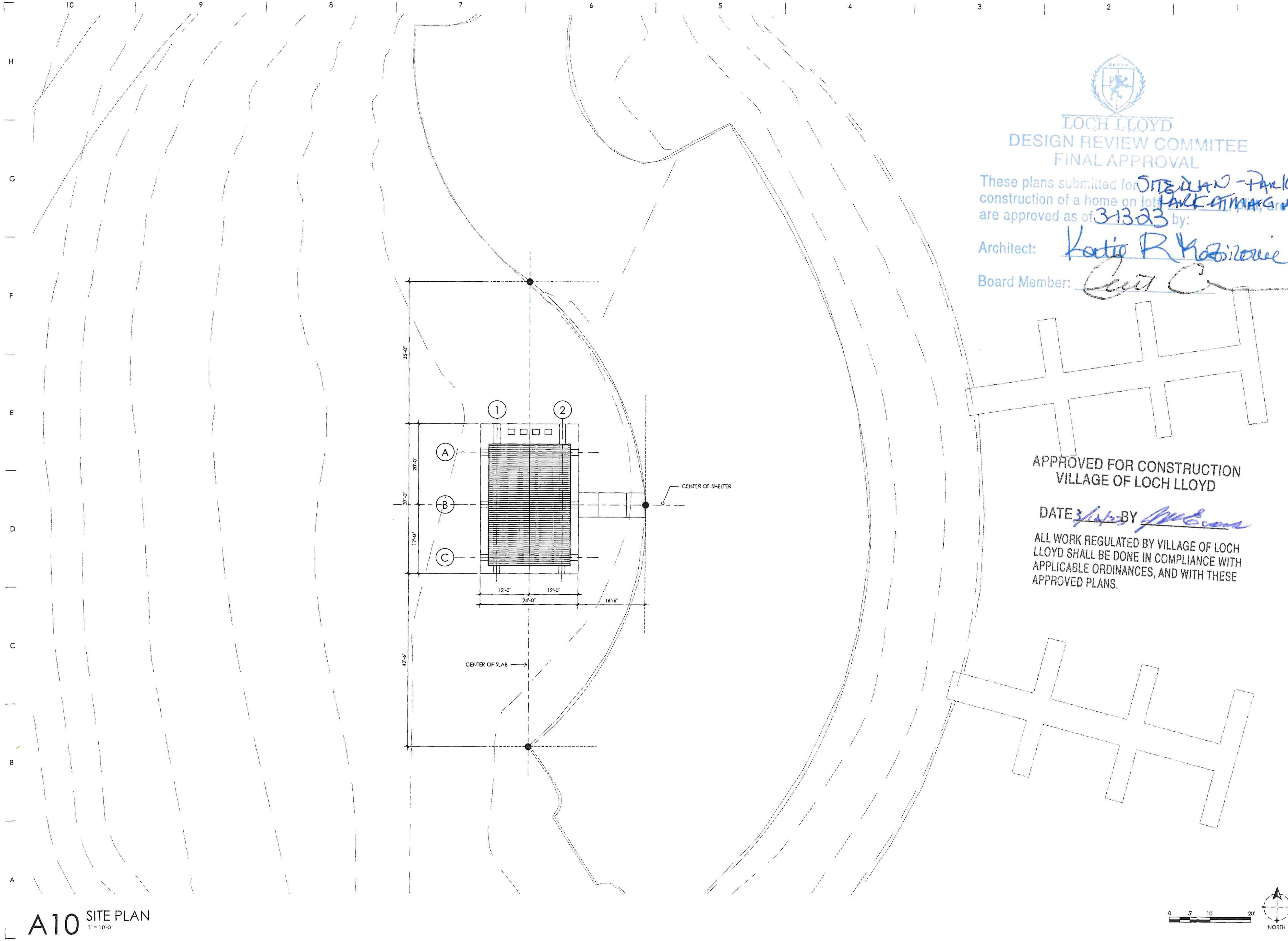
All Color Samples on the above page are approximations only!
Your monitor WILL vary from the true color.
PLEASE CALL FOR ACTUAL COLOR MATERIAL SAMPLES.

RAL 7013

NOT FOR CONSTRUCTION



ELEVATION 20'X30' ORLANDO MODEL
NTS



LOCH LLOYD
DESIGN REVIEW COMMITEE
FINAL APPROVAL

These plans submitted for SITE PLAN - Park Shelter
construction of a home on lot PARK AT MARINA
are approved as of 3-13-23 by:

Architect: Katie R Kozilovic

Board Member: [signature]

APPROVED FOR CONSTRUCTION
VILLAGE OF LOCH LLOYD

DATE 3/13/23 BY [signature]

ALL WORK REGULATED BY VILLAGE OF LOCH LLOYD SHALL BE DONE IN COMPLIANCE WITH APPLICABLE ORDINANCES, AND WITH THESE APPROVED PLANS.

A10 SITE PLAN

1" = 10'-0"

3/7/2023 8:20:26 AM

M:\2023\23001 - Loch Lloyd Shelter\1 - Drawings\Revit\23001-Loch Lloyd Shelter3-2.rvt

WSKF ARCHITECTS

Missouri Certificate of Authority #2003011262

JOB NUMBER 23001

LOCH LLOYD SHELTER

110 Armour Road North Kansas City, Missouri 64116 Tel. 816.300.4101 Fax 816.300.4102

NOT FOR CONSTRUCTION

DESIGN DEVELOPMENT DOCUMENTS

ISSUE DATE 02 / 06 / 23

No	Description	Date

WSKF, Inc. © 2022

SITE PLAN

SP1.01

Structural Calculations

for

Loch Lloyd 30' x 20' Model Model
Village of Loch Lloyd, MO

August 24, 2023

Alan E Money — Digitally signed by Alan E Money
Date: 2023.08.25 18:21:16 -07'00'

STATE OF MISSOURI
ALAN E MONEY
NUMBER PE-2012025247
PROFESSIONAL ENGINEER
Aug 25, 2023

Structural Calculations and Design Details Applicable to Installation of One - 30' x 20' Model Model at the Subject Site

AMMTec CONSULTANTS, PLLC
CONSULTING ENGINEERING SERVICES
2447 W 12th Street, Suite 1 Tempe, AZ 85281 Phone: (480) 927-9696 Fax: (480) 927-9797

AMMTEC CONSULTANTS

CLIENT:	CRS 23118	Prepared By:	AA
PROJECT:	Loch Lloyd 30' x 20' Model Model	Checked By:	MJK
	Village of Loch Lloyd, MO	Date:	08/24/23

GENERAL NOTES & BASIS OF DESIGN

1. BUILDING CODE .... **IBC 2018 ASCE 7-16**
2. GRAVITY DESIGN:

Sail Cloth Ventilation Reduction: **N/A**

EXPOSURE .... **C** — Seismic Design Category = **A**

OCCUPANCY CLASS .... **A** — Risk Category = **II**

3 SECOND WIND GUST .... **90** (mph) — Structure Obstructed **N**

		Min:	0.48	(kPa)	10.0	(psf)	
Live Load:	20.0	(psf)	Dead Load:	1.9	(psf)	Snow Load:	20.0 (psf)
SR:	0.957	(kPa)	Dead Load:	0.09	(kPa)	SS =	0.957 (kPa)

Member Dead Load will be included in the Risa Calculation

3. SOILS:

IBC 1806.3.4 Increase for poles

Soil bearing pressure .... **1,000** psf — Soil lateral bearing pressure .... **200** psf

Minimum footing depth.. **12** (inches) Unless local conditions are greater

CONCRETE

1. CODES AND STANDARDS. Comply with the following Codes:
   A. ACI 318, "Building Code Requirements for Reinforced Concrete".
   B. ACI 347, "Recommended Practice for Concrete Form Work".
2. MATERIALS shall conform to the following:
   A. Cement; ASTM C150, Type V, Portland Cement.
   B. Hard rock aggregates: ASTM C33
      Lightweight aggregates: ASTM C330
   C. Water shall be potable.
   D. Air entrainment: ASTM C260
   E. Fly ash: ASTM C618
   F. Calcium chloride SHALL NOT be used.
3. MIX DESIGNS:
   A. The maximum slump shall be 4" w/o plasticizer added.
   B. Use pea gravel and/or plasticizer in congested areas.
   C. Limit fly ash to 20% of the total cement.
   D. Concrete mixes shall conform to the following:

Type of Concrete Member	28 Day Strength (psi)*	W/C Ratio	Dry Weight (pcf)	Max Aggregate Size (inches)	Entrained Air (%)	Min Cement Per CY (lbs)
Footings & Slabs on Grade	2500	0.45	150	3/4	5 ±1	517

*(Special Inspection not required)

4. CONSTRUCTION: A. Mechanically vibrate concrete during placement.
5. FOOTINGS: B. Center footings on structure above, UNO.
   C. Exterior footings to be embedded a minimum depth.

STEEL

1. CODES AND STANDARDS. Comply with:
   A. CRSI "Manual of Standard Practice".
   B. ACI "Detailing Manual", ACI 315 (or SP-66).

Reinforcing:	60 ksi	A-615 - Grade 60	HSS Tube:	46 ksi	A -500
Roof Decking:	50 ksi	A-792 - Grade 50	Pipe:	36 ksi	A-501

Bolts ASTM A36, ASTM A307 as specified on details

2. CONSTRUCTION:
   A. Detail, bolster, and support all rebar. Tie bars securely with proper clearances before casting concrete.
   B. Use rebar free flaky rust, grease, dirt, and other materials, which affect bond.
   C. Minimum lap splices (inches):

Bar #	#3	#4	#5	#6
Inches	16	20	24	33

   D. Make cold bends. DO NOT use heat. DO NOT re-bend a previously bent bar.

   E. Minimum concrete cover: (securely position and anchor rebar prior to pour)
      Cast against and permanently exposed to earth .... 3 (inches)
      Slabs-On-Grade (SOG) .... Center of slab, UNO
   F. DO NOT weld reinforcing unless specifically noted.

AMMTEC PLLC CONSULTANTS

CLIENT:	CRS 23118	Prepared By:	AA
PROJECT:	Loch Lloyd 30' x 20' Model Model	Checked By:	MJK
	Village of Loch Lloyd, MO	Date:	08/24/23

Member Weights	psf	Area	Ttl Wt (lbs)
Roof Type & Guage:	1.44	600	864
T&G Roofing	0.0	600	0
Misc Appurtenances & Matls:	0.5	600	300
Total Material Risa Weight =			1790.439
Total Weight =			2,954
20% Snow Load for Seismic =			893
Total Load for Seismic =			3,848

Areas Trib:	C_{NW} =	300 SF		C_{NL} =	300 SF	
	C_{NWe} =	150 SF		C_{NLe} =	150 SF	

Roof Snow Load [IBC 1608, ASCE 7]

(Eq 7-1) $p_f = 0.7 * C_e * C_t * I * p_g$

p_f=Ground Snow Load=	20	psf
C_e=Exposure Factor=	1.0	[ASCE T 7-2]
C_t*= Thermal Factor=	1.2	[ASCE T 7-3]
I= Impoortance Factor=	1.0	[ASCE T 7-4]
p_f=	16.8	psf
C_s= Sloped Roof Coeff=	0.94	[ASCE F 7-2]
(Eq 7-2) $p_s = C_s * p_f$ p_s=	15.79	psf

Spans

2

Canopy Dimensions

Width	20	(ft)	Length	30	(ft)
Roof Pitch	4	(in) V		12	(in) H
Column Height	8.667	(ft) Columns		6	
Top of Structure Height	11.333	(ft)			

Structure Geometry Rectangle

Rectangle Area Formula

A=W*L= 600.0 ft^2

AMMTEC PLLC CONSULTANTS

CLIENT:	CRS 23118	Prepared By:	AA
PROJECT:	Loch Lloyd 30' x 20' Model Model	Checked By:	MJK
	Village of Loch Lloyd, MO	Date:	######

Calculaton of Design Wind Loads - Main Force Resisting Systems   ASCE 7-16

Exposure: C
Occupancy Class: 1
3s Wind Gust (mph): 90

Eq: $p=q_h*G*C_N$ (Eq 27.3-2) [274]

z	Exp
ft	C
0	0.85
15	0.85
20	0.90
25	0.94
30	0.98
35	1.01
40	1.04
45	1.07
50	1.09
60	1.13

Where: $q_h= 0.00256*k_z*k_{zt}*k_D*V^2*I$ (Eq 26.10-1) [268]

z= 11.33 $k_z=$ 0.85   (T 26.10-1) [268]

$k_{zt}= (1+ k_1*k2*k_3)^2$ (F 26.8-1) [267]

$k_1=$ 0.29 $H/L_H=0$ (F 26.8-1) [267]

$k_2=$ 1.0 $X/L_H=0$ (F 26.8-1) [267]

$k_3=$ 0.0 $Z/h_H=Z/0$ (F 26.8-1) [267]

$k_{zt}=$ 1.0

$k_D=$ 0.85

V= 90 mph   (F 26.5-1B) [252]

$q_h=$ 0.00256*0.85*1*0.85*90^2*1= **14.98** psf

G= **0.85**   (S 26.11) [269]

$q_h*G=$ **12.73** psf

	Rise	Run
Gable Roof Pitch =	4	12

α= 18.4 Degrees

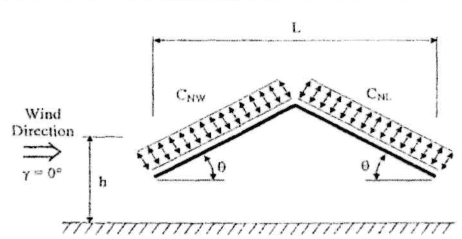
α= 18.4

CN Values interpolated to 18.4 degrees

	C_{NW}	= p (psf)	C_{NL}	= p (psf)				
Case A -Clear/Unobstructed Wind Flow: 0°,180°	1.10	14.01	-0.17	-2.21	$\Delta C_N=$	1.27	$C_{N(Avg)}=$	0.46
Case B -Clear/Unobstructed Wind Flow: 0°,180°	0.01	0.12	-0.96	-12.28	$\Delta C_N=$	0.97	$C_{N(Avg)}=$	-0.48

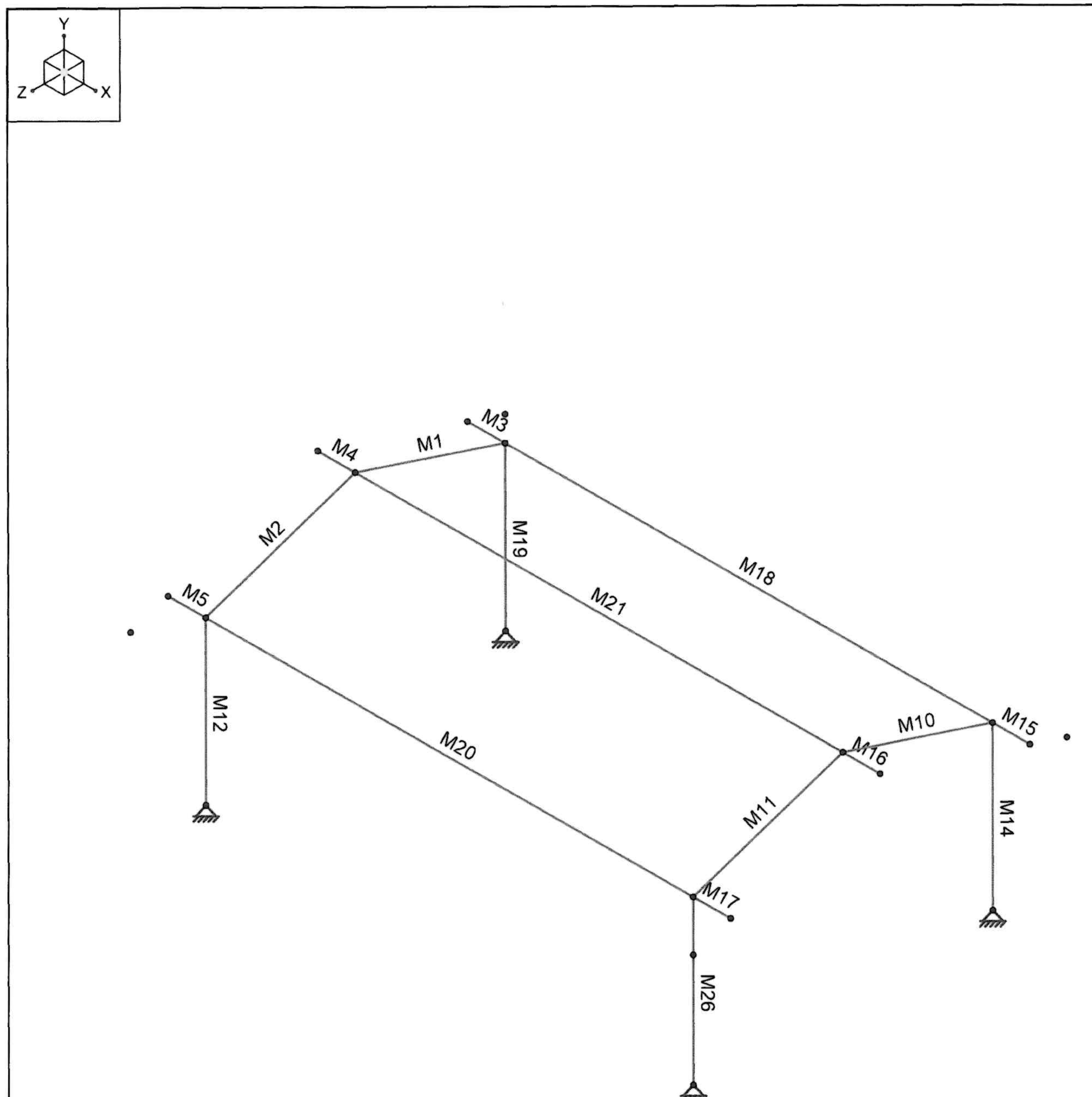
(F27.4-4 thru F27.3-7) [279-282]

Main Wind Force Resisting System		$0.25 \le h/L \le 1.0$
Figure 6-18B	Net Pressure Coefficient, C_N	**Pitched Free Roofs** $\theta \le 45°, \gamma = 0°, 180°$
Open Buildings		



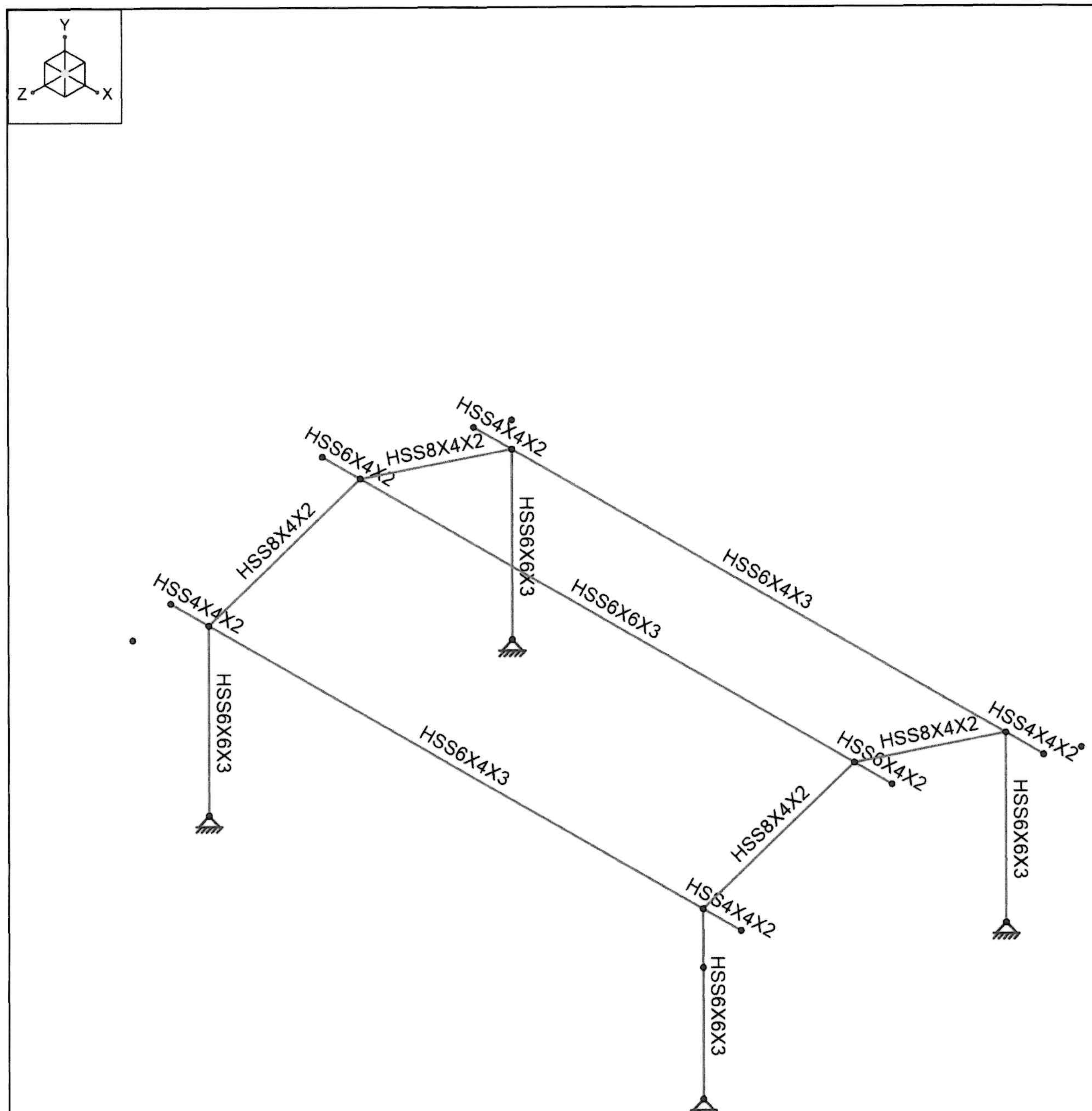
Roof Angle, θ	Load Case	Wind Direction, g = 0°, 180°			
		Clear Wind Flow		Obstructed Wind Flow	
		C_{NW}	C_{NL}	C_{NW}	C_{NL}
7.5°	A	1.1	-0.3	-1.6	-1
	B	0.2	-1.2	-0.9	-1.7
15°	A	1.1	-0.4	-1.2	-1
	B	0.1	-1.1	-0.6	-1.6
22.5°	A	1.1	0.1	-1.2	-1.2
	B	-0.1	-0.8	-0.8	-1.7
30°	A	1.3	0.3	-0.7	-0.7
	B	-0.1	-0.9	-0.2	-1.1
37.5°	A	1.3	0.6	-0.6	-0.6
	B	-0.2	-0.6	-0.3	-0.9
45°	A	1.1	0.9	-0.5	-0.5
	B	-0.3	-0.5	-0.3	-0.7

Notes:
1. C_{NW} and C_{NL} denote net pressures (contributions from top and bottom surfaces) for windward and leeward roof surfaces, respectively.
2. Clear wind flow denotes relatively unobstructed wind flow with blockage less than or equal to 50% wind flow denotes objects below roof inhibiting wind flow (>50% blockage).
3. For values of θ between 7.5° and 45°, linear interpolation is permitted. For values of θ less than monoslope roof load coefficients.
4. Plus and minus signs signify pressures acting towards and away from the top roof surface, respectively.
5. All load cases shown for each roof angle shall be investigated.
6. Notation:
   L : horizontal dimension of roof, measured in the along wind direction, ft. (m)
   h : mean roof height, ft. (m)
   γ : direction of wind, degrees
   θ : angle of plane of roof from horizontal, degrees



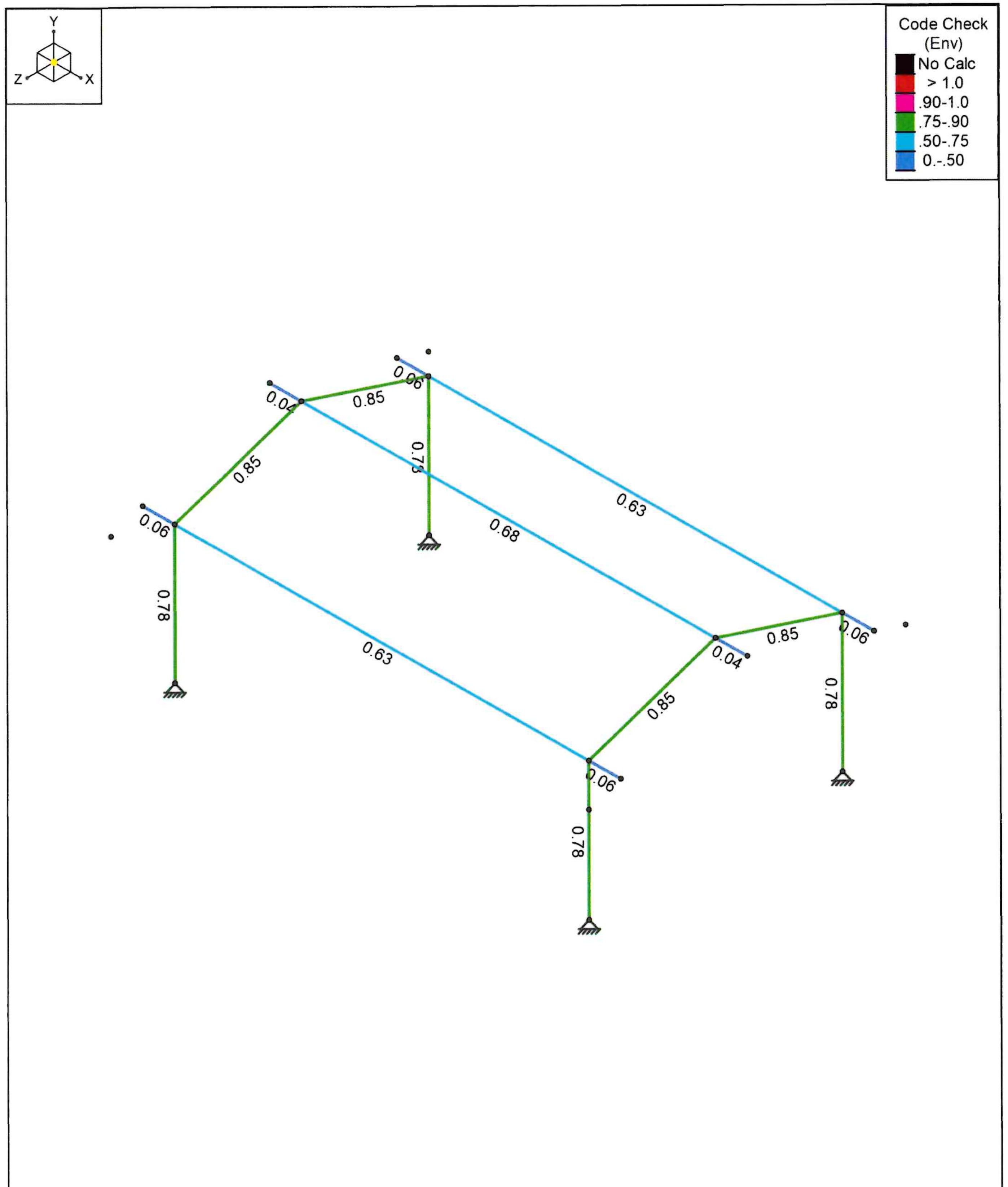
Envelope Only Solution

CRS 23118	Loch Lloyd	SK-2
AA		Aug 24, 2023
23118		Loch Lloyd 30' x 20' Model Model ...



Envelope Only Solution

CRS 23118	Loch Lloyd	SK-4
AA		Aug 24, 2023
23118		Loch Lloyd 30' x 20' Model Model ...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

CRS 23118	Loch Lloyd	SK-5
AA		Aug 24, 2023
23118		Loch Lloyd 30' x 20' Model Model ...

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N3	0	8.667	-2	
2	N4	0	11.333	-10	
3	N5	0	0	-2	
4	N7	0	8.667	-18	
5	N9	0	0	-18	
6	N9A	2	8	0	
7	N10	2	8.667	-2	
8	N11	2	11.333	-10	
9	N12	2	8	-20	
10	N13	2	8.667	-18	
11	N14	-28	8	0	
12	N15	-28	8.667	-2	
13	N16	-28	11.333	-10	
14	N17	-28	8	-20	
15	N18	-28	8.667	-18	
16	N20	-26	8.667	-2	
17	N21	-26	11.333	-10	
18	N22	-26	0	-2	
19	N24	-26	8.667	-18	
20	N25	-26	0	-18	

Node Boundary Conditions

	Node Label	X [lb/in]	Y [lb/in]	Z [lb/in]
1	N22	Reaction	Reaction	Reaction
2	N5	Reaction	Reaction	Reaction
3	N9	Reaction	Reaction	Reaction
4	N25	Reaction	Reaction	Reaction

Hot Rolled Steel Properties

	Label	E [psi]	G [psi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [lb/ft³]	Yield [psi]	Ry	Fu [psi]	Rt
1	A36 Gr.36	2.9e+7	1.115e+7	0.3	0.65	490	36000	1.5	58000	1.2
2	A572 Gr.50	2.9e+7	1.115e+7	0.3	0.65	490	50000	1.1	58000	1.2
3	A992	2.9e+7	1.115e+7	0.3	0.65	490	50000	1.1	58000	1.2
4	A500 Gr.42	2.9e+7	1.115e+7	0.3	0.65	490	42000	1.3	58000	1.1
5	A500 Gr.46	2.9e+7	1.115e+7	0.3	0.65	490	46000	1.2	58000	1.1

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Column	HSS6X6X3	Column	Tube	A500 Gr.46	Typical	3.98	22.3	22.3	35
2	Rafter	HSS8X4X2	Beam	Tube	A500 Gr.46	Typical	2.7	7.9	22.9	18.7
3	Perimeter	HSS6X4X3	Beam	Tube	A500 Gr.46	Typical	3.28	8.76	16.4	18.2
4	Ridge	HSS6X6X3	Beam	Tube	A500 Gr.46	Typical	3.98	22.3	22.3	35
5	EXT 1	HSS6X4X2	Beam	Tube	A500 Gr.46	Typical	2.23	6.15	11.4	12.6
6	EXT 2	HSS4X4X2	Beam	Tube	A500 Gr.46	Typical	1.77	4.4	4.4	6.91

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N24	N21		Rafter	Beam	Tube	A500 Gr.46	Typical
2	M2	N21	N20		Rafter	Beam	Tube	A500 Gr.46	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
3	M3	N18	N24		EXT 2	Beam	Tube	A500 Gr.46	Typical
4	M4	N16	N21		EXT 1	Beam	Tube	A500 Gr.46	Typical
5	M5	N15	N20		EXT 2	Beam	Tube	A500 Gr.46	Typical
6	M10	N7	N4		Rafter	Beam	Tube	A500 Gr.46	Typical
7	M11	N4	N3		Rafter	Beam	Tube	A500 Gr.46	Typical
8	M12	N20	N22		Column	Column	Tube	A500 Gr.46	Typical
9	M14	N7	N9		Column	Column	Tube	A500 Gr.46	Typical
10	M15	N7	N13		EXT 2	Beam	Tube	A500 Gr.46	Typical
11	M16	N4	N11		EXT 1	Beam	Tube	A500 Gr.46	Typical
12	M17	N3	N10		EXT 2	Beam	Tube	A500 Gr.46	Typical
13	M19	N24	N25		Column	Column	Tube	A500 Gr.46	Typical
14	M26	N3	N5		Column	Column	Tube	A500 Gr.46	Typical
15	M20	N20	N3		Perimeter	Beam	Tube	A500 Gr.46	Typical
16	M18	N24	N7		Perimeter	Beam	Tube	A500 Gr.46	Typical
17	M21	N21	N4	90	Ridge	Beam	Tube	A500 Gr.46	Typical

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	y sway	z sway	Function
1	M1	Rafter	8.433	Lbyy	N/A	N/A			Lateral
2	M2	Rafter	8.433	Lbyy	N/A	N/A			Lateral
3	M3	EXT 2	2	Lbyy	N/A	N/A			Lateral
4	M4	EXT 1	2	Lbyy	N/A	N/A			Lateral
5	M5	EXT 2	2	Lbyy	N/A	N/A			Lateral
6	M10	Rafter	8.433	Lbyy	N/A	N/A			Lateral
7	M11	Rafter	8.433	Lbyy	N/A	N/A			Lateral
8	M12	Column	8.667	Lbyy	N/A	N/A			Lateral
9	M14	Column	8.667	Lbyy	N/A	N/A			Lateral
10	M15	EXT 2	2	Lbyy	N/A	N/A			Lateral
11	M16	EXT 1	2	Lbyy	N/A	N/A			Lateral
12	M17	EXT 2	2	Lbyy	N/A	N/A			Lateral
13	M19	Column	8.667	Lbyy	N/A	N/A			Lateral
14	M26	Column	8.667	Lbyy	N/A	N/A			Lateral
15	M20	Perimeter	26	Lbyy	N/A	N/A			Lateral
16	M18	Perimeter	26	Lbyy	N/A	N/A			Lateral
17	M21	Ridge	26	Lbyy	N/A	N/A			Lateral

Member Point Loads

No Data to Print...

Member Area Loads (BLC 1 : Dead Load)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N14	N9A	N11	N16	Y	Perp to A-B	-2
2	N17	N12	N11	N16	Y	Perp to A-B	-2

Member Area Loads (BLC 2 : Live Load)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N14	N9A	N11	N16	Y	Perp to A-B	-20
2	N17	N12	N11	N16	Y	Perp to A-B	-20

Member Area Loads (BLC 3 : Snow Load)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N12	N17	N16	N11	Y	Perp to A-B	-15.79
2	N9A	N14	N16	N11	Y	Perp to A-B	-15.79

Member Area Loads (BLC 4 : Wind Load)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N9A	N14	N16	N11	Perp	Perp to A-B	14.01
2	N12	N17	N16	N11	Perp	Perp to A-B	-2.21

Member Area Loads (BLC 5 : Earthquake Load)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N9A	N14	N16	N11	X	Perp to A-B	0.67
2	N12	N17	N16	N11	X	Perp to A-B	0.67

Member Area Loads (BLC 6 : Wind uplift)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N9A	N14	N16	N11	Perp	Perp to A-B	0.12
2	N12	N17	N16	N11	Perp	Perp to A-B	-12.28

Member Area Loads (BLC 7 : Earthquake Load)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [psf]
1	N9A	N14	N16	N11	Z	Perp to A-B	0.67
2	N12	N17	N16	N11	Z	Perp to A-B	0.67

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed	Area(Member)
1	Dead Load	DL	-1		2
2	Live Load	RLL			2
3	Snow Load	SL			2
4	Wind Load	WL			2
5	Earthquake Load	ELX			2
6	Wind uplift	WL			2
7	Earthquake Load	ELZ			2
8	BLC 1 Transient Area Loads	None		12	
9	BLC 2 Transient Area Loads	None		12	
10	BLC 3 Transient Area Loads	None		11	
11	BLC 4 Transient Area Loads	None		22	
13	BLC 6 Transient Area Loads	None		22	

Load Combinations

	Description	Solve	BLC	Factor	BLC	Factor	BLC	Factor
1	Case 1	Yes	DL	1				
2	Case 3	Yes	DL	1	RLL	1		
3	Case 3 SL	Yes	DL	1	SL	1		
4	Case 4 Lr	Yes	DL	1	RLL	0.75		
5	Case 4 SL	Yes	DL	1	SL	0.75		
6	Case 5	Yes	DL	1	4	0.6		

Load Combinations (Continued)

	Description	Solve	BLC	Factor	BLC	Factor	BLC	Factor
7	Case 6a snow	Yes	DL	1	4	0.45	SL	0.75
8	Case 6a Lr	Yes	DL	1	4	0.45	RLL	0.75
9	Case 6b snow	Yes	DL	1	SL	0.75	EL	0.525
10	Case 7	Yes	DL	0.6	4	0.6		
11	Case 8	Yes	DL	0.6	EL	0.7		
12	Case 5 Up	Yes	DL	1	6	0.6		
13	Case 7 Up	Yes	DL	0.6	6	0.6		
14	LIVE LOAD CHECK		RLL	1				
15								

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N22	max	992.209	8	3926.081	2	43.268	10	0	13	0	13	0	13
2		min	91.117	11	458.301	11	-505.287	2	0	1	0	1	0	1
3	N5	max	-91.117	11	3926.081	2	43.268	10	0	13	0	13	0	13
4		min	-992.209	8	458.301	11	-505.287	2	0	1	0	1	0	1
5	N9	max	-91.117	11	3926.081	2	594.038	8	0	13	0	13	0	13
6		min	-959.71	2	458.301	11	-67.477	13	0	1	0	1	0	1
7	N25	max	959.71	2	3926.081	2	594.038	8	0	13	0	13	0	13
8		min	91.117	11	458.301	11	-67.477	13	0	1	0	1	0	1
9	Totals:	max	0	2	15704.322	2	707.929	6						
10		min	0	3	1833.203	11	-729.527	13						

Envelope Member End Reactions

	Member	Member End		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[lb-ft]	LC	y-y Moment[lb-ft]	LC	z-z Moment[lb-ft]	LC
1	M1	I	max	1106.796	8	1347.922	8	34.363	13	1626.482	2	88.59	2	5148.528	8
2			min	107.915	11	123.215	13	-370.158	2	148.334	11	-624.042	13	-584.819	13
3		J	max	1082.302	8	1274.422	8	34.363	13	1626.482	2	-281.321	11	-641.775	11
4			min	93.219	11	79.115	13	-370.158	2	148.334	11	-3032.778	2	-6479.363	2
5	M2	I	max	949.489	2	-109.403	11	370.158	2	-148.334	11	-281.321	11	-641.775	11
6			min	93.219	11	-1250.964	2	-32.528	10	-1626.482	2	-3032.778	2	-6479.363	2
7		J	max	973.983	2	-153.503	11	370.158	2	-148.334	11	88.59	2	4379.321	2
8			min	107.915	11	-1324.464	2	-32.528	10	-1626.482	2	-717.653	10	-375.002	10
9	M3	I	max	0	13	0	13	0	13	0	13	0	13	0	13
10			min	0	1	0	1	0	1	0	1	0	1	0	1
11		J	max	0	13	-22.406	11	29.469	12	0	13	29.469	12	290.326	2
12			min	0	1	-290.326	2	0	1	0	1	0	1	22.406	11
13	M4	I	max	0	13	0	13	0	13	0	13	0	13	0	13
14			min	0	1	0	1	0	1	0	1	0	1	0	1
15		J	max	0	13	-29.344	11	19.454	12	0	13	19.454	12	386.208	2
16			min	0	1	-386.208	2	-18.878	10	0	1	-18.878	10	29.344	11
17	M5	I	max	0	13	0	13	0	13	0	13	0	13	0	13
18			min	0	1	0	1	0	1	0	1	0	1	0	1
19		J	max	0	13	-22.406	11	0	11	0	13	0	11	302.735	8
20			min	0	1	-302.735	8	-33.621	10	0	1	-33.621	10	22.406	11
21	M10	I	max	1106.796	8	1347.922	8	370.158	2	-148.334	11	624.042	13	5148.528	8
22			min	107.915	11	123.215	13	-34.363	13	-1626.482	2	-88.59	2	-584.819	13
23		J	max	1082.302	8	1274.422	8	370.158	2	-148.334	11	3032.778	2	-641.775	11
24			min	93.219	11	79.115	13	-34.363	13	-1626.482	2	281.321	11	-6479.363	2
25	M11	I	max	949.489	2	-109.403	11	32.528	10	1626.482	2	3032.778	2	-641.775	11
26			min	93.219	11	-1250.964	2	-370.158	2	148.334	11	281.321	11	-6479.363	2
27		J	max	973.983	2	-153.503	11	32.528	10	1626.482	2	717.653	10	4379.321	2
28			min	107.915	11	-1324.464	2	-370.158	2	148.334	11	-88.59	2	-375.002	10

Envelope Member End Reactions (Continued)

	Member	Member End		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[lb-ft]	LC	y-y Moment[lb-ft]	LC	z-z Moment[lb-ft]	LC
29	M12	I	max	3808.703	2	992.209	8	43.268	10	0	13	4379.321	2	8599.475	8
30			min	387.874	11	91.117	11	-505.287	2	0	1	-375.002	10	789.711	11
31		J	max	3926.081	2	992.209	8	43.268	10	0	13	0	13	0	13
32			min	458.301	11	91.117	11	-505.287	2	0	1	0	1	0	1
33	M14	I	max	3808.703	2	-91.117	11	594.038	8	0	13	584.819	13	-789.711	11
34			min	387.874	11	-959.71	2	-67.477	13	0	1	-5148.528	8	-8317.802	2
35		J	max	3926.081	2	-91.117	11	594.038	8	0	13	0	13	0	13
36			min	458.301	11	-959.71	2	-67.477	13	0	1	0	1	0	1
37	M15	I	max	0	13	290.326	2	0	11	0	13	29.469	13	290.326	2
38			min	0	1	22.406	11	-29.469	13	0	1	0	1	22.406	11
39		J	max	0	13	0	13	0	13	0	13	0	13	0	13
40			min	0	1	0	1	0	1	0	1	0	1	0	1
41	M16	I	max	0	13	386.208	2	18.878	10	0	13	19.454	12	386.208	2
42			min	0	1	29.344	11	-19.454	12	0	1	-18.878	10	29.344	11
43		J	max	0	13	0	13	0	13	0	13	0	13	0	13
44			min	0	1	0	1	0	1	0	1	0	1	0	1
45	M17	I	max	0	13	302.735	8	33.621	10	0	13	0	11	302.735	8
46			min	0	1	22.406	11	0	1	0	1	-33.621	10	22.406	11
47		J	max	0	13	0	13	0	13	0	13	0	13	0	13
48			min	0	1	0	1	0	1	0	1	0	1	0	1
49	M19	I	max	3808.703	2	959.71	2	594.038	8	0	13	584.819	13	8317.802	2
50			min	387.874	11	91.117	11	-67.477	13	0	1	-5148.528	8	789.711	11
51		J	max	3926.081	2	959.71	2	594.038	8	0	13	0	13	0	13
52			min	458.301	11	91.117	11	-67.477	13	0	1	0	1	0	1
53	M26	I	max	3808.703	2	-91.117	11	43.268	10	0	13	4379.321	2	-789.711	11
54			min	387.874	11	-992.209	8	-505.287	2	0	1	-375.002	10	-8599.475	8
55		J	max	3926.081	2	-91.117	11	43.268	10	0	13	0	13	0	13
56			min	458.301	11	-992.209	8	-505.287	2	0	1	0	1	0	1
57	M20	I	max	750.476	8	2034.577	8	218.536	10	0	13	598.269	2	7395.518	8
58			min	26.563	13	185.72	11	0	1	0	1	-605.084	10	645.14	13
59		J	max	750.476	8	-185.72	11	0	11	0	13	598.269	2	7395.518	8
60			min	26.563	13	-2034.577	8	-218.536	6	0	1	-605.084	10	645.14	13
61	M18	I	max	589.552	2	1953.917	2	0	11	0	13	536.815	13	7093.082	2
62			min	56.649	11	185.72	11	-191.551	13	0	1	-598.269	2	674.342	11
63		J	max	589.552	2	-185.72	11	191.551	12	0	13	536.815	13	7093.082	2
64			min	56.649	11	-1953.917	2	0	1	0	1	-598.269	2	674.342	11
65	M21	I	max	740.316	2	122.706	6	-237.183	11	0	13	5389.983	2	449.762	6
66			min	67.369	10	-126.449	13	-2587.763	2	0	1	488.678	11	-463.484	13
67		J	max	740.316	2	126.449	12	2587.763	2	0	13	5389.983	2	449.762	10
68			min	67.369	10	-122.706	10	237.183	11	0	1	488.678	11	-463.484	12

Envelope AISC 9TH: ASD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Fa [psi]	Ft [psi]	Fb y-y [psi]	Fb z-z [psi]	Cb	Cmy	Cmz	ASD Eqn
1	M1	HSS8X4X2	0.847	8.433	2	0.231	0	y	2	21404.63	27600	27600	27600	2.3	0.588	0.85	H1-2
2	M2	HSS8X4X2	0.847	0	2	0.231	8.433	y	2	21404.63	27600	27600	27600	2.3	0.588	0.85	H1-2
3	M3	HSS4X4X2	0.057	2	2	0.017	2	y	2	26533.469	27600	27600	27600	1.75	0.6	0.85	H1-2
4	M4	HSS6X4X2	0.044	2	2	0.015	2	y	2	26597.436	27600	27600	27600	1.75	0.6	0.85	H1-2
5	M5	HSS4X4X2	0.065	2	8	0.018	2	y	8	26533.469	27600	27600	27600	1.75	0.85	0.85	H1-2
6	M10	HSS8X4X2	0.847	8.433	2	0.231	0	y	2	21404.63	27600	27600	27600	2.3	0.588	0.85	H1-2
7	M11	HSS8X4X2	0.847	0	2	0.231	8.433	y	2	21404.63	27600	27600	27600	2.3	0.588	0.85	H1-2
8	M12	HSS6X6X3	0.777	0	2	0.026	8.667	y	8	23485.466	27600	27600	27600	1.75	0.6	0.6	H1-2
9	M14	HSS6X6X3	0.777	0	2	0.025	8.667	y	2	23485.466	27600	27600	27600	1.75	0.6	0.6	H1-2
10	M15	HSS4X4X2	0.057	0	2	0.017	0	y	2	26533.469	27600	27600	27600	1.75	0.6	0.85	H1-2
11	M16	HSS6X4X2	0.044	0	2	0.015	0	y	2	26597.436	27600	27600	27600	1.75	0.6	0.85	H1-2
12	M17	HSS4X4X2	0.065	0	8	0.018	0	y	8	26533.469	27600	27600	27600	1.75	0.85	0.85	H1-2

Envelope AISC 9TH: ASD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Fa [psi]	Ft [psi]	Fb y-y [psi]	Fb z-z [psi]	Cb	Cmy	Cmz	ASD Eqn
13	M19	HSS6X6X3	0.777	0	2	0.025	8.667	y	2	23485.466	27600	27600	27600	1.75	0.6	0.6	H1-2
14	M26	HSS6X6X3	0.777	0	2	0.026	8.667	y	8	23485.466	27600	27600	27600	1.75	0.6	0.6	H1-2
15	M20	HSS6X4X3	0.63	26	2	0.053	26	y	8	4097.06	27600	27600	27600	1	1	0.85	H1-2
16	M18	HSS6X4X3	0.63	26	2	0.051	26	y	2	4097.06	27600	27600	27600	1	1	0.85	H1-2
17	M21	HSS6X6X3	0.675	13	2	0.067	26	z	2	8595.356	27600	27600	27600	1.75	0.85	0.6	H1-2

Material Take-Off

	Material	Size	Pieces	Length[ft]	Weight[LB]
1	Hot Rolled Steel				
2	A500 Gr.46	HSS4X4X2	4	8	48.183
3	A500 Gr.46	HSS6X4X2	2	4	30.353
4	A500 Gr.46	HSS6X4X3	2	52	580.378
5	A500 Gr.46	HSS6X6X3	5	60.7	821.63
6	A500 Gr.46	HSS8X4X2	4	33.7	309.895
7	Total HR Steel		17	158.4	1790.439

Rafter Beam M10'- : Moment Couple from Risa Calculation

Beam Depth =	8	inches
Mu(resultant) conservative =	6.48	ft-kips
d =	6.75	inches
Bolt Pairs=	1	
Top Bolt Force =	11.5	kips
Bolt Dia (in): 7/8	A307	OK
Rn/W =	12.0	kips

Per Beam Ring Shear Loading= 1.35 kips

Checked Combined Loading		Bolt Area (in^2)
Shear check (ksi)		0.6013
fv=Pv/Ab =	2.240	
Tension Check (ksi)		
ft=Pt/Ab =	19.15	
Ft' = 26-1.8*fv <20	20.00	
If F't > ft then OK	OK	

rimeter Beam M20'- : Moment Couple from Risa Calculation

Beam Depth =	6	inches
Mu(resultant) conservative =	7.40	ft-kips
d =	4.75	inches
Bolt Pairs=	1	
Top Bolt Force =	18.7	kips
Bolt Dia (in): 3/4	A325	OK
Rn/W =	19.4	kips

Per Beam Ring Shear Loading= 2.03 kips

Checked Combined Loading		Bolt Area (in^2)
Shear check (ksi)		0.4418
fv=Pv/Ab =	4.604	
Tension Check (ksi)		
ft=Pt/Ab =	42.29	
F't = (44^2-4.39*fv^2)^.5 =	42.93	
If F't > ft then OK	OK	

Ridge Beam M21'- : Moment Couple from Risa Calculation

Beam Depth =	6	inches
Mu(resultant) conservative =	5.39	ft-kips
d =	4.75	inches
Bolt Pairs=	1	
Top Bolt Force =	13.6	kips
Bolt Dia (in): 3/4	A325	OK
Rv/Ω =	19.4	kips

Per Beam End Loading= 2.59 kips

Checked Combined Loading		Bolt Area (in^2)
Shear check (ksi)		0.4418
fv=Pv/Ab =	5.856	
Tension Check (ksi)		
ft=Pt/Ab =	30.82	
F't = (44^2-4.39*fv^2)^.5 =	42.25	
If F't > ft then OK	OK	

AMMTEC CONSULTANTS	CLIENT: CRS 23118	Prepared By: AA
	PROJECT: Loch Lloyd 30' x 20' Model Model	Checked By: MJK
	Village of Loch Lloyd, MO	Date: 08/24/23

Vertical Column

Height of Column =	8.67	ft
Max Moment at Top of Footing =	0.01	kip-ft
Max Vert / Column =	3,926	lbs
Total Pole Uplift / Column =	100	lbs

Soil / Foundation (Spread)

Allowable Bearing Capacity = B =	1,000	psf
kp =	200	psf/ft
Ms = $(w*L^2/2*h_3*150)+F*w*h_3*L$		
Ms =	3.04	kip-ft
$M_{resultant}$ =	0.01	kip-ft
$FS_{overturning}$ =	1.50	[FS Actual =303.75]
Check Overturning	OK	
Fnd Wt =	2,025	lbs
CMU Clmn Wt =	-	lbs
Bearing Pressure=	436.2222222	psf
	OK	

Dimensions of Spread Foundation

h_3 =	1.50	ft (=18")
Length = L =	36	inches
Min Side = w =	36	inches

With CMU Surround	n	
FS_{uplift} =	1.2	[FS Actual =12
Pole Uplift =	100	
Friction Resistance=	-	
Ttl Fnd Uplift Resistance=	2,025	lbs
Check Dead Wt Uplift	OK	

Soil / Foundation - (Pier)

Allowable Bearing Capacity = B =	1,000	psf
kp =	200	psf/ft
Footing Type =	Unconstrained	

Dimensions of Pier Foundation

Embedment Depth = d =	4	ft (=48")
Min Diameter = b =	24	inches

Fnd Wt =	1,885	lbs
End Bearing =	1,250	psf/ft
CMU Clmn Wt =	-	lbs
Total Wt =	3,135	lbs
	OK	

Constrained Lateral Resistance

d = sqrt(4.25*(Mg/(S3*b))) [IBC Eq 18-3]

= 0.12 ft

Check OK

where

s3 = 1,600

Unconstrained Lateral Resistance

d = 0.5*A*{1+[1+(4.36*h/A)]^1/2} [IBC Eq 18-1]

= 0.16 ft

Check OK

where

A = 2.34*P/(S1*b) = 0.00

P = M/h1 = 1 lb

S1 = 2*kb*d/3 = 533 psf

Bearing by Skin Friction Reference Braja M.Das

Assumed Cohesion Ph=	100	psf
Strength of soil = tan (27 degrees)*45*h^2/2	183	
Skin Friction psf =	283	psf
Perimeter = 2(3.14)*r	6	ft
Skin Friction resistance*/1.1(F S) lbs =	6,476	lbs
Friction Resistance	OK	

AMMTEC PLLC CONSULTANTS

CLIENT:	CRS 23118	Prepared By:	AA
PROJECT:	Loch Lloyd 30' x 20' Model Model	Checked By:	MJK
	Village of Loch Lloyd, MO	Date:	08/24/23

USGS–Provided Output

Village of Loch Lloyd, MO

S_S =	0.098	S_{MS} =	0.157	S_{DS} =	0.105
S_1 =	0.070	S_{M1} =	0.168	S_{D1} =	0.112

IBC 2018 Seismic Design Requirements - Equivalent Lateral Force Procedure

IBC/CBC Section 1613 Earthquake Loads

			Description	REFERENCE
Risk Category		II		ASCE 7-16 Table 1.5-1 [4]
Importance Factor =		1.0		ASCE 7-16 Table 1.5-2 [5]
Site Classification				
Soil Site Class =		D		ASCE 7-16 Table 20.3-1 [204]
Site Coefficients				
S_S = =		0.098	Mapped Spectral Accelerations: Short Period	ASCE 7-16 [210-223] or USGS Mapping
S_1 = =		0.070	Mapped Sectral Accelerations: 1 sec Period	ASCE 7-16 [210-223] or USGS Mapping
F_a = =		1.600	Site Coefficient	ASCE 7-16 Table 11.4-1 [84]
F_v = =		2.4	Site Coefficient	ASCE 7-16 Table 11.4-2 [84]
S_{MS} =		0.157	Max Spectral Accelerations: Short Periods	ASCE 7-16 Equ (11.4-1) [84]
S_{M1} =		0.168	Max Spectral Accelerations: 1sec Period	ASCE 7-16 Equ (11.4-2) [84]
Design Spectral Response Acceleration Parameters				
S_{DS} =		0.105	5% Damped Spectral Acceleration: Short Period	ASCE 7-16 Equ (11.4-3) [84]
S_{D1} =		0.112	5% Damped Spectral Acceleration: 1 sec Period	ASCE 7-16 Equ (11.4-4) [84]
SDC =		A	Seismic Design Category	ASCE 7-16 Tables 11.6-1 and 2 [85]
Equivalent Lateral Force Procedure				
T_a =	$C_t h_n x$ =	0.177	Fundamental Period	ASCE 7-16 Equ 12.8-7 [102]
	C_t =	0.028	Period Parameter	ASCE 7-16 Tables 12.8-2 [102]
	x =	0.800	Period Parameter	ASCE 7-16 Tables 12.8-2 [102]
	h_n =	10.0	Structure Height	
R^a =		1.250	Response Modification Factor	ASCE 7-16 Tables 12.2-1 [90-92]
T_L =		12.000	Long-Period Transition Period	ASCE 7-16 Figure 22-12 [225-227]
C_s =	S_{DS}/[R/I] =	0.084	Seismic Response Coefficient	ASCE 7-16 Equ 12.8-2 [101]
where;				
C_s >		0.100	Lower Limit	ASCE 7-16 Equ 12.8-5 [101]
C_s >	0.5 S1/[R/I] =	0.028	Lower Limit for $S_1 > 0.6g$	ASCE 7-16 Equ 12.8-2 [101]
C_s <	S_{D1}/T[R/I] =	0.507	Upper Limit for $T \leq T_L$	ASCE 7-16 Equ 12.8-3 [101]
C_s <	SD1TL/T^2[R/I] =	34.449	Upper Limit for $T > T_L$	ASCE 7-16 Equ 12.8-4 [101]
	Design Value C_s =	0.084		
W =		3.8	Total Dead Load and Snow Load (kips)	
Ω_o=		1.250		ASCE 7-16 Tables 12.2-1 [90-92]
Emh =	$C_s W \Omega_o$ =	0.40	Equivalent Seismic Base Shear (kips)	ASCE 7-16 Equ 12.8-7 [99]
		0.67	Equivalent Seismic Load (psf)	
Ev =	.2S_{DS}*D =	0.080		ASCE 7-16 Equ 12.4-4a [99]
Em =	Emh + Ev =	0.483		ASCE 7-16 Equ 12.4-1 [98]
	F_{wind} =	0.768	Unfactored Horizontal Wind Base Shear (kips) :	

Lateral Wind Shear > Seismic Base Shear : Wind Controls Design

⚠ This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

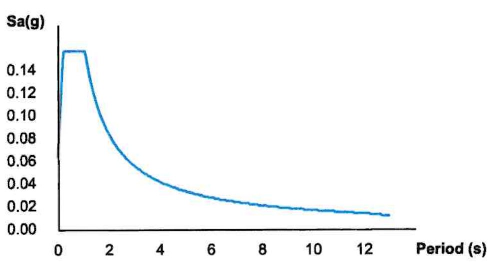
ℹ The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

ATC Hazards by Location

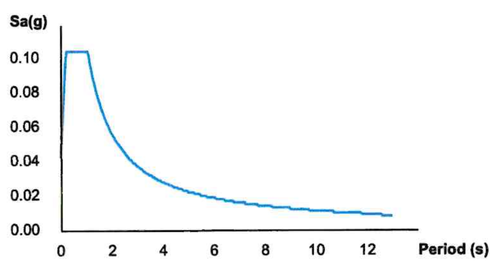
Search Information

Address:	Village of Loch Lloyd, Loch Lloyd, MO 64012, USA
Coordinates:	38.8270567, -94.59598059999999
Elevation:	967 ft
Timestamp:	2023-08-24T19:47:14.914Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D-default

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.098	MCE_R ground motion (period=0.2s)
S_1	0.07	MCE_R ground motion (period=1.0s)
S_{MS}	0.157	Site-modified spectral acceleration value
S_{M1}	0.168	Site-modified spectral acceleration value
S_{DS}	0.104	Numeric seismic design value at 0.2s SA
S_{D1}	0.112	Numeric seismic design value at 1.0s SA

▾Additional Information

Name	Value	Description
SDC	B	Seismic design category
F_a	1.6	Site amplification factor at 0.2s
F_v	2.4	Site amplification factor at 1.0s
CR_S	0.928	Coefficient of risk (0.2s)
CR_1	0.875	Coefficient of risk (1.0s)
PGA	0.046	MCE_G peak ground acceleration
F_{PGA}	1.6	Site amplification factor at PGA
PGA_M	0.074	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	0.098	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.105	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.07	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.08	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)

S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	Factored deterministic acceleration value (PGA)

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

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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SIMPSON Strong-Tie®

Anchor Designer™ Software
Version 3.0.7947.0

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 0.625
Effective Embedment depth, h_{ef} (inch): 12.000
Code report: ICC-ES ESR-2508
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 15.75
c_{ac} (inch): 16.44
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 48.00
State: Uncracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.4
Reinforcement condition: B tension, B shear
Supplemental 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): 7.00 x 7.00 x 0.50
Yield stress: 36000 psi

Profile type/size: HSS6X6X1/8

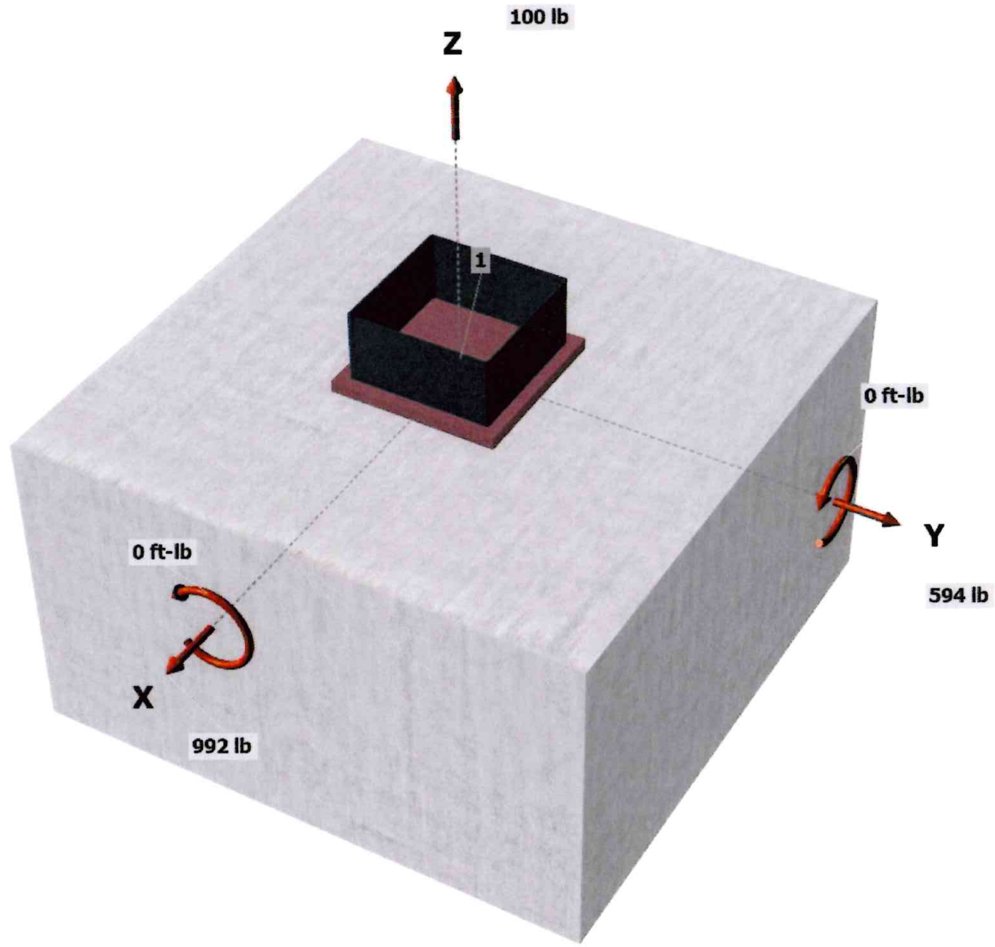
Recommended Anchor
Anchor Name: SET-XP® - SET-XP w/ 5/8"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-2508

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

Strength level loads:

N_{ua} [lb]: 100
V_{uax} [lb]: 992
V_{uay} [lb]: 594
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0

<Figure 1>



Company:		Date:	2/2/2023
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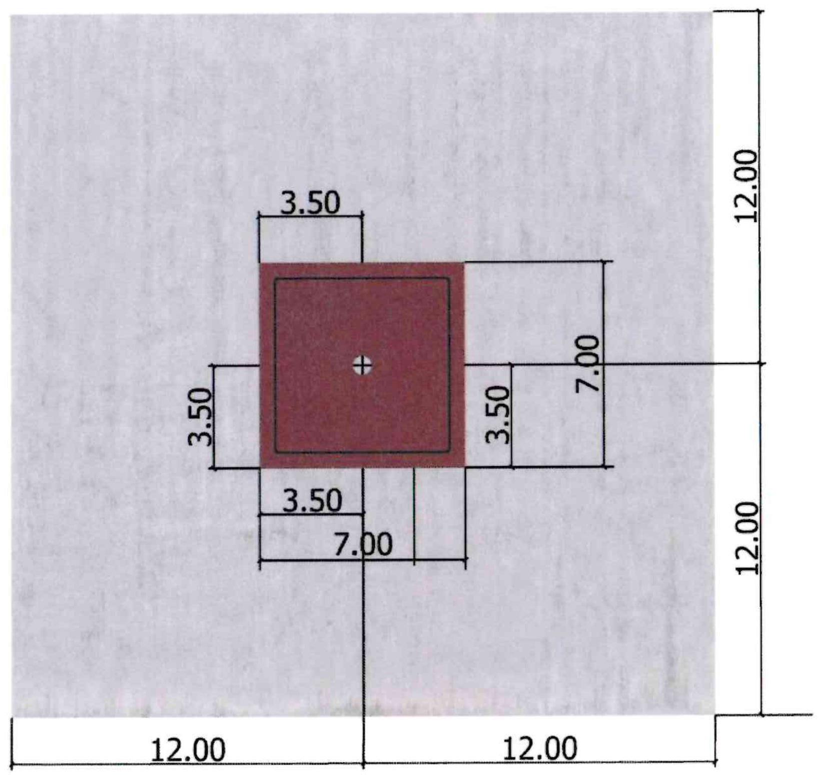
Phone:			
E-mail:			

<Figure 2>

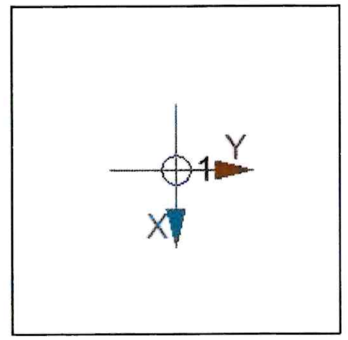


3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	100.0	992.0	594.0	1156.2
Sum	100.0	992.0	594.0	1156.2

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 100
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
13110	0.75	9833

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
24.0	1.00	2500	8.000	27153

$\phi N_{cb} = \phi\ (A_{Nc} / A_{Nco})\ \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1a)

A_{Nc} (in^2)	A_{Nco} (in^2)	$c_{a,min}$ (in)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cb} (lb)
576.00	576.00	12.00	1.000	1.00	1.000	27153	0.65	17649

6. Adhesive Strength of Anchor in Tension (Sec. 17.4.5)

$\tau_{k,uncr} = \tau_{k,uncr} f_{short\text{-}term} K_{sat}$

$\tau_{k,uncr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	$\tau_{k,uncr}$ (psi)
1060	1.00	1.00	1060

$N_{ba} = \lambda_a \tau_{uncr} \pi d_a h_{ef}$ (Eq. 17.4.5.2)

λ_a	τ_{uncr} (psi)	d_a (in)	h_{ef} (in)	N_{ba} (lb)
1.00	1060	0.63	12.000	24976

$\phi N_a = \phi\ (A_{Na} / A_{Na0})\ \Psi_{ed,Na} \Psi_{cp,Na} N_{ba}$ (Sec. 17.3.1 & Eq. 17.4.5.1a)

A_{Na} (in^2)	A_{Na0} (in^2)	c_{Na} (in)	$c_{a,min}$ (in)	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	ϕ	ϕN_a (lb)
150.57	150.57	6.14	12.00	1.000	0.730	24976	0.65	11852

8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
7865	1.0	0.65	5112

9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.5.2)

Shear perpendicular to edge in y-direction:

$V_{by} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
5.00	0.625	1.00	2500	12.00	17434

$\phi V_{cby} = \phi (A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. 17.3.1 & Eq. 17.5.2.1a)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cby} (lb)
432.00	648.00	0.900	1.400	1.000	17434	0.70	10251

Shear perpendicular to edge in x-direction:

$V_{bx} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
5.00	0.625	1.00	2500	12.00	17434

$\phi V_{cbx} = \phi (A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.3.1 & Eq. 17.5.2.1a)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbx} (lb)
432.00	648.00	0.900	1.400	1.000	17434	0.70	10251

Shear parallel to edge in x-direction:

$V_{by} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
5.00	0.625	1.00	2500	12.00	17434

$\phi V_{cbx} = \phi (2)(A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. 17.3.1, 17.5.2.1(c) & Eq. 17.5.2.1a)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbx} (lb)
432.00	648.00	1.000	1.400	1.000	17434	0.70	22780

Shear parallel to edge in y-direction:

$V_{bx} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
5.00	0.625	1.00	2500	12.00	17434

$\phi V_{cby} = \phi (2)(A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.3.1, 17.5.2.1(c) & Eq. 17.5.2.1a)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cby} (lb)
432.00	648.00	1.000	1.400	1.000	17434	0.70	22780

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$\phi V_{cp} = \phi \min|k_{cp}N_a ; k_{cp}N_{cb}| = \phi \min|k_{cp}(A_{Na}/A_{Na0})\Psi_{ed,Na}\Psi_{cp,Na}N_{ba} ; k_{cp}(A_{Nc}/A_{Nco})\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b|$ (Sec. 17.3.1 & Eq. 17.5.3.1a)

k_{cp}	A_{Na} (in²)	A_{Na0} (in²)	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	N_a (lb)
2.0	150.57	150.57	1.000	0.730	24976	18234

A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ	ϕV_{cp} (lb)
576.00	576.00	1.000	1.000	1.000	27153	27153	0.70	25528

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E-mail:			

11. Results

Interaction of Tensile and Shear Forces (Sec. 17.6.)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	**100**	**9833**	**0.01**	**Pass (Governs)**
Concrete breakout	100	17649	0.01	Pass
Adhesive	100	11852	0.01	Pass

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	**1156**	**5112**	**0.23**	**Pass (Governs)**
T Concrete breakout y+	594	10251	0.06	Pass
T Concrete breakout x+	992	10251	0.10	Pass
|| Concrete breakout x-	594	22780	0.03	Pass
|| Concrete breakout y+	992	22780	0.04	Pass
Concrete breakout, combined	-	-	0.11	Pass
Pryout	1156	25528	0.05	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. 17.6..2	0.00	0.23	22.6%	1.0	Pass

SET-XP w/ 5/8"Ø F1554 Gr. 36 with hef = 12.000 inch meets the selected design criteria.

12. Warnings

- When cracked concrete is selected, concrete compressive strength used in concrete breakout strength in tension, adhesive strength in tension and concrete pryout strength in shear for SET-XP adhesive anchor is limited to 2,500 psi per ICC-ES ESR-2508 Section 5.3.

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

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

Company:		Date:	2/2/2023
Engineer:		Page:	1/6
Project:			
Address:			
Phone:			
E-mail:			

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Cast-in-place
Material: F1554 Grade 36
Diameter (inch): 0.625
Effective Embedment depth, h_{ef} (inch): 12.000
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 13.38
C_{min} (inch): 3.75
S_{min} (inch): 3.75

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 48.00
State: Uncracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.4
Reinforcement condition: B tension, B shear
Supplemental reinforcement: No
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: No
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 7.00 x 7.00 x 0.50
Yield stress: 36000 psi

Profile type/size: HSS6X6X1/8

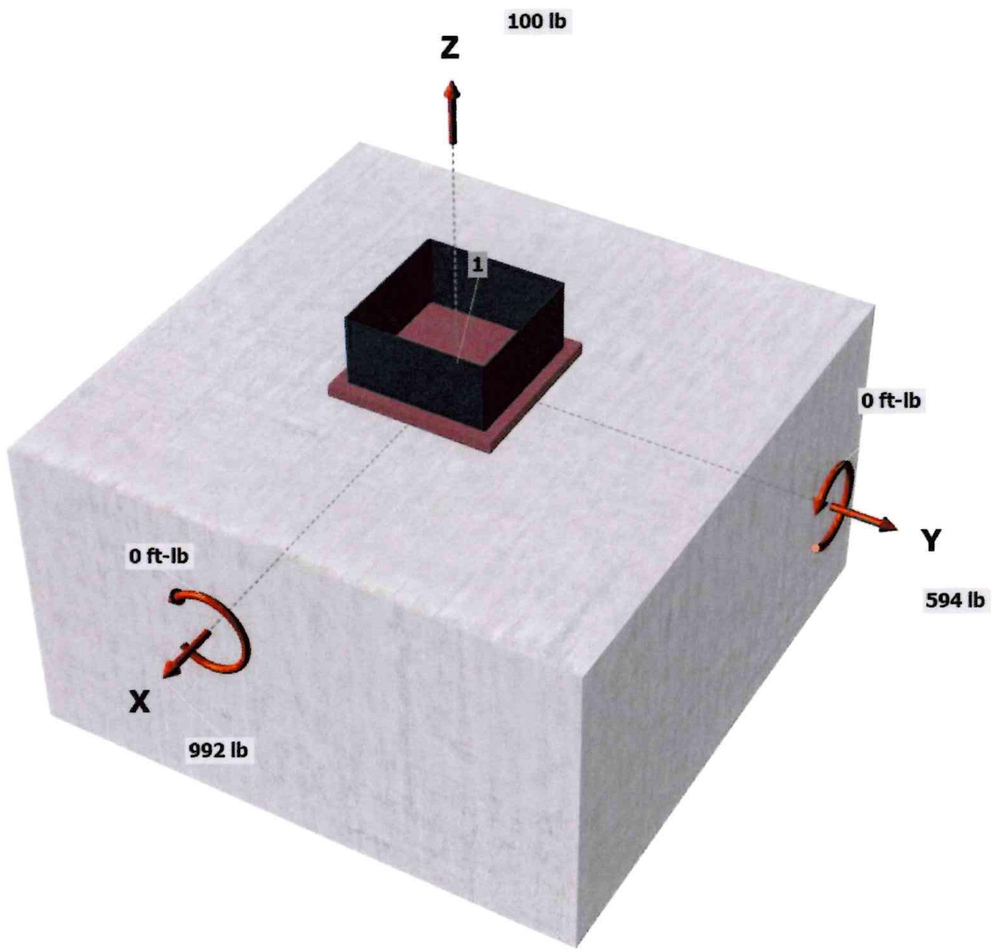
Recommended Anchor
Anchor Name: Heavy Hex Bolt - 5/8"Ø Heavy Hex Bolt, F1554 Gr. 36

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: Not applicable
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

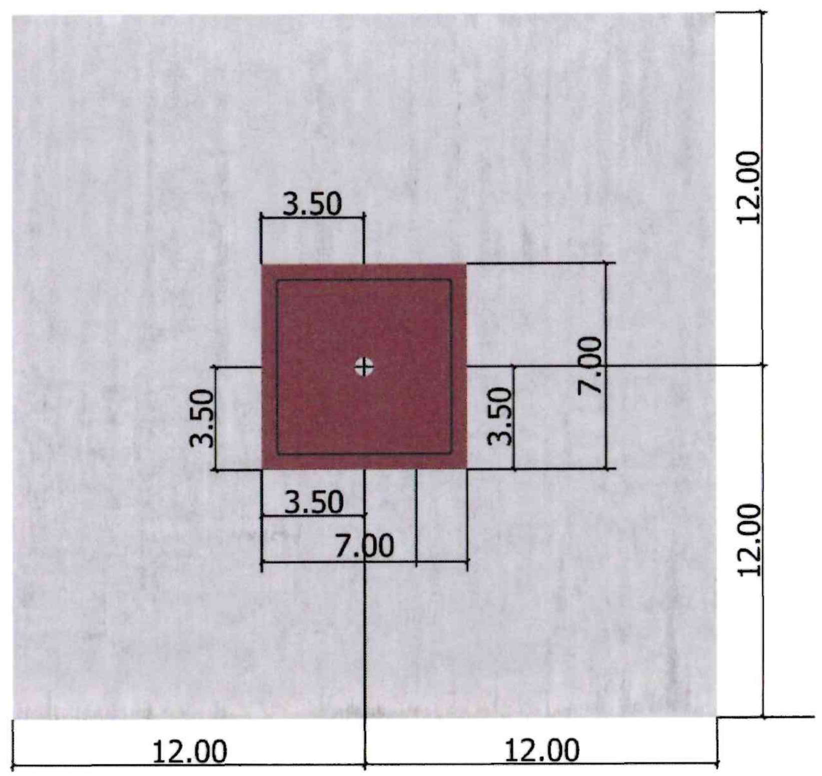
Strength level loads:

N_{ua} [lb]: 100
V_{uax} [lb]: 992
V_{uay} [lb]: 594
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0

<Figure 1>



<Figure 2>

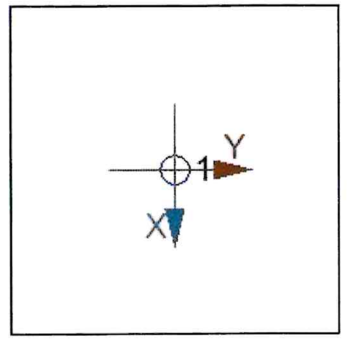


3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	100.0	992.0	594.0	1156.2
Sum	100.0	992.0	594.0	1156.2

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 100
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
13100	0.75	9825

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = 16\lambda_a\sqrt{f'_c}h_{ef}^{5/3}$ (Eq. 17.4.2.2b)

λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
1.00	2500	8.000	25600

$\phi N_{cb} = \phi\,(A_{Nc}/A_{Nco})\,\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1a)

A_{Nc} (in²)	A_{Nco} (in²)	$c_{a,min}$ (in)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cb} (lb)
576.00	576.00	12.00	1.000	1.25	1.000	25600	0.70	22400

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$\phi N_{pn} = \phi\Psi_{c,P}N_p = \phi\Psi_{c,P}8A_{brg}f'_c$ (Sec. 17.3.1, Eq. 17.4.3.1 & 17.4.3.4)

$\Psi_{c,P}$	A_{brg} (in²)	f'_c (psi)	ϕ	ϕN_{pn} (lb)
1.4	0.67	2500	0.70	13152

8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
7865	1.0	0.65	5112

9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.5.2)

Shear perpendicular to edge in y-direction:

$V_{by} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
5.00	0.625	1.00	2500	12.00	17434

$\phi V_{cby} = \phi\,(A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. 17.3.1 & Eq. 17.5.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cby} (lb)
432.00	648.00	0.900	1.400	1.000	17434	0.70	10251

Shear perpendicular to edge in x-direction:

$V_{bx} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
5.00	0.625	1.00	2500	12.00	17434

$\phi V_{cbx} = \phi\,(A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.3.1 & Eq. 17.5.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbx} (lb)
432.00	648.00	0.900	1.400	1.000	17434	0.70	10251

Shear parallel to edge in x-direction:

$V_{by} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
5.00	0.625	1.00	2500	12.00	17434

$\phi V_{cbx} = \phi\,(2)(A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. 17.3.1, 17.5.2.1(c) & Eq. 17.5.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbx} (lb)
432.00	648.00	1.000	1.400	1.000	17434	0.70	22780

Shear parallel to edge in y-direction:

$V_{bx} = \min|7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
5.00	0.625	1.00	2500	12.00	17434

$\phi V_{cby} = \phi\,(2)(A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.3.1, 17.5.2.1(c) & Eq. 17.5.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cby} (lb)
432.00	648.00	1.000	1.400	1.000	17434	0.70	22780

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$\phi V_{cp} = \phi k_{cp}N_{cb} = \phi k_{cp}(A_{Nc}/A_{Nco})\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b$ (Sec. 17.3.1 & Eq. 17.5.3.1a)

k_{cp}	A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕV_{cp} (lb)
2.0	576.00	576.00	1.000	1.250	1.000	25600	0.70	44800

11. Results

Interaction of Tensile and Shear Forces (Sec. 17.6.)

Tension	Factored Load, N_{ua} (lb)	Design Strength, $øN_n$ (lb)	Ratio	Status
Steel	**100**	**9825**	**0.01**	**Pass (Governs)**
Concrete breakout	100	22400	0.00	Pass
Pullout	100	13152	0.01	Pass

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	**1156**	**5112**	**0.23**	**Pass (Governs)**
T Concrete breakout y+	594	10251	0.06	Pass
T Concrete breakout x+	992	10251	0.10	Pass
|| Concrete breakout x-	594	22780	0.03	Pass
|| Concrete breakout y+	992	22780	0.04	Pass
Concrete breakout, combined	-	-	0.11	Pass
Pryout	1156	44800	0.03	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. 17.6..2	0.00	0.23	22.6%	1.0	Pass

5/8"Ø Heavy Hex Bolt, F1554 Gr. 36 with hef = 12.000 inch meets the selected design criteria.

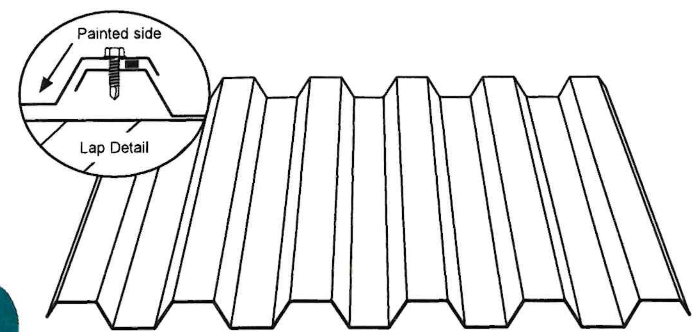
12. Warnings

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

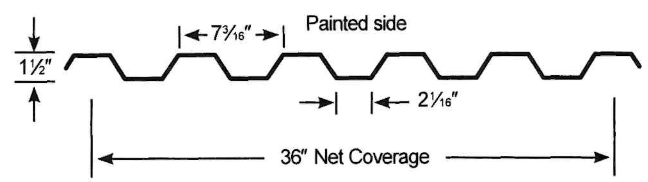
HR-36® Roof and Wall

HR-36 is an economical, structural, exposed-fastener roof and wall panel suitable for general usage.

HR-36 is ideal for architectural, commercial, industrial and agricultural roof and wall applications. Can be installed as a vertical or horizontal wall. **HR-36** is also well suited for open framed canopy or carports designs.



HR-36 Roof & Wall



Properties									Standard Finishes	
Gauge	Base Steel Thickness (in)	Yield (ksi)	Tensile (ksi)	Wt. (lbs/ft^2)	I+ (in^4/ft)	S+ (in^3/ft)	I- (in^4/ft)	S- (in^3/ft)	Metallic Coating	Paint System
29	0.0139	80	82	0.8	0.0579	0.0483	0.0554	0.0406	AZ50	ColorGuard™ *xt*
26	0.0173	80	82	0.9	0.0736	0.0642	0.0707	0.0538	AZ50	Cool DuraTech® *nt*
24	0.0232	50	65	1.2	0.1131	0.1239	0.1127	0.1121	AZ50	Cool DuraTech® 5000 (polyvinylidene fluoride) or DuraTech *mx* (metallic polyvinylidene)
22	0.0294	50	65	1.6	0.1467	0.1686	0.1467	0.1544	AZ50	
20	0.0354	40	55	1.9	0.1844	0.2263	0.1867	0.2076	G90	
18	0.0459	40	55	2.5	0.2456	0.3107	0.2500	0.2947	G90	

NOTES: The moments of inertia, I^+ and I^-, presented for determining deflection are: $(2I_{Effective} + I_{Gross})/3$

standard features

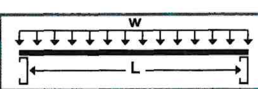
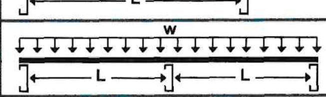
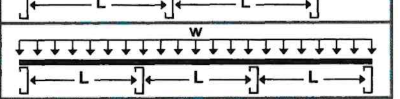
- Custom manufactured sheet lengths from 5'-0" to 45'-0."
- Available in 29ga, 26ga, 24ga and 22ga in standard finishes – refer to AEP Span Color Charts for full range of color options and paint systems.
- 20ga available in Bare Zincalume® plus.
- Zincalume® coated substrate, per ASTM A-792, is standard and backed by a corrosion warranty on painted or unpainted panels.
- Meets IBC requirements for wall and roof panels in accordance to Chapters 14 & 15.
- Performance testing:
  - Air – ASTM E283
  - Water -ASTM E331
- All colors meet a minimum SRI of 29 and one color, Regal White has a SRI of 85.
- Reverse rolled HR-36 available for wall applications. See Reverse HR-36 product sheet.

optional features

- Short cut sheets from 5'-0" to 1'-0". Additional fees and lead times may apply.
- 20ga available in standard colors subject to a minimum order size of 4,500 square feet and longer lead times.
- 18ga available in bare G-90 galvanized and standard colors subject to a minimum order size of 4,500 square feet and longer lead times.
- Custom colors, thick film primer and/or clear coat paint finishes available. Subject to 4,500 square feet minimum order.
- Perforation options available for an additional charge. Minimum order size 1,500 sq feet. Select from standard perforation patterns with open areas of 7.8%, 13.8%, 23.4%, 30.6% or 41.4%.
- Crimp curving:
  24 gage – max length 30'-0", Min outside radius 12"
  24 gage - max length 30'-0", Min outside radius 24"
  20 gage - max length 30'-0", Min outside radius 24"
  18 gage - max length 20'-0", Min outside radius 48"
- Stucco embossed available on 29ga, 26ga, 24ga and 22ga. Subject to min. order size of 1,500 square feet.

Gauge	Span	Cond.	Allowable Inward Loads (lbs/ft²) per Span (ft.-in.)								
			16"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	5'-0"	8'-0"	10'-0"
29	SS	f	651	289	185	129	72	46	32	18	12
		L/180	-	-	-	-	-	40	23	10	5
	DS	f	547	243	156	108	61	39	27	15	10
		L/180	-	-	-	-	-	-	-	-	-
	TS	f	684	304	195	135	76	49	34	19	12
		L/180	-	-	-	-	-	-	-	-	11
26	SS	f	865	384	246	171	96	61	43	24	15
		L/180	-	-	-	-	-	51	30	13	6
	DS	f	725	322	206	143	81	52	36	20	13
		L/180	-	-	-	-	-	-	-	-	-
	TS	f	907	403	258	179	101	64	45	25	16
		L/180	-	-	-	-	-	-	-	-	14
24	SS	f	1391	618	396	275	155	99	69	39	25
		L/180	-	-	-	-	154	79	46	19	10
	DS	f	1258	559	358	249	140	89	62	35	22
		L/180	-	-	-	-	-	-	-	-	-
	TS	f	1573	699	447	311	175	112	78	44	28
		L/180	-	-	-	-	-	-	-	43	22
22	SS	f	1893	841	539	374	210	135	93	53	34
		L/180	-	-	-	-	200	103	59	25	13
	DS	f	1733	770	493	342	193	123	86	48	31
		L/180	-	-	-	-	-	-	-	-	-
	TS	f	2166	963	616	428	241	154	107	60	39
		L/180	-	-	-	-	-	-	-	-	-
20	SS	f	2033	904	578	402	226	145	100	56	36
		L/180	-	-	-	-	-	129	75	31	16
	DS	f	1865	829	530	368	207	133	92	52	33
		L/180	-	-	-	-	-	-	-	-	-
	TS	f	2331	1036	663	460	259	166	115	65	41
		L/180	-	-	-	-	-	-	-	55	28
18	SS	f	2790	1240	794	551	310	198	138	78	50
		L/180	-	-	-	-	-	172	99	42	21
	DS	f	2647	1176	753	523	294	188	131	74	47
		L/180	-	-	-	-	-	-	-	-	-
	TS	f	3308	1470	941	654	368	235	163	92	59
		L/180	-	-	-	-	-	-	-	-	47

LOADING TABLE LEGEND
f - Load limited by flexural bending stress
L - Span (Inches)
L/180 - Load limited by a deflection of 1/180 of the span
w - Distributed load

Inward Loads	SS-Single span	
	DS-Double span	
	TS-Triple span	

Oil Canning: All flat metal surfaces can display waviness commonly referred to as "oil canning". "Oil canning" is an inherent characteristic of steel products, not a defect, and therefore is not a cause for panel rejection.

NOTES:

- Top values based on allowable stress.
  Bottom values based on allowable deflection of L/180.
- "-" denotes that the allowable load is limited by the allowable flexural bending stress.
- Steel conforms to ASTM A653 (Galvanized) or ASTM A792 (Zincalume) structural steel.
- Tabulated values are for positive (Inward) loading only.
- Values are based on the American Iron and Steel Institute (AISI) "Cold Formed Steel Design Manual" (2007 Edition).

Specifications subject to change without notice.

Tacoma, WA & Fontana, CA Phone: 800-733-4955 Fax: 253-272-0791 www.aepspan.com

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CRS, INC.

MATERIAL LIST

BEAM/COLUMN	SIZE	BOLT DIA.	GRADE:	END PLATE
COLUMN	6"X6"X.188 HSS	PER DETAIL		½"
RAFTER FRAME	8"X4"X.120 HSS	⅞"	A307	⅜"
PERIMETER BEAM	6"X4"X.188 HSS	¾"	A325	⅜"
RIDGE BEAM	6"X6"X.188 HSS	¾"	A325	⅜"
EXTENSION BEAM #1	6"X4"X.120 HSS	NA	NA	NA
EXTENSION BEAM #2	4"X4"X.120 HSS	NA	NA	NA
KING POST	5"X3"X.120 HSS	NA	NA	NA
WEB BEAM	5"X2"X.120 HSS	NA	NA	NA

NOTE:

IT IS THE OWNER/CONTRACTORS RESPONSIBILITY TO HAVE INSPECTIONS REQUIRED BY EITHER THE MUNICIPALITY OR THE ENGINEER OF RECORD COMPLETED AT THE TIME OF INSTALLATION BY A QUALIFIED INSPECTOR.

SPECIAL INSPECTION IS REQUIRED FOR ALL A325 HIGH STRENGTH BOLTS PER THE CURRENT BUILDING CODE. ALL CONNECTIONS HAVE BEEN DESIGNED AS SNUG TIGHTENED JOINTS. AFTER THE CONNECTIONS HAVE BEEN ASSEMBLED, IT SHALL BE VISUALLY ENSURED THAT THE PLIES OF THE CONNECTED ELEMENTS HAVE BEEN BROUGHT INTO FIRM CONTACT. IT SHALL BE DETERMINED THAT ALL OF THE BOLTS IN THE JOINT HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE TURNING OF THE NUTS WITHOUT THE USE OF A WRENCH.

FRY, LOCH LLOYD #23118
17141 STONEHAVEN DR.
VILLAGE OF LOCH LLOYD, MO 64012

Detail Sheet 1 of 13

STATE OF MISSOURI
ALAN E MONEY
NUMBER PE-2012025247
PROFESSIONAL ENGINEER
Aug 30, 2023

CRS, INC.

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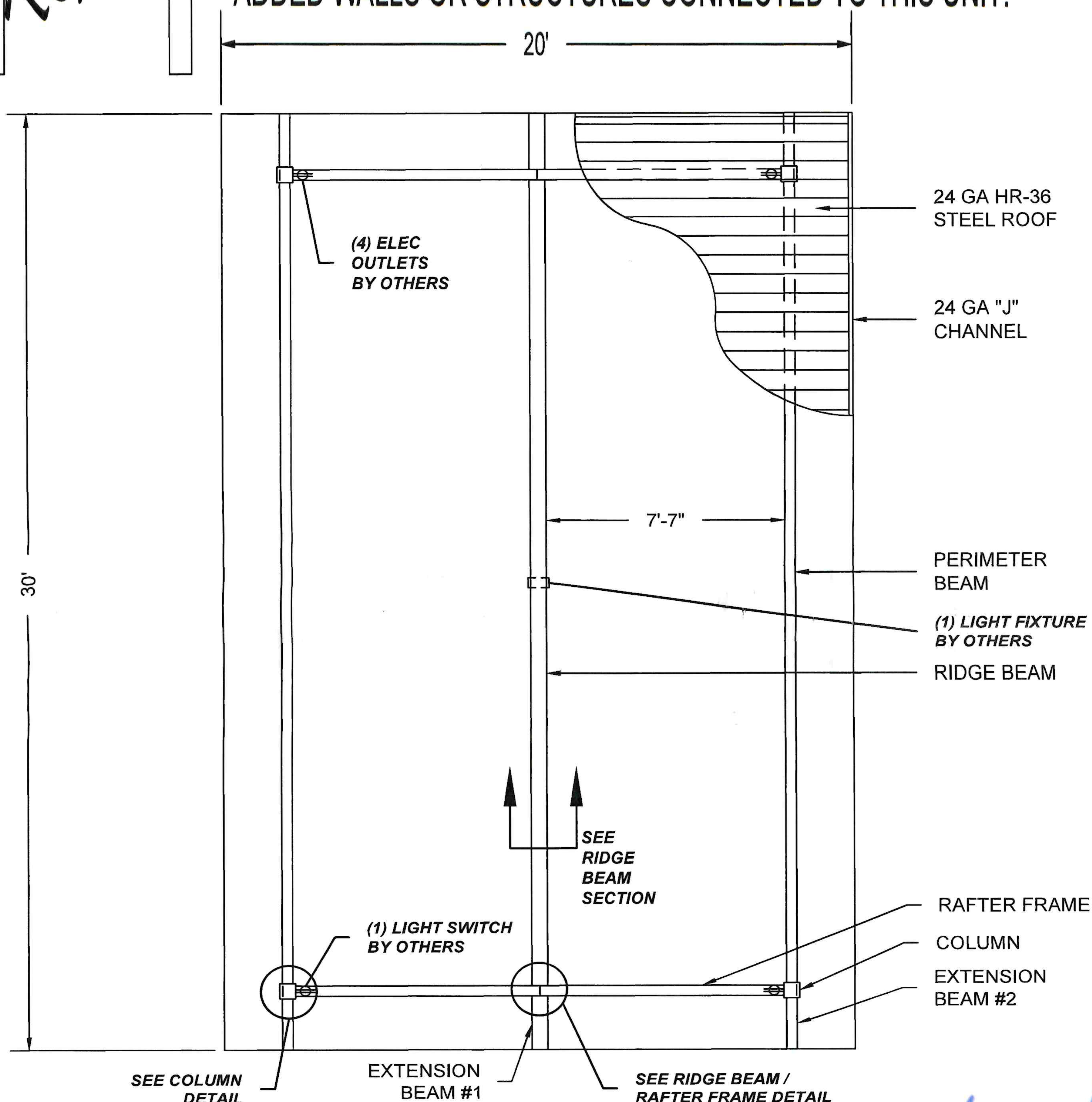

PLAN VIEW 20'X30' ORLANDO MODEL
NTS

FRY, LOCH LLOYD #23118
17141 STONEHAVEN DR.
VILLAGE OF LOCH LLOYD, MO 64012

Detail Sheet 2 of 13

STATE OF MISSOURI
ALAN E MONEY
NUMBER PE-2012025247
PROFESSIONAL ENGINEER
Aug 25, 2023

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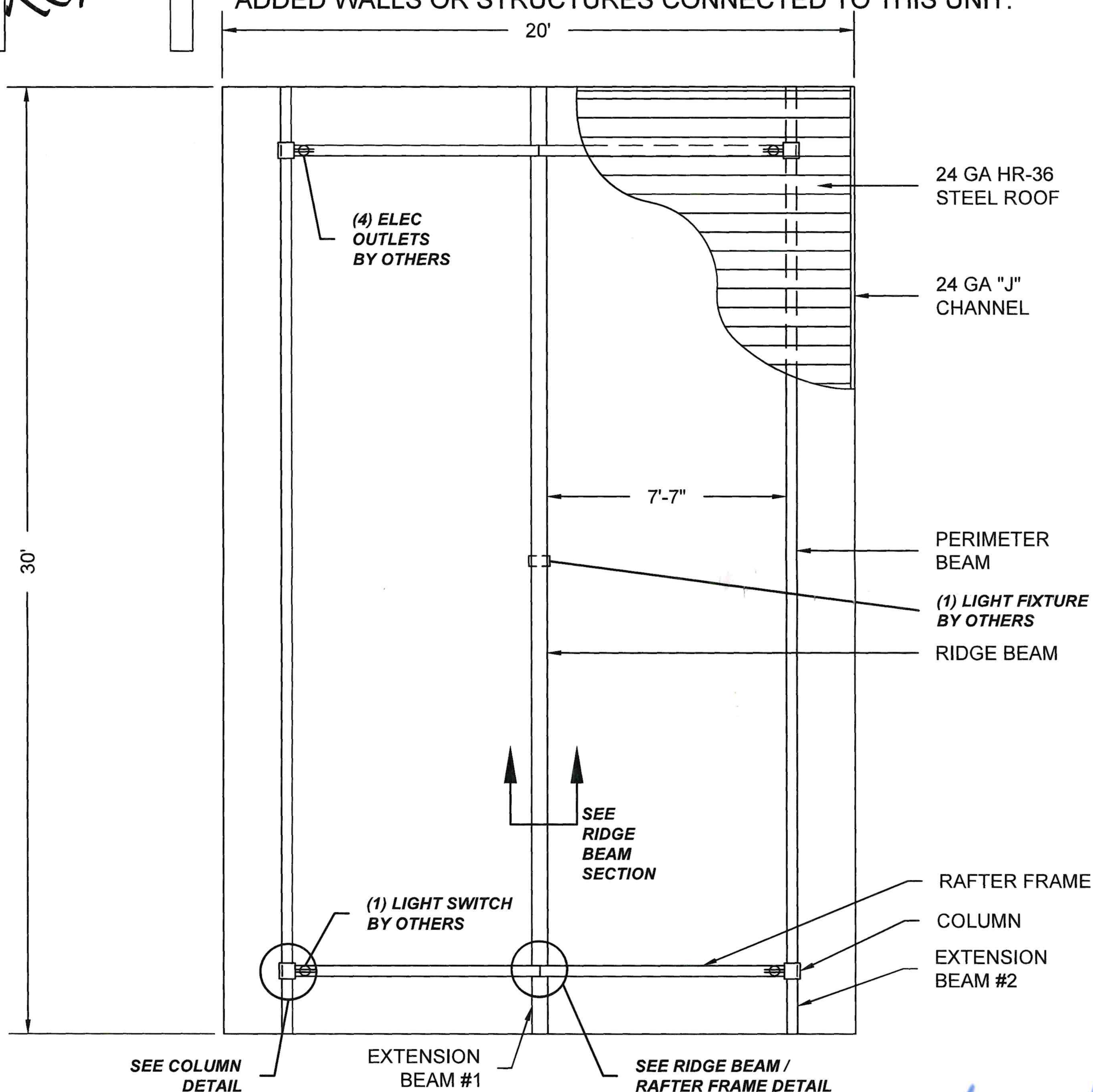
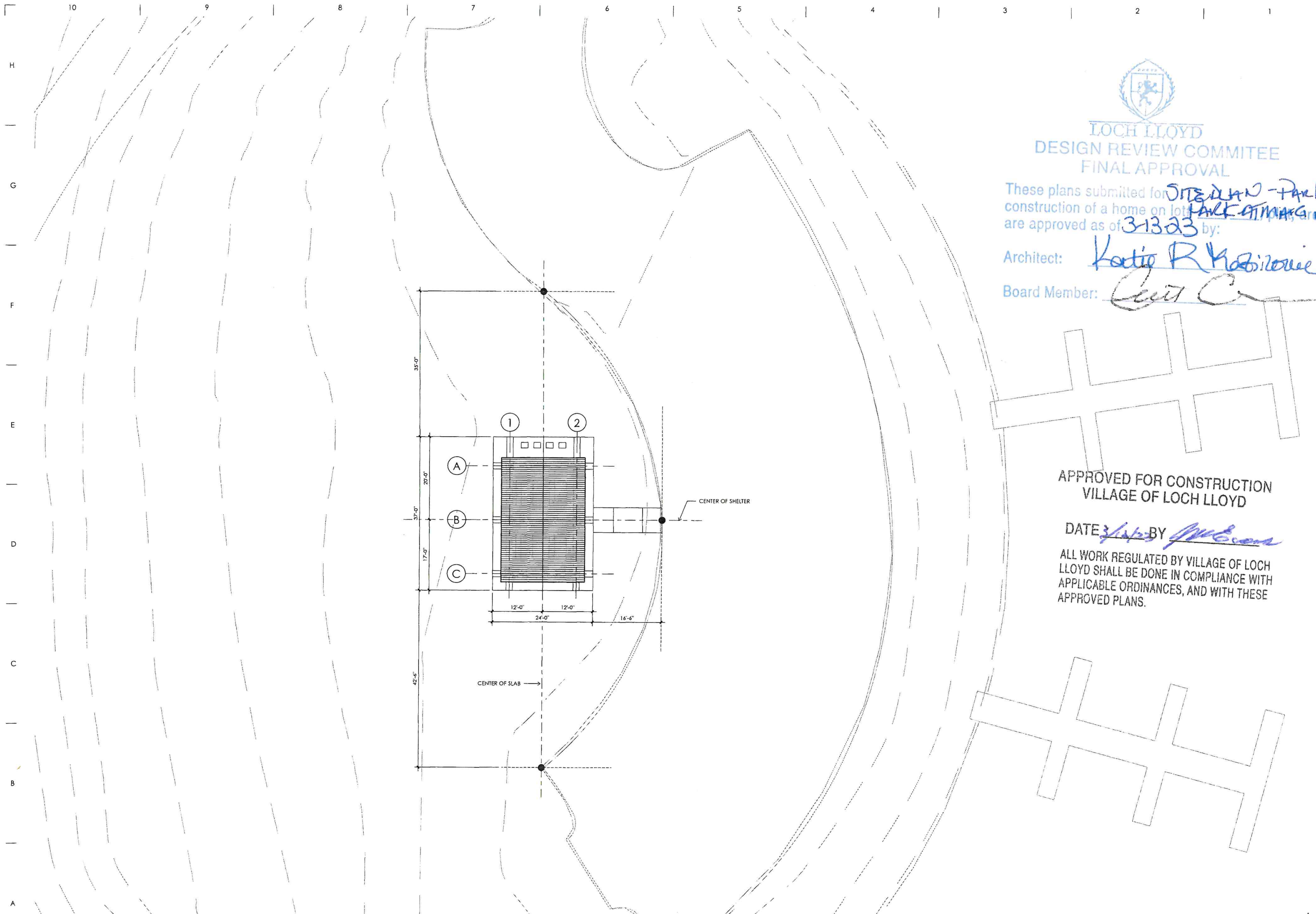


PLAN VIEW 20'X30' ORLANDO MODEL
NTS

STATE OF MISSOURI
ALAN E MONEY
NUMBER PE-2012025247
PROFESSIONAL ENGINEER
Aug 23, 2023

FRY, LOCH LLOYD #23118
17141 STONEHAVEN DR.
VILLAGE OF LOCH LLOYD, MO 64012

Detail Sheet 2 of 13



A10 SITE PLAN
1" = 10'-0"

LOCH LLOYD
DESIGN REVIEW COMMITEE
FINAL APPROVAL

These plans submitted for SITE PLAN - Park Shelter
construction of a home on lot PARK AMENITY
are approved as of 3-13-23 by:

Architect: Katie R Kozikowie

Board Member: [signature]

APPROVED FOR CONSTRUCTION
VILLAGE OF LOCH LLOYD

DATE 3/13/23 BY [signature]

ALL WORK REGULATED BY VILLAGE OF LOCH LLOYD SHALL BE DONE IN COMPLIANCE WITH APPLICABLE ORDINANCES, AND WITH THESE APPROVED PLANS.

WSKF ARCHITECTS
Missouri Certificate of Authority #2003011262

JOB NUMBER 23001

LOCH LLOYD SHELTER

110 Armour Road North Kansas City, Missouri 64116 Tel. 816.300.4101 Fax 816.300.4102

NOT FOR CONSTRUCTION

DESIGN DEVELOPMENT DOCUMENTS

ISSUE DATE		02 / 06 / 23
No	Description	Date

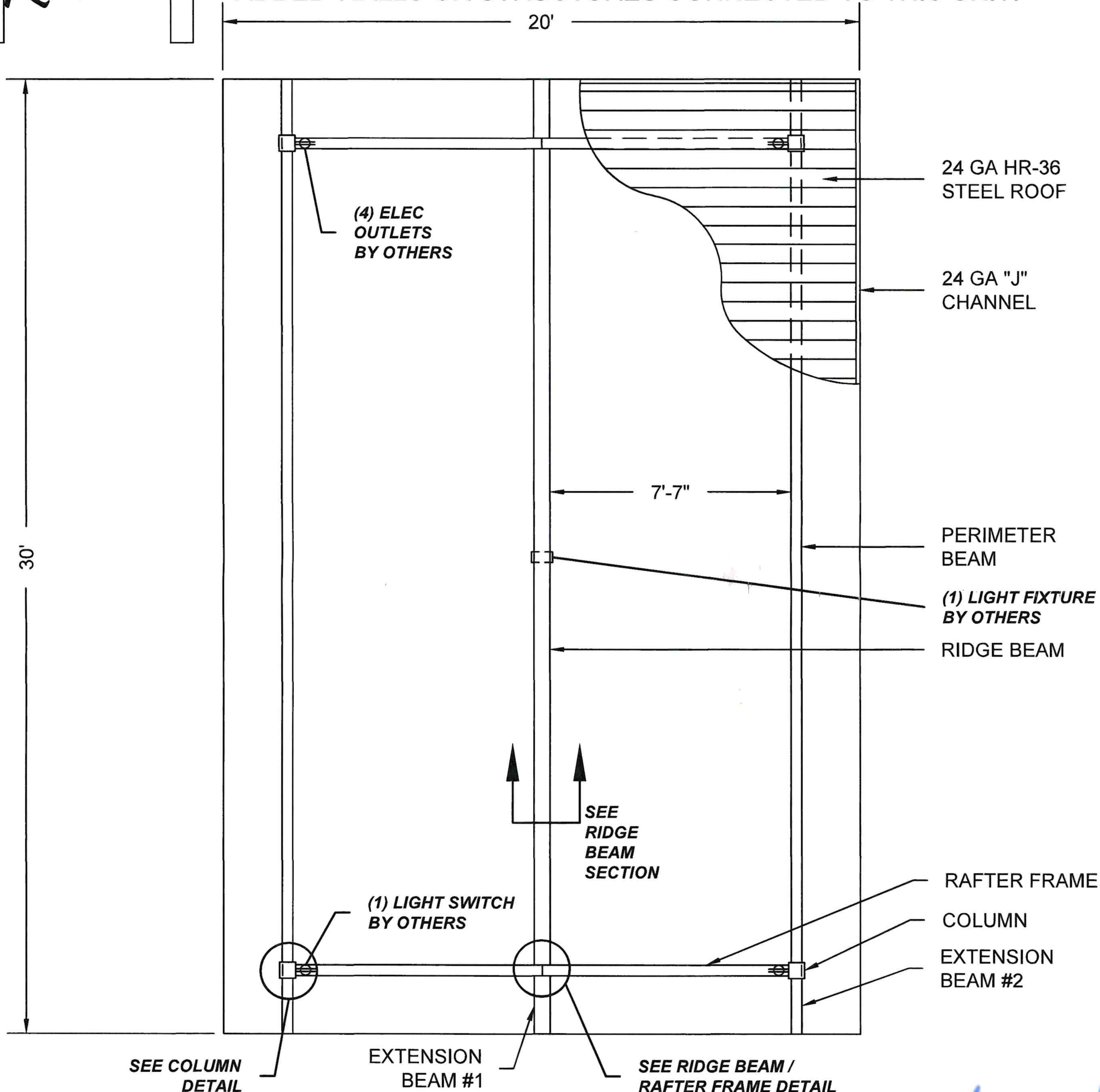
WSKF, Inc. © 2022

SITE PLAN

SP1.01

3/7/2023 8:20:26 AM
M:\2023\23001 - Loch Lloyd Shelter\1 - Drawings\Revit\23001-Loch Lloyd Shelter3-2.rvt

NOTE: STRUCTURE(S) SHALL NOT BE MODIFIED OR ALTERED WITHOUT PRIOR WRITTEN PERMISSION FROM CLASSIC RECREATION SYSTEMS, INC. STRUCTURAL CALCULATIONS FOR THIS STRUCTURE DO NOT ALLOW FOR ANY ADDITIONAL LATERAL LOADS FOR ADDED WALLS OR STRUCTURES CONNECTED TO THIS UNIT.

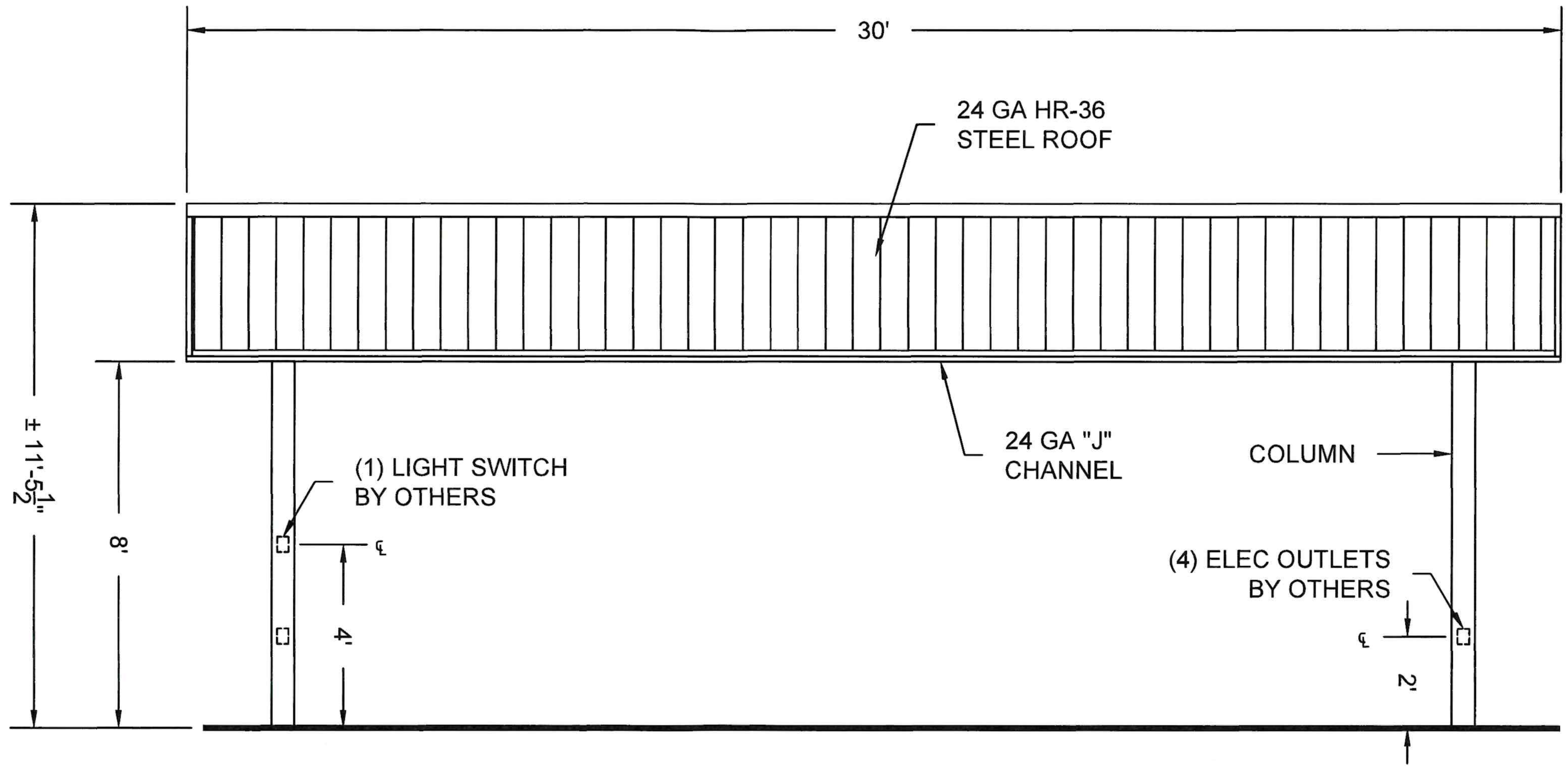


PLAN VIEW 20'X30' ORLANDO MODEL
NTS

FRY, LOCH LLOYD #23118
17141 STONEHAVEN DR.
VILLAGE OF LOCH LLOYD, MO 64012

Detail Sheet 2 of 13

STATE OF MISSOURI
ALAN E
MONEY
NUMBER
PE-2012025247
PROFESSIONAL ENGINEER
Aug 25, 2023



ELEVATION 20'X30' ORLANDO MODEL
NTS

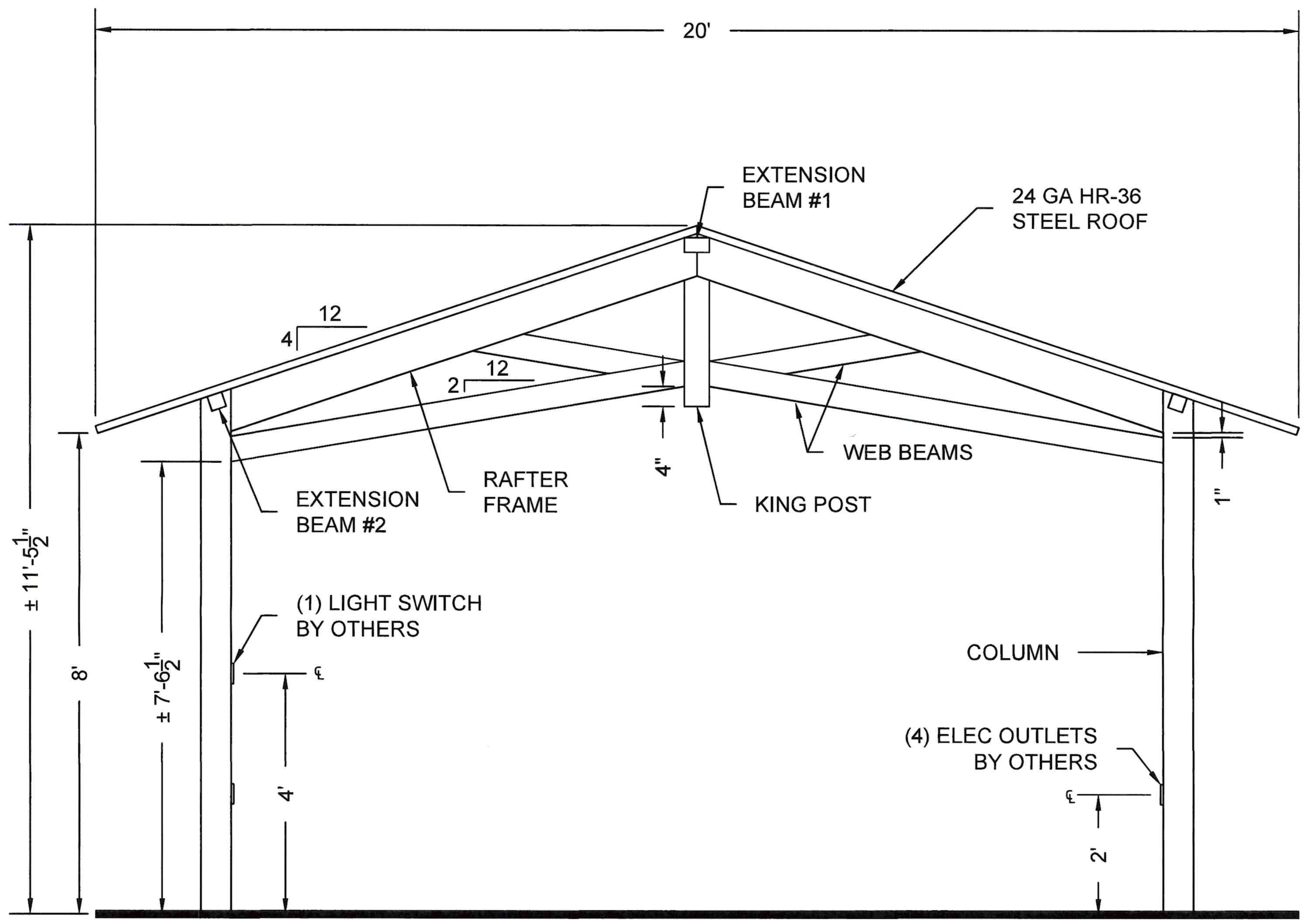
FRY, LOCH LLOYD
17141 STONEHAVEN DR.
VILLAGE OF LOCH LLOYD, MO 64012

#23118

Detail Sheet 3 of 13

STATE OF MISSOURI
ALAN E MONEY
NUMBER PE-2012025247
PROFESSIONAL ENGINEER

CRS, INC.

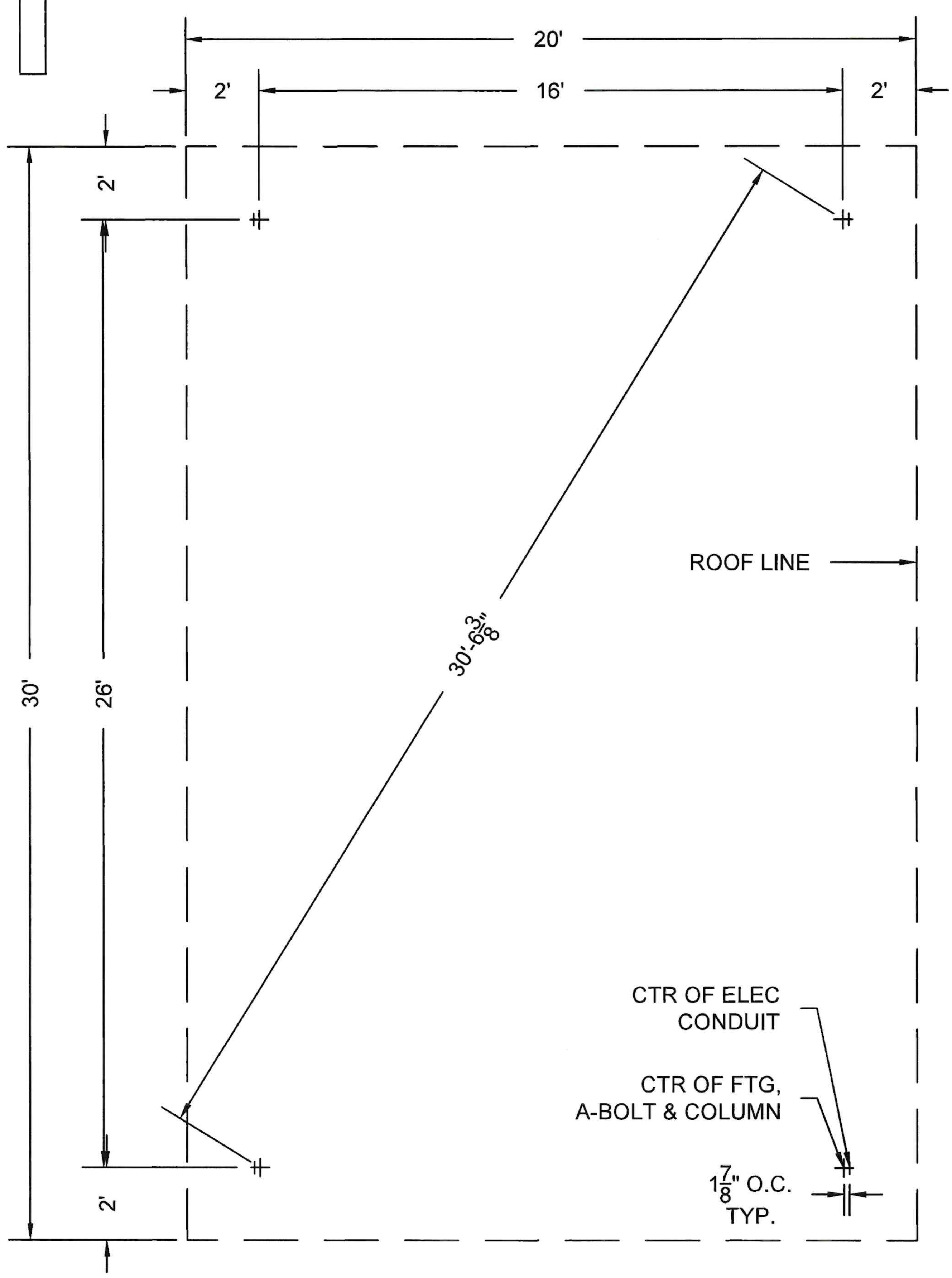


END ELEVATION 20'X30' ORLANDO MODEL

NTS

FRY, LOCH LLOYD	#23118	
17141 STONEHAVEN DR.		
VILLAGE OF LOCH LLOYD, MO 64012		Detail Sheet 4 of 13

STATE OF MISSOURI
ALAN E MONEY
NUMBER PE-2012025247
PROFESSIONAL ENGINEER
Aug 25, 2023



LAYOUT PLAN 20'X30' ORLANDO MODEL
NTS

FRY, LOCH LLOYD #23118
17141 STONEHAVEN DR.
VILLAGE OF LOCH LLOYD, MO 64012

Detail Sheet 5 of 13

STATE OF MISSOURI
ALAN E MONEY
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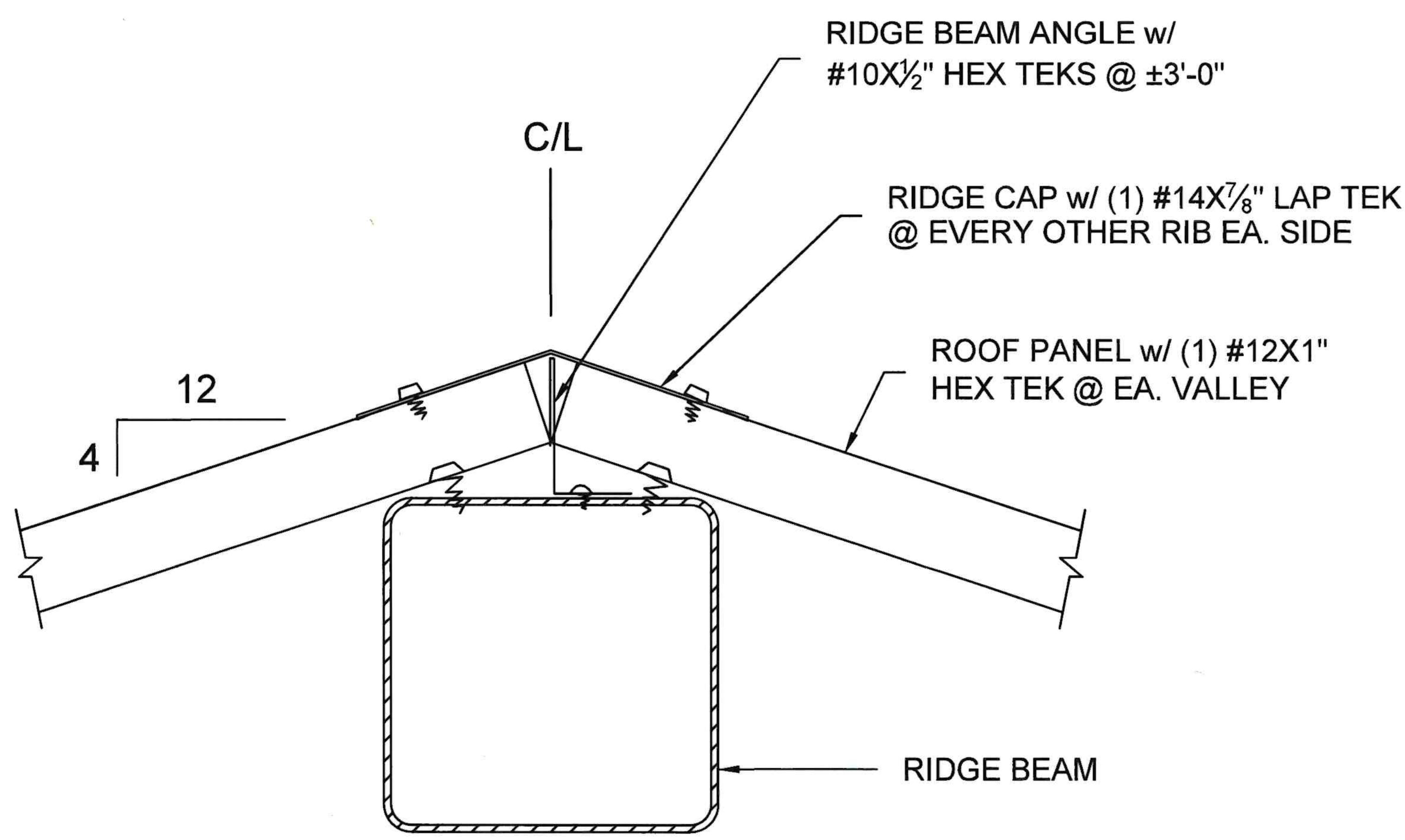

RIDGE BEAM SECTION

NTS

FRY, LOCH LLOYD	#23118	
17141 STONEHAVEN DR.		
VILLAGE OF LOCH LLOYD, MO 64012		Detail Sheet 6 of 13

STATE OF MISSOURI
ALAN E MONEY
NUMBER PE-2012025247
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Aug 25, 2023

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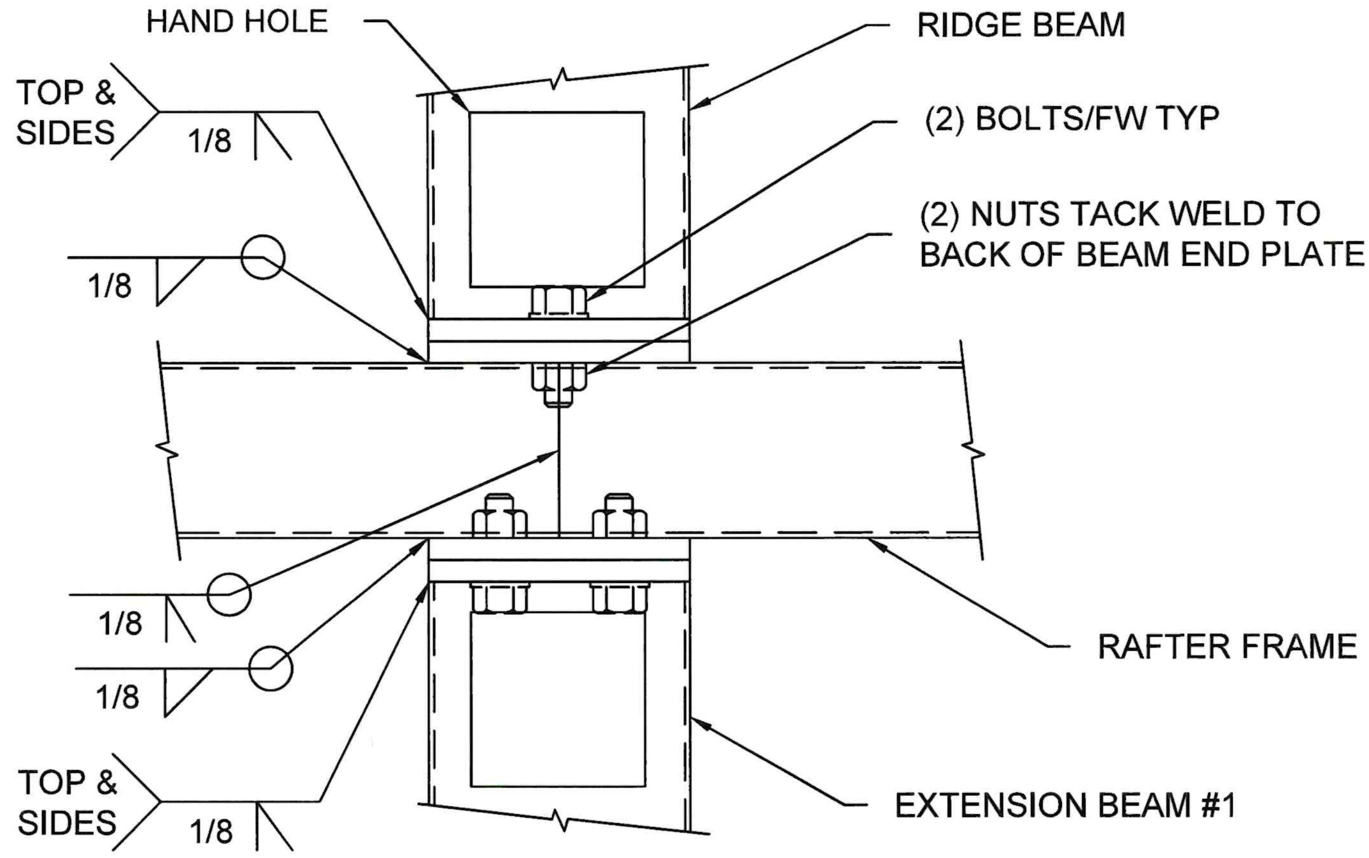
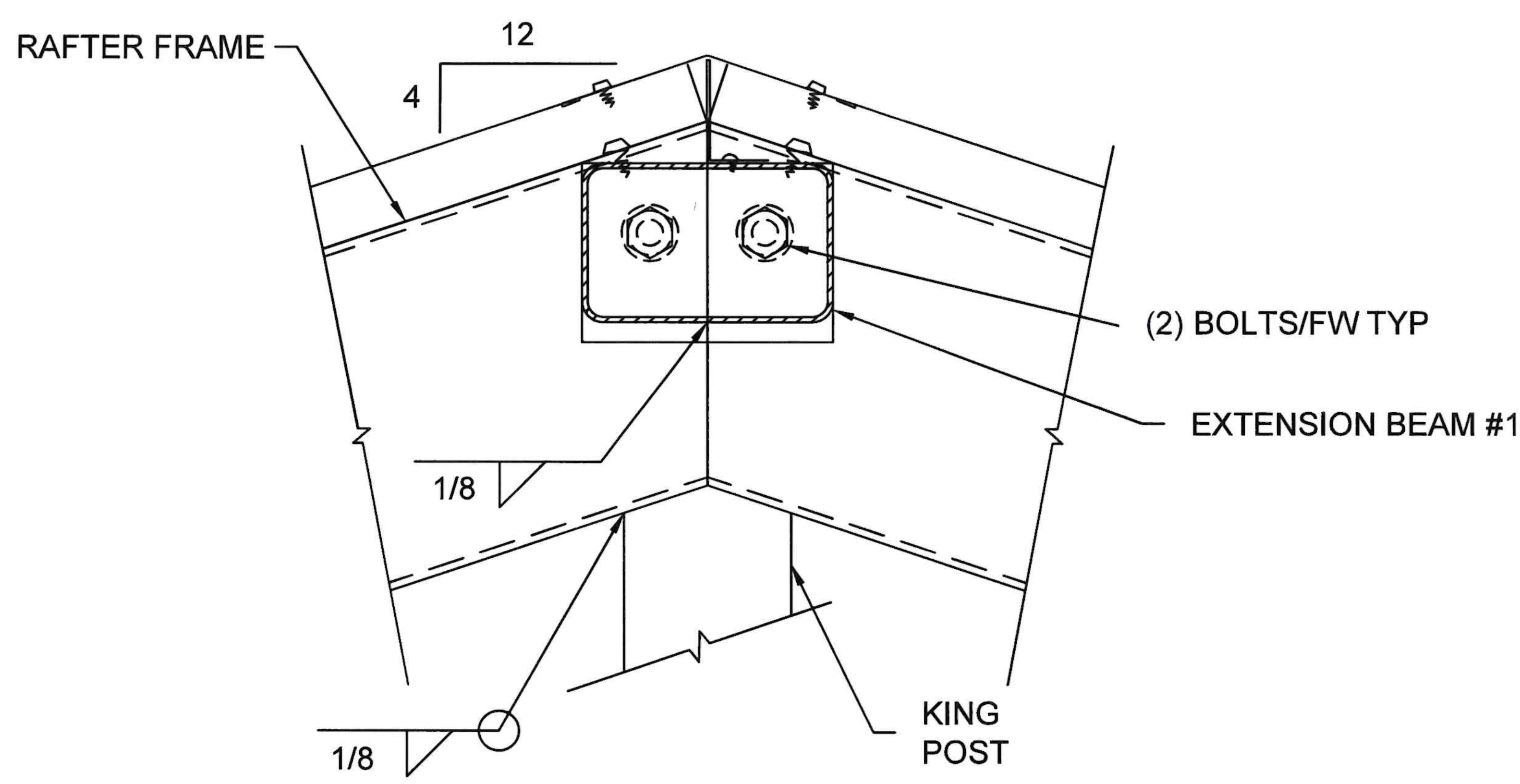


RIDGE BEAM / RAFTER FRAME PLAN

NTS

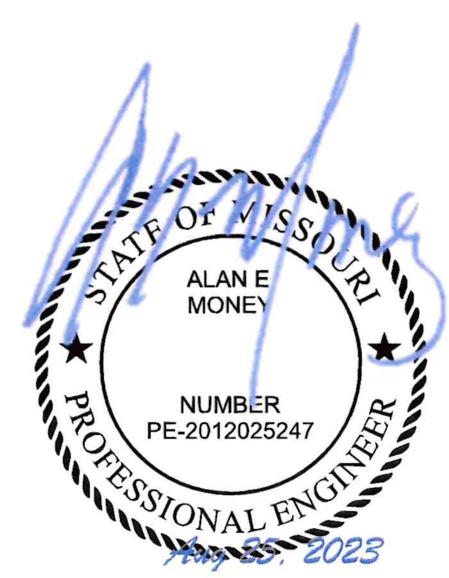


RIDGE BEAM / RAFTER FRAME SECTION

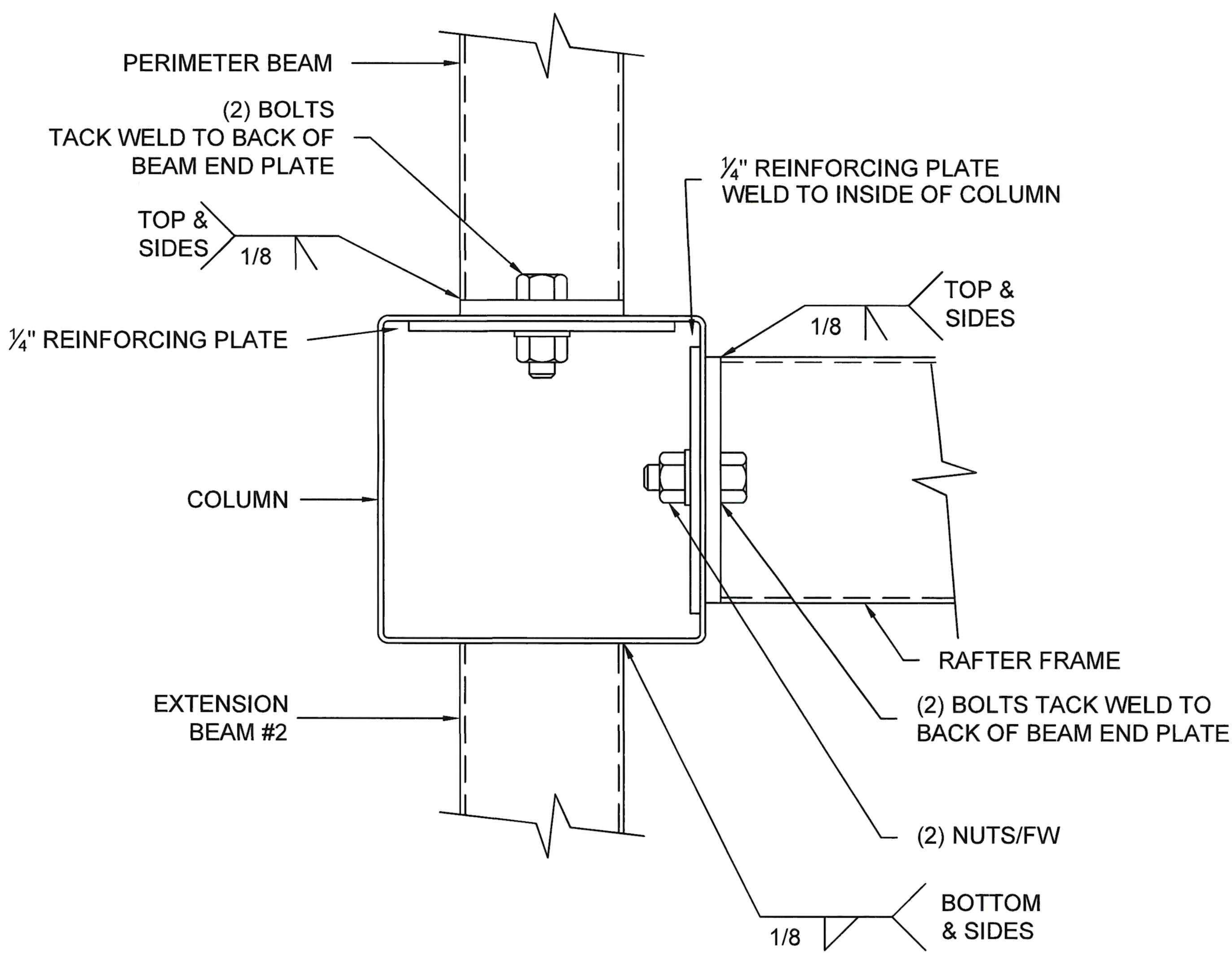
NTS

FRY, LOCH LLOYD #23118
17141 STONEHAVEN DR.
VILLAGE OF LOCH LLOYD, MO 64012

Detail Sheet 7 of 13



CRS, INC.



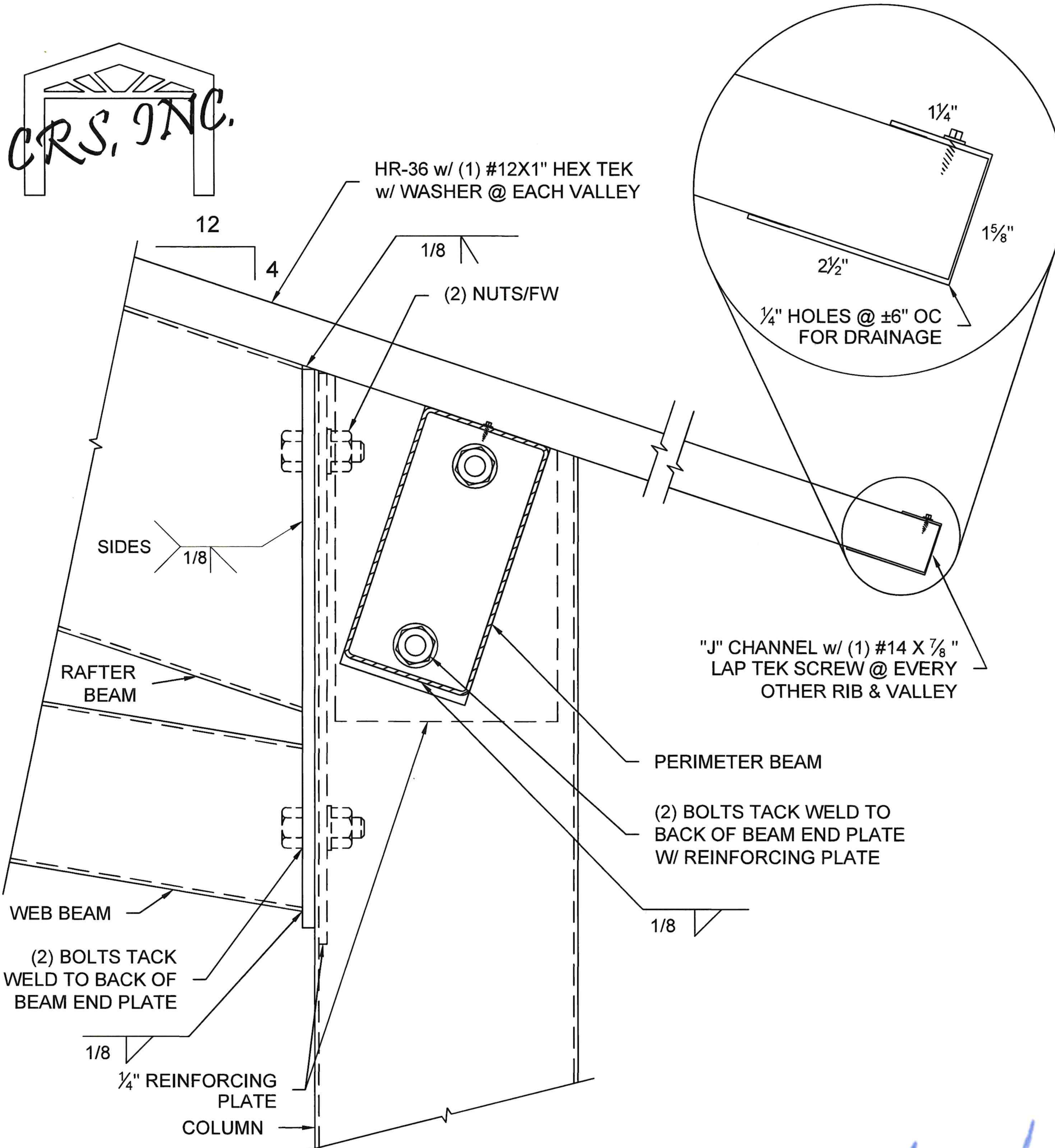
PLAN VIEW / COLUMN CONNECTION DETAIL

NTS

FRY, LOCH LLOYD #23118
17141 STONEHAVEN DR.
VILLAGE OF LOCH LLOYD, MO 64012

Detail Sheet 8 of 13

STATE OF MISSOURI
ALAN E MONEY
NUMBER PE-2012025247
PROFESSIONAL ENGINEER
Aug 25, 2023



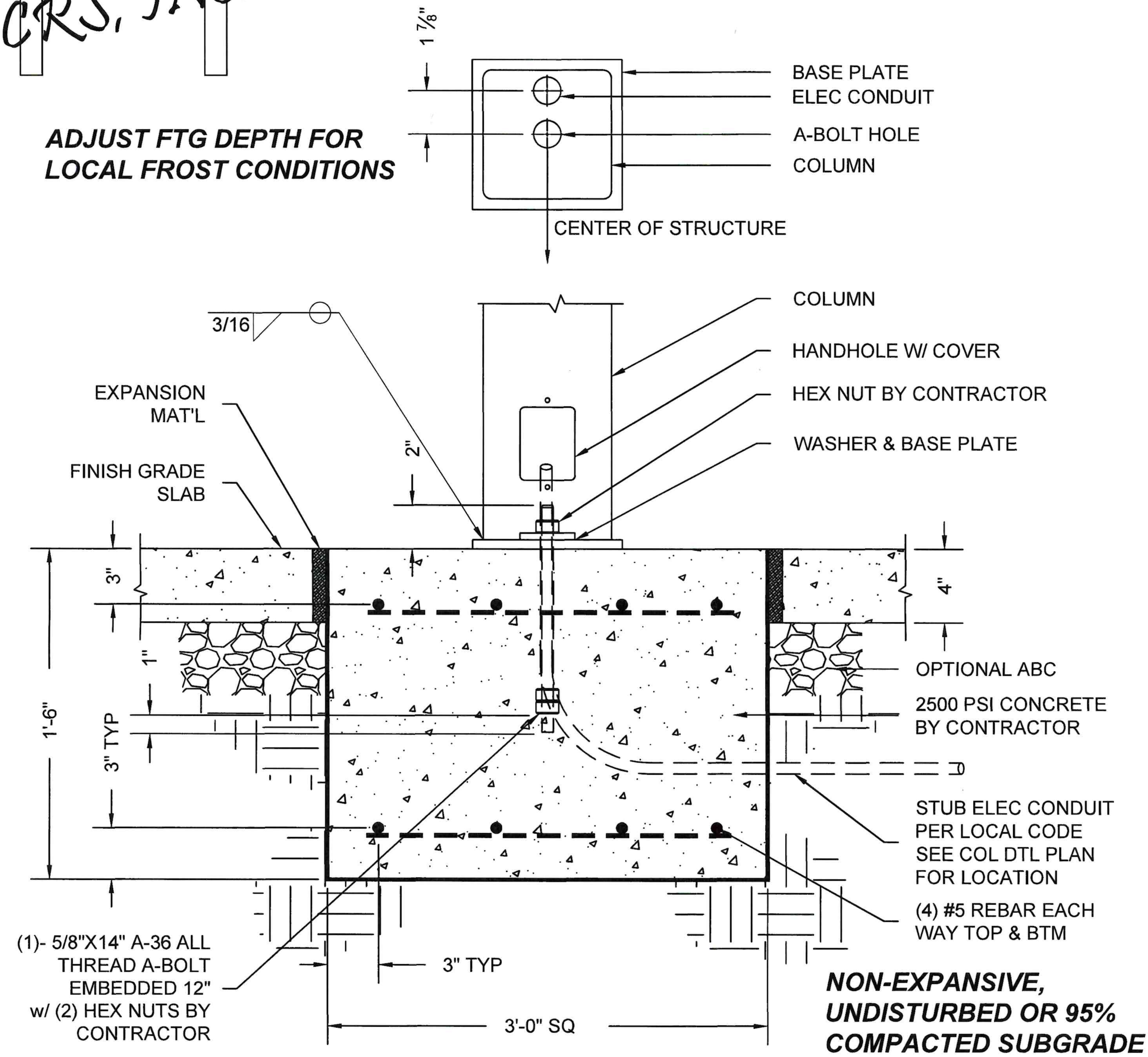
FASCIA SECTION

NTS

FRY, LOCH LLOYD	#23118
17141 STONEHAVEN DR.	
VILLAGE OF LOCH LLOYD, MO 64012	Detail Sheet 9 of 13

STATE OF MISSOURI
ALAN E MONEY
NUMBER PE-2012025247
PROFESSIONAL ENGINEER
Aug 30, 2023

CRS, INC.



1-BOLT SURFACE MOUNT SPREAD FOOTING
20'X30' ORLANDO MODEL

NTS

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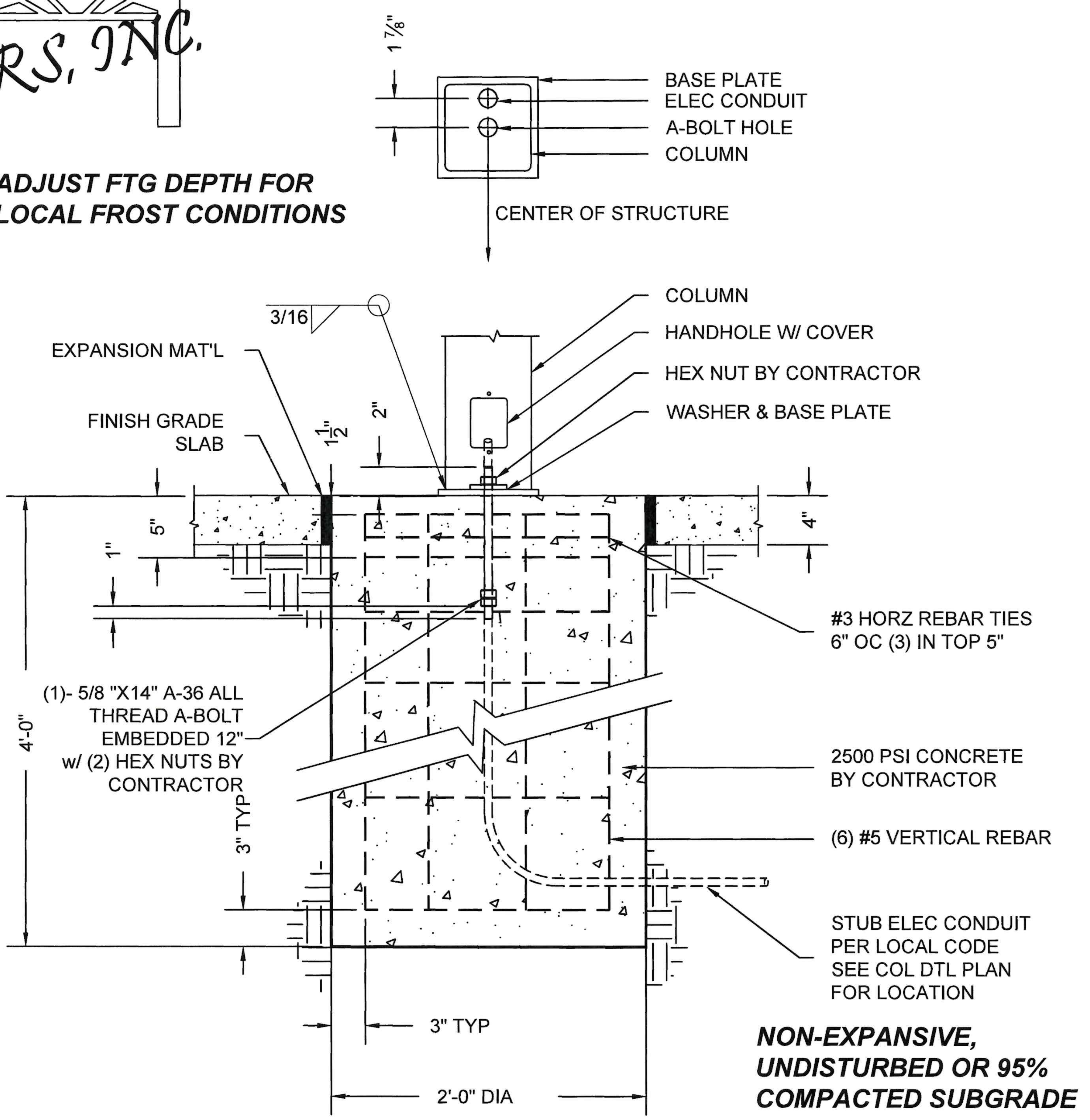
17141 STONEHAVEN DR.
VILLAGE OF LOCH LLOYD, MO 64012

Detail Sheet 10 of 13

STATE OF MISSOURI
ALAN E MONEY
NUMBER PE-2012025247
PROFESSIONAL ENGINEER
Aug 25, 2023

CRS, INC.

ADJUST FTG DEPTH FOR LOCAL FROST CONDITIONS



NON-EXPANSIVE, UNDISTURBED OR 95% COMPACTED SUBGRADE

1-BOLT SURFACE MOUNT CAISSON FOOTING
20'X30' ORLANDO MODEL

NTS

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Detail Sheet 11 of 13

STATE OF MISSOURI
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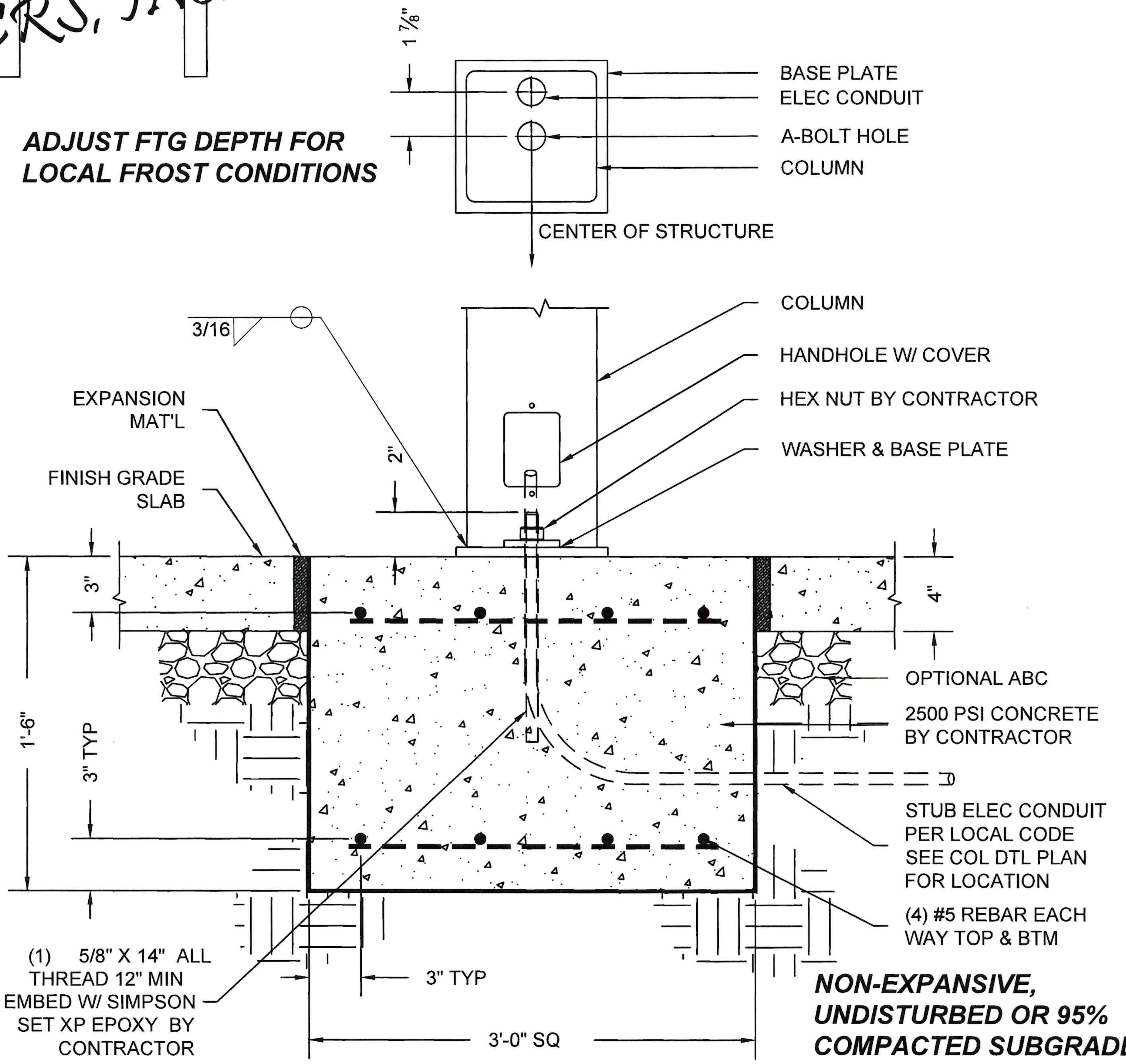
Aug 25, 2023

CRS, INC.

ADJUST FTG DEPTH FOR LOCAL FROST CONDITIONS



NON-EXPANSIVE, UNDISTURBED OR 95% COMPACTED SUBGRADE

1-BOLT EPOXY OPTION
SURFACE MOUNT SPREAD FOOTING
20'X30' ORLANDO MODEL

NTS

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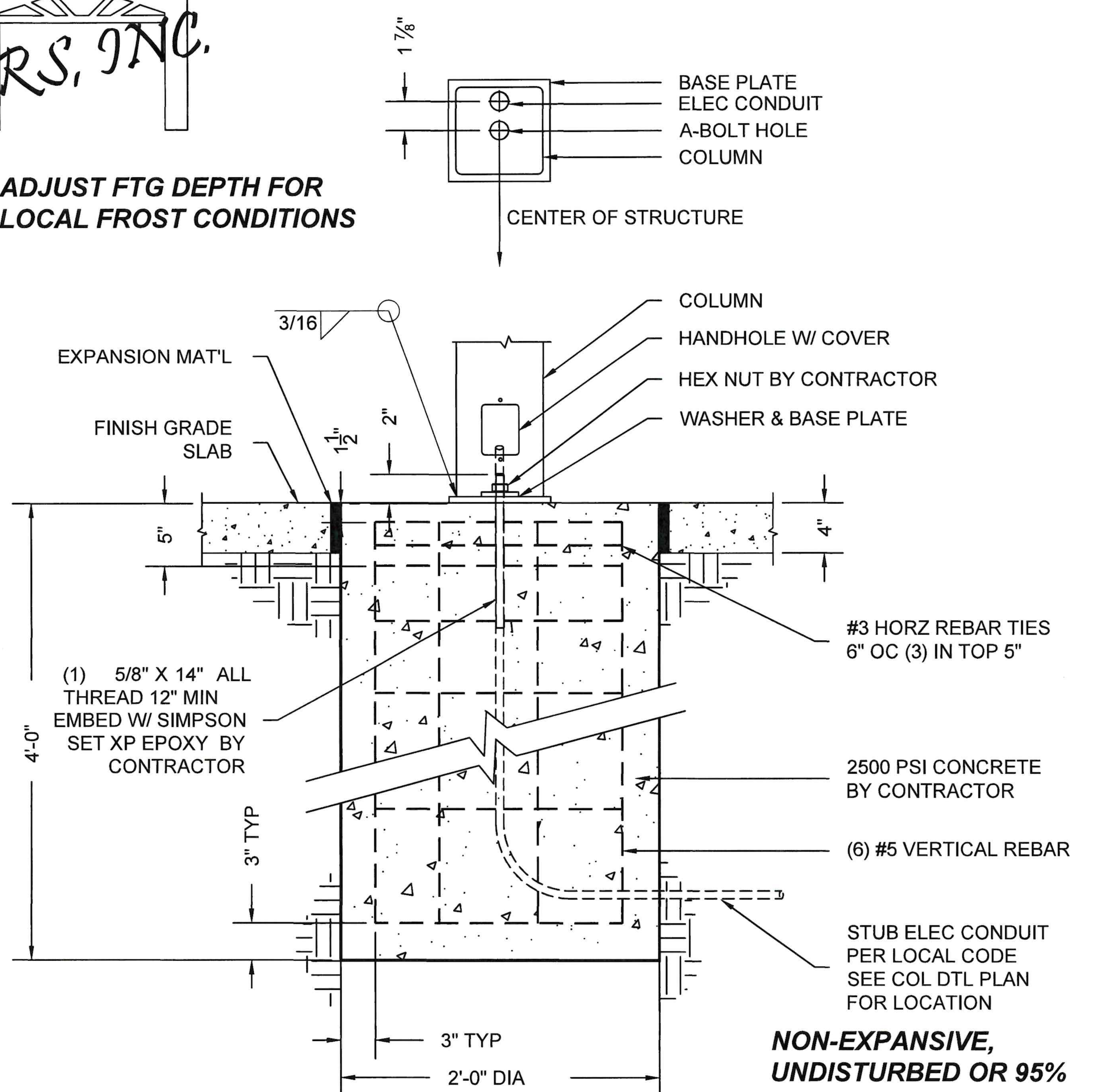

1-BOLT EPOXY OPTION
SURFACE MOUNT CAISSON FOOTING
20'X30' ORLANDO MODEL

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Detail Sheet 13 of 13

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