

GENERAL NOTES

1. DESIGN IS FOR MAXIMUM 30'-0" WIDE X 20'-0" EAVE HEIGHT UTILITY STRUCTURES.
2. APPLICABLE CODES, REGULATIONS, & STANDARDS:
 - A. 2023 FLORIDA BUILDING CODE (8TH EDITION)
 - B. 2024 INTERNATIONAL BUILDING CODE
 - C. ASCE 7-22: MINIMUM DESIGN LOADS ON BUILDINGS AND OTHER STRUCTURES
 - D. AISC STEEL CONSTRUCTION MANUAL (15TH EDITION)
 - E. ACI 318-19: BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
 - F. TMS 402-16: BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES
 - G. AWS D1.1: STRUCTURAL WELDING

3. RISK CATEGORY: I

4. EXPOSURE CATEGORY: C

5. LOW ULTIMATE WIND SPEED 105 TO 150 MPH (NOMINAL WIND SPEED 81 TO 116 MPH): MAXIMUM RAFTER/POST AND END POST SPACING = 5.0 FEET.
HIGH ULTIMATE WIND SPEED 151 TO 180 MPH (NOMINAL WIND SPEED 117 TO 139 MPH): MAXIMUM RAFTER/POST AND END POST SPACING = 4.0 FEET.

6. DEAD LOAD = 5 PSF

7. ROOF LIVE LOAD = 12 PSF

8. SPECIFICATIONS APPLICABLE TO 29/26 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/2" x 2 1/2" - 14 GAUGE TUBE STEEL (TS) FRAMING MEMBERS FOR VERTICAL PANELS, 29/26 GAUGE METAL PANELS SHALL BE FASTENED TO 18 GAUGE HAT CHANNELS (UNLESS OTHERWISE NOTED).

9. OPTIONAL BASE RAIL ANCHORAGE MAY BE USED FOR LOW AND MUST BE USED FOR HIGH WIND SPEEDS.

10. FASTENERS CONSIST OF #12-14 x 3/4" SELF DRILLING FASTENER (SDF), USE CONTROL SEAL WASHER WITH EXTERIOR FASTENERS SPECIFICATIONS APPLICABLE ONLY FOR MEAN ROOF HEIGHT OF 20 FEET OR LESS, AND ROOF SLOPES OF 14° (3:12 PITCH) OR LESS SPACING REQUIREMENTS FOR OTHER ROOF HEIGHTS AND/OR SLOPES MAY VARY.

11. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR PURLINS, AND POSTS, INTERIOR = 9" OR END = 6", (MAX.). THIS CONNECTION PATTERN SHALL BE SUPERCEDED BY THE PANEL MANUFACTURER'S INSTALLATION INSTRUCTIONS.

12. WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:

SOIL SITE CLASS = D
R = 3.5 Ie = 1.0
Sds = 0.087 g V = CsW
Sdi = 0.084 g

13. GROUND ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6" OF EACH RAFTER COLUMN ALONG SIDES.

14. GROUND ANCHOR (SOIL NAILS) CONSIST OF #5 REBAR W/ WELDED NUT X 30" LONG IN SUITABLE SOIL CONDITIONS MAY BE USED FOR LOW (\leq 108 MPH NOMINAL) WIND SPEEDS ONLY. OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED.

15. MIN. LAP REQUIREMENT FOR REBAR IN FOOTER IS 25".

16. SOIL TO BE COMPACTED TO 95% OF ITS MAXIMUM DRY DENSITY, AT OPTIMUM MOISTURE CONTENT, IN ACCORDANCE WITH ASTM D1557-93

17. PRIOR TO PLACING CONCRETE, TREAT THE ENTIRE SUBSURFACE AREA FOR TERMITES IN COMPLIANCE WITH THE FBC.

18. A LANDING OF MIN. 36" WIDTH IN THE DIRECTION OF TRAVEL SHALL BE PROVIDED AT THE EXTERIOR DOORS. SLOPE OF LANDING NOT TO EXCEED 1/4"-1". LANDING LEVEL NOT TO BE LOWER THAN 1-1/2" (FOR EGRESS DOORS) & 7-3/4" (FOR OTHER EXTERIOR DOORS) BELOW THE TOP OF THRESHOLD.

19. CONTRACTOR TO PROVIDE APPROVED PRODUCTS THAT MEET OR EXCEED WIND DESIGN PRESSURES.

20. CONSTRUCTION IN SPECIAL FLOOD HAZARD AREAS:
CONTRACTOR TO VERIFY THAT THE FINISHED FLOOR ELEVATION FOR THE PROPOSED STRUCTURE IS AT OR ABOVE THE GREATER OF THE FOLLOWING ELEVATIONS:
I) BFE (BASE FLOOD ELEVATION) + 2'-0"
II) DFE (DESIGN FLOOD ELEVATION)
III) THE MINIMUM ELEVATION MANDATED BY THE BUILDING CODES ADOPTED BY THE AUTHORITY HAVING JURISDICTION.

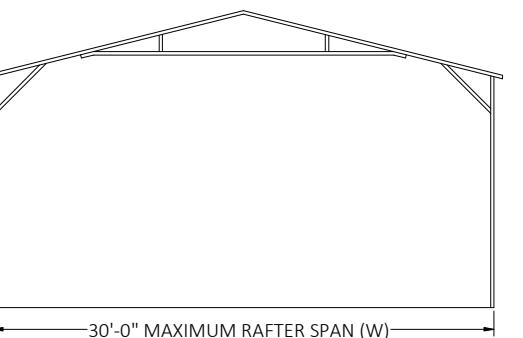
DRAWING INDEX

PAGE NO.	DESCRIPTION
1	NOTES AND SPECIFICATIONS
2	BOX EAVE FRAME RAFTER ENCLOSED BUILDING
3	BOW EAVE FRAME RAFTER ENCLOSED BUILDING
4	BASE RAIL AND FOUNDATION ANCHORAGE
5	BOX/BOW EAVE VERTICAL ROOF/SIDING OPTION
6	BOX/BOW EAVE RAFTER LEAN-TO OPTIONS
7	BOX EAVE RAFTER END WALL, SIDE WALL AND OPENING FRAMING
8	VENT AND CMU STEM WALL DETAIL
9	OPTIONAL CONCRETE STRIP FOOTING

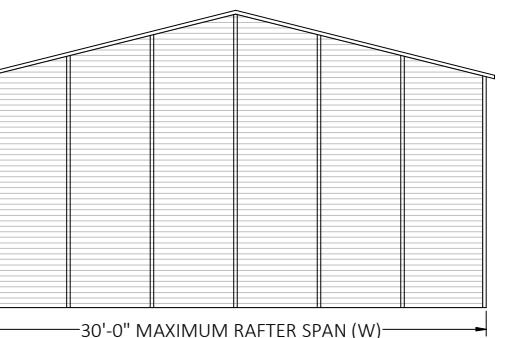
UTILITY METAL BUILDING DESIGN
MAXIMUM 30'-0" WIDE X 20'-0" EAVE HEIGHT
BOX/BOW EAVE FRAME

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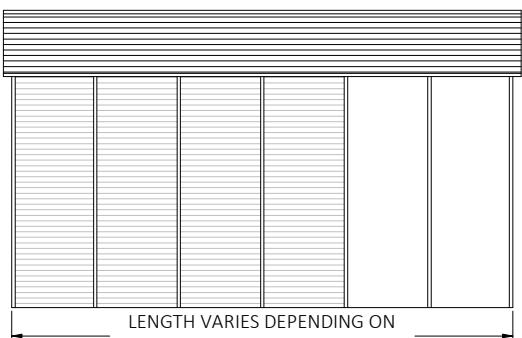
BOX EAVE FRAME RAFTER UTILITY BUILDING



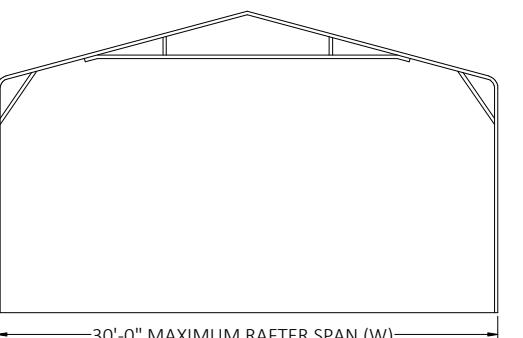
TYPICAL END ELEVATION



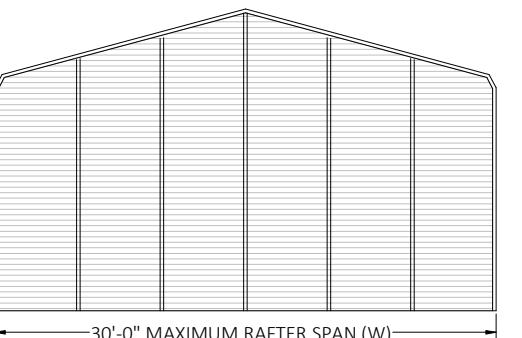
TYPICAL END ELEVATION - HORIZONTAL ROOF



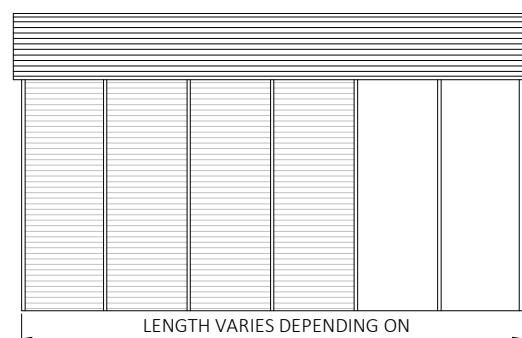
LENGTH VARIES DEPENDING ON
NUMBER AND SPACING OF RAFTERS
TYPICAL SIDE ELEVATION - HORIZONTAL ROOF



TYPICAL END ELEVATION



TYPICAL END ELEVATION - HORIZONTAL ROOF



LENGTH VARIES DEPENDING ON
NUMBER AND SPACING OF RAFTERS
TYPICAL SIDE ELEVATION - HORIZONTAL ROOF



FLORIDA ENGINEERING LLC PROJECT NO. 2504211-30-U
SIGNED AND SEALED DATED 03/27/2025 REVISES AND
SUPERSEDES FLORIDA ENGINEERING LLC PROJECT NO.
2322771-30-U SIGNED AND SEALED DATED 01/16/2024.

DIGITAL CERTIFICATION NOTES:
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2. THIS DOCUMENT HAS BEEN CREATED BY FLORIDA
ENGINEERING LLC FOR TUBULAR BUILDING SYSTEMS
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3. ALTERATIONS, ADDITIONS OR OTHER MARKINGS TO
THIS DOCUMENT ARE NOT PERMITTED AND INVALIDATE
FLORIDA ENGINEERING LLC'S CERTIFICATION.
4. THESE PLANS ARE GENERIC AND DO NOT PROVIDE
INFORMATION FOR A SITE-SPECIFIC PROJECT WHERE THE
SITE CONDITIONS DEVIATE FROM WHAT HAS BEEN CALLED
OUT ON THESE PLANS.
5. CONTRACTOR MUST NOT DEVIATE FROM THE
CONDITIONS DETAILED ON THESE PLANS.
6. CONSTRUCTION SAFETY AT THE SITE IS THE
CONTRACTOR'S RESPONSIBILITY.

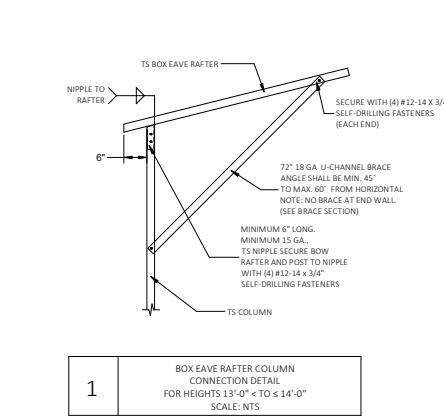
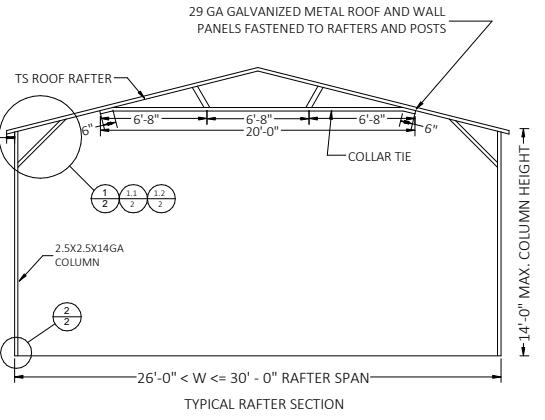
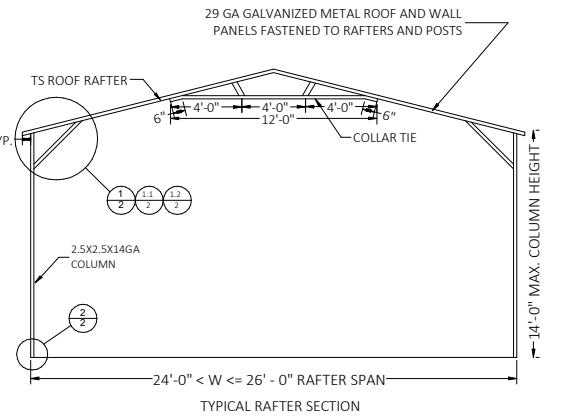
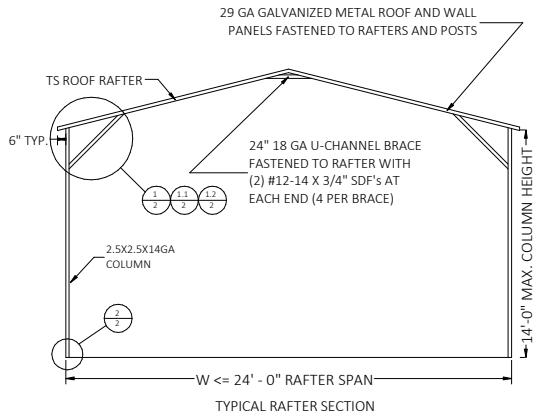
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LAKE CITY, FL 32025

PROJECT DESCRIPTION:
30' WIDE X 20' HIGH
UTILITY STRUCTURE

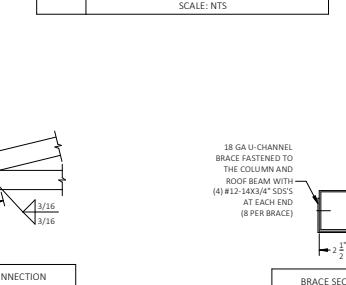
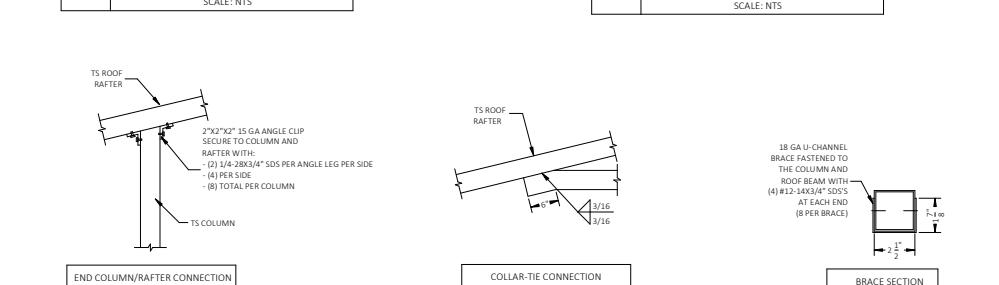
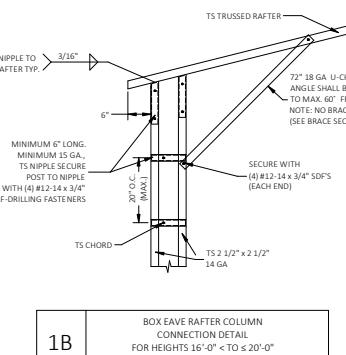
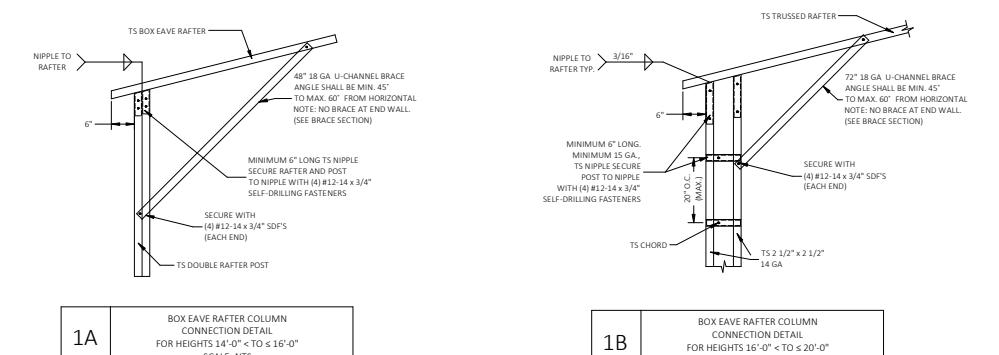
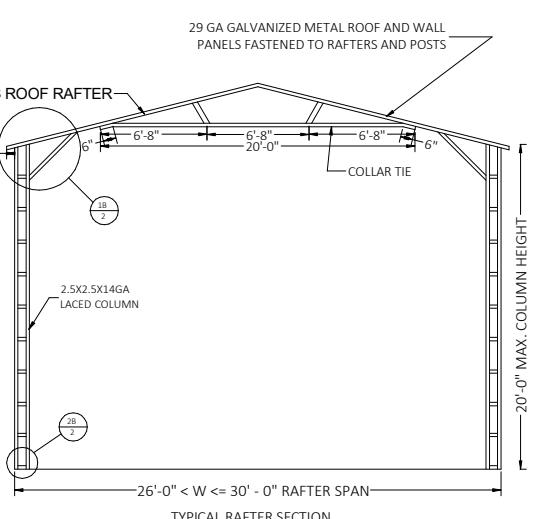
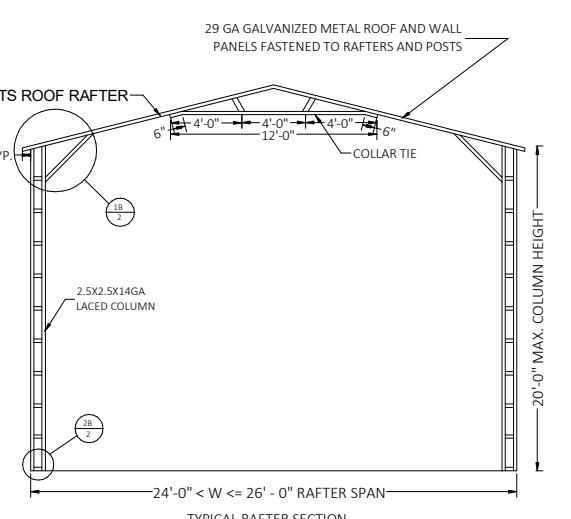
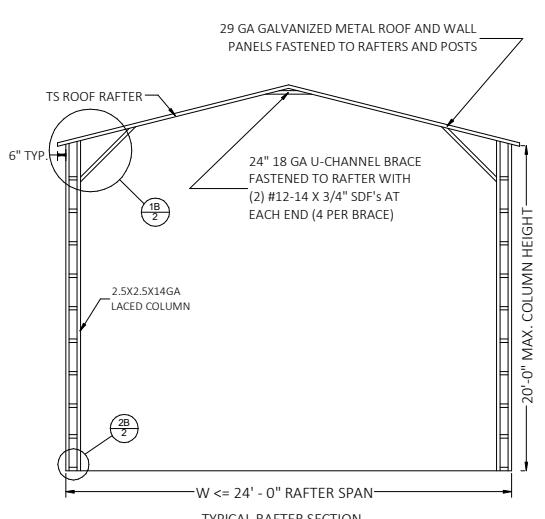
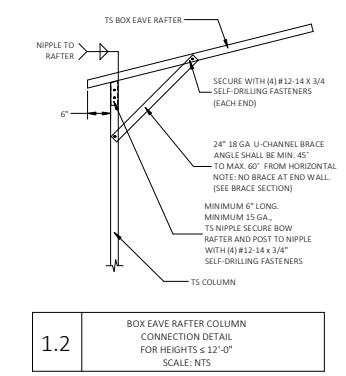
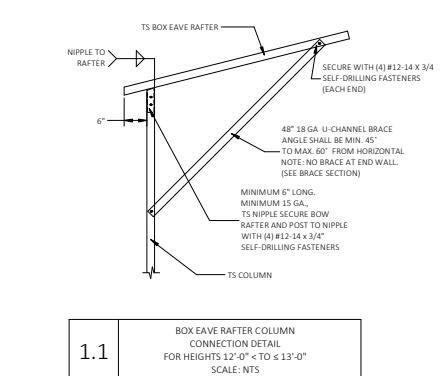
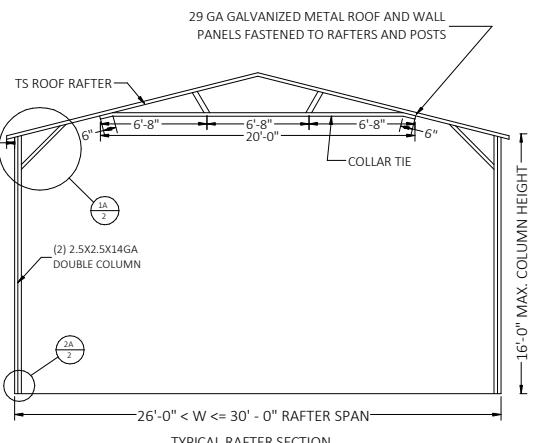
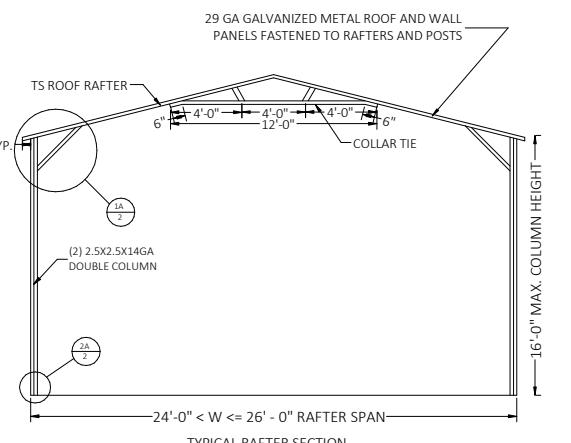
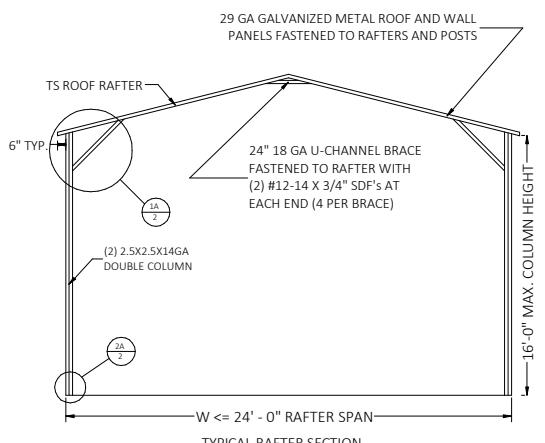
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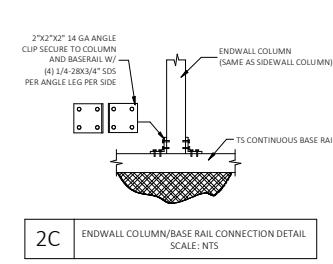
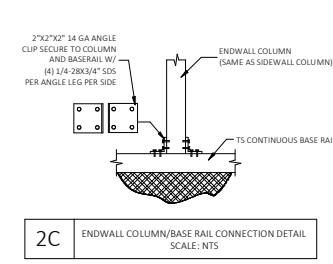
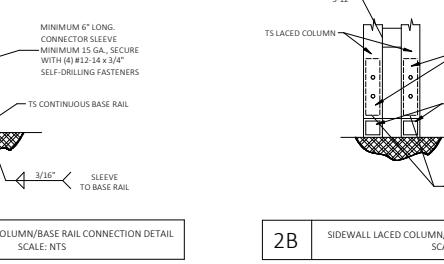
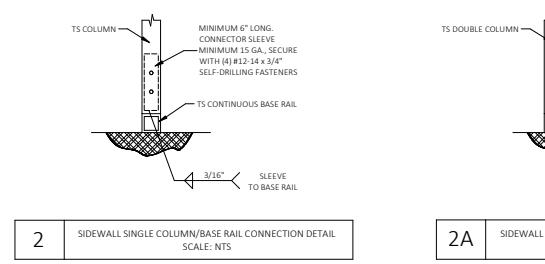
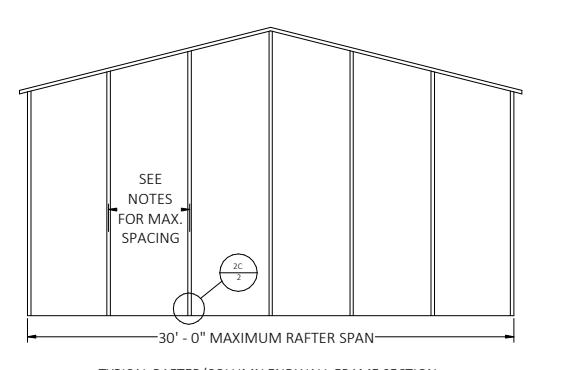
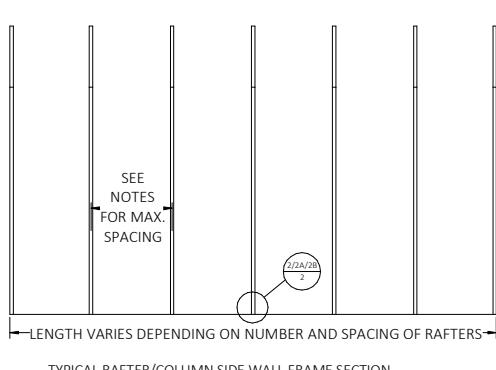


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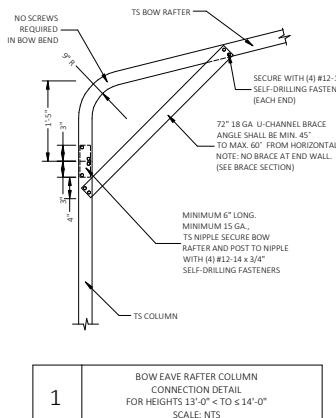
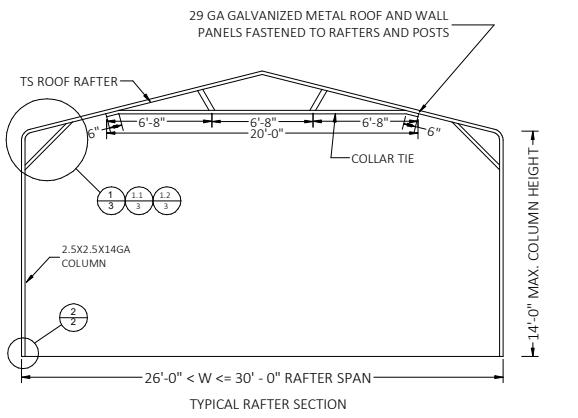
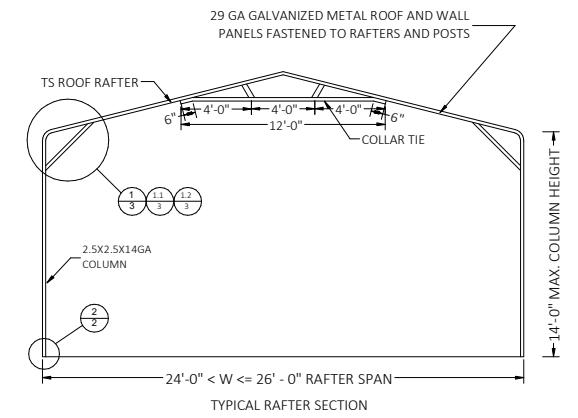
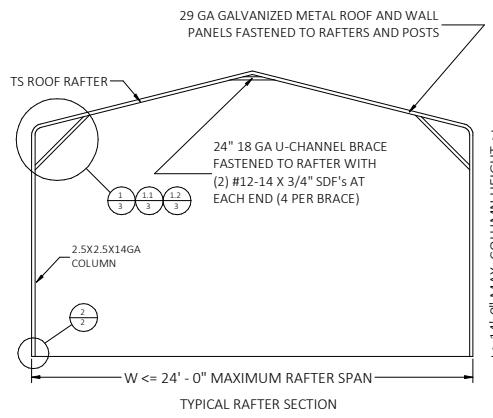
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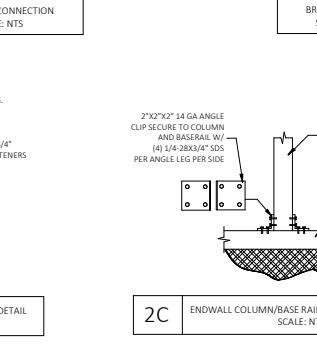
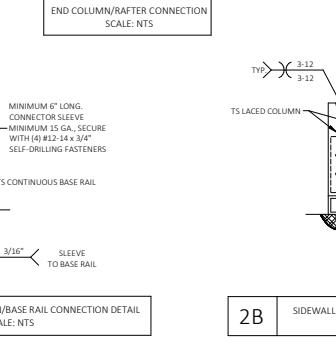
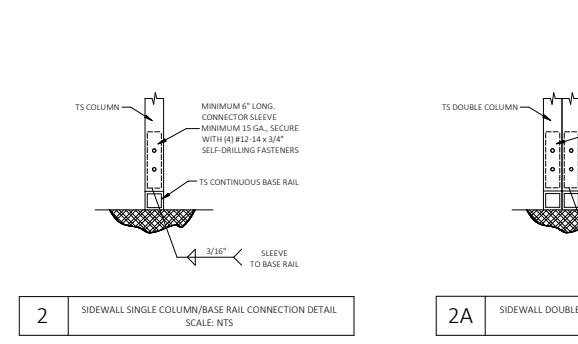
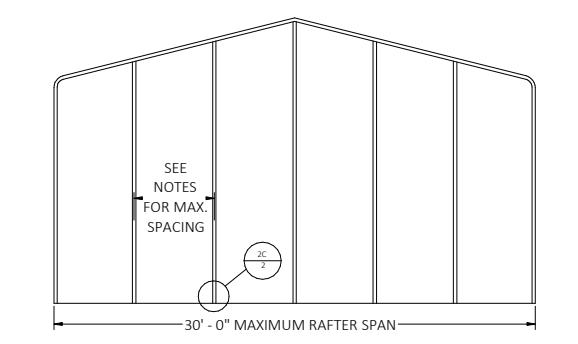
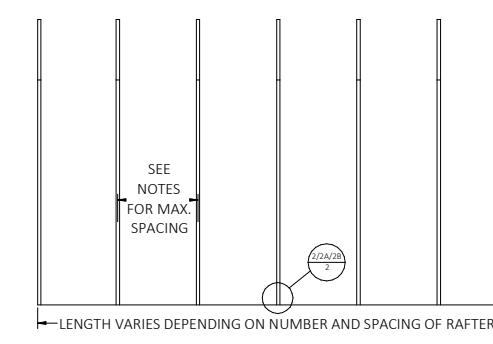
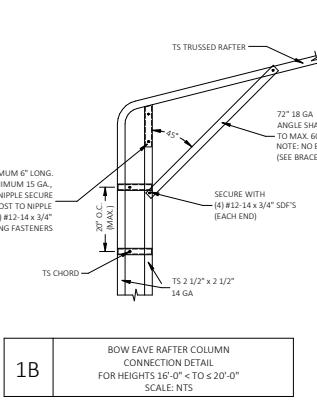
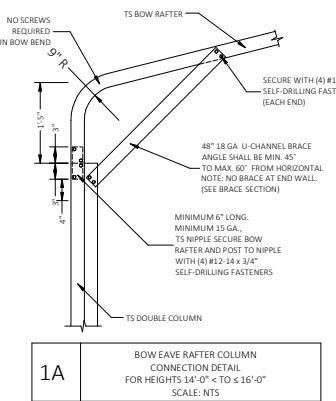
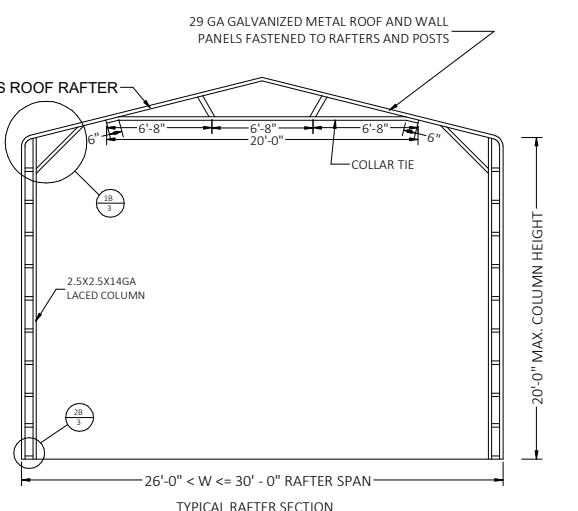
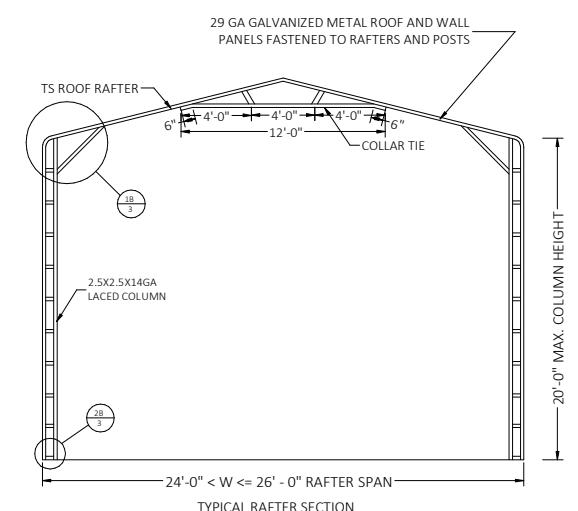
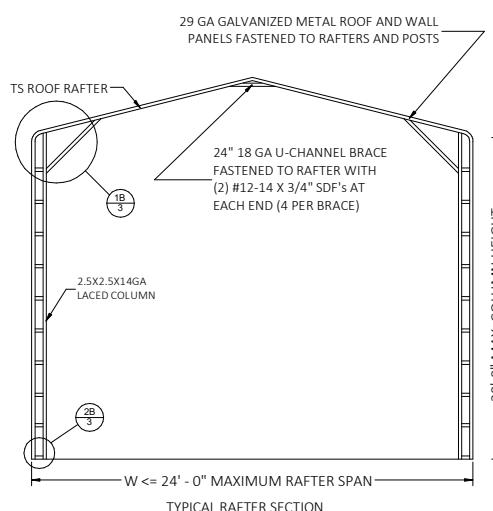
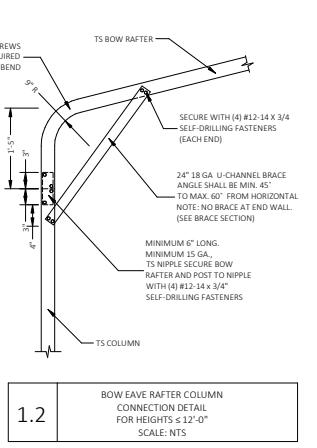
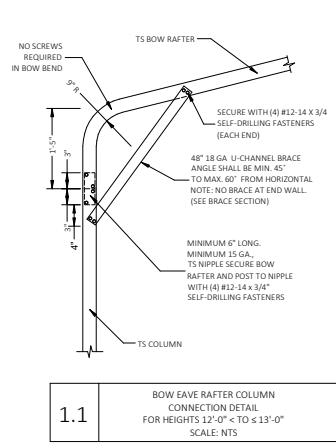
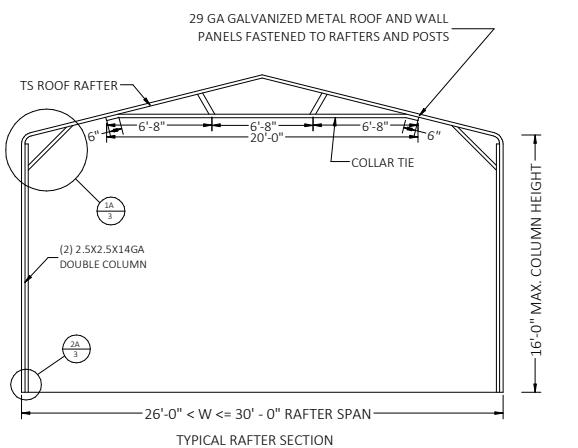
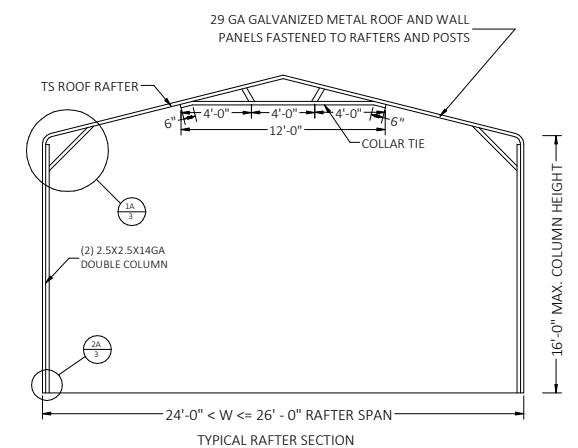
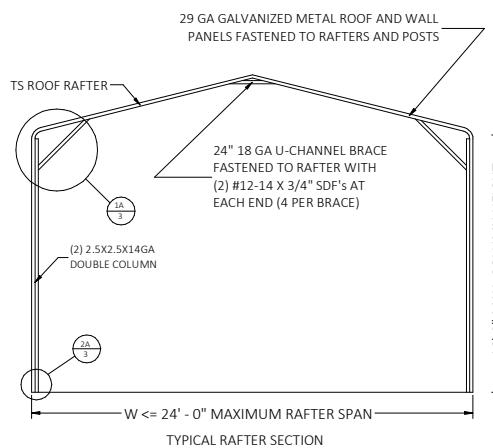
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DESIGN DATE: 03/27/2025
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LAKE CITY, FL 32025

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PAGE : 3

BASE RAIL ANCHORAGE OPTIONS FOR LOW AND HIGH WIND SPEED

GENERAL NOTES

CONCRETE:

1. CONCRETE SHALL HAVE A MINIMUM SPECIFIED COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
2. PRIOR TO PLACING CONCRETE, TREAT THE ENTIRE SUBSURFACE AREA FOR TERMITES IN COMPLIANCE WITH THE FBC.
3. MINIMUM SOIL BEARING CAPACITY OF COMPACTED GRADE= 2000 PSF

COVERAGE OF THE REINFORCED STEEL:

FOR FOUNDATIONS, MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE PER ACI-318: 3 INCHES WHERE THE CONCRETE IS POURED AGAINST AND TEMPORARY IN CONTACT WITH THE EARTH OR UNPROTECTED FROM THE EARTH OR WEATHER, OTHERWISE 1-1/2 INCHES.

REINFORCING STEEL:

THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 60. THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT.

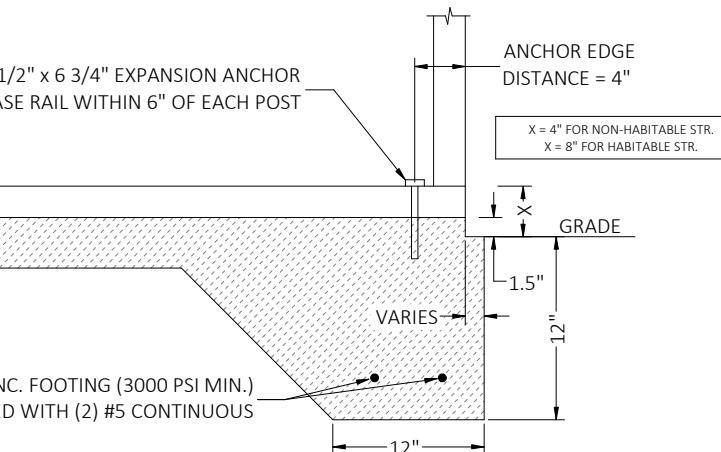
REINFORCEMENT MAY BE BENT IN THE FIELD OR SHOP AS LONG AS:

1. IT IS BENT COLD;
2. REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT;
3. THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS.
4. MINIMUM REQUIRED LAP LENGTH SHALL NOT BE LESS THAN 57-BAR DIAMETERS.

HELIX ANCHOR NOTES

1. FOR VERY DENSE AND/OR CEMENTED SANDS, COARSE GRAVEL AND COBBLES, CALICHE, PRELOADED SILTS AND CLAYS USE MINIMUM (2) 4" HELICES WITH MINIMUM 30 INCH EMBEDMENT.
2. FOR CORAL USE MINIMUM (2) 4" HELICES WITH MINIMUM 30 INCH EMBEDMENT.
3. FOR MEDIUM DENSE COARSE SANDS, SANDY GRAVELS, VERY STIFF SILTS AND CLAYS USE MINIMUM (2) 4" HELICES WITH MINIMUM 30 INCH EMBEDMENT.
4. FOR LOOSE TO MEDIUM DENSE COARSE SANDS, FIRM TO STIFF CLAYS AND SILTS, ALLUVIAL FILL USE MINIMUM (2) 6" HELICES WITH MINIMUM 50 INCH EMBEDMENT.
5. FOR VERY LOSE TO MEDIUM DENSE SANDS, FIRM TO STIFF CLAYS AND SILTS, ALLUVIAL FILL USE MINIMUM (2) 8" HELICES WITH MINIMUM 60 INCH EMBEDMENT.

INSTALL 1/2" x 6 3/4" EXPANSION ANCHOR THROUGH BASE RAIL WITHIN 6" OF EACH POST



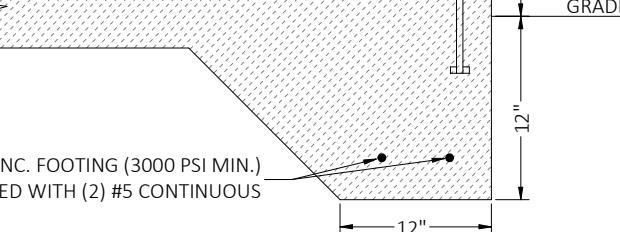
3A1 CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE
SCALE: NTS

1/2" CAST-IN ANCHORS
ASTM F1554 GR 36
MIN. EDGE DISTANCE = 1.5"

WIND SPEED	WALL HEIGHT	ANCHOR EMBED. ENCLOSED PORTION	ANCHOR EMBED. OPEN PORTION
UP TO 150 MPH	UP TO 16'-0"	3.25"	3.25"
	16'-1" TO 20'-0"	5.00"	3.25"
151 MPH TO 170 MPH	UP TO 14'-0"	3.25"	3.25"
	14'-1" TO 16'-0"	5.00"	3.25"
171 MPH TO 180 MPH	16'-1" TO 20'-0"	5.50"	4.25"
	UP TO 14'-0"	3.25"	3.25"
	14'-1" TO 16'-0"	5.00"	3.25"
	16'-1" TO 20'-0"	6.50"	4.25"

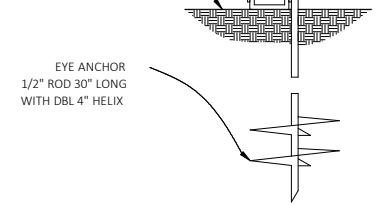
X = 4" FOR NON-HABITABLE STR.
X = 8" FOR HABITABLE STR.

MONOLITHIC CONC. FOOTING (3000 PSI MIN.)
REINFORCED WITH (2) #5 CONTINUOUS

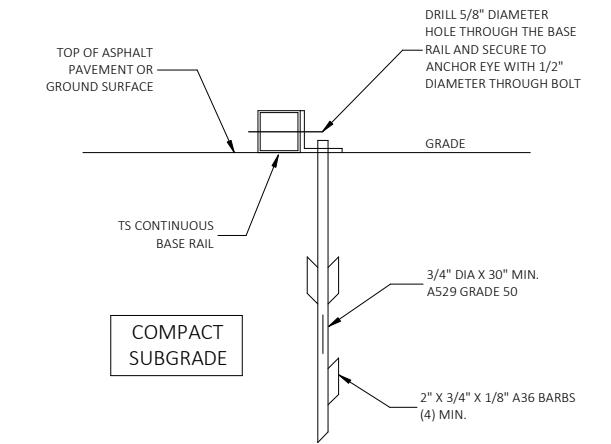


3A2 CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE
SCALE: NTS

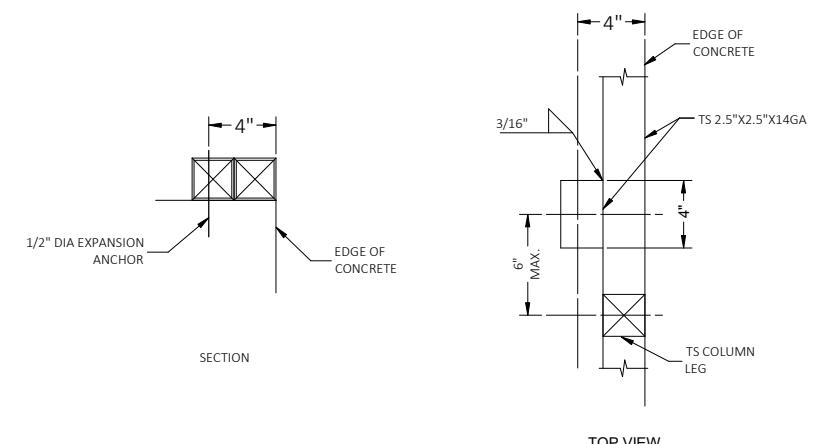
2" WASHERS
TOP OF ASPHALT PAVEMENT OR GROUND SURFACE
EYE ANCHOR 1/2" ROD 30" LONG WITH DBL 4" HELIX
DRILL 5/8" HOLE THROUGH THE BASE RAIL AND SECURE TO ANCHOR EYE WITH 1/2" DIAMETER THROUGH BOLT



3B GROUND BASE HELIX ANCHORAGE
SCALE: NTS



3C ASPHALT BASE ANCHORAGE (HP 9 BARBED DRIVE ANCHOR)
SCALE: NTS



3D TYPICAL ANCHOR DETAIL WHEN BASE RAIL IS NEAR EDGE OF CONCRETE
SCALE: NTS

CONTRACTOR:
TUBULAR BUILDING SYSTEMS
631 SE INDUSTRIAL CIRCLE,
LAKE CITY, FL 32025

PROJECT DESCRIPTION:
30' WIDE X 20' HIGH
UTILITY STRUCTURE

FLORIDA ENGINEERING LLC
4161 MIAMI TRAIL, UNIT 101
PORT CHARLOTTE, FLORIDA 33952
(941) 391-5980
FLEng.com
Orders@FLEng.com

CA CERT. #30782

DESIGN DATE: 03/27/2025

4

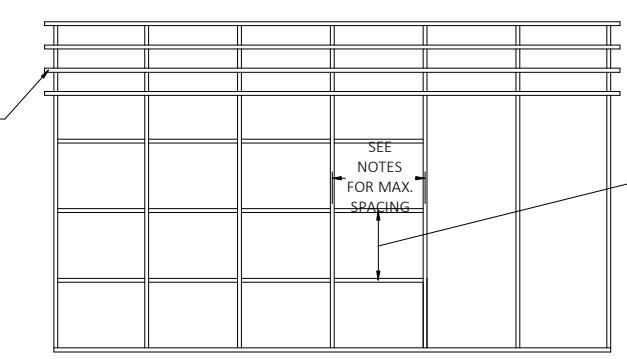
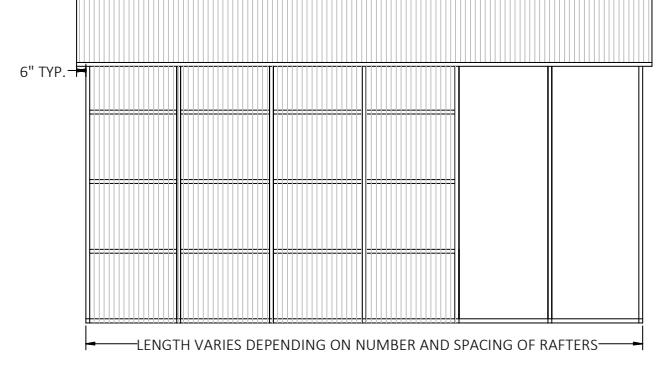
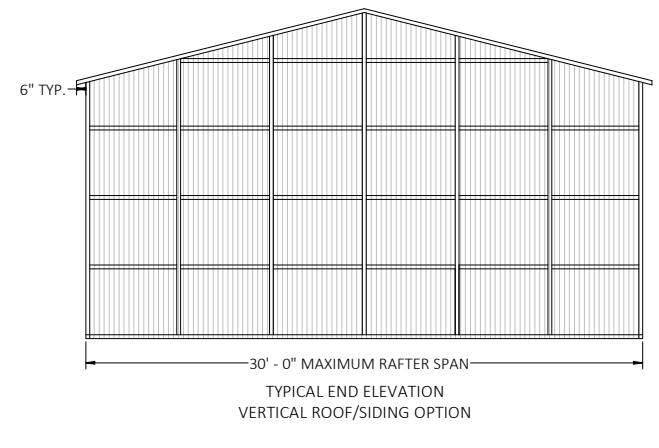
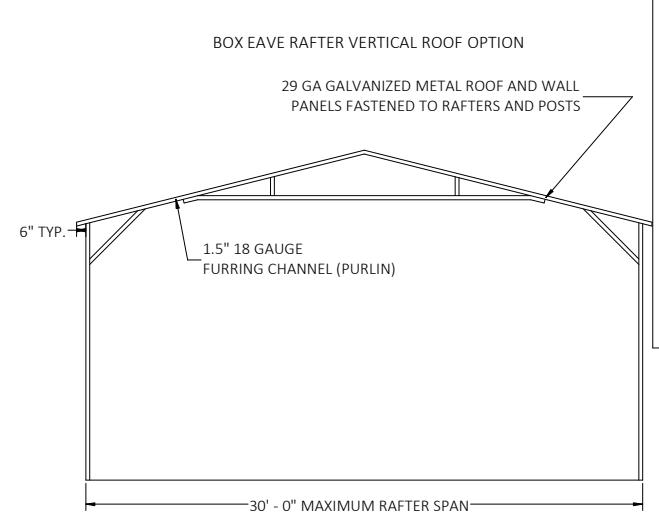
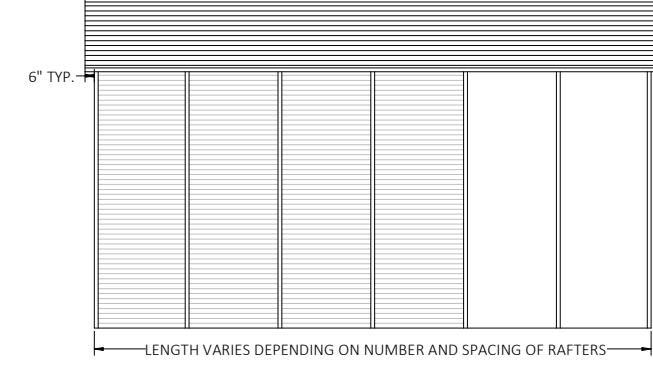
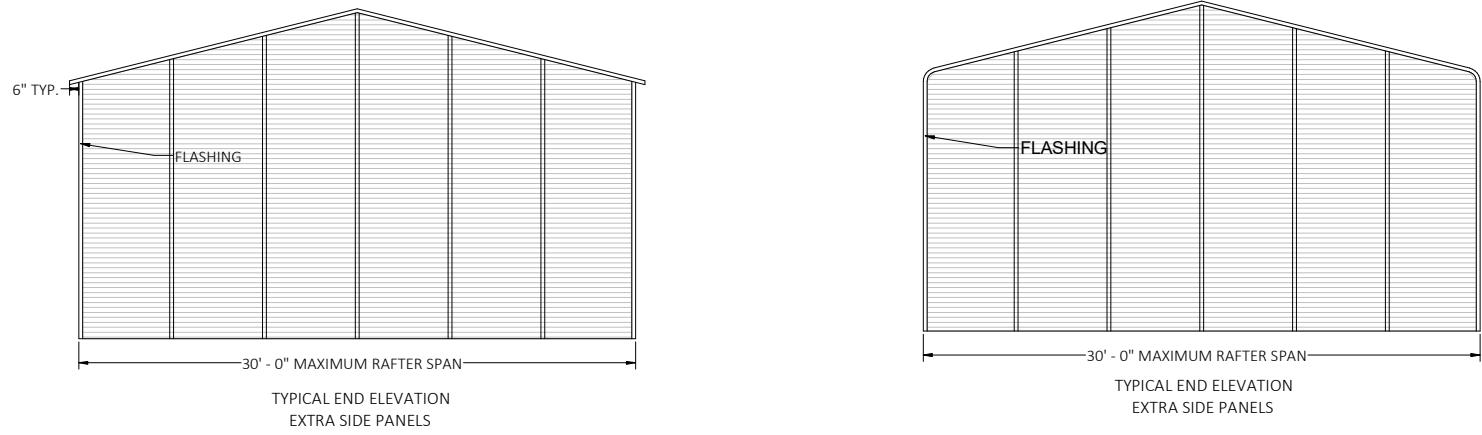
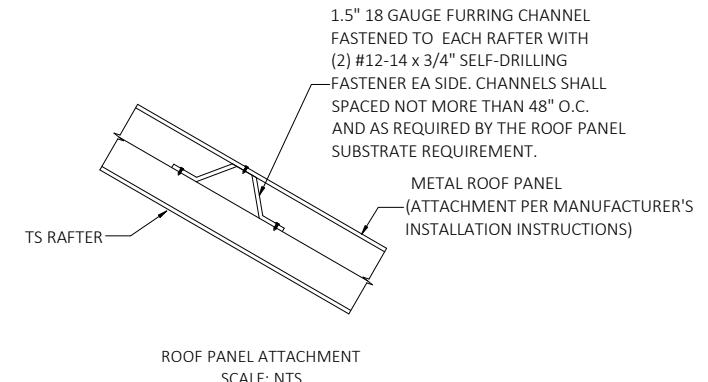
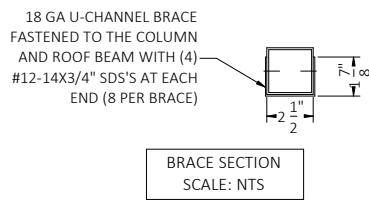
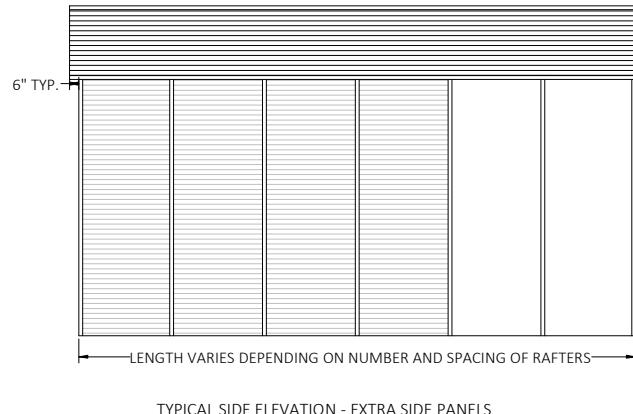
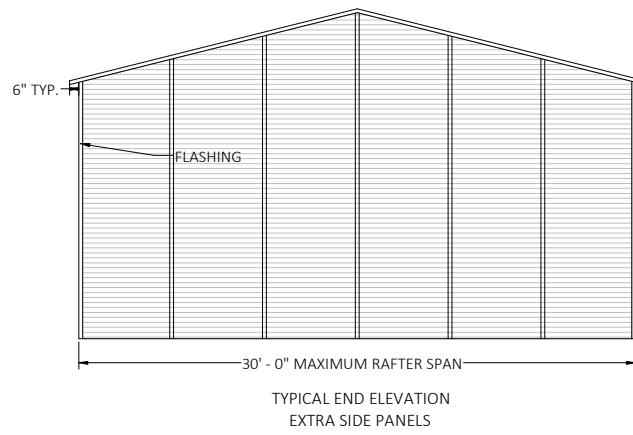
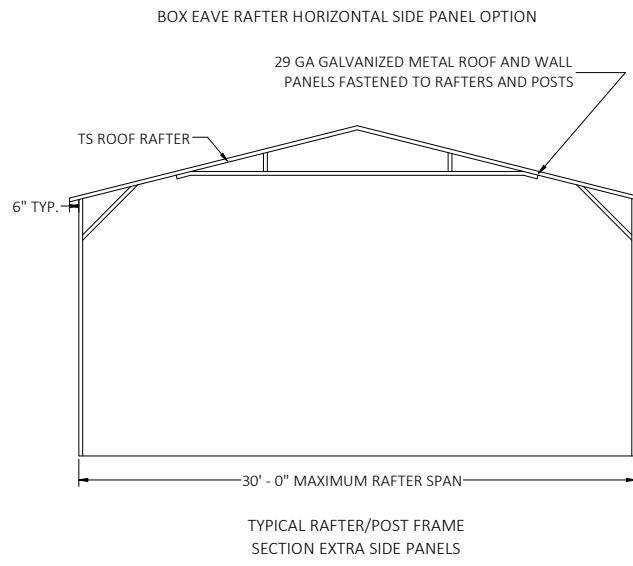
REVISION 1: DATE

PAGE :

4

REVISION 2: DATE

SCALE: NTS



CONTRACTOR:
TUBULAR BUILDING SYSTEMS
631 SE INDUSTRIAL CIRCLE,
LAKE CITY, FL 32025

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PROJECT NO. 2504211-30-U

30' WIDE X 20' HIGH
UTILITY STRUCTURE

DATE

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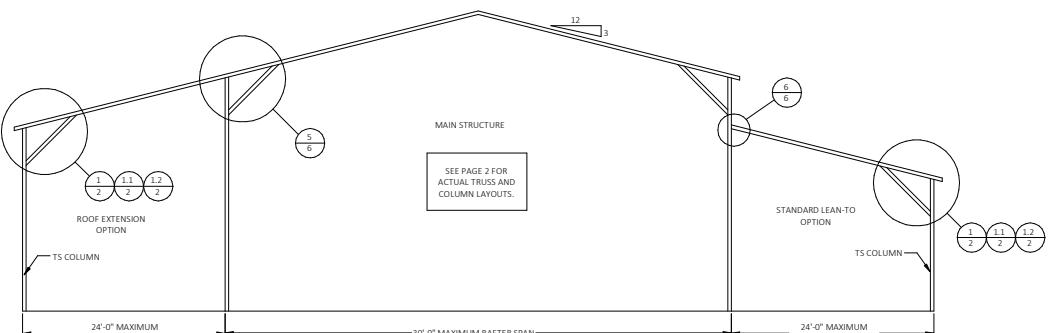
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SCALE: NTS

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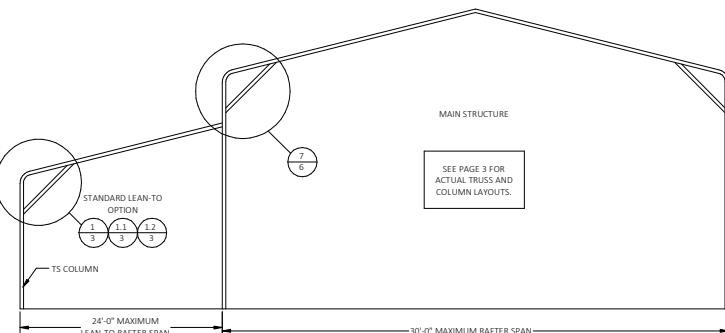
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BOX EAVE RAFTER LEAN-TO OPTIONS



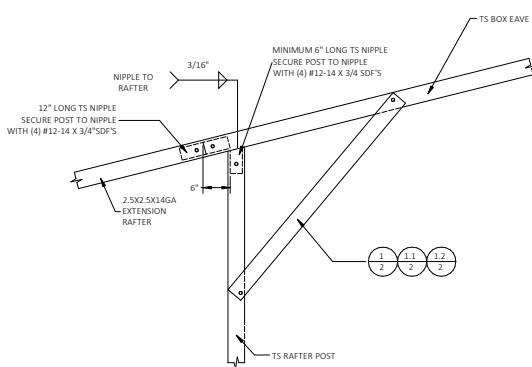
TYPICAL BOX EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN)

BOW RAFTER LEAN-TO OPTIONS

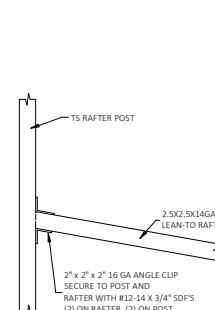


TYPICAL BOW RAFTER LEAN-TO OPTIONS FRAMING SECTION

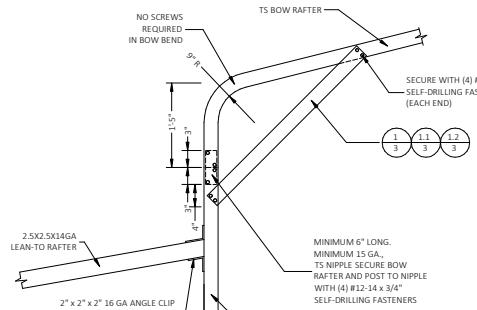
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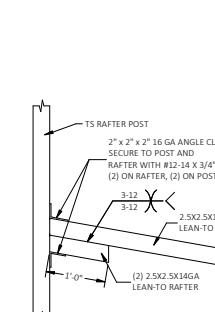
5A
SIDE EXTENSION RAFTER/COLUMN DETAIL
FOR EXTENSION RAFTER SPANS W<12'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1.2/2.
FOR EXTENSION RAFTER SPANS W<13'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1.1/2.
FOR EXTENSION RAFTER SPANS W<15'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1/2.
SCALE: NTS



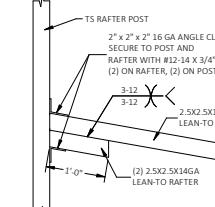
6A
LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL
FOR LEAN-TO RAFTER SPANS W<12'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1.2/2 OR 1.2/3.
FOR LEAN-TO RAFTER SPANS W<13'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1.1/2 OR 1.1/3.
FOR LEAN-TO RAFTER SPANS W<15'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1/2 OR 1/3.
SCALE: NTS



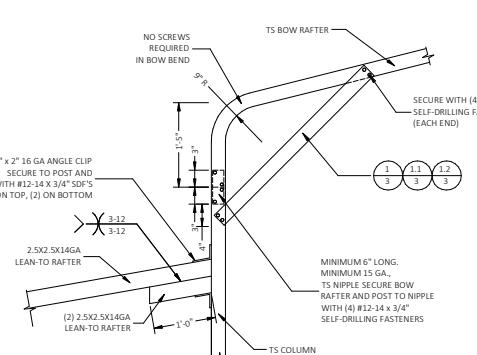
7A
SIDE EXTENSION RAFTER/COLUMN DETAIL
FOR EXTENSION RAFTER SPANS W<12'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1.2/2.
FOR EXTENSION RAFTER SPANS W<13'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1.1/2.
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SCALE: NTS



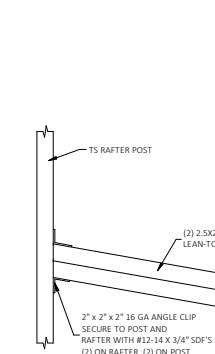
5B
SIDE EXTENSION RAFTER/COLUMN DETAIL
FOR EXTENSION RAFTER SPANS 12'-0"<W<16'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1.2/2.
FOR EXTENSION RAFTER SPANS 13'-0"<W<18'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1.1/2.
FOR EXTENSION RAFTER SPANS 15'-0"<W<19'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1/2.
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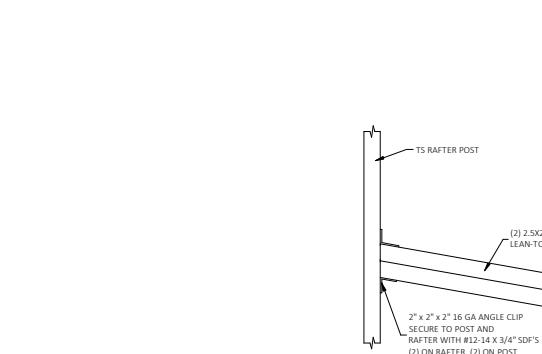
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SCALE: NTS



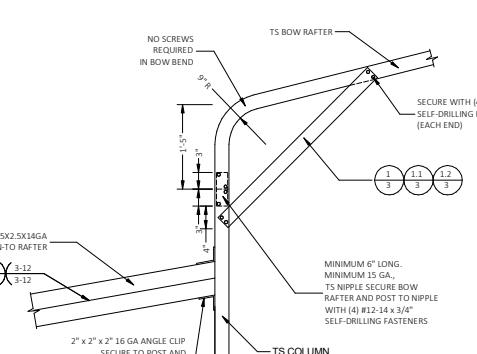
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SCALE: NTS



5C
SIDE EXTENSION RAFTER/COLUMN DETAIL
FOR EXTENSION RAFTER SPANS 16'-0"<W<24'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1.2/2.
FOR EXTENSION RAFTER SPANS 18'-0"<W<24'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1.1/2.
FOR EXTENSION RAFTER SPANS 19'-0"<W<24'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1/2.
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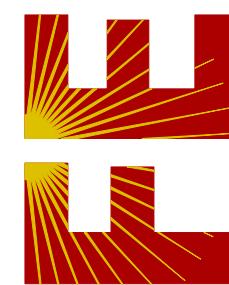
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LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL
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FOR LEAN-TO RAFTER SPANS 19'-0"<W<24'-0", IF THE KNEE BRACE ON THE OTHER END OF THE RAFTER IS PER DETAIL 1/2 OR 1/3.
SCALE: NTS



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PROJECT NO. 2504211-30-U



CONTRACTOR:
TUBULAR BUILDING SYSTEMS
631 SE INDUSTRIAL CIRCLE,
LAKE CITY, FL 32025

PROJECT DESCRIPTION:
30' WIDE X 20' HIGH
UTILITY STRUCTURE

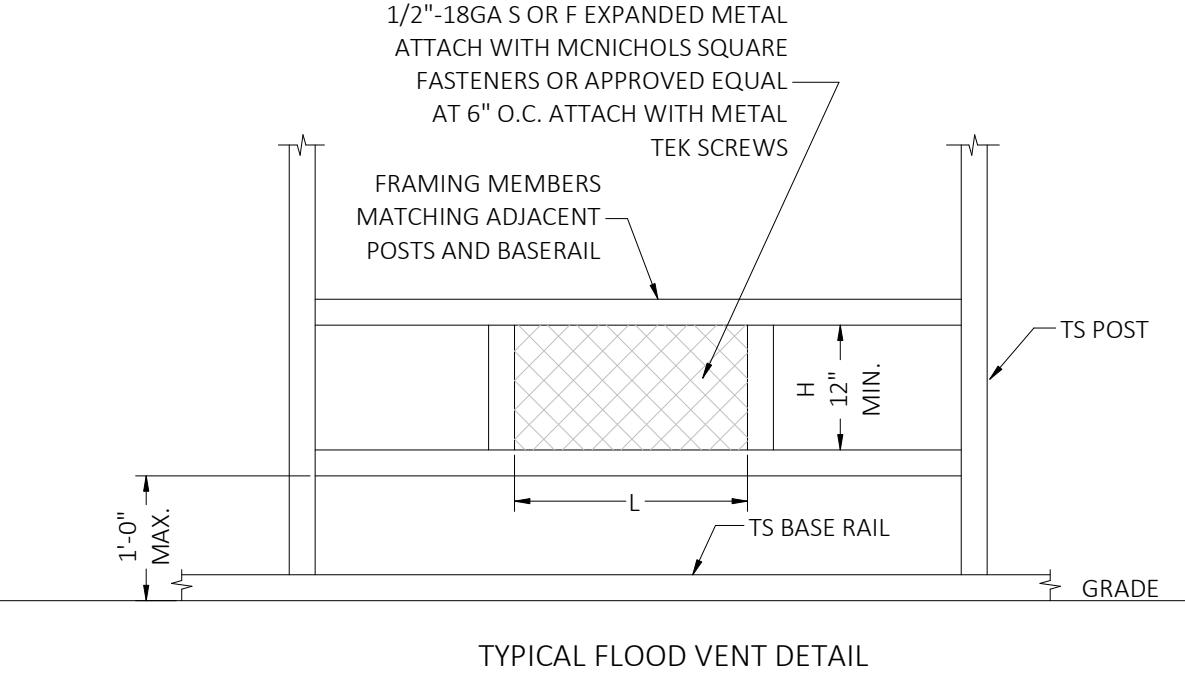
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6



CONSTRUCTION IN SPECIAL FLOOD HAZARD AREAS:

CONTRACTOR TO VERIFY THAT THE FINISHED FLOOR ELEVATION FOR THE PROPOSED STRUCTURE IS AT OR ABOVE THE GREATER OF THE FOLLOWING ELEVATIONS:

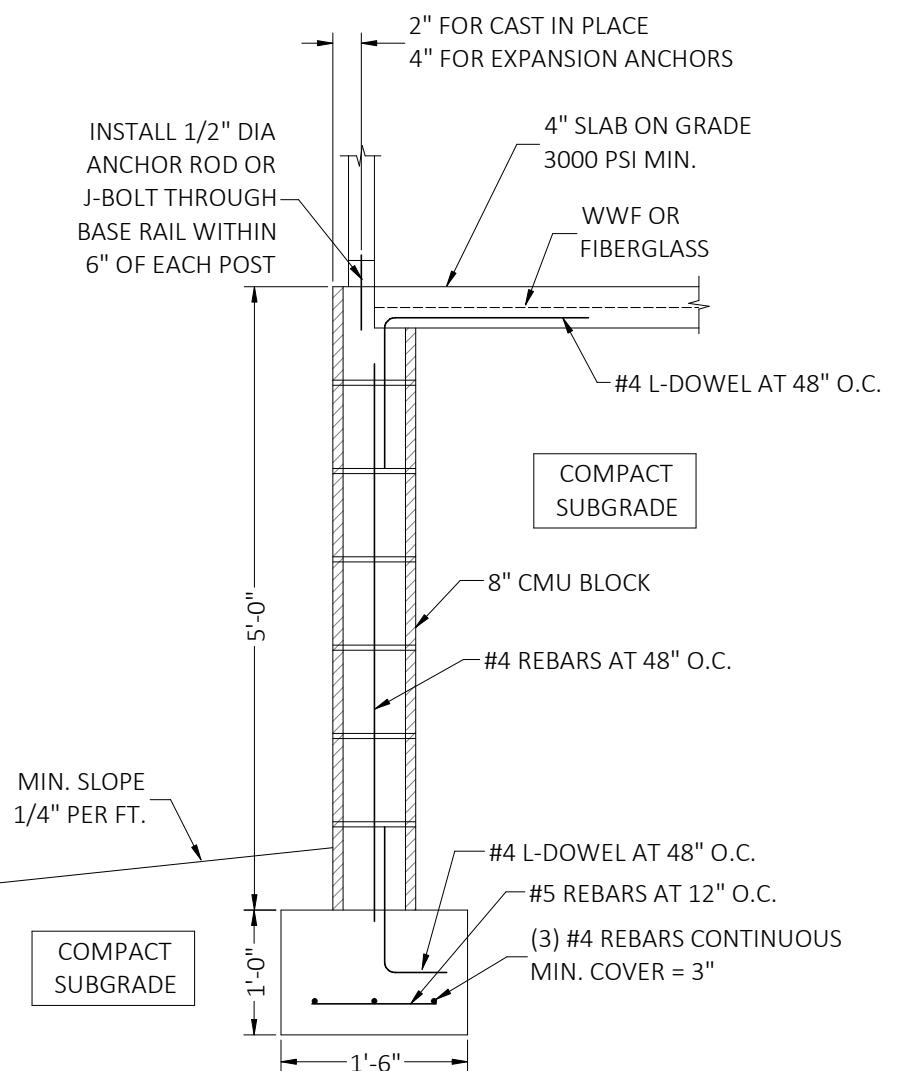
- I) BFE (BASE FLOOD ELEVATION) + 2'-0"
- II) DFE (DESIGN FLOOD ELEVATION)
- III) THE MINIMUM ELEVATION MANDATED BY THE BUILDING CODES ADOPTED BY THE AUTHORITY HAVING JURISDICTION.

FLOOD VENT INSTALLATION NOTES:

1. MINIMUM VENT SPACE REQUIRED = 1 SQ. IN. OF OPEN VENT AREA PER SQ. FT. OF ENCLOSED AREA.
2. PROVIDE A MINIMUM OF TWO OPENINGS ON DIFFERENT SIDES OF EACH ENCLOSED AREA.
3. APPLY A 1.3 FACTOR WHEN CALCULATING TOTAL OPEN AREA WHEN USING 1/2"-18GA S OR F EXPANDED METAL.
4. TOTAL OPEN AREA OF VENT = L X H (MIN. 12").
5. FLOOD VENT DETAIL COMPLIES WITH FEMA/NFIP.
6. PREFABRICATED FLOOD VENTS MEETING THE REQUIREMENTS OF FEMA/NFIP MAY BE INSTALLED.

FLOOD SOLUTIONS STATIC FLOOD VENTS FL #17588.1-R4				
VENT MODEL	VENT SIZE (WIDHT x HEIGHT) (in.)	ROUGH OPENING SIZE (Width x Height) (in.)	ENCLSOED AREA COVERAGE (sq. ft.)	NET FREE AREA (sq. in.)
FS-1608	18 $\frac{1}{2}$ " X 10 $\frac{1}{2}$ "	16 X 8	97	80.7
FS-1616	18 $\frac{1}{2}$ " X 18 $\frac{1}{2}$ "	16 X 16	191	158.2
FS-1412	17 $\frac{1}{2}$ " X 14 $\frac{1}{2}$ "	14 $\frac{1}{2}$ " X 12"	129	106.7
FS-1608-HEX	18 $\frac{1}{2}$ " X 10 $\frac{1}{2}$ "	16 X 8	110	91.4

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PROJECT NO. 2504211-30-U

CONTRACTOR:
TUBULAR BUILDING SYSTEMS
631 SE INDUSTRIAL CIRCLE,
LAKE CITY, FL 32025

PROJECT DESCRIPTION:

30' WIDE X 20' HIGH
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8

GENERAL NOTES

CONCRETE MONOLITHIC SLAB DESIGN IS BASED ON A MINIMUM SOIL BEARING CAPACITY OF 1500 PSF.

CONCRETE

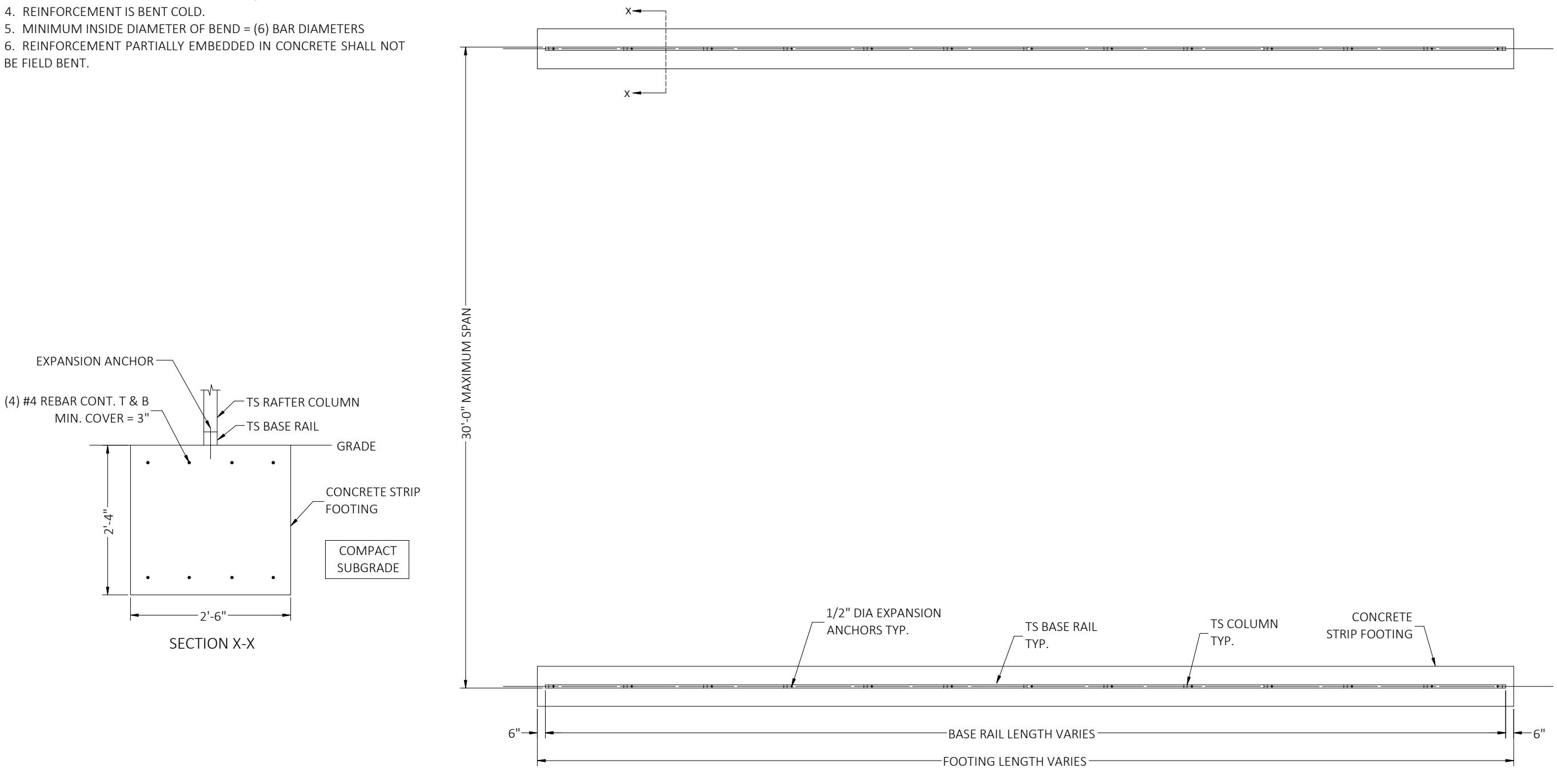
MINIMUM 28-DAY SPECIFIED COMPRESSIVE STRENGTH = 3000 PSI

REINFORCING STEEL

1. TURNDOWN REINFORCING STEEL = ASTM A615 GRADE 60
2. SLAB REINFORCEMENT = WELDED WIRE FABRIC PER ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT
3. REINFORCING STEEL COVER = 3" WHERE CASE AGAINST AND PERMANENTLY EXPOSED TO SOIL OR WATER, 1.5" EVERYWHERE ELSE.
4. REINFORCEMENT IS BENT COLD.
5. MINIMUM INSIDE DIAMETER OF BEND = (6) BAR DIAMETERS
6. REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT.

OPTIONAL CONCRETE STRIP FOOTING

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CONCRETE STRIP FOOTING PLAN

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