



STRUCTURAL DESIGN

ENCLOSED BUILDING **EXPOSURE B**

**MAXIMUM 50'-0" WIDE X 20'-0" EAVE HEIGHT- BOX EAVE
FRAME**

18 December 2017

Revision 0

M&A Project No. 17250S

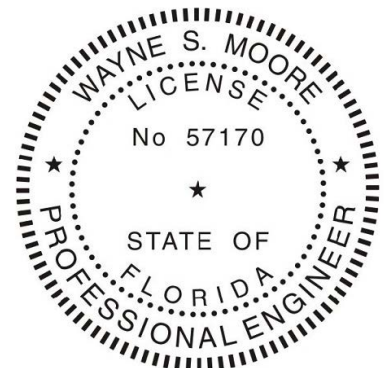
Prepared for:

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Lake City, Florida 32025**

Prepared by:

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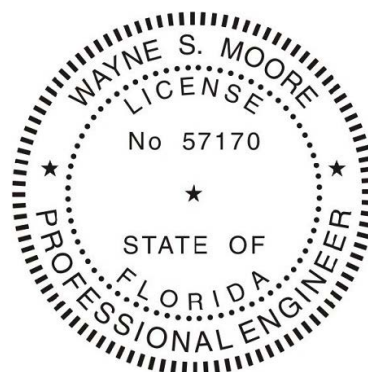
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MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	TUBULAR BUILDING SYSTEMS PE COVER SHEET	
	50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B	
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	CHECKED BY: PDH	SCALE: NTS
	PROJECT MGR: WSM	JOB NO: 17250S
	CLIENT: TBS	DWG. NO: SK-3
	SHT. 1	REV: 0

DRAWING INDEX

SHEET 1	PE SEAL COVER SHEET
SHEET 2	DRAWING INDEX
SHEET 3	INSTALLATION NOTES AND SPECIFICATIONS
SHEET 4	TYPICAL SIDE AND END ELEVATIONS
SHEET 5	TYPICAL RAFTER/POST FRAME AND SIDE FRAMING SECTION
SHEET 6	TYPICAL RAFTER/POST FRAME AND SIDE FRAMING SECTION
SHEET 7	TYPICAL RAFTER/POST FRAME AND SIDE FRAMING SECTION
SHEET 8	TYPICAL RAFTER/POST CONNECTION DETAILS
SHEET 9	TYPICAL RAFTER/POST CONNECTION DETAILS
SHEET 10	BASE RAIL ANCHORAGE OPTIONS FOR HIGH AND LOW WIND SPEED
SHEET 11	BOX EAVE RAFTER END WALL AND WALL OPENINGS
SHEET 12	BOX EAVE RAFTER END WALL AND WALL OPENINGS
SHEET 13	BOX EAVE RAFTER SIDE WALL AND WALL OPENINGS
SHEET 14	BOX EAVE RAFTER WALL OPENING DETAILS
SHEET 15	BOX EAVE RAFTER WALL OPENING DETAILS
SHEET 16	BOX EAVE RAFTER LEAN-TO OPTIONS
SHEET 17	BOX EAVE RAFTER LEAN-TO OPTIONS
SHEET 18	BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION
SHEET 19	BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION
SHEET 20	OPTIONAL FOUNDATION ANCHORAGE FOR LOW AND HIGH WIND SPEED
SHEET 21	OPTIONAL HEADER



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**TUBULAR BUILDING SYSTEMS
50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B**

DATE: 12-18-17

SCALE: NTS

JOB NO: 172505

SHT. 2

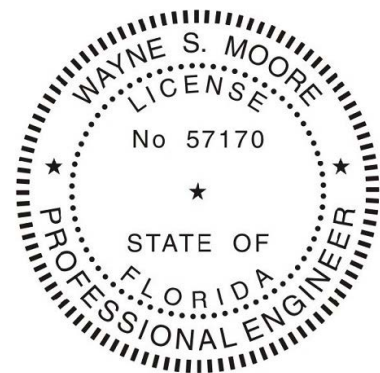
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INSTALLATION NOTES AND SPECIFICATIONS

1. DESIGN IS FOR A MAXIMUM 50'-0" WIDE x 20'-0" EAVE HEIGHT STRUCTURES
2. DESIGN WAS DONE IN ACCORDANCE WITH THE 2014 FLORIDA BUILDING CODE (FBC) 5TH EDITION, 2017 FBC 6TH EDITION, 2012 INTERNATIONAL BUILDING CODE (IBC), AND 2015 IBC.
3. DESIGN LOADS ARE AS FOLLOWS:
 - A) DEAD LOAD = 15 PSF
 - B) LIVE LOAD = 12 PSF
 - C) GROUND SNOW LOAD = 35 PSF
4. LOW ULTIMATE WIND SPEED 105 TO 140 MPH (NOMINAL WIND SPEED 81 TO 108 MPH) MAXIMUM RAFTER/POST AND END POST SPACING = 5.0 FEET.
5. HIGH ULTIMATE WIND SPEED 141 TO 170 MPH (NOMINAL WIND SPEED 109 TO 132 MPH) MAXIMUM RAFTER/POST AND END POST SPACING = 4.0 FEET.
6. LOW HAZARD RISK CATEGORY I (WIND).
7. WIND EXPOSURE CATEGORY B.
8. SPECIFICATIONS APPLICABLE TO 29 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/2" x 2 1/2" - 14 GAUGE TUBE STEEL (TS) FRAMING MEMBERS. FOR VERTICAL PANELS, 29 GAUGE METAL PANELS SHALL BE FASTENED TO 18 GAUGE HAT CHANNELS.
9. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR PURLINS, AND POSTS, INTERIOR = 9" AND END = 6", (MAX)
10. FASTENERS CONSIST OF #12-14x3/4" 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. GROUND ANCHORS CONSISTING OF #4 REBAR W/ WELDED NUT x 30" LONG MAY BE USED FOR LOW WIND SPEEDS ONLY.
12. GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT x 30" LONG IN SUITABLE SOIL CONDITIONS. OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED. SOIL NAILS ARE NOT ALLOWED FOR HIGH WIND APPLICATION.
13. OPTIONAL BASE RAIL ANCHORAGE MAY BE USED FOR LOW AND HIGH WIND SPEEDS.
14. WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:
SOIL SITE CLASS = D
RISK CATEGORY I/II/III
R = 3.25 I_E = 10
S_{DS} = 1.522 V = C_sW
S_{D1} = 0.839



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BOX EAVE FRAME RAFTER ENCLOSED BUILDING

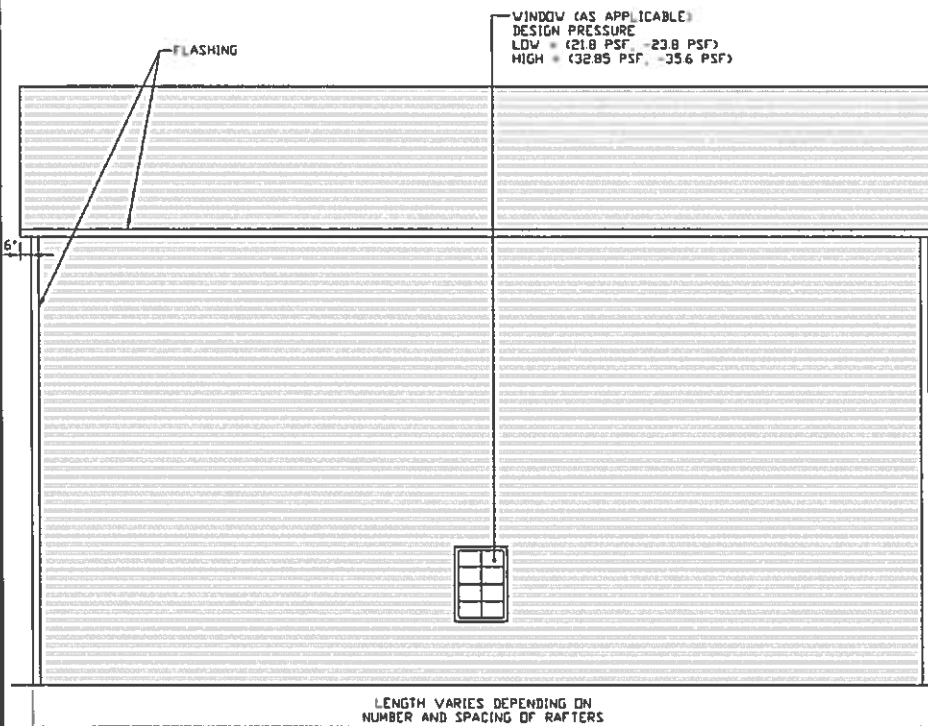
ROLL-UP DOOR
(AS APPLICABLE)
DESIGN PRESSURE
LOW = (18.5 PSF, -20.4 PSF)
HIGH = (27.95 PSF, -30.7 PSF)

SWINGING DOOR
(AS APPLICABLE)
DESIGN PRESSURE
LOW = (20.8 PSF, -22.6 PSF)
HIGH = (31.35 PSF, -34.15 PSF)



TYPICAL SIDE ELEVATION-HORIZONTAL ROOF

SCALE: 1/8" = 1'-0"



TYPICAL END ELEVATION-HORIZONTAL ROOF

SCALE: 1/8" = 1'-0"



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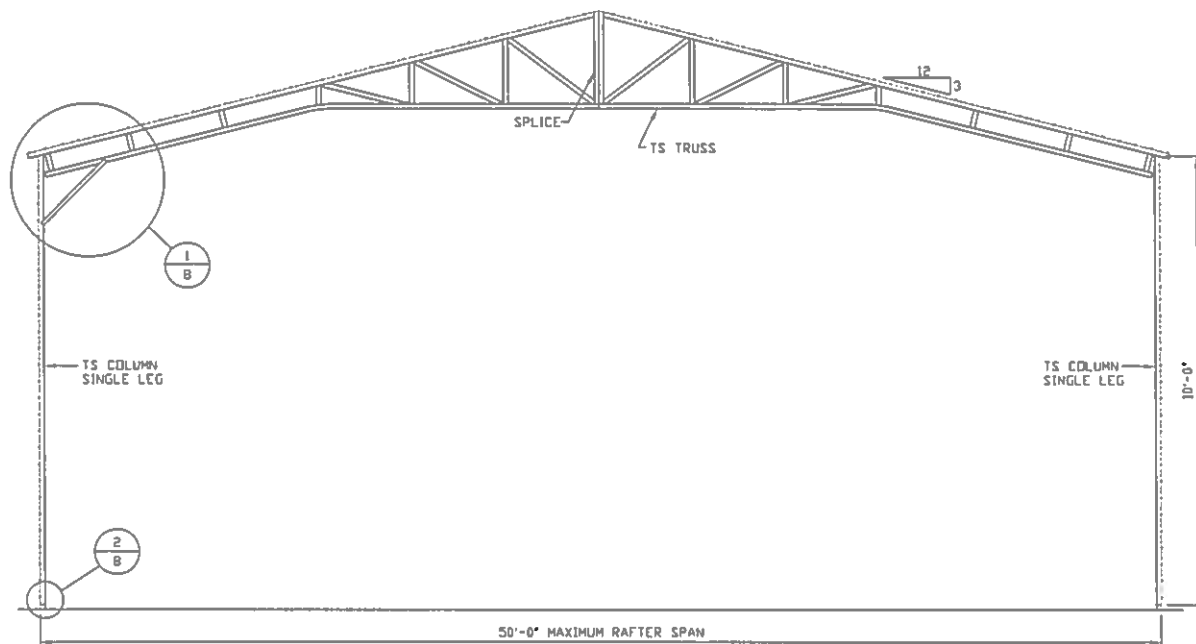
SHT. 4

SCALE: NTS

DWG. NO. SK-3

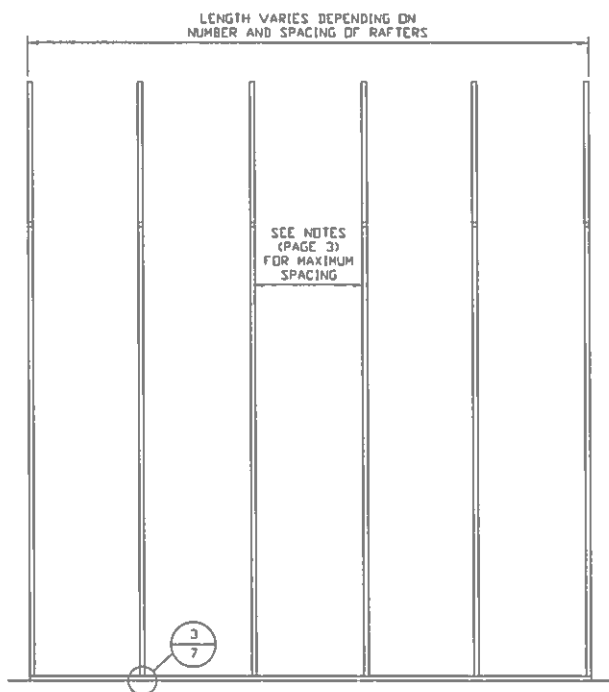
JOB NO: 17250S

REV: 0



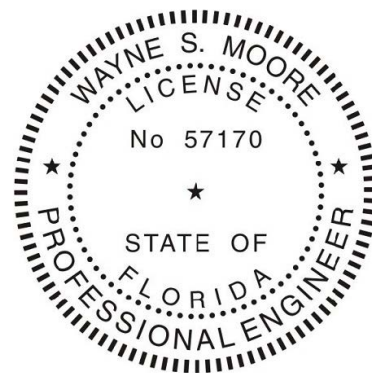
TYPICAL RAFTER/POST FRAME SECTION

SCALE: 1/8" = 1'-0"



TYPICAL RAFTER/POST SIDE FRAMING SECTION

SCALE: 1/8" = 1'-0"



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SHT. 5

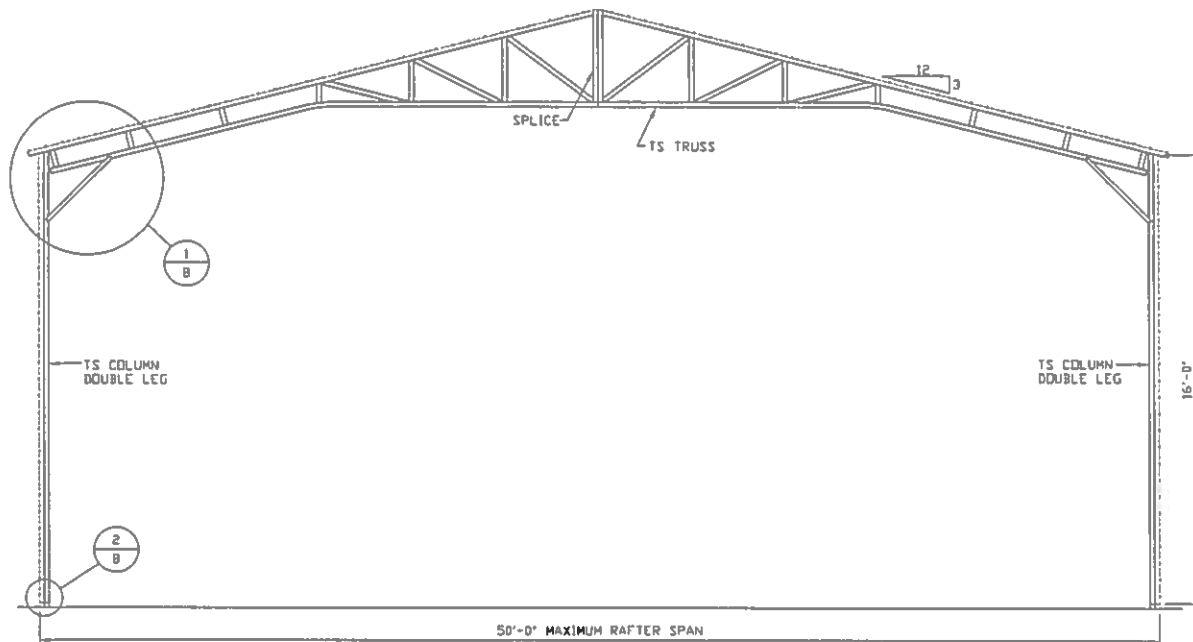
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DWG. NO: SK-3

JOB NO: 17230S

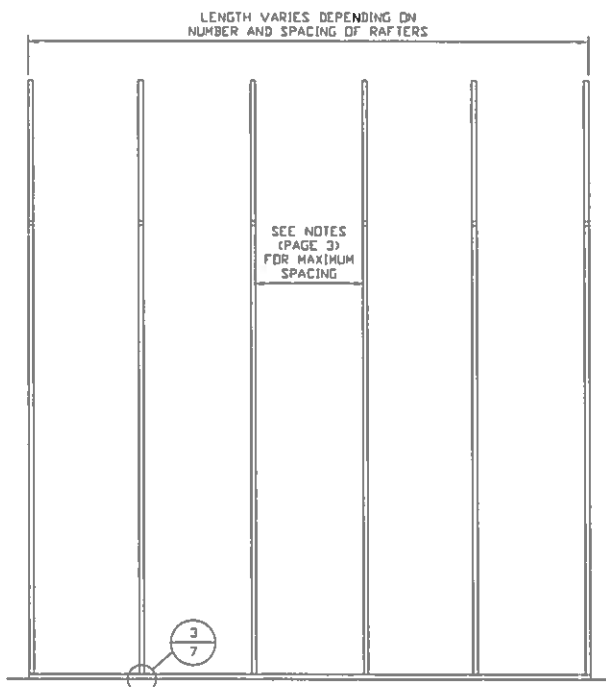
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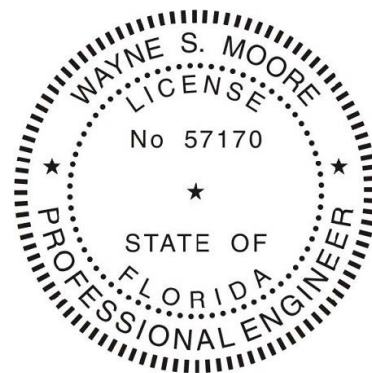
TYPICAL RAFTER/POST FRAME SECTION

SCALE: 1/8" = 1'-0"



TYPICAL RAFTER/POST SIDE FRAMING SECTION

SCALE: 1/8" = 1'-0"



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SHT. 6

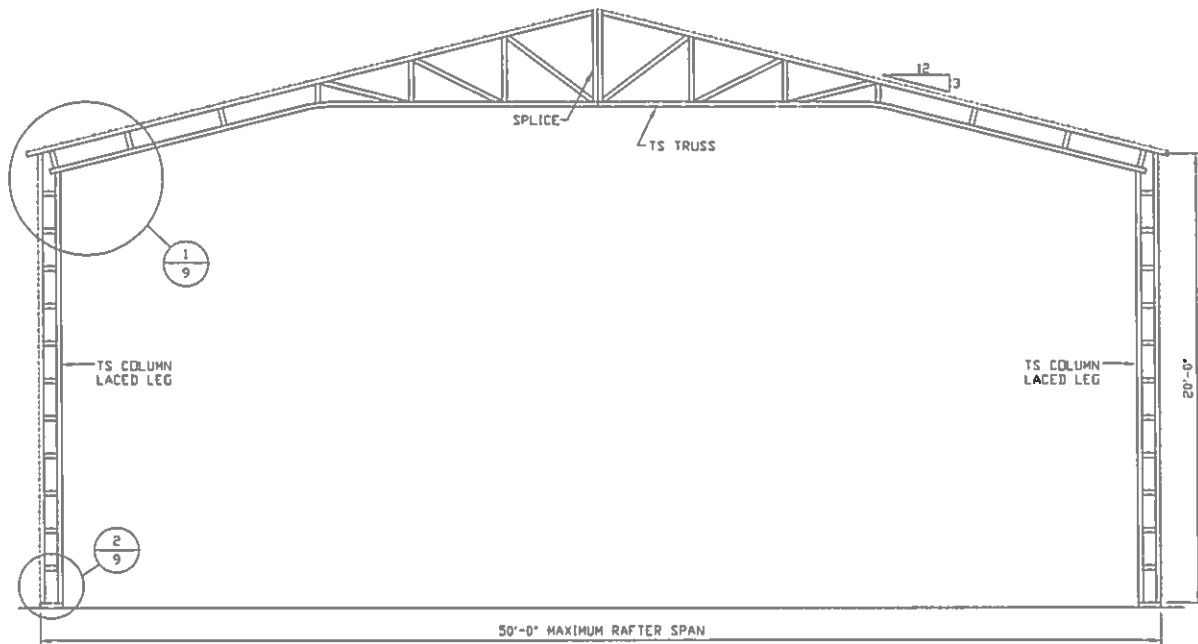
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DWG. NO: SK-3

JOB NO: 172505

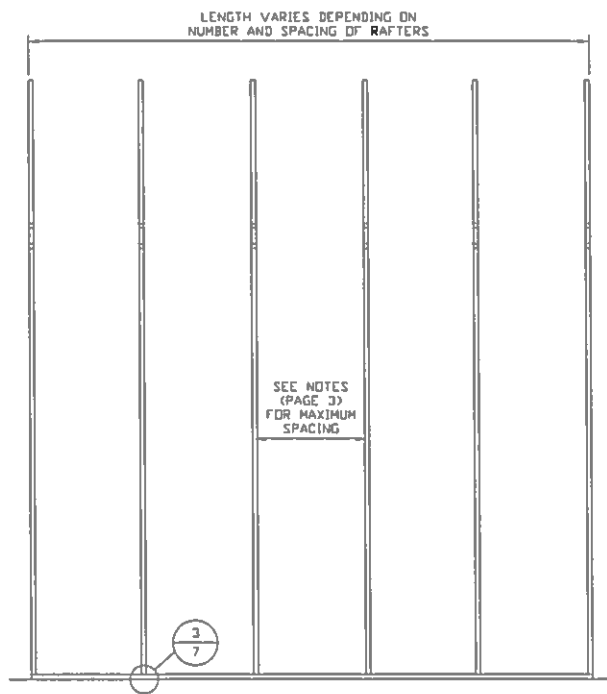
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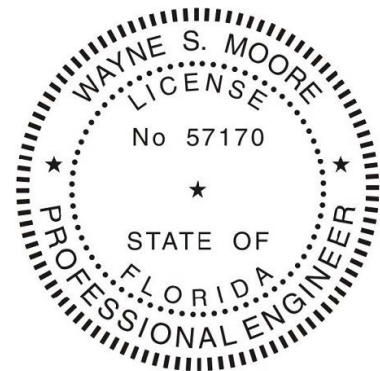
TYPICAL RAFTER/POST FRAME SECTION

SCALE: 1/8" = 1'-0"



TYPICAL RAFTER/POST SIDE FRAMING SECTION

SCALE: 1/8" = 1'-0"



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SHT. 7

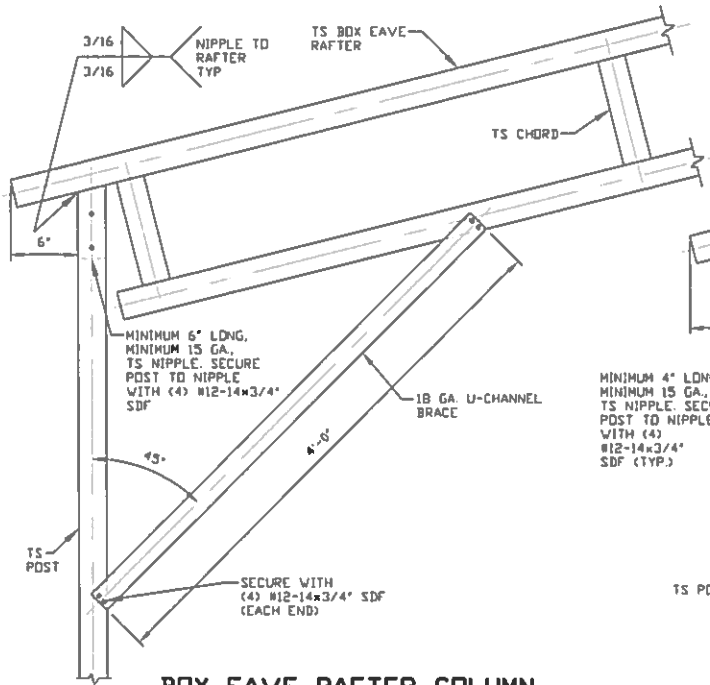
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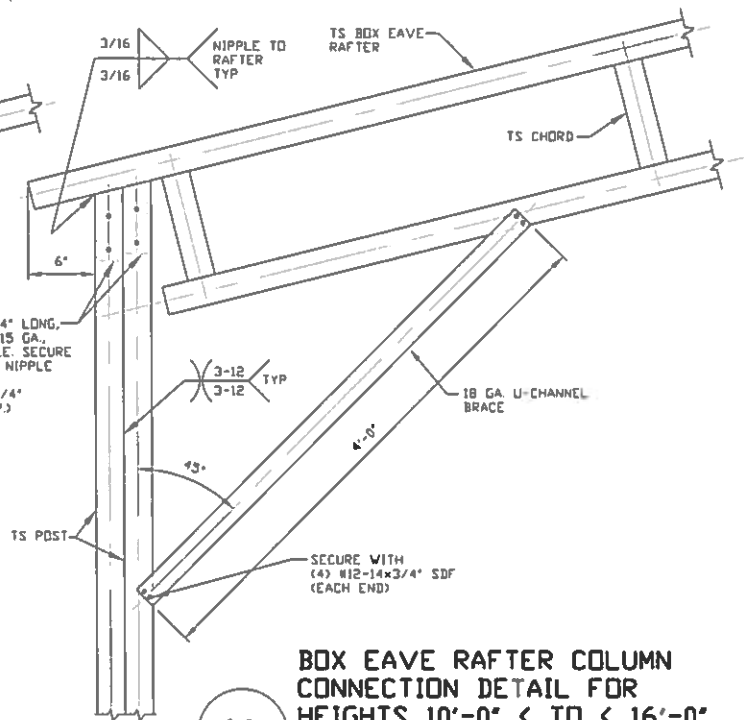
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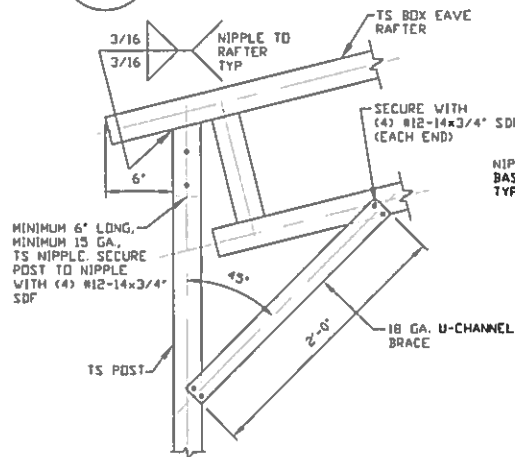
**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS 8'-0" < TO ≤ 10'-0"**

SCALE: NTS



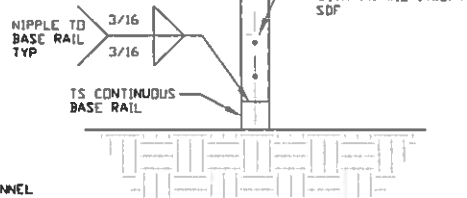
**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS 10'-0" < TO ≤ 16'-0"**

SCALE: NTS



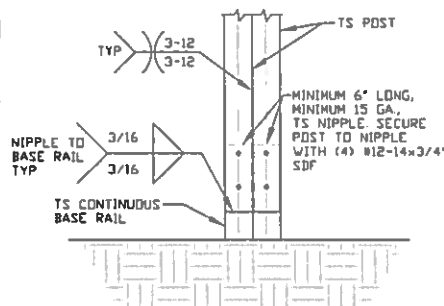
**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS ≤ 8'-0"**

SCALE: NTS



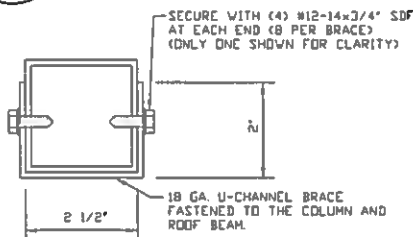
**POST/BASE RAIL
CONNECTION DETAIL**

SCALE: NTS



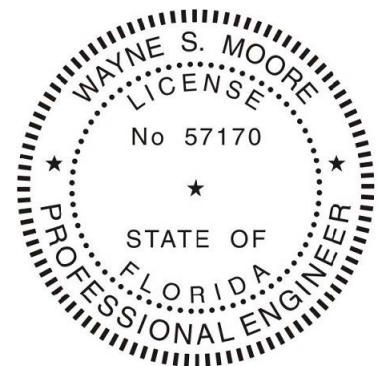
**POST/BASE RAIL
CONNECTION DETAIL**

2A



BRACE SECTION

SCALE: NTS



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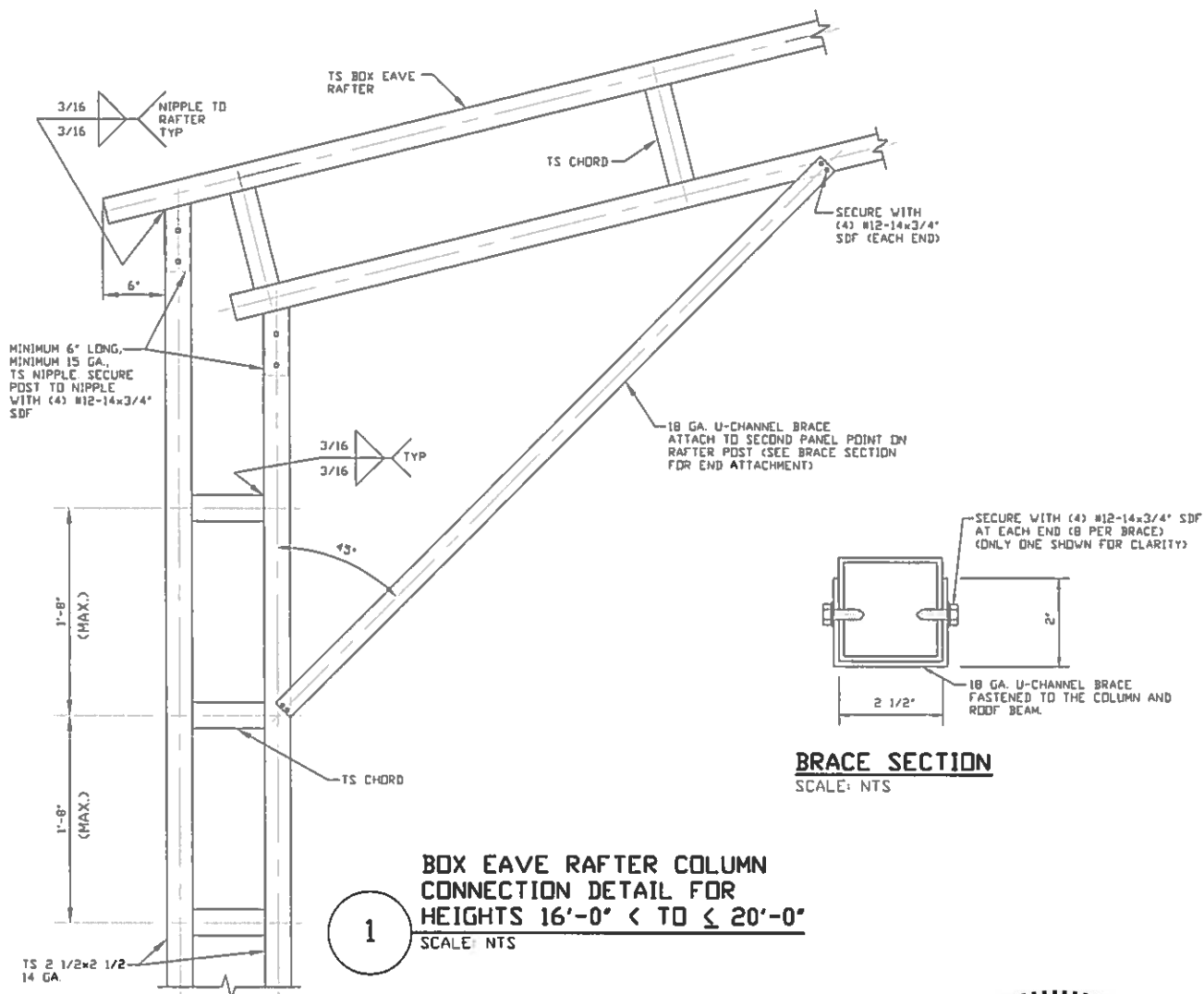
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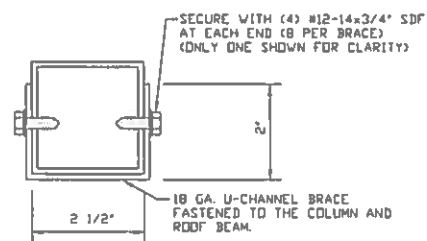
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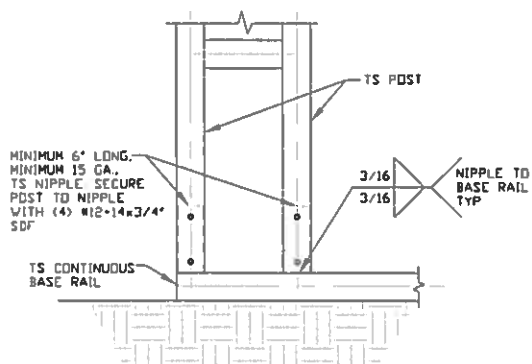
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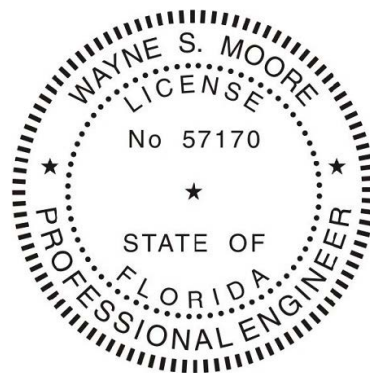
**BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS 16'-0" < TO ≤ 20'-0"**
SCALE: NTS



BRACE SECTION
SCALE: NTS



**POST/BASE RAIL
CONNECTION DETAIL**
SCALE: NTS



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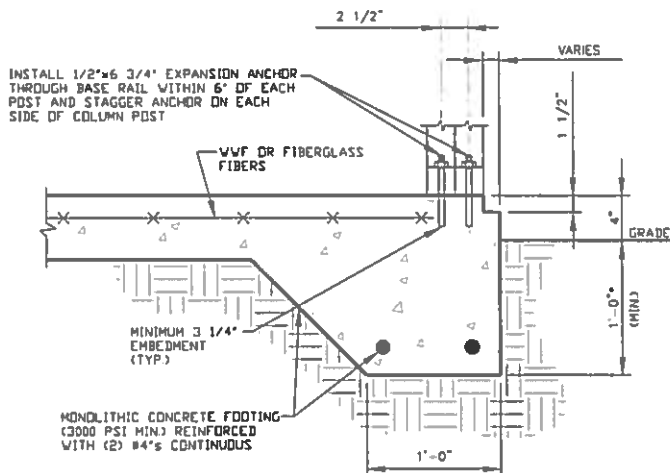
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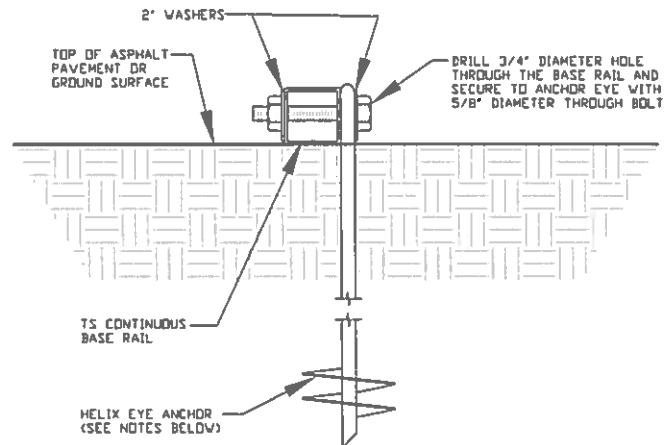
BASE RAIL ANCHORAGE OPTIONS FOR LOW AND HIGH WIND SPEED



3A

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS
(MINIMUM ANCHOR EDGE DISTANCE IS 4")
* COORDINATE WITH LOCAL CODES/ORD.



3B

GROUND BASE HELIX ANCHORAGE

SCALE: NTS (CAN BE USED FOR ASPHALT)

GENERAL NOTES

CONCRETE:

CONCRETE SHALL HAVE A MINIMUM SPECIFIED COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS

COVER OVER REINFORCING STEEL:

FOR FOUNDATIONS, MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE PER ACI-318
3 INCHES IN FOUNDATIONS WHERE THE CONCRETE IS CAST AGAINST AND PERMANENTLY IN CONTACT WITH THE EARTH OR EXPOSED TO THE EARTH OR WEATHER, AND 1 1/2 INCHES ELSEWHERE.

REINFORCING STEEL:

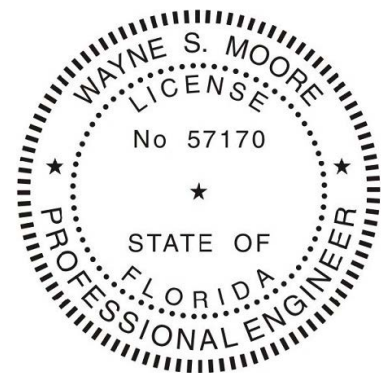
THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 60. THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT.

REINFORCEMENT MAY BE BENT IN THE SHOP OR THE FIELD PROVIDED:

1. REINFORCEMENT IS BENT COLD.
2. THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS.
3. REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT.

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 SANDS, FIRM TO STIFF CLAYS AND SILTS ALLUVIAL FILL USE MINIMUM (2) 6" HELICES WITH MINIMUM 50 INCH EMBEDMENT.
5. FOR VERY LOOSE TO MEDIUM DENSE SANDS, FIRM TO STIFFER CLAYS AND SILTS, ALLUVIAL FILL USE MINIMUM (2) 8" HELICES WITH MINIMUM 60 INCH EMBEDMENT.



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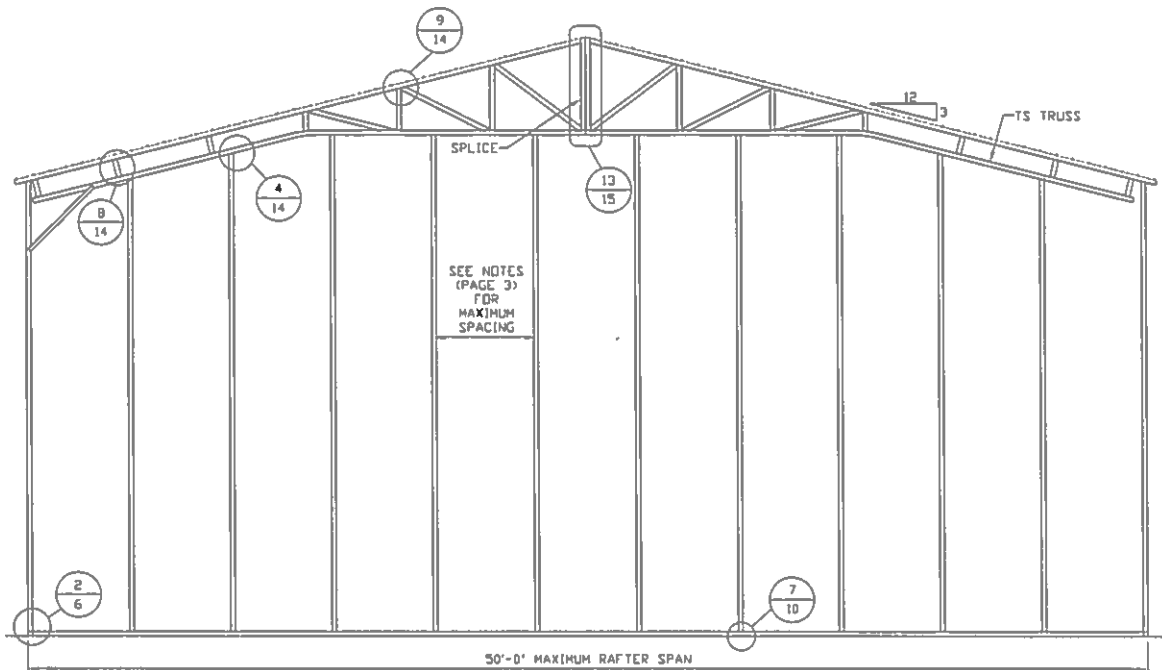
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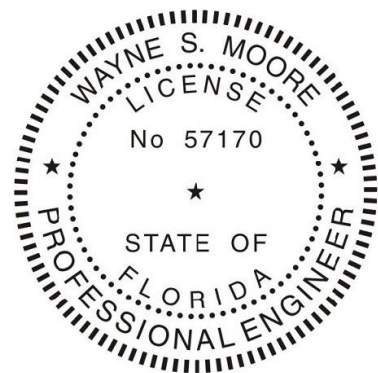
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BOX EAVE RAFTER END WALL AND WALL OPENINGS



TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: 1/8" = 1'-0"



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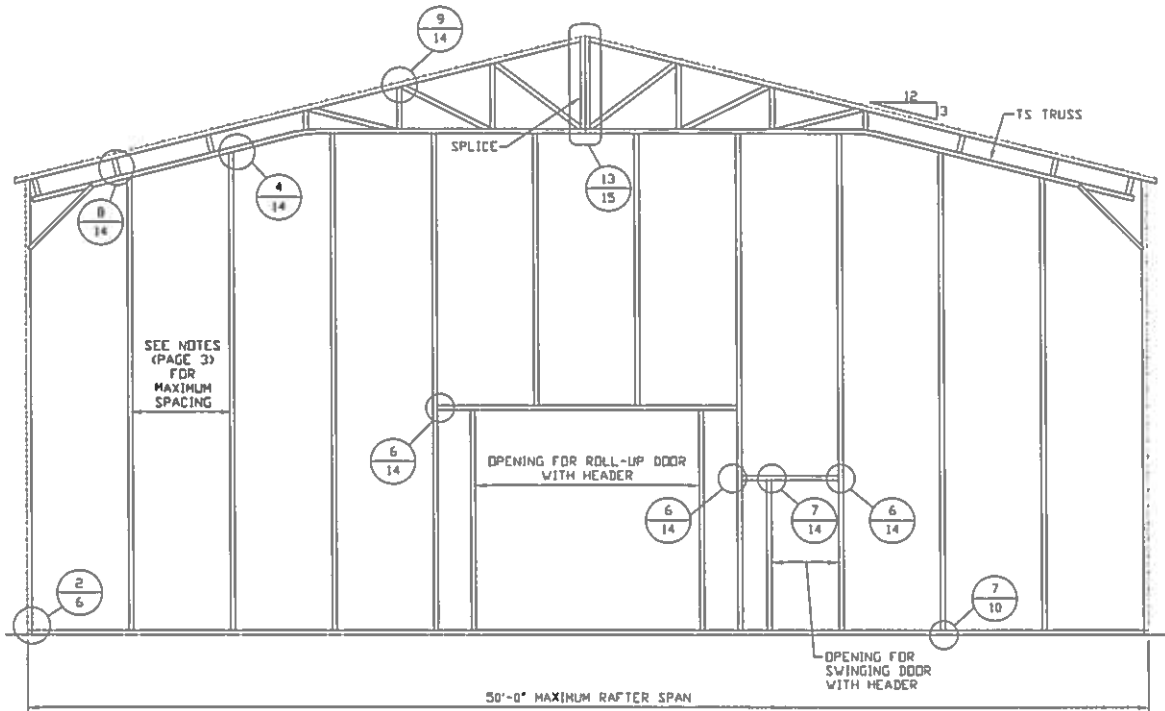
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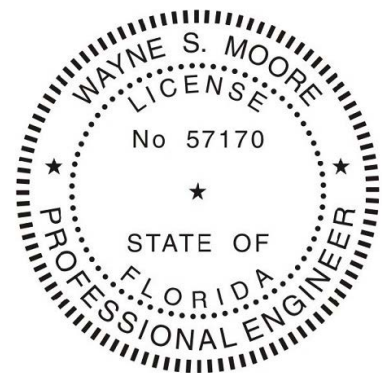
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BOX EAVE RAFTER END WALL AND WALL OPENINGS



TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: 1/8" = 1'-0"



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DRAWN BY: JRS

CHECKED BY: PDM

PROJECT MGR: WSM

CLIENT: TBS

**TUBULAR BUILDING SYSTEMS
50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B**

DATE: 12-18-17

SHT. 12

SCALE: NTS

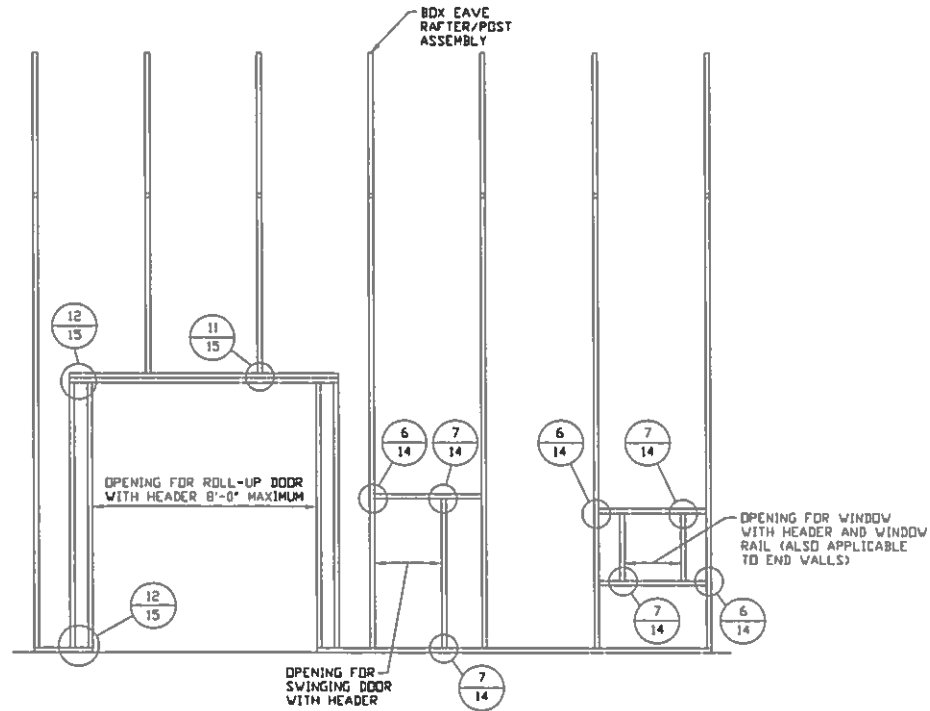
DWG. NO: SK-3

JOB NO: 172305

REV: 0

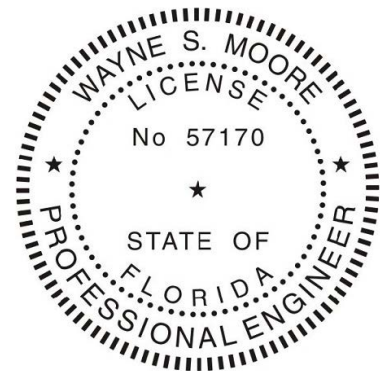
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BOX EAVE RAFTER SIDE WALL AND WALL OPENINGS



TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

SCALE: 1/8" = 1'-0"



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PROJECT MGR: VSM

CLIENT: TBS

**TUBULAR BUILDING SYSTEMS
50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B**

DATE: 12-18-17

SCALE: NTS

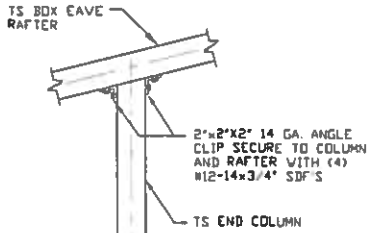
JOB NO: 17250S

SHT. 13

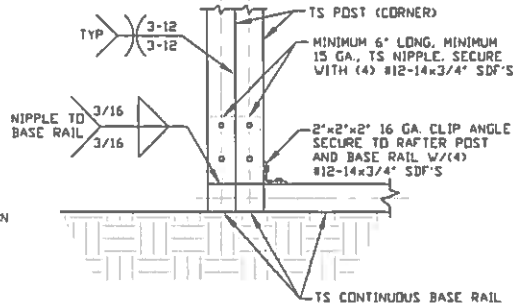
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REV: 0

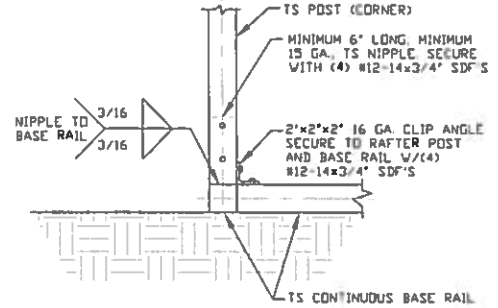
BOX EAVE RAFTER WALL OPENING DETAILS



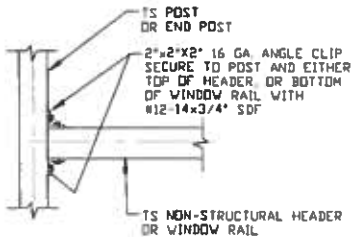
4 **END POST/RAFTER CONNECTION DETAIL**
SCALE: NTS



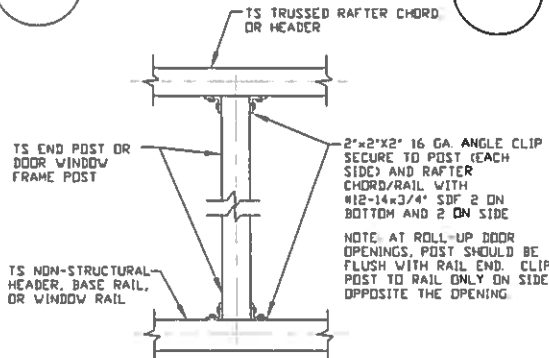
5 **END POST/BASE RAIL CONNECTION DETAIL**
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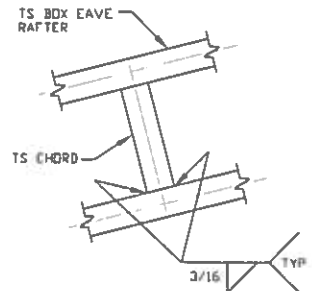
5A **END POST/BASE RAIL CONNECTION DETAIL**
SCALE: NTS



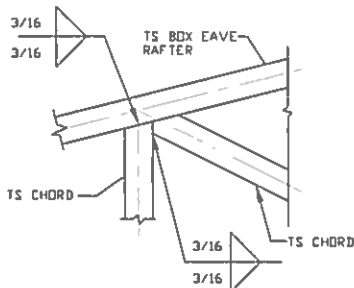
6 **HEADER OR WINDOW RAIL TO POST CONNECTION DETAIL**
SCALE: NTS



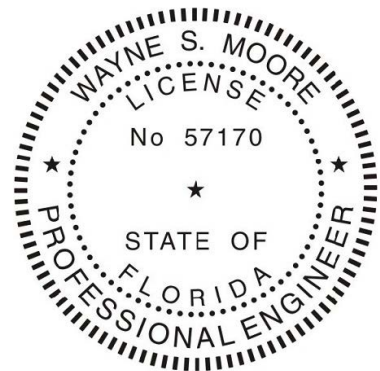
7 **POST TO HEADER, BASE RAIL, OR WINDOW RAIL CONNECTION DETAIL**
SCALE: NTS



8 **CHORD/RAFTER CONNECTION DETAIL**
SCALE: NTS



9 **TRUSS POST AND CORD TO RAFTER CONNECTION DETAIL**
SCALE: NTS



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**TUBULAR BUILDING SYSTEMS
50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B**

DATE: 12-18-17

SHT. 14

SCALE: NTS

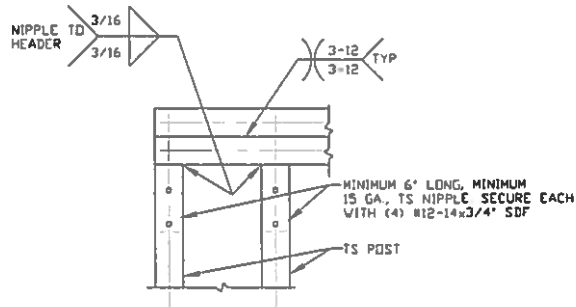
DWG. NO: SK-3

JOB NO: 172505

REV: 0

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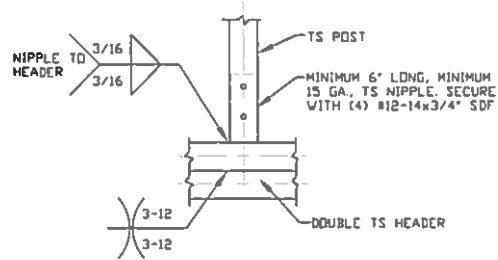
BOX EAVE RAFTER WALL OPENING DETAILS



10

DOUBLE HEADER/POST CONNECTION DETAIL

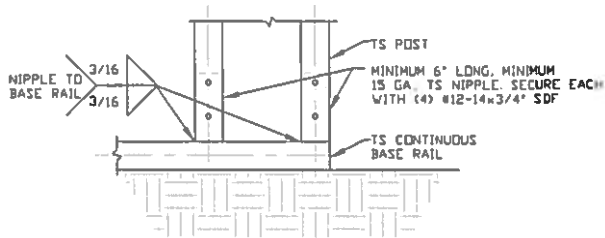
SCALE: NTS



11

POST/DOUBLE HEADER CONNECTION DETAIL

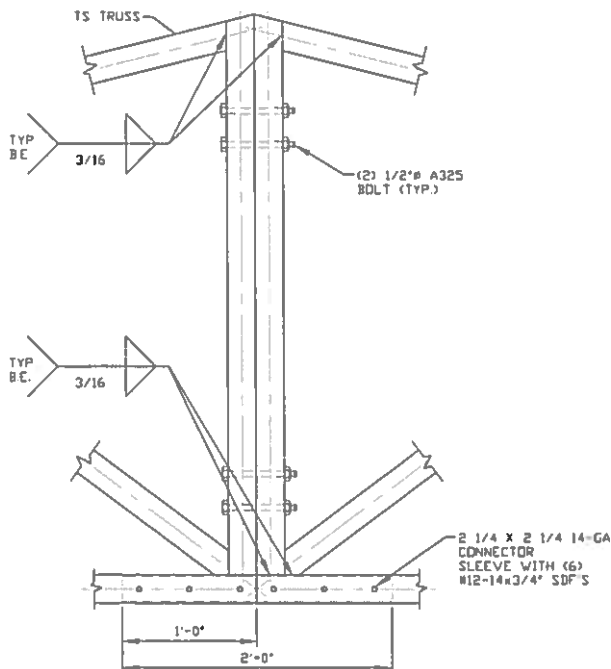
SCALE: NTS



12

POST/BASE RAIL CONNECTION DETAIL

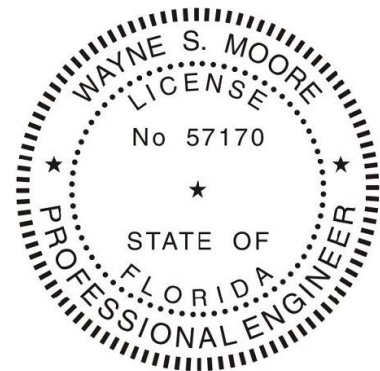
SCALE: NTS



13

SPLICE CONNECTION DETAIL

SCALE: NTS



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**TUBULAR BUILDING SYSTEMS
50'-0" x 20'-0" ENCLOSED BUILDING EXPOSURE B**

DATE: 12-18-17

SHT. 15

SCALE: NTS

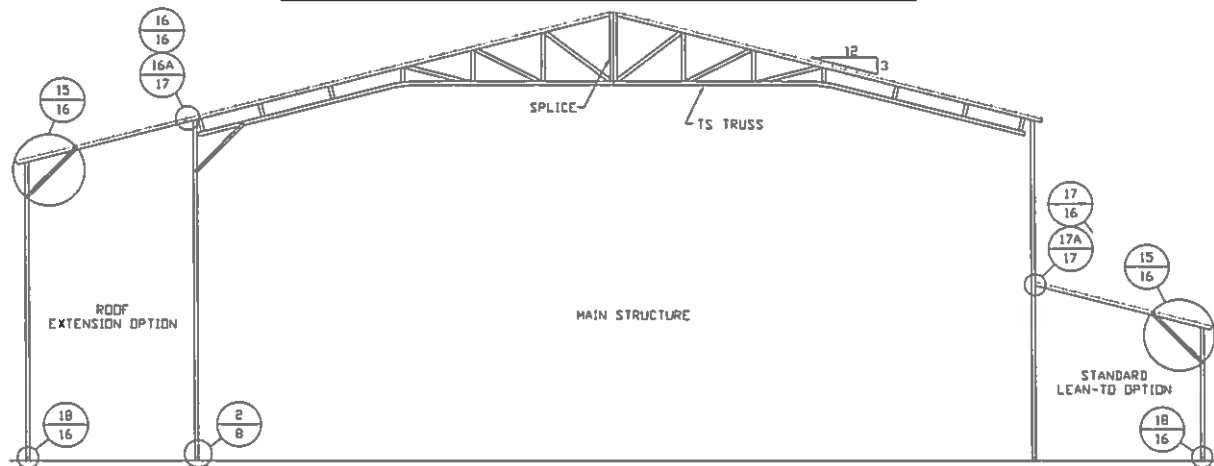
DWG. NO: SK-3

JOB NO: 17250S

REV: 0

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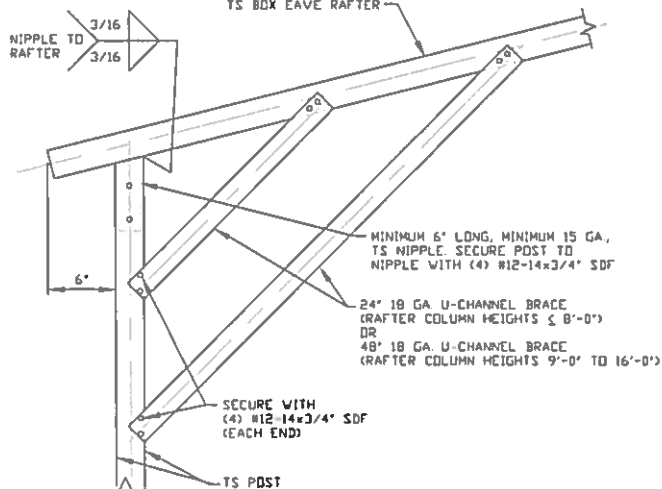
BOX EAVE RAFTER LEAN-TO OPTIONS



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

SCALE: NTS

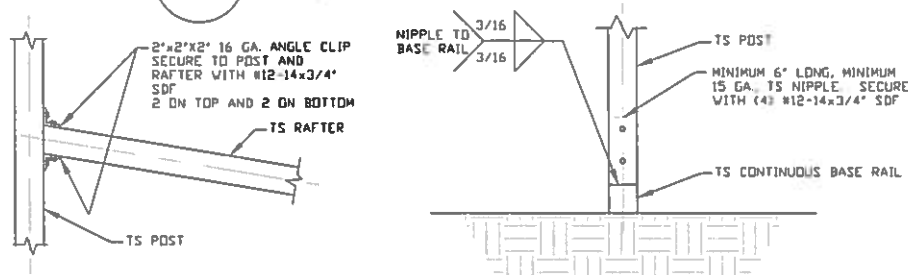
(MAXIMUM WIDTH OF SINGLE MEMBER RAFTER LEAN-TO IS 12'-0")
(MAXIMUM WIDTH OF DOUBLE MEMBER RAFTER LEAN-TO IS 16'-0")
TS BOX EAVE RAFTER



15

**LEAN-TO RAFTER/
CORNER POST DETAIL**

SCALE: NTS



17

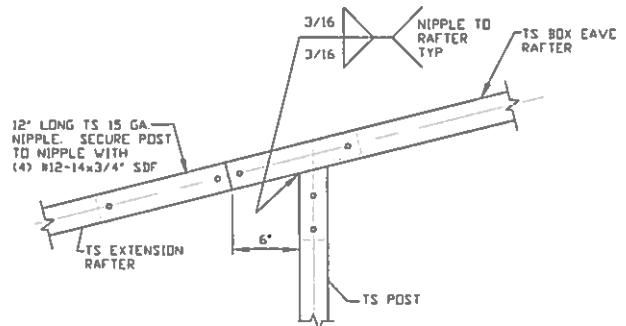
**LEAN-TO RAFTER TO RAFTER
COLUMN CONNECTION DETAIL
FOR RAFTER SPANS 12'-0"**

SCALE: NTS

18

**LEAN-TO POST
CONNECTION DETAIL**

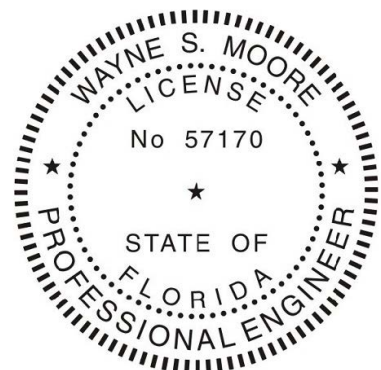
SCALE: NTS



16

**SIDE EXTENSION RAFTER/COLUMN
DETAIL FOR RAFTER SPANS ≤ 12'-0"**

SCALE: NTS



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CLIENT: TBS

**TUBULAR BUILDING SYSTEMS
50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B**

DATE: 12-18-17

SHT. 16

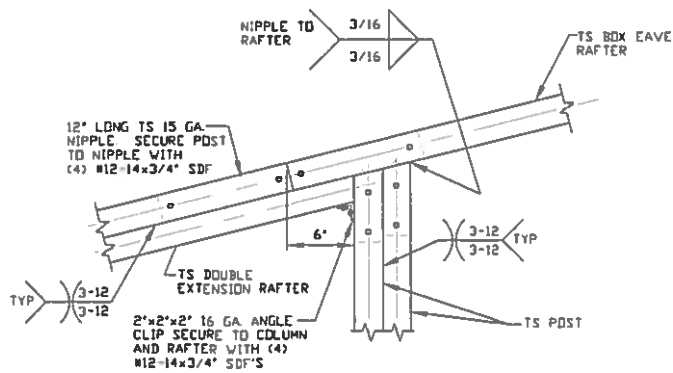
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DWG. NO. SK-3

JOB NO: 172305

REV: 0

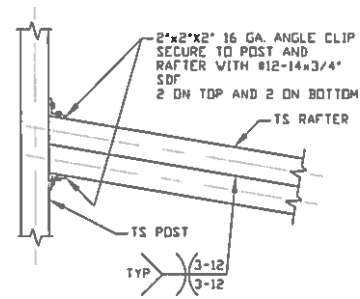
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16A

SIDE EXTENSION RAFTER/COLUMN DETAIL
FOR RAFTER SPANS 12'-0" < L ≤ 16'-0"

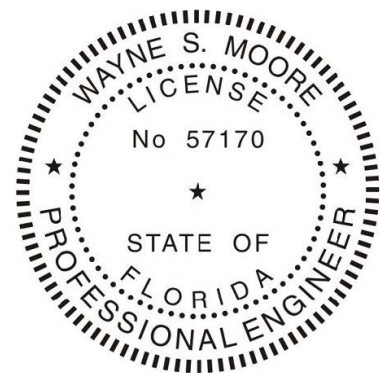
SCALE: NTS



17A

LEAN-TO RAFTER TO RAFTER
COLUMN CONNECTION DETAIL FOR
RAFTER SPANS 12'-0" < L ≤ 16'-0"

SCALE: NTS



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CLIENT: TBS

TUBULAR BUILDING SYSTEMS
50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B

DATE: 12-18-17

SCALE: NTS

JOB NO: 17250S

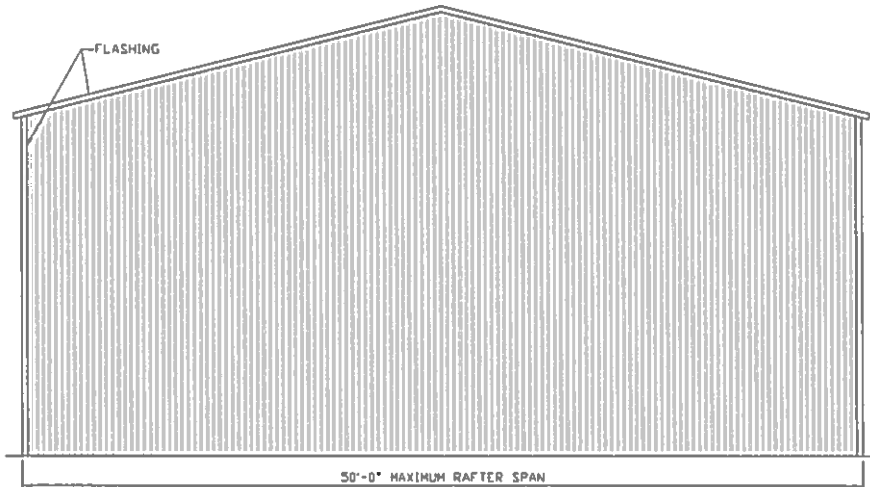
SHT. 17

DWG. NO: SK-3

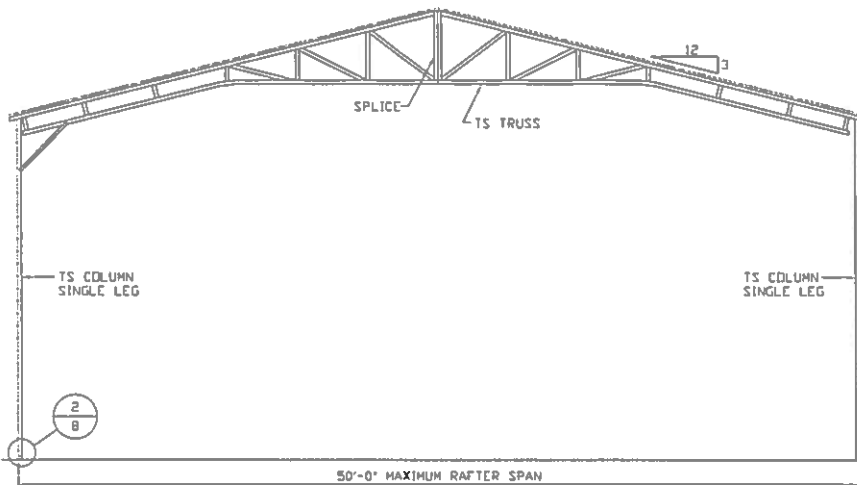
REV: 0

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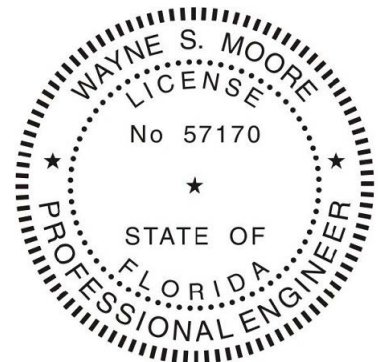
BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



TYPICAL END ELEVATION VERTICAL ROOF/SIDING
SCALE: NTS



TYPICAL SECTION VERTICAL ROOF/SIDING OPTION
SCALE: NTS



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**TUBULAR BUILDING SYSTEMS
50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B**

DATE: 12-18-17

SMT. 18

SCALE: NTS

DWG. NO: SK-3

JOB NO: 17250S

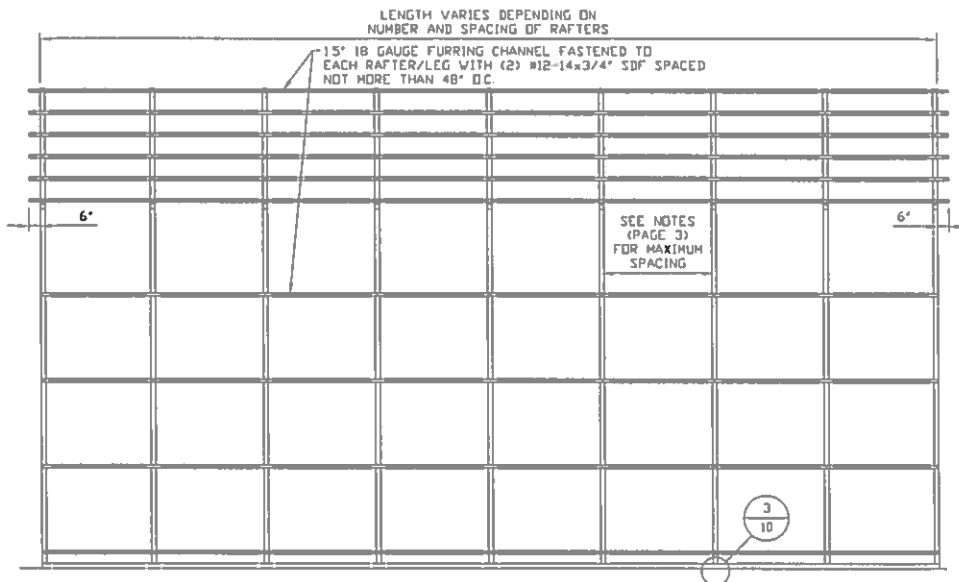
REV: 0

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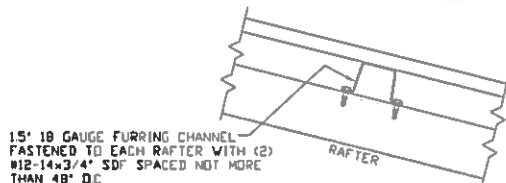
BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



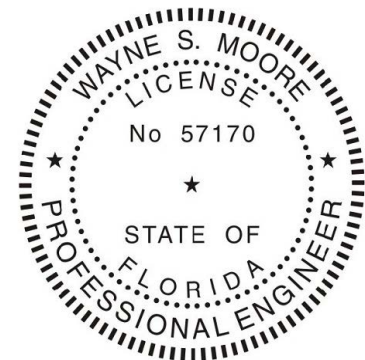
TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING
SCALE: 1/8" = 1'-0"



TYPICAL FRAMING SECTION VERTICAL ROOF OPTION
SCALE: 1/8" = 1'-0"



PANEL ATTACHMENT
(ALTERNATE FOR VERTICAL ROOF PANELS)



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CLIENT: TBS

**TUBULAR BUILDING SYSTEMS
50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B**

DATE: 12-18-17

SHT. 19

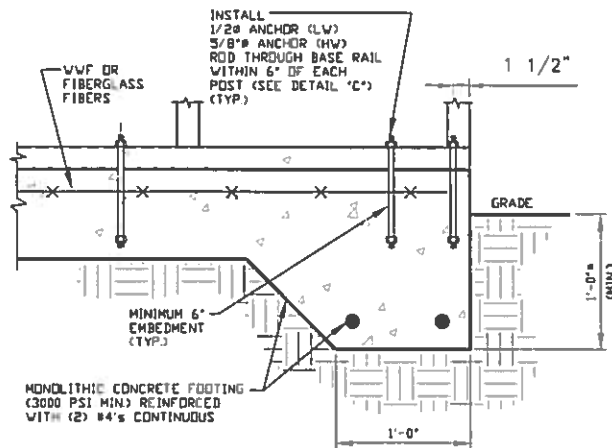
SCALE: NTS

DWG. NO: SK-3

JOB NO: 17250S

REV: 0

OPTIONAL FOUNDATION ANCHORAGE FOR LOW AND HIGH WIND SPEED



1A

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS
(MINIMUM ANCHOR EDGE DISTANCE IS 1 1/2")
* COORDINATE WITH LOCAL CODES/ORD.

GENERAL NOTES

CONCRETE:

CONCRETE SHALL HAVE A MINIMUM SPECIFIED COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.

COVER OVER REINFORCING STEEL:

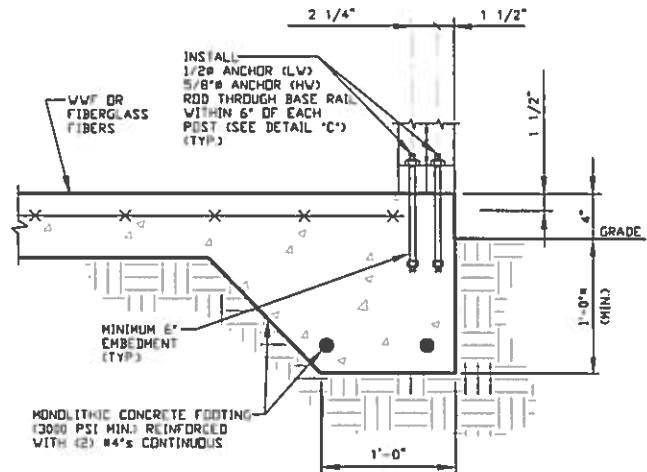
FOR FOUNDATIONS, MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE PER ACI-318.
3 INCHES IN FOUNDATIONS WHERE THE CONCRETE IS CAST AGAINST AND PERMANENTLY IN CONTACT WITH THE EARTH OR EXPOSED TO THE EARTH OR WEATHER, AND 1 1/2 INCHES ELSEWHERE.

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 SHOP OR THE FIELD PROVIDED:

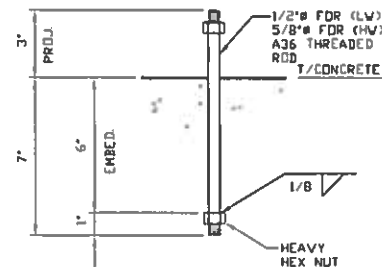
- 1 REINFORCEMENT IS BENT COLD.
- 2 THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS.
- 3 REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT.



1B

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

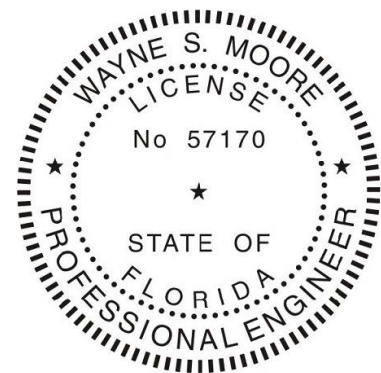
SCALE: NTS
(MINIMUM ANCHOR EDGE DISTANCE IS 1 1/2")
* COORDINATE WITH LOCAL CODES/ORD.



1C

ANCHOR ROD THROUGH BASE RAIL DETAIL

SCALE: NTS



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CLIENT: TBS

**TUBULAR BUILDING SYSTEMS
50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B**

DATE: 12-18-17

SHT. 20

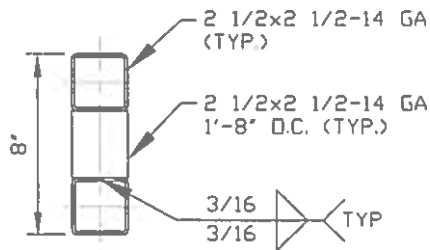
SCALE: NTS

DWG. NO: SK-3

JOB NO: 17250S

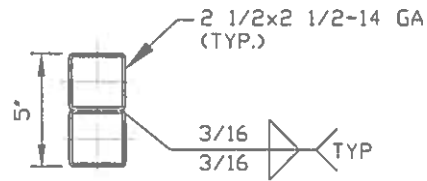
REV: 0

OPTIONAL HEADER



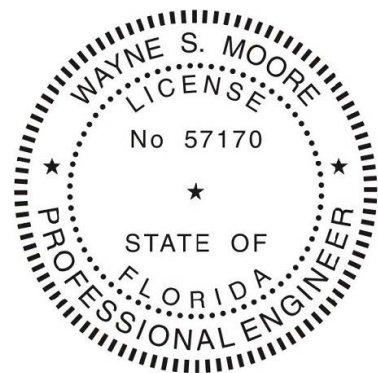
**HEADER DETAIL FOR
OPENINGS 8'-0" < LENGTH <15'-0"**

SCALE: NTS



**HEADER DETAIL FOR
OPENINGS LENGTH <8'-0"**

SCALE: NTS



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CLIENT: TBS

**TUBULAR BUILDING SYSTEMS
50'-0"x20'-0" ENCLOSED BUILDING EXPOSURE B**

DATE: 12-18-17

SHT. 21

SCALE: NTS

DWG. NO: SK-3

JOB NO: 17250S

REV: 0

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