

## STRUCTURAL DESIGN

# PARTIALLY ENCLOSED (UTILITY) BUILDING EXPOSURE B

**MAXIMUM 30'-0" WIDE X 20'-0" EAVE HEIGHT- BOX EAVE  
FRAME AND BOW FRAME**

**29 July 2021**

**Revision 3**

**M&A Project No. 16154S/17300S/20352S**

**Prepared for:**

**Tubular Building Systems, LLC  
631 SE Industrial Circle  
Lake City, Florida 32025**

**Prepared by:**

**Moore and Associates Engineering and Consulting, Inc.  
1009 East Avenue  
North Augusta, SC 29841**

**401 S. Main Street, Suite 200  
Mount Airy, NC 27030**

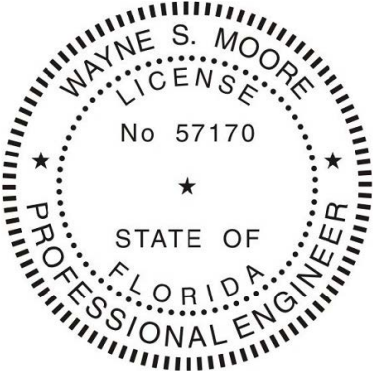
**Wayne  
S Moore** Digitally signed  
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|                                                                                                                                                                                                                                                                                                                                  | CHECKED BY: PDH  |                                                                                          |            |               |        |                              |
|                                                                                                                                                                                                                                                                                                                                  | PROJECT MGR: WSM | DATE: 7-29-21                                                                            | SCALE: NTS | DWG. NO: SK-2 | REV: 3 |                              |
|                                                                                                                                                                                                                                                                                                                                  | CLIENT: TBS      | SHT. 1                                                                                   |            |               |        |                              |

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**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: TBS**

**TUBULAR BUILDING SYSTEMS  
631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0"x20'-0" UTILITY BUILDING EXP. B**

**DATE: 7-29-21**

**SCALE: NTS**

**SHT. 2**

**DWG. NO: SK-2**

**JOB NO: 16154S/  
17300S/20352S**

**REV: 3**

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## INSTALLATION NOTES AND SPECIFICATIONS

- 1 DESIGN IS FOR A MAXIMUM 30'-0" WIDE x 20'-0" EAVE HEIGHT PARTIALLY ENCLOSED UTILITY STRUCTURES.
- 2 DESIGN WAS DONE IN ACCORDANCE WITH THE 2020 FLORIDA BUILDING CODE (FBC) 7TH EDITION, 2012 INTERNATIONAL BUILDING CODE (IBC), 2015 IBC, AND 2018 IBC
- 3 DESIGN LOADS ARE AS FOLLOWS
  - A) DEAD LOAD = 15 PSF
  - B) LIVE LOAD = 12 PSF
  - C) GROUND SNOW LOAD = 10 PSF
- 4 LOW ULTIMATE WIND SPEED 105 TO 140 MPH (NOMINAL WIND SPEED 81 TO 108 MPH); MAXIMUM RAFTER/POST AND END POST SPACING = 50 FEET
- 5 HIGH ULTIMATE WIND SPEED 141 TO 170 MPH (NOMINAL WIND SPEED 109 TO 132 MPH); MAXIMUM RAFTER/POST AND END POST SPACING = 40 FEET
- 6 END WALL COLUMNS (POSTS) AND SIDE WALL COLUMNS ARE EQUIVALENT IN SIZE AND SPACING (UNLESS NOTED OTHERWISE)
- 7 RISK CATEGORY 1
- 8 WIND EXPOSURE CATEGORY B
- 9 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 (UNLESS OTHERWISE NOTED)
- 10 AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR PURLINS, AND POSTS, INTERIOR = 9" OR END = 6" (MAX)
- 11 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. ROOF SLOPES LESS THAN 3:12 REQUIRE USE OF JOINT SEALANT
- 12 STANDARD ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6" OF EACH COLUMN
- 13 STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/WELDED NUT x 30" LONG IN SUITABLE SOIL CONDITIONS MAY BE USED FOR LOW (< 108 MPH NOMINAL) WIND SPEEDS ONLY. OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED. COORDINATE WITH LOCAL CODES/ORDINANCES REGARDING MINIMUM LENGTH FOR FROST DEPTH PROTECTION
- 14 WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:  
SOIL SITE CLASS = D  
RISK CATEGORY I  
R= 325      I<sub>E</sub>= 1.0  
S<sub>DS</sub>= 1522 g      V= C<sub>S</sub>W  
S<sub>DI</sub>= 0839 g



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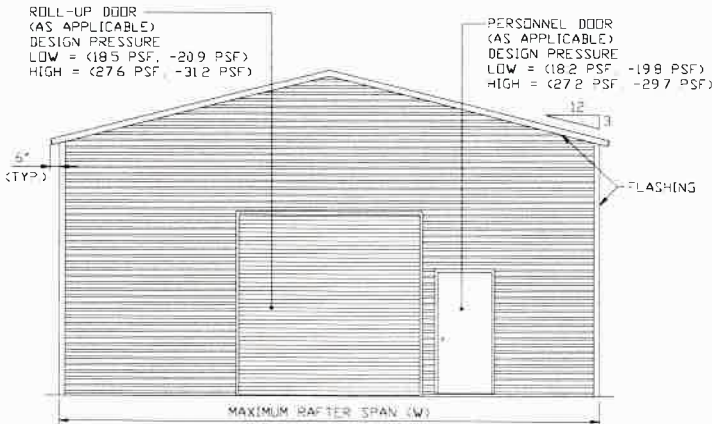
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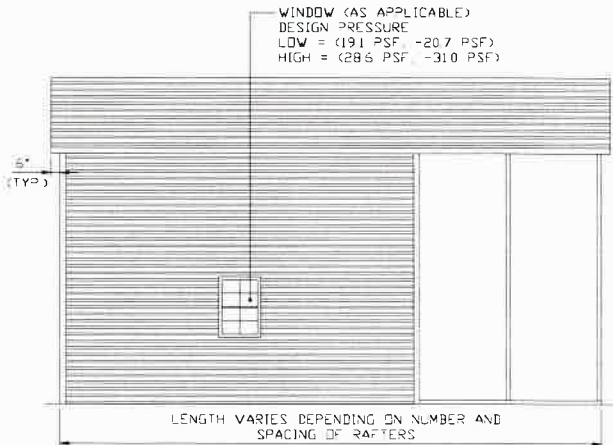
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# BOX EAVE FRAME RAFTER ENCLOSED BUILDING

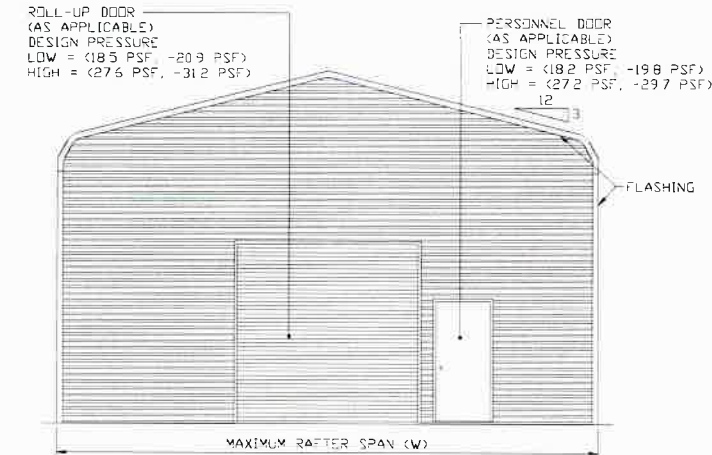


**TYPICAL END ELEVATION**  
SCALE: NTS

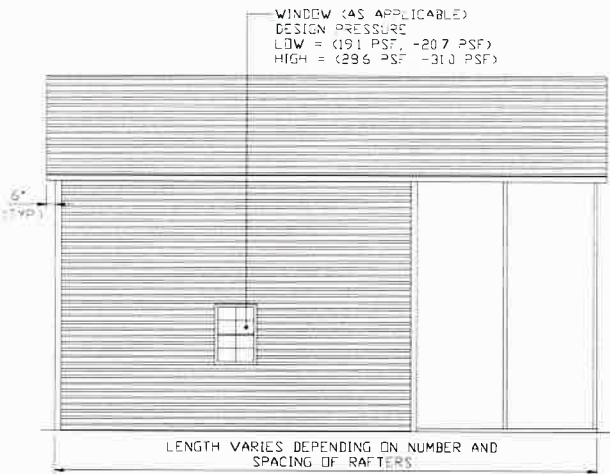


**TYPICAL SIDE ELEVATION**  
SCALE: NTS

# BOW FRAME RAFTER ENCLOSED BUILDING



**TYPICAL END ELEVATION**  
SCALE: NTS



**TYPICAL SIDE ELEVATION**  
SCALE: NTS



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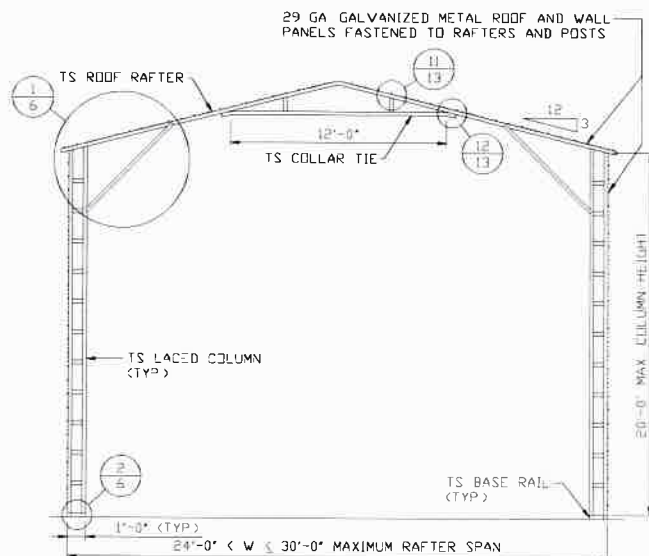
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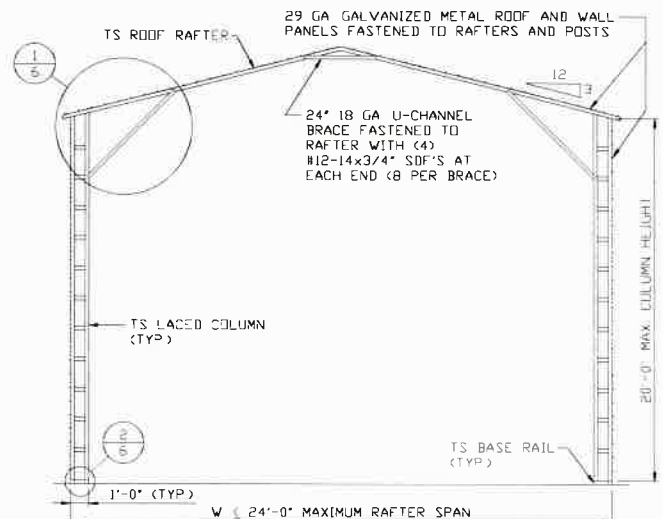
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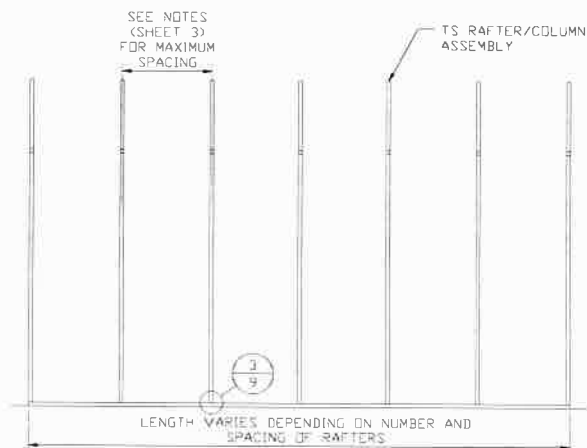
**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION**

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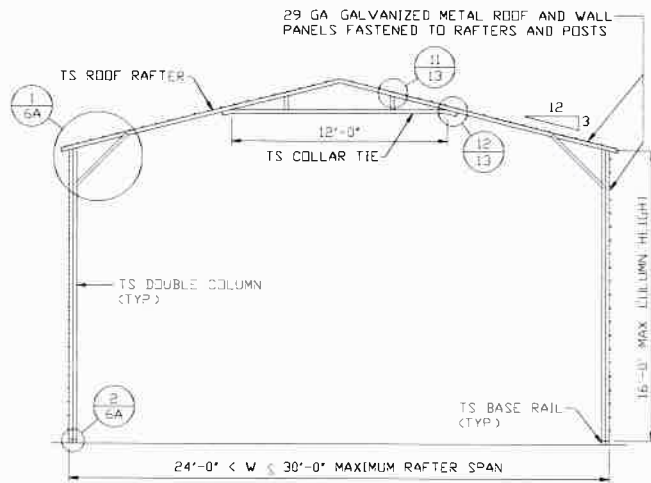
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**SCALE: NTS**

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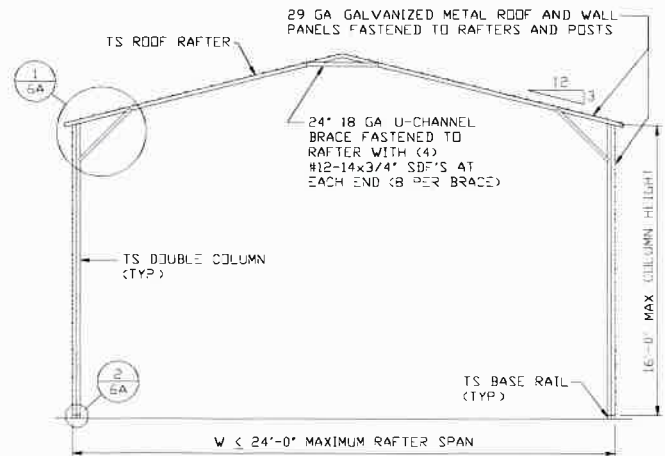
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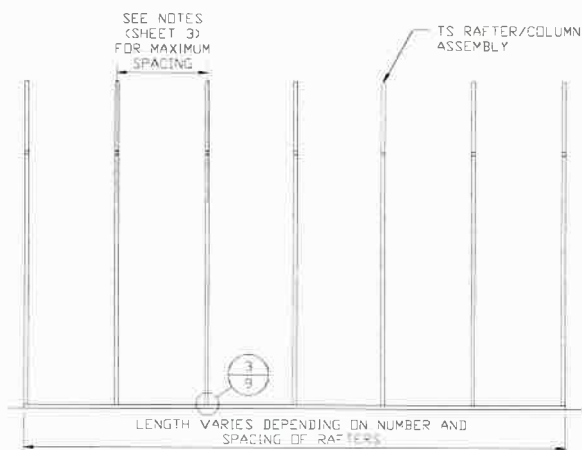
**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION**

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**CLIENT: TBS**

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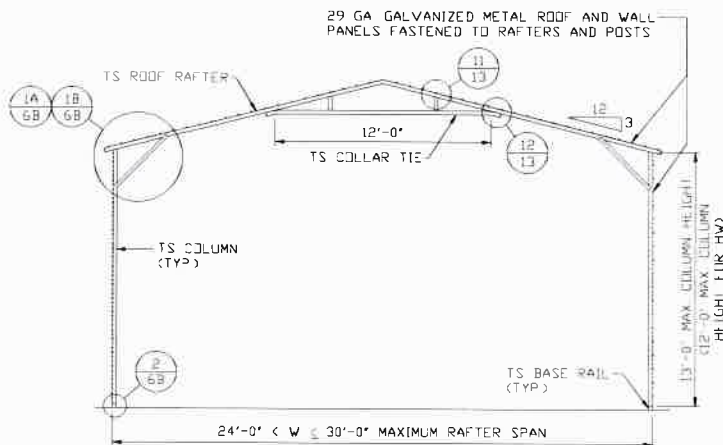
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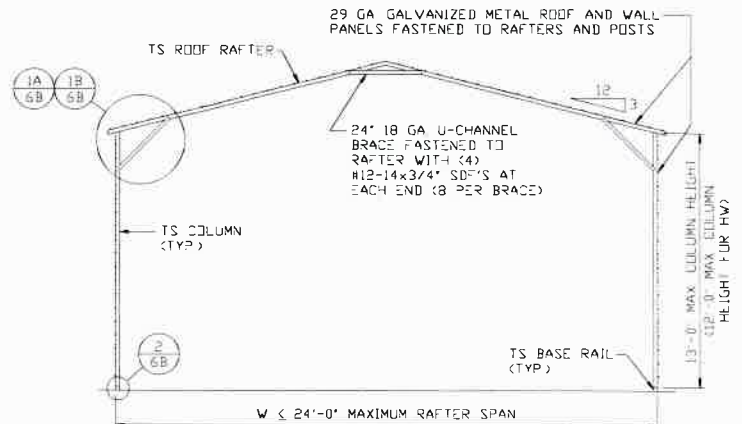
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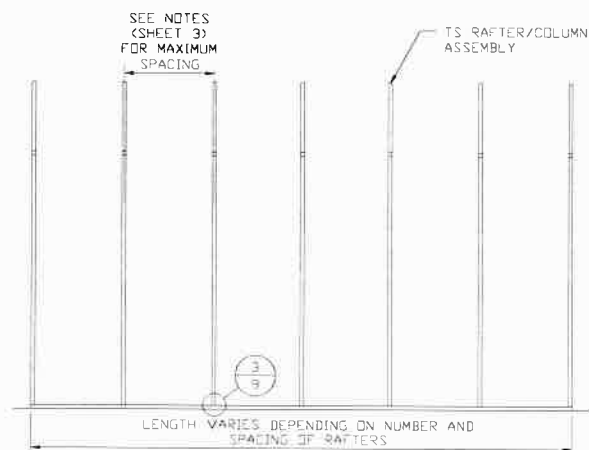
**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION**

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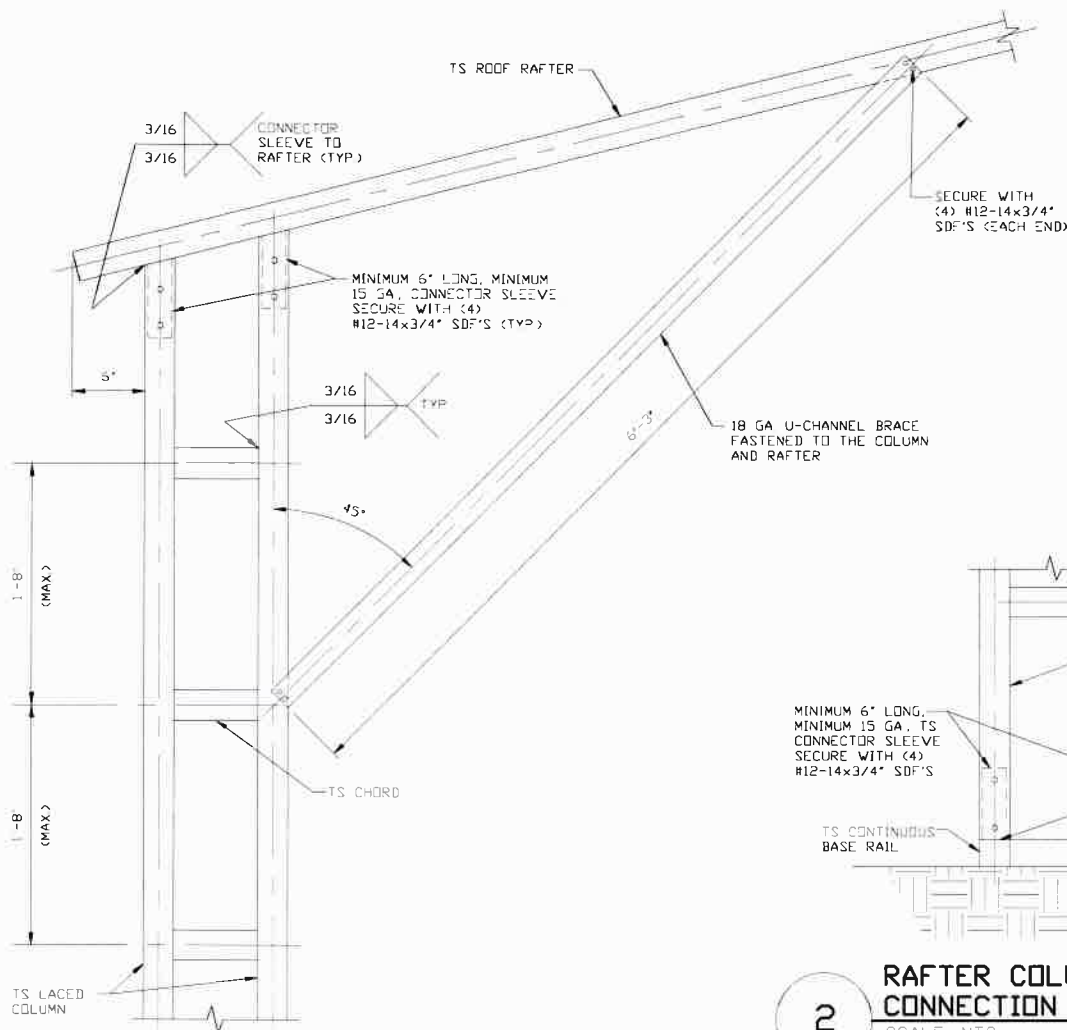
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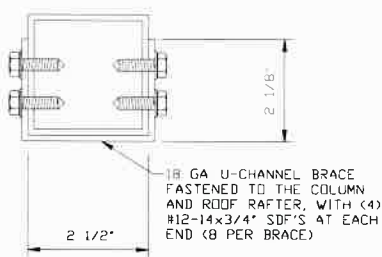
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REV: 3



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

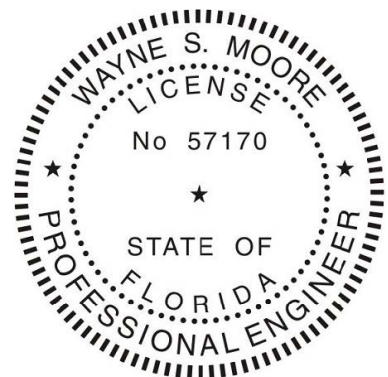
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**BRACE SECTION**

SCALE: NTS

**2** RAFTER COLUMN/BASE RAIL CONNECTION DETAIL  
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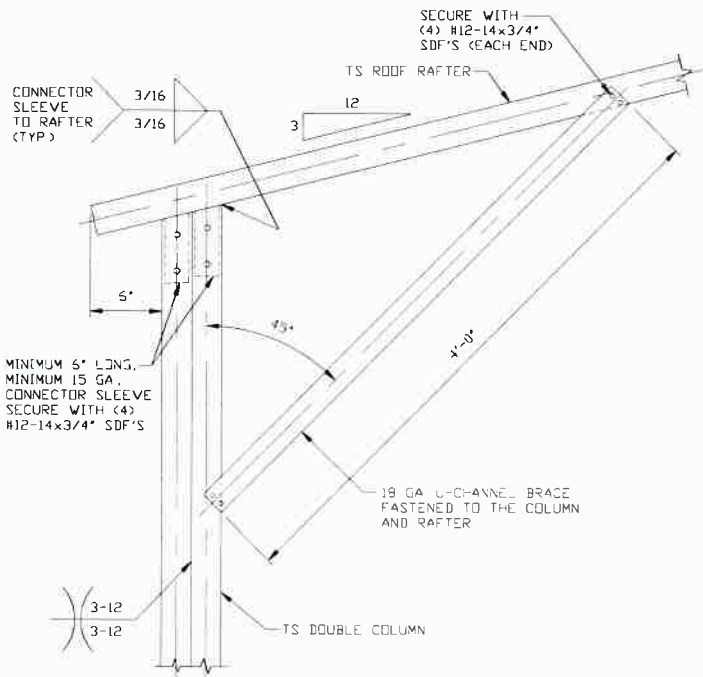
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SCALE: NTS

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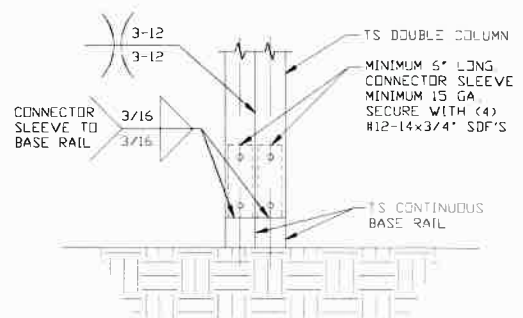
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# **BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 13'-0" < TO ≤ 16'-0"**

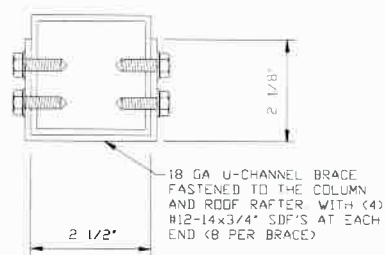
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NOTE: COLUMN HEIGHTS 12'-0" < TO ≤ 16'-0" FOR HIGH WIND



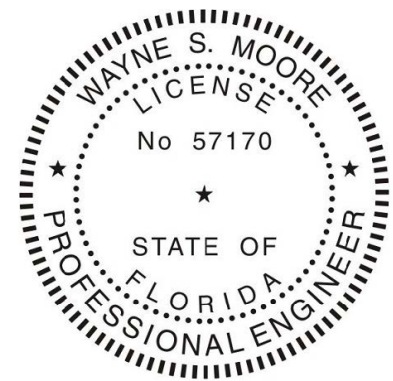
## **RAFTER COLUMN/BASE RAIL CONNECTION DETAIL**

SCALE: NTS



## **BRACE SECTION**

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SHT. 6A

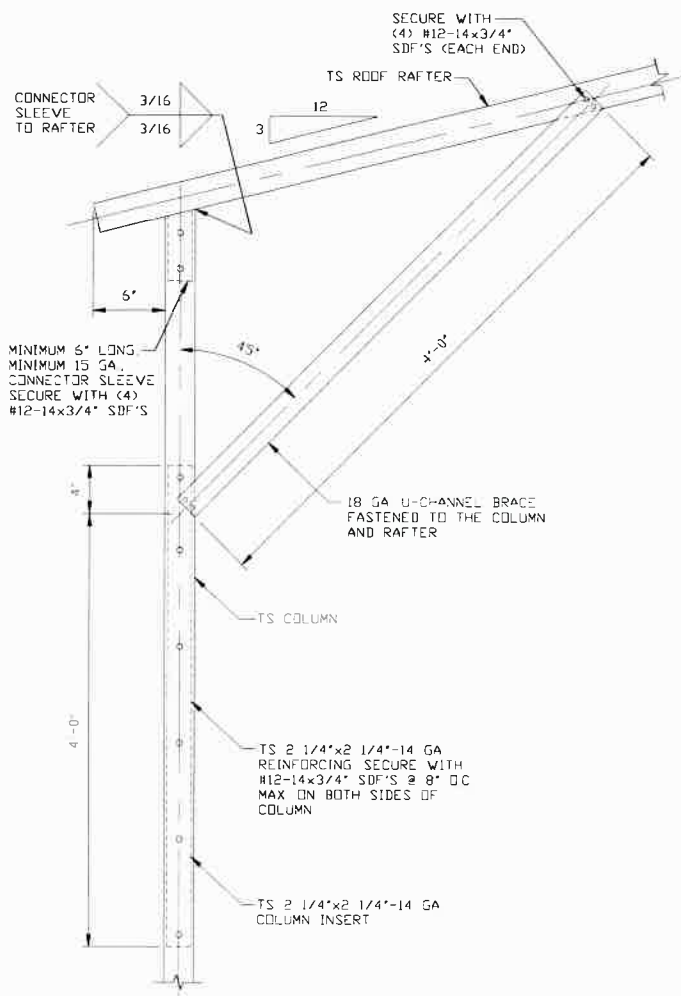
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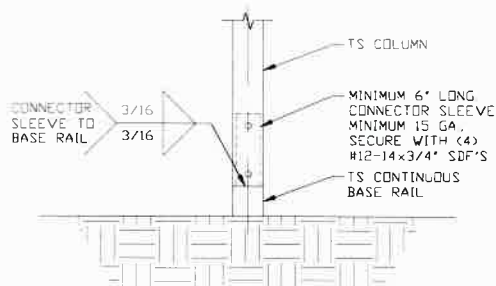


### BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10'-0" < TO ≤ 13'-0"

1A

SCALE: NTS

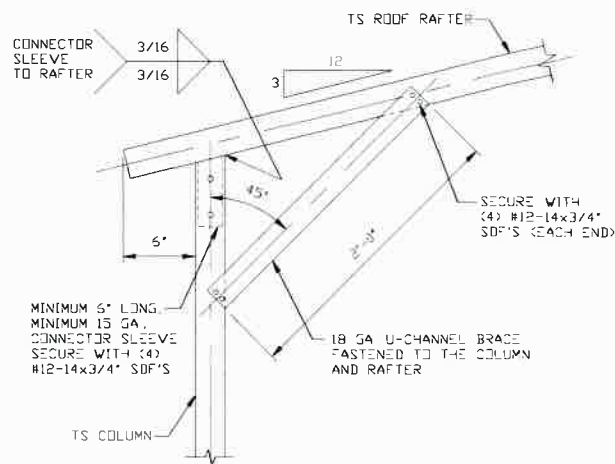
NOTE: MAXIMUM COLUMN HEIGHT IS 12'-0" FOR HIGH WIND



### RAFTER COLUMN/BASE RAIL CONNECTION DETAIL

2

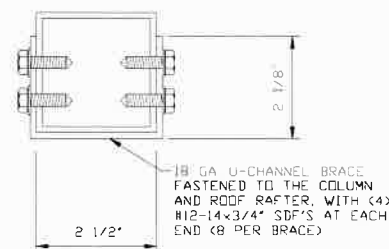
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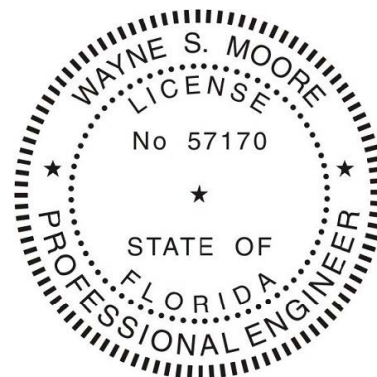
1B

SCALE: NTS



### BRACE SECTION

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30'-0"x20'-0" UTILITY BUILDING EXP. B

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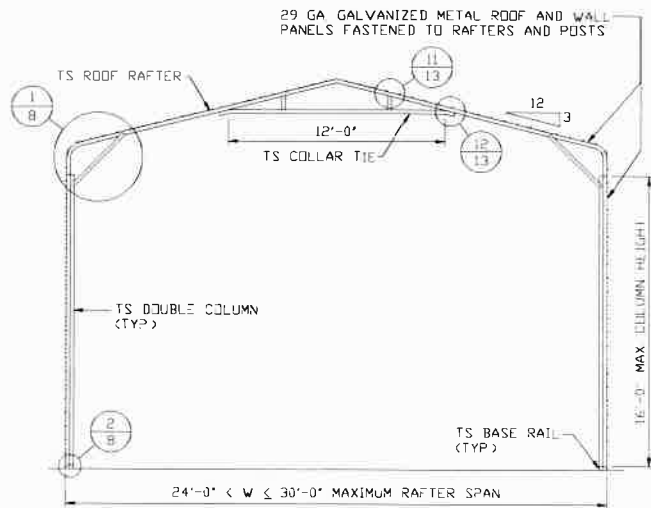
SHT. 6B

SCALE: NTS

DWG. NO: SK-2

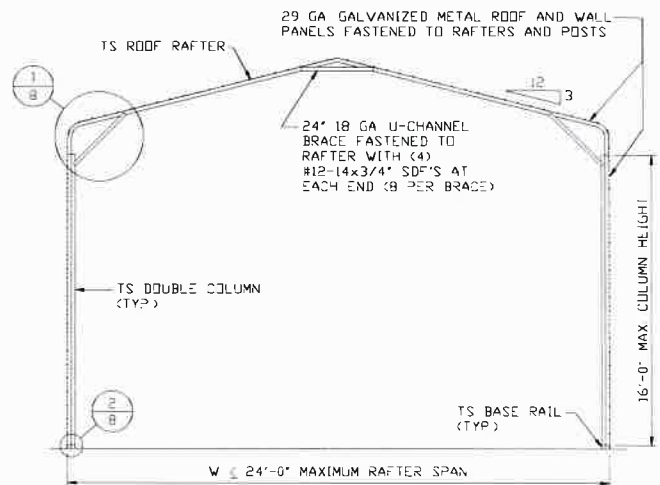
JOB NO: 16154S/  
17300S/20352S

REV: 3



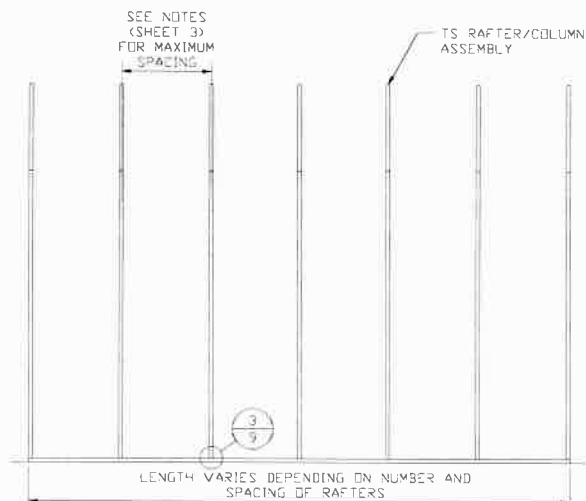
**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION**

SCALE: NTS



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**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: TBS**

**TUBULAR BUILDING SYSTEMS  
631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0"x20'-0" UTILITY BUILDING EXP. B**

**DATE: 7-29-21**

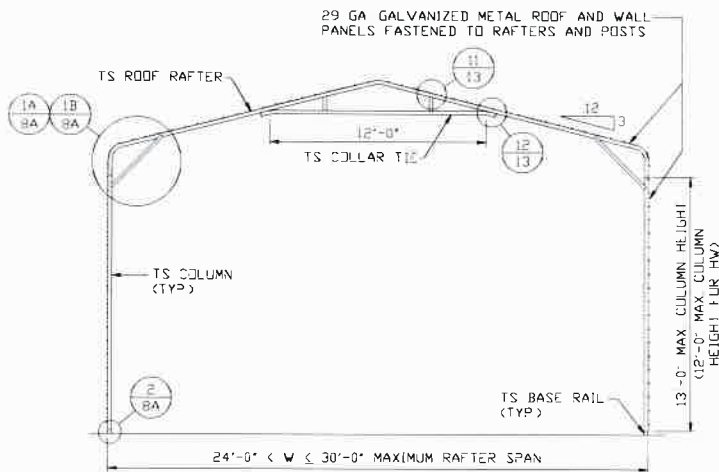
**SHT. 7**

**SCALE: NTS**

**DWG. NO: SK-2**

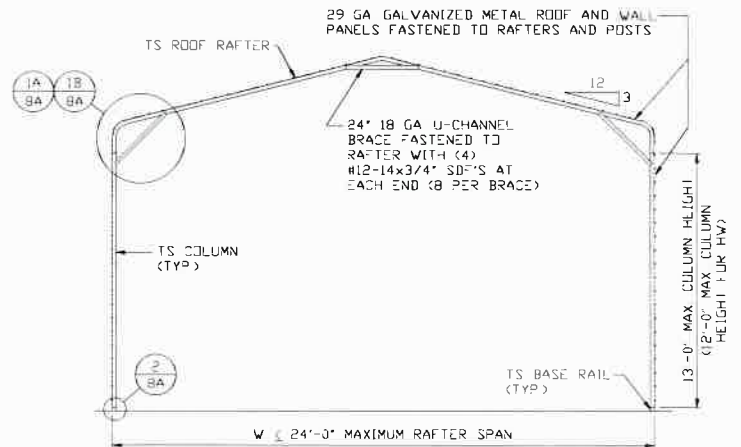
**JOB NO: 16154S/  
17300S/20352S**

**REV: 3**



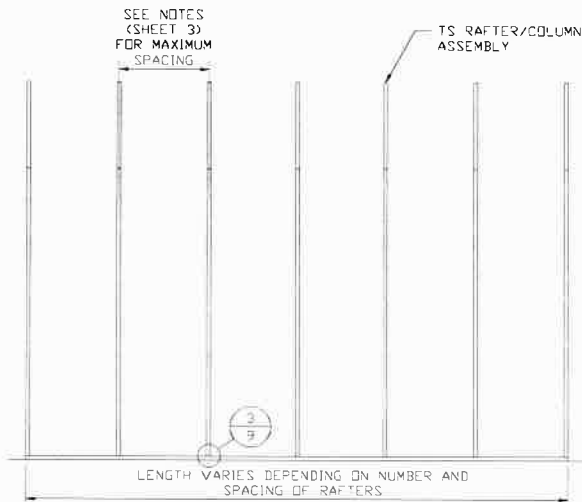
**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION**

SCALE: NTS



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PROJECT MGR: WSM

CLIENT: TBS

TUBULAR BUILDING SYSTEMS  
631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0"x20'-0" UTILITY BUILDING EXP. B

DATE: 7-29-21

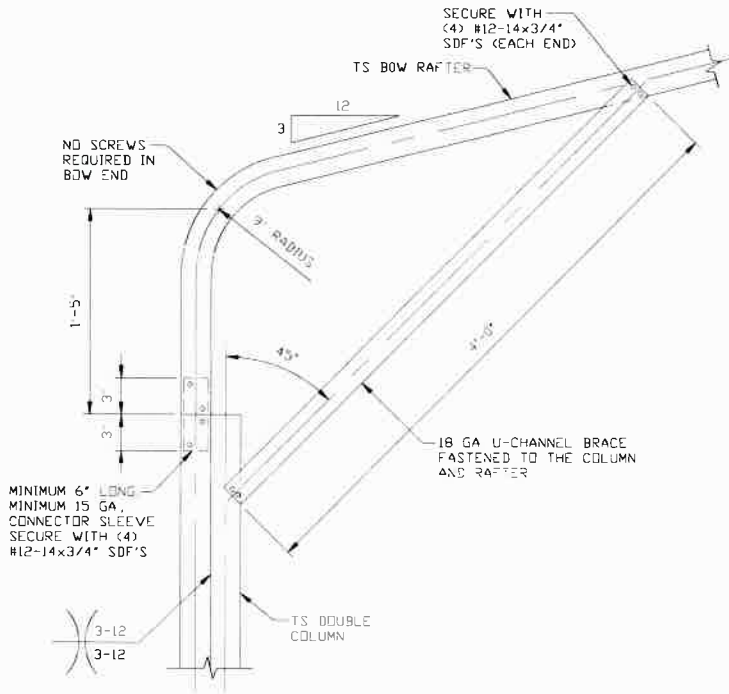
SHT. 7A

SCALE: NTS

DWG. NO: SK-2

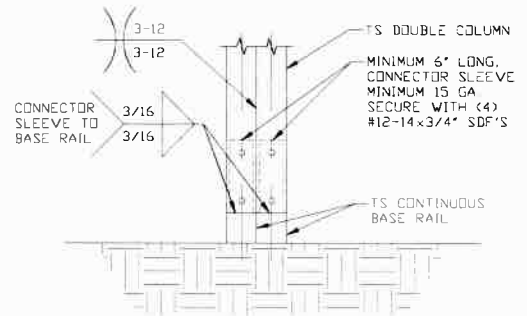
JOB NO: 16154S/  
17300S/20352S

REV: 3



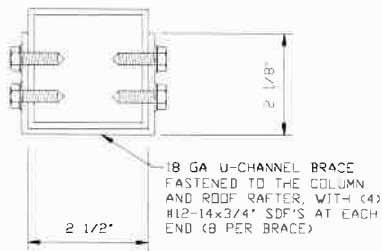
# **BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 13'-0" < TO ≤ 16'-0"**

SCALE: NTS  
NOTE: COLUMN HEIGHTS 12'-0" < TO ≤ 16'-0" FOR HIGH WIND



## **2 RAFTER COLUMN/BASE RAIL CONNECTION DETAIL**

SCALE: NTS



## **BRACE SECTION**

SCALE: NTS



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**PROJECT MGR:** WSM

**CLIENT:** TBS

**TUBULAR BUILDING SYSTEMS  
631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0"x20'-0" UTILITY BUILDING EXP. B**

**DATE:** 7-29-21

**SHT.** 8

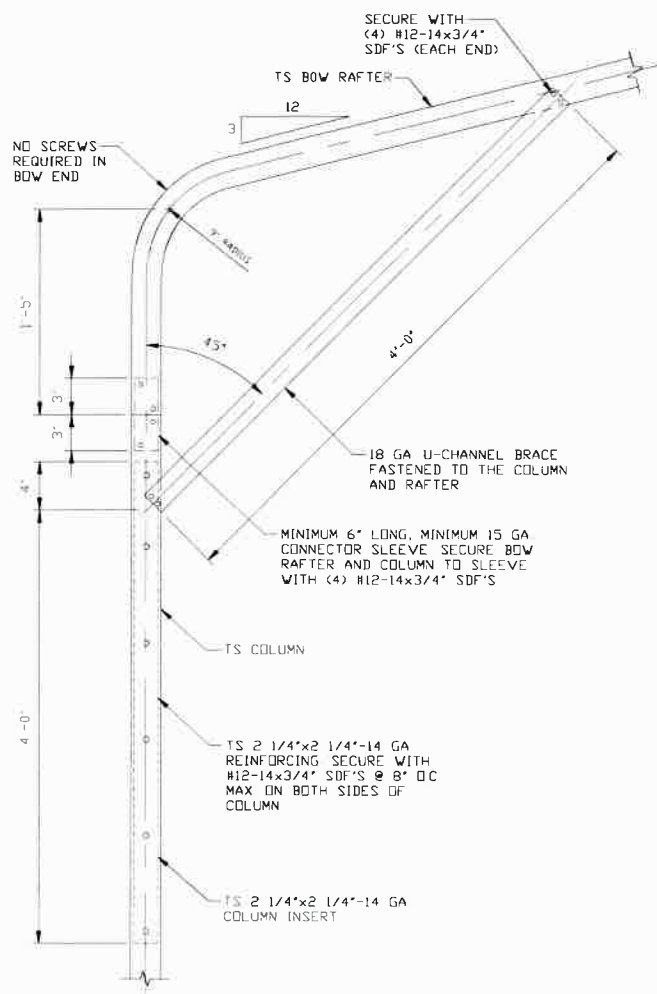
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**DWG. NO:** SK-2

**JOB NO:** 16154S/  
17300S/20352S

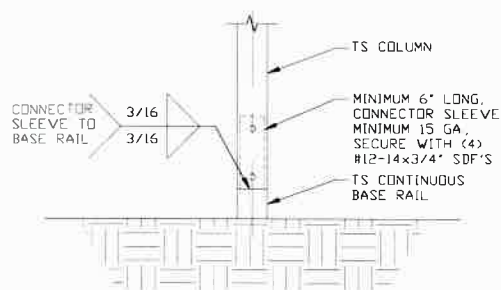
**REV:** 3

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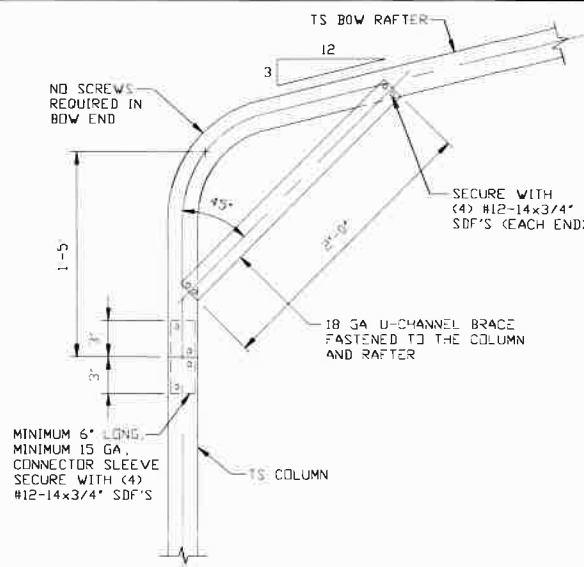


BOX EAVE RAFTER COLUMN  
CONNECTION DETAIL  
FOR HEIGHTS 10'-0" < TD ≤ 13'-0"

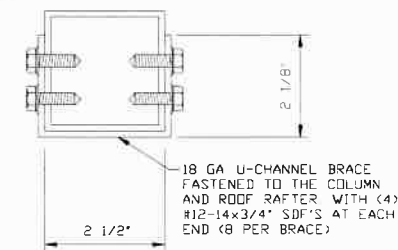
SCALE: NTS  
NOTE: MAXIMUM COLUMN HEIGHT IS 12'-0" FOR HIGH WIND



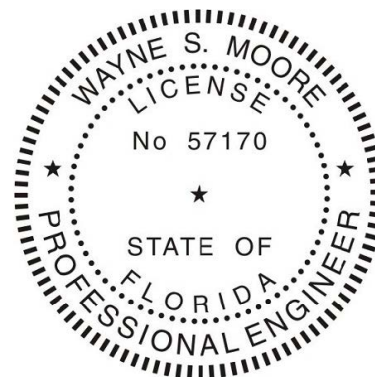
**RAFTER COLUMN/BASE RAIL  
CONNECTION DETAIL**  
SCALE: NTS



BOX EAVE RAFTER COLUMN  
CONNECTION DETAIL  
FOR HEIGHTS < 10'-0"



**BRACE SECTION**  
SCALE: NTS



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**DRAWN BY: JG**

**CHECKED BY: PDH**

PROJECT MGR: VSM

**CLIENT: TBS**

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631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0"x20'-0" UTILITY BUILDING EXP. B

DATE: 7-29-21

**SHT. 8A**

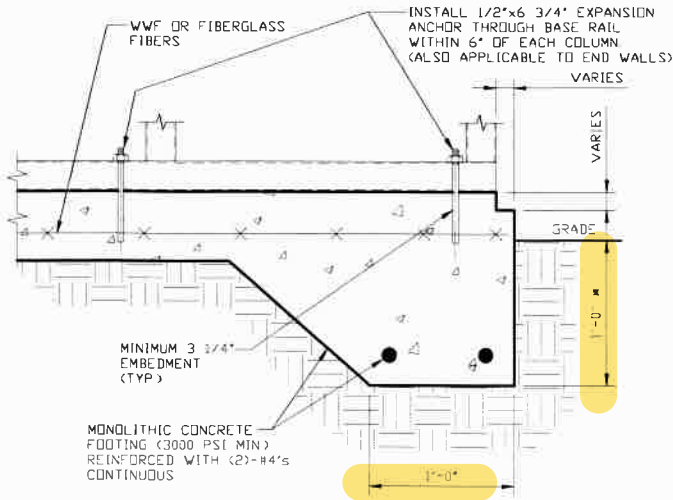
**SCALE: NTS**

DWG. NO: SK-2

**JOB NO: 16154S/  
17300S/20352S**

REV. 3

## BASE RAIL ANCHORAGE OPTIONS FOR LOW AND HIGH WIND SPEED



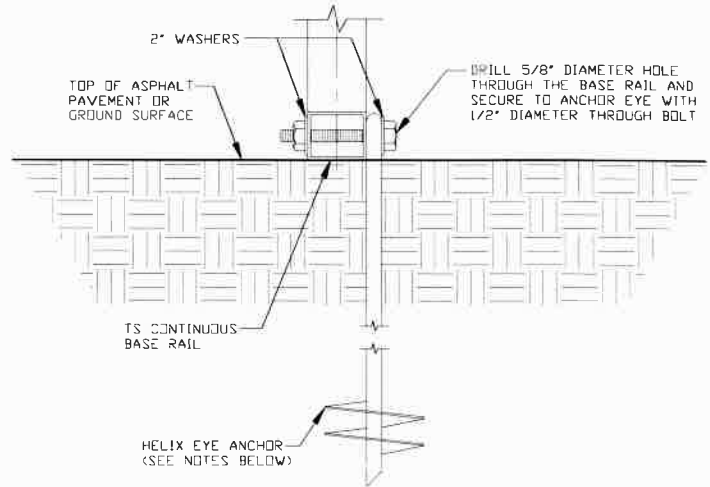
3A

### CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS

MINIMUM ANCHOR EDGE DISTANCE IS 4"

\* COORDINATE WITH LOCAL CODES/ORD  
REGARDING MINIMUM FROST DEPTH REQ



3B

### GROUND BASE HELIX ANCHORAGE

SCALE: NTS

(CAN BE USED FOR ASPHALT)

\* COORDINATE WITH LOCAL CODES/ORD  
REGARDING MINIMUM FROST DEPTH REQ

## GENERAL NOTES

NOTE: CONCRETE MONOLITHIC SLAB DESIGN ON MINIMUM SOIL BEARING CAPACITY OF 1,500 PSF

### 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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DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TBS

TUBULAR BUILDING SYSTEMS  
631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0"X20'-0" UTILITY BUILDING EXP. B

DATE: 7-29-21

SHT. 9

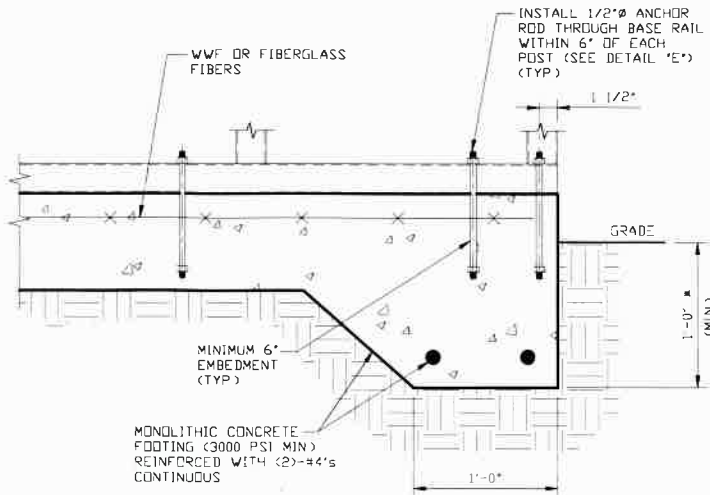
SCALE: NTS

DWG. NO: SK-2

JOB NO: 16154S/  
17300S/20352S

REV: 3

## OPTIONAL FOUNDATION ANCHORAGE FOR LOW AND HIGH WIND SPEED

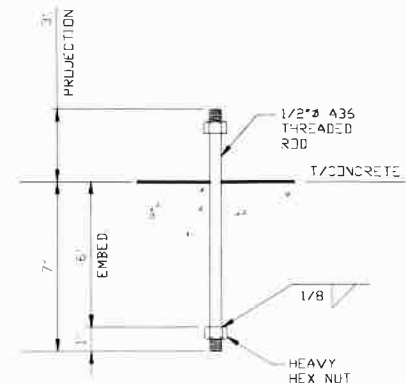


3C

### CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS

MINIMUM ANCHOR EDGE DISTANCE IS 1 1/2"  
\* COORDINATE WITH LOCAL CODES/ORD  
REGARDING MINIMUM FROST DEPTH REQ



3D

### ANCHOR ROD THROUGH BASE RAIL DETAIL

SCALE: NTS

## GENERAL NOTES

NOTE: CONCRETE MONOLITHIC SLAB DESIGN ON MINIMUM SOIL BEARING CAPACITY OF 1,500 PSF

### 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



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PROJECT MGR: WSM

CLIENT: TBS

TUBULAR BUILDING SYSTEMS  
631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0" x 20'-0" UTILITY BUILDING EXP. B

DATE: 7-29-21

SHT. 9A

SCALE: NTS

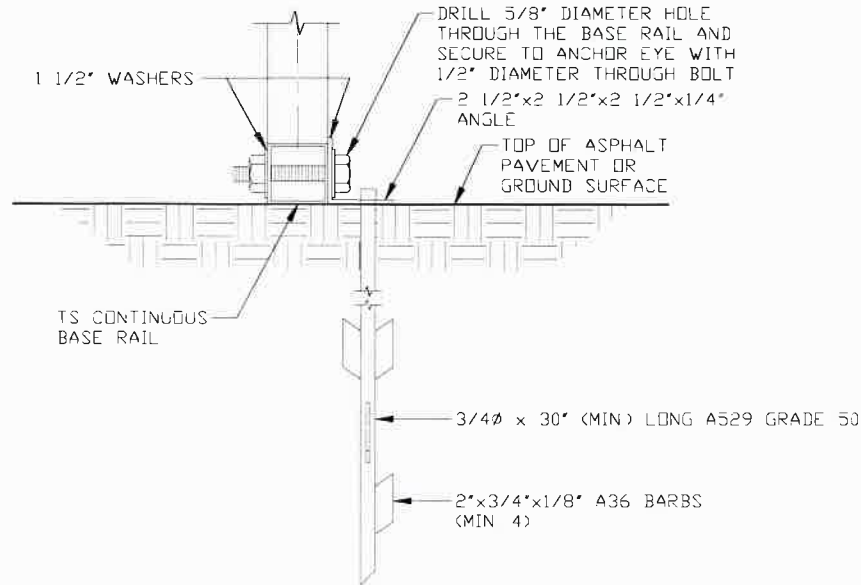
DWG. NO: SK-2

JOB NO: 16154S/  
17300S/20352S

REV: 3

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## BASE RAIL ANCHORAGE OPTION



**3E**

### ASPHALT BASE ANCHORAGE (HP 9 BARBED DRIVE ANCHOR)

SCALE: NTS  
(CAN BE USED FOR ASPHALT)  
\* COORDINATE WITH LOCAL CODES/ORD  
REGARDING MINIMUM FROST DEPTH REQ



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**PROJECT MGR: WSM**

**CLIENT: TBS**

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631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0"X20'-0" UTILITY BUILDING EXP. B**

**DATE: 7-29-21**

**SHT. 9B**

**SCALE: NTS**

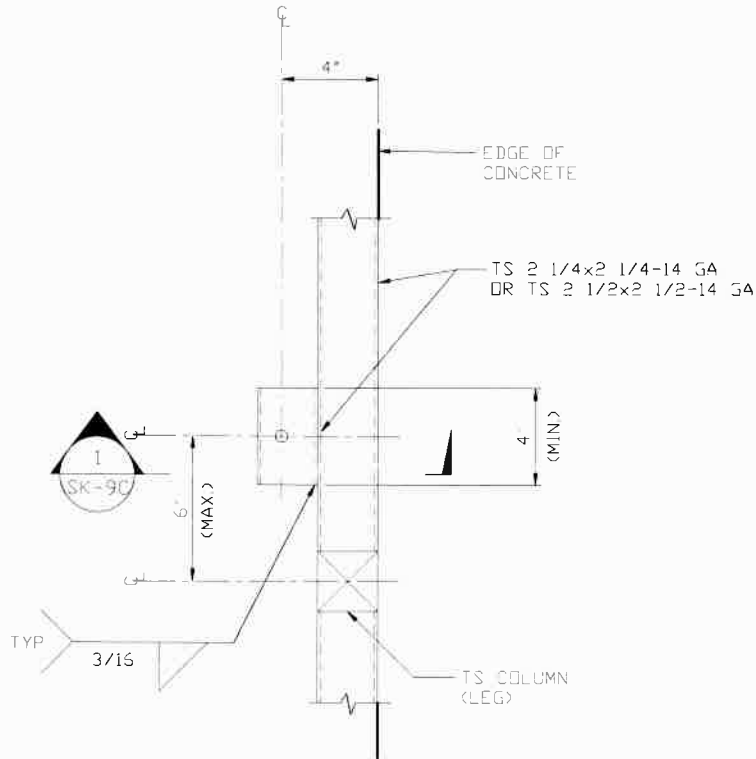
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**JOB NO: 16154S/  
17300S/20352S**

**REV: 3**

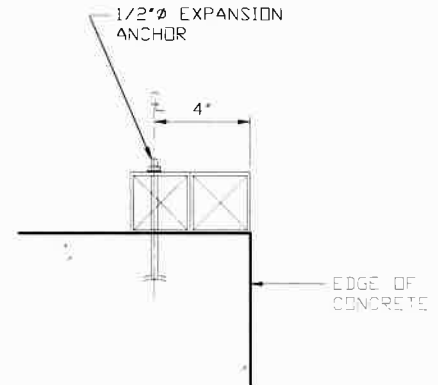
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## BASE RAIL ANCHORAGE OPTIONS



**TYPICAL ANCHOR DETAIL WHEN BASE  
RAIL IS NEAR EDGE OF CONCRETE**

SCALE: NTS



**SECTION 1**  
SCALE: NTS



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**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: TBS**

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631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0"x20'-0" UTILITY BUILDING EXP. B

**DATE: 7-29-21**

**SHT. 9C**

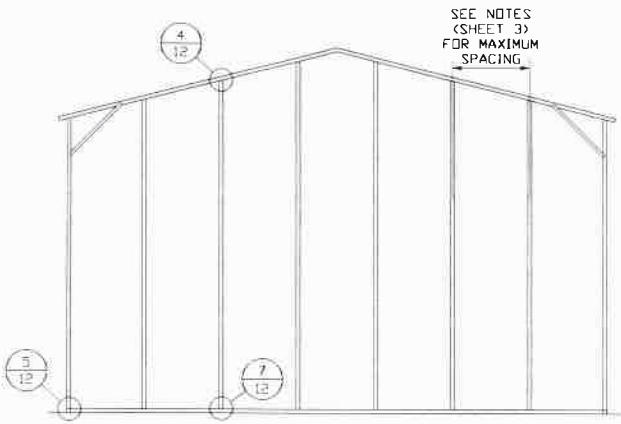
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**JOB NO: 16154S/  
17300S/20352S**

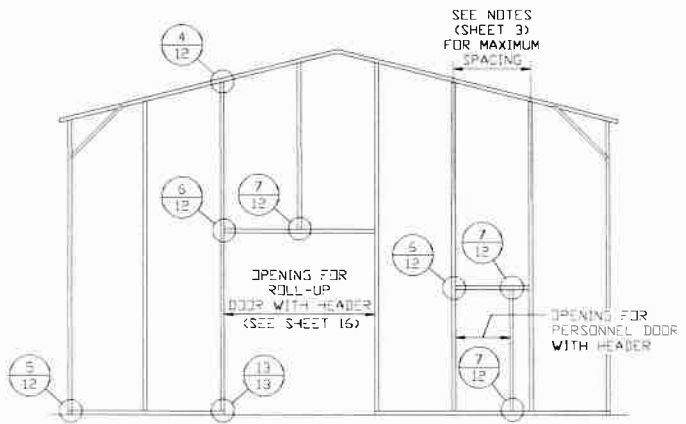
**REV: 3**

**BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS**



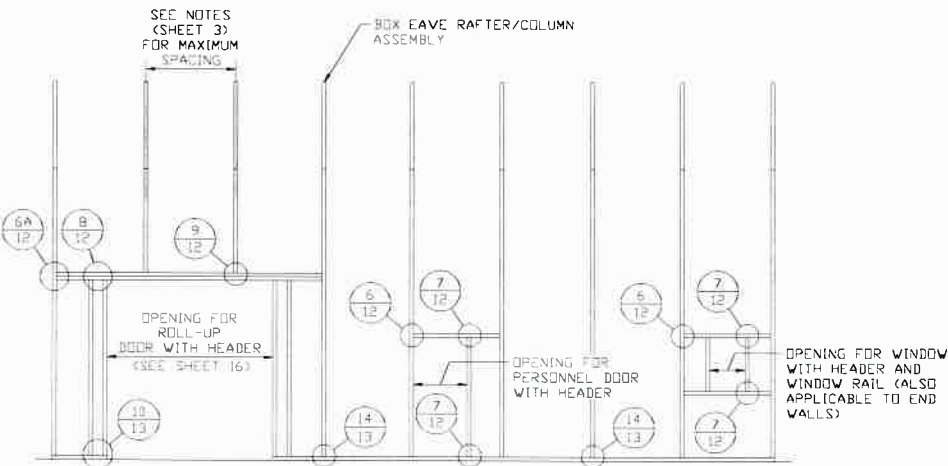
**TYPICAL BOX EAVE RAFTER  
END WALL FRAMING SECTION**

SCALE: NTS



**TYPICAL BOX EAVE RAFTER END  
WALL OPENINGS FRAMING SECTION**

SCALE: NTS



**TYPICAL BOX EAVE RAFTER SIDE  
WALL OPENINGS FRAMING SECTION**

SCALE: NTS



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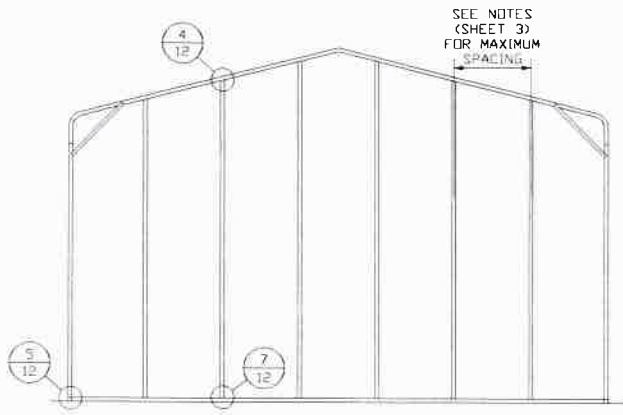
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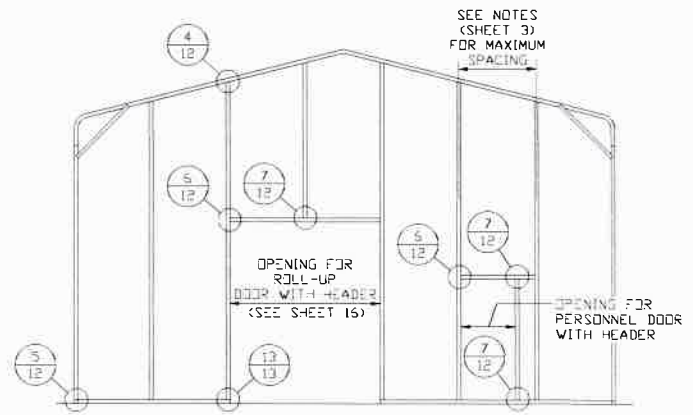
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|                  | CHECKED BY: PDH                                                                                                           |               |                                  |  |
| PROJECT MGR: WSM | DATE: 7-29-21                                                                                                             | SCALE: NTS    | JOB NO: 16154S/<br>17300S/20352S |  |
| CLIENT: TBS      | SHT. 10                                                                                                                   | DWG. NO: SK-2 | REV: 3                           |  |

## BOW RAFTER END WALL AND SIDE WALL OPENINGS



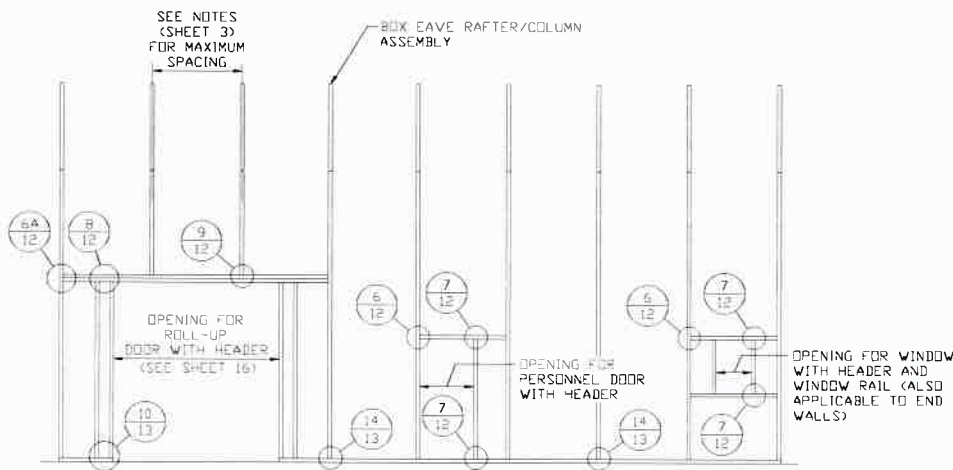
**TYPICAL BOX EAVE RAFTER  
END WALL FRAMING SECTION**

SCALE: NTS



**TYPICAL BOX EAVE RAFTER END  
WALL OPENINGS FRAMING SECTION**

SCALE: NTS



**TYPICAL BOX EAVE RAFTER SIDE  
WALL OPENINGS FRAMING SECTION**

SCALE: NTS



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**DRAWN BY:** JG

**CHECKED BY:** PDH

**PROJECT MGR:** WSM

**CLIENT:** TBS

**TUBULAR BUILDING SYSTEMS**  
631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0"x20'-0" UTILITY BUILDING EXP. B

**DATE:** 7-29-21

**SHT.** 11

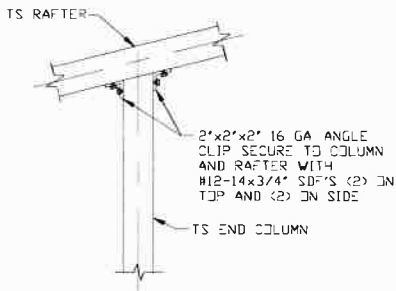
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**DWG. NO:** SK-2

**JOB NO:** 16154S/  
17300S/20352S

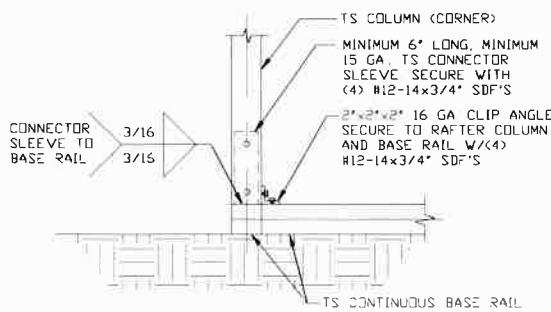
**REV:** 3

## CONNECTION DETAILS



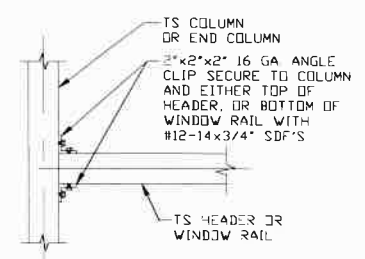
**4** **END COLUMN/RAFTER CONNECTION DETAIL**

SCALE: NTS



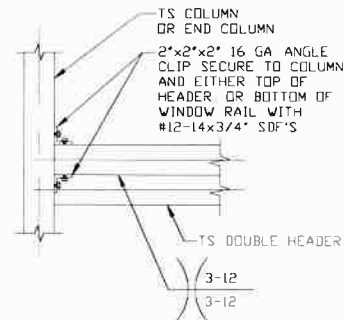
**5** **END COLUMN/BASE RAIL CONNECTION DETAIL**

SCALE: NTS



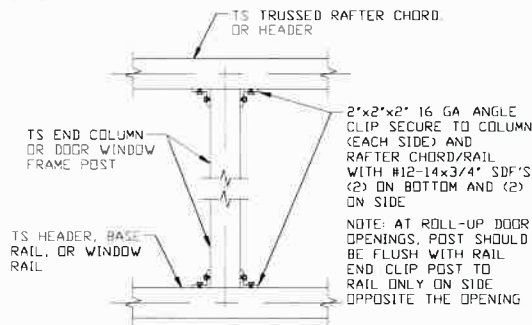
**6** **HEADER OR WINDOW RAIL TO COLUMN CONNECTION DETAIL**

SCALE: NTS



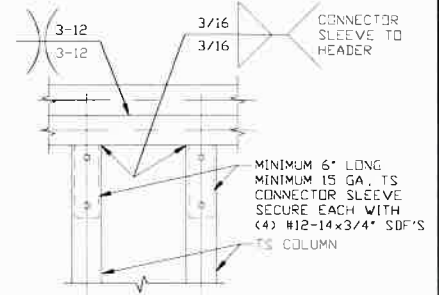
**6A** **DOUBLE HEADER TO COLUMN CONNECTION DETAIL**

SCALE: NTS



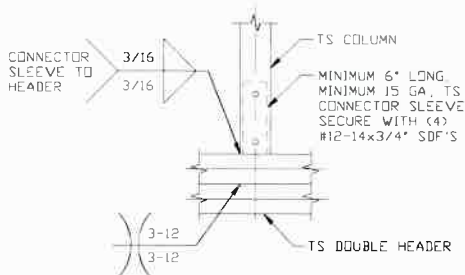
**7** **COLUMN TO HEADER, BASE RAIL, OR WINDOW RAIL CONNECTION DETAIL**

SCALE: NTS



**8** **DOUBLE HEADER/COLUMN CONNECTION DETAIL**

SCALE: NTS



**9** **COLUMN/DOUBLE HEADER CONNECTION DETAIL**

SCALE: NTS



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**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: TBS**

**TUBULAR BUILDING SYSTEMS  
631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0" x 20'-0" UTILITY BUILDING EXP. B**

**DATE: 7-29-21**

**SHT. 12**

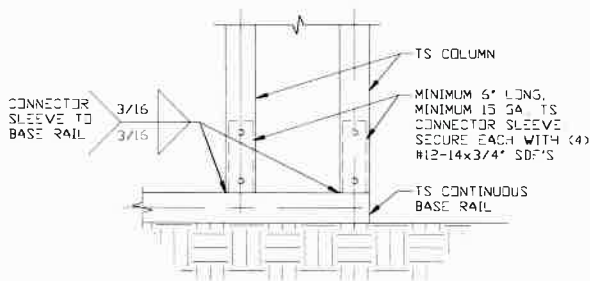
**SCALE: NTS**

**DWG. NO: SK-2**

**JOB NO: 16154S/  
17300S/20352S**

**REV: 3**

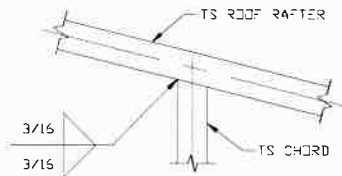
# CONNECTION DETAILS



**COLUMN/BASE RAIL  
CONNECTION DETAIL**

10

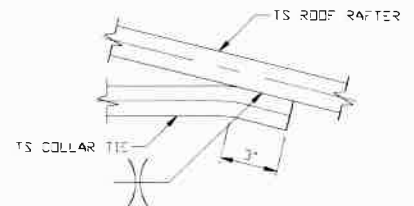
SCALE: NTS



**RAFTER TO CHORD  
CONNECTION DETAIL**

11

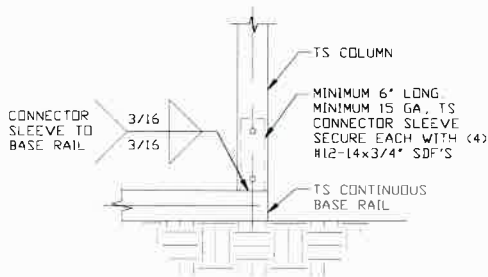
SCALE: NTS



**COLLAR TIE  
CONNECTION DETAIL**

12

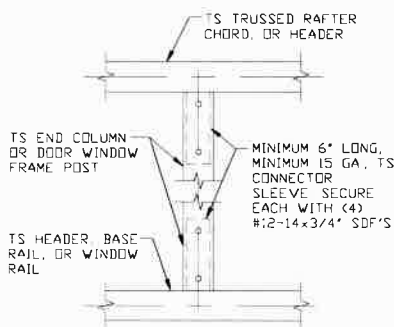
SCALE: NTS



**COLUMN/BASE RAIL  
CONNECTION DETAIL**

13

SCALE: NTS



**COLUMN TO HEADER,  
BASE RAIL  
CONNECTION DETAIL**

14

SCALE: NTS



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**DATE: 7-29-21**

**SHT. 13**

**SCALE: NTS**

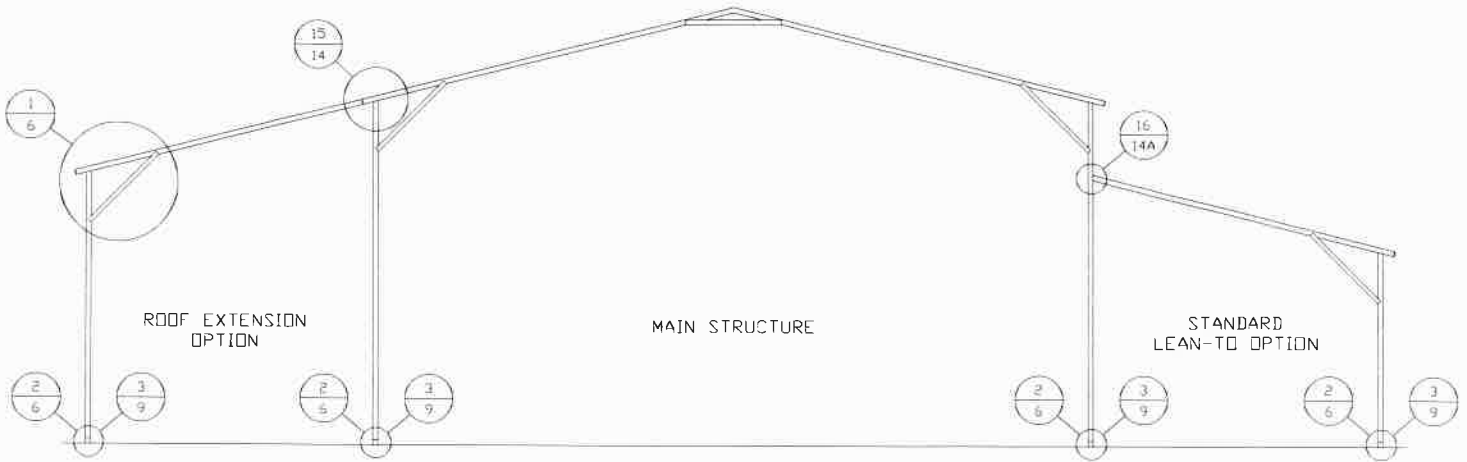
**DWG. NO: SK-2**

**JOB NO: 16154S/  
17300S/20352S**

**REV: 3**

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# BOX EAVE RAFTER LEAN-TO OPTIONS



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

SCALE: NTS

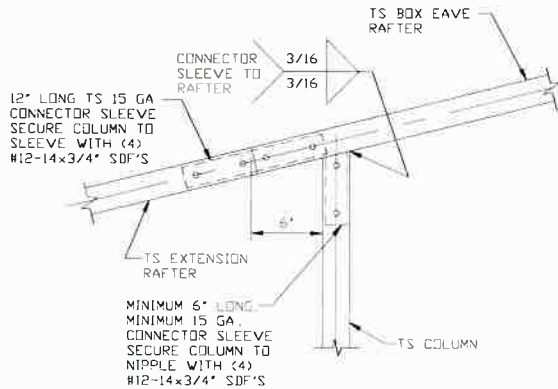
MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE LACED COLUMNS FOR EAVE HEIGHTS 16'-0" < TO < 20'-0"

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR EAVE HEIGHTS 13'-0" (12'-0" FOR HIGH WIND) < TO < 16'-0"

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR EAVE HEIGHTS 10'-0" < TO < 13'-0" (12'-0" FOR HIGH WIND) (WITH 4'-4" INSERT)

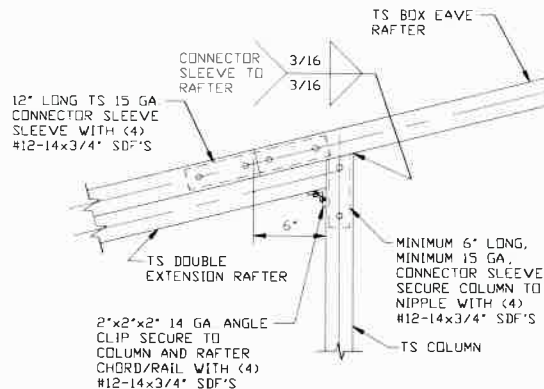
MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR EAVE HEIGHTS < 10'-0"

KNEE BRACES MUST BE 4'-0" (5'-0" FOR HIGH WIND) WHEN LEAN-TO'S ARE ADDED



## 15 SIDE EXTENSION RAFTER/COLUMN DETAIL FOR RAFTER SPANS < 15'-0"

SCALE: NTS



## 15A SIDE EXTENSION RAFTER/COLUMN DETAIL FOR RAFTER SPANS 15'-0" < TO < 24'-0"

SCALE: NTS



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CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: TBS

TUBULAR BUILDING SYSTEMS  
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LAKE CITY, FLORIDA 32025  
30'-0"x20'-0" UTILITY BUILDING EXP. B

DATE: 7-29-21

SHT. 14

SCALE: NTS

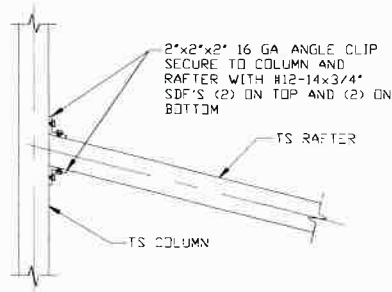
DWG. NO: SK-2

JOB NO: 16154S/  
17300S/20352S

REV: 3

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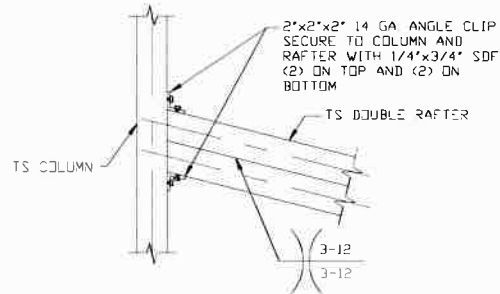
## BOX EAVE RAFTER LEAN-TO OPTIONS



**LEAN-TO RAFTER TO RAFTER  
COLUMN CONNECTION DETAIL  
FOR RAFTER SPANS  $\leq 15'-0''$**

**16**

SCALE: NTS



**LEAN-TO RAFTER TO RAFTER  
COLUMN CONNECTION DETAIL  
FOR RAFTER SPANS  
 $15'-0'' < \text{TO} \leq 24'-0''$**

**16A**

SCALE: NTS



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30'-0" x 20'-0" UTILITY BUILDING EXP. B**

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**SCALE: NTS**

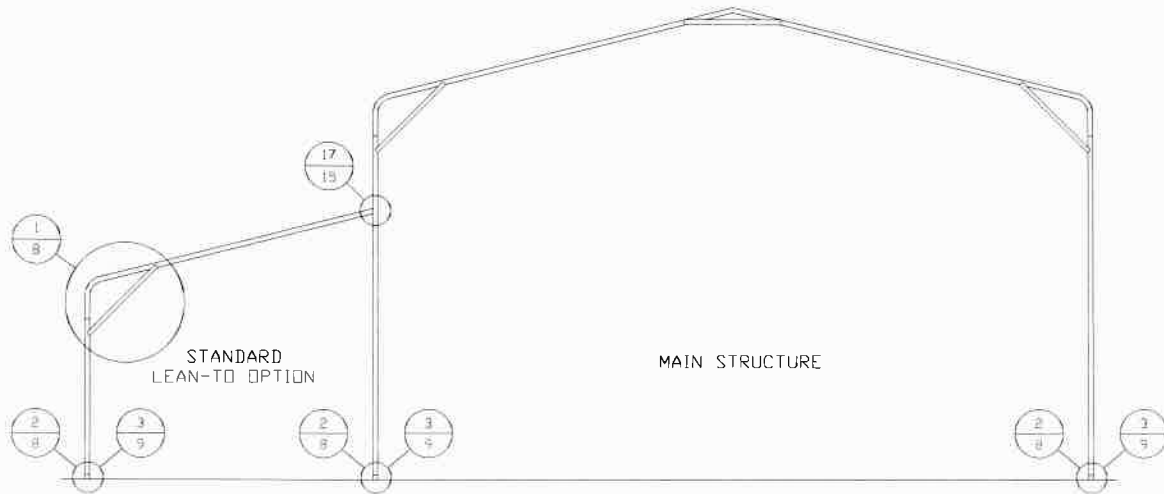
**DWG. NO: SK-2**

**JOB NO: 16154S/  
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## BOW RAFTER LEAN-TO OPTIONS



### TYPICAL BOW RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN)

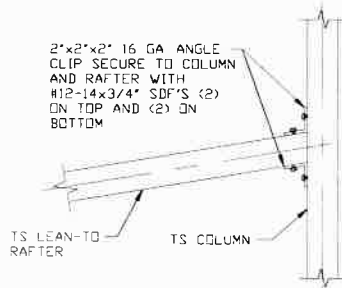
SCALE: NTS

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR EAVE HEIGHTS 13'-0" (12'-0" FOR HIGH WIND) < TO < 15'-0"

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR EAVE HEIGHTS 10'-0" < TO < 13'-0" (12'-0" FOR HIGH WIND) (WITH 4'-4" INSERT)

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR EAVE HEIGHTS < 10'-0"

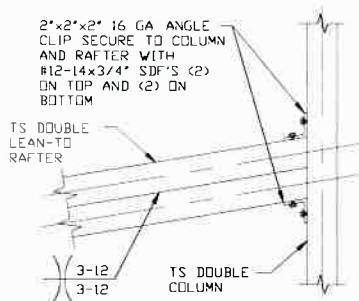
KNEE BRACES MUST BE 4'-0" (5'-0" FOR HIGH WIND) WHEN LEAN-TO'S ARE ADDED



### LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS ≤ 15'-0"

17

SCALE: NTS



### LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 15'-0" < TO ≤ 24'-0"

17A

SCALE: NTS



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**PROJECT MGR: WSM**

**CLIENT: TBS**

**TUBULAR BUILDING SYSTEMS  
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30'-0"x20'-0" UTILITY BUILDING EXP. B**

**DATE: 7-29-21**

**SHT. 15**

**SCALE: NTS**

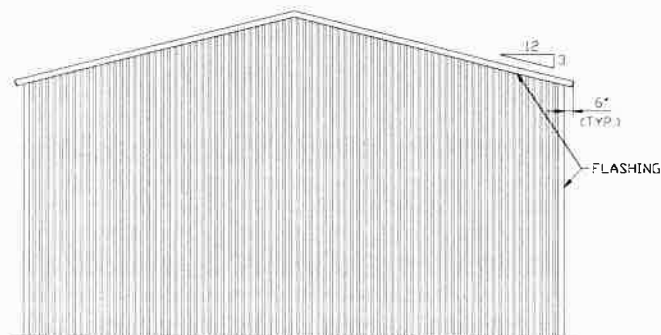
**DWG. NO: SK-2**

**JOB NO: 16154S/  
17300S/20352S**

**REV: 3**

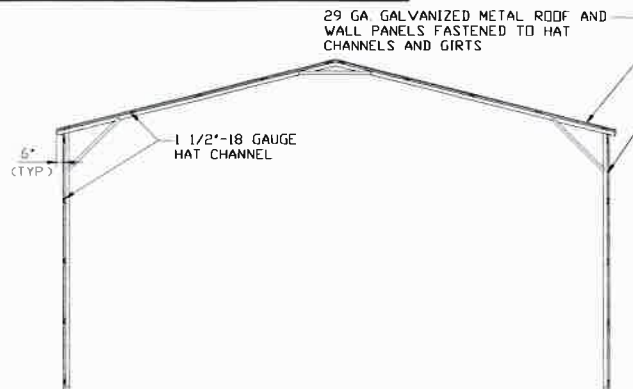
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## BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



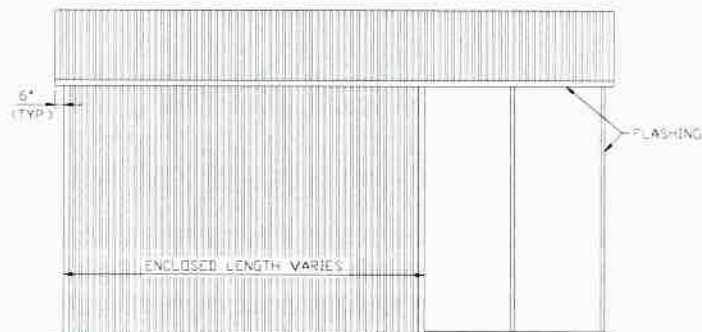
**TYPICAL END ELEVATION  
VERTICAL ROOF/SIDING OPTION**

SCALE: NTS



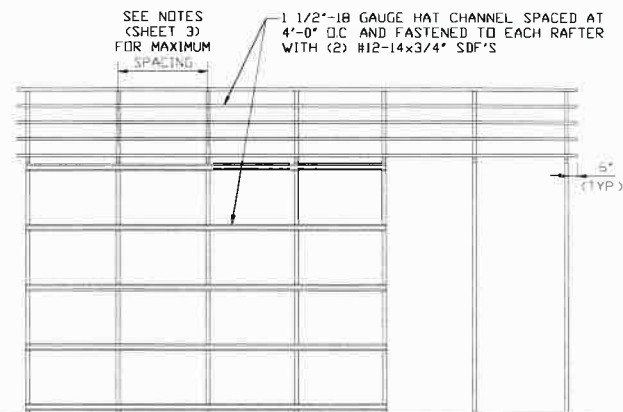
**TYPICAL SECTION VERTICAL  
ROOF/SIDING OPTION**

SCALE: NTS



**TYPICAL SIDE ELEVATION  
VERTICAL ROOF/SIDING OPTION**

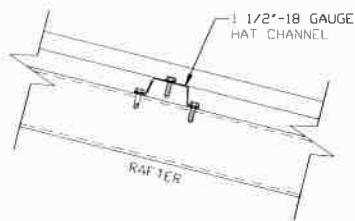
SCALE: NTS



**TYPICAL FRAMING SECTION  
VERTICAL ROOF/SIDING OPTION**

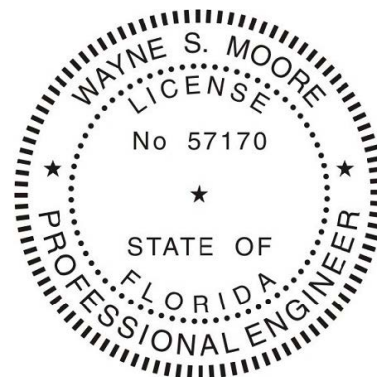
SCALE: NTS

NOTE: TS WALL GIRTS CAN BE USED AS AN OPTION IN PLACE OF HAT CHANNELS TS GIRTS MUST BE SPACD AT 4'-0" (MAX) O.C.



**ROOF PANEL ATTACHMENT**

(ALTERNATE FOR VERTICAL ROOF PANELS)  
SCALE: NTS



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**PROJECT MGR: WSM**

**CLIENT: TBS**

**TUBULAR BUILDING SYSTEMS  
631 SE INDUSTRIAL CIRCLE  
LAKE CITY, FLORIDA 32025  
30'-0"x20'-0" UTILITY BUILDING EXP. B**

**DATE: 7-29-21**

**SHT. 16**

**SCALE: NTS**

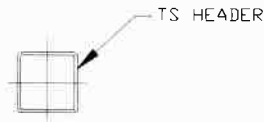
**DWG. NO: SK-2**

**JOB NO: 16154S/  
17300S/20352S**

**REV: 3**

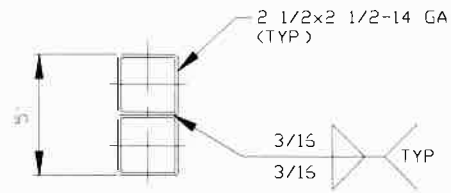
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## SIDE WALL HEADER OPTIONS



**HEADER DETAIL FOR DOOR  
OPENINGS  $\leq 10'-0''$**

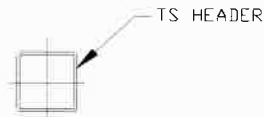
SCALE: NTS



**HEADER DETAIL FOR DOOR  
OPENINGS  $10'-0'' < \text{LENGTH} \leq 15'-0''$**

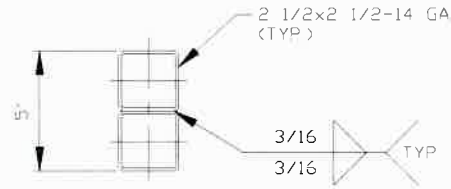
SCALE: NTS

## END WALL HEADER OPTIONS



**HEADER DETAIL FOR DOOR  
OPENINGS  $\leq 12'-0''$**

SCALE: NTS



**HEADER DETAIL FOR DOOR  
OPENINGS  $12'-0'' < \text{LENGTH} \leq 15'-0''$**

SCALE: NTS



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DATE: 7-29-21

SHT. 17

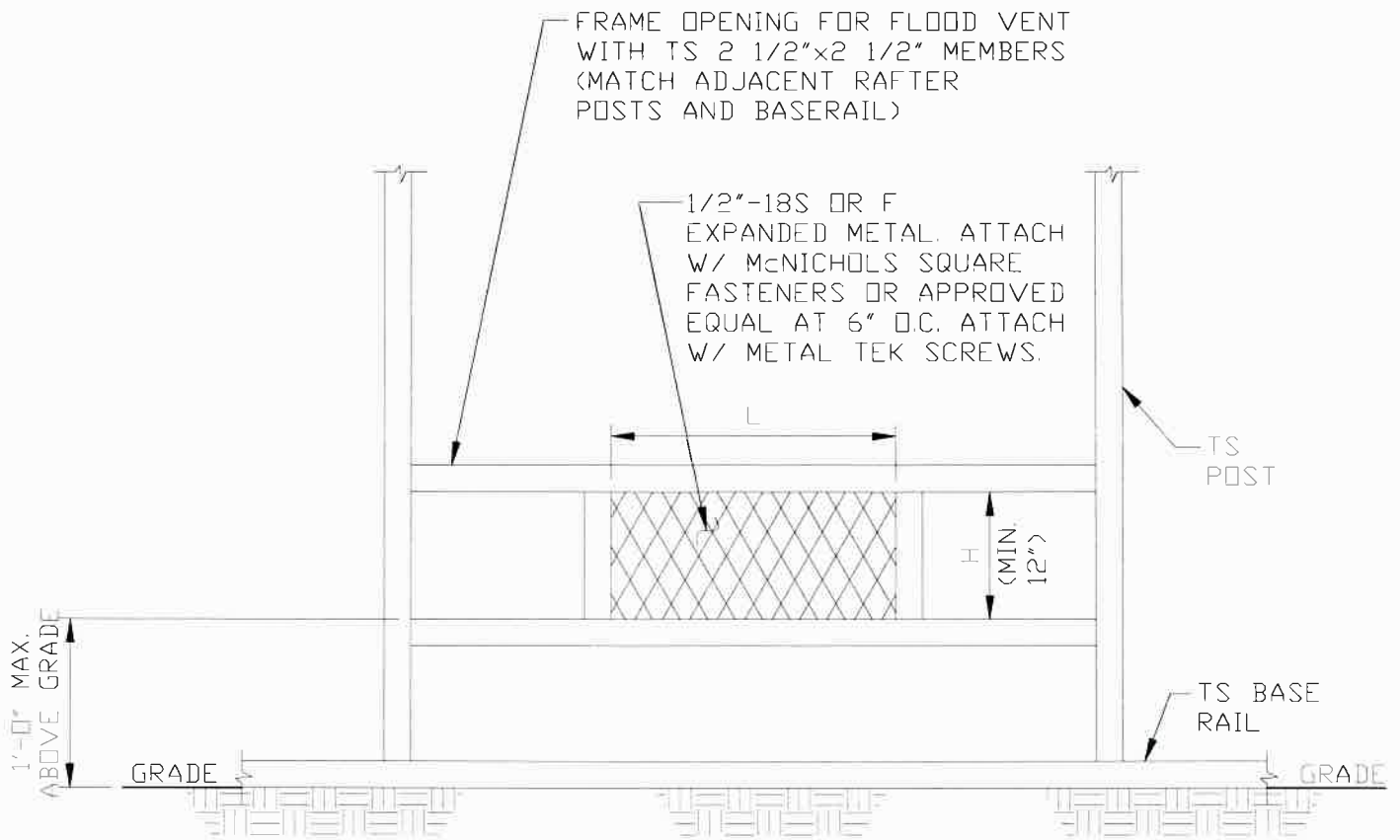
SCALE: NTS

DWG. NO: SK-2

JOB NO: 16154S/  
17300S/20352S

REV: 3

## FLOOD VENT DETAIL



### TYPICAL FLOOD VENT DETAIL

SCALE: NTS

- 1 MINIMUM VENT SPACE REQUIRED = 1 SQ. INCH OF OPEN VENT AREA PER SQ. FOOT OF BUILDING AREA
- 2 THERE SHALL BE A MINIMUM OF TWO OPENINGS ON DIFFERENT SIDES FOR EACH ENCLOSED BUILDING
- 3 APPLY 13 FACTOR WHEN CALCULATING TOTAL OPEN AREA WHEN USING 1/2"-18GA S OR F EXPANDED METAL
- 4 TOTAL OPEN AREA OF VENT =  $L \times H (\text{MIN } 12")$
- 5 FLOOD VENT DETAIL COMPLIES WITH FEMA/NFIP
- 6 PREFABRICATED FLOOD VENTS MEETING THE REQUIREMENTS OF FEMA/NFIP MAY BE USED



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**SHT. 18**

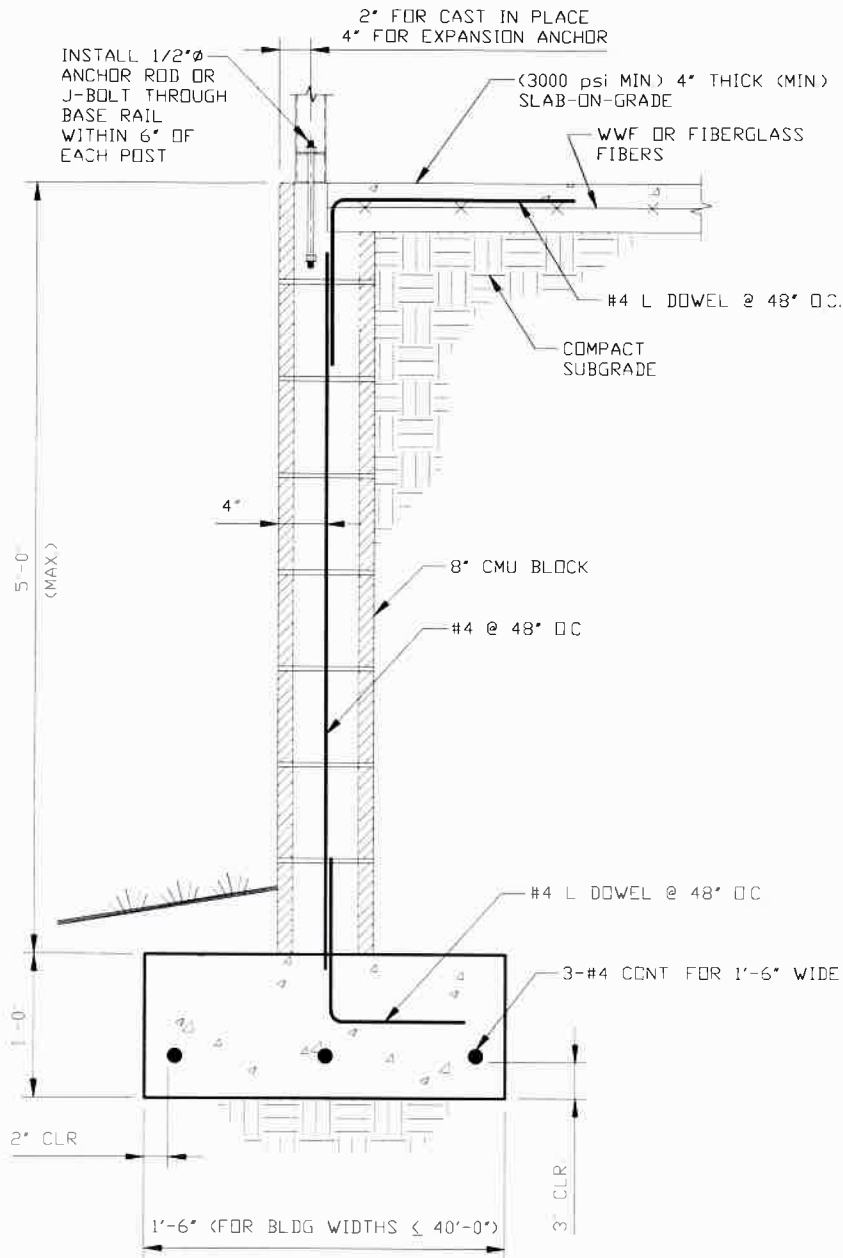
**SCALE: NTS**

**DWG. NO: SK-2**

**JOB NO: 16154S/  
17300S/20352S**

**REV: 3**

## STAND -ALONE STEM WALL DETAIL



**STAND-ALONE CONCRETE MASONRY UNIT (CMU)  
FOUNDATION STEM WALL DETAIL**

SCALE: NTS



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TUBULAR BUILDING SYSTEMS  
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SCALE: NTS

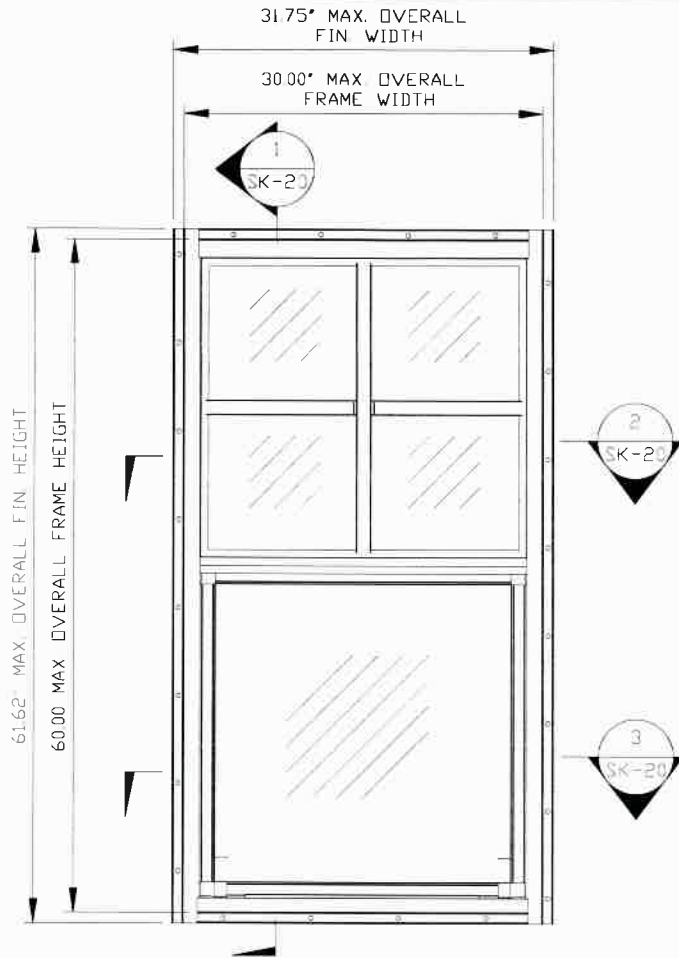
DWG. NO: SK-2

JOB NO: 16154S/  
17300S/20352S

SHT. 19

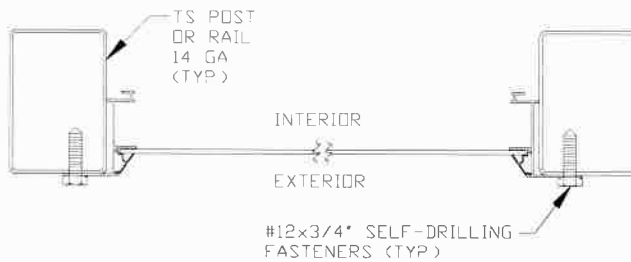
REV: 3

# VERTICAL SLIDING WINDOW DETAIL



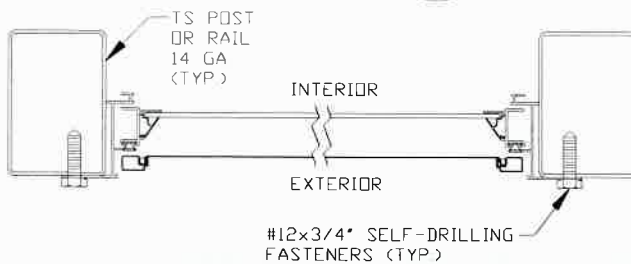
**ELEVATION VIEW**

SCALE: NTS



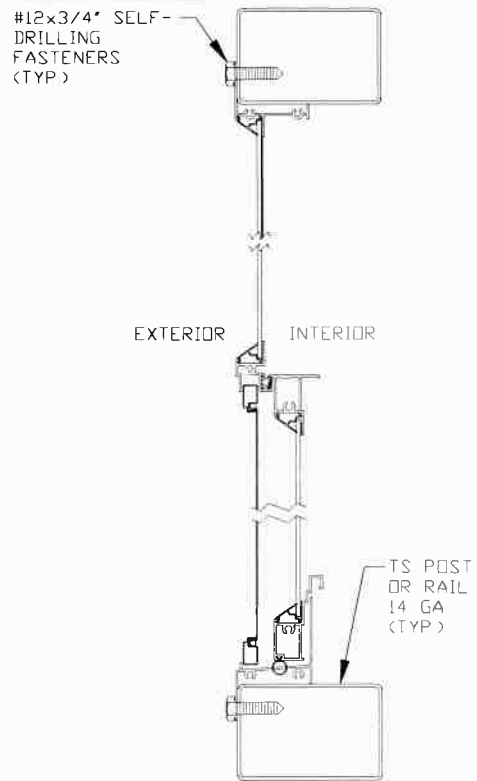
**SECTION 1**

SCALE: 3"=1'-0"



**SECTION 2**

SCALE: 3"=1'-0"



**SECTION 3**

SCALE: 3"=1'-0"



NOTE: KINRD SERIES 18000-R VS OR EQUIVALENT WINDOW IS REQUIRED

**POSITIVE WALL PRESSURE: +40.0 PSF**

**NEGATIVE WALL PRESSURE: -40.0 PSF**



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**PROJECT MGR: WSM**

**CLIENT: TBS**

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**DATE: 7-29-21**

**SHT. 20**

**SCALE: NTS**

**DWG. NO: SK-2**

**JOB NO: 16154S/  
17300S/20352S**

**REV: 3**

FOOTING AND BASE RAIL

30'-0" MAXIMUM

FOOTING AND BASE RAIL

6"

BASE RAIL LENGTH VARIES

1  
SK-21

1/2"Ø EXPANSION ANCHOR (TYP)

TS BASE RAIL (TYP)

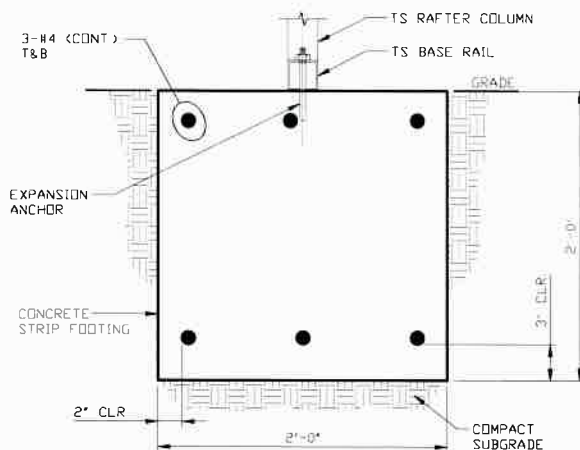
TS RAFTER COLUMN (TYP)

CONCRETE STRIP FOOTING

**CONCRETE STRIP FOOTING PLAN**

- CONCRETE STRIP FOOTING PLAN

SCALE NTS



SECTION 1  
SCALE: NTS (SK-21)

SCALE: NTS

\* COORDINATE WITH LOCAL CODES/ORD.



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REV. 3

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