

STRUCTURAL DESIGN

ENCLOSED BUILDING EXPOSURE B

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

18 December 2017 Revision 4 M&A Project No. 16022S/17300S

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



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ENGINEERING AND		CHECKED BY: PDH		E SEAL COVER	UILDING EXP. B SHEET
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INSTALLATION NOTES AND SPECIFICATIONS

- 1. DESIGN IS FOR A MAXIMUM 30"-0" WIDE x 20"-0" EAVE HEIGHT ENCLOSED STRUCTURES.
- 2. DESIGN WAS DONE IN ACCORDANCE WITH THE 2017 FLORIDA BUILDING CODE (FBC) 6TH EDITION, 2012 INTERNATIONAL BUILDING CODE (IBC), AND 2015 IBC.
- 3. DESIGN LOADS ARE AS FOLLOWS:
 A) DEAD LOAD = 1.5 PSF
 B) LIVE LOAD = 12 PSF
 C) GROUND SNOW LOAD = 10 PSF
- 4. LOW ULTIMATE WIND SPEED 105 TO 140 MPH (NOMINAL WIND SPEED B) TO 108 MPH): MAXIMUM RAFTER/POST AND END POST SPACING = 5.0 FEET.
- 5. HIGH ULTIMATE WIND SPEED 141 TO 170 MPH (NDMINAL 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
- B. SPECIFICATIONS APPLICABLE TO 29 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/2" x 2 1/2" x 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):
- 9. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR PURLINS, AND POSTS, INTERIOR = 9° OR 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 SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6° OF EACH RAFTER COLUMN ALONG SIDES
- 12. GROUND ANCHORS (SDIL NAILS) CONSIST OF #4 REBAR W/WELDED NUT x 30° LONG IN SUITABLE SDIL CONDITIONS MAY BE USED FOR LOW (≤ 108 MPH NDMINAL) WIND SPEEDS ONLY. OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SDILS AND MUST BE USE IN UNSUITABLE SDILS AS NOTED.
- 13. OPTIONAL BASE RAIL ANCHORAGE MAY BE USED FOR LOW AND MUST BE USED FOR HIGH WIND SPEEDS.
- 14. WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:

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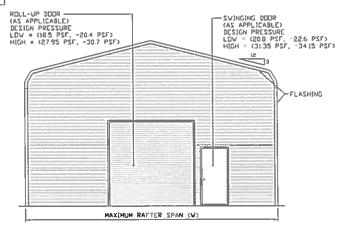
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CHECKED BY: PDH					
PROJECT HGR: WSH	DATE: 12-18-17	SCALE: NTS	JOB NO: 20067173005		
CLIENT: TRS	SHT. 3	DAC' NO 2X-3	REV. 4		

BOX EAVE FRAME RAFTER ENCLOSED BUILDING RDLL-UP DDDR (AS APPLICABLE) DESIGN PRESSURE LDV = (183 SPF, -204 PSF) HIGH = (27.95 PSF, -30.7 PSF) AS APPLICABLE) DESIGN PRESSURE LDV = (288 PSF, -22.6 PSF) HIGH = (3135 PSF, -34.15 PSF) FLASHING

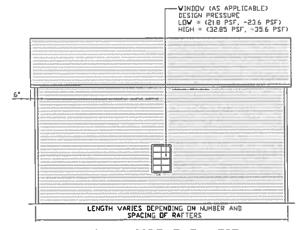
TYPICAL END ELEVATION-HORIZONTAL ROOF

2CMFF: N12

BOW FRAME RAFTER ENCLOSED BUILDING



TYPICAL END ELEVATION SCALE NTS



TYPICAL SIDE ELEVATION SCALE: NTS

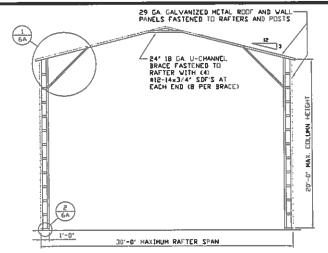
		LOW = (218 P HIGH = (32.85	SF, -236 PSF PSF, -356 P
	-	100	

TYPICAL SIDE ELEVATION-HORIZONTAL ROOF
SCALE NTS

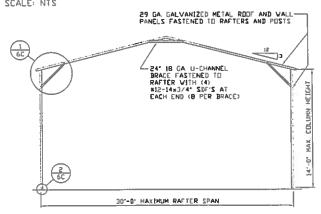
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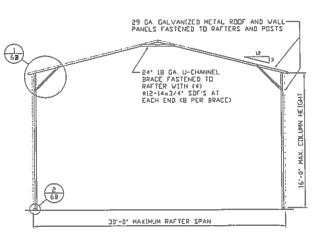
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CLIENT: TBS	SHT. 4	DAC NO 2K-3	REV= 4		



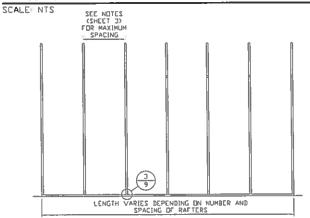
TYPICAL RAFTER/COLUMN END FRAME SECTION



TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE NTS



TYPICAL RAFTER/CDLUMN END FRAME SECTION

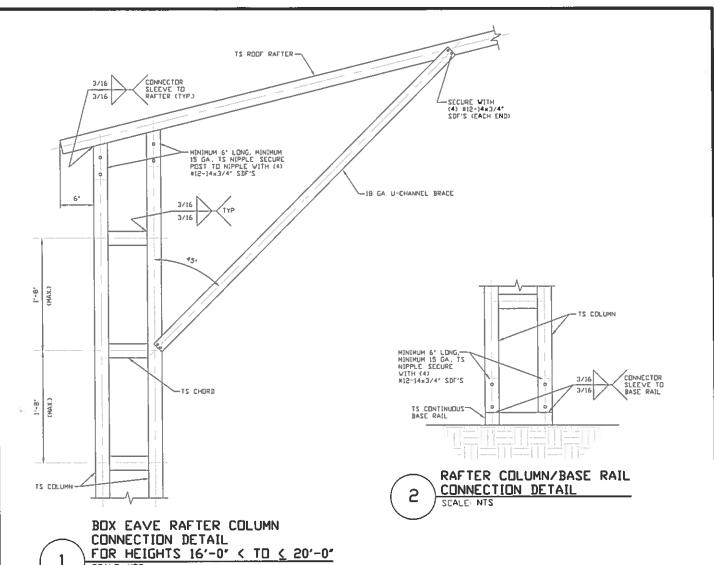


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION SCALE NTS

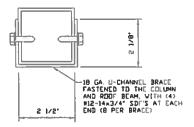
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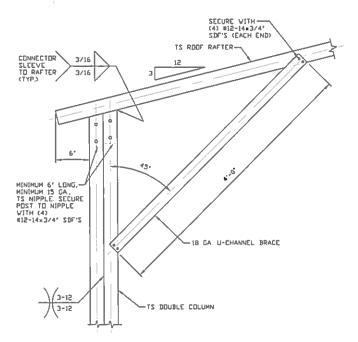


1 SCALE NTS

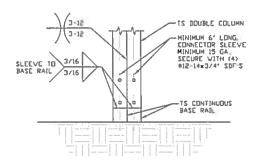


BRACE SECTION

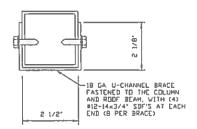
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BDX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS 14'-0' < TO < 16'-0'
SCALE: NTS



2 RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL
SCALE NTS

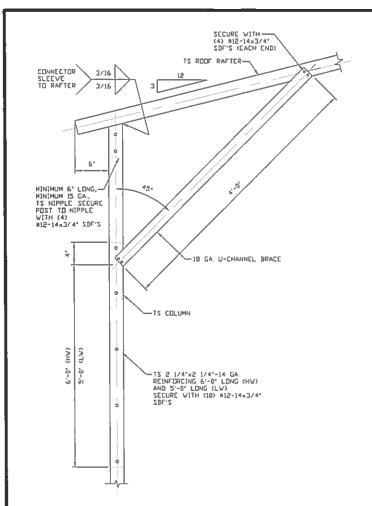


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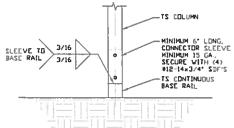
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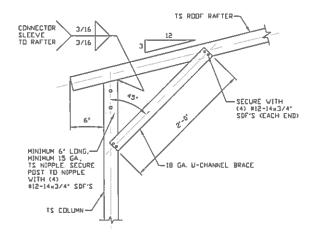
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	CLIENT: TBS	SHT. 68	DWG. ND: SK-3	REV. 4		

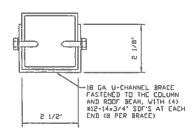


BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10'-0" < T□ ≤ 14'-0" **1A** SCALE: NTS





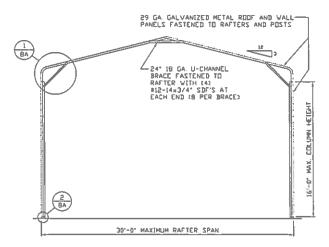
BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS < 10'-0" 1B SCALE: NTS



BRACE SECTION
SCALE NTS

(2)	RAFTER COLUMN/BASE CONNECTION DETAIL	RAIL
(- /	SCALE: NTS	

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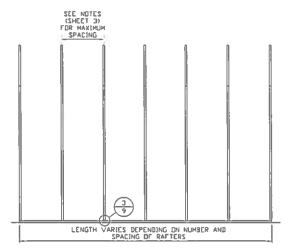
TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE: NTS

29 GA. GALVANIZED METAL RODF AND VALL
PANELS FASTENED TO RAFTERS AND POSTS

18
24' 18 GA. U-CHANNEL
BRACE FASTENED TO
RAFTER VITH (4)
112-14-374' SDT'S AT
EACH END (8 PER BRACE)

20'-D' MAXIMUM RAFTER SPAN

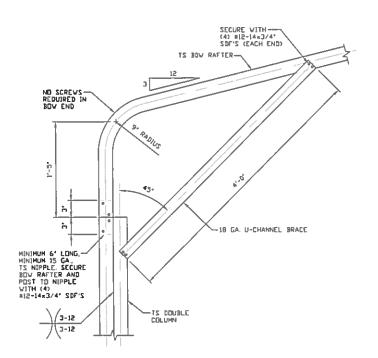
TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS

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3-12

3-12

3-12

TS DDUBLE COLUMN

MINIMUM 6' LDNG,
CDMRECTOR SLEEVE
MINIMUM 15 GA,
SECURE VITH (4)
BASE RAIL

3/16

0

0

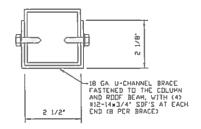
TS CONTINUOUS
BASE RAIL

BOX EAVE RAFTER COLUMN
CONNECTION DETAIL

FOR HEIGHTS 14'-0" < TO < 16'-0"

SCALE: NTS

2 RAFTER COLUMN/BASE RAIL CONNECTION DETAIL

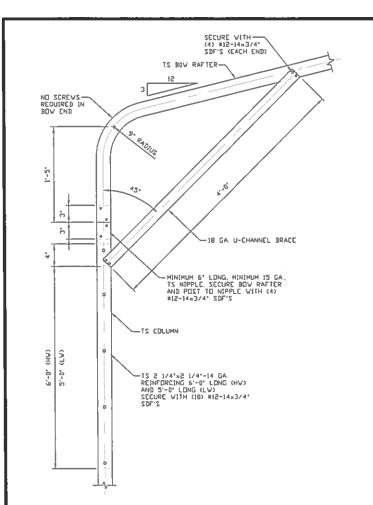


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ND SCREVS
REQUIRED IN
BDV END

12

SECURE VITH
(4) NI2-14x3/4*
SDF'S (EACH END)

13

145.

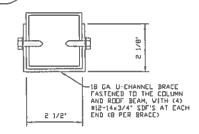
15 GA. U-CHANNEL BRACE

NINIMUM 6' LDNG,
MINIMUM 15 GA.
TS NIPPLE SECURE
BDV RAFTER AND
PDST TO NIPPLE
VITH (4)
RI2-14x3/4* SDF'S

PDV FAVE PASTED COLLIMN

BOX EAVE RAFTER COLUMN CONNECTION DETAIL | FOR HEIGHTS \(\) 10'-0'

1B) FUR HEI



BRACE SECTION SCALE NTS

BOX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS 10'-0" < TO < 14'-0"

SLEEVE TO 3/16 O CONNECTOR SLEEVE HINIMUM 13 CA.
SECURE VITH (4)
BASE RAIL 3/16 O SECURE VITH (4)
BIZ-14x3/4" SDF'S
15 CONTINUOUS
BASE RAIL

RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL
SCALE NTS

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BASE RAIL ANCHORAGE OPTIONS FOR LOW AND HIGH WIND SPEED

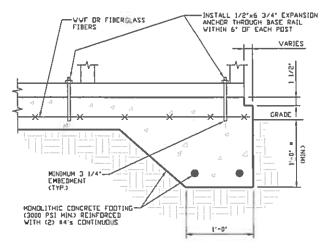
2" WASHERS

TS CONTINUOUS BASE RAIL

HELIX EYE ANCHOR-

佴

TOP OF ASPHALT-PAVEMENT OR GROUND SURFACE





CONCRETE MONDLITHIC SLAB BASE RAIL ANCHORAGE

SCALE! NTS (MINIMUM ANCHOR EDGE DISTANCE IS 4")

" COORDINATE WITH LOCAL CODES/ORD

3B

GROUND BASE HELIX ANCHORAGE (CAN BE USED FOR ASPHALT)

DRILL 5/8" DIAMETER HOLE THROUGH THE BASE RAIL AND SECURE TO ANCHOR EYE WITH 1/2" DIAMETER THROUGH BOLT

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:

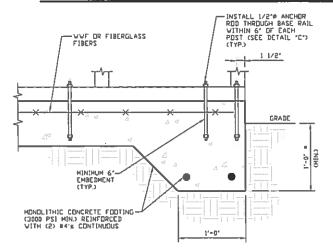
- 1. FOR VERY DENSE AND/OR CEMENTED SANDS, CDARSE GRAVEL AND COBBLES, CALICHE, PRELOADED SILTS AND CLAYS USE MINIMUM (2) 4° HELICES WITH MINIMUM 3D INCH EMBEDMENT.
- 2 FOR CORAL USE MINIMUM (2) 4' HELICES WITH MINIMUM 30 INCH EMBEDMENT:
- 3 FOR MEDIUM DENSE COARSE SANDS, SANDY GRAVELS, VERY STIFF SILTS, AND CLAYS USE MINIMUM (2) 4" HELICES WITH MINIMUM 30 INCH EMBEDMENT.
- 4 FOR LOUSE 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 LOSE TO MEDIUM DENSE SANDS, FIRM TO STIFFER CLAYS AND SILTS, ALLUVIAL FILL USE MINIMUM (2) B' HELICES WITH MINIMUM 60 INCH EMBEDMENT.

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OPTIONAL FOUNDATION ANCHORAGE FOR LOW & HIGH WIND SPEED





CONCRETE MONDLITHIC SLAB BASE RAIL ANCHORAGE

(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:

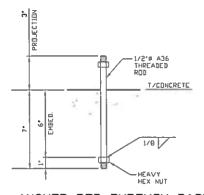
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 2 THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS
 3 REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT



1C

ANCHOR ROD THROUGH BASE RAIL DETAIL SCALE: NTS

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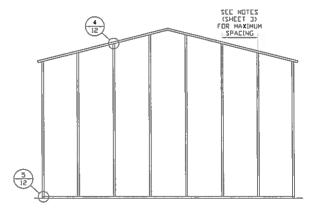
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INSTALL 1/2'# ANCHOR-RDD THROUGH BASE RAIL WITHIN 6' DF EACH POST (SEE BETAIL 'C') (TYP.) FIBERGLASS FIBERS GRADE CHI EMBEDMENT MBNDLITHIC CONCRETE FOOTING (3000 PSI MIN.) REINFORCED WITH (2) #4°s CONTINUOUS 1'-0"

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE 1B SCALE: NTS

(MINIMUM ANCHUR EDGE DISTANCE IS 1 1/2°) = COURDINATE WITH LOCAL CODES/ORD

BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

DPENING FOR ROLL-UP DOOR VITH HEADER

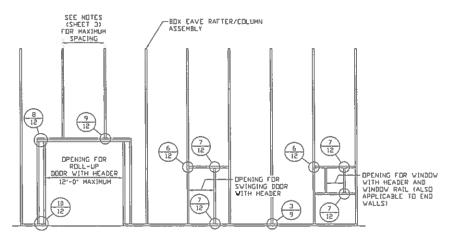
TYPICAL ROY FAVE PAFTER FND

SEE NOTES (SHEET 3) FOR MAXIMUM SPACING

TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS

12



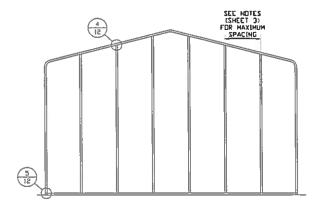
TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

SCALE: NTS

SCALE: NTS

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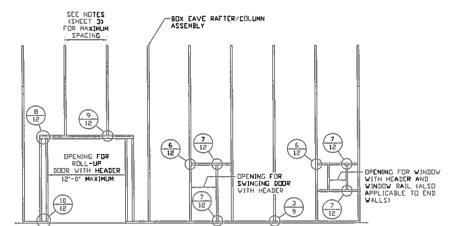
BOW RAFTER END WALL AND SIDE WALL OPENINGS



TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

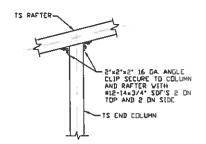
SCALE NTS

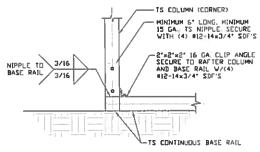
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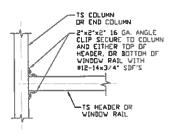
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PROJECT HGR: VSH	DATE: 12-18-17		JOB NO: 160225/173005	
CLIENT: TBS	SHT. II	DWG_NO: SK-3	REV= 4	

BOW AND BOX EAVE RAFTER WALL OPENING DETAILS



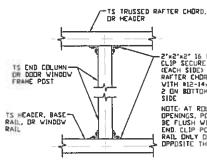




END COLUMN/RAFTER CONNECTION DETAIL 4 SCALE: NTS

END COLUMN/BASE RAIL CONNECTION DETAIL 5 SCALE NTS

HEADER OR WINDOW RAIL TO COLUMN CONNECTION DETAIL 6 SCALE: NTS



-2'x2'x2' 16 GA. ANGLE CLIP SECURE TO COLUMN (EACH SIDE) AND RAFTER CHORD/RAIL VITH 812-14x3/4' SDF'S 2 IN BUTTOM AND 2 DN SIDE

NOTE: AT ROLL-UP DOOR OPENINGS, POST SHOULD BE FLUSH WITH RAIL END. CLIP POST TO RAIL ONLY ON SIDE, OPPOSITE THE OPENING.

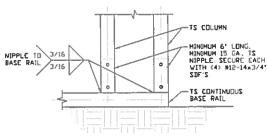
3/16 NIPPLE TO 3-12 3/16 3-12 0 HINIMUM 6' LDNG, HINIMUM 15 GA., TS NIPPLE SECURE EACH VITH (4) #12-14x3/4' SDFS TS COLUMN

-TS COLUMN NIPPLE TO 3/16 -MINIMUM 6' LÜNG, MINIMUM 15 GA. TS NIPPLE. SECURE VITH (4) #12-14x3/4' SDF'S TS DOUBLE HEADER 3-12

COLUMN TO HEADER, BASE RAIL, OR WINDOW RAIL CONNECTION DETAIL SCALE: NTS

DOUBLE HEADER/COLUMN CONNECTION DETAIL 8 SCALE: NTS

COLUMN/DOUBLE HEADER CONNECTION DETAIL 9

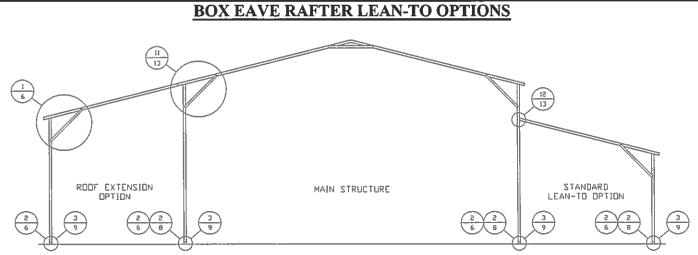


COLUMN/BASE RAIL CONNECTION DETAIL 10

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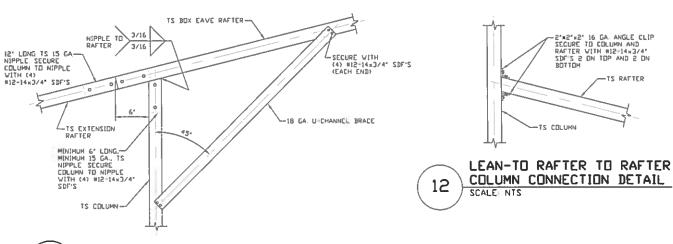
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TYPICAL BOX EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN)

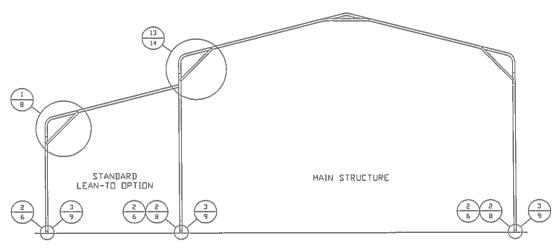
SCALE: NTS MAXIMUM WIDTH OF SINGLE MEMBER RAFTER LEAN-TO IS 16'-0"



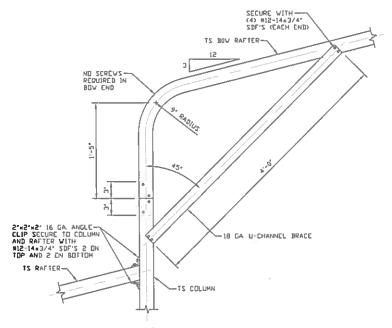
11A SIDE EXTENSION RAFTER/COLUMN DETAIL

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BOW RAFTER LEAN-TO OPTIONS



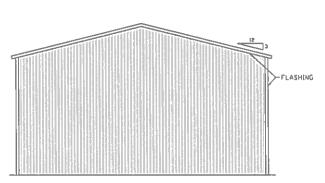
TYPICAL BOW RAFTER LEAN-TO OPTIONS FRAMING SECTION (BOTH OPTIONS SHOWN) SCALE: NTS MAXIMUM WIDTH OF SINGLE MEMBER RAFTER LEAN-TO IS 16'-0'.



(12)	SIDE	EXTENSION	RAFTER/COLUMN	DETAIL
13/	SCALE	NTS		

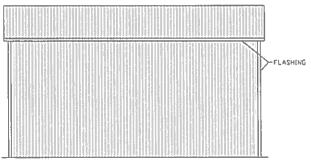
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BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



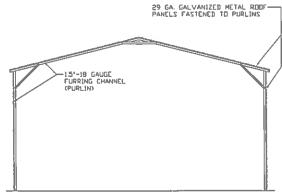
TYPICAL END ELEVATION VERTICAL ROOF/SIDING OPTION

SCALE: NTS



TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING OPTION

SCALE! NTS



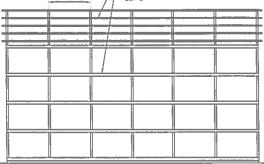
TYPICAL SECTION VERTICAL ROOF/SIDING OPTION

SCALE: NTS

SEE NOTES
(SHEET 3)
FOR MAXIMUM
SPACING

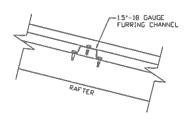
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TYPICAL FRAMING SECTION VERTICAL ROOF/SIDING OPTION

SCALE NTS



ROOF PANEL ATTACHMENT

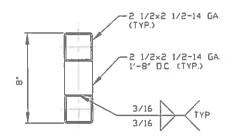
(ALTERNATE FOR VERTICAL ROOF PANELS) SCALE NTS

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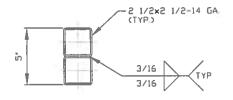
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PROJECT HGR: VSH	DATE: 12-18-17	SCALE: NTS	JOB NO: 160225/173005		
CLIENT: TBS	SHT. 15	DWG. NO: SK-3	REVa 4		

OPTIONAL DOOR HEADER



HEADER DETAIL FOR DOOR OPENINGS 12'-0" < LENGTH ≤ 15'-0"

SCALE NTS



HEADER DETAIL FOR DOOR OPENINGS LENGTH < 12'-0'

SCALE NTS

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