

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:

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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 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 (UNLESS OTHERWISE NOTED).
- 9. AVERAGE FASTENER SPACING DN-CENTERS ALONG RAFTERS OR PURLINS, AND POSTS, INTERIOR = 9' DR 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 NOMINAL) WIND SPEEDS DNLY. □PTIONAL 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

SDIL SITE CLASS = D RISK CATEGORY I/II/III

R= 3.25

I_E= 10

S_{DS}= 1.522

V= CsW

Sp1= 0.839

ORIDA TILDE

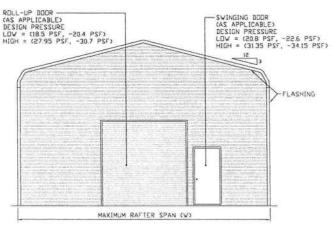
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BOX EAVE FRAME RAFTER ENCLOSED BUILDING ROLL-UP DODR (AS APPLICABLE) DESIGN PRESSURE LDV = (185 PSF, -20.4 PSF) HIGH = (27.95 PSF, -30.7 PSF) BESTIGN PRESSURE LDV = (28.08 PSF, -22.6 PSF) HIGH = (31.35 PSF, -34.15 PSF)

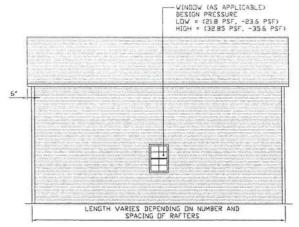
TYPICAL END ELEVATION-HORIZONTAL ROOF

SCALE: NTS

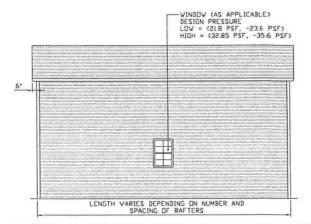
BOW FRAME RAFTER ENCLOSED BUILDING



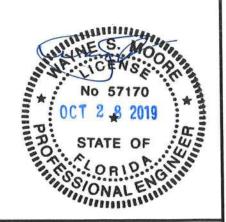
TYPICAL END ELEVATION



TYPICAL SIDE ELEVATION



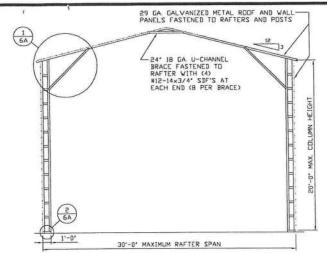
TYPICAL SIDE ELEVATION-HORIZONTAL ROOF



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TYPICAL RAFTER/COLUMN END FRAME SECTION

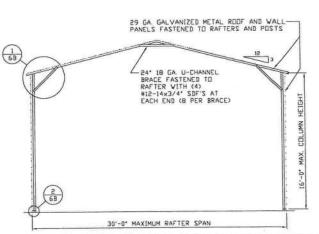
SCALE: NTS

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

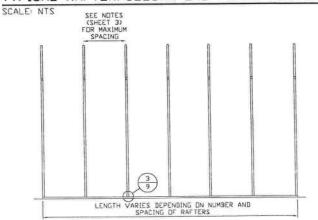
24' 18 GA. U-CHANNEL
BRACE FASTENED TO
RAFTER WITH (4)
HI2-14-3/4' SDF'S AT
EACH END (8 PER BRACE)

30'-0' MAXIMUM RAFTER SPAN

TYPICAL RAFTER/COLUMN END FRAME SECTION



TYPICAL RAFTER/COLUMN END FRAME SECTION



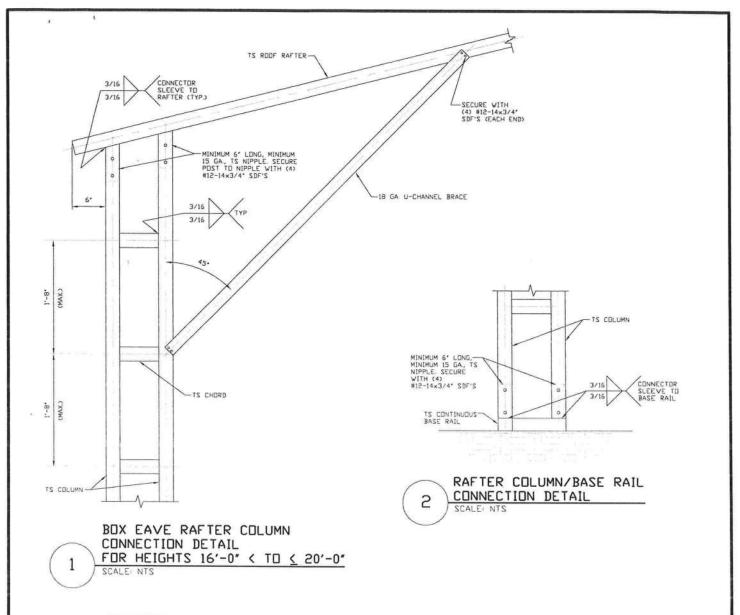
TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION SCALE: NTS

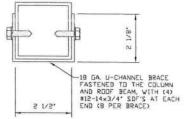


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CLIENT: TBS	SHT. 5	DWG. NO: SK-3	REV: 4

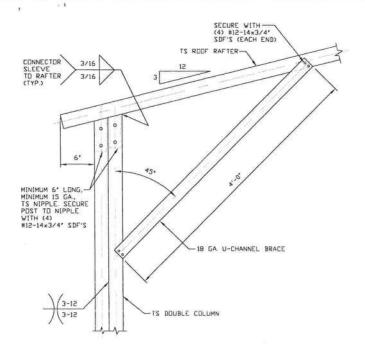




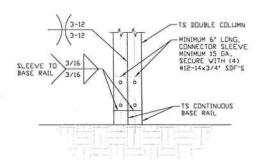
BRACE SECTION



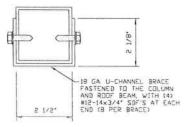
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BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 14'-0" < TO < 16'-0" SCALE: NTS



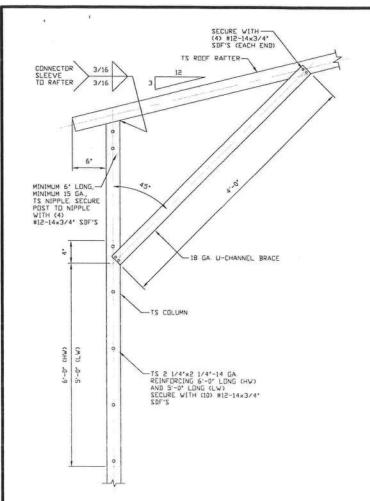
2 RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL
SCALE: NTS



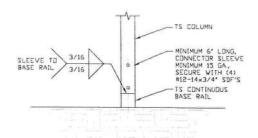
BRACE SECTION
SCALE: NTS



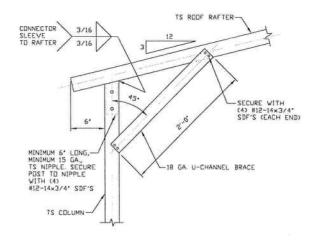
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BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10'-0" < TO < 14'-0"



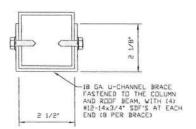
2 RAFTER COLUMN/BASE RAIL
CONNECTION DETAIL
SCALE: NTS



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

SCALE: NTS

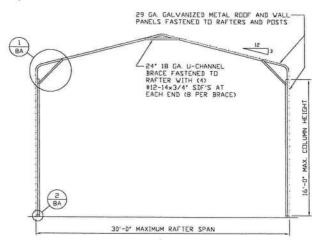
1B



BRACE SECTION SCALE: NTS



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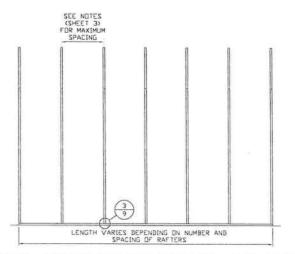
TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS

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

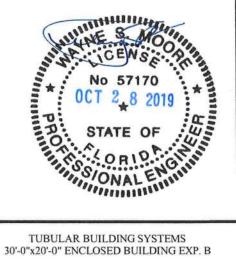
12
324' 18 GA. U-CHANNEL
BRACE FASTENED TO
RAFTER VITH (4)
H12-14x3/4' SDF'S AT
EACH END (8 PER BRACE)

24' 18 GA. U-CHANNEL
BRACE FASTENED TO
RAFTER VITH (4)
H12-14x3/4' SDF'S AT
EACH END (8 PER BRACE)

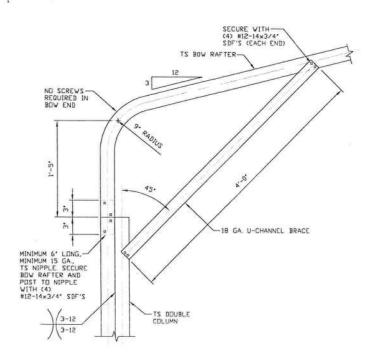
TYPICAL RAFTER/COLUMN END FRAME SECTION



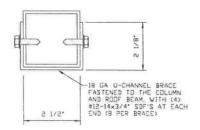
TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION



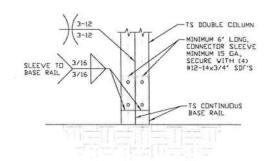
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BOX EAVE RAFTER COLUMN
CONNECTION DETAIL
FOR HEIGHTS 14'-0" < TO < 16'-0"
SCALE: NTS



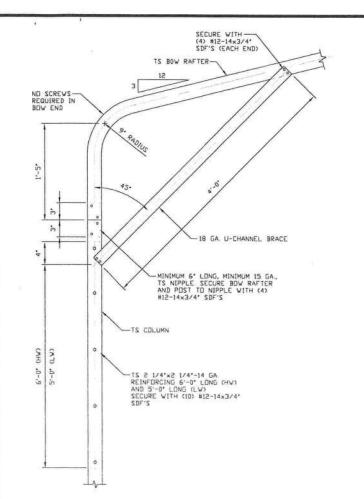
BRACE SECTION



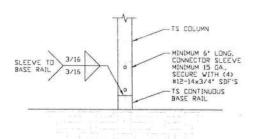
2 RAFTER COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



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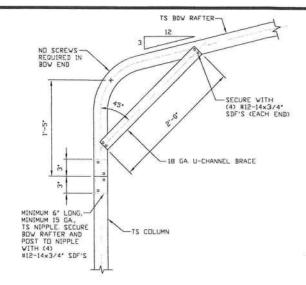


BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10'-0" < TO < 14'-0"

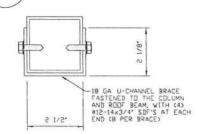


RAFTER COLUMN/BASE RAIL CONNECTION DETAIL

SCALE: NTS



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



BRACE SECTION

1B

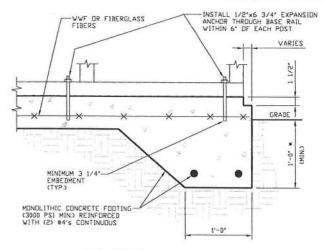


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BASE RAIL ANCHORAGE OPTIONS FOR LOW AND HIGH WIND SPEED



2' WASHERS DRILL 5/8' DIAMETER HOLE THROUGH THE BASE RAIL AND SECURE TO ANCHOR EYE WITH 1/2' DIAMETER THROUGH BOLT TOP OF ASPHALT-PAVEMENT OR GROUND SURFACE TS CONTINUOUS BASE RAIL HELIX EYE ANCHOR-

3A

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

(MINIMUM ANCHOR EDGE DISTANCE IS 4') * COORDINATE WITH LOCAL CODES/ORD.

GROUND BASE HELIX ANCHORAGE **3B** (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-31B:
3 INCHES IN FOUNDATIONS WHERE THE CONCRETE IS CAST AGAINST AND PERMANENTLY IN CONTACT WITH THE EARTH DR 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

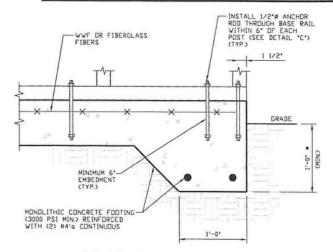
HELIX ANCHOR NOTES:

- 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. FDR CDRAL 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 LODSE 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) 8' HELICES WITH MINIMUM 60 INCH EMBEDMENT.



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OPTIONAL FOUNDATION ANCHORAGE FOR LOW & HIGH WIND SPEED





CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

(MINIMUM ANCHOR EDGE DISTANCE IS 1 1/2") ■ COURDINATE WITH LOCAL CODES/ORD.

INSTALL 1/2'# ANCHOR— RDD THROUGH BASE RAIL WITHIN 6' DF EACH PDST (SEE DETAIL 'C') (TYP.) VVF DR FIBERGLASS FIBERS GRADE (MIN.) 1.-0. MINIMUM 6 EMBEDMENT (TYP.) MDNOLITHIC CONCRETE FOOTING (3000 PSI MIN.) REINFORCED VITH (2) #4's CONTINUOUS 1'-0"

1B

CONCRETE MONOLITHIC 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 DF 3,000 PSI AT 28 DAYS.

COVER OVER REINFORCING STEEL:

FOR FOUNDATIONS, MINIMUM CONCRETE COVER OVER REINFORCING BARS SHALL BE PER ACI-31B 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.

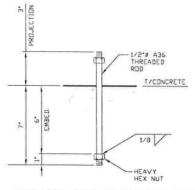
REINFORCING STEEL:

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.

REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT.



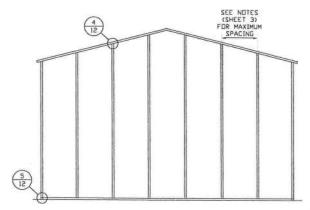
1C

ANCHOR ROD THROUGH BASE RAIL DETAIL



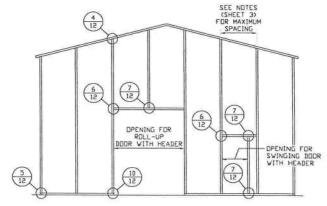
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



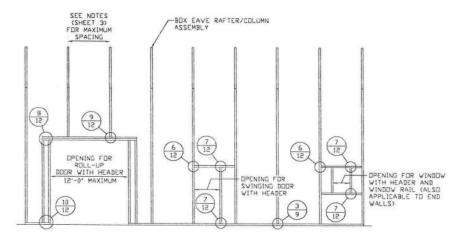
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS

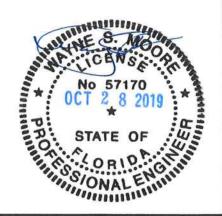


TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS

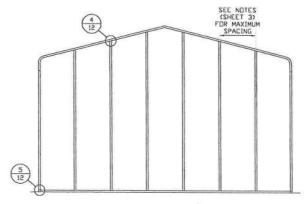


TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION



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BOW RAFTER END WALL AND SIDE WALL OPENINGS



TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

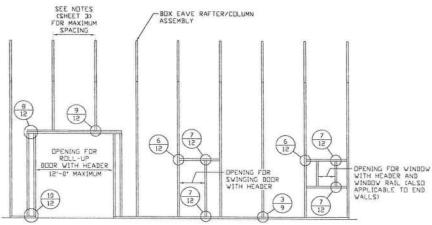
TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS

SCALE: NTS

SEE NOTES (SHEET 3)

BOX EAVE RAFTER/

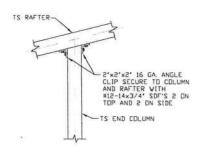


TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION



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BOW AND BOX EAVE RAFTER WALL OPENING DETAILS



TS COLUMN (CORNER) MINIMUM 6' LDNG, MINIMUM 15 GA., TS NIPPLE SECURE WITH (4) #12-14x3/4' SDF'S -2'x2'x2' 16 GA. CLIP ANGLE SECURE TO RAFTER COLUMN AND BASE RAIL W/(4) #12-14x3/4' SDF'S NIPPLE TO BASE RAIL 3/16 3/16 TS CONTINUOUS BASE RAIL

TS COLUMN OR END COLUMN 2"x2"x2" 16 GA. ANGLE
CLIP SECURE TO COLUMN
AND EITHER TOP OF
HEADER, OR BOTTOM OF
WINDOW RAIL WITH
#12-14x3/4" SDF'S TS HEADER DR WINDDW RAIL

END COLUMN/RAFTER CONNECTION DETAIL

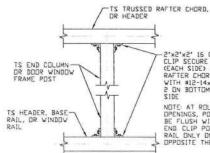
END COLUMN/BASE RAIL CONNECTION DETAIL 5

HEADER OR WINDOW RAIL TO COLUMN CONNECTION DETAIL

SCALE: NTS

SCALE: NTS

6 SCALE: NTS



-2'x2'x2' IS GA. ANGLE CLIP SECURE TO COLUMN (EACH SIDE) AND RAFTER CHORD/RAIL VITH #12-14x3/4' SDF'S 2 DN BOTTOM AND 2 DN SIDE

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

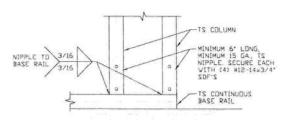
3-12 3/16 NIPPLE TO HEADER 3/16 //3-12 MINIMUM 6' LDNG, MINIMUM 15 GA., TS NIPPLE SECURE EACH WITH (4) #12-14x3/4' SDF'S TS COLUMN

TS COLUMN 3/16 NIPPLE TO HEADER MINIMUM 6' LONG, MINIMUM 15 GA., TS NIPPLE SECURE WITH (4) #12-14x3/4' SDF'S 3/16 3-15 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 SCALE: NTS



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ENGINEERING AND CONSULTING, INC.

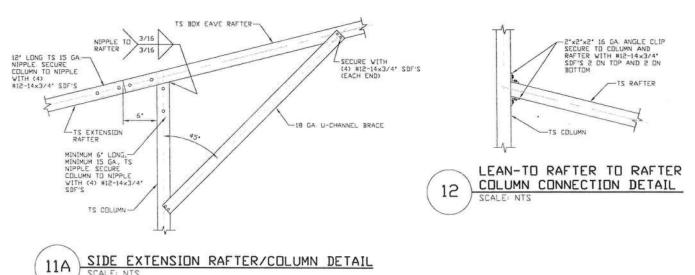
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BOX EAVE RAFTER LEAN-TO OPTIONS ROUF EXTENSION DPTION MAIN STRUCTURE STANDARD LEAN-TO DPTION 2 2 2 2 6 8 9 6 8 9 6 8 9 9 6 8 9 9

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

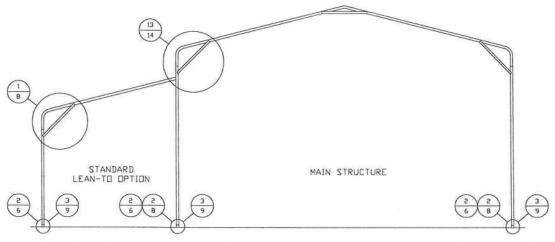
SCALE: NTS MAXIMUM WIDTH OF SINGLE MEMBER RAFTER LEAN-TO IS 16'-0'.





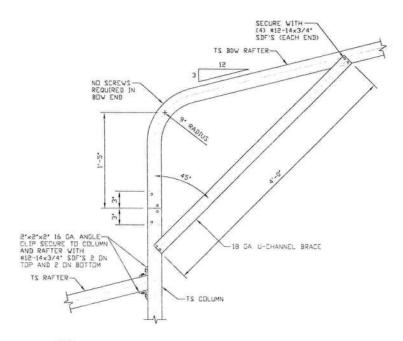
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BOW RAFTER LEAN-TO OPTIONS



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

SCALE: NTS MAXIMUM WIDTH DF SINGLE MEMBER RAFTER LEAN-TD IS 16'-0'.

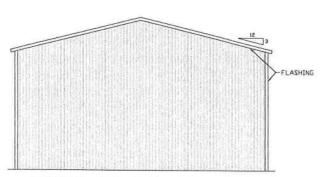


13 SIDE EXTENSION RAFTER/COLUMN DETAIL

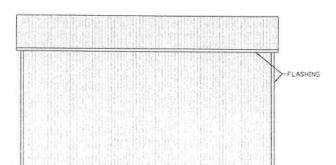


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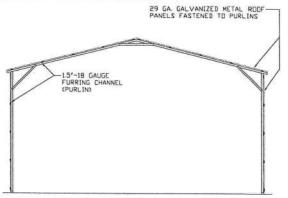
BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



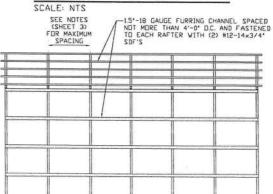
TYPICAL END ELEVATION VERTICAL ROOF/SIDING OPTION



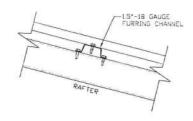
TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING OPTION



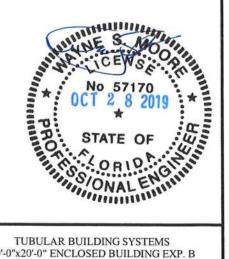
TYPICAL SECTION VERTICAL ROOF/SIDING OPTION



TYPICAL FRAMING SECTION VERTICAL ROOF/SIDING OPTION

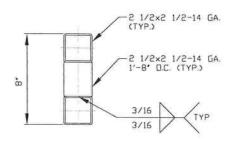


ROOF PANEL ATTACHMENT
(ALTERNATE FOR VERTICAL ROOF PANELS)
SCALE: NTS



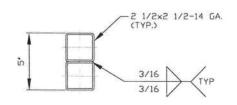
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OPTIONAL DOOR HEADER



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

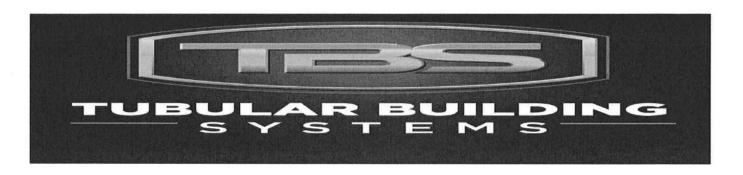
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HEADER DETAIL FOR DOOR OPENINGS LENGTH < 12'-0"



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Florida Product Approval Codes

Roll-Up Doors:

Janus International Corporation Model 750: 21450.8

EXP 12/31/2020

Walk-In Door:

Elixir Door & Metal Company blank (no window): 17996.5

EXP 9/14/2020

Window:

Kinro 993.7

EXP 10/19/21

Roof Deck:

Capital Metal Supply Inc. Ag Panel: 20147.1

EXP 07/20/2020

Wall Panel:

Capital Metal Supply Inc. Ag Panel: 20148.1

EXP 07/20/2020

If you have any questions on concern, please contact Donald Little at 386-961-0006 or at tubularbuildingsystems@gmail.com.

