

## STRUCTURAL DESIGN

## **ENCLOSED BUILDING**

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

26 June 2017 Revision 0 M&A Project No. 17118S

Prepared for:

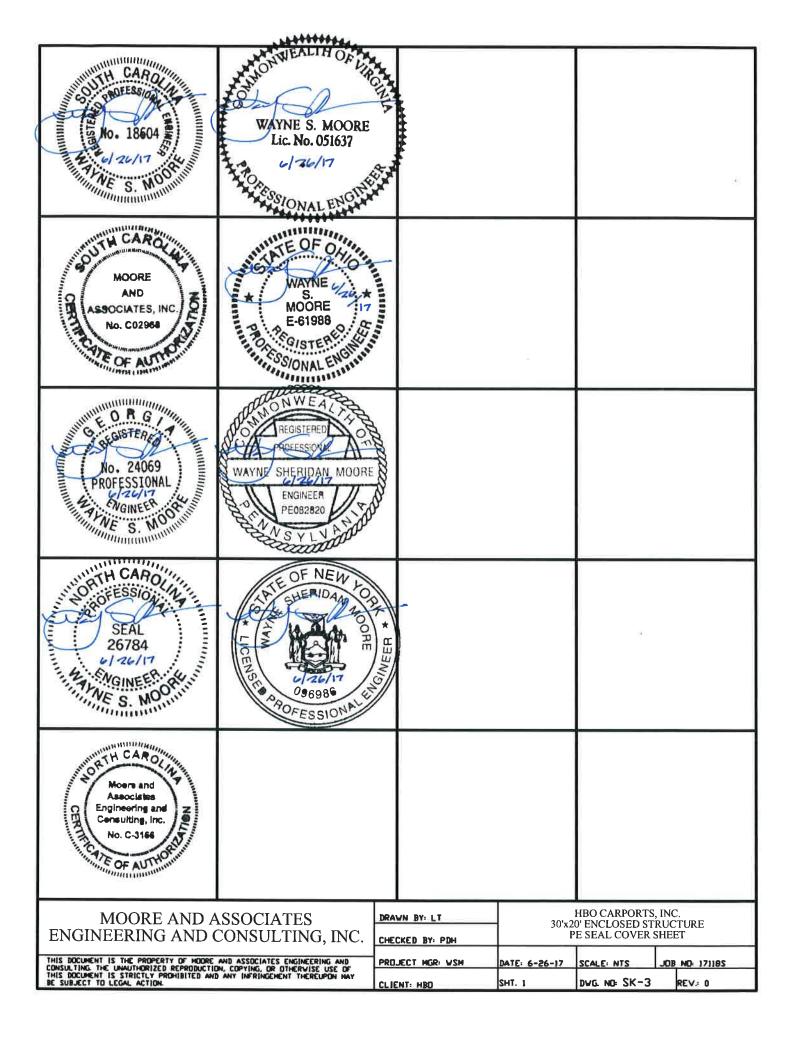
HBO Carports, Inc. 998 W Pine St. Mount Airy, North Carolina 27030

#### Prepared by:

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

> 401 S. Main Street, Suite 200 Mt. Airy, NC 27030



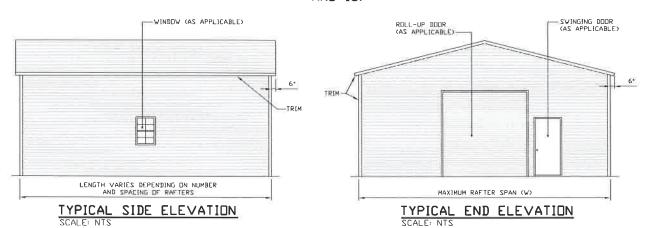


# DRAWING INDEX

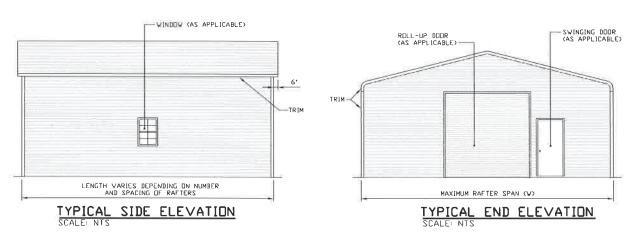
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MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: LT	HBO CARPORTS, INC. 998 W PINE ST. MOUNT AIRY, NC 27030 30'×20' ENCLOSED STRUCTURE				
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## BOX EAVE FRAME RAFTER STRUCTURE (Sheets 4, 4A, 4B, 4C, 5, 5A, 5B, 5C, 8, 9, 11, 12, 13 AND 15)



BOW FRAME RAFTER STRUCTURE (Sheets 6, 6A, 7, 7A, 8, 10, 11, 12 AND 14)



#### INSTALLATION NOTES AND SPECIFICATIONS

- 1: DESIGN IS FOR MAXIMUM 30' WIDE x 20' EAVE HEIGHT ENCLOSED STRUCTURES.
- 2. DESIGN WAS DONE IN ACCORDANCE WITH THE 2012 NORTH CAROLINA BUILDING CODE, 2006 INTERNATIONAL BUILDING CODE (IBC), 2009 IBC 2012 IBC AND 2015 IBC
- 3 DESIGN LOADS ARE AS FOLLOWS:
  - A) DEAD LOAD = 1.5 PSF
  - B) LIVE LOAD = 12 PSF (20 PSF FOR RISK CATUIL)
  - = 30 PSF (< 24'), 70 PSF (24' < W < 30') C) GROUND SNOW LOAD
- 4 LOW ULTIMATE WIND SPEED (LW) 105 (115 MPH (RC II) TO 145 (155 MPH (RC II)) (NOMINAL WIND SPEED BI (89) TO 108 (120) MPH): MAXIMUM RAFTER/POST AND END POST SPACING = 4.0 FEET (5.0 FEET FOR WIND SPEED 105 MPH < TO ≤ 145 MPH RC I ONLY).
- 5. HAZARD RISK CATEGORY I AND II.
- 6. WIND EXPOSURE CATEGORY B OR C
- 7 SPECIFICATIONS APPLICABLE TO 29 GAUGE (FOR SL < 60 PSF) AND 26 GAUGE (FOR SL > 60 PSF) METAL PANELS FASTENED DIRECTLY TO 2 1/2' × 2 1/2' 14 GAUGE TUBE STEEL (TS) FOR RISK CAT I AND 2 1/4' × 2 1/4' 12 GAUGE (TS) FOR RISK CAT II FRAMING MEMBERS (UNLESS NOTED DTHERWISE).
- 8 AVERAGE FASTENER SPACING DN-CENTERS ALONG RAFTERS OR HAT CHANNELS, AND COLUMNS (INTERIOR OR END) = 8' D.C. (MAX.).
- FASTENERS CONSIST OF #12-14x3/4' SELF-DRILLING FASTENER (SDF), USE CONTROL SEAL WASHER WITH EXTERIOR FASTENERS.

  SPECIFICATIONS APPLICABLE DNLY 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.
- 10. ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6' OF EACH RAFTER COLUMN ALONG SIDES.
- 11 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, NOT ALLOWED FOR HIGH WIND APPLICATION.
- 12. WIND FORCES GOVERN OVER SEISMIC FORCES, SEISMIC PARAMETERS ANALYZED ARE:

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

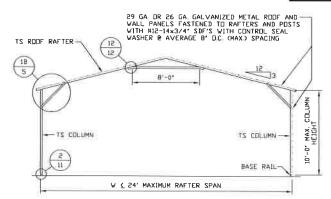
R= 3,25

 $I_E = 1.0$ V= CsW

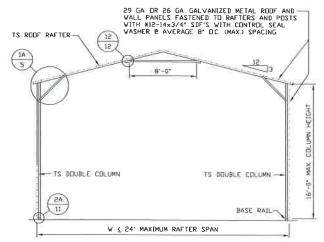
S<sub>DS</sub>= 1522

 $S_{D1} = 0.839$ 

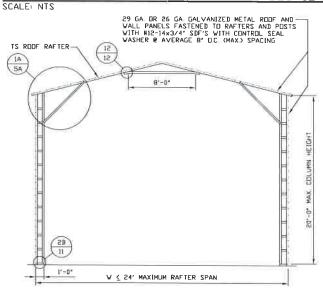
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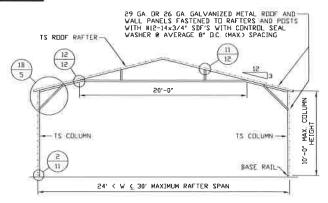
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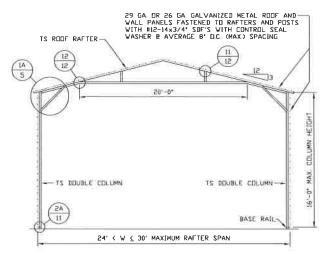
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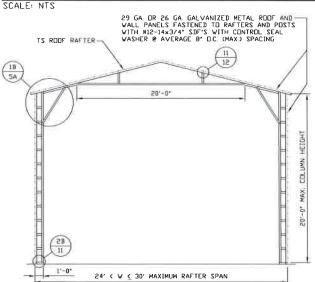
#### TYPICAL RAFTER/COLUMN END FRAME SECTION



#### TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE: NTS



#### **TYPICAL** RAFTER/COLUMN END FRAME SECTION

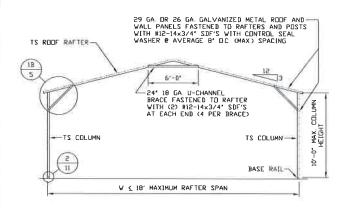


#### TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE: NTS

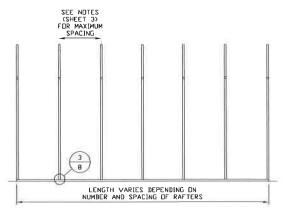
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TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE: NTS



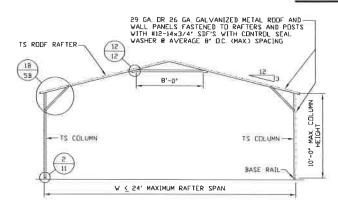
TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION SCALE: NTS

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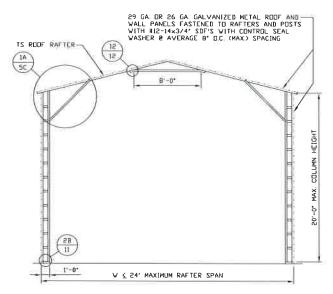
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#### **EXPOSURE C**

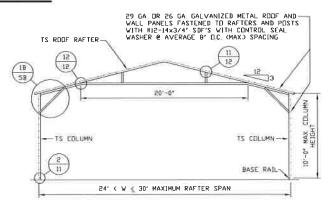


## TYPICAL RAFTER/COLUMN END FRAME SECTION

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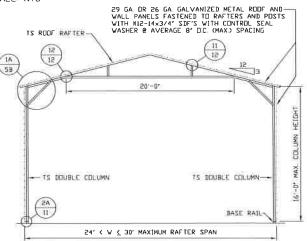


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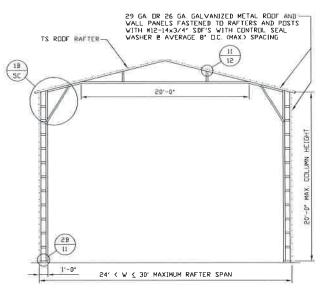


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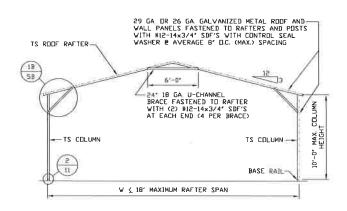
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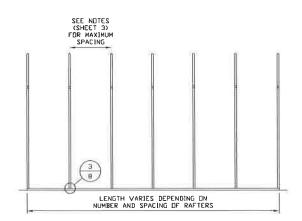


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## **EXPOSURE C**





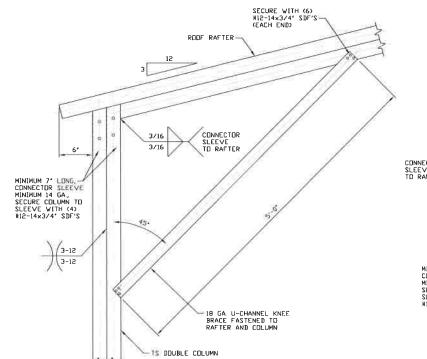
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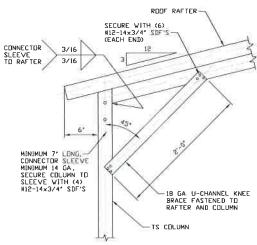
TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

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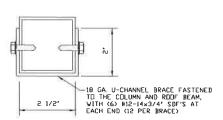




BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10' < TO < 16'

BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS & 10'

1B

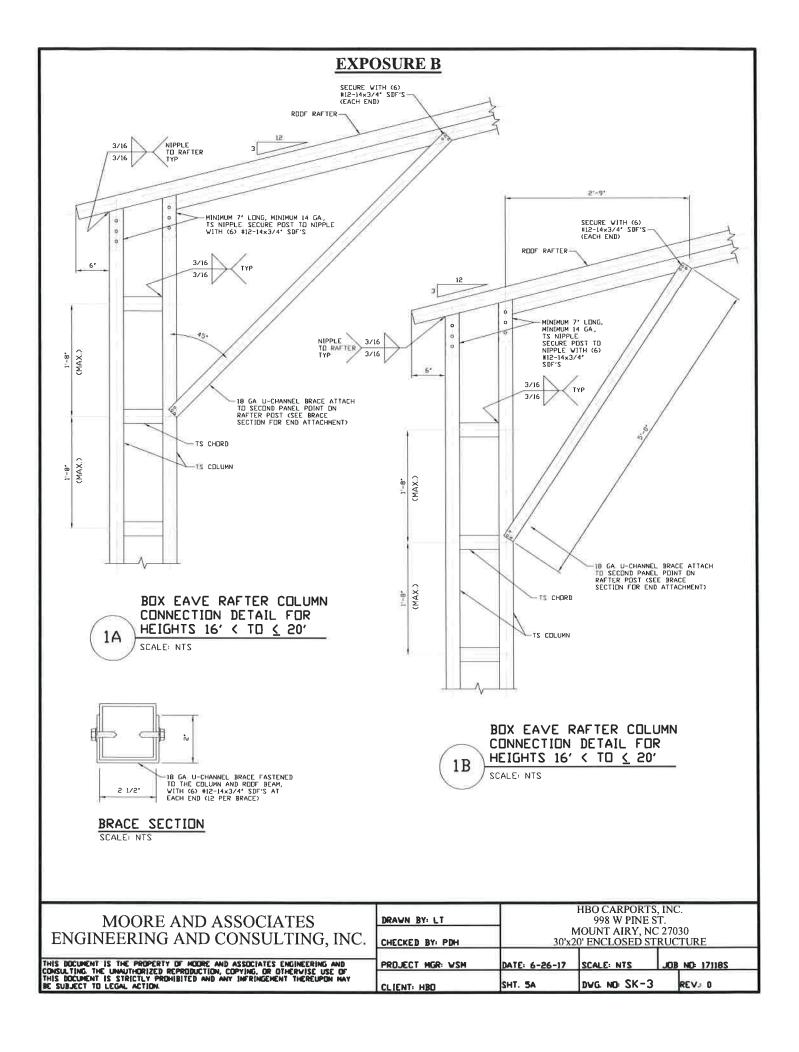


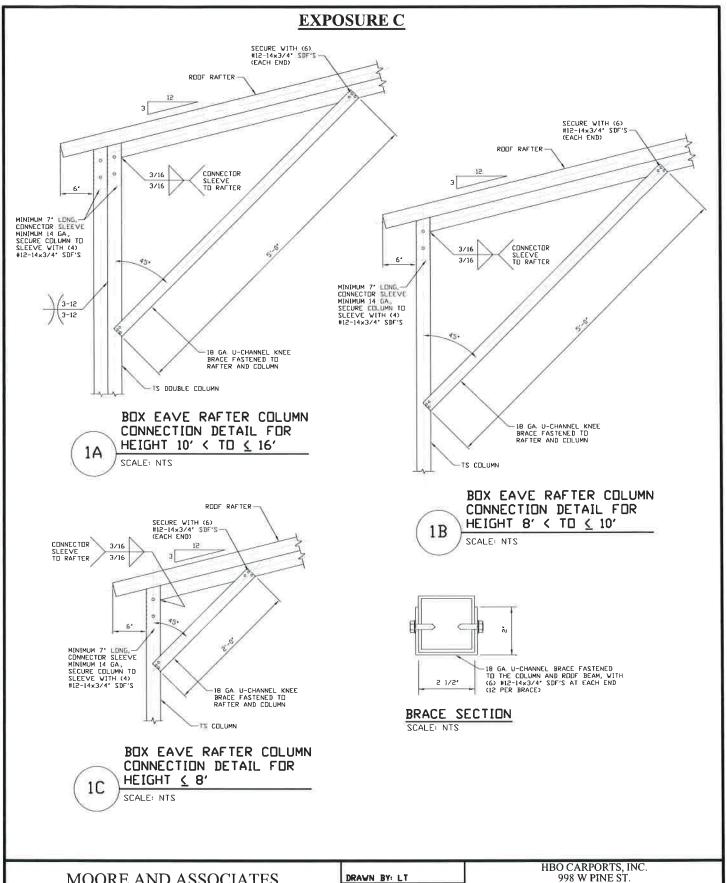
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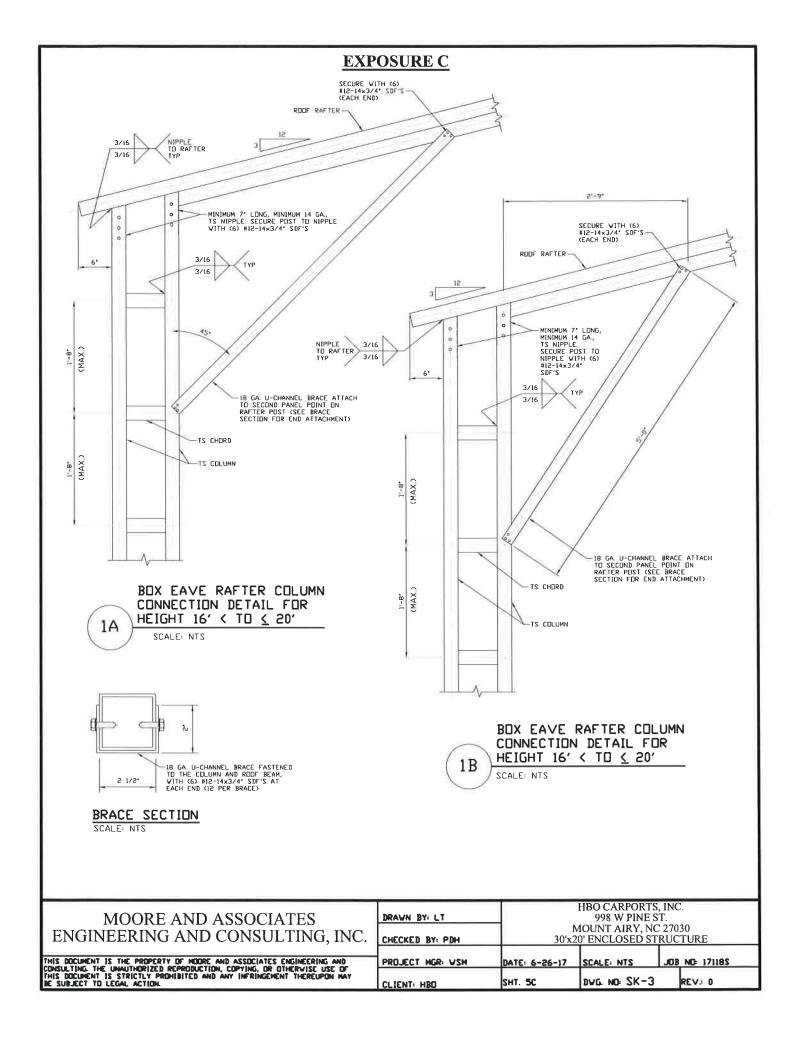
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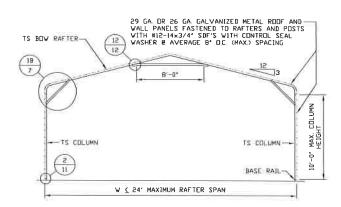
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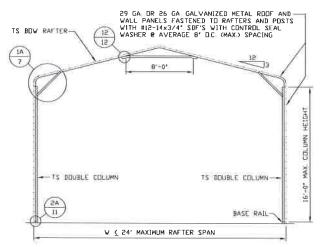
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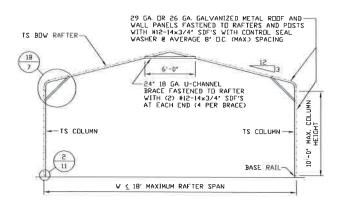
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SCALE: NTS



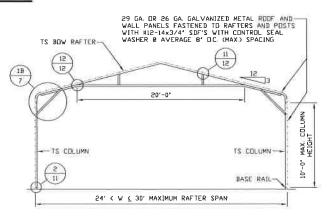
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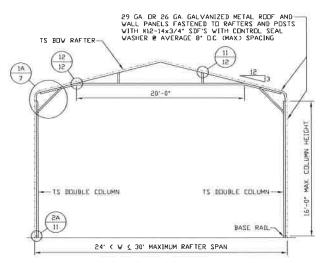
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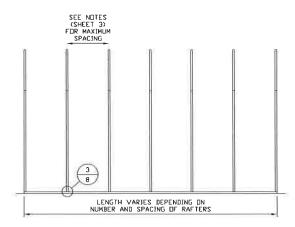
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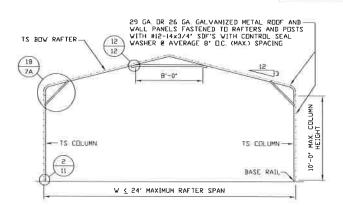


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

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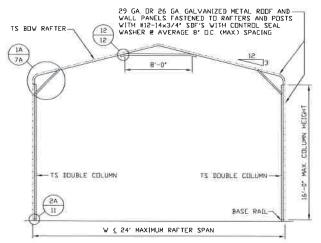
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### **EXPOSURE C**



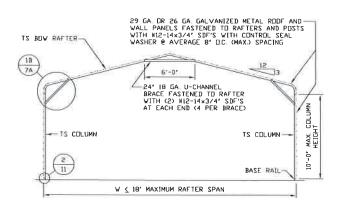
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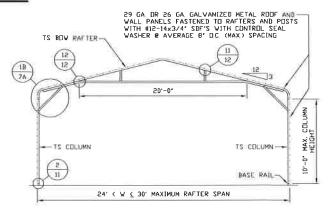
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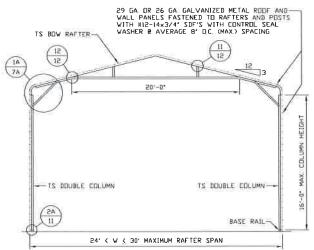
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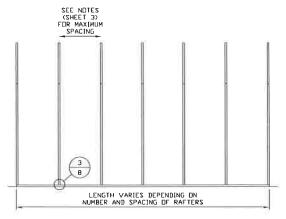
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#### TYPICAL RAFTER/COLUMN END FRAME SECTION

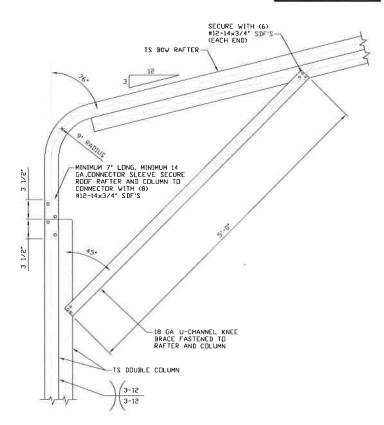
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#### TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

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MINIMUM 7' LONG, CONNECTOR
SLEEVE MINIMUM 14 GA.
SECURE COLLUMN TO SLEEVE
WITH (4) NIZ-14x3/4' SDF'S
TS COLUMN

BOX EAVE RAFTER COLUMN
CONNECTION DETAIL FOR
HEIGHTS & 10'
SCALE: NTS

18 GA U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN

TS BOW RAFTER

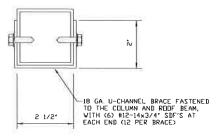
SECURE WITH (6) H12-14×3/4" SDF'S-(EACH END)

9. RADIUS

1A

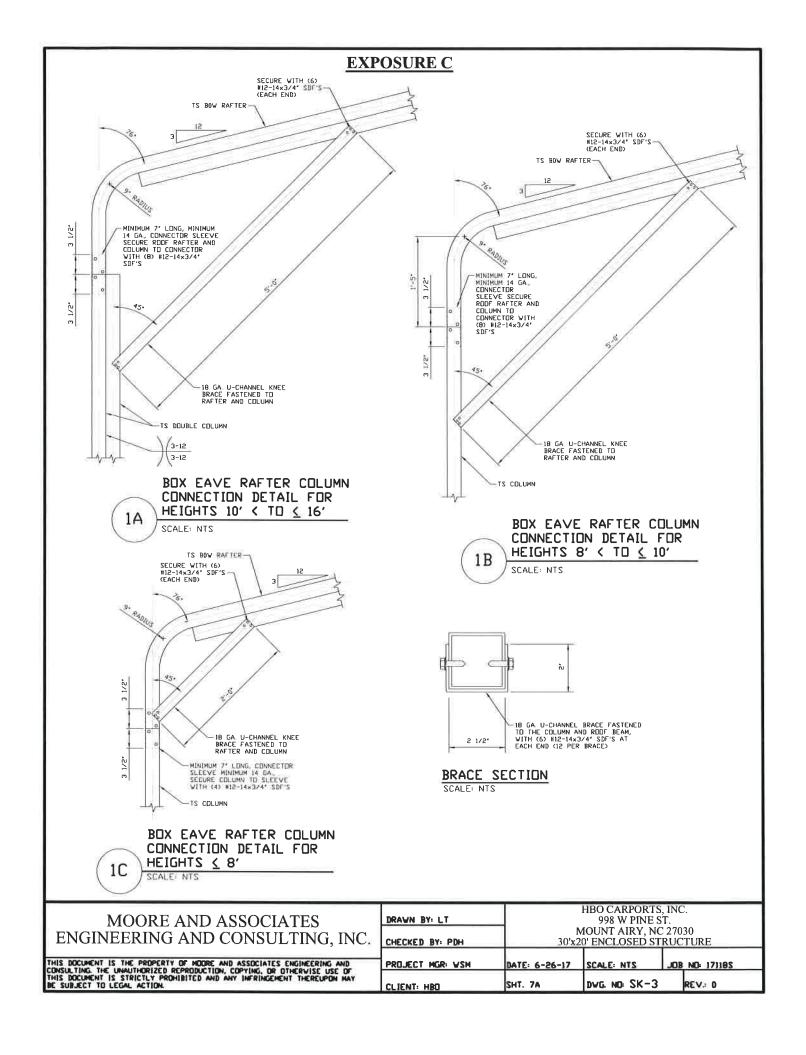
BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10' < TO < 16'

SCALE: NTS



BRACE SECTION
SCALE: NTS

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#### INSTALL 1/2'x6 3/4" EXPANSION ANCHOR THROUGH BASE RAIL WITHIN 6' DF EACH COLUMN (ALSO APPLICABLE TO WF OR FIBERGLASS FIBER REINF END WALLS) VARIES GRADE 1.0 (MIM) MINIMUM 3 1/4° EMBEDMENT (SAYT) MONOLITHIC CONCRETE FOOTING (3000 PSI MIN.) REINFORCED 1'-0" VARIES WITH (2)-#4's CONTINUOUS

CONCRETE MONOLITHIC SLAB

(MINIMUM ANCHOR EDGE DISTANCE IS 4")

BASE RAIL ANCHORAGE



INSTALL 1/2"x6 3/4"

END WALLS)

EXPANSION ANCHOR THROUGH BASE RAIL WITHIN 6' OF EACH COLUMN (ALSO APPLICABLE TO

VARIES

CMIMO

GRADE

VARIES

### 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

PARS SHALL BE PER ACI-318:

3' 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' ELSEWHERE.

#### REINFORCING STEEL:

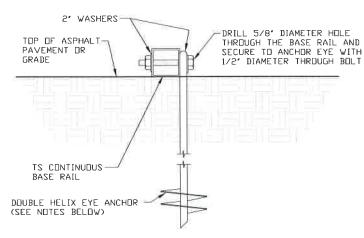
THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 60. THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT.

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

- REINFORCEMENT IS BENT COLD.
  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 FIFI D BENT.

#### HELIX ANCHOR NOTES:

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



GROUND BASE HELIX ANCHORAGE SCALE: NTS (CAN BE USED FOR ASPHAL

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BASE RAIL ANCHORAGE OPTIONS

WWF OR FIBERGLASS

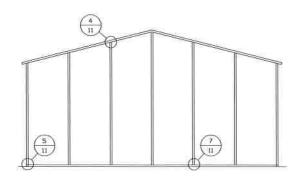
MINIMUM 3 1/4"

EMBEDMENT

(TYP.)

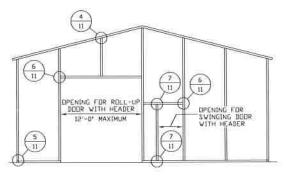
FIBER REINF

## BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



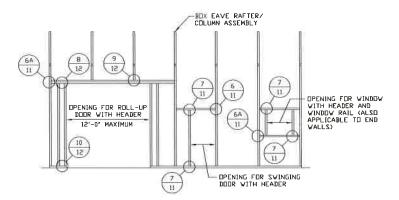
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS



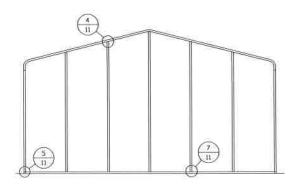
TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION SCALE: NTS

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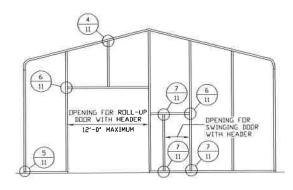
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	PROJECT HGR: VSH	DATE: 6-26-17	SCALE: NTS	JOB NO	171185	
	CHECKED BY: PDH		MOUNT AIRY, NO 20' ENCLOSED ST		RE	
Ī	DRAWN BY: LT		HBO CARPORTS 998 W PINE S			
+	r	_	UDOCADDODTS	INC		_

## **BOW RAFTER END WALL AND SIDE WALL OPENINGS**



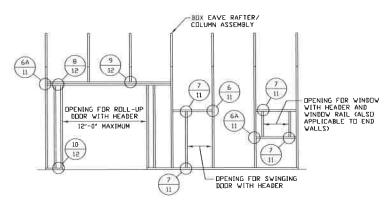
TYPICAL BOW RAFTER END WALL FRAMING SECTION

SCALE: NTS



## TYPICAL BOW RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS



## TYPICAL BOW RAFTER SIDE WALL OPENINGS FRAMING SECTION

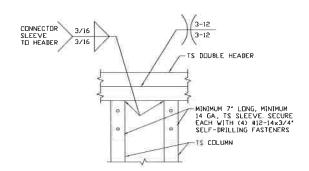
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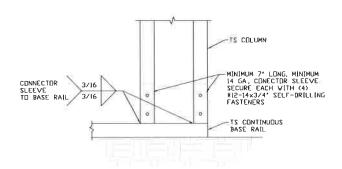
#### BOW AND BOX EAVE RAFTER WALL OPENING DETAILS TS COLUMN TS COLUMN TS COLUMN MINIMUM 7' LONG, CONNECTOR SLEEVE MINIMUM 14 GA,, SECURE WITH (4) #12-14×3/4' SDF'S MINIMUM 7" LONG, CONNECTOR SLEEVE MINIMUM 14 GA, SECURE WITH (4) H12-14x3/4" SDF'S MINIMUM 7' LDNG, MINIMUM 14 GA, TS NIPPLE SECURE WITH (6) #12-14×3/4' SDF'S SLEEVE TO 3/16 BASE RAIL 3/16 SLEEVE TO BASE RAIL 3/16 3/16 NIPPLE TO BASE RAIL TYP TS CONTINUOUS BASE RAIL TS CONTINUOUS BASE RAIL 3/16 TS CONTINOUS BASE RAIL COLUMN/BASE RAIL COLUMN/BASE RAIL CONNECTION DETAIL COLUMN/BASE RAIL CONNECTION DETAIL SCALE: NTS CONNECTION DETAIL SCALE: NTS 2B TS COLUMN (CORNER) TS COLUMN (CORNER) 3-12 3/16 MINIMUM 7" LONG, MINIMUM 14 GA, CONECTOR SLEEVE SECURE WITH (4) #12-14×3/4" SDF'S CONNECTOR TS RAFTER MINIMUM 7' LONG, MINIMUM 14 GA, CONECTOR SLEEVE SECURE WITH (4) H12-14x3/4' SDF'S ZVEEVE TO BASE TO BASE 3-12 3/16 CONNECTOR 3/16 2'x2'x2' 14 GA ANGLE CLIP SECURE TD RAFTER COLUMN AND BASE RAIL WITH (4) #12-14x3/4' SDF'S SLEEVE TO BASE RAIL 2'x2'x2' 14 GA ANGLE CLIP SECURE TO RAFTER COLUMN AND BASE RAIL WITH (4) #12-14x3/4' SDF'S 3/16 -2'x2'x2' 14 GA ANGLE CLIP SECURE TO COLUMN AND RAFTER WITH H12-14x3/4' SDF'S 2 DN EDIZ NO S DNA SIDE TS END COLUMN TS CONTINUOUS BASE RAIL TS CONTINUOUS BASE RAIL END COLUMN/RAFTER END COLUMN/BASE RAIL END COLUMN/BASE RAIL CONNECTION DETAIL CONNECTION DETAIL 4 CONNECTION DETAIL SCALE: NTS 5 5A SCALE: NTS SCALE: NTS TS TRUSSED RAFTER CHORD, OR NON-STRUCTURAL HEADER TS COLUMN OR END COLUMN 2'x2'x2' 14 GA. ANGLE CLIP SECURE TO CDLUMN AND EITHER TOP DF HEADER. OR BOTTOM OF WINDOW RAIL VITH #12-14x3/4' SDF'S 2'x2'x2' 14 GA ANGLE CLIP SECURE TO COLUMN AND EITHER TOP OF HEADER, OR BOTTOM OF WINDOW RAIL VITH #12-14x3/4' SDF'S -2'x2'x2' 14 GA ANGLE CLIP SECURE TO COLUMN (EACH SIDE) AND RAFTER CHORD/RAIL WITH H12-14x3/4' SDF'S 2 DN BOTTOM AND 2 DN SIDE TS END COLUMN— OR DOOR WINDOW FRAME POST NOTE: AT ROLL-UP DOOR OPENINGS, COLUMN SHOULD BE FLUSH WITH RAIL END CLIP COLUMN TO RAIL ONLY ON SIDE OPPOSITE THE OPENING. TS HEADER OR WINDOW RAIL TS HEADER OR WINDOW RAIL TS HEADER, BASE RAIL, DR WINDDW RAIL 3-12 3-12 COLUMN OR WINDOW RAIL TO POST COLUMN OR WINDOW CONNECTION DETAIL 6 RAIL TO POST COLUMN TO HEADER, BASE SCALE: NTS CONNECTION DETAIL RAIL OR WINDOW RAIL 6A SCALE: NTS CONNECTION DETAIL 7 SCALE: NTS

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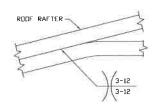
## **BOW AND BOX EAVE RAFTER WALL OPENING DETAILS**



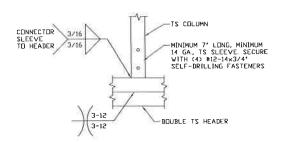
# 8 DOUBLE HEADER/COLUMN CONNECTION DETAIL SCALE: NTS



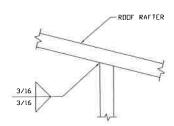
10 COLUMN/BASE RAIL CONNECTION DETAIL SCALE: NTS



COLLAR TIE CONNECTION DETAIL
SCALE: NTS



9 COLUMN/DOUBLE HEADER
CONNECTION DETAIL
SCALE: NTS



RAFTER TO CHORD CONNECTION DETAIL

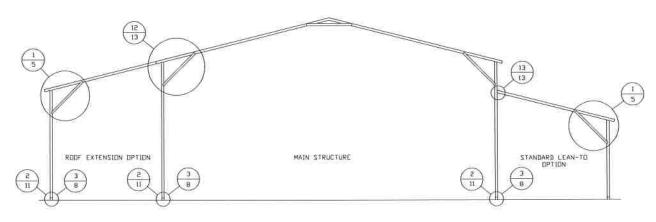
SCALE: NTS

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PROJECT HGR: VSH	DATE: 6-26-17	SCALE: NTS	JOB NO: 17118S					
CHECKED BY: PDH	MOUNT AIRY, NC 27030 30'x20' ENCLOSED STRUCTURE							
DRAWN BY: LT	_	HBO CARPORTS, INC. 998 W PINE ST.						

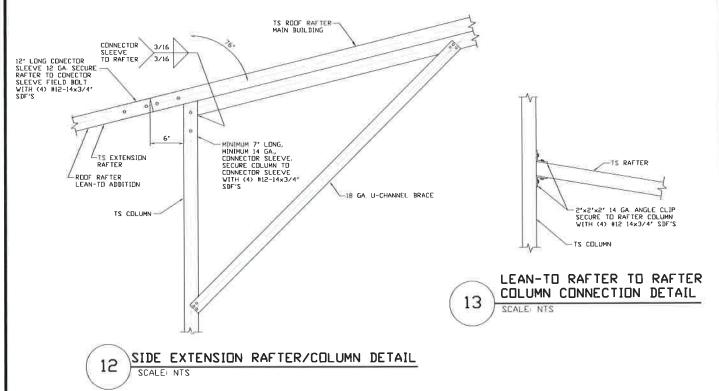
## **BOX EAVE RAFTER LEAN-TO OPTIONS**



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

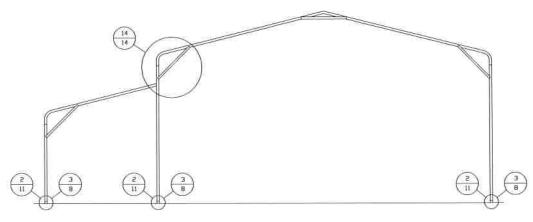
SCALE: NTS

NOTE: MAX. WIDTH OF LEAN-TO W/ SL OF 70 PSF = 11'-0' MAX. WIDTH OF LEAN-TO W/ SL OF < 70 PSF = 12'-0'



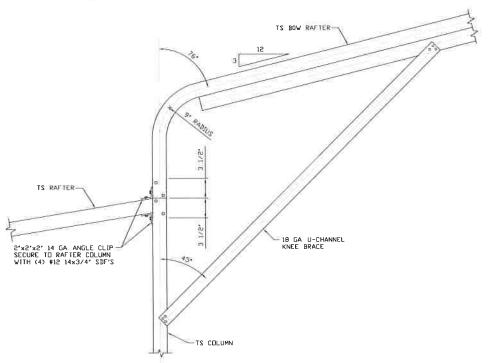
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## **BOW RAFTER LEAN-TO OPTION**



### TYPICAL BOW RAFTER LEAN-TO OPTION FRAMING SECTION

SCALE: NTS NDTE: MAX. WIDTH DF LEAN-TO W/ SL DF 70 PSF = 11'-0' MAX. WIDTH DF LEAN-TO W/ SL DF < 70 PSF = 12'-0'



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL

SCALE: NTS

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## **BOX EAVE RAFTER VERTICAL ROOF OPTION**

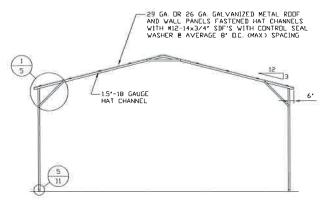




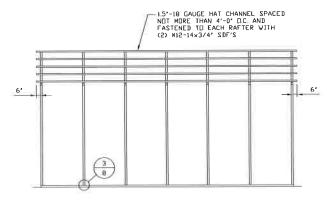
6'
TRIM

TYPICAL SIDE ELEVATION-VERTICAL ROOF OPTION

SCALE: NTS



TYPICAL SECTION-VERTICAL ROOF
SCALE: NTS



TYPICAL FRAMING SECTION-VERTICAL ROOF OPTION SCALE: NTS

1.5'-18 GAUGE HAT CHANNEL

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

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	CHECKED BY: PDH	30'x20' ENCLOSED STRUCTURE				
_	PROJECT MGR: VSM	DATE: 6-26-17	SCALE: NTS	JOB	JOB NO: 17118S	
	CLIENT: HBO		DVG. NO: SK-3 REV.: 0		REV. 0	