

STRUCTURAL DESIGN

ENCLOSED BUILDING EXPOSURE B

MAXIMUM 40'-0" WIDE X 20'-0" EAVE HEIGHT- BOX EAVE FRAME

15 January 2021 Revision 5 M&A Project No. 16022S/16072S/16073S/17301S/20352S

Prepared for:

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

Prepared by:

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

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





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INSTALLATION NOTES AND SPECIFICATIONS

- 1 DESIGN IS FOR A MAXIMUM 40'-0" WIDE x 20'-0" EAVE HEIGHT ENCLOSED STRUCTURES
- 2 DESIGN WAS DONE IN ACCORDANCE WITH THE 2020 FLORIDA BUILDING CODE (FBC) 7TH EDITION, 2018 INTERNATIONAL BUILDING CODE (IBC), 2015 IBC AND 2012 IBC.
- 3 DESIGN LOADS ARE AS FOLLOWS:

A) DEAD LOAD = 15 PSF
B) LIVE LOAD = 12 PSF
C) GROUND SNOW LOAD = 10 PSF

NOTE: UNBALANCED SNOW LOAD DUE TO DRIFTING HAS NOT BEEN EVALUATED

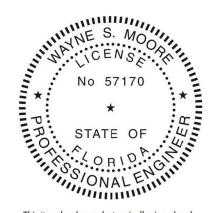
- 4. LOW ULTIMATE WIND SPEED 105 TO 140 MPH (NOMINAL WIND SPEED 8) TO 108 MPH): MAXIMUM RAFTER/POST AND END POST SPACING = 5.0 FEET.
- 5. HIGH ULTIMATE WIND SPEED 141 TO 170 MPH (NOMINAL WIND SPEED 109 TO 132 MPH): MAXIMUM RAFTER/POST AND END POST SPACING = 4.0 FEET.
- 6 END WALL COLUMNS (POSTS) AND SIDE WALL COLUMNS ARE EQUIVALENT IN SIZE AND SPACING (UNLESS NOTED OTHERWISE)
- 7 DISK CATECHDY I
- 8 WIND EXPOSURE CATEGORY B.
- 9. SPECIFICATIONS APPLICABLE TO 29 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/2' × 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 (U.N.D.).
- 10. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR PURLINS, AND POSTS, INTERIOR = 9° AND END = 6° (MAX.)
- 11 FASTENERS CONSIST OF #12-14×3/4" 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
- 12 ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6' OF EACH RAFTER COLUMN ALONG SIDES AND ENDS.
- I3. STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT x 30° LONG AND MAY BE USED IN SUITABLE SOILS.

 □PTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED. SOIL NAILS MAY BE USED FOR WIND SPEEDS ≤ 145 MPH. 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 = 3.25 $I_{\varepsilon} = 1.0$ $V = C_{s}W$

S_{DI} = 1.258 g



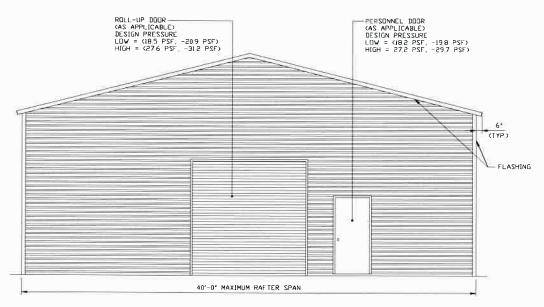
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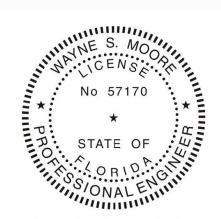
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PROJECT MGR: VSM	DATE: 1-15-21	SCALE: NTS	160225/173015/20352

BOX EAVE FRAME RAFTER ENCLOSED BUILDING



TYPICAL END ELEVATION-HORIZONTAL ROOF

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



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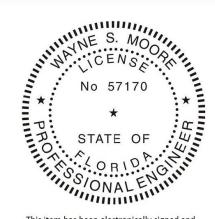
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CLIENT: TBS	SHT. 4	DVG. ND SK-	3	REV. 5		

BOX EAVE FRAME RAFTER ENCLOSED BUILDING VINDOV (AS APPLICABLE) DESIGN PRESSURE LEGIS PSF, -310 PSF) MICH = (286 PSF, -310 PSF) LENGTH VARIES DEPENDING ON NUMBER AND SPACING DE NAVIERS

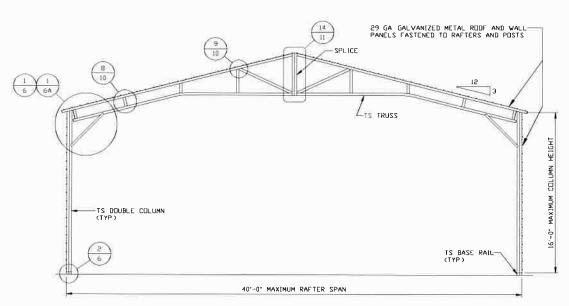
TYPICAL SIDE ELEVATION-HORIZONTAL ROOF

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



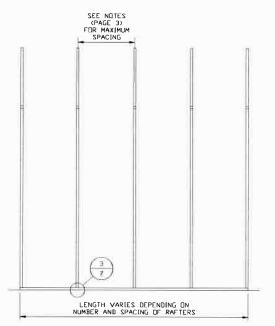
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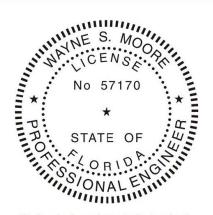


TYPICAL RAFTER/POST FRAME SECTION

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



TYPICAL RAFTER/POST SIDE FRAMING SECTION SCALE: 1/8' = 1'-0'



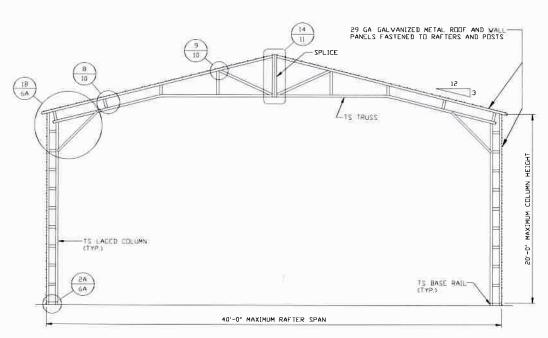
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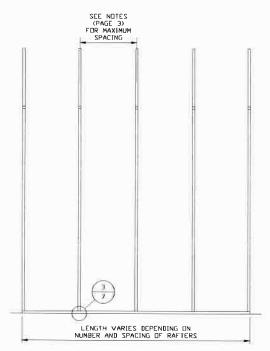
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TYPICAL RAFTER/POST FRAME SECTION

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

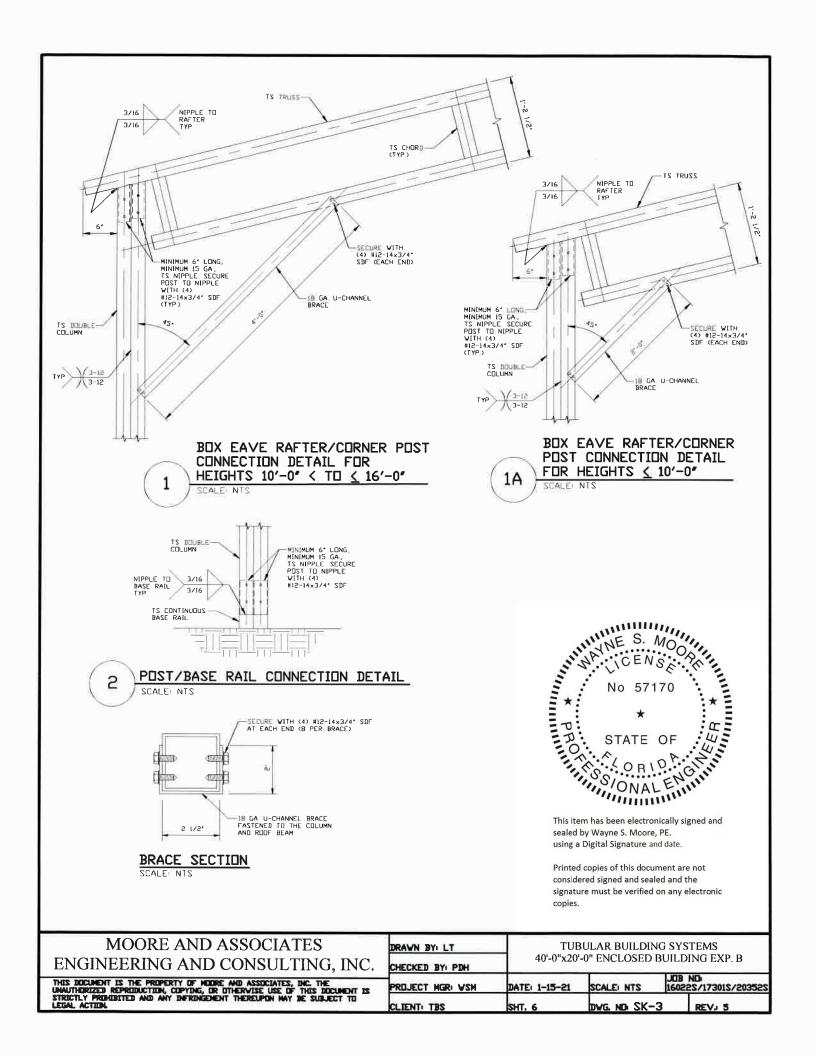


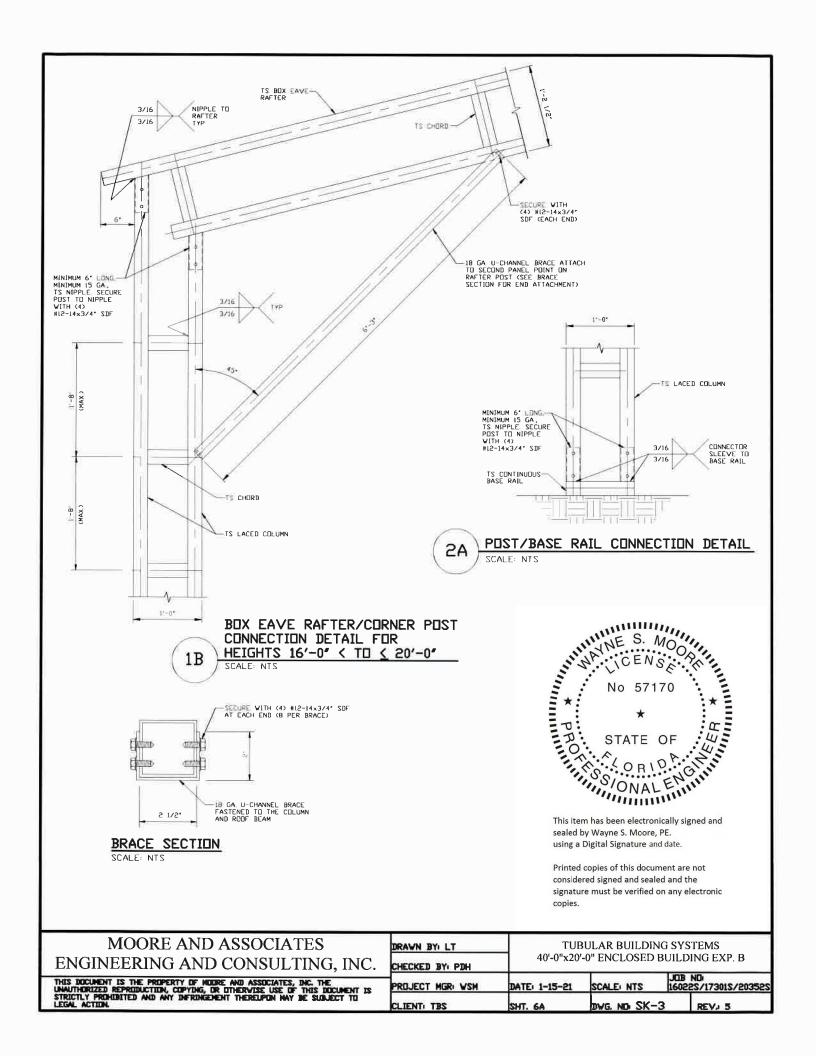
TYPICAL RAFTER/POST SIDE FRAMING SECTION SCALE: 1/8' = 1'-0'



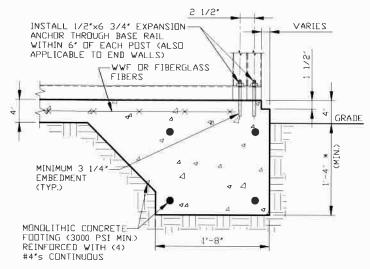
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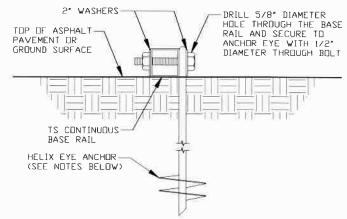
BASE RAIL ANCHORAGE OPTIONS FOR LOW AND HIGH WIND SPEED





CONCRETE MONOLITHIC SLAB BASE RAIL ANCHURAGE

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



ЗА

GROUND BASE HELIX ANCHORAGE

(CAN BE USED FOR ASPHALT) * COORDINATE WITH LOCAL CODES/ORD. REGARDING MINIMUM FROST DEPTH REQ.

GENERAL NOTES

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

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 AGIS 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 FIELD BENT.

HELIX ANCHOR NOTES:

- 1 FOR VERY DENSE AND/OR CEMENTED SANDS, COARSE GRAVEL AND CUBBLES, CALICHE, PRELDADED 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 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 LOOSE TO MEDIUM DENSE SANDS, FIRM TO STIFFER CLAYS AND SILTS, ALLUVIAL FILL USE MINIMUM (2) 8" HELICES WITH MINIMUM 60 INCH EMBEDMENT



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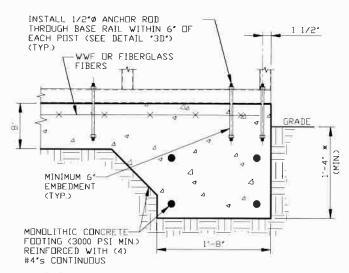
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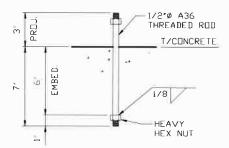
OPTIONAL FOUNDATION ANCHORAGE FOR LOW AND HIGH WIND SPEED



3B

CONCRETE MONDLITHIC SLAB BASE RAIL ANCHURAGE

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





GENERAL NOTES

NOTE: CONCRETE MONOLITHIC SLAB DESIGN BASED ON MINIMUM SDIL 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:

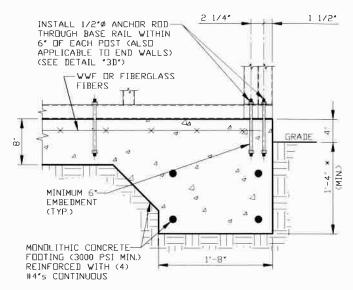
3 INCHES IN FOUNDATIONS WHERE THE CONCRETE IS CAST AGAINST
AND PERMANENTLY IN CONTACT WITH THE EARTH OR EXPOSED TO
THE EARTH OR WEATHER, AND 1 1/2 INCHES ELSEWHERE.

REINFORCING STEEL:

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

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

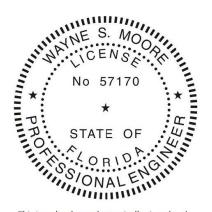
- 1 REINFORCEMENT IS BENT COLD
- 2 THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS
- 3 REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE EIFLD BENT





CONCRETE MONOLITHIC SLAB BASE RAIL ANCHURAGE

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



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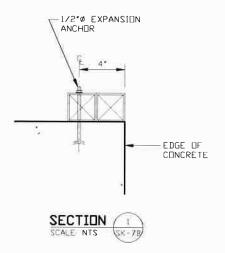
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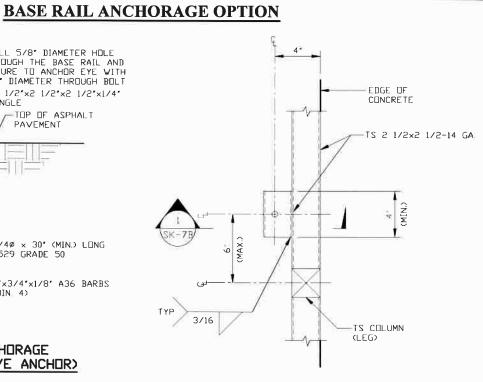
DRILL 5/8' DIAMETER HOLE THROUGH THE BASE RAIL AND SECURE TO ANCHOR EYE WITH 1/2' DIAMETER THROUGH BOLT 2 1/2'x2 1/2'x2 1/2'x1/4' ANGLE TOP OF ASPHALT PAVEMENT TS CONTINUOUS BASE RAIL 3/40 x 30' (MIN.) LONG A529 GRADE 50 2'x3/4'x1/8' A36 BARBS (MIN. 4)

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.

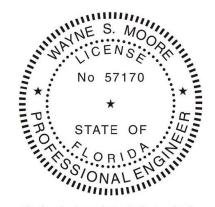
3E





TYPICAL ANCHOR DETAIL WHEN BASE RAIL IS NEAR EDGE OF CONCRETE

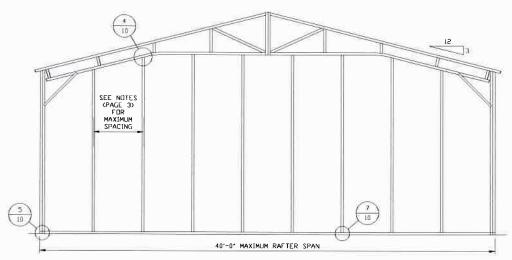
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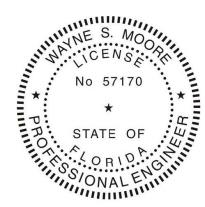
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BOX EAVE RAFTER END WALL AND WALL OPENINGS



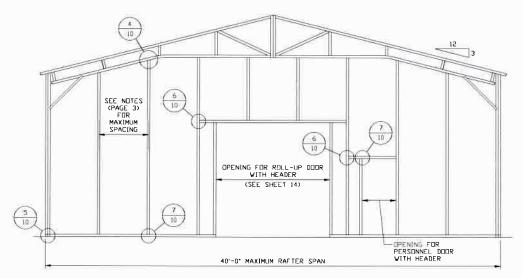
 $\frac{\text{TYPICAL BDX EAVE RAFTER END WALL FRAMING SECTION}}{\text{SCALE: } 1/8" = 1'-0"}$



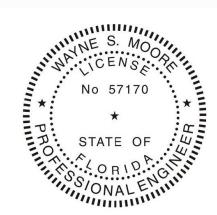
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BOX EAVE RAFTER END WALL AND WALL OPENINGS



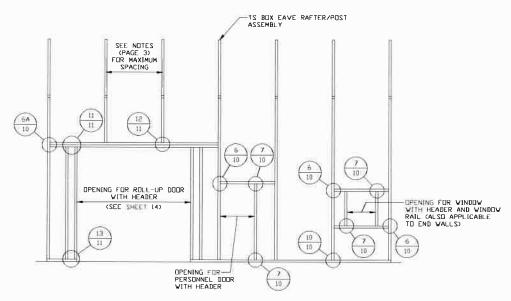
 $\frac{\text{TYPICAL BDX EAVE RAFTER END WALL DPENINGS FRAMING SECTION}}{\text{SCALE: } 1/8' = 1'-0'$



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BOX EAVE RAFTER SIDE WALL AND WALL OPENINGS



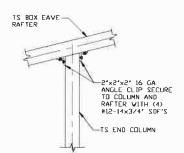
TYPICAL BUX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION SCALE: 1/8' = 1'-0'



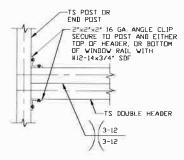
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CONNECTION DETAILS



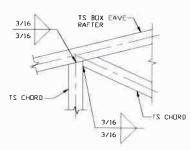
4 END POST/RAFTER CONNECTION DETAIL SCALE: NTS



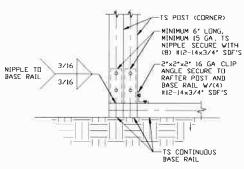
DOUBLE HEADER TO COLUMN CONNECTION DETAIL

6A

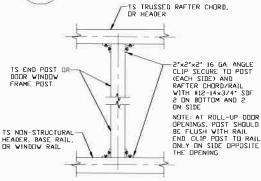
9



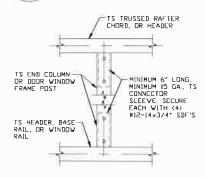
TRUSS POST AND CORD TO RAFTER CONNECTION DETAIL



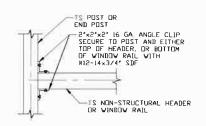
5 END POST/BASE RAIL CONNECTION DETAIL SCALE NTS



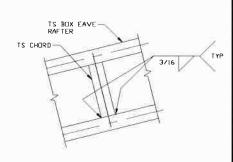
POST TO HEADER, BASE RAIL OR WINDOW RAIL CONNECTION DETAIL



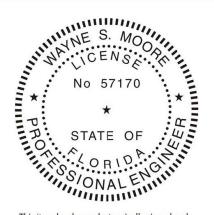
COLUMN TO HEADER/ BASE RAIL CONNECTION DETAIL



HEADER OR WINDOW
RAIL TO POST
CONNECTION DETAIL
SCALE: NTS



8 CHORD/RAFTER
CONNECTION DETAIL
SCALE NTS



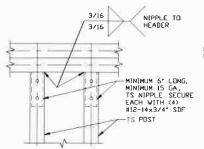
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CLIENT: TBS	SHT. 10	DVG. ND SK-3		REV. 5

CONNECTION DETAILS



TS POST MINIMUM 6' LDNG, MINIMUM 15 GA, TS NIPPLE SECURE WITH (4) #12-14×3/4' SDF NIPPLE TO HEADER 3/16 3/16 TS DOUBLE HEADER 3-15

MINIMUM 6' LONG, MINIMUM 15 GA. TS NIPPLE SECURE EACH WITH (4) #12-14×3/4' SDF 3/16 NIPPLE TO BASE RAIL ENDUNITION STATE

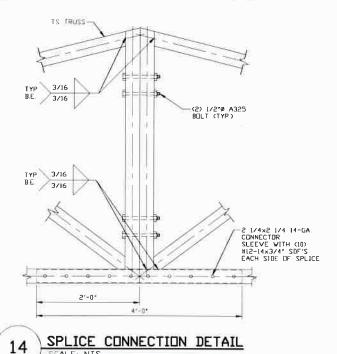
DOUBLE HEADER/POST CONNECTION DETAIL

11

SCALE: NTS

POST/DOUBLE HEADER CONNECTION DETAIL 12 SCALE: NTS

POST/BASE RAIL CONNECTION DETAIL 13



No 57170

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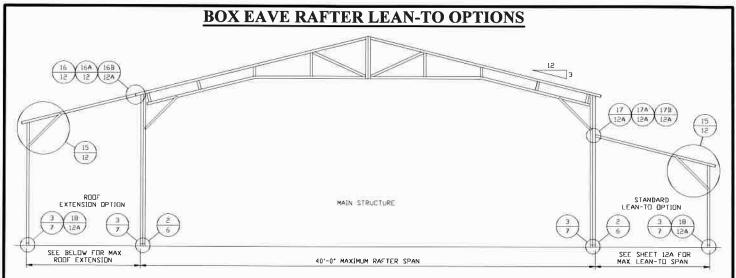
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CHE JOB NO 160225/173015/203525 PROJECT MGR: VSM DATE: 1-15-21 SCALE: NTS DVG. ND: SK-3 CLIENT: TBS SHT. 11 REV. 5



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

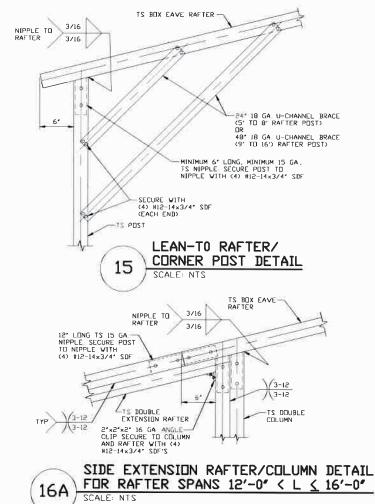
16

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 11'-0' < TO < 16'-0' MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMNS FOR

EAVE HEIGHTS < 10'-0"



12' LONG TS 15 GA NIPPLE-SECURE POST TO NIPPLE WITH (4) #12-14x3/4' SDF TS EXTENSION RAFTER 3-12 / 3-12 NIPPLE TO RAFTER TYP TS DOUBLE 3/16

SIDE EXTENSION RAFTER/COLUMN DETAIL FOR RAFTER SPANS < 12'-0' SCALE: NTS



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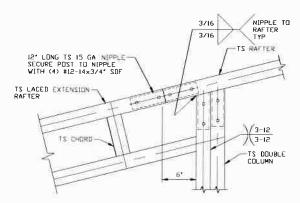
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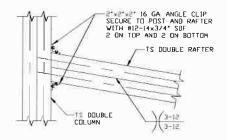
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CLIENT, TRE		C17 42	DIVE NO SK-3		DE14. E	
PROJECT MGR: VSM					JOB NO 160225/173015/203525	
	CHECKED BY: PDH	40'-0"x20'	'-0" ENCLOSED			
	DRAWN BY: LT	TUBULAR BUILDING SYSTEMS				

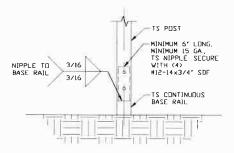
BOX EAVE RAFTER LEAN-TO OPTIONS



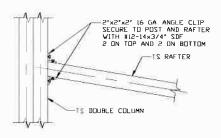
SIDE EXTENSION RAFTER/COLUMN DETAIL FOR RAFTER SPANS 16'-0" < L < 24'-0" 16B



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 12'-0" < L ≤ 16'-0" 17A

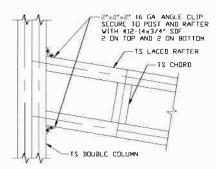


LEAN-TO POST CONNECTION DETAIL 18



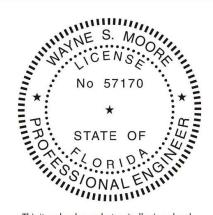
LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 12'-0" 17

SCALE! NTS



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 16'-0" < L ≤ 24'-0"

SCALE: NTS



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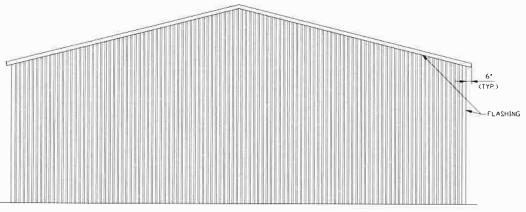
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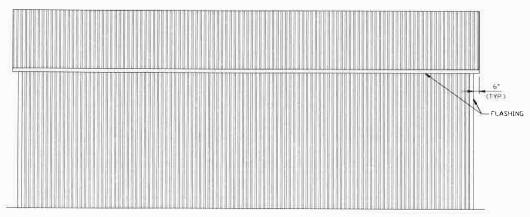
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PROJECT MGR: VSM	DATE: 1-15-21	SCALE: NTS	JOB 1602	ND: 2S/17301S/20352S
CLIENT: TBS	SHT. 12A	DVG. ND SK-	-3	REV. 5

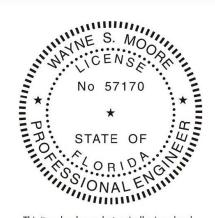
BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



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



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



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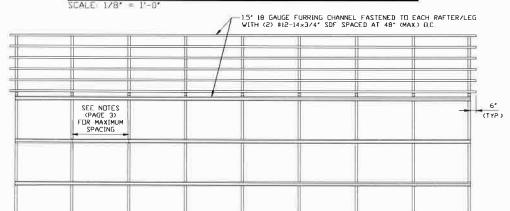
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CLIENT: TRS	SHT. 13	THE NO SK-	-2	PEV. 5	
PROJECT MGR: VSM	DATE: 1-15-21	SCALE: NTS	JOB 1602	ND: 28/173018/203528	
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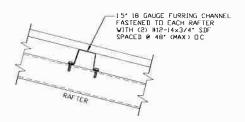
BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION 29 GA GALVANIZED METAL RODFPANELS FASTENED TO PURLINS 1.5' 18 GAUGE FURRING CHANNEL (PURLIN) @ 48' II C. MAX

TYPICAL SECTION VERTICAL ROOF/SIDING OPTION

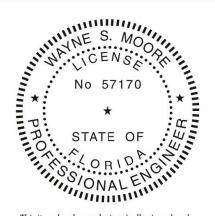


TYPICAL FRAMING SECTION VERTICAL ROOF/SIDING OPTION

SCALE: 1/8' = 1'-0'
NDTE: TS 2 1/2'x2 1/2'-14 GA: WALL GIRTS CAN BE USED
AS AN OPTION IN PLACE OF HAT CHANNELS TS
GIRTS MUST BE SPACED AT 4'-0' (MAX) DC



PANEL ATTACHMENT
(ALTERNATE FOR VERTICAL ROOF PANELS)



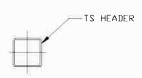
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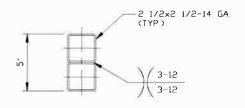
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CHECKED BY: PDH	40'-0"x20'	-0" ENCLOSED	BUILD	ING EXP. B	
PROJECT MGR: VSM	DATE: 1-15-21	SCALE: NTS	JE18 1602	ND: 2S/17301S/20352S	
CLIENT: TBS	SHT. 13A	DVG. ND SK-	3	REV. 5	

SIDE WALL OPTIONAL HEADER



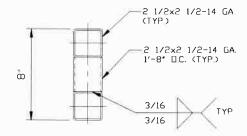
HEADER DETAIL FOR OPENINGS LENGTH & 8'-0"

SCALE: NTS



HEADER DETAIL FOR OPENINGS 8'-0' < LENGTH ≤ 10'-0'

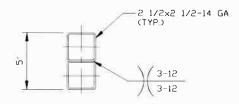
SCALE: NTS



HEADER DETAIL FOR OPENINGS 10'-0' < LENGTH < 15'-0'

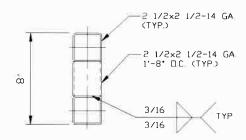
SCALE: NTS

END WALL OPTIONAL HEADER



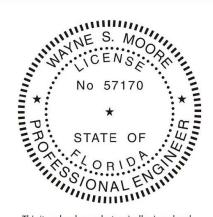
HEADER DETAIL FOR OPENINGS LENGTH ≤ 10'-0"

SCALE: NTS



HEADER DETAIL FOR OPENINGS 10'-0" < LENGTH ≤ 15'-0"

SCALE: NTS



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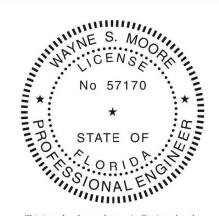
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PROJECT MGR: VSM	DATE: 1-15-21	SCALE: NTS	J03 1602	ND: 2S/17301S/20352S
CLIENTI TBS	SHT, 14	DVG. ND SK-	-3	REV. 5

FRAME DPENING FOR FLOOD VENT WITH TS 2 1/2*x2 1/2* MEMBERS (MATCH ADJACENT RAFTER POSTS AND BASERAIL) 1/2*-18S OR F EXPANDED METAL ATTACH W MENICHOLES SOUARE FASTENERS OR APPROVED EQUAL AT 6* OLC, ATTACH W/ METAL TEK SCREWS TS POST TS POST GRADE

TYPICAL FLOOD VENT DETAIL

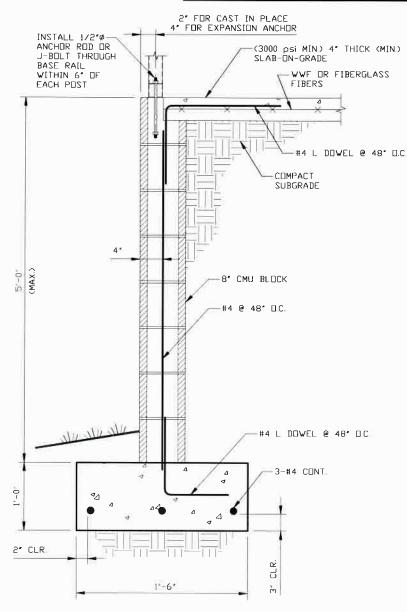
- 1. MINIMUM VENT SPACE REQUIRED = 1 SQ INCH OF OPEN VENT AREA PER SQ. FOOT OF BUILDING AREA \circ
- 2. THERE SHALL BE A MINIMUM OF TWO OPENINGS ON DIFFERENT SIDES FOR EACH ENCLOSED BUILDING.
- 3. APPLY 1.3 FACTOR WHEN CALCULATING TOTAL OPEN AREA WHEN USING 1/2'-18GA S OR F EXPANDED METAL.
- 4. TOTAL OPEN AREA OF VENT = LxH(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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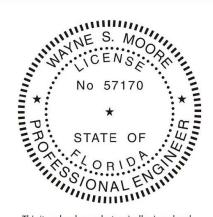
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STAND -ALONE STEM WALL DETAIL



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

SCALE: NTS



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DWG. NO SK-3

REV. 5

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PROJECT MGR: VSM	DATE	1-15-21	SCALE: NTS	JUB NO: 160225/173015/203525
	DRAWN BY: LT CHECKED BY: PDH PROJECT MGR: VSM	CHECKED BY: PDH	CHECKED BY: PDH 40'-0"x20"	CHECKED BY: PDH 40'-0"x20'-0" ENCLOSED

SHT. 16

CLIENT: TBS

