

STRUCTURAL DESIGN PARTIALLY OPEN (UTILITY) BUILDING

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

11 December 2020 Revision 9 M&A Project No. 16062S/16155S/16207S/17155S/17200S/18068S/18156S/18290S/20019S/20324S

Prepared for:

Steel Buildings and Structures, Inc. P.O. Box 1287 Mt. Airy, NC 27030

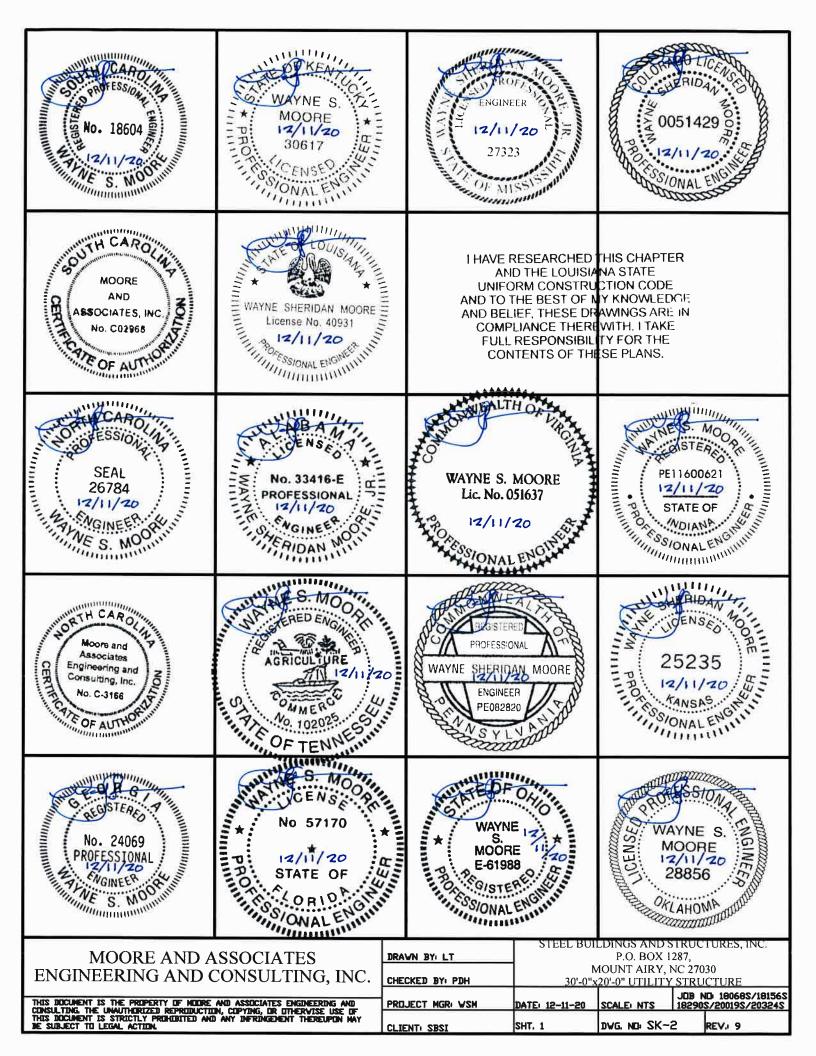
Prepared by:

Moore and Associates Engineering and Consulting, Inc.

1009 East Avenue North Augusta, SC 29841

401 S. Main St., Suite 200 Mt. Airy, NC 27030





12/11/20 MARY	Professional Certification I hereby certify that these documents were prepared approved by me, and that a duly licensed profession engineer under the laws of the State of Maryland, License No. 49744, Expiration Date 6/6/22	d or I am al f			
WAYNE S. MOORE 12/11/20 NUMBER PE-2016030730	ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 17214 No. 17214 PERIDAN 12/11/20				
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ENGINEERING AND C		CHECKED BY: PDH	30'-0"x	20'-0" UTILITY STI	RUCTURE B NO: 180685/181565
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OPTIONAL CONCRETE STRIP FOOTING

SHEET 21

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MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	CHECKED BY: PDH		P.O. BOX 1 MOUNT AIRY, 1 20'-0" UTILITY I	NC 270 STRU	JCTURE
MOODE AND AGGOCIATEG		STEEL BUI	LDINGS AND S		TURES, INC.

INSTALLATION NOTES AND SPECIFICATIONS

- 1. DESIGN IS FOR MAXIMUM 30'-0" WIDE x 20'-0" EAVE HEIGHT UTILITY STRUCTURES.
- 2. DESIGN WAS DONE IN ACCORDANCE WITH THE 2020 FLORIDA BUILDING CODE (FBC) 7TH EDITION, 2018 NORTH CAROLINA BUILDING CODE, 2006 INTERNATIONAL BUILDING CODE (IBC), 2009 IBC, 2012 IBC, 2015 IBC AND 2018 IBC.
- 3. DESIGN LOADS ARE AS FOLLOWS:

A) DEAD LOAD = 1.5 PSF B) LIVE LOAD = 12 PSF

C) GROUND SNOW LOAD = 30 PSF (< 26'-0"), 35 PSF (26'-0" < ₩ < 30'-0")

NOTE: (UNBALANCED SNOW LOADS DUE TO DRIFTING HAVE NOT BEEN EVALUATED).

- 4, 3-SECOND GUST ULTIMATE WIND SPEED (V_{ULT}) = 105 TO 145 MPH (NOMINAL WIND SPEED = 82 TO 112 MPH):
- 5, MAXIMUM RAFTER/COLUMN AND END COLUMN SPACING = 50 FEET (UNLESS NOTED OTHERWISE).
- 6. END WALL COLUMNS (POSTS) ARE EQUIVALENT TO SIDE WALL POSTS IN SIZE AND SPACING (UNLESS NOTED OTHERWISE).
- 7. RISK CATEGORY 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 (UNLESS NOTED OTHERWISE)
- 10. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR HAT CHANNELS, AND COLUMNS (INTERIOR OR END) = 8 INCHES
- 11. FASTENERS CONSIST OF 1/4*x3/4" SELF-DRILLING FASTENER (SDF), USE CONTROL SEAL WASHER WITH EXTERIOR FASTENERS.

 SPECIFICATIONS APPLICABLE ONLY FOR MEAN ROOF HEIGHT OF 20 FEET OR LESS, AND ROOF SLOPES OF 14" (3:12 PITCH) OR LESS SPACING REQUIREMENTS FOR OTHER ROOF HEIGHTS AND/OR SLOPES MAY VARY. ROOF SLOPES LESS THAN 3:12 REQUIRE USE OF LAP JOINT SEALANT.
- 12. GROUND ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6' OF EACH COLUMN.
- 13. STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT x 36' LONG AND MAY BE USED IN SUITABLE SOILS.

 OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED.
- 14 WIND FORCES GOVERN OVER SEISMIC FORCES SEISMIC PARAMETERS ANALYZED ARE:

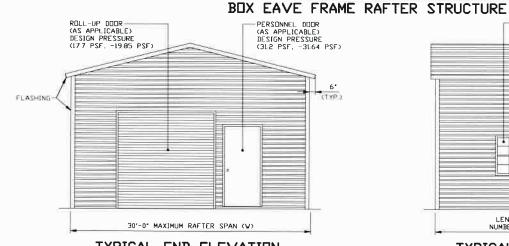
SDIL SITE CLASS = D RISK CATEGORY I

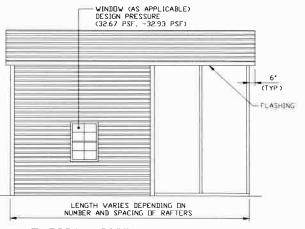
R = 3.25 $I_E = 10$ $V = C_S W$

S_{D1}= 1.258 g

15. WINDOW AND DOOR DESIGN PRESSURES ARE APPLICABLE TO THE STATE OF FLORIDA ONLY

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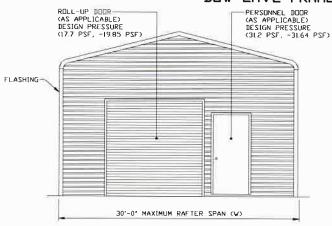


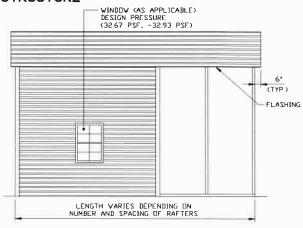
TYPICAL END ELEVATION

SCALE: NTS

TYPICAL SIDE ELEVATION SCALE: NTS

BOW EAVE FRAME RAFTER STRUCTURE



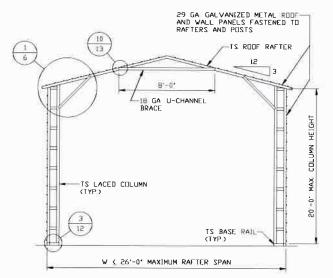


TYPICAL END ELEVATION

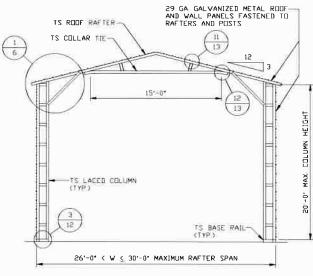
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TYPICAL SIDE ELEVATION

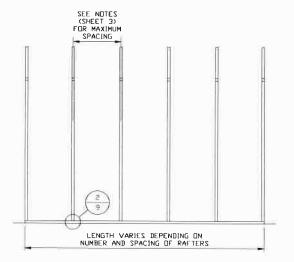
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$\frac{\text{TYPICAL RAFTER/COLUMN FRAME SECTION}}{\text{SCALE: NTS}}$

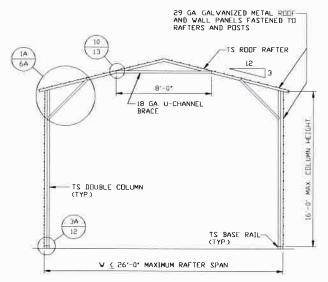


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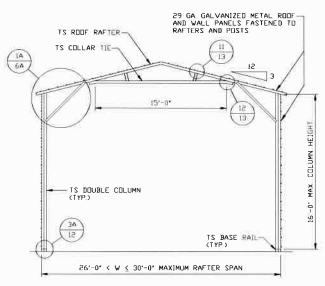


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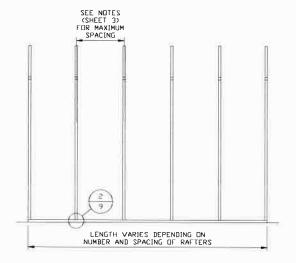
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TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS

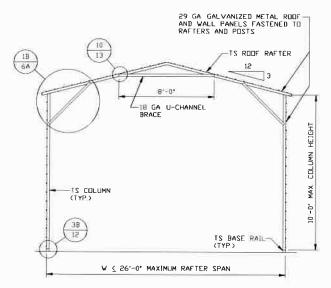


TYPICAL RAFTER/COLUMN FRAME SECTION
SCALE: NTS



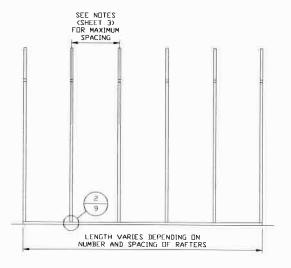
TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

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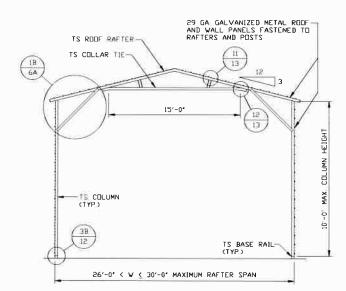
TYPICAL RAFTER/COLUMN FRAME SECTION

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TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS

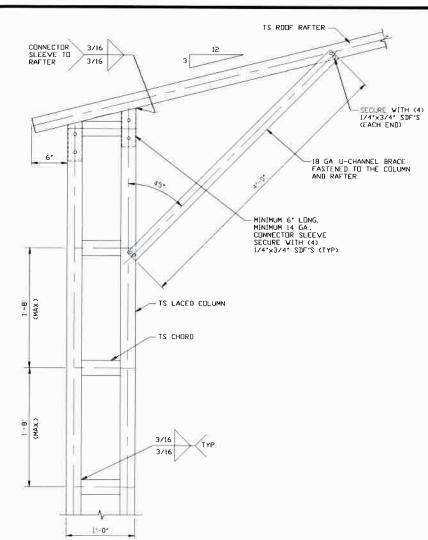


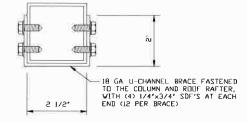
TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS

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BRACE SECTION SCALE: NTS

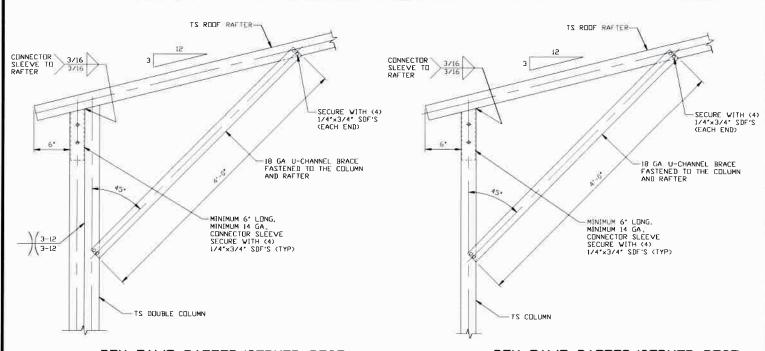
BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS 16'-0' < TO \(20'-0'')

SCALE: NTS

1

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SCALE: NTS

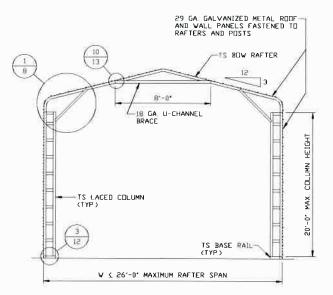
BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS 10'-0' < TO ≤ 16'-0" 1A SCALE: NTS

BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS ≤ 10'-0'

18 GA U-CHANNEL BRACE FASTENED TO THE COLUMN AND ROOF RAFTER, WITH (4) 1/4"x3/4" SDF'S AT EACH END (8 PER BRACE) 5 1/5.

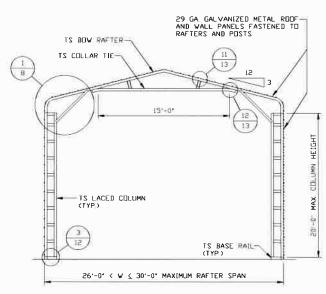
BRACE SECTION SCALE: NTS

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	MOUNT .			RY, NC 27030		
ENGINEERING AND CONSULTING, INC.	CHECKED BY: PDH	30'-0">	20'-0" UTILITY	STRU	CTURE	
				JOB N	D: 18068S/18156S	
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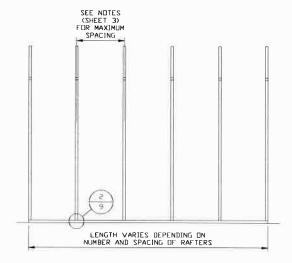


TYPICAL RAFTER/COLUMN FRAME SECTION

2CALE: N12

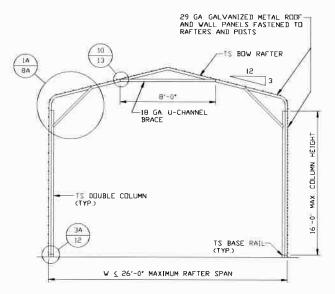


TYPICAL RAFTER/COLUMN FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

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TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS

29 GA GALVANIZED RETAL ROOF
AND WALL PANELS FASTENED TO
RAFTERS AND POSTS

TS COLLAR TIE

13

12

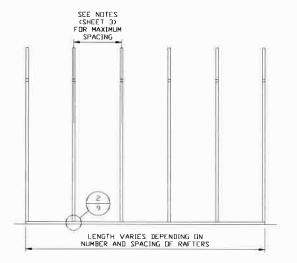
15'-0'

TS DOUBLE COLUMN
(TYP)

TS BASE RAIL
(TYP)

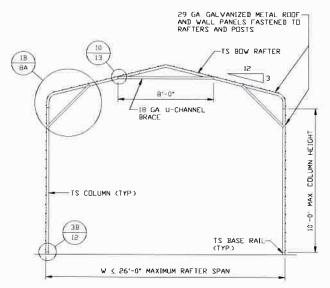
26'-0' (V (30'-0' MAXIMUM RAFTER SPAN

TYPICAL RAFTER/COLUMN FRAME SECTION SCALE: NTS

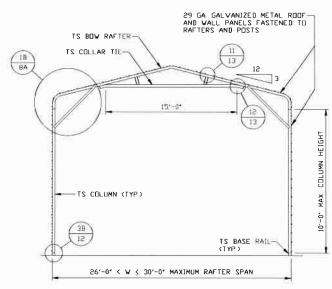


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

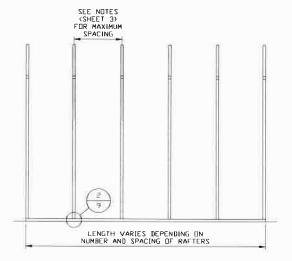
		STEEL BUI	STEEL BUILDINGS AND STRUCTURES, INC.				
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TYPICAL RAFTER/COLUMN FRAME SECTION



TYPICAL RAFTER/COLUMN FRAME SECTION

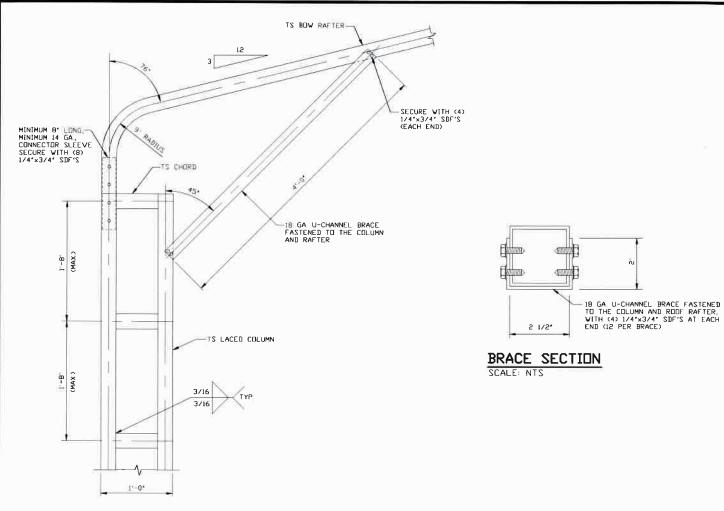


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

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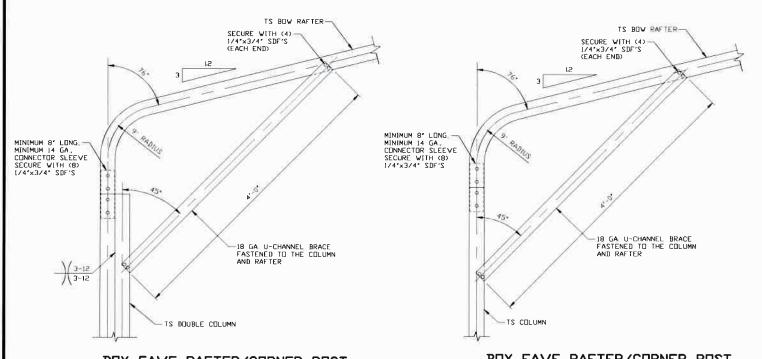


BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL

FOR HEIGHTS 16'-0' < TO < 20'-0'

SCALE: NTS

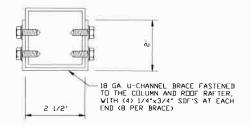
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BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL

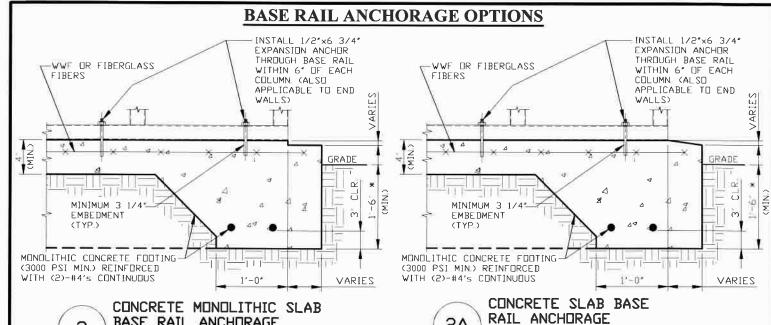
FOR HEIGHTS 10'-0' < TO \(\sigma\) 16'-0'

BOX EAVE RAFTER/CORNER POST CONNECTION DETAIL FOR HEIGHTS & 10'-0'



BRACE SECTION SCALE: NTS

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2A

BASE RAIL ANCHORAGE 2

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

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' 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:

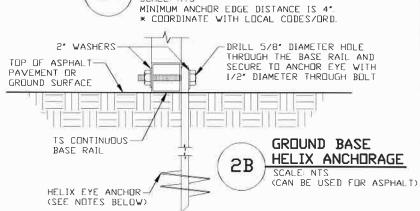
THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT,

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.
- 3 REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIFI D BENT

HELIX ANCHOR NOTES:

- I FOR VERY DENSE AND/OR CEMENTED SANDS, COARSE 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 LOOSE 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) 8° HELICES WITH MINIMUM 60° EMBEDMENT



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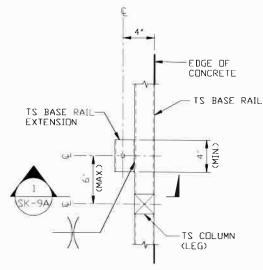
CLIENT: SBSI	SHT. 9	DVG. NO SK-2		REV. 9		
PROJECT MGR: WSM	DATE: 12-11-20	SCALE: NTS	JUB N 182905	Di 18068\$/18156\$ \$/20019\$/20324\$		
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DRAWN BY: LT		P.O. BOX 1	287,	• 10		

ADDITIONAL BASE RAIL ANCHORAGE OPTION

1/2'Ø EXPANSION ANCHOR

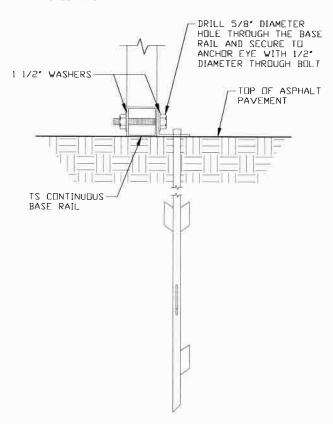
SK-9A

SECTION SCALE: NTS EDGE OF CONCRETE



TYPICAL ANCHOR DETAIL WHEN BASE RAIL IS NEAR EDGE OF CONCRETE

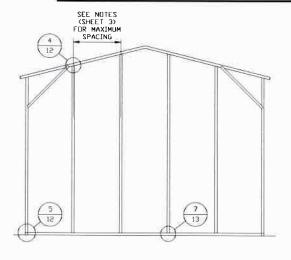
SCALE: NTS



2C ASPHALT BASE ANCHORAGE

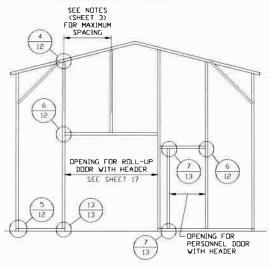
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



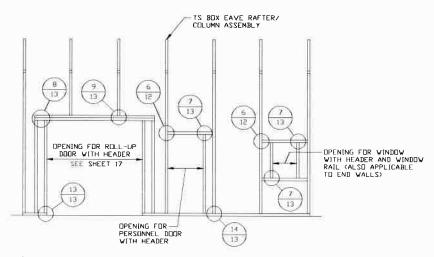
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

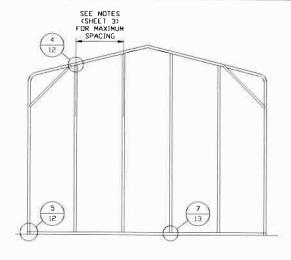
SCALE: NTS



TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

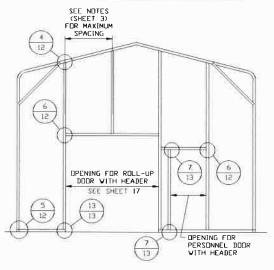
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BOW EAVE RAFTER END WALL AND SIDE WALL OPENINGS



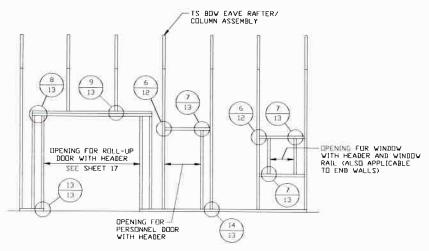
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



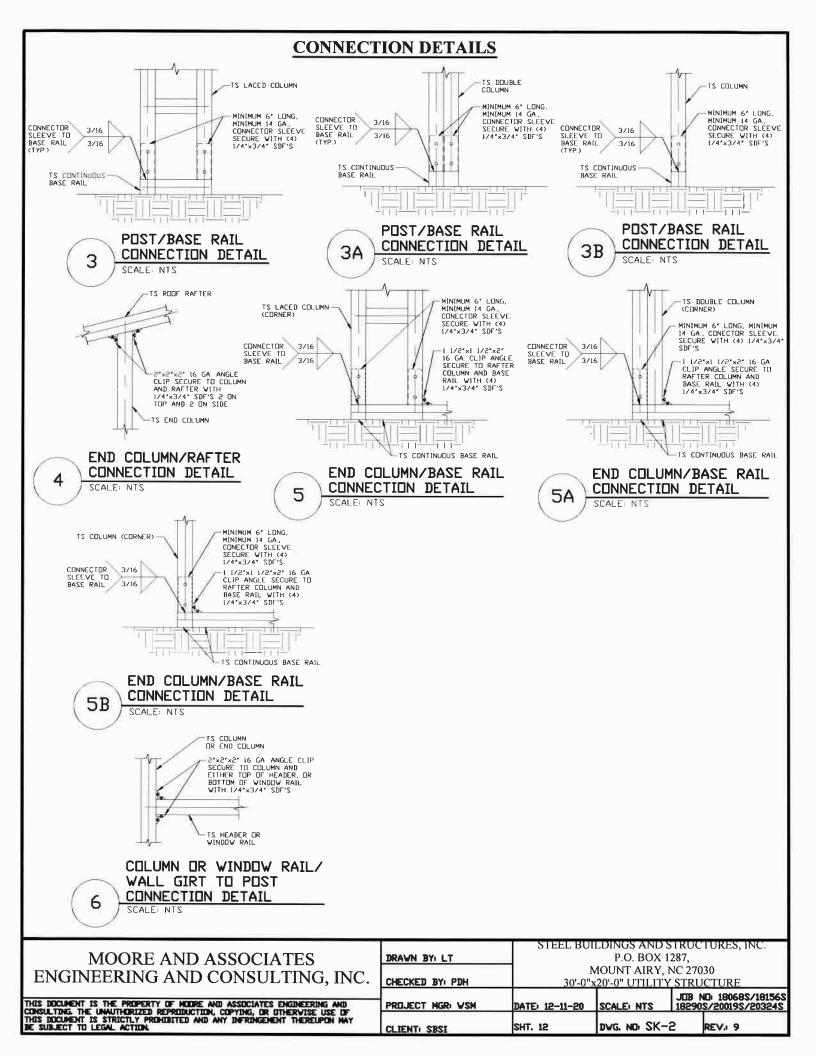
TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

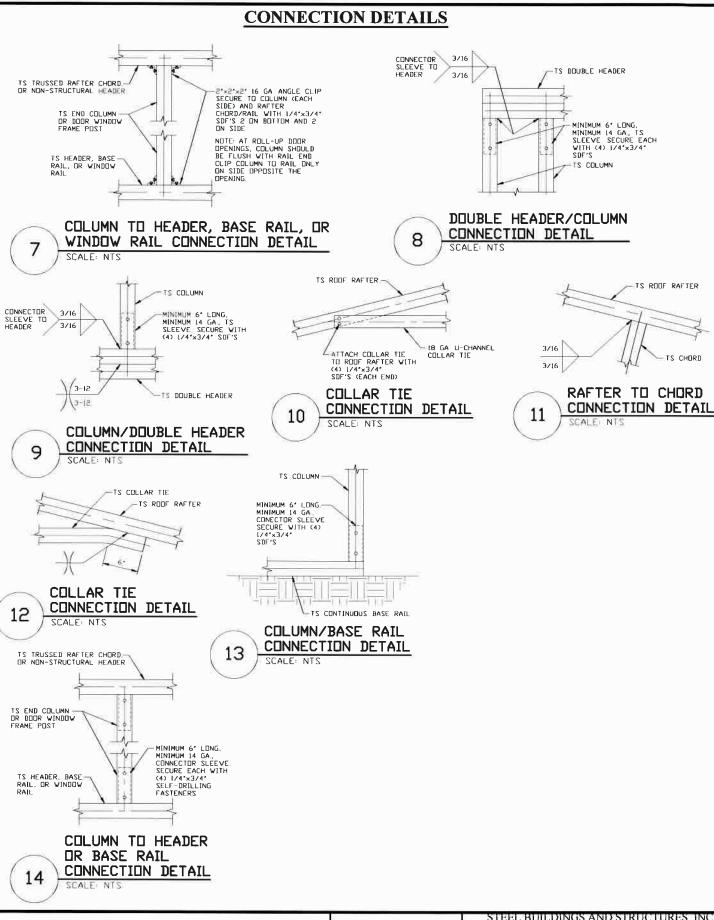
SCALE: NTS



TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

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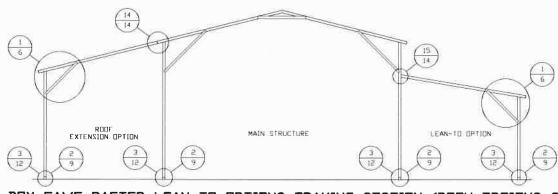


TS ROOF RAFTER

TS CHORD

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BOX EAVE RAFTER LEAN-TO OPTIONS



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

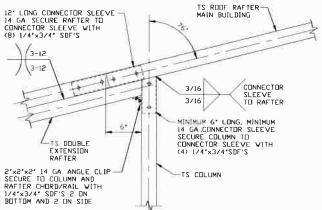
SCALE: NTS

MAXIMUM WIDTH OF SINGLE TS ROOF EXTENSION LEAN-TO IS 12'-0".

MAXIMUM WIDTH OF DOUBLE TS ROOF EXTENSION LEAN-TO IS 16'-0".

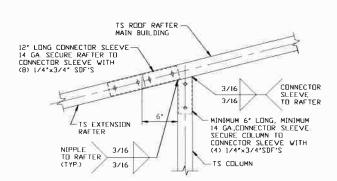
MAXIMUM SINGLE COLUMN HEIGHT FOR MAIN BUILDING WITH ROOF EXTENSION LEAN-TO ATTACHED IS 8'-0".

FOR COLUMN CONFIGURATIONS REFERENCE RAFTER COLUMN CONNECTION DETAILS

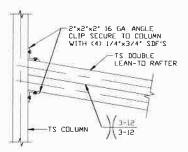


SIDE EXTENSION RAFTER/
COLUMN DETAIL FOR RAFTER

SPANS 12'-0' < TO < 16'-0'



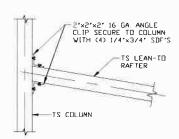
SIDE EXTENSION RAFTER/COLUMN DETAIL FOR RAFTER SPANS & 12'-0'



LEAN-TO RAFTER
TO RAFTER POST
CONNECTION DETAIL
FOR WIDTHS
12'-0' < TO < 16'-0'
SCALE: NTS

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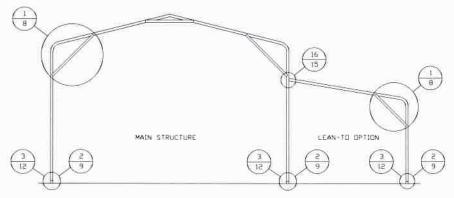


LEAN-TO RAFTER
TO RAFTER POST
CONNECTION DETAIL
FOR WIDTHS & 12'-0'
SCALE: NTS

MOORE AND ASSOCIATES

15A

BOW EAVE RAFTER LEAN-TO OPTIONS



TYPICAL BOW EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION

SCALE: NTS

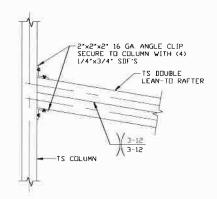
MAXIMUM WIDTH OF SINGLE TS ROOF EXTENSION LEAN-TO IS 12'-0'.

MAXIMUM WIDTH OF DOUBLE TS ROOF EXTENSION LEAN-TO IS 16'-0'.

MAXIMUM WIDTH OF DOUBLE TS ROOF EXTENSION LEAN-TO IS 16'-0'.

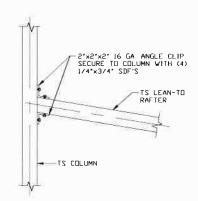
MAXIMUM SINGLE COLUMN HEIGHT FOR MAIN BUILDING WITH ROOF EXTENSION LEAN-TO ATTACHED IS 8'-0'.

FOR COLUMN CONFIGURATIONS REFERENCE RAFTER COLUMN CONNECTION DETAILS.



LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS 12'-0' < TO \(\) 16'-0'

16



LEAN-TO RAFTER
TO RAFTER POST
CONNECTION DETAIL
FOR WIDTHS & 12'-0'
SCALE: NTS

CLIENT: SBSI

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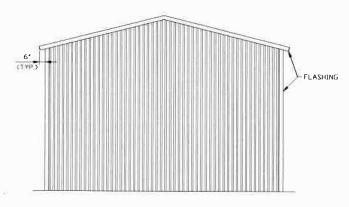
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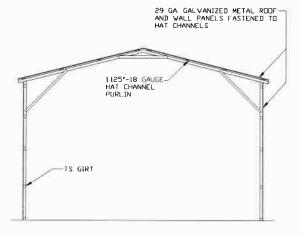
SHT. 15

BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



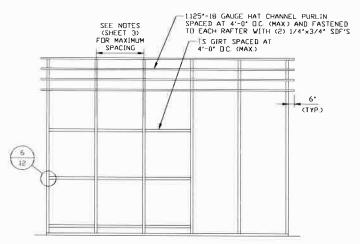
TYPICAL END ELEVATION VERTICAL ROOF/SIDING

SCALE: NTS



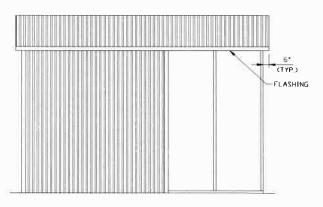
TYPICAL SECTION VERTICAL ROOF/SIDING OPTION

SCALE: NTS



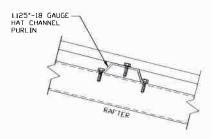
TYPICAL FRAMING SECTION VERTICAL ROOF/SIDING OPTION

SCALE: NTS



TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING

SCALE: NTS

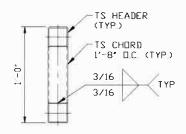


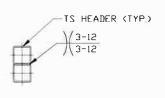
PANEL ATTACHMENT

(ALTERNATE FOR VERTICAL ROOF PANELS)

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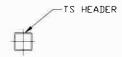
SIDE WALL HEADER OPTIONS



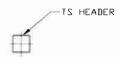


LACED HEADER DETAIL FOR DOOR OPENINGS 12'-0' < LENGTH < 20'-0'

DOUBLE HEADER DETAIL FOR DOOR OPENINGS 7'-0' < LENGTH < 12'-0'



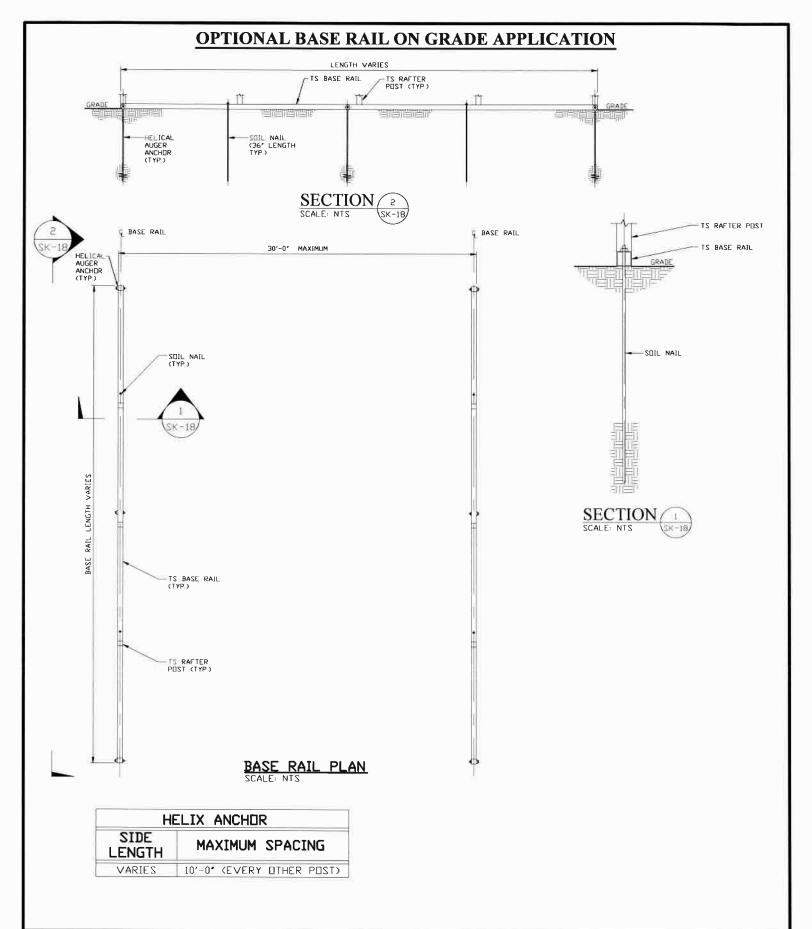
END WALL HEADER OPTIONS



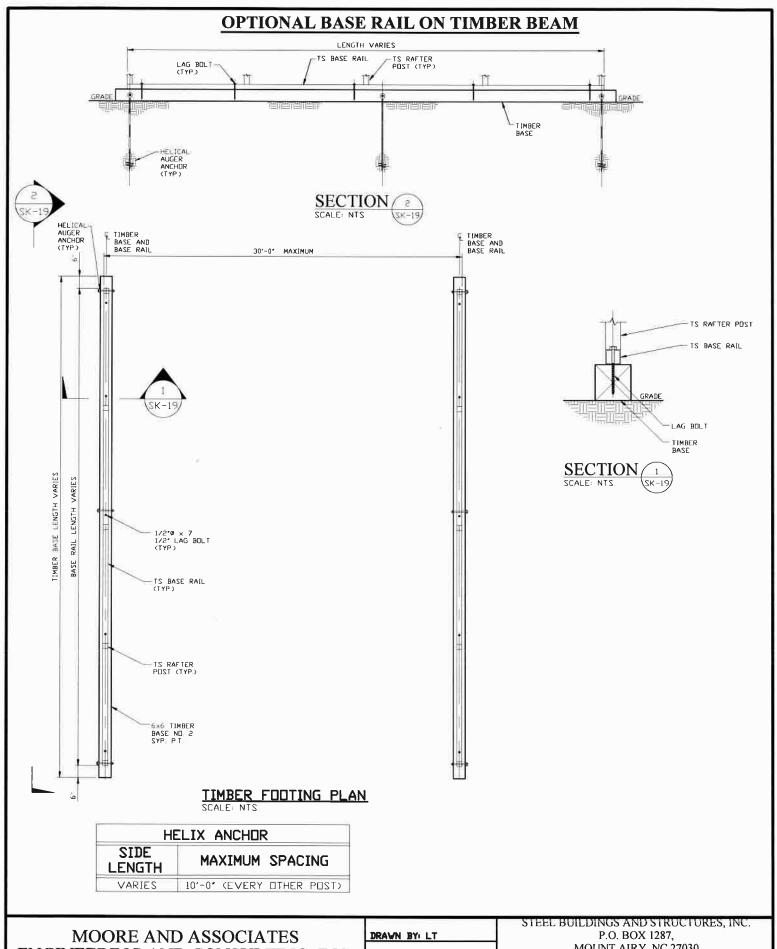
SINGLE HEADER DETAIL F□R
D□□R □PENINGS LENGTH ≤ 12'-0'
SCALE: NTS

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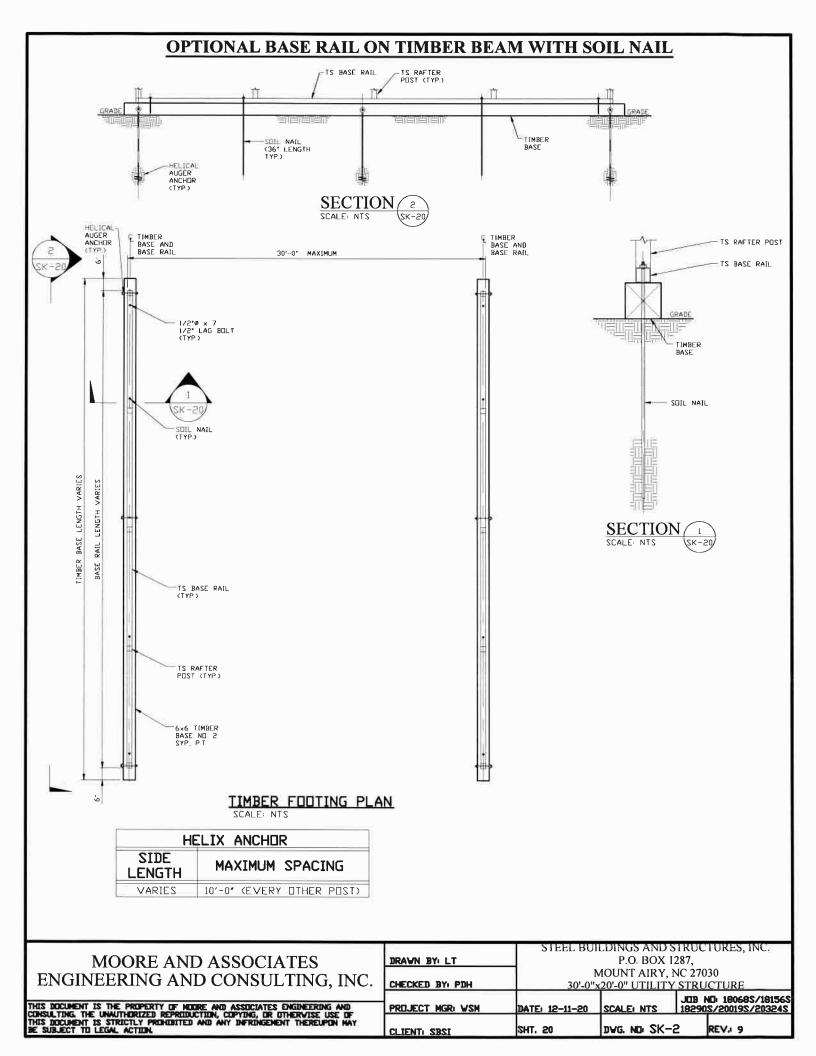
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OPTIONAL CONCRETE STRIP FOOTING FOOTING AND BASE RAIL FOOTING AND BASE RAIL 30'-0" MAXIMUM LENGTH VARIES LENGTH 1/2"Ø EXPANSION ANCHOR (TYP) RA1L FOOTING TS BASE RAIL TS RAFTER POST (TYP) CONCRETE STRIP FOOTING (3000 PSI MIN) CONCRETE STRIP FOOTING PLAN SCALE: NTS TS RAFTER POST TS BASE RAIL GRADE (MIN) 2-#4, CONT. T&B .9-1 INSTALL 1/2'x6 3/4' EXPANSION ANCHOR THROUGH BASE RAIL WITHIN 6' OF EACH COLUMN MINIMUM 3 1/4' EMBEDMENT (TYP) CLR COMPACT SUBGRADE

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PROJECT MGR: VSM DATE: 12-11-20 SCALE: NTS 18290\$/20019\$/20324\$

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