John Tripp
1834 Thomas Kelly Rd.
Sanford, NC 27330

STRUCTURAL DESIGN

ENCLOSED BUILDING

MAXIMUM 30'- 0" WIDE X 16'- 0" EAVE HEIGHT- BOX EAVE FRAME AND BOW FRAME

24 October 2018
Revision 1
M&A Project No. 17171S/18253S

Prepared for:

Carport Central, Inc.
737 South Main Street
Mt. Airy, NC 27030

Prepared by:

Moore and Associates Engineering and Consulting, Inc.

1009 East Avenue
North Augusta, SC 29841

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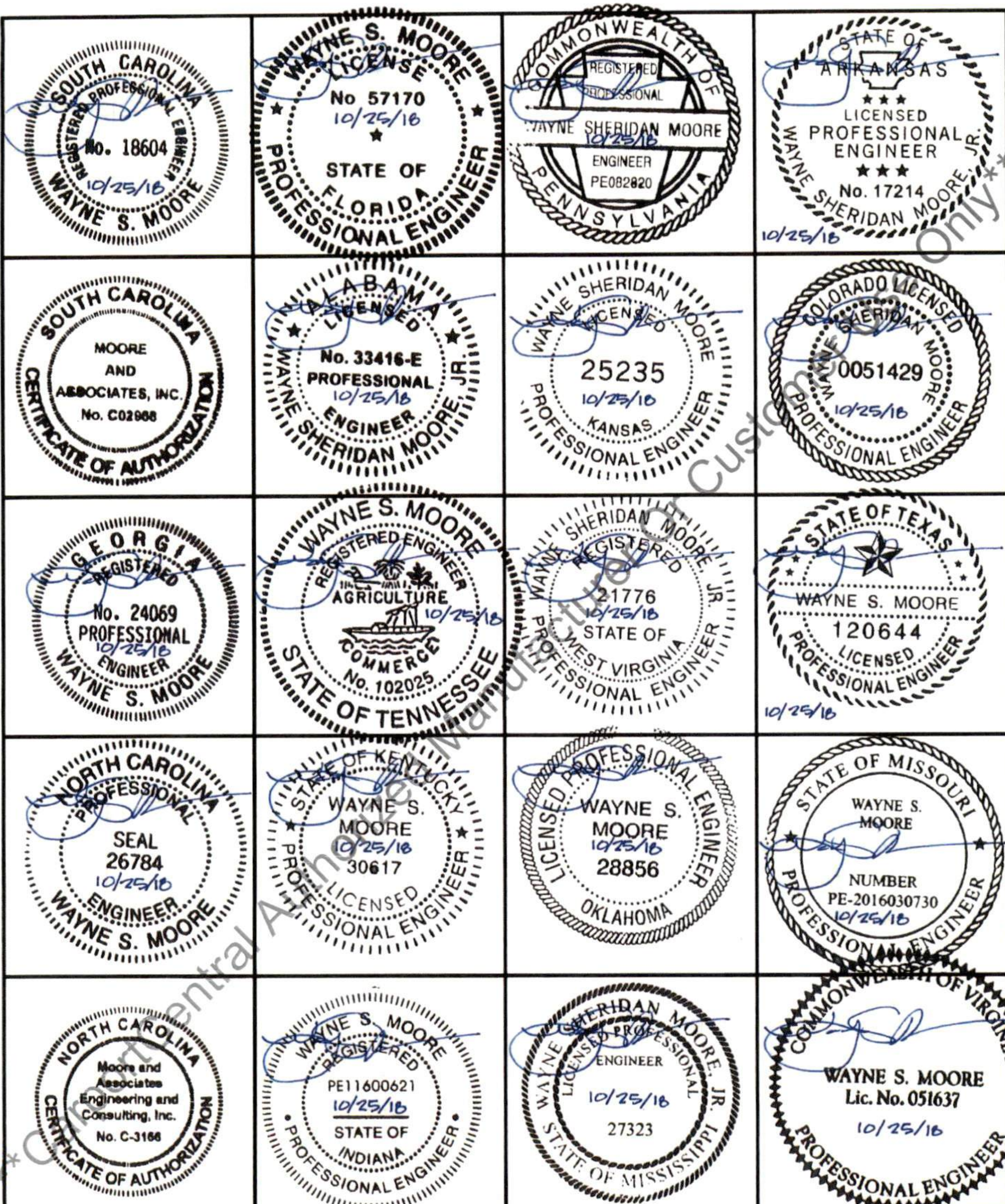
MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING



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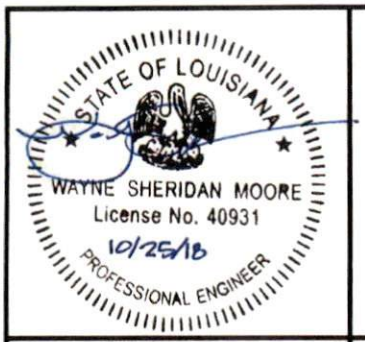
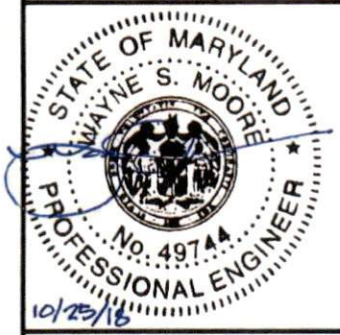
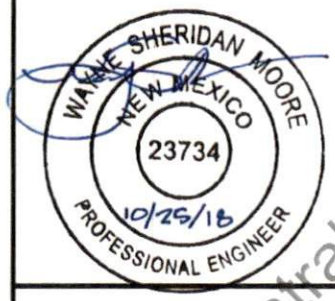
	CLIENT: CC	SHT. 1	DWG. NO: SK-3	REV.: 1





Professional Certification.
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 49744, Expiration Date 8/8/19



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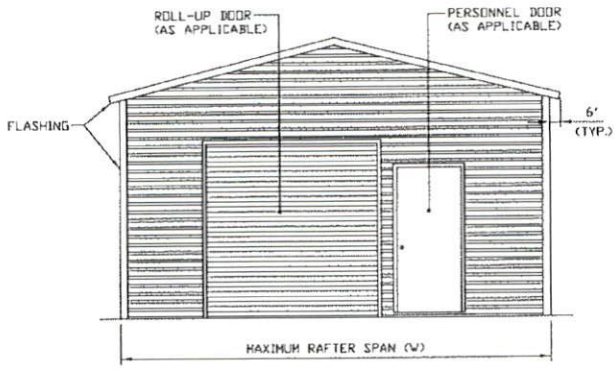
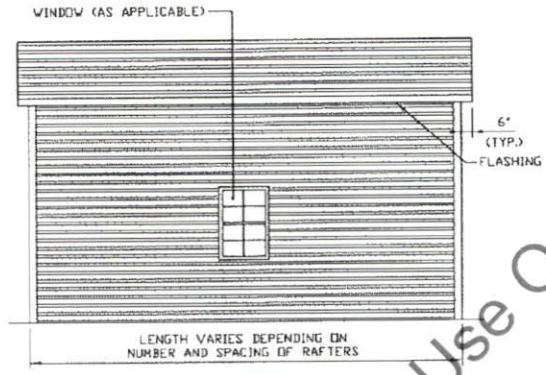
BOX EAVE FRAME RAFTER STRUCTURE (Sheets 4, 5, 8, 9, 11, 12, 13, AND 15)

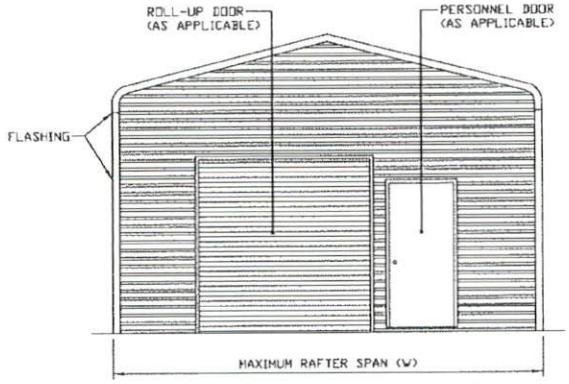


TYPICAL END ELEVATION-HORIZONTAL ROOF
SCALE: NTS

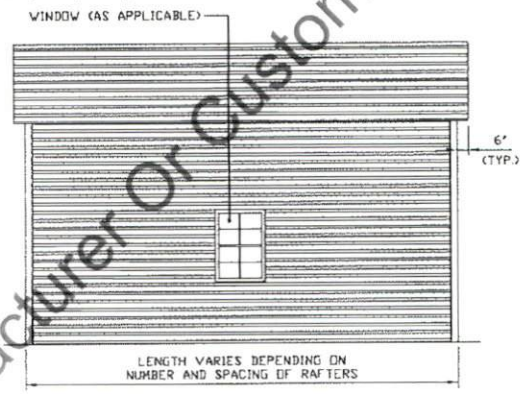


TYPICAL SIDE ELEVATION-HORIZONTAL ROOF
SCALE: NTS

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



TYPICAL END ELEVATION
SCALE: NTS



TYPICAL END ELEVATION
SCALE: NTS

INSTALLATION NOTES AND SPECIFICATIONS

1. DESIGN IS FOR MAXIMUM 30'-0" WIDE x 16'-0" EAVE HEIGHT ENCLOSED STRUCTURES.
2. DESIGN WAS DONE IN ACCORDANCE WITH THE 2018 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
   C) GROUND SNOW LOAD = 30 PSF ($\leq$ 26'-0"), 35 PSF (26'-0" < W $\leq$ 30'-0")
4. ULTIMATE WIND SPEED 105 TO 145 MPH (NOMINAL WIND SPEED 82 TO 113 MPH); MAXIMUM RAFTER/COLUMN AND END COLUMN SPACING = 5.0 FEET (UNLESS NOTED OTHERWISE).
5. END WALL COLUMNS (POST) ARE SIMILAR TO SIDE WALL POSTS UNLESS NOTED OTHERWISE.
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 (UNLESS NOTED OTHERWISE).
9. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR HAT CHANNELS, AND COLUMNS (INTERIOR OR END) = 8 INCHES.
10. FASTENERS CONSIST OF 1/4"x3/4" (UNLESS OTHERWISE NOTED) 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 COLUMN.
12. GROUND ANCHORS CONSIST OF #4 REBAR W/ WELDED NUT x 36" LONG IN SUITABLE SOIL CONDITIONS. OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED.
13. WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:
    SOIL SITE CLASS = D
    RISK CATEGORY I/II/III
    R= 3.25 I_E= 1.0
    S_{DS}= 2.039 g V= C_SW
    S_{D1}= 1.258 g

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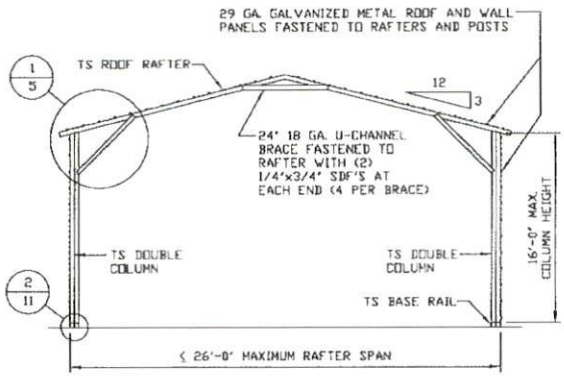
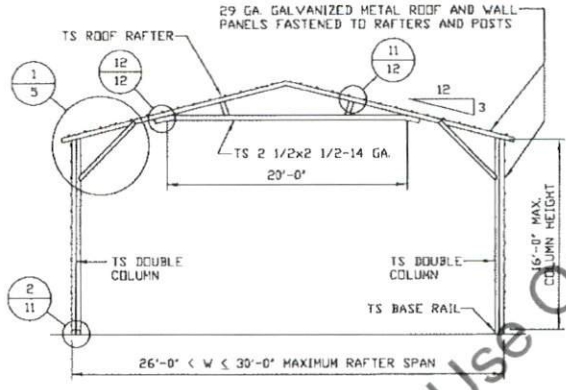
	CLIENT: CC	SHT. 3	DWG. NO: SK-3	REV.: 1



TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS



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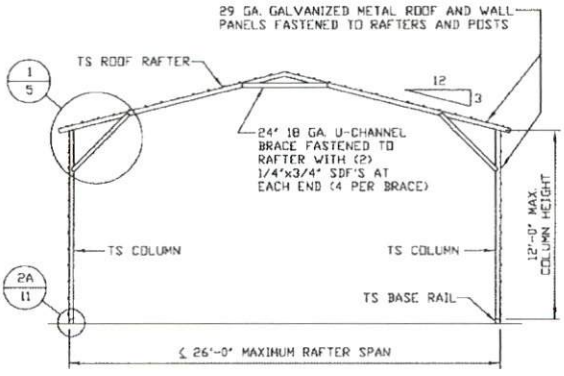

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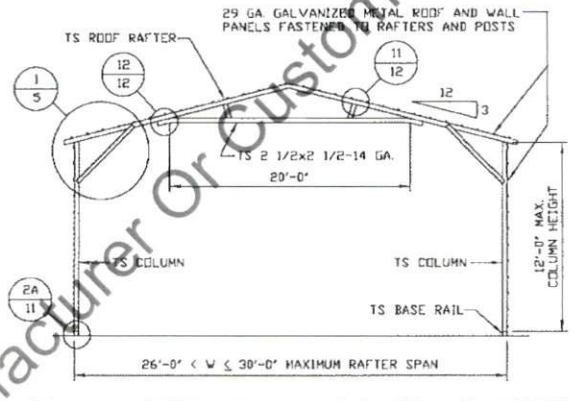

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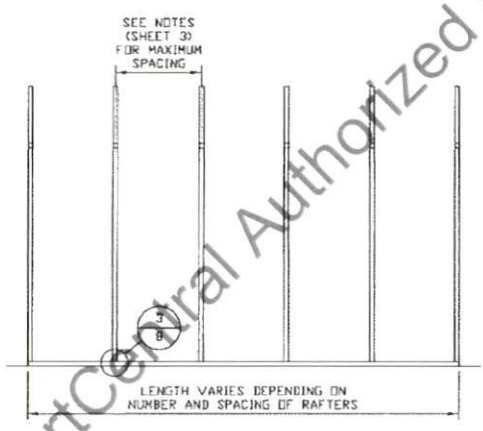

TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
SCALE: NTS

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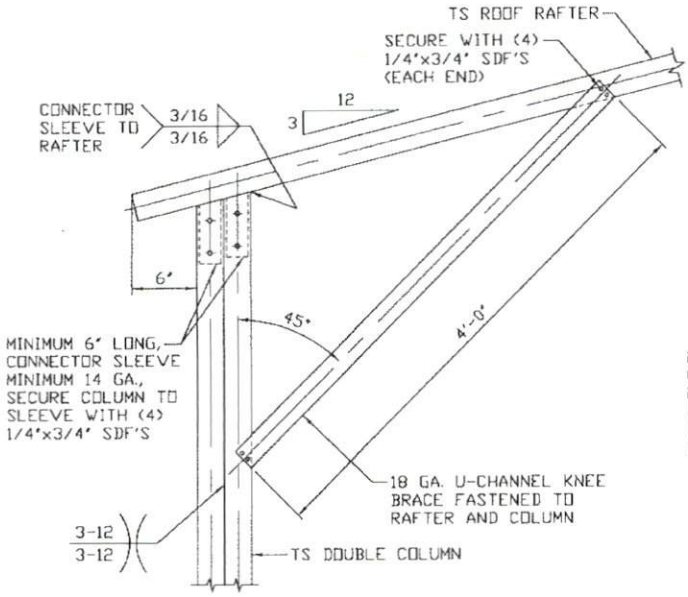
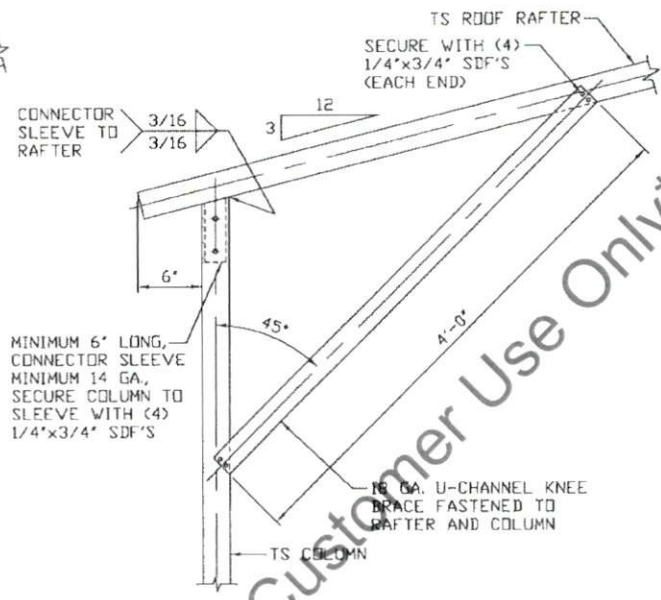


1 BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 12'-0" < TO ≤ 16'-0"
SCALE: NTS



1A BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10'-0" < TO ≤ 12'-0"
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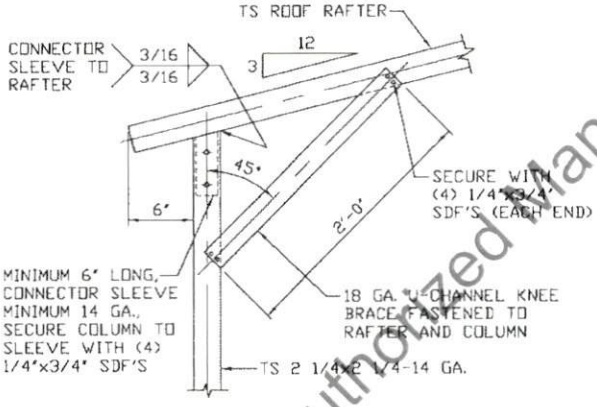

1B BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS ≤ 10'-0"
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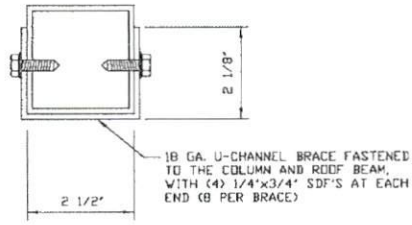

BRACE SECTION
SCALE: NTS

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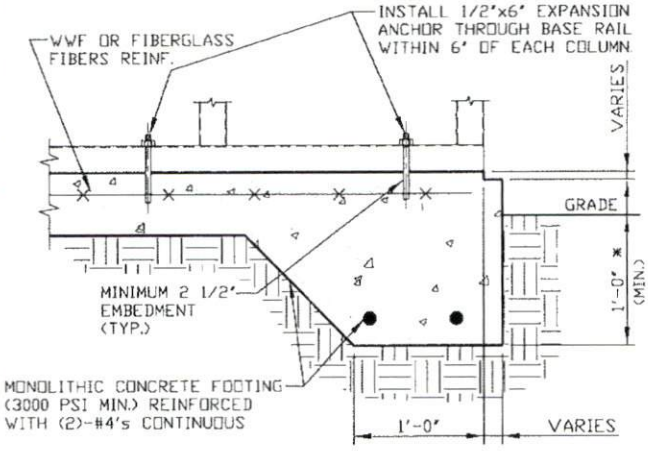
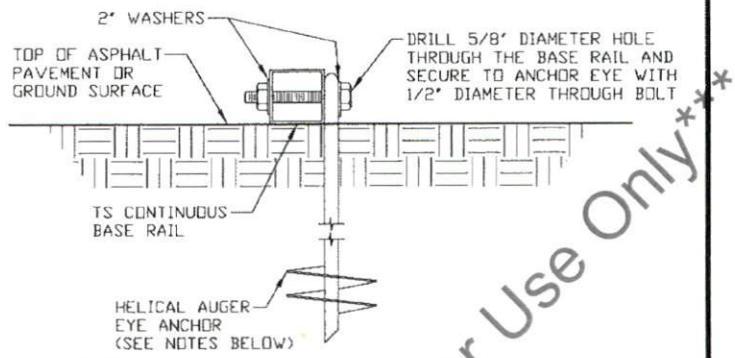
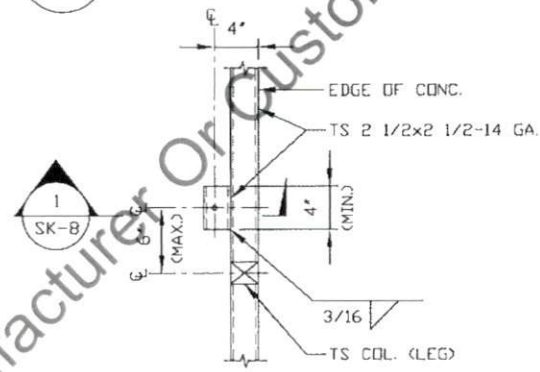
BASE RAIL ANCHORAGE OPTIONS



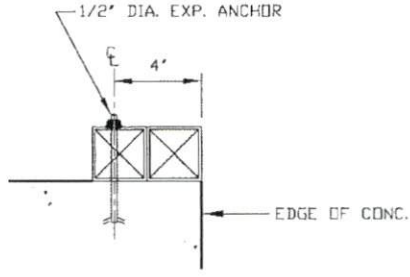
3A CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE
SCALE: NTS
MINIMUM ANCHOR EDGE DISTANCE IS 4".



3B HELICAL AUGER ANCHORAGE
SCALE: NTS (CAN BE USED FOR ASPHALT)



TYPICAL ANCHOR DETAIL WHEN BASE RAIL IS NEAR EDGE OF CONCRETE
SCALE: NTS



SECTION 1 SK-8
SCALE: NTS

GENERAL NOTES

NOTE: CONCRETE MONOLITHIC SLAB DESIGN BASED ON MINIMUM SOIL 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" 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:

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.

HELICAL AUGER 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" 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 50" 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" EMBEDMENT.

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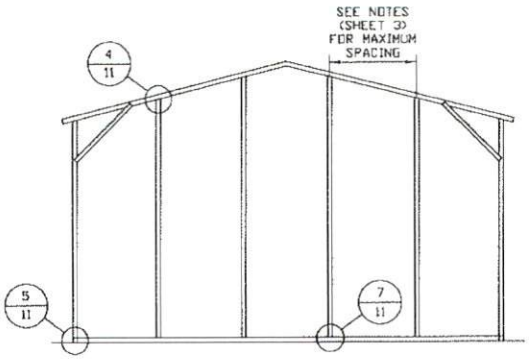
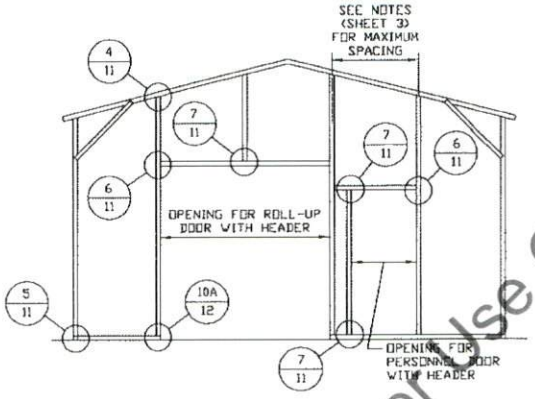
	CLIENT: CC	SHT. 8	DWG. NO: SK-3	REV.: 1

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

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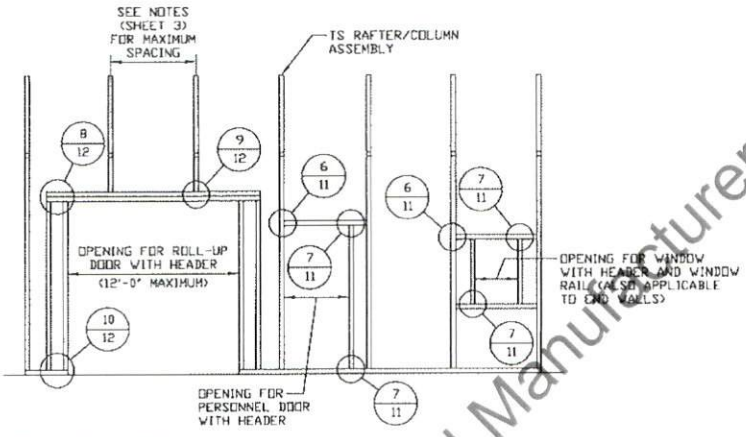

TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

SCALE: NTS

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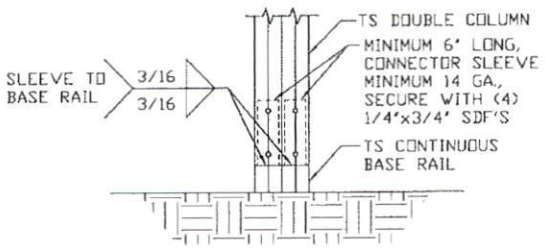
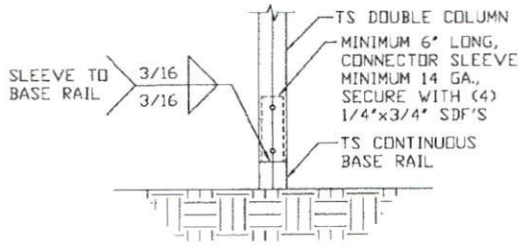
BOW AND BOX EAVE RAFTER WALL OPENING DETAILS



2 RAFTER COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



2A RAFTER COLUMN/BASE RAIL CONNECTION DETAIL
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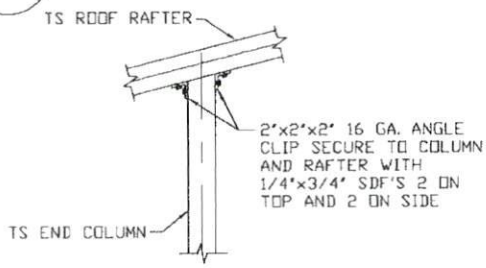

4 END COLUMN/RAFTER CONNECTION DETAIL
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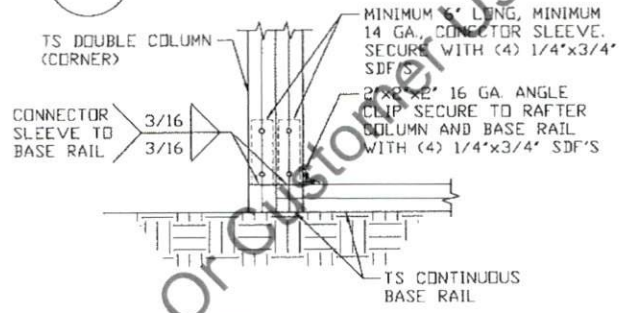

5 END COLUMN/BASE RAIL CONNECTION DETAIL
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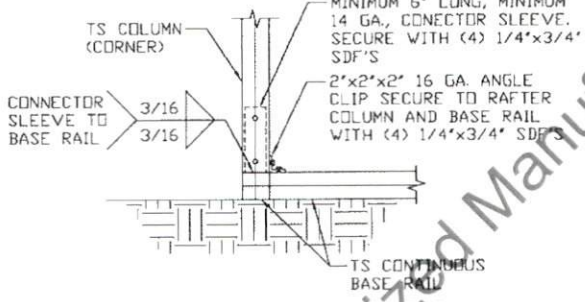

5A END COLUMN/BASE RAIL CONNECTION DETAIL
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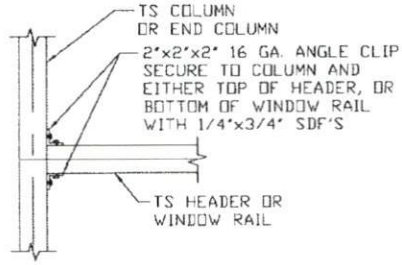

6 COLUMN OR WINDOW RAIL TO POST CONNECTION DETAIL
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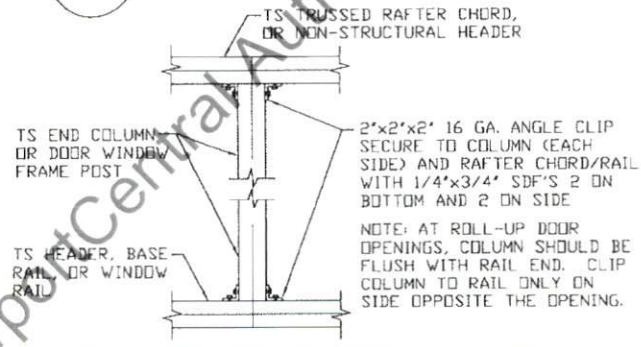

7 COLUMN TO HEADER, BASE RAIL, OR WINDOW RAIL CONNECTION DETAIL
SCALE: NTS

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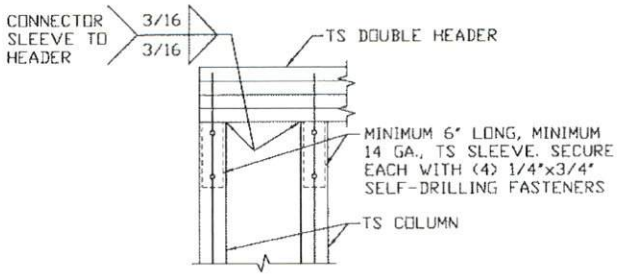
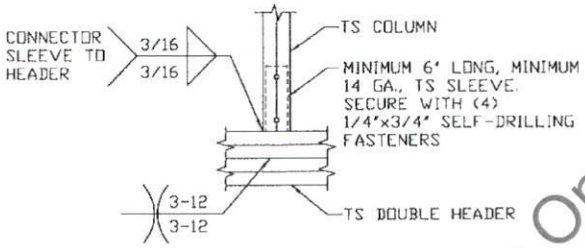
	CLIENT: CC	SHT. 11	DWG. NO: SK-3	REV: 1

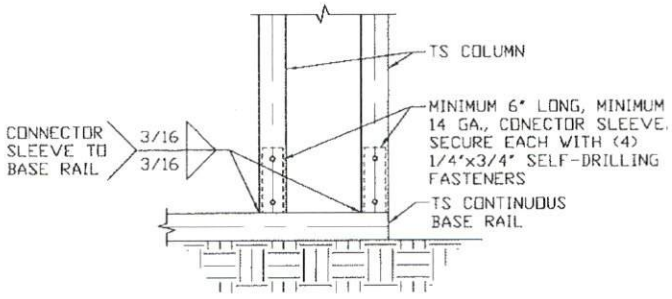
BOW AND BOX EAVE RAFTER WALL OPENING DETAILS



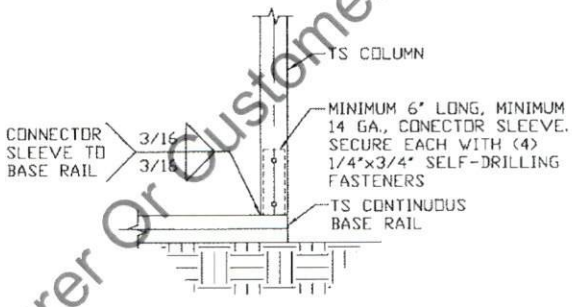
8 DOUBLE HEADER/COLUMN CONNECTION DETAIL
SCALE: NTS



9 COLUMN/DOUBLE HEADER CONNECTION DETAIL
SCALE: NTS



10 COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



10A COLUMN/BASE RAIL CONNECTION DETAIL
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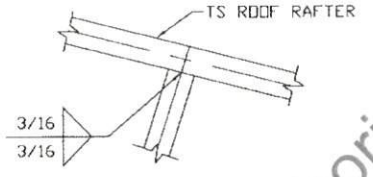
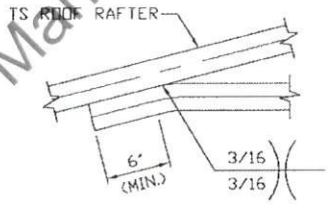


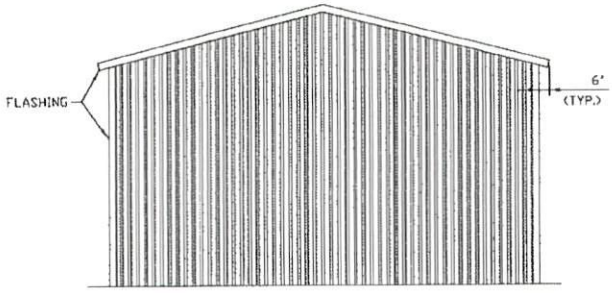
11 RAFTER TO CHORD CONNECTION DETAIL
SCALE: NTS



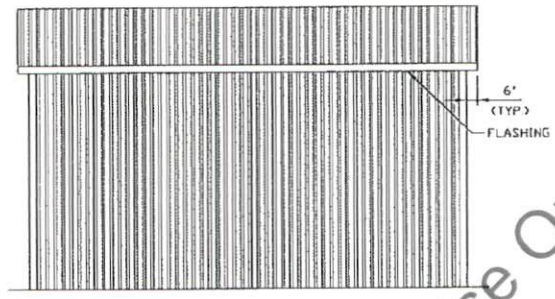
12 COLLAR TIE CONNECTION DETAIL
SCALE: NTS

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: LT	John Tripp 1834 Thomas Kelly Rd. Sanford, NC 27330		
	CHECKED BY: PDH			
	PROJECT MGR: WSH	DATE: 10-24-18	SCALE: NTS	JOB NO: 17171S/18253S
	CLIENT: CC	SHT. 12	DWG. NO: SK-3	REV.: 1

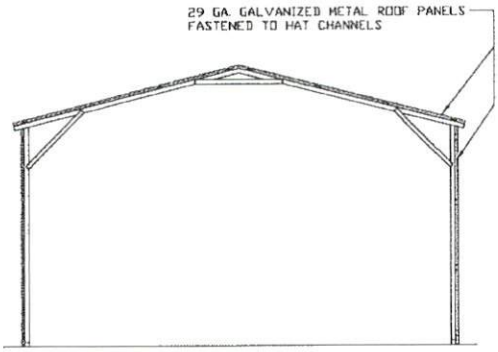
BOX EAVE RAFTER VERTICAL ROOF OPTION



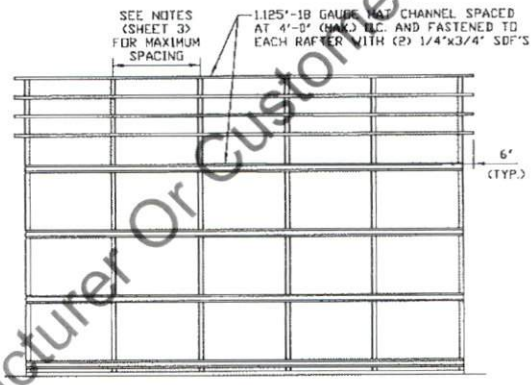
TYPICAL END ELEVATION
VERTICAL ROOF
SCALE: NTS



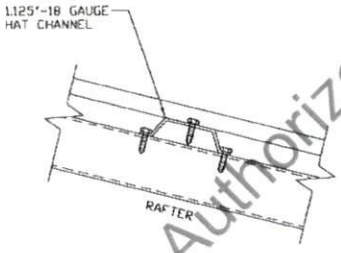
TYPICAL SIDE ELEVATION
VERTICAL ROOF
SCALE: NTS



TYPICAL SECTION
VERTICAL ROOF OPTION
SCALE: NTS



TYPICAL FRAMING SECTION
VERTICAL ROOF OPTION
SCALE: NTS



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

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: LT	John Tripp 1834 Thomas Kelly Rd. Sanford, NC 27330		
	CHECKED BY: PDH			
	PROJECT MGR: WSH	DATE: 10-24-18	SCALE: NTS	JOB NO: 171715/182535
	CLIENT: CC	SHT. 15	DWG. NO: SK-3	REV: 1