

NOTICE TO CONTRACTOR
All construction shall comply with Current NC Building Codes
and is subject to field inspection and verification.

APPROVED
Contract building only in accordance
with building requirements for
full compliance with the code.

06/02/2020



NC



PILOT MOUNTAIN, NORTH CAROLINA

**STRUCTURAL DESIGN
ENCLOSED BUILDING**

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

25 June 2019
Revision 1

M&A Project No. 18315S/19179S

Prepared for:

NC Carports and Garages, LLC
309 S. Depot Street
Pilot Mountain, NC 27041

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



MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING

MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING, INC.

DRAWN BY: JG

CHECKED BY: PH

PROJECT MGR: WSM

CLIENT: NC CARPORTS

NC CARPORTS AND GARAGES, LLC
309 S. DEPOT STREET
PILOT MOUNTAIN, NC 27041
30'-0" x 16'-0" ENCLOSED STRUCTURE

DATE: 6-25-19

SHT. 1

SCALE: NTS

DWG. NO: SK-3

JOB NO:
18315S/19179S

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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 2009 INTERNATIONAL BUILDING CODE (IBC), 2012 IBC AND 2015 IBC
- 3 DESIGN LOADS ARE AS FOLLOWS
 - A) DEAD LOAD = 15 PSF
 - B) LIVE LOAD = 12 PSF
 - C) GROUND SNOW LOAD = 35 PSF
 - = 30 PSF (W ≤ 24'-0" WITH U-CHANNEL COLLAR TIE)
- 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 SIDEWALL COLUMNS AND ENDWALL COLUMNS ARE SIMILAR IN SIZE 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" x 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) = 9 INCHES
- 11 FASTENERS CONSIST OF #12-14x3/4" SELF-DRILLING FASTENER (SDF), USE CONTROL SEAL WASHER WITH EXTERIOR FASTENERS SPECIFICATIONS APPLICABLE ONLY FOR MEAN ROOF HEIGHT OF 16 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 COLUMN.
- 13 STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT 30" LONG SOIL NAILS MAY BE USED FOR WIND SPEEDS ≤ 145 MPH AND IN SUITABLE SOIL CONDITIONS OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED FOR WIND SPEEDS > 145 MPH AND/OR IN SUITABLE SOILS AS NOTED
- 14 WIND FORCES GOVERN OVER SEISMIC FORCES SEISMIC PARAMETERS ANALYZED ARE
 - SOIL SITE CLASS = D
 - RISK CATEGORY I/II/III
 - R = 325 I_g = 10
 - S_{DS} = 2039 V = C_sW
 - S₁ = 1259

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30'-0" x 16'-0" ENCLOSED STRUCTURE

DATE: 6-25-19

SHT. 3A

SCALE: NTS

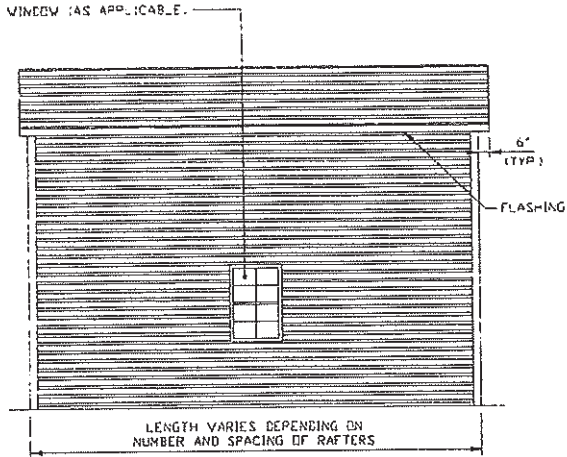
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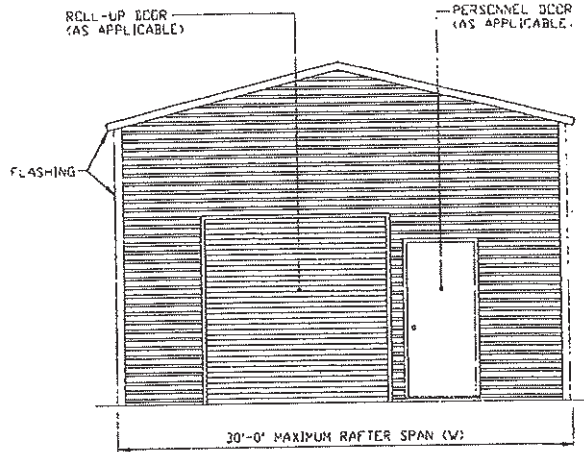
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BOX EAVE FRAME RAFTER STRUCTURE



TYPICAL SIDE ELEVATION
SCALE: NTS



TYPICAL END ELEVATION
SCALE: NTS

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SHT. 3B

SCALE: NTS

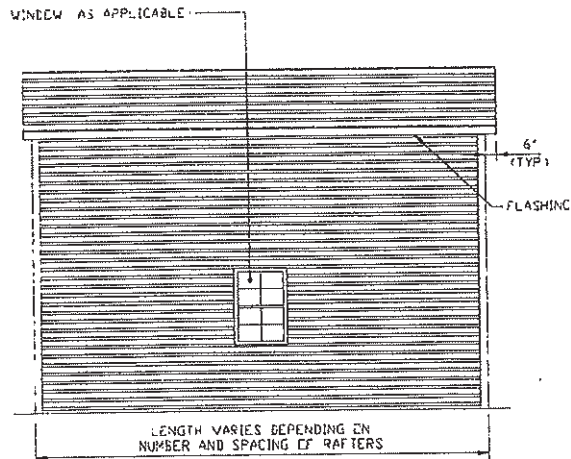
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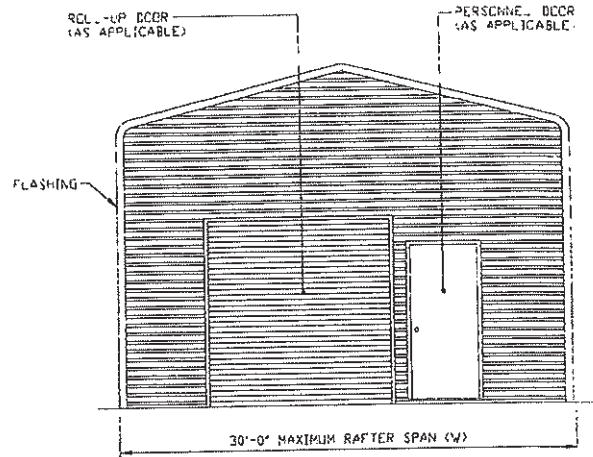
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BOW EAVE FRAME RAFTER STRUCTURE



TYPICAL SIDE ELEVATION
SCALE: NTS



TYPICAL END ELEVATION
SCALE: NTS

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SHT: 3C

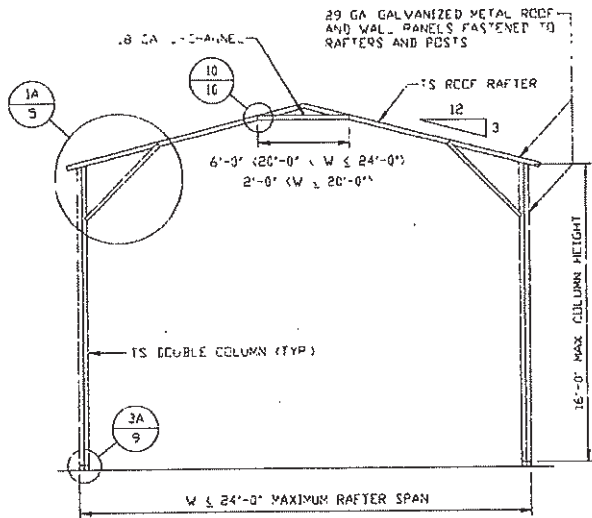
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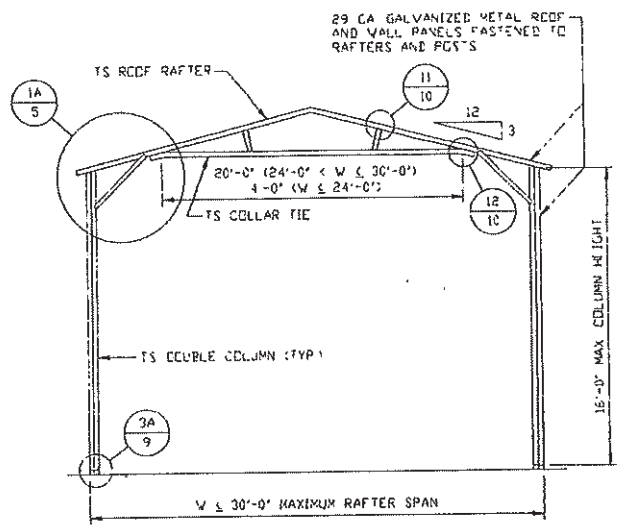
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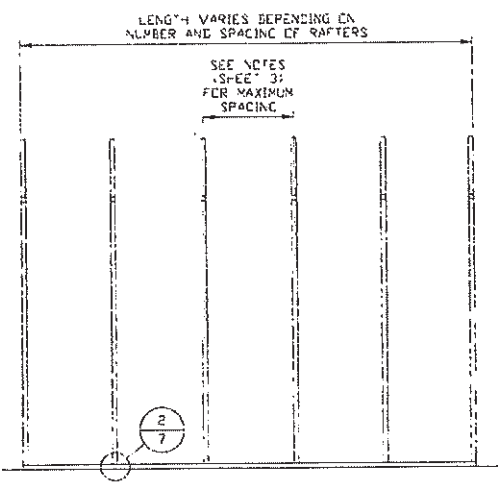
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TYPICAL RAFTER/COLUMN FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
SCALE: NTS

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SHT. 4

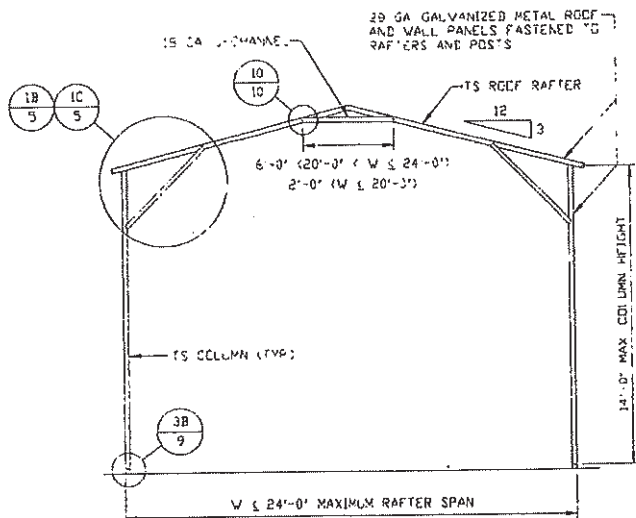
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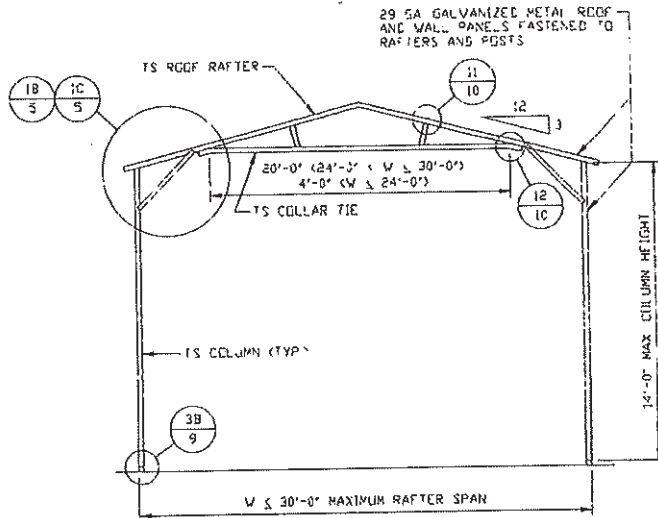
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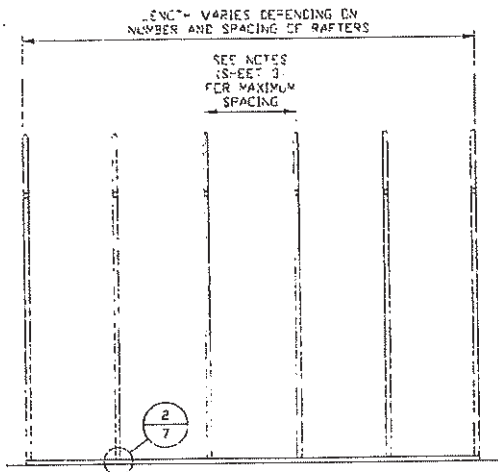
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TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
SCALE: NTS

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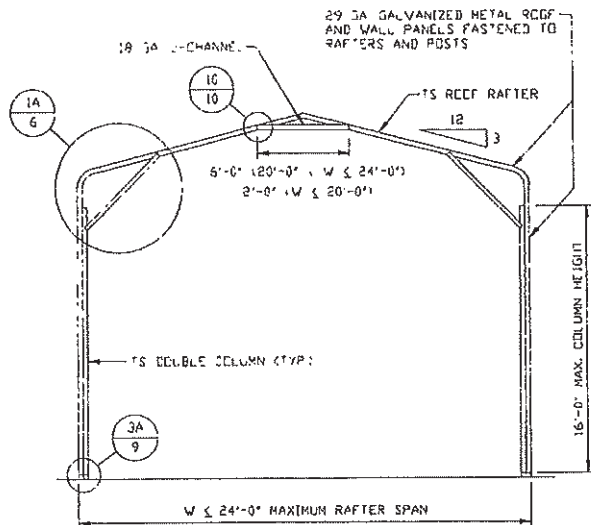
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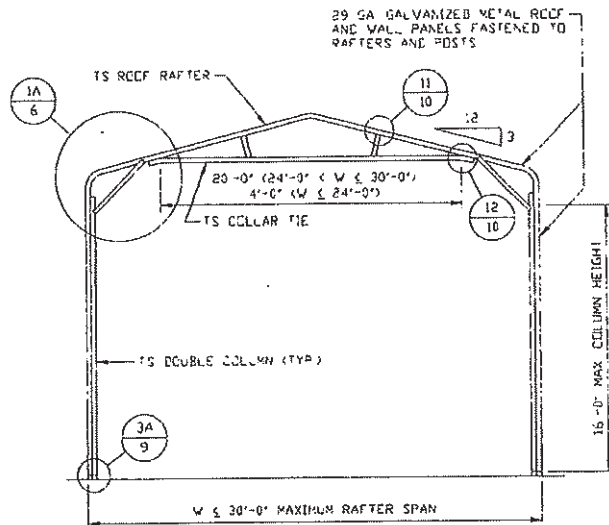
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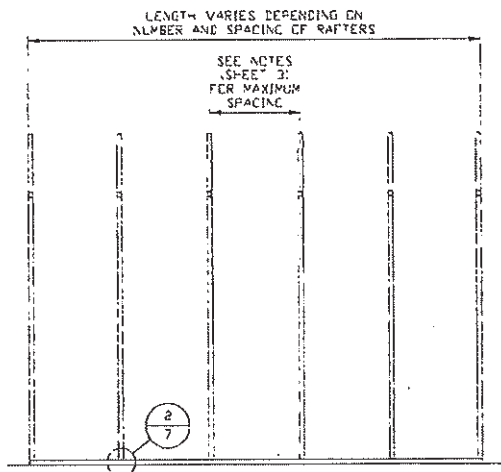
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TYPICAL RAFTER/COLUMN FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
SCALE: NTS

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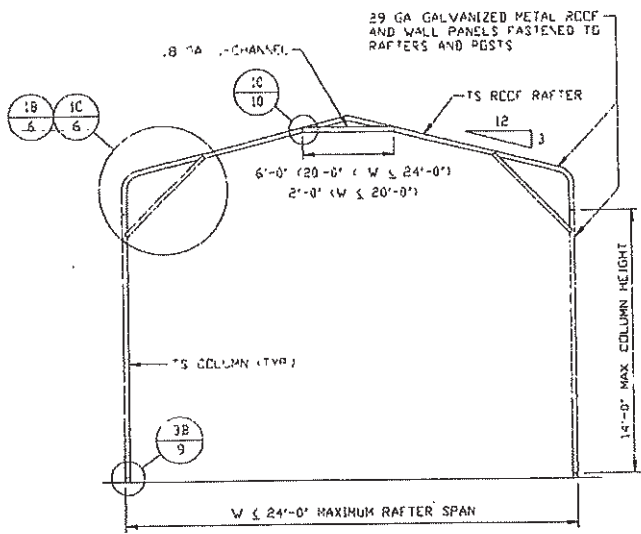
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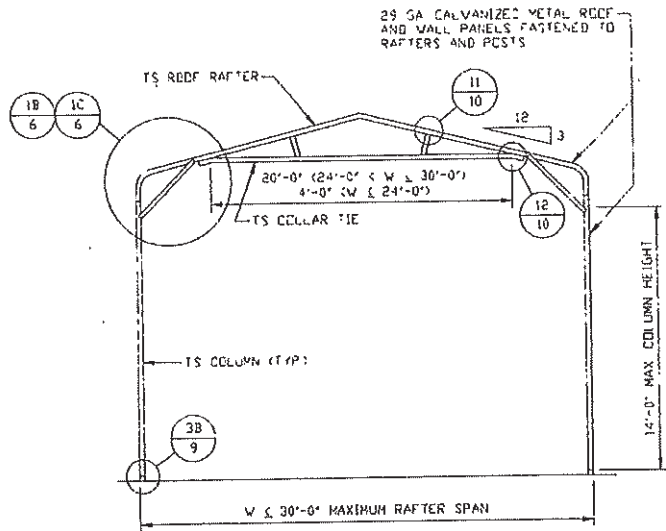
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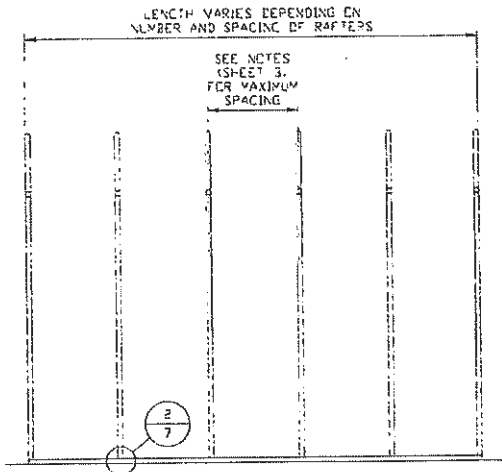
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TYPICAL RAFTER/COLUMN FRAME SECTION
SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION
SCALE: NTS

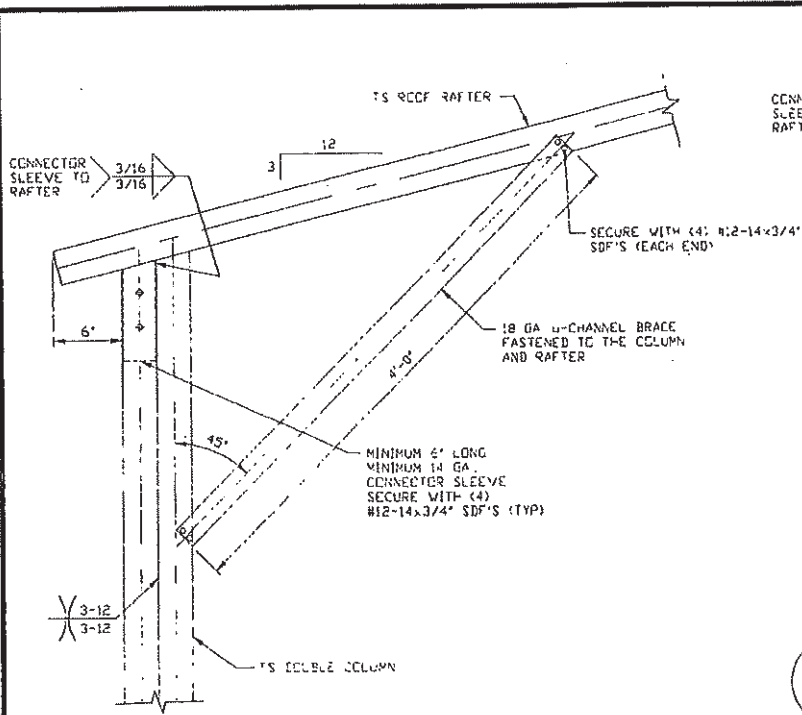
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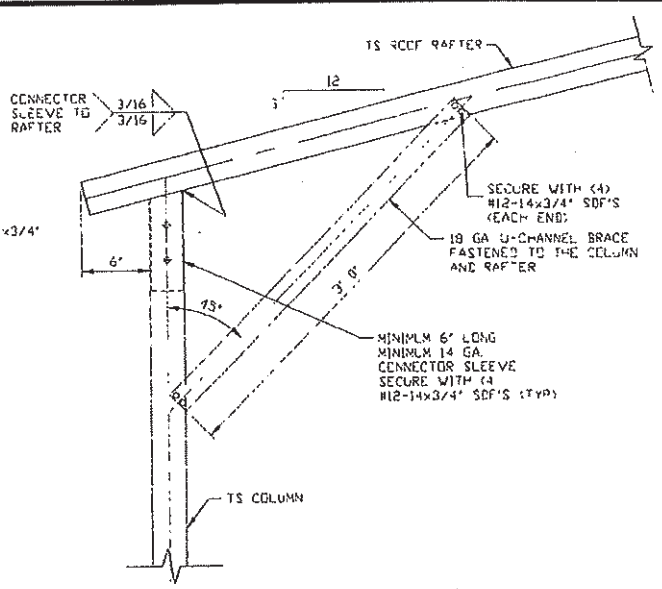
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SHT. 4C
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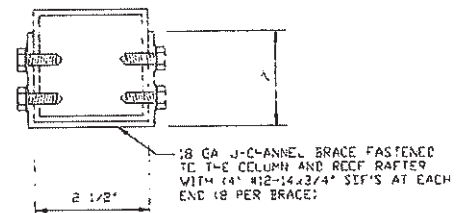
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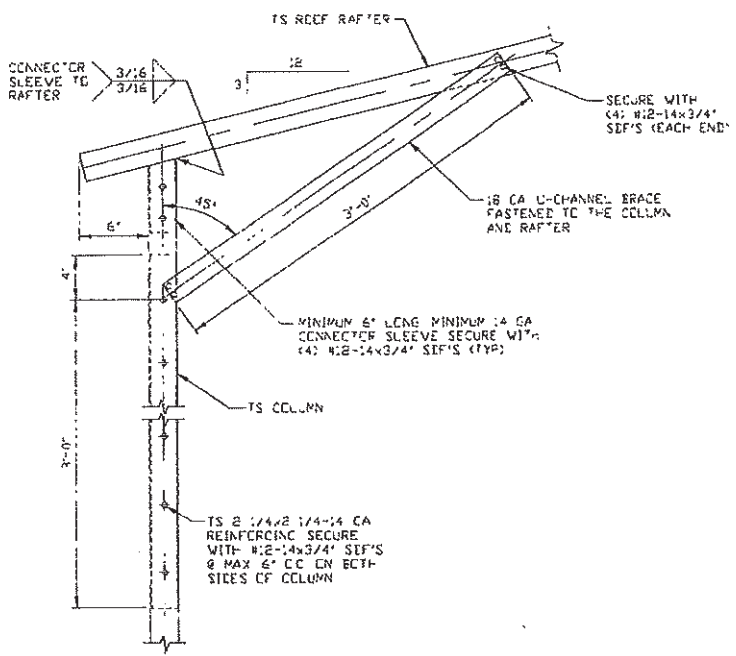
1A
 BOX EAVE RAFTER/CORNER POST
 CONNECTION DETAIL
 FOR HEIGHTS 14'-0" < TO <= 16'-0"
 SCALE: NTS



1C
 BOX EAVE RAFTER/CORNER POST
 CONNECTION DETAIL
 FOR HEIGHTS <= 12'-0"
 SCALE: NTS



BRACE SECTION
 SCALE: NTS

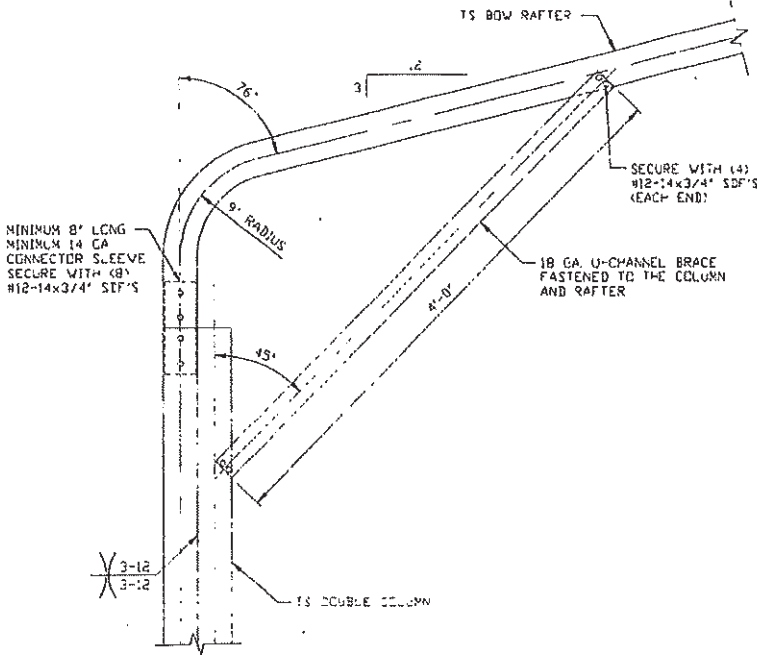


1B
 BOX EAVE RAFTER/CORNER POST
 CONNECTION DETAIL
 FOR HEIGHTS 12'-0" < TO <= 14'-0"
 SCALE: NTS

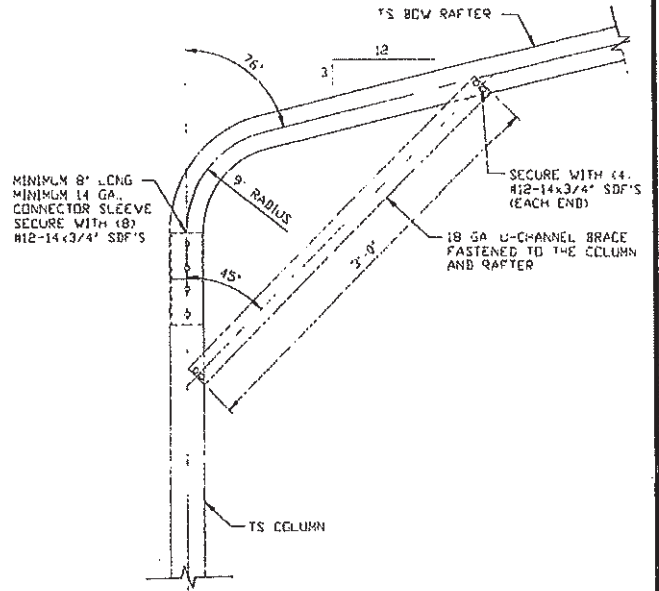
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CHECKED BY: PH		DATE: 6-25-19		JOB NO: 183155/19179S
PROJECT MGR: WSH		SHT. 5		DWG. NO: SK-3
CLIENT: NC CARPORTS		REV: 1		

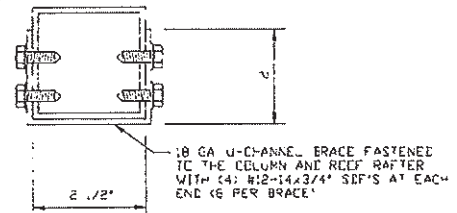
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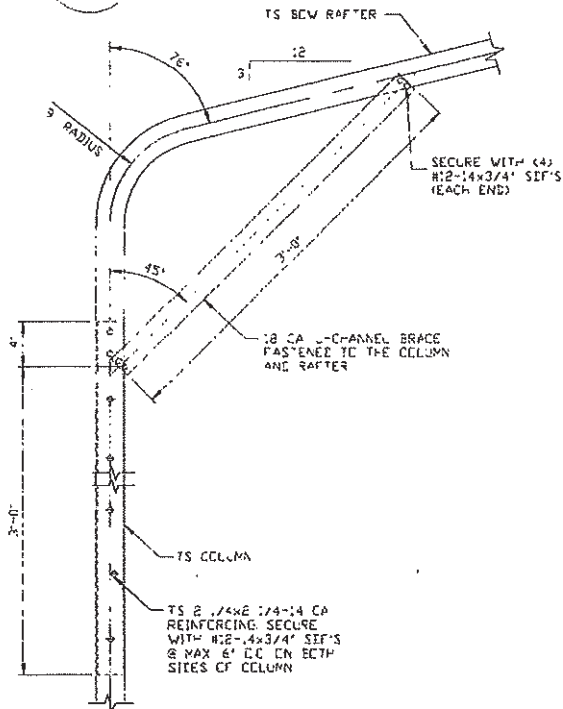
1A
BOX EAVE RAFTER/CORNER POST
CONNECTION DETAIL
FOR HEIGHTS 14'-0" < TO <= 16'-0"
 SCALE: NTS



1C
BOX EAVE RAFTER/CORNER POST
CONNECTION DETAIL
FOR HEIGHTS <= 12'-0"
 SCALE: NTS



BRACE SECTION
 SCALE: NTS



1B
BOW RAFTER/CORNER POST
CONNECTION DETAIL
FOR HEIGHTS 12'-0" < TO <= 14'-0"
 SCALE: NTS

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 30'-0" x 16'-0" ENCLOSED STRUCTURE

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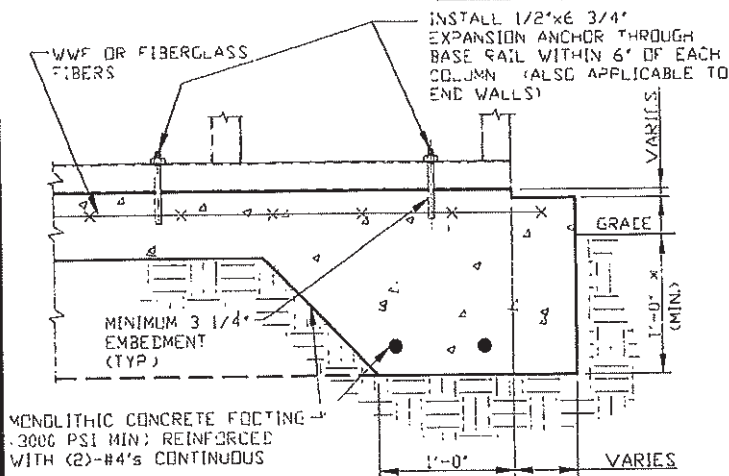
PROJECT MGR: WSM
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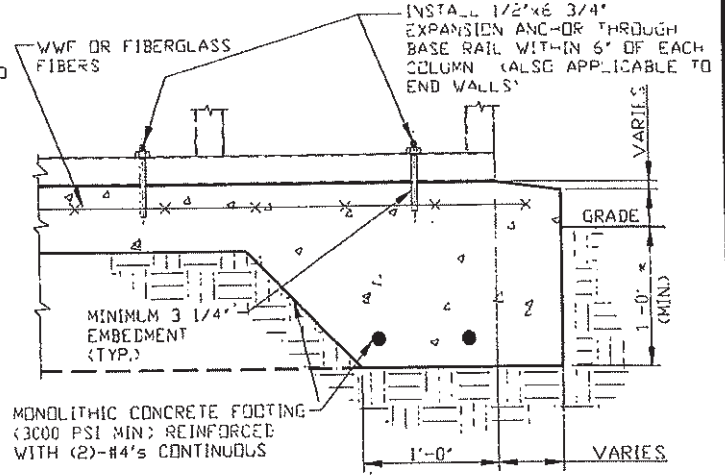
BASE RAIL ANCHORAGE OPTIONS



2A

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS
MINIMUM ANCHOR EDGE DISTANCE IS 4"
* COORDINATE WITH LOCAL CODES/ORD.



2B

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS
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:

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-308

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:

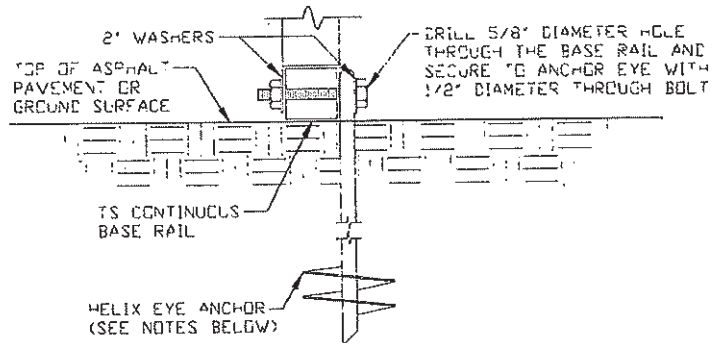
THE TURNDOWN REINFORCING STEEL SHALL BE ASTM A615 GRADE 60. THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT

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

HELIX ANCHOR NOTES:

1. FOR VERY DENSE AND/OR CEMENTED SANDS, COARSE GRAVEL AND COBBLES, CALICHE, PRELOADED SILTS AND CLAYS, USE MINIMUM (2) 4" HELICES WITH MINIMUM 30" 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" 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 LOOSE TO MEDIUM DENSE SANDS, FIRM TO STIFFER CLAYS AND SILTS, ALLUVIAL FILL, USE MINIMUM (2) 8" HELICES WITH MINIMUM 60" EMBEDMENT



2C

GROUND BASE HELIX ANCHORAGE

SCALE: NTS
(CAN BE USED FOR ASPHALT)

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SHT. 7

SCALE: NTS

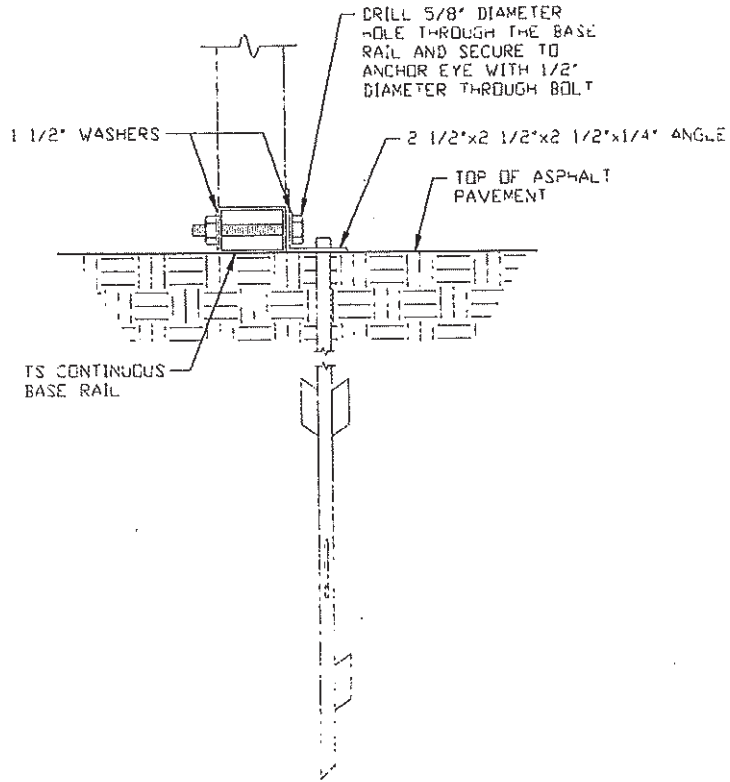
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BASE RAIL ANCHORAGE OPTIONS



2D

ASPHALT BASE ANCHORAGE
 SCALE: NTS

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ENGINEERING AND CONSULTING, INC.**

DRAWN BY: JG

CHECKED BY: PH

PROJECT MGR: WSM

CLIENT: NC CARPORTS

NC CARPORTS AND GARAGES, LLC
 309 S. DEPOT STREET
 PILOT MOUNTAIN, NC 27041
 30'-0" x 16'-0" ENCLOSED STRUCTURE

DATE: 6-25-19

SHT. 7A

SCALE: NTS

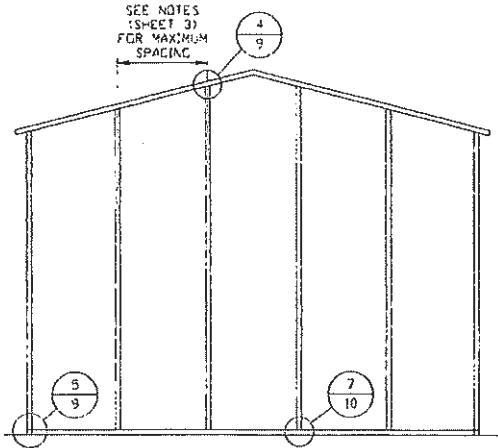
DWG. NO: SK-3

JOB NO:
19315S/19179S

REV: 1

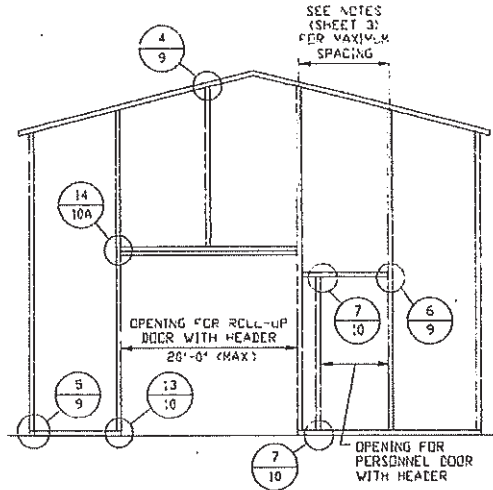
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



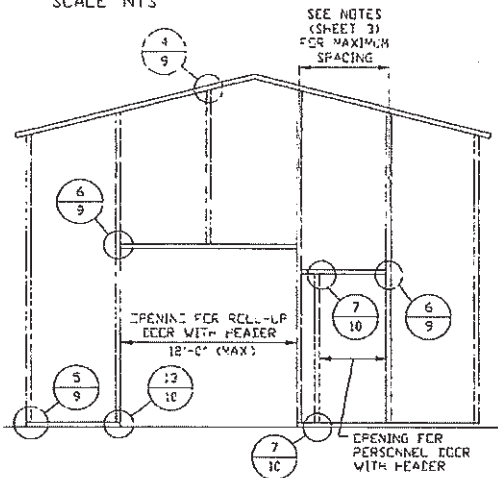
**TYPICAL BOX EAVE RAFTER
END WALL FRAMING SECTION**

SCALE NTS



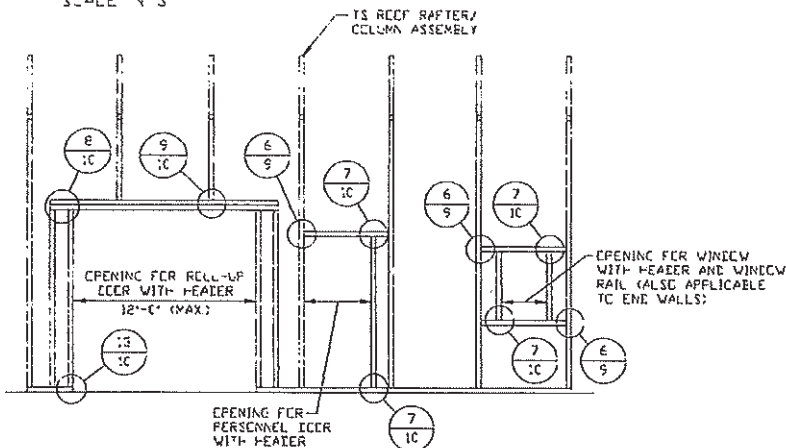
**TYPICAL BOX EAVE RAFTER END
WALL OPENINGS FRAMING SECTION**

SCALE NTS



**TYPICAL BOX EAVE RAFTER END
WALL OPENINGS FRAMING SECTION**

SCALE NTS



**TYPICAL BOX EAVE RAFTER
SIDE WALL OPENINGS FRAMING SECTION**

SCALE NTS

**MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING, INC.**

DRAWN BY: JG

CHECKED BY: PH

PROJECT MGR: WSH

CLIENT: NC CARPORTS

NC CARPORTS AND GARAGES, LLC
309 S. DEPOT STREET
PILOT MOUNTAIN, NC 27041
30'-0" x 16'-0" ENCLOSED STRUCTURE

DATE: 6-25-19

SHT. 8

SCALE: NTS

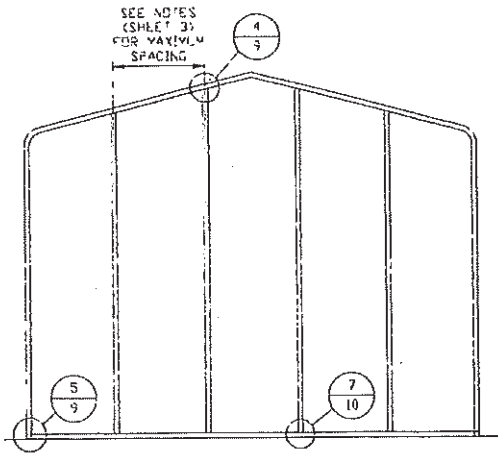
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JOB NO:
16315S/19179S

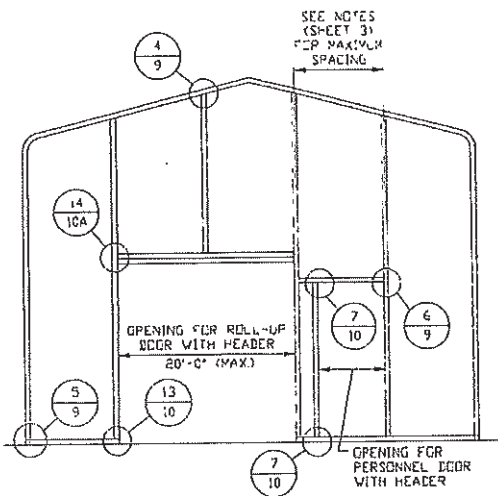
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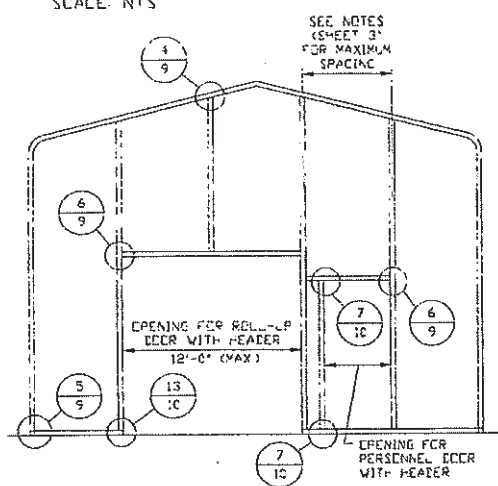
BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



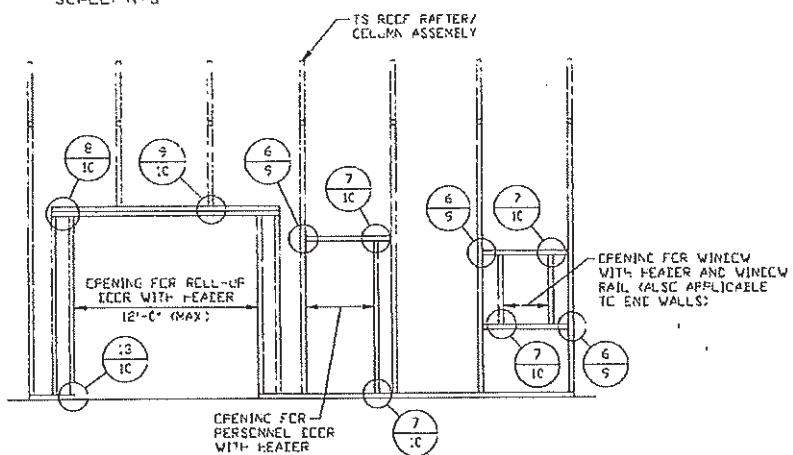
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION
SCALE: NTS



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



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

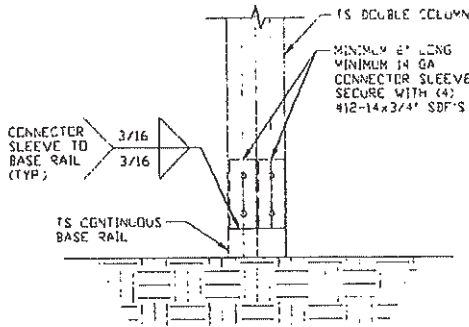


TYPICAL BOX EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION
SCALE: NTS

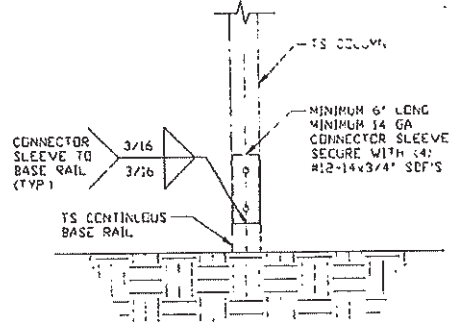
MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: JG	NC CARPORTS AND GARAGES, LLC 309 S. DEPOT STREET PILOT MOUNTAIN, NC 27041 30'-0" x 16'-0" ENCLOSED STRUCTURE		
	CHECKED BY: PH			
PROJECT MGR: WSM	DATE: 6-25-19	SCALE: NTS	JOB NO: 183155/19179S	
CLIENT: NC CARPORTS	SHT. 8A	DWG. NO: SK-3	REV: 1	

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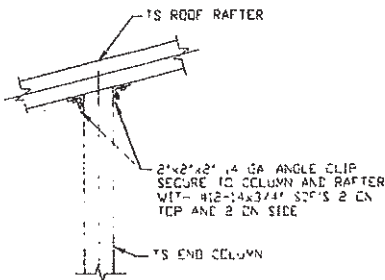
CONNECTION DETAILS



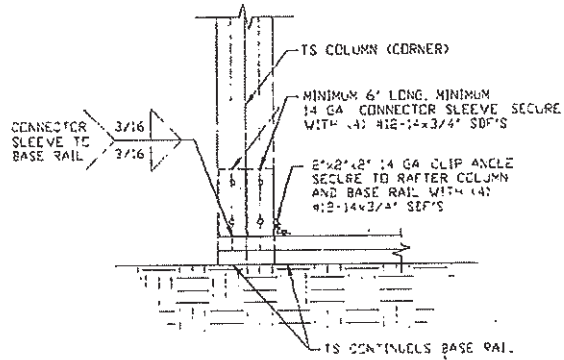
3A POST/BASE RAIL CONNECTION DETAIL
SCALE: NTS



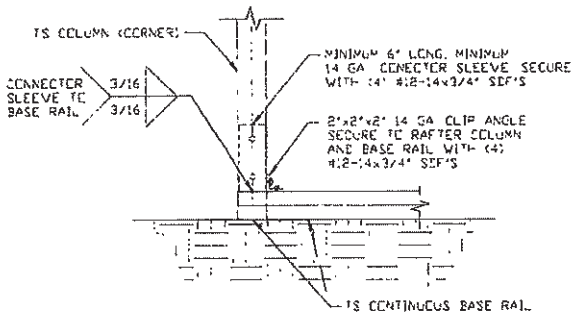
3B POST/BASE RAIL CONNECTION DETAIL
SCALE: NTS



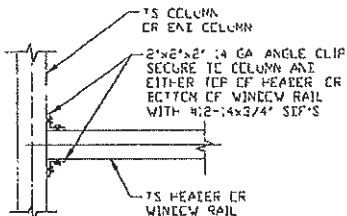
4 END COLUMN/RAFTER CONNECTION DETAIL
SCALE: NTS



5A END COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



5B END COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS



6 COLUMN OR WINDOW RAIL TO POST CONNECTION DETAIL
SCALE: NTS

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CHECKED BY: PH

PROJECT MGR: WSH

CLIENT: NC CARPORTS

NC CARPORTS AND GARAGES, LLC
309 S. DEPOT STREET
PILOT MOUNTAIN, NC 27041
30'-0" x 16'-0" ENCLOSED STRUCTURE

DATE: 6-25-19

SHT. 9

SCALE: NTS

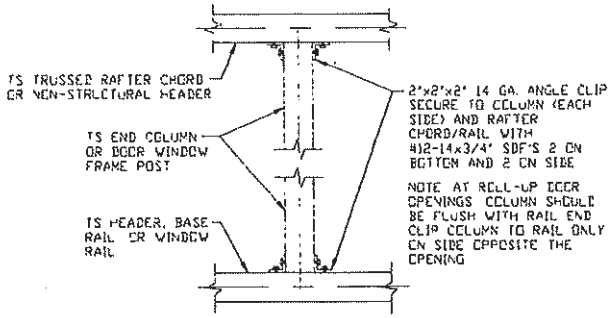
DWG. NO: SK-3

JDB NO:
183155/19179S

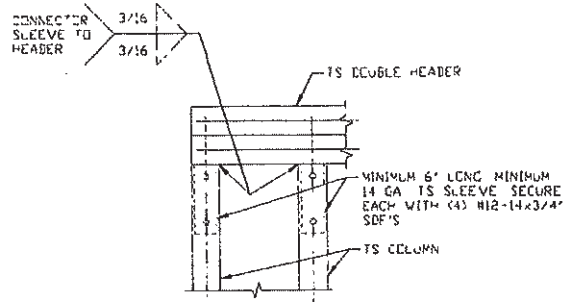
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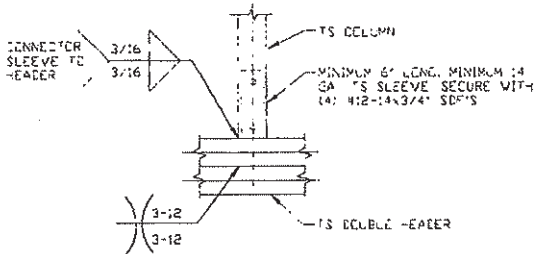
CONNECTION DETAILS



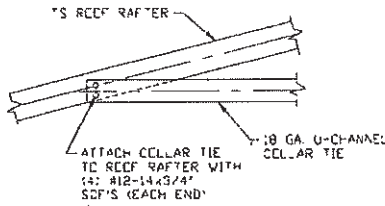
7 COLUMN TO HEADER, BASE RAIL, OR WINDOW RAIL CONNECTION DETAIL
SCALE: NTS



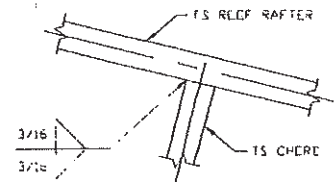
8 DOUBLE HEADER/COLUMN CONNECTION DETAIL
SCALE: NTS



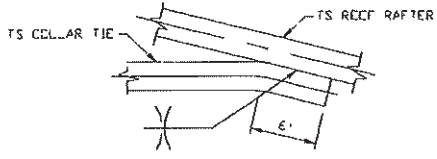
9 COLUMN/DOUBLE HEADER CONNECTION DETAIL
SCALE: NTS



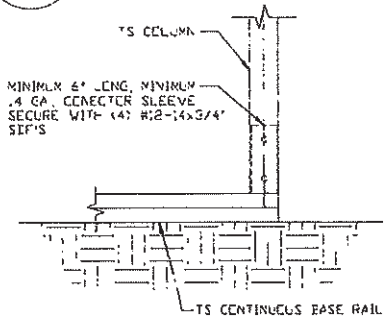
10 COLLAR TIE CONNECTION DETAIL
SCALE: NTS



11 RAFTER TO CHORD CONNECTION DETAIL
SCALE: NTS



12 COLLAR TIE CONNECTION DETAIL
SCALE: NTS



13 COLUMN/BASE RAIL CONNECTION DETAIL
SCALE: NTS

**MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING, INC.**

DRAWN BY: JG

CHECKED BY: PH

PROJECT MGR: WSM

CLIENT: NC CARPDRTS

NC CARPDRTS AND GARAGES, LLC
309 S. DEPOT STREET
PILOT MOUNTAIN, NC 27041
30'-0" x 16'-0" ENCLOSED STRUCTURE

DATE: 6-25-19

SHT. 10

SCALE: NTS

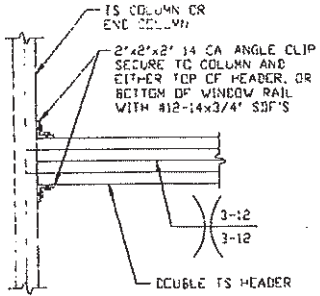
DWG. NO: SK-3

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CONNECTION DETAILS



DOUBLE HEADER TO COLUMN CONNECTION DETAIL

14

SCALE: NTS

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ENGINEERING AND CONSULTING, INC.

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CLIENT: NC CARPORTS

NC CARPORTS AND GARAGES, LLC
309 S. DEPOT STREET
PILOT MOUNTAIN, NC 27041
30'-0" x 16'-0" ENCLOSED STRUCTURE

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SHT. 10A

SCALE: NTS

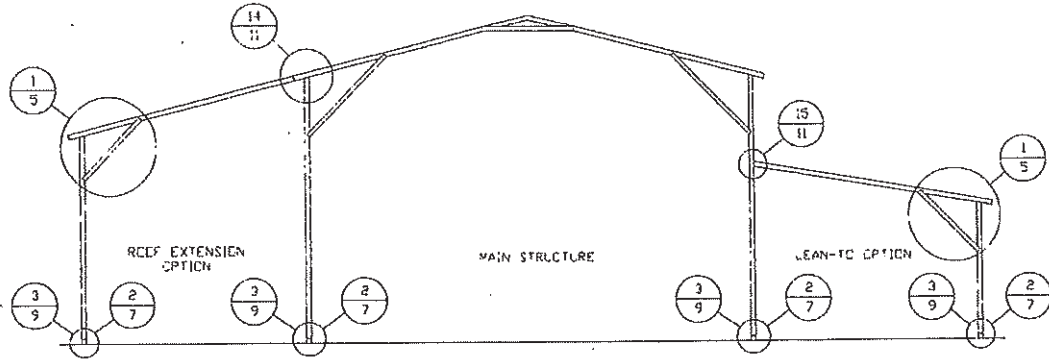
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JOB NO:
183155/19179S

REV: 1

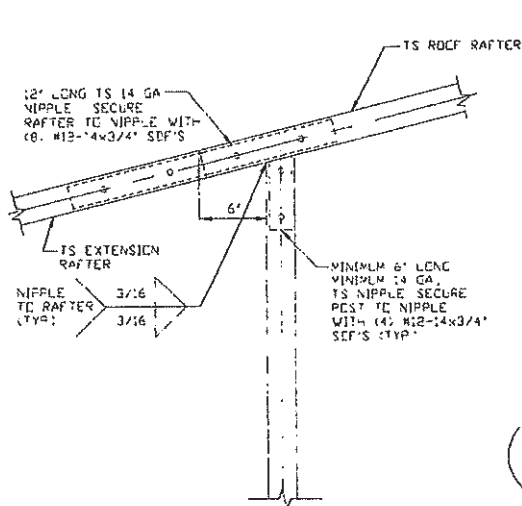
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BOX EAVE RAFTER LEAN-TO OPTIONS



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

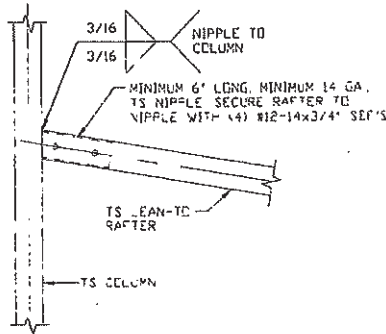
SCALE: NTS
 MAXIMUM WIDTH OF SINGLE MEMBER ROOF EXTENSION AND LEAN-TO OPTION IS 12'-0"
 MAXIMUM WIDTH OF DOUBLE MEMBER ROOF EXTENSION AND LEAN-TO OPTION IS 16'-0"



14

ROOF EXTENSION RAFTER/CORNER POST DETAIL FOR WIDTHS $\leq 12'-0''$

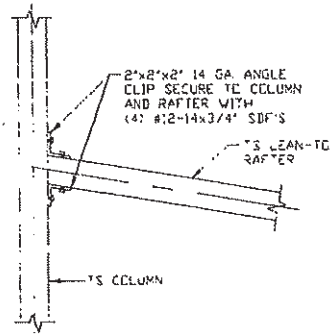
SCALE: NTS



15A

LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS $\leq 12'-0''$

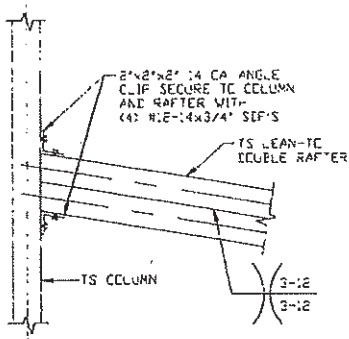
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15B

LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS $\leq 12'-0''$

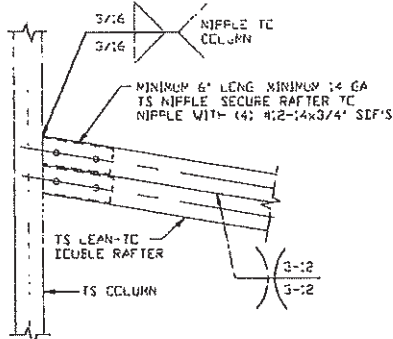
SCALE: NTS



15C

LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS $\leq 16'-0''$

SCALE: NTS



15D

LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS $\leq 16'-0''$

SCALE: NTS

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ENGINEERING AND CONSULTING, INC.**

DRAWN BY: JG

CHECKED BY: PH

PROJECT MGR: WSM

CLIENT: NC CARPORTS

NC CARPORTS AND GARAGES, LLC
 309 S. DEPOT STREET
 PILOT MOUNTAIN, NC 27041
 30'-0" x 16'-0" ENCLOSED STRUCTURE

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SHT. 11

SCALE: NTS

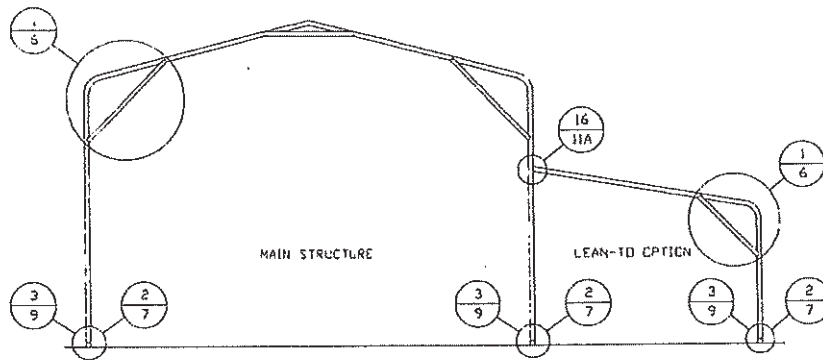
DWG. NO: SK-3

JOB NO: 103155/19179S

REV: 1

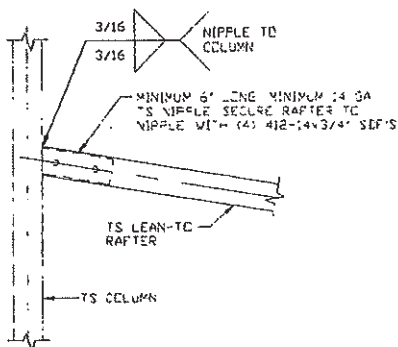
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BOW EAVE RAFTER LEAN-TO OPTIONS

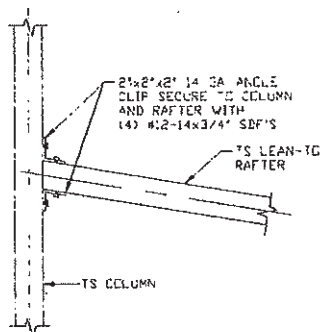


TYPICAL BOW EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION

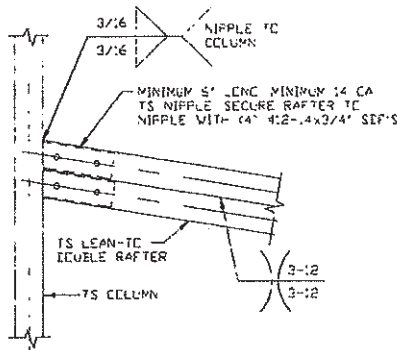
SCALE: NTS
 MAXIMUM WIDTH OF SINGLE MEMBER LEAN-TO OPTION IS 12'-0".
 MAXIMUM WIDTH OF DOUBLE MEMBER LEAN-TO OPTION IS 16'-0".



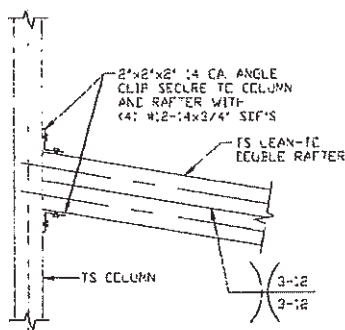
16A LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS $\leq 12'-0"$
 SCALE: NTS



16B LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS $\leq 12'-0"$
 SCALE: NTS



16C LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS $\leq 16'-0"$
 SCALE: NTS



16D LEAN-TO RAFTER TO RAFTER POST CONNECTION DETAIL FOR WIDTHS $\leq 16'-0"$
 SCALE: NTS

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 ENGINEERING AND CONSULTING, INC.**

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PROJECT MGR: WSH

CLIENT: NC CARPORTS

NC CARPORTS AND GARAGES, LLC
 309 S. DEPOT STREET
 PILOT MOUNTAIN, NC 27041
 30'-0" x 16'-0" ENCLOSED STRUCTURE

DATE: 6-25-19

SHT. 11A

SCALE: NTS

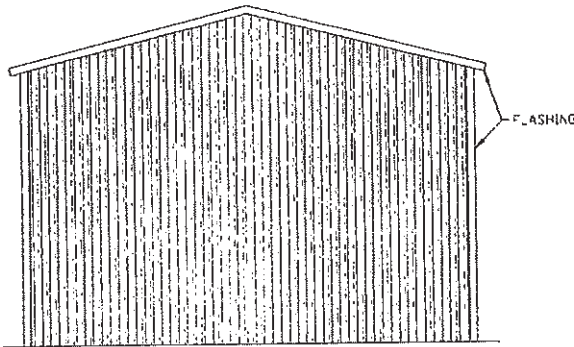
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JOB NO:
 19315S/19179S

REV: 1

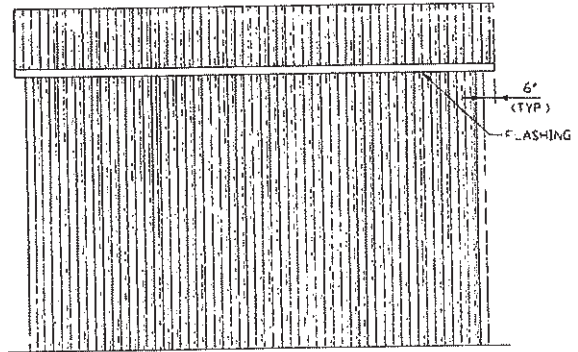
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BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



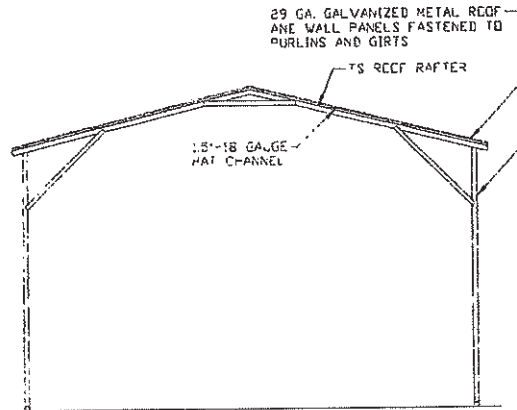
**TYPICAL END ELEVATION
VERTICAL ROOF/SIDING**

SCALE: NTS



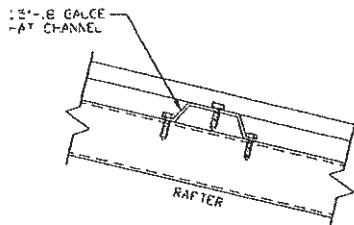
**TYPICAL SIDE ELEVATION
VERTICAL ROOF/SIDING**

SCALE: NTS



**TYPICAL SECTION
VERTICAL ROOF/SIDING OPTION**

SCALE: NTS



PANEL ATTACHMENT

(ALTERNATE FOR VERTICAL ROOF PANELS)
SCALE: NTS

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ENGINEERING AND CONSULTING, INC.**

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309 S. DEPOT STREET
PILOT MOUNTAIN, NC 27041
30'-0" x 16'-0" ENCLOSED STRUCTURE

DATE: 6-25-19

SHT. 12

SCALE: NTS

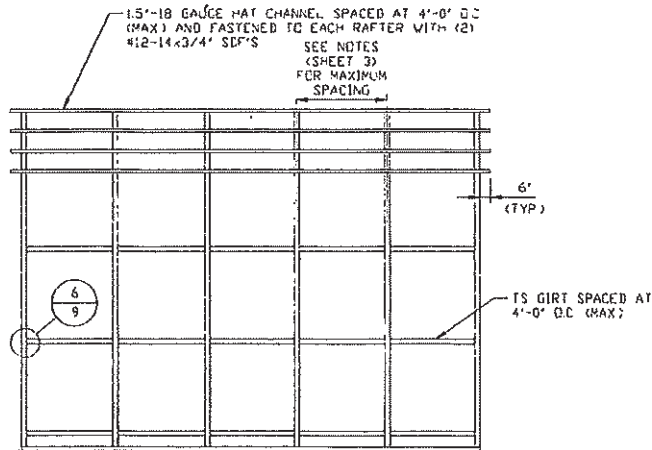
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JDB NCR
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BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



**TYPICAL FRAMING SECTION
VERTICAL ROOF/SIDING OPTION
WITH TS GIRTS**

SCALE: NTS

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ENGINEERING AND CONSULTING, INC.**

DRAWN BY: JG

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CLIENT: NC CARPORTS

NC CARPORTS AND GARAGES, LLC
309 S. DEPOT STREET
PILOT MOUNTAIN, NC 27041
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SHT. 12A

SCALE: NTS

DWG. NO: SK-3

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