



**METAL CARPORTS & STRUCTURES**  
INC

**STRUCTURAL DESIGN**

**ENCLOSED BUILDING**

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

**30 July 2021**

**Revision 0**

**M&A Project No. 21087S**

**Prepared for:**

**Metal Carports and Structures, LLC  
715 Willow Street  
Mount Airy, NC 27030**

**Prepared by:**



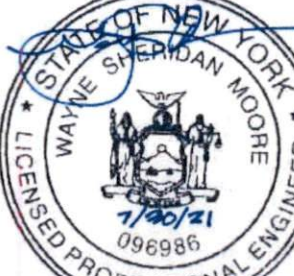
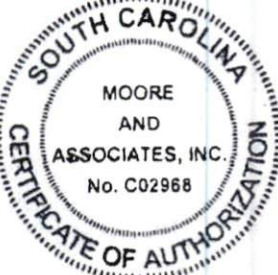
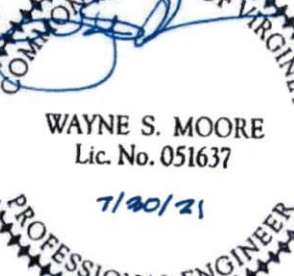
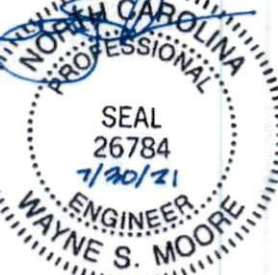



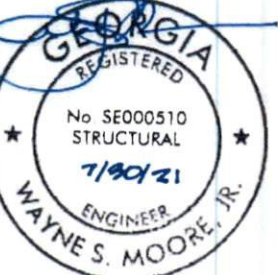
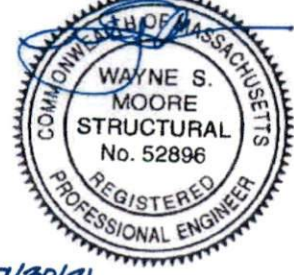
**Moore and Associates Engineering and Consulting, Inc.**

**1009 East Avenue  
North Augusta, SC 29841**

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



**MOORE AND ASSOCIATES**  
ENGINEERING AND CONSULTING

<p align="center"><b>MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.</b></p>	<p>DRAWN BY: JG</p>	<p align="center">METAL CARPORTS AND STRUCTURES, LLC 715 WILLOW STREET MOUNT AIRY, NC 27030 30'-0"x20'-0" SP ENCLOSED STRUCTURE</p>		
	<p>CHECKED BY: PDH</p>	<p>PROJECT MGR: WSM</p>	<p>DATE: 7-30-21</p>	<p>SCALE: NTS</p>
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## INSTALLATION NOTES AND SPECIFICATIONS

- 1 DESIGN IS FOR MAXIMUM 30'-0" WIDE x 20'-0" EAVE HEIGHT ENCLOSED STRUCTURES
- 2 DESIGN WAS DONE IN ACCORDANCE WITH THE APPLICABLE BUILDING CODES LISTED ON SHEET 3A
- 3 DESIGN LOADS ARE AS FOLLOWS:
  - A) DEAD LOAD = 15 PSF
  - B) LIVE LOAD = 12 PSF
  - C) GROUND SNOW LOAD = 35 PSF
  - = 30 PSF WITH U-CHANNEL PEAK BRACE (<< 22'-0")

NOTE UNBALANCED LOADING DUE TO SNOW DRIFTING FROM AN ADJACENT TALLER STRUCTURE HAS NOT BEEN EVALUATED
- 4 3-SECOND GUST ULTIMATE WIND SPEED ( $V_{ULT}$ ) =  $\leq$  145 MPH (NOMINAL WIND SPEED =  $\leq$  112 MPH)
- 5 MAXIMUM RAFTER/POST AND END POST 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"x2 1/2"-14 GAUGE TUBE STEEL (TS) FRAMING MEMBERS (UNLESS NOTED OTHERWISE) WHERE TS 2 1/2"x2 1/2"-14 GAUGE IS SPECIFIED, TS 2 1/4"x2 1/4"-12 GAUGE MAY BE USED AS OPTION
- 10 AVERAGE PANEL FASTENER SPACING ON-CENTERS = 10" O.C (MAX)
- 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 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 ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL AT OR WITHIN 6" OF EVERY RAFTER COLUMN
- 13 STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT x 36" LONG 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:
  - SOIL SITE CLASS = D
  - RISK CATEGORY I
  - R = 3.25                       $I_e = 10$
  - $S_{DS} = 2.039 g$                $V = C_s W$
  - $S_{D1} = 1.258 g$
- 15 CONTRACTOR TO PROVIDE ADEQUATE BRACING FOR STRUCTURE SO THAT IT WILL BE STABLE DURING ALL STAGES OF CONSTRUCTION. THE STRUCTURE AND FOUNDATIONS ARE DESIGNED FOR A COMPLETED CONDITION ONLY AND, THEREFORE, REQUIRE ADDITIONAL SUPPORT TO MAINTAIN STABILITY BEFORE COMPLETION

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## LIST OF APPLICABLE BUILDING CODES

2018 INTERNATIONAL BUILDING CODE (IBC 2018)

2015 INTERNATIONAL BUILDING CODE (IBC 2015)

BUILDING CODE 2015 OF ALABAMA  
(ADOPTS THE IBC 2015 WITH AMENDMENTS)

GEORGIA STATE MINIMUM STANDARD BUILDING CODE  
(ADOPTS THE IBC 2018 WITH AMENDMENTS)

MASSACHUSETTS STATE BUILDING CODE, 9TH EDITION  
(ADOPTS THE IBC 2015 WITH AMENDMENTS)

2020 BUILDING CODE OF NEW YORK STATE  
(ADOPTS THE IBC 2018 WITH AMENDMENTS)

2018 NORTH CAROLINA BUILDING CODE  
(ADOPTS THE IBC 2015 WITH AMENDMENTS)

OHIO BUILDING CODE 2017  
(ADOPTS THE IBC 2015 WITH AMENDMENTS)

BUILDING CODE 2015 OF PENNSYLVANIA  
(ADOPTS THE IBC 2015 WITH AMENDMENTS)

2018 SOUTH CAROLINA BUILDING CODE  
(ADOPTS THE IBC 2018 WITH AMENDMENTS)

2015 VIRGINIA CONSTRUCTION CODE  
(ADOPTS THE IBC 2015 WITH AMENDMENTS)

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715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0" x 20'-0" SP ENCLOSED STRUCTURE

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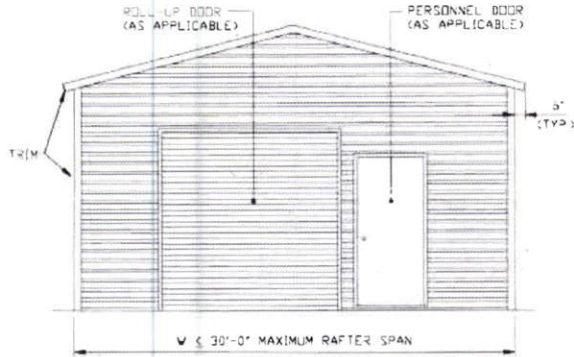
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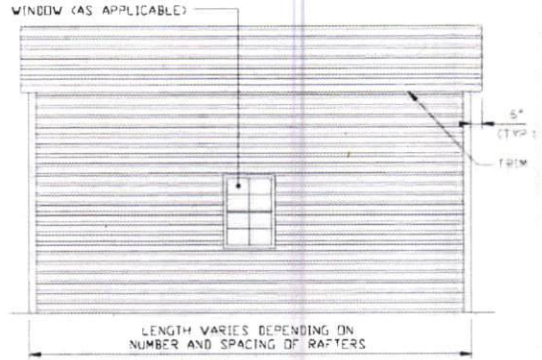


**BOX EAVE FRAME RAFTER STRUCTURE**



**TYPICAL END ELEVATION**

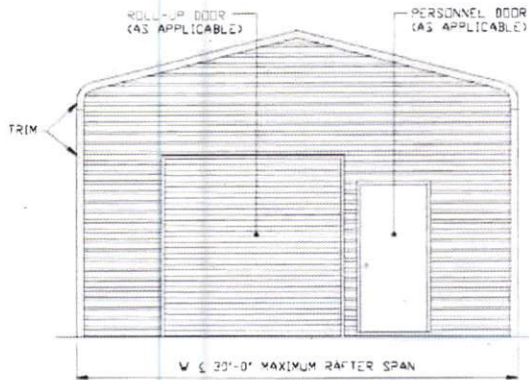
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**TYPICAL SIDE ELEVATION**

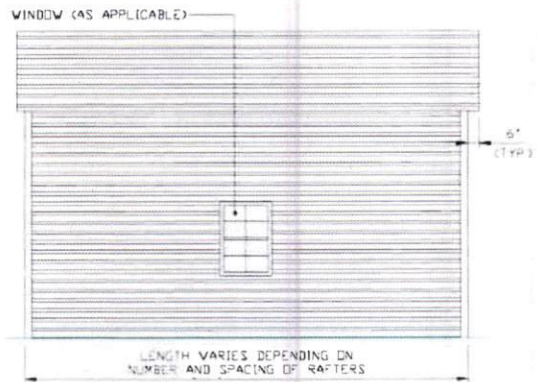
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**BOX FRAME RAFTER STRUCTURE**



**TYPICAL END ELEVATION**

SCALE: NTS



**TYPICAL SIDE ELEVATION**

SCALE: NTS

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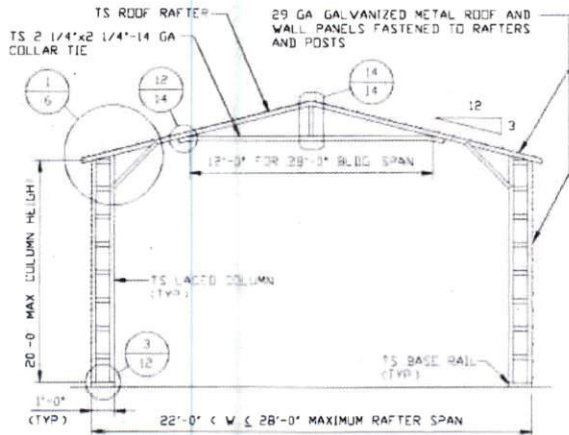
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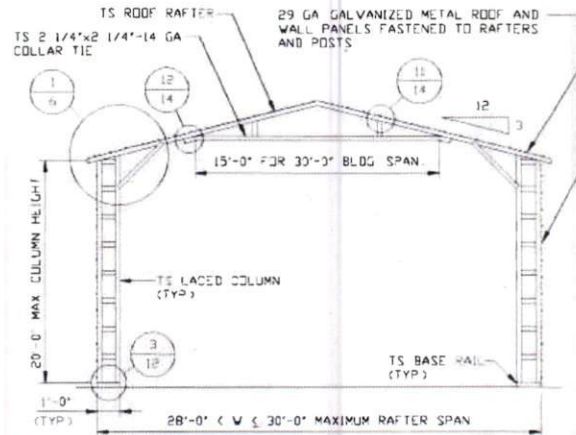
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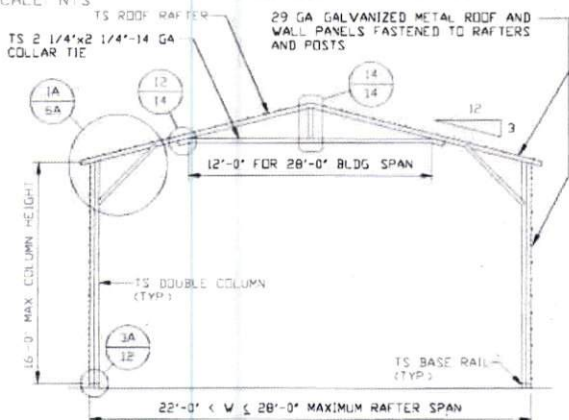
**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



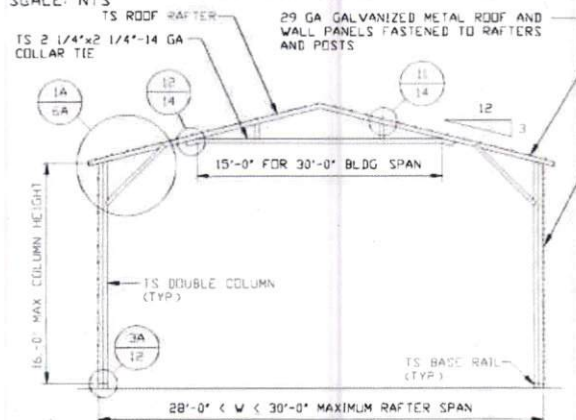
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**SHT. 5**

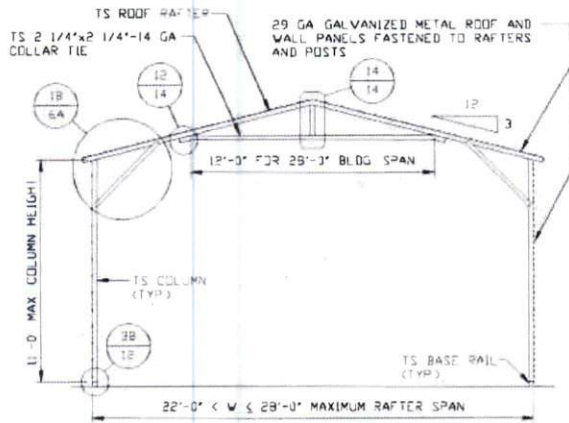
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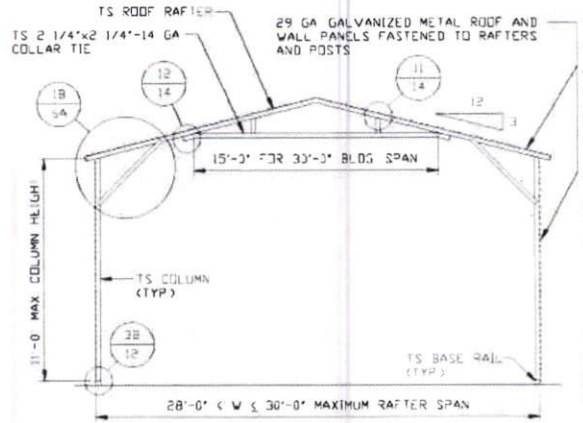
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**TYPICAL RAFTER/COLUMN END FRAME SECTION**  
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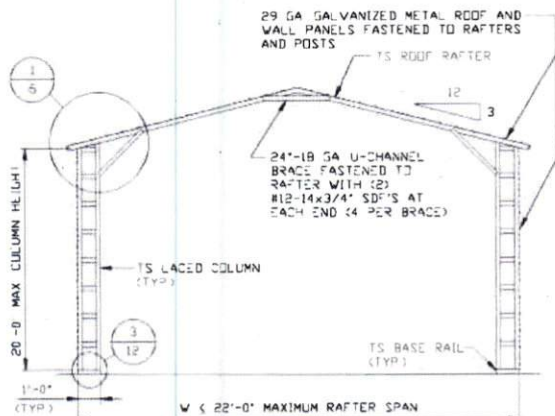
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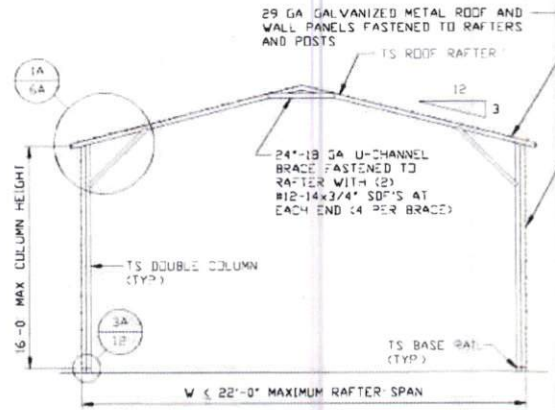
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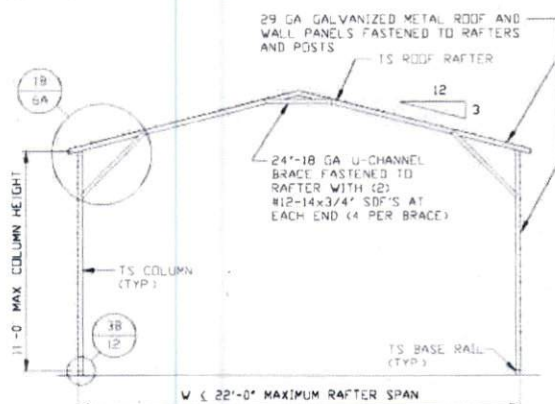




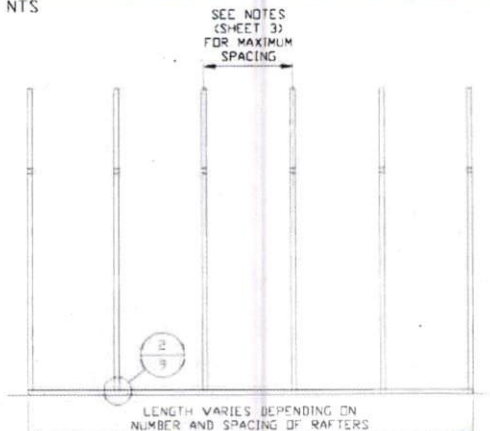
**TYPICAL RAFTER/COLUMN END FRAME SECTION**  
SCALE: NTS



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



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



**TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION**  
SCALE: NTS

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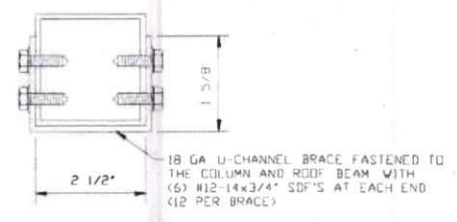
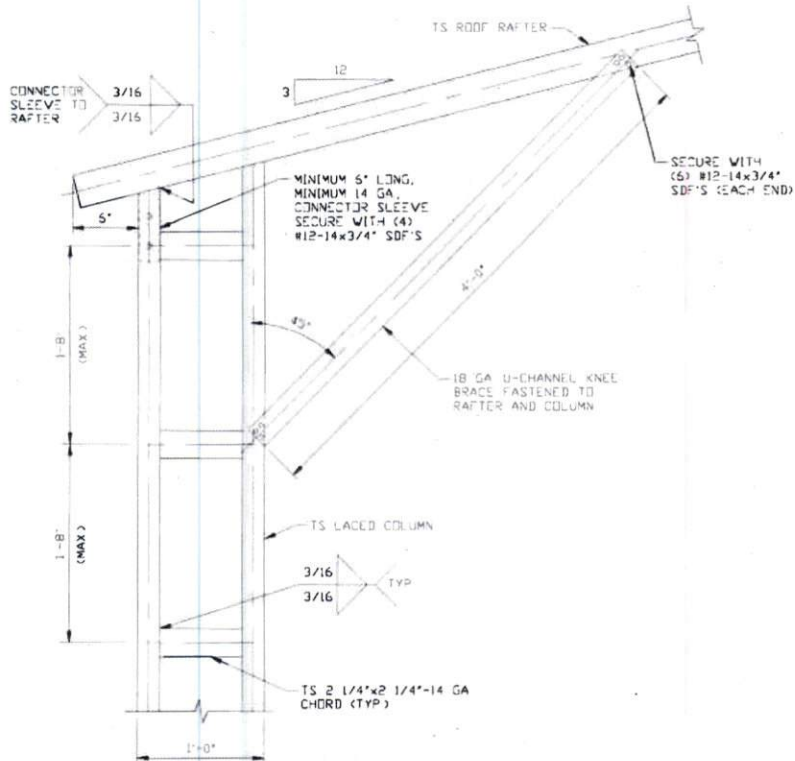
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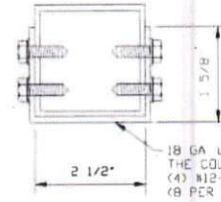
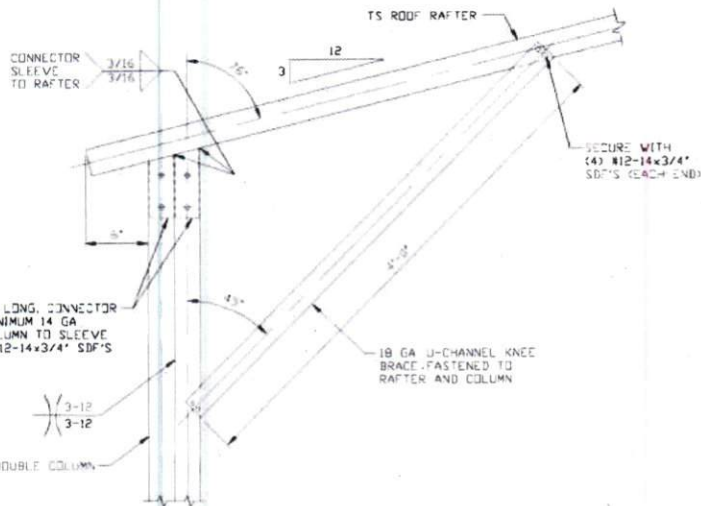
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**BRACE SECTION**  
SCALE: NTS

**1** **BOX EAVE RAFTER COLUMN CONNECTION**  
**DETAIL FOR HEIGHTS 16'-0" < TO ≤ 20'-0"**  
SCALE: NTS

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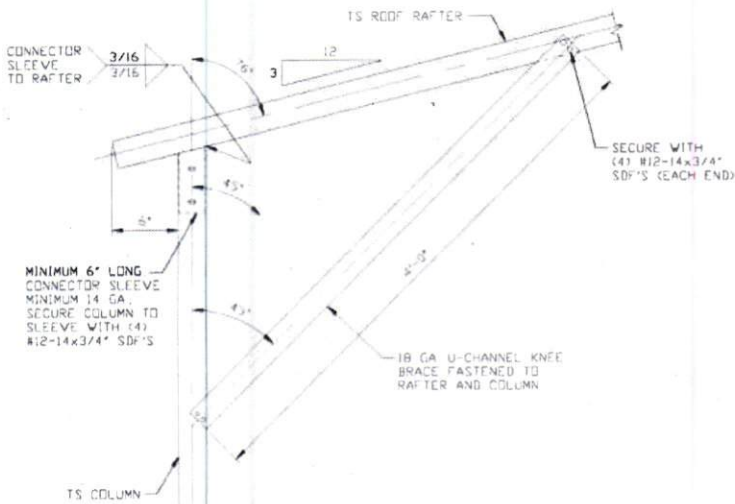


**BRACE SECTION**  
SCALE: NTS

**BOX EAVE RAFTER COLUMN CONNECTION  
DETAIL FOR HEIGHTS 11'-0" < TO ≤ 16'-0"**

1A

SCALE: NTS



**BOX EAVE RAFTER COLUMN  
CONNECTION DETAIL  
FOR HEIGHTS ≤ 11'-0"**

1B

SCALE: NTS

NOTE: 2'-0" KNEE BRACE CAN BE USED  
FOR SPANS ≤ 28'-0"

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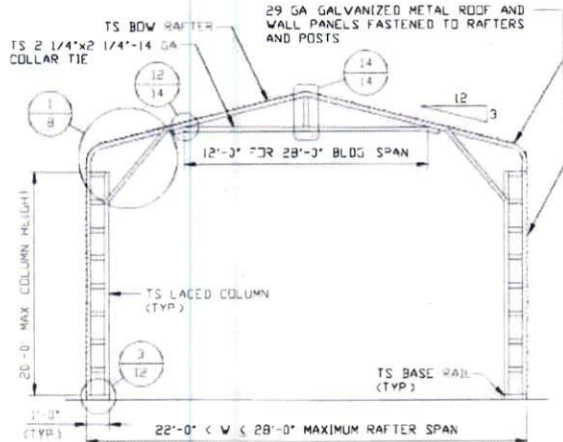
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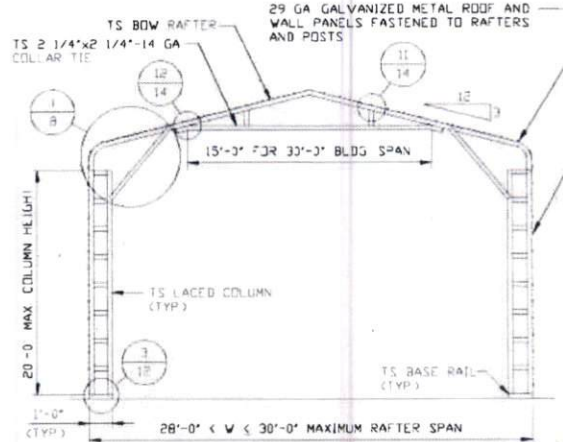
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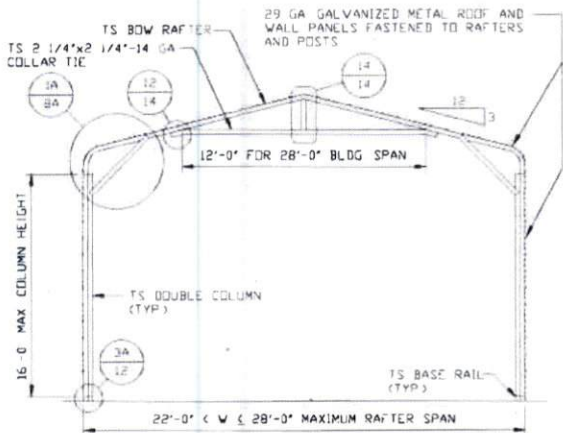
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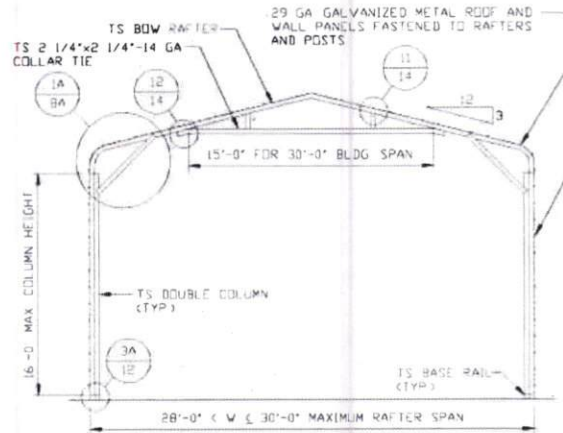
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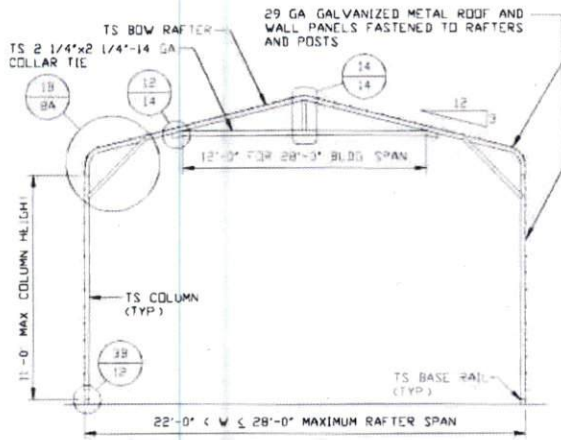
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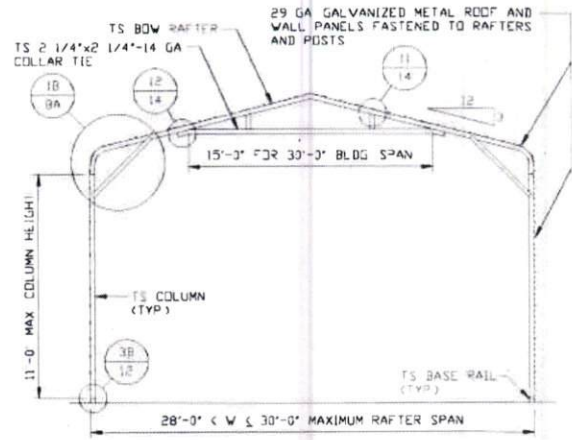
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SHT. 7  
SCALE: NTS  
DWG. NO: SK-3  
JOB NO: 21087S  
REV: 0



**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS



**TYPICAL RAFTER/COLUMN END FRAME SECTION**

SCALE: NTS

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

DRAWN BY: JG  
CHECKED BY: PDH

METAL CARPORTS AND STRUCTURES, LLC  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

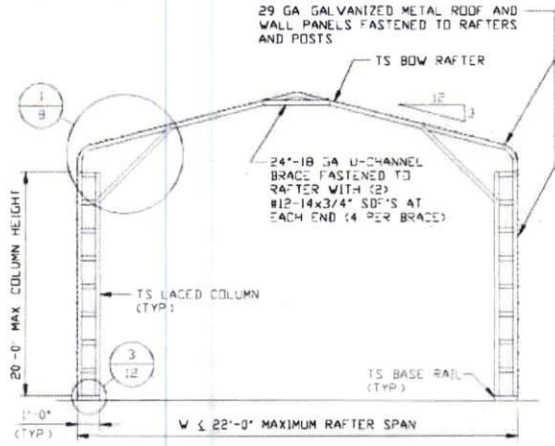
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PROJECT MGR: WSM  
CLIENT: METAL CARPORTS AND STRUCTURES, LLC

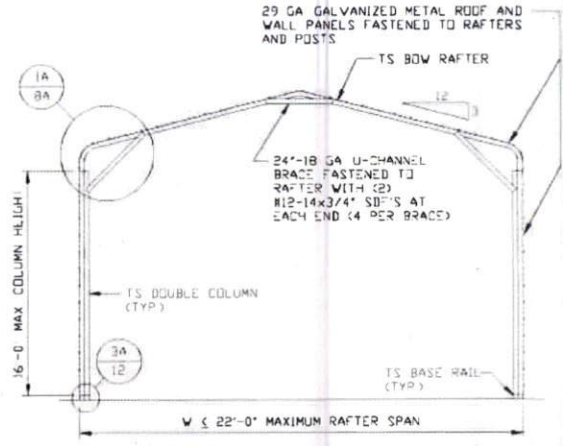
DATE: 7-30-21  
SHT. 7A

SCALE: NTS  
DWG. NO: SK-3

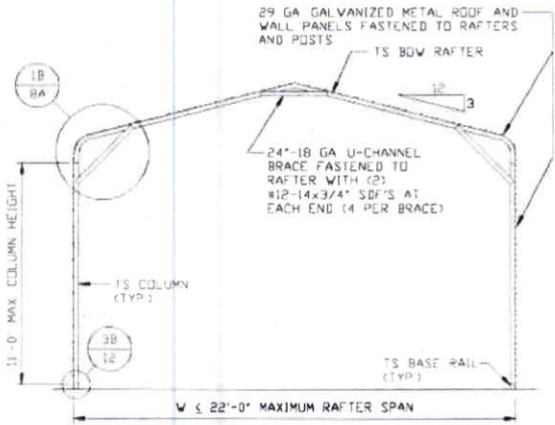
JOB NO: 21087S  
REV: 0



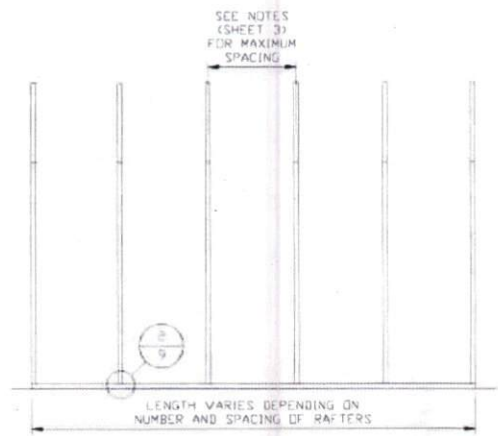
**TYPICAL RAFTER/COLUMN END FRAME SECTION**  
SCALE: NTS



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



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



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

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

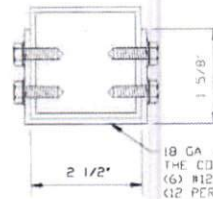
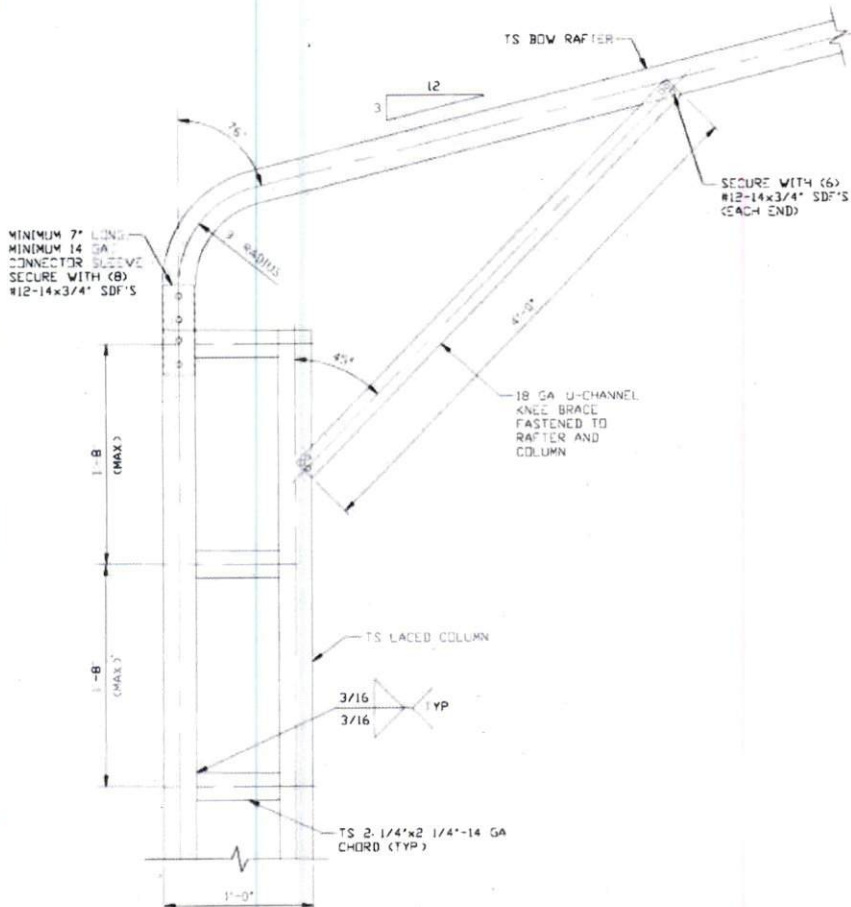
**DRAWN BY:** JG  
**CHECKED BY:** PDH  
**PROJECT MGR:** VSM  
**CLIENT:** METAL CARPORTS AND STRUCTURES, LLC

**METAL CARPORTS AND STRUCTURES, LLC**  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

**DATE:** 7-30-21  
**SCALE:** NTS  
**JOB NO:** 21087S  
**SHT.** 7B  
**DWG. NO:** SK-3  
**REV:** 0

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**BRACE SECTION**

SCALE: NTS

**1 BOW RAFTER COLUMN CONNECTION DETAIL  
FOR HEIGHTS 16'-0" < TO ≤ 20'-0"**

SCALE: NTS

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CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: METAL CARPORTS  
AND STRUCTURES, LLC

METAL CARPORTS AND STRUCTURES, LLC  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30-0"x20'-0" SP ENCLOSED STRUCTURE

DATE: 7-30-21

SHT. 8

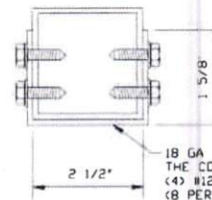
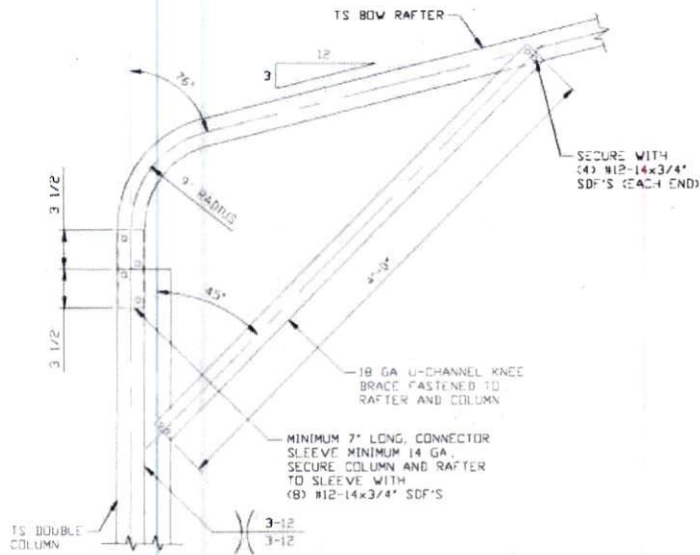
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DWG. NO: SK-3

JOB NO: 21087S

REV: 0

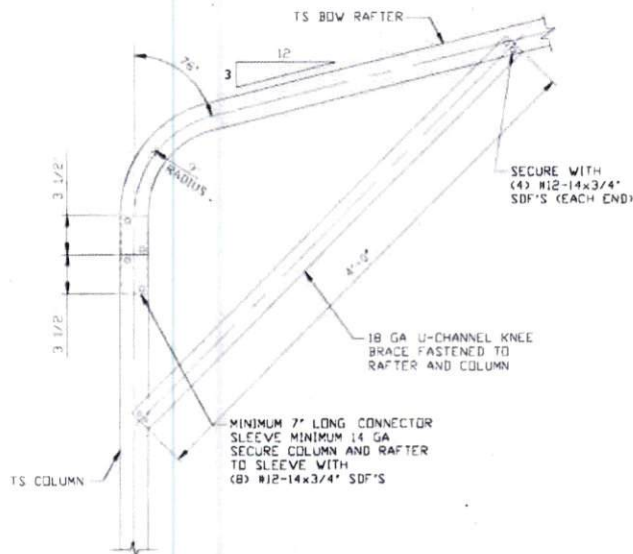
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**BRACE SECTION**  
SCALE: NTS

1A

**BOW EAVE RAFTER COLUMN CONNECTION  
DETAIL FOR HEIGHTS 11'-0" < TO <= 16'-0"**  
SCALE: NTS



1B

**BOW EAVE RAFTER COLUMN  
CONNECTION DETAIL  
FOR HEIGHTS <= 11'-0"**  
SCALE: NTS  
NOTE: 2'-0" KNEE BRACE CAN BE USED  
FOR SPANS <= 28'-0"

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ENGINEERING AND CONSULTING, INC.**

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CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: METAL CARPORTS  
AND STRUCTURES, LLC

METAL CARPORTS AND STRUCTURES, LLC  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30-0"x20'-0" SP ENCLOSED STRUCTURE

DATE: 7-30-21

SCALE: NTS

JOB NO: 21087S

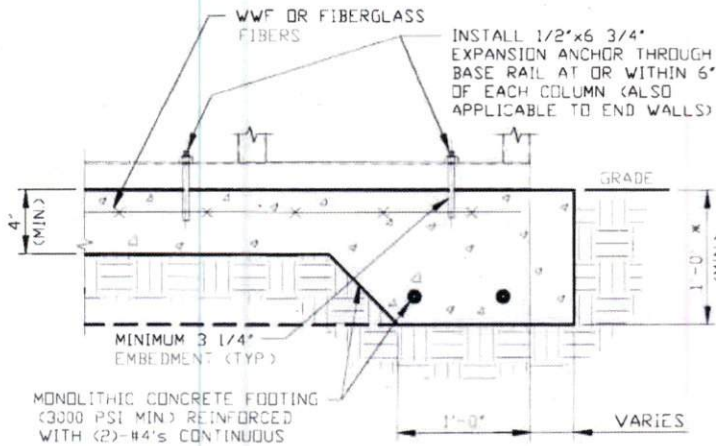
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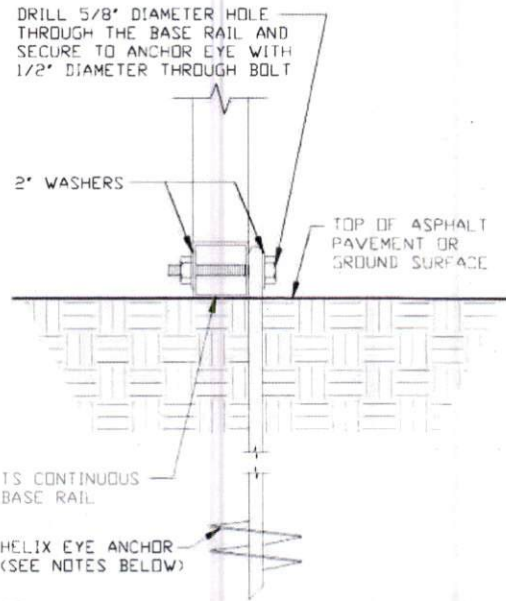
## BASE RAIL ANCHORAGE OPTIONS



2A

### CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS  
MINIMUM ANCHOR EDGE DISTANCE IS 4"  
\* COORDINATE WITH LOCAL BUILDING CODE/ORD  
REGARDING REQUIRED FOOTING DEPTH



2B

### GROUND BASE HELIX ANCHORAGE

SCALE: NTS (CAN BE USED FOR ASPHALT)  
\* COORDINATE WITH LOCAL CODES/ORD  
REGARDING REQUIRED ANCHOR LENGTH

### 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

#### 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 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 LOOSE TO MEDIUM DENSE SANDS, FIRM TO STIFFER CLAYS AND SILTS, ALLUVIAL FILL, USE MINIMUM (2) 8" HELICES WITH MINIMUM 50" EMBEDMENT

**MOORE AND ASSOCIATES  
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DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: METAL CARPORTS  
AND STRUCTURES, LLC

METAL CARPORTS AND STRUCTURES, LLC  
715 WILLOW STREET  
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30'-0"x20'-0" SP ENCLOSED STRUCTURE

DATE: 7-30-21

SHT. 9

SCALE: NTS

DWG. NO: SK-3

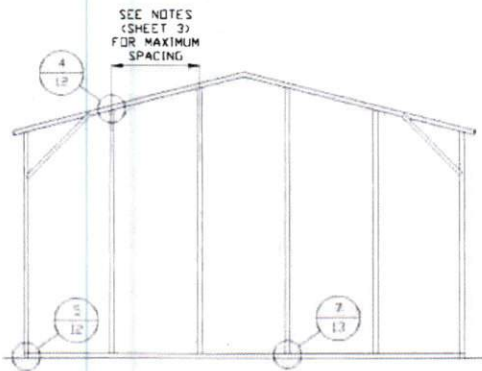
JOB NO: 21087S

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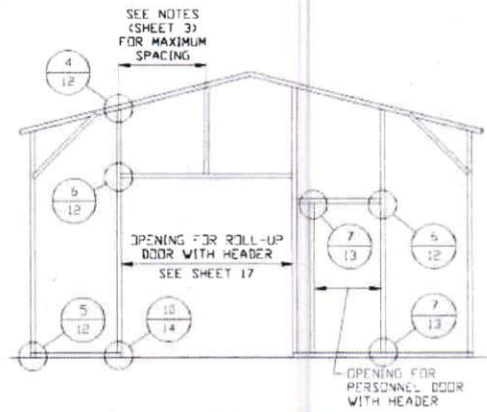


## BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS



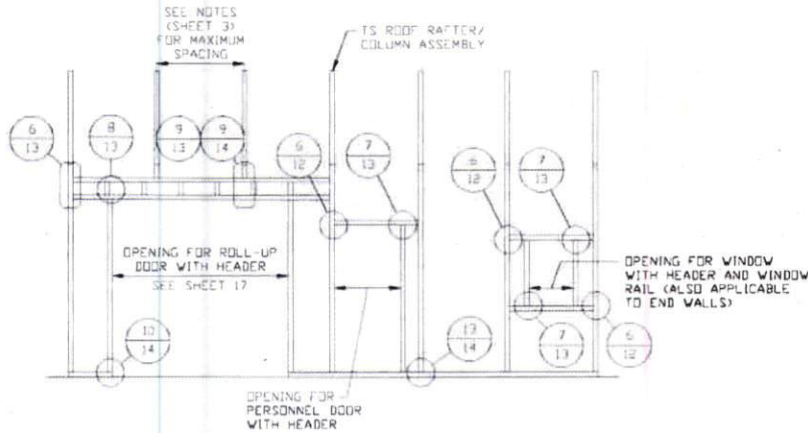
**TYPICAL BOX EAVE RAFTER  
END WALL FRAMING SECTION**

SCALE: NTS



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

SCALE: NTS



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

SCALE: NTS

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**CHECKED BY: PDH**

**PROJECT MGR: VSM**

**CLIENT: METAL CARPORTS  
AND STRUCTURES, LLC**

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715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-30-21**

**SCALE: NTS**

**JOB NO: 21087S**

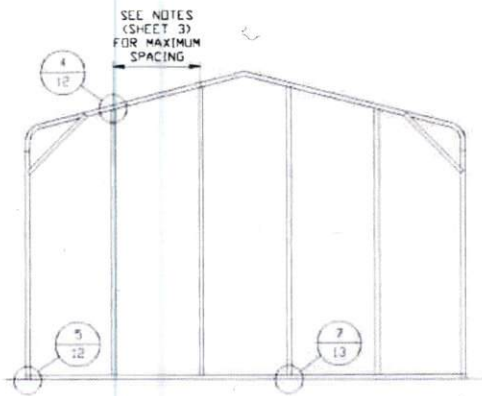
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**DWG. NO: SK-3**

**REV: 0**

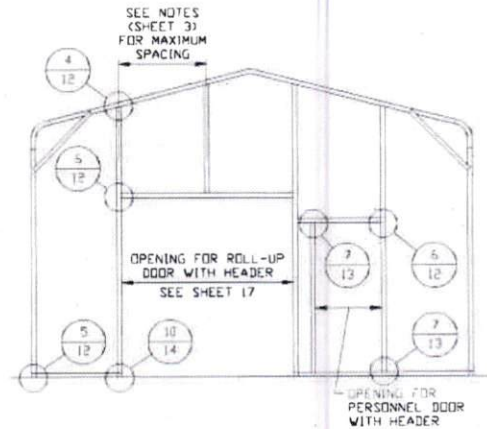
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## BOW RAFTER END WALL AND SIDE WALL OPENINGS



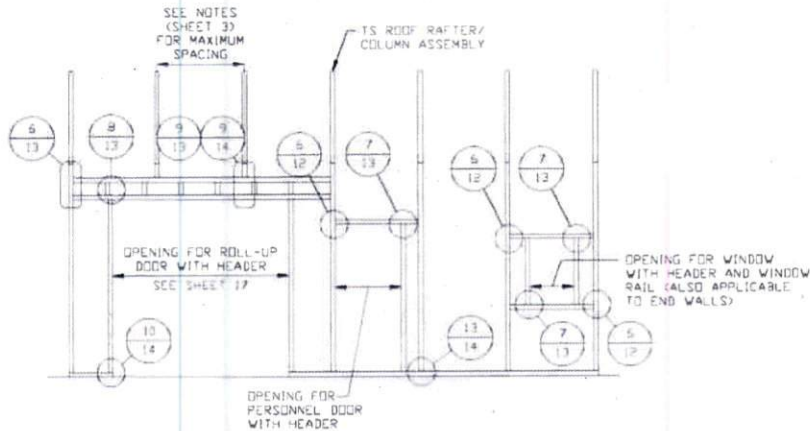
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END WALL FRAMING SECTION**

SCALE: NTS



**TYPICAL BOW RAFTER END  
WALL OPENINGS FRAMING SECTION**

SCALE: NTS



**TYPICAL BOW RAFTER SIDE  
WALL OPENINGS FRAMING SECTION**

SCALE: NTS

**MOORE AND ASSOCIATES  
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**CHECKED BY:** PDH

**PROJECT MGR:** WSM

**CLIENT:** METAL CARPORTS  
AND STRUCTURES, LLC

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715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0" x 20'-0" SP ENCLOSED STRUCTURE

**DATE:** 7-30-21

**SCALE:** NTS

**JOB NO:** 21087S

**SHT.** 11

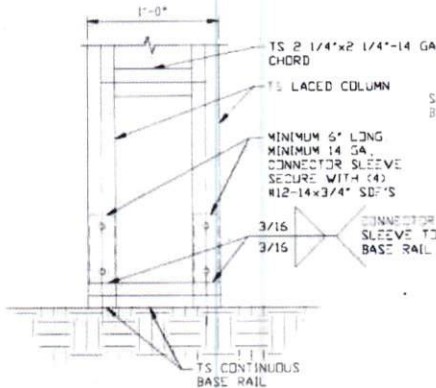
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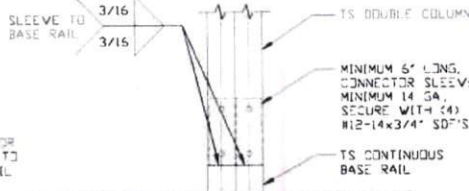


# CONNECTION DETAILS



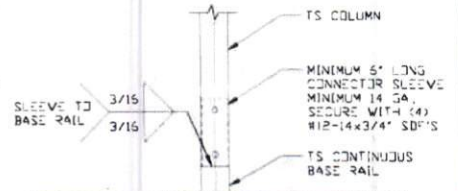
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**RAFTER COLUMN/  
BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



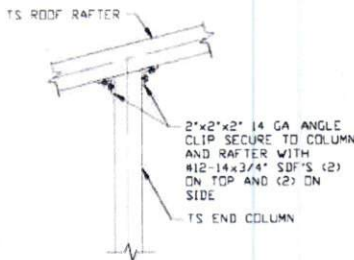
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**RAFTER COLUMN/  
BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



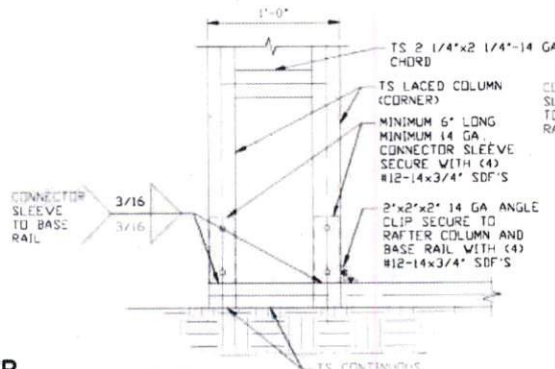
**3B**  
**RAFTER COLUMN/  
BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



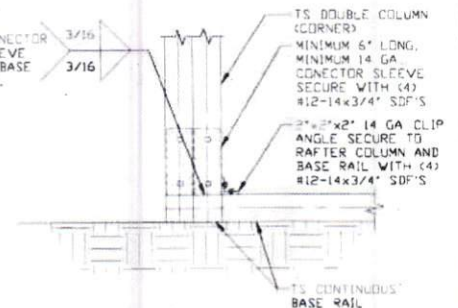
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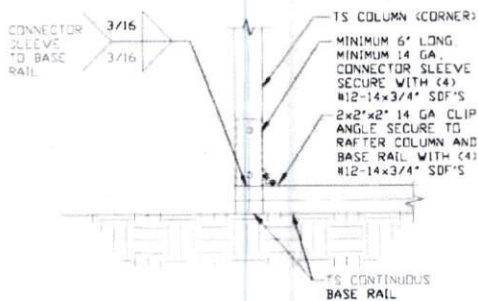
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**END COLUMN/BASE RAIL  
CONNECTION DETAIL**

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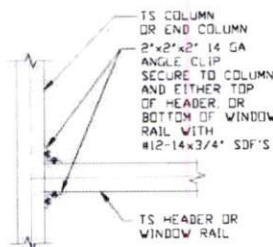
**5A**  
**END COLUMN/BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



**5B**  
**END COLUMN/BASE RAIL  
CONNECTION DETAIL**

SCALE: NTS



**6**  
**COLUMN OR WINDOW  
RAIL/WALL GIRTS  
TO POST  
CONNECTION DETAIL**

SCALE: NTS

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ENGINEERING AND CONSULTING, INC.**

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: METAL CARPORTS  
AND STRUCTURES, LLC

METAL CARPORTS AND STRUCTURES, LLC  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

DATE: 7-30-21

SHT. 12

SCALE: NTS

DWG. NO: SK-3

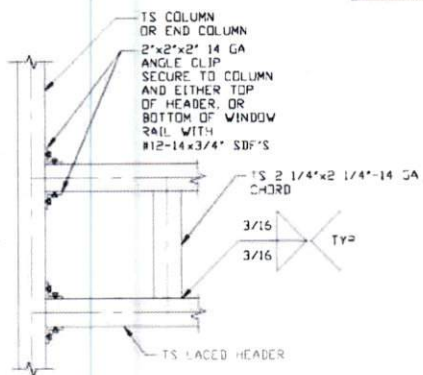
JOB NO: 21087S

REV: 0

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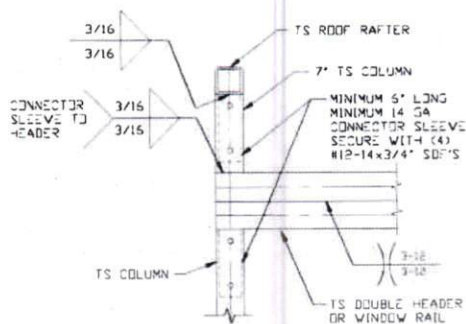
## CONNECTION DETAILS



6A

### COLUMN/LACED HEADER CONNECTION DETAIL

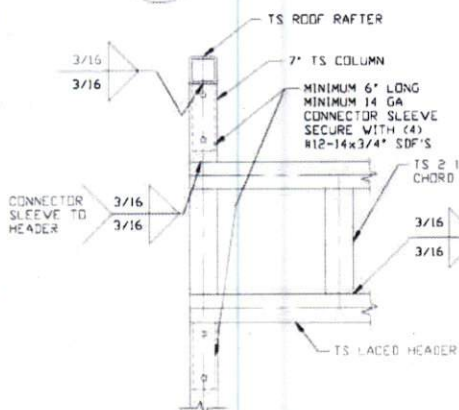
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6B

### COLUMN/DOUBLE HEADER CONNECTION DETAIL

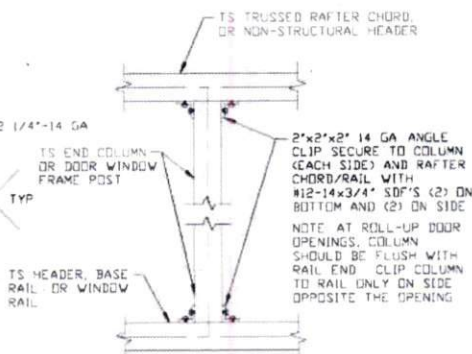
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6C

### COLUMN/LACED HEADER CONNECTION DETAIL

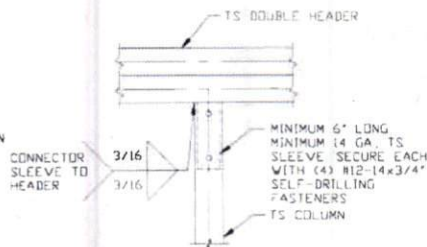
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7

### COLUMN TO WINDOW RAIL CONNECTION DETAIL

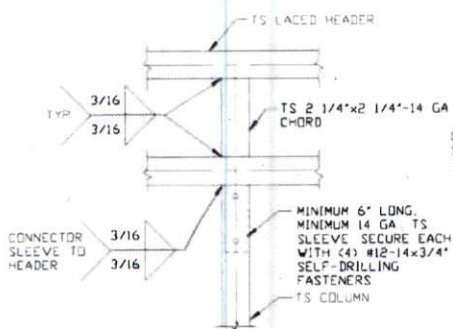
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8

### DOUBLE HEADER/COLUMN CONNECTION DETAIL

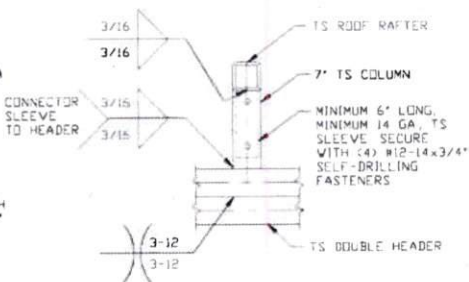
SCALE: NTS



8A

### LACED HEADER/COLUMN CONNECTION DETAIL

SCALE: NTS



9

### COLUMN/DOUBLE HEADER CONNECTION DETAIL

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: METAL CARPORTS  
AND STRUCTURES, LLC

METAL CARPORTS AND STRUCTURES, LLC  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30-0"x20'-0" SP ENCLOSED STRUCTURE

DATE: 7-30-21

SHT. 13

SCALE: NTS

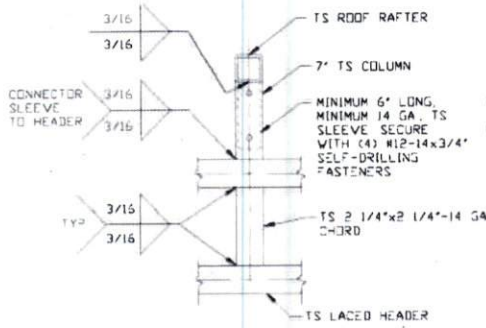
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JOB NO: 21097S

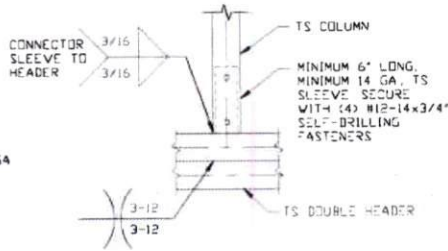
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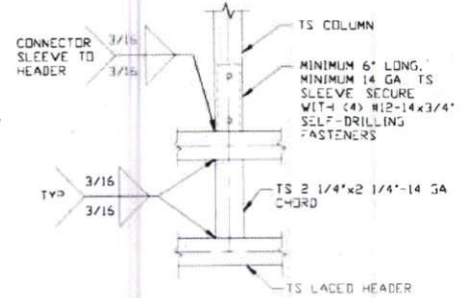
## CONNECTION DETAILS



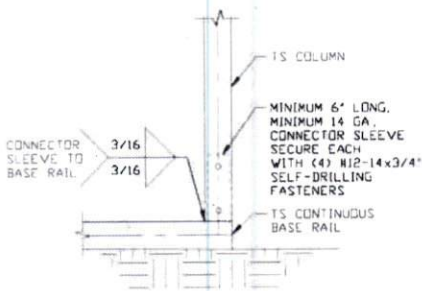
**9A** COLUMN/LACED HEADER CONNECTION DETAIL  
SCALE: NTS



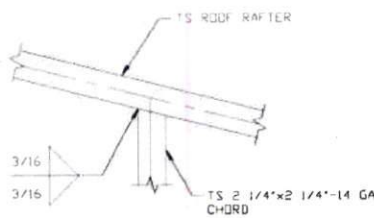
**9B** COLUMN/DOUBLE HEADER CONNECTION DETAIL  
SCALE: NTS



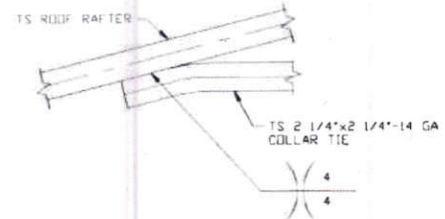
**9C** COLUMN/DOUBLE HEADER CONNECTION DETAIL  
SCALE: NTS



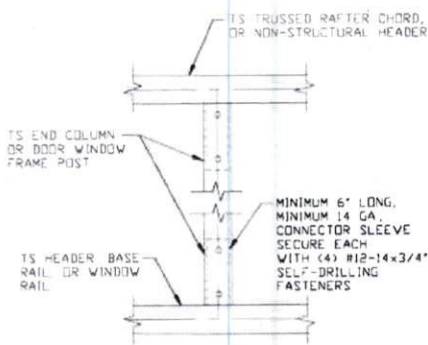
**10** COLUMN/BASE RAIL CONNECTION DETAIL  
SCALE: NTS



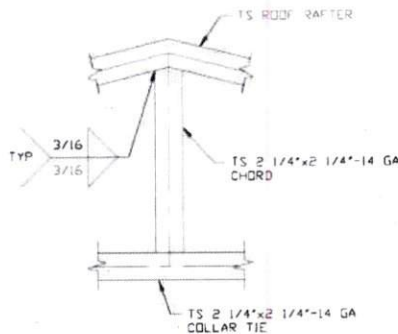
**11** RAFTER TO CHORD CONNECTION DETAIL  
SCALE: NTS



**12** COLLAR TIE CONNECTION DETAIL  
SCALE: NTS



**13** COLUMN TO HEADER OR BASE RAIL CONNECTION DETAIL  
SCALE: NTS



**14** RAFTER TO CHORD TO COLLAR TIE CONNECTION DETAIL  
SCALE: NTS

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

**DRAWN BY:** JG  
**CHECKED BY:** PDH

METAL CARPORTS AND STRUCTURES, LLC  
715 WILLOW STREET  
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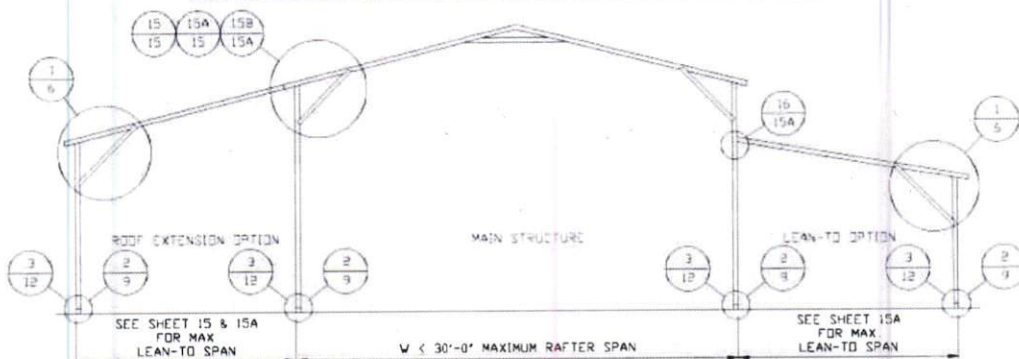
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**SHT.** 14

**SCALE:** NTS  
**DWG. NO.:** SK-3

**JOB NO.:** 21087S  
**REV.:** 0



# 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 (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 12'-0"

MAXIMUM WIDTH OF DOUBLE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 16'-0"

MAXIMUM WIDTH OF LACED MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 20'-0"

MAIN BUILDING COLUMNS WITH LEAN-TO OR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE LACED COLUMNS FOR EAVE HEIGHTS

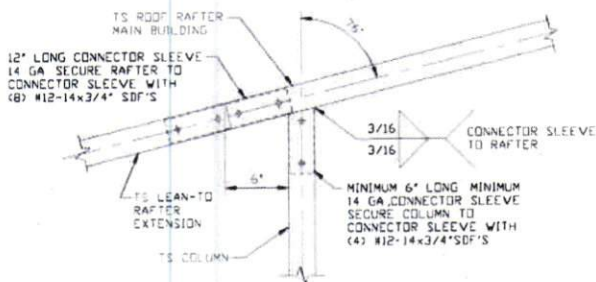
16'-0" < TO ≤ 20'-0"

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

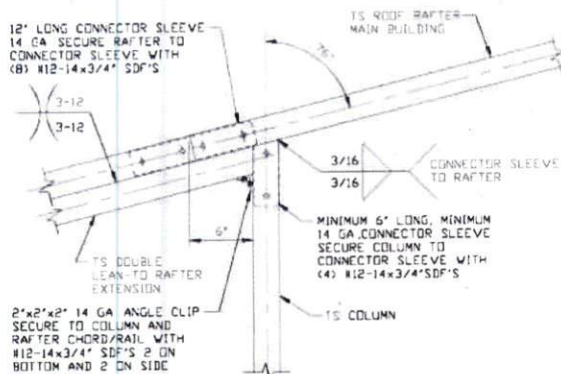
≤ 11'-0"



### SIDE EXTENSION RAFTER/ COLUMN DETAIL FOR RAFTER SPANS ≤ 12'-0"

15

SCALE: NTS



### SIDE EXTENSION RAFTER/ COLUMN DETAIL FOR RAFTER SPANS 12'-0" < TO ≤ 16'-0"

15A

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: VSM

CLIENT: METAL CARPORTS  
AND STRUCTURES, LLC

METAL CARPORTS AND STRUCTURES, LLC  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

DATE: 7-30-21

SHT. 15

SCALE: NTS

DWG. NO: SK-3

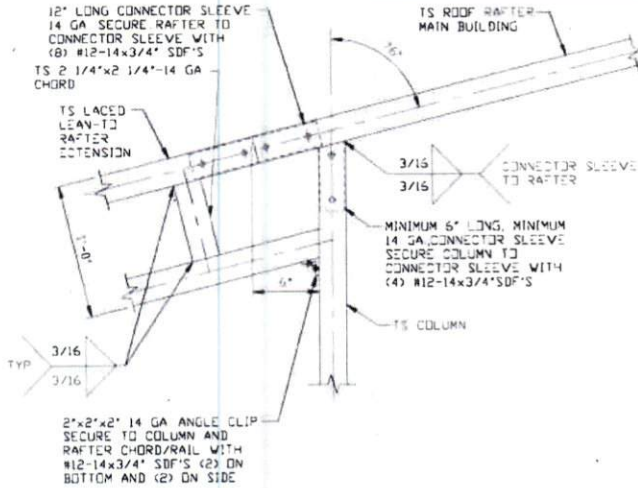
JOB NO: 21087S

REV: 0

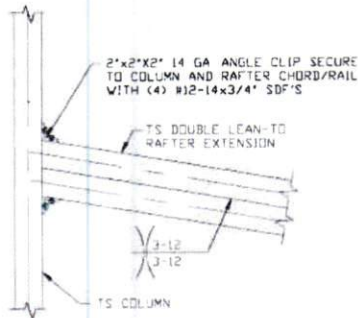
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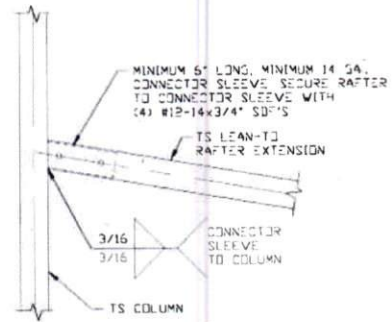
## BOX EAVE RAFTER LEAN-TO OPTIONS



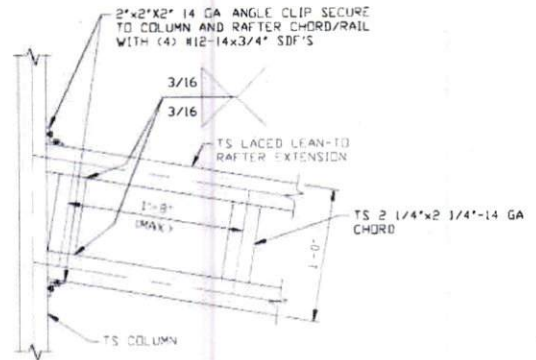
**15B** SIDE EXTENSION RAFTER/  
COLUMN DETAIL FOR RAFTER  
SPANS 16'-0" < TO <= 20'-0"  
SCALE: NTS



**16A** LEAN-TO RAFTER TO RAFTER  
COLUMN CONNECTION DETAIL  
FOR RAFTER SPANS 12'-0" < TO <= 16'-0"  
SCALE: NTS



**16** LEAN-TO RAFTER TO RAFTER  
COLUMN CONNECTION DETAIL  
FOR RAFTER SPANS <= 12'-0"  
SCALE: NTS



**16B** LEAN-TO RAFTER TO RAFTER  
COLUMN CONNECTION DETAIL  
FOR RAFTER SPANS 16'-0" < TO <= 20'-0"  
SCALE: NTS

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

**DRAWN BY:** JG  
**CHECKED BY:** PDH

METAL CARPORTS AND STRUCTURES, LLC  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0" x 20'-0" SP ENCLOSED STRUCTURE

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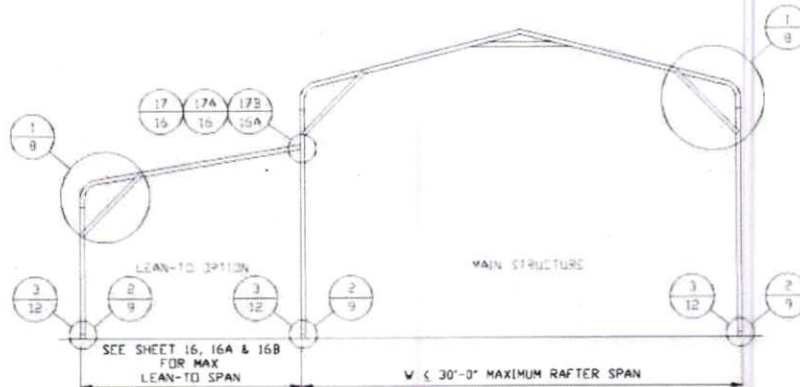
**PROJECT MGR:** WSM  
**CLIENT:** METAL CARPORTS AND STRUCTURES, LLC

**DATE:** 7-30-21  
**SHT.** 15A

**SCALE:** NTS  
**DWG. NO:** SK-3

**JOB NO:** 21087S  
**REV:** 0

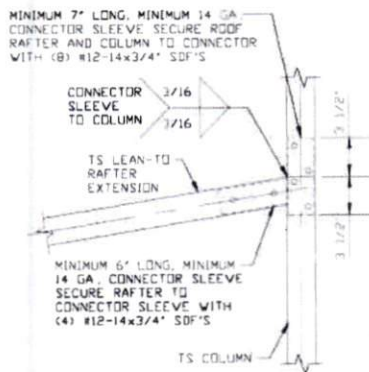
# BOW RAFTER LEAN-TO OPTION



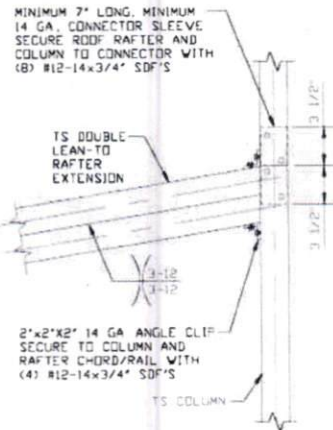
## TYPICAL BOW RAFTER LEAN-TO OPTION FRAMING SECTION

SCALE: NTS

MAXIMUM WIDTH OF SINGLE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 12'-0"  
 MAXIMUM WIDTH OF DOUBLE MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 16'-0"  
 MAXIMUM WIDTH OF LACED MEMBER (RAFTER AND COLUMN) ROOF EXTENSION AND LEAN-TO IS 20'-0"  
 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 < 11'-0"



**17** LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS < 12'-0"  
 SCALE: NTS



**17A**

LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 12'-0" < TO < 16'-0"  
 SCALE: NTS

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

**DRAWN BY: JG**  
**CHECKED BY: PDH**

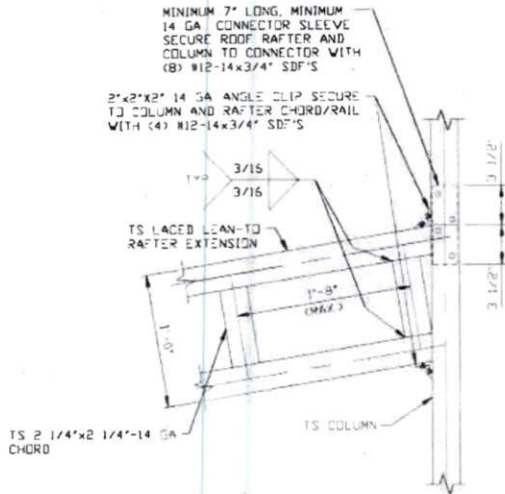
**METAL CARPORTS AND STRUCTURES, LLC**  
 715 WILLOW STREET  
 MOUNT AIRY, NC 27030  
 30'-0"x20'-0" SP ENCLOSED STRUCTURE

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**PROJECT MGR: WSM**  
**CLIENT: METAL CARPORTS AND STRUCTURES, LLC**

**DATE: 7-30-21**  
**SHT. 16**  
**SCALE: NTS**  
**DWG. NO: SK-3**  
**JOB NO: 21087S**  
**REV: 0**

## BOW RAFTER LEAN-TO OPTION



**LEAN-TO RAFTER TO RAFTER COLUMN  
CONNECTION DETAIL FOR  
RAFTER SPANS 16'-0" < TO ≤ 20'-0"**

**17B**

SCALE: NTS

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

DRAWN BY: JG

CHECKED BY: PDH

PROJECT MGR: WSM

CLIENT: METAL CARPORTS  
AND STRUCTURES, LLC

METAL CARPORTS AND STRUCTURES, LLC  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

DATE: 7-30-21

SHT. 16A

SCALE: NTS

DWG. NO: SK-3

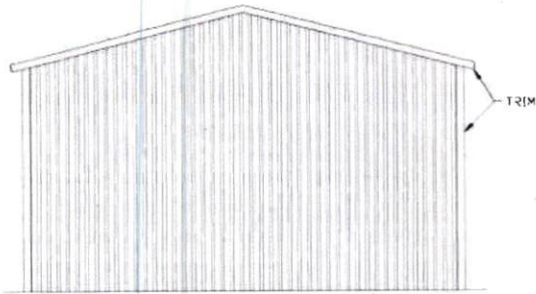
JOB NO: 21087S

REV: 0

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## BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION



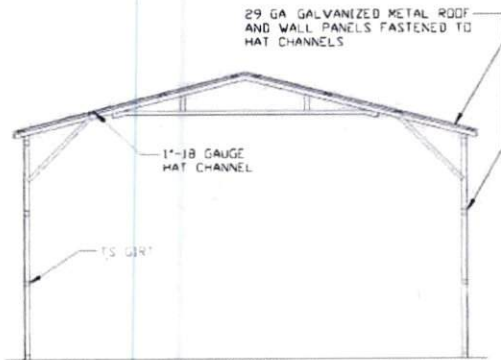
**TYPICAL END ELEVATION  
VERTICAL ROOF/SIDING**

SCALE: NTS



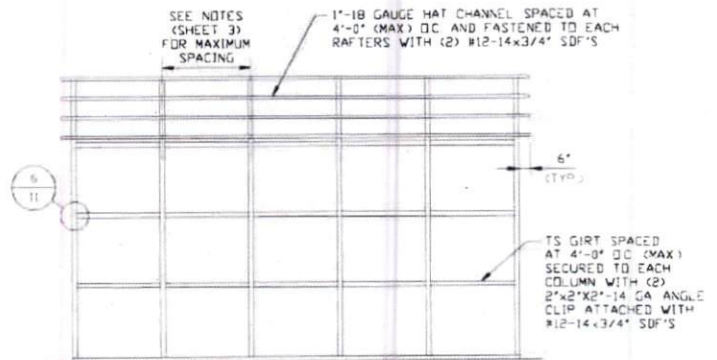
**TYPICAL SIDE ELEVATION  
VERTICAL ROOF/SIDING**

SCALE: NTS



**TYPICAL SECTION VERTICAL  
ROOF/SIDING OPTION**

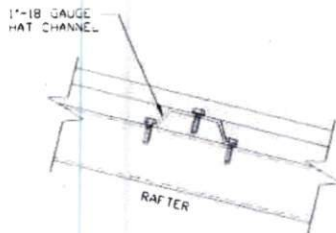
SCALE: NTS



**TYPICAL FRAMING SECTION  
VERTICAL ROOF/SIDING OPTION**

SCALE: NTS

NOTE: HAT CHANNELS CAN BE USED AS AN OPTION IN PLACE OF TS GIRTS. HAT CHANNELS MUST BE SPACED AT 4'-0" O.C. (MAX) AND FASTENED TO EACH COLUMN (LEG) WITH #12-14x3/4" SDF'S



**PANEL ATTACHMENT**

(ALTERNATE FOR VERTICAL ROOF PANELS)  
SCALE: NTS

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

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: VSM**

**CLIENT: METAL CARPORTS  
AND STRUCTURES, LLC**

**METAL CARPORTS AND STRUCTURES, LLC**  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-30-21**

**SHT. 17**

**SCALE: NTS**

**DWG. NO: SK-3**

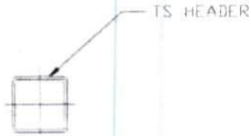
**JOB NO: 21087S**

**REV: 0**

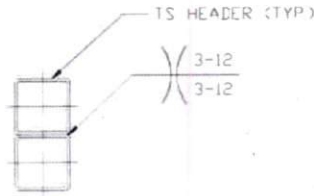
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## HEADER OPTIONS

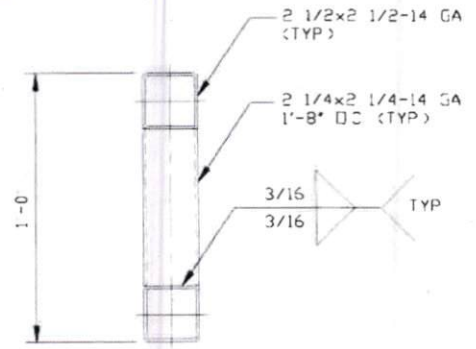
### SIDE WALL HEADER OPTIONS



**HEADER DETAIL FOR  
LENGTHS  $\leq 7'-0"$**   
SCALE: NTS

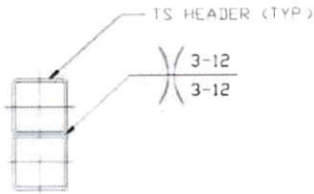


**HEADER DETAIL FOR  
7'-0" < LENGTHS  $\leq 12'-0"$**   
SCALE: NTS

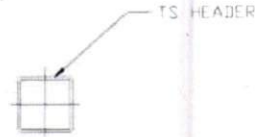


**HEADER DETAIL FOR  
12'-0" < LENGTHS  $\leq 18'-0"$**   
SCALE: NTS

### END WALL HEADER OPTIONS



**HEADER DETAIL FOR  
13'-0" < LENGTHS  $\leq 18'-0"$**   
SCALE: NTS



**HEADER DETAIL FOR  
LENGTHS  $\leq 13'-0"$**   
SCALE: NTS

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

**DRAWN BY: JG**

**CHECKED BY: PDH**

**PROJECT MGR: WSM**

**CLIENT: METAL CARPORTS  
AND STRUCTURES, LLC**

**METAL CARPORTS AND STRUCTURES, LLC**  
715 WILLOW STREET  
MOUNT AIRY, NC 27030  
30'-0"x20'-0" SP ENCLOSED STRUCTURE

**DATE: 7-30-21**

**SHT. 18**

**SCALE: NTS**

**DWG. NO: SK-3**

**JOB NO: 21087S**

**REV: 0**

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