

# STRUCTURAL DESIGN

# **ENCLOSED BUILDING**

# MAXIMUM 32'-0" WIDE X 16'- 0" EAVE HEIGHT-BOX EAVE FRAME AND BOW FRAME

1 October 2021 Revision 0 M&A Project No. 21048S

Prepared for:

SteelCraft Structures 1841 Amity Hill Rd. Statesville, NC 28677

# 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



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Moore and Associates Engineering and Consulting, Inc. No. C-3166				
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### INSTALLATION NOTES AND SPECIFICATIONS

- 1. DESIGN IS FOR MAXIMUM 32'-0" WIDE x 16'-0" EAVE HEIGHT ENCLOSED STRUCTURES.
- 2. DESIGN WAS DONE IN ACCORDANCE WITH ALL THE APPLICABLE BUILDING CODES LISTED ON SHEET 3A.
- 3. DESIGN LOADS ARE AS FOLLOWS:

A) DEAD LOAD

= 1.5 PSF

B) LIVE LOAD

= 12 PSF C) GROUND SNOW LOAD = 20 PSF

NOTE: UNBALANCED LOADING DUE TO SNOW DRIFTING FROM AN ADJACENT TALLER STRUCTURE HAS NOT BEEN EVALUATED.

- 4. 3-SECOND GUST ULTIMATE WIND SPEED ( VULT) = < 140 MPH (NOMINAL WIND SPEED = < 108 MPH)
- 5. MAXIMUM RAFTER/COLUMN AND END COLUMN SPACING = 5.0 FEET (UNLESS NOTED OTHERWISE).
- 6. ENDWALL COLUMNS (POSTS) AND SIDE WALL COLUMNS ARE EQUIVALENT IN SIZE AND SPACING (UNLESS NOTED OTHERWISE).
- 7. RISK CATEGORY I.
- 8. WIND EXPOSURE CATEGORY B
- 9. SPECIFICATIONS APPLICABLE TO 29 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/2" × 2 1/2" 14 GAUGE TUBE STEEL (FRAMING MEMBERS (UNLESS NOTED DTHERWISE). 2 1/4" × 2 1/4" 12 GAUGE TS MAY BE USED AS OPTIONAL FRAMING MEMBERS. - 14 GAUGE TUBE STEEL (TS)
- 10. AVERAGE PANEL SPACING DN-CENTERS = 10 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, ROOF SLOPES LESS THAN 3:12 REQUIRE USE OF JOINT SEALANT.
- 12. ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL AT OR WITHIN 6° OF EVERY COLUMN.
- STANDARD GROUND ANCHORS (SDIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT x 30' LONG AND MAY DNLY BE USED IN SUITABLE SDILS OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED IN UNSUITABLE SOILS AS NOTED. COORDINATE WITH LOCAL CODES/ORDINANCES REGARDING MINIMUM LENGTH FOR FROST DEPTH PROTECTION.
- 14. WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:

SDIL SITE CLASS = D RISK CATEGORY I

R = 3.25Sps= 2.039 g I<sub>E</sub>= 1.0

Sp1= 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 FOUNDATION ARE DESIGNED FOR A COMPLETED CONDITION DNLY 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)

2012 INTERNATIONAL BUILDING CODE (IBC 2012)

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

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

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

BUILDING CODE 2012 OF TENNESSEE (ADOPTS THE IBC 2012 WITH AMENDMENTS)

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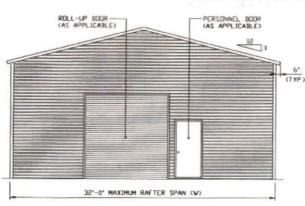
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BRAWN BY: LT	100	1841 AMITY HILL RD.				

SHT. 3A

CLIENTI STEELCRAFT

DVG. ND SK-3

# BOX EAVE FRAME RAFTER STRUCTURE



LENGTH VARIES DEPENDING ON NUMBER AND SPACING OF RAFTERS

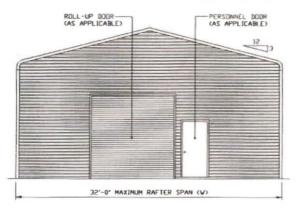
# TYPICAL END ELEVATION

SCALE: NTS

# TYPICAL SIDE ELEVATION

SCALE: NTS

### BOW EAVE FRAME RAFTER STRUCTURE



LENGTH VARIES DEPENDING IN
NUMBER AND SPACING OF RAFTERS

TYPICAL END ELEVATION

SCALE: NTS

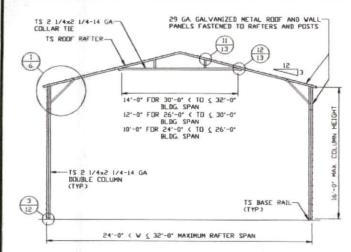
TYPICAL SIDE ELEVATION

SCALE: NTS

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# TYPICAL RAFTER/COLUMN FRAME SECTION

TS 2 1/4x2 1/4-14 GA PANELS FASTENED TO RAFTERS AND POSTS

TS ROOF RAFTER

14'-0' FOR 30'-0' ( TO ( 32'-0')
BLOG SPAN

12'-0' FOR 24'-0' ( TO ( 26'-0')
BLOG SPAN

TS BASE RAIL

(TYP)

# TYPICAL RAFTER/COLUMN FRAME SECTION

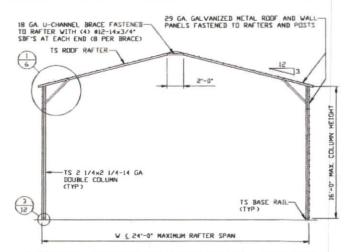
24'-0' < V € 32'-0' MAXIMUM RAFTER SPAN

SEE NOTES
(SHEET 3)
FOR MAXIMUM
SPACING

LENGTH VARIES DEPENDING DN
NUMBER AND SPACING OF RAFTERS

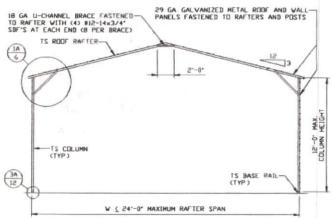
# TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS



# TYPICAL RAFTER/COLUMN FRAME SECTION

SCALE: NTS



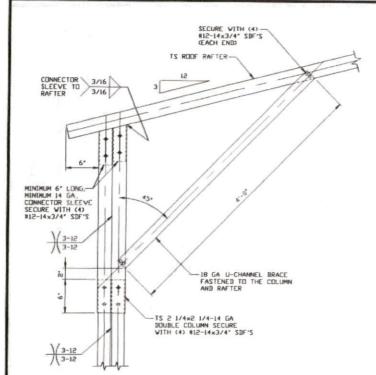
# TYPICAL RAFTER/COLUMN FRAME SECTION

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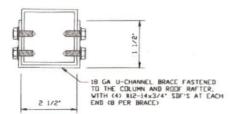
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BOX EAVE RAFTER/CORNER COLUMN CONNECTION DETAIL FOR HEIGHTS 12'-0' < TO < 16'-0' 1 SCALE: NTS



BRACE SECTION SCALE: NTS

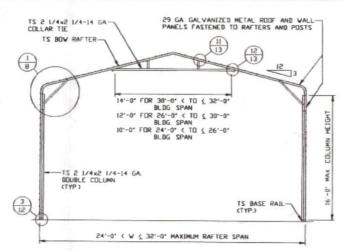
SECURE WITH (4)  MI2-14×3/4" SDF'S  CEACH END)  TS ROOF RAFTER
CONNECTUR 3/16 SLEEVE TO 3/16 RAFTER 3/16
6.
MINIMUM 12 LCING; MINIMUM 14 GA. CDINNECTOR SLEEVE SECURE WITH (4) 812-14x3/4" SDF'S  IB GA. U-CHANNEL BRACE FASTENED TO THE COLUMN AND RAFTER
TS COLUMN

BOX EAVE RAFTER/CORNER COLUMN CONNECTION DETAIL FOR HEIGHTS ≤ 12'-0" 1A

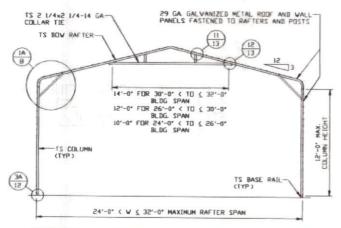
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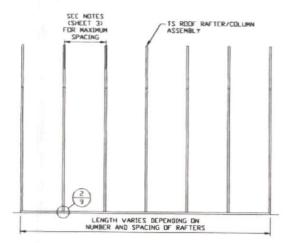
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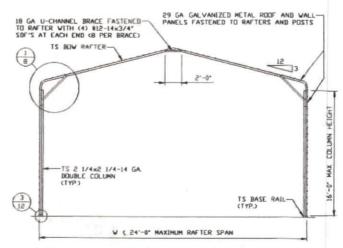
# TYPICAL RAFTER/COLUMN FRAME SECTION



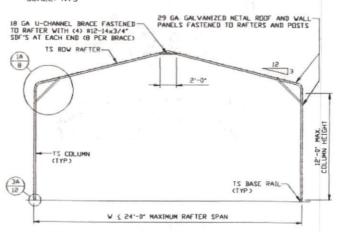
# TYPICAL RAFTER/COLUMN FRAME SECTION



# TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

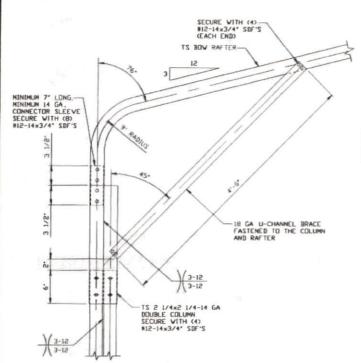


# TYPICAL RAFTER/COLUMN FRAME SECTION



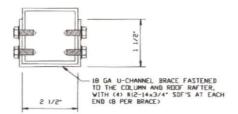
# TYPICAL RAFTER/COLUMN FRAME SECTION

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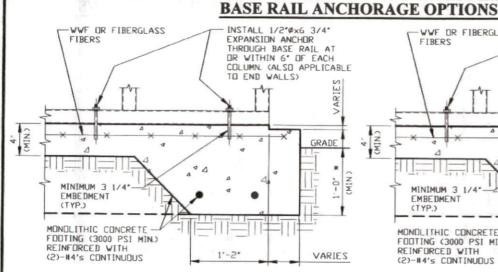
BOW EAVE RAFTER/CORNER
COLUMN CONNECTION DETAIL
FOR HEIGHTS 12'-0' < TO \( \) 16'-0'

BOX EAVE RAFTER/CORNER COLUMN CONNECTION DETAIL FOR HEIGHTS & 12'-0'



BRACE SECTION
SCALE: NTS

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### CONCRETE MONOLITHIC SLAB BASE RAIL ANCHURAGE

MINIMUM ANCHOR EDGE DISTANCE IS 4'.

\* COORDINATE WITH LOCAL CODES/ORD.

REGARDING MINIMUM FROST DEPTH REQ.

# GENERAL NOTES

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

CONCRETE SHALL HAVE A MINIMUM SPECIFIED COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.

COVER OVER REINFORCING STEEL:

FOR FOUNDATIONS, MINIMUM CONCRETE COVER DVER 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 AGIS GRADE 60. THE SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC MEETING ASTM A185 OR FIBERGLASS FIBER REINFORCEMENT

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

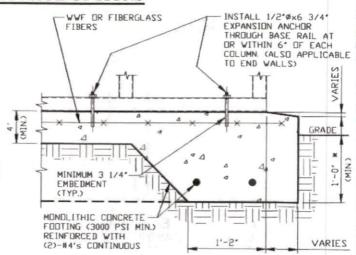
REINFORCEMENT IS BENT COLD.

THE DIAMETER OF THE BEND, MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS.
REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT

BE FIELD BENT

### HELIX ANCHOR NOTES

- I. FOR VERY DENSE AND/OR CEMENTED SANDS, COARSE GRAVEL AND COBBLES, CALICHE, PRELIABED SILTS AND CLAYS, USE MINIMUM (2) 4" HELICES WITH MINIMUM 30" EMBEDMENT OR SINGLE 6' HELIX WITH MINIMUM 50' EMBEDMENT
- 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
- FOR LODSE TO MEDIUM DENSE SANDS, FIRM TO STIFF CLAYS AND SILTS ALLUVIAL FILL, USE MINIMUM (2) 6' HELICES WITH MINIMUM 50' EMBEDMENT.
- FOR VERY LOSE TO MEDIUM DENSE SANDS, FIRM TO STIFFER CLAYS AND SILTS, ALLUVIAL FILL, USE MINIMUM (2) 8' HELICES WITH MINIMUM 60' EMBEDMENT.

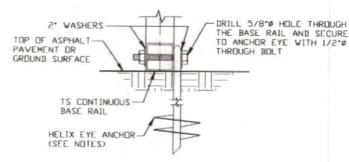


2A

### CONCRETE SLAB BASE RAIL ANCHORAGE

SCALE: NTS

MINIMUM ANCHOR EDGE DISTANCE IS 4° ■ COURDINATE WITH LOCAL CODES/ORD.
REGARDING MINIMUM FROST DEPTH REQ.



2B

### GROUND BASE HELIX ANCHURAGE

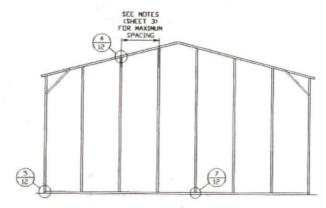
(CAN BE USED FOR ASPHALT) \* COURDINATE WITH LOCAL CODES/ORD.
REGARDING MINIMUM FROST DEPTH REQ.

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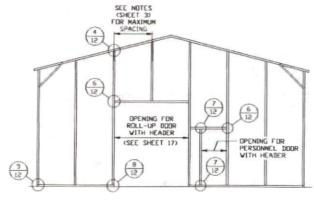
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# BOX EAVE RAFTER END WALL AND SIDE WALL FRAMING SECTIONS



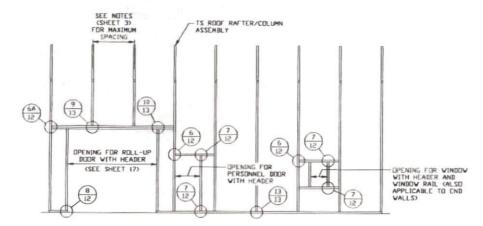
TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS

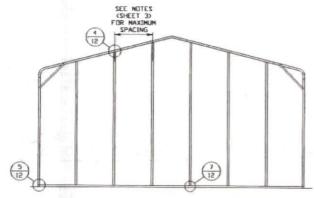


TYPICAL BOX EAVE RAFTER SIDE WALL **OPENINGS FRAMING SECTION** 

SCALE: NTS

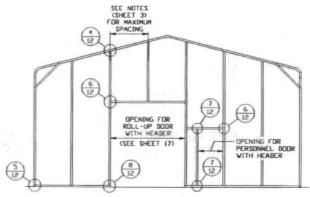
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# **BOW EAVE RAFTER END WALL AND SIDE WALL FRAMING SECTIONS**



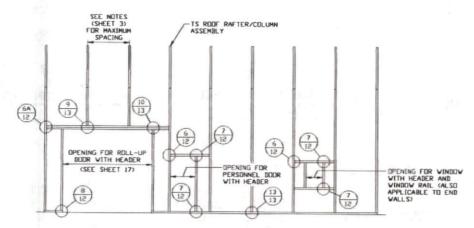
TYPICAL BOW EAVE RAFTER END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOW EAVE RAFTER END WALL OPENINGS FRAMING SECTION

SCALE: NTS



TYPICAL BOW EAVE RAFTER SIDE WALL OPENINGS FRAMING SECTION

SCALE: NTS

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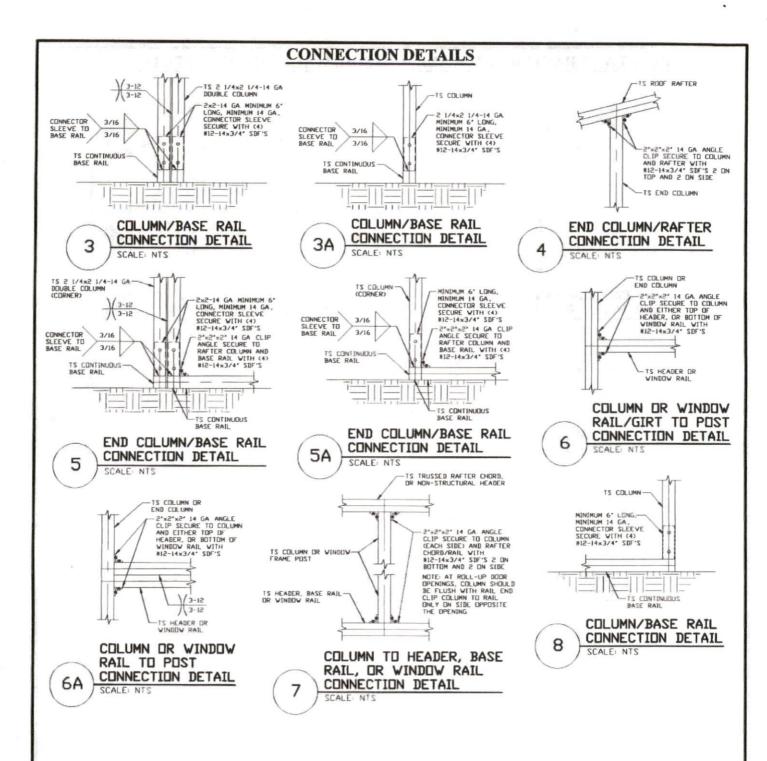
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CLIENT: STEELCRAFT

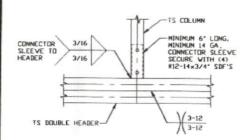
DATE: 10-1-21 SHT. 11 DVG. ND SK-3

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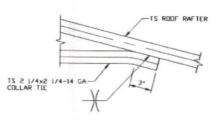


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		32-0°X	16-0" ENCLOSE	DSTRUCTURE
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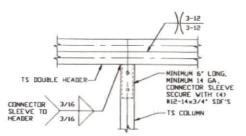
# **CONNECTION DETAILS**



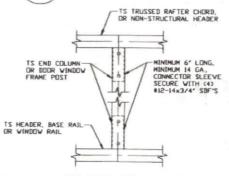
9 COLUMN/DOUBLE HEADER
CONNECTION DETAIL
SCALE: NTS



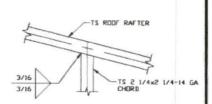
12 COLLAR TIE CONNECTION DETAIL



10 DOUBLE HEADER/COLUMN CONNECTION DETAIL
SCALE NTS



COLUMN TO HEADER
OR BASE RAIL
CONNECTION DETAIL
SCALE: NTS



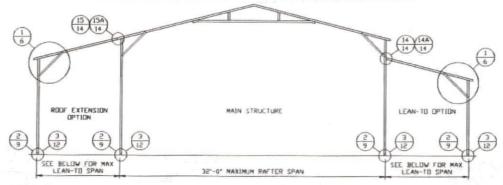
11 RAFTER TO CHORD CONNECTION DETAIL
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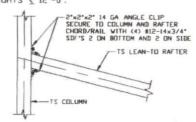
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# **BOX EAVE RAFTER LEAN-TO OPTIONS**



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

MAXIMUM WIDTH OF SINGLE MEMBER RAFTER ROOF EXTENSION AND LEAN-TO IS 12'-O' MAXIMUM WIDTH OF DOUBLE MEMBER RAFTER ROOF EXTENSION AND LEAN-TO IS 16'-O'. MAIN BUILDING COLUMNS WITH LEAN-TO DR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS FOR EAVE HEIGHTS 12'-0' < TO < 16'-0' MAIN BUILDING COLUMNS WITH LEAN-TO DR ROOF EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMN FOR EAVE HEIGHTS & 12'-0'.



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

TS ROOF RAFTER-12' LONG TS 14 GA NIPPLE-SECURE RAFTER TO NIPPLE WITH (8) #12-14x3/4' SDF'S TS EXTENSION RAFTER -MINIMUM 6' LONG, MINIMUM 14 GA, TS NIPPLE. SECURE POST TO NIPPLE WITH (4) #12-14x3/4' SDF'S TS COLUMN

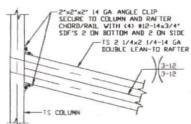
14

15A

### SIDE EXTENSION RAFTER COLUMN DETAIL FOR SPANS ≤ 12'-0" 15 SCALE: NTS

TS ROOF RAFTER-12' LONG TS 14 GA NIPPLE-SECURE RAFTER TO NIPPLE WITH (8) #12-14x3/4' SDF'S 3-15 3-12 MINIMUM 6' LONG, MINIMUM 14 GA, TS NIPPLE SECURE POST TO NIPPLE WITH (4) #12-14x3/4' DOUBLE EXTENSION RAFTER TS COLUMN

> SIDE EXTENSION RAFTER COLUMN DETAIL FOR SPANS 12'-0' < TO ≤ 16'-0'



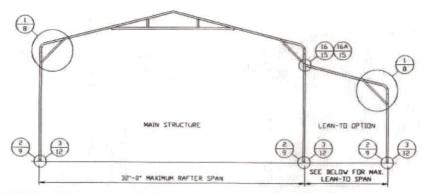
LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 12'-0" < T□ ≤ 16'-0"

14A SCALE: NTS

# S'x2'x2' 14 GA ANGLE CLIP\_ SECURE TO COLUMN AND RAFTER WITH (4) 812-14x3/4' SDF'S

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# **BOW EAVE RAFTER LEAN-TO OPTIONS**



# TYPICAL BOW EAVE RAFTER LEAN-TO OPTIONS FRAMING SECTION

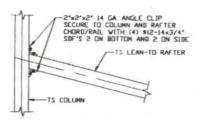
SCALE: NTS

MAXIMUM WIDTH DE SINGLE MEMBER RAFTER RODE EXTENSION AND LEAN-TO IS 12'-0'.

MAXIMUM WIDTH DE DOUBLE MEMBER RAFTER RODE EXTENSION AND LEAN-TO IS 16'-0'.

MAIN BUILDING COLUMNS WITH LEAN-TO DR RODE EXTENSION ATTACHED ARE REQUIRED TO BE DOUBLE COLUMNS
FOR EAVE HEIGHTS 12'-0' < TO < 16'-0'.

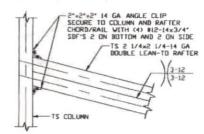
MAIN BUILDING COLUMNS WITH LEAN-TO DR RODE EXTENSION ATTACHED ARE REQUIRED TO BE SINGLE COLUMN
FOR EAVE HEIGHTS < 12'-0'.



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 

12'-0'

16



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

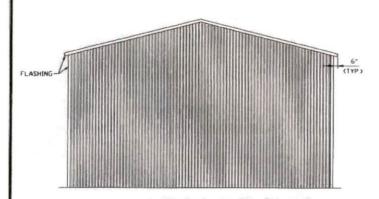
16A) SCALE NTS

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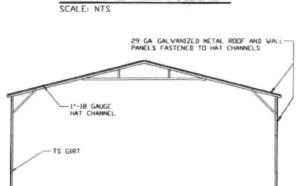
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# BOX EAVE RAFTER VERTICAL ROOF/SIDING OPTION

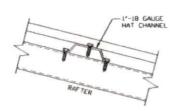


TYPICAL END ELEVATION VERTICAL ROOF/SIDING



TYPICAL SECTION VERTICAL ROOF/SIDING OPTION

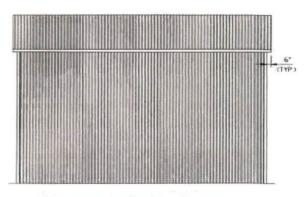
SCALE: NTS



PANEL ATTACHMENT

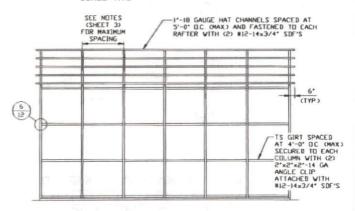
(ALTERNATE FOR VERTICAL ROOF PANELS)

SCALE: NTS



### TYPICAL SIDE ELEVATION VERTICAL ROOF/SIDING

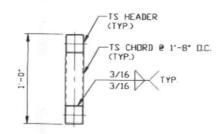
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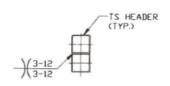
TYPICAL FRAMING SECTION VERTICAL ROOF/SIDING OPTION

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# SIDE WALL HEADER OPTIONS



HEADER DETAIL FOR SIDE WALL DOOR OPENINGS 14'-0' < LENGTH ≤ 16'-0"

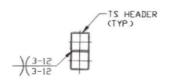


HEADER DETAIL FOR SIDE WALL DOOR OPENINGS
8'-0' < LENGTH & 14'-0"

SCALE: NTS TS HEADER

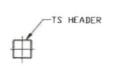
HEADER DETAIL FOR SIDE WALL
DOOR OPENINGS & 8'-0' SCALE: NTS

# END WALL HEADER OPTIONS



HEADER DETAIL FOR SIDE WALL DOOR OPENINGS 13'-0" < LENGTH ≤ 16'-0"

SCALE: NTS



HEADER DETAIL FOR END WALL DOOR OPENINGS ≤ 13'-0"

SCALE: NTS

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