STRUCTURAL DESIGN
RISK CATEGORY I/II
ENCLOSED BUILDING

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

10 November 2020
Revision 0
M&A Project No. 20214S

Darrell Flynn
3067 Hillmon Grove Rd.
Cameron, NC 28326
30'x60'x12'

Prepared for:

Luna Metal Buildings
468 N Fayetteville Street
Asheboro, NC 27203

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

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 18604 11/11/20 WAYNE S. MOORE

COMMONWEALTH OF VIRGINIA WAYNE S. MOORE Lic. No. 051637 11/11/20 PROFESSIONAL ENGINEER

SOUTH CAROLINA MOORE AND ASSOCIATES, INC. No. C02968 CERTIFICATE OF AUTHORIZATION

WAYNE S. MOORE REGISTERED ENGINEER AGRICULTURE COMMERCE 11/11/20 No. 102025 STATE OF TENNESSEE

NORTH CAROLINA PROFESSIONAL SEAL 26784 11/11/20 ENGINEER WAYNE S. MOORE

NORTH CAROLINA Moore and Associates Engineering and Consulting, Inc. No. C-3166 CERTIFICATE OF AUTHORIZATION

GEORGIA REGISTERED No. 24069 PROFESSIONAL 11/11/20 ENGINEER WAYNE S. MOORE

MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING, INC.

DRAWN BY: JG	LUNA METAL BUILDINGS 468 N FAYETTEVILLE ST. ASHEBORO, NC 27203 30'-0"x20'-0" RC I / II ENCLOSED STRUCTURE			
CHECKED BY: PDH				
PROJECT MGR: WSM	DATE: 11-10-20	SCALE: NTS	JOB NO: 20214S	
CLIENT: LUNA METAL	SHT. 1	DWG. NO: SK-3	REV: 0	

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 2018 NORTH CAROLINA BUILDING CODE, 2012 INTERNATIONAL BUILDING CODE (IBC), 2015 IBC, AND 2018 IBC
3. DESIGN LOADS ARE AS FOLLOWS:
   A) DEAD LOAD = 11.5 PSF FOR RISK CATEGORY II
      = 1.5 PSF FOR RISK CATEGORY I.
   B) LIVE LOAD = 20 PSF FOR RISK CATEGORY II
      = 12 PSF FOR RISK CATEGORY I.
   C) GROUND SNOW LOAD = 30 PSF WITH U-CHANNEL PEAK BRACE (W ≤ 24-'0)
      = 35 PSF
      (UNBALANCED SNOW LOADS DUE TO DRIFTING HAVE NOT BEEN EVALUATED)
4. 3-SECOND ULTIMATE WIND SPEED (V_{ULT}) = ≤ 155 MPH (NOMINAL WIND SPEED = 120 MPH) FOR RISK CATEGORY II.
5. 3-SECOND ULTIMATE WIND SPEED (V_{ULT}) = ≤ 145 MPH (NOMINAL WIND SPEED = 112 MPH) FOR RISK CATEGORY I
6. MAXIMUM RAFTER/POST AND END POST SPACING = 4.0 FEET FOR RISK CATEGORY II (UNLESS NOTED OTHERWISE)
7. MAXIMUM RAFTER/POST AND END POST SPACING = 5.0 FEET FOR RISK CATEGORY I (UNLESS NOTED OTHERWISE)
8. END WALL COLUMNS/POSTS ARE EQUIVALENT TO SIDE WALL COLUMNS/POSTS IN SIZE AND SPACING UNLESS NOTED OTHERWISE
9. RISK CATEGORY I/II
10. WIND EXPOSURE CATEGORY B (RISK CATEGORY I)/C (RISK CATEGORY II)
11. SPECIFICATIONS APPLICABLE TO 29 GAUGE METAL PANELS FASTENED DIRECTLY TO 2 1/4"x2 1/4"-14 GAUGE TUBE STEEL (TS) FRAMING MEMBERS (UNLESS NOTED OTHERWISE). WHERE TS 2 1/4" x 2 1/4" - 14 GAUGE IS SPECIFIED, TS 2 1/4" x 2 1/4" - 12 GAUGE MAY BE USED AS AN OPTION
12. AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR HAT CHANNELS, AND COLUMNS (INTERIOR OR END) = 10" O.C. (MAX.) FOR RISK CATEGORY I AND 8" O.C. (MAX.) FOR RISK CATEGORY II. FOR WIND SPEEDS > 145 MPH = 6" O.C. (MAX.).
13. 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 1/4" (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
14. GROUND ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6" OF EACH RAFTER COLUMN ALONG SIDES
15. STANDARD SOIL NAIL FOUNDATION SYSTEM CONSISTS OF #4 REBAR x WELDED NUT x 30" LONG AND ARE APPLICABLE ONLY IN MEDIUM TO STIFF (SUITABLE) SOILS. SOIL NAILS MAY BE USED FOR WIND SPEEDS ≤ 145 MPH. OPTIONAL ANCHORAGE MAY BE USED IN SUITABLE SOILS AND MUST BE USED FOR WIND SPEEDS > 145 MPH AND/OR IN UNSUITABLE SOILS AS NOTED. COORDINATE WITH LOCAL CODES/ORDINANCES REGARDING MINIMUM LENGTH FOR FROST DEPTH PROTECTION.
16. WIND FORCES GOVERN OVER SEISMIC FORCES. SEISMIC PARAMETERS ANALYZED ARE:
    SOIL SITE CLASS = D
    RISK CATEGORY I/II
    R = 3.25 I_E = 1.0
    S_{DS} = 2.039 g $V = C_S W$
    S_{D1} = 1.258 g
17. FOR RISK CATEGORY II STRUCTURES, MAXIMUM THRESHOLD HEIGHT IS 1 1/2" FOR PERSONNEL DOORS UTILIZED AS MEANS OF EGRESS

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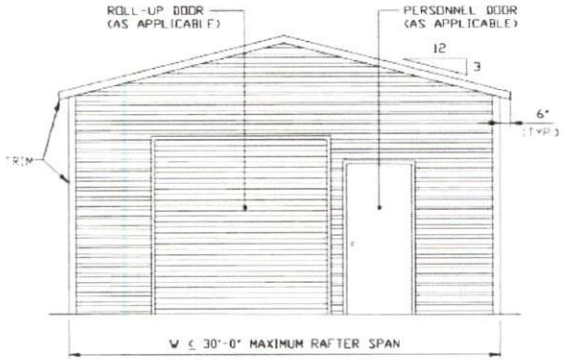
	CLIENT: LUNA METAL	SHT. 3	DWG. NO: SK-3	REV: 0



TYPICAL END ELEVATION
SCALE: NTS

TYPICAL SIDE ELEVATION
SCALE: NTS

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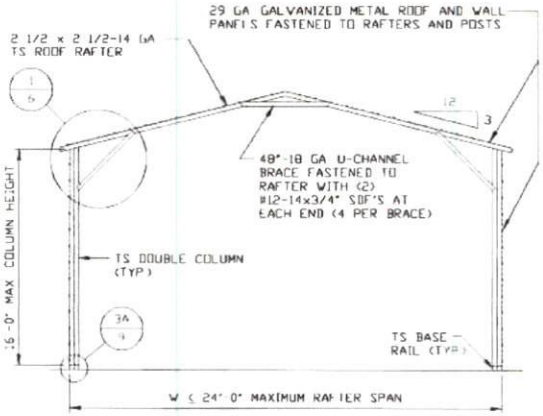
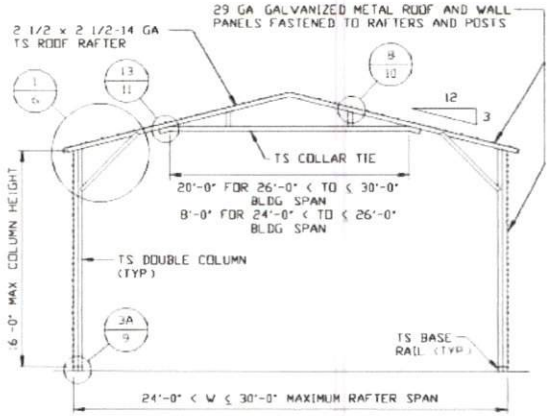
EXPOSURE B



TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



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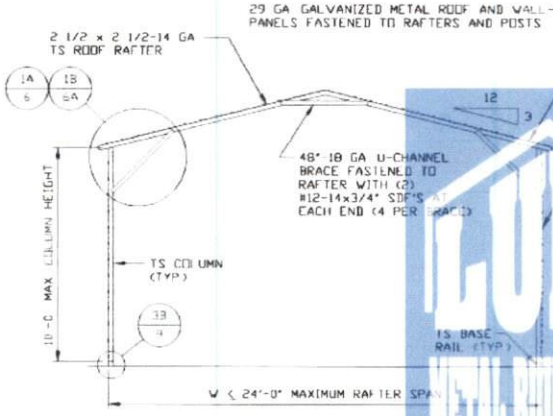

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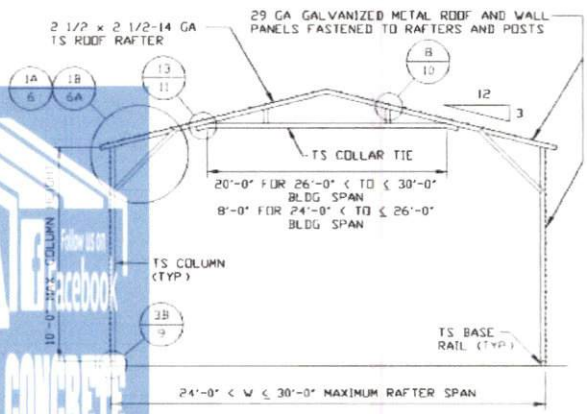
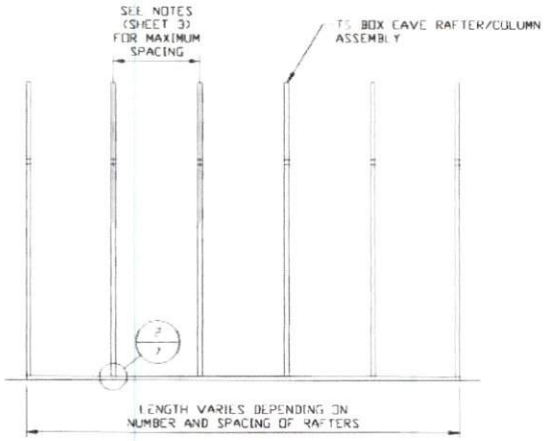


TYPICAL RAFTER/COLUMN END FRAMING SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS

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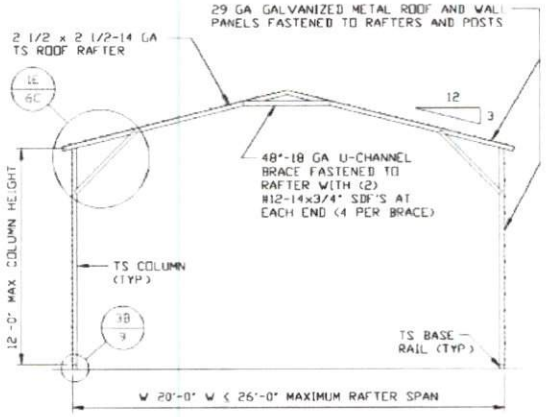
EXPOSURE C



TYPICAL RAFTER/COLUMN END FRAME SECTION

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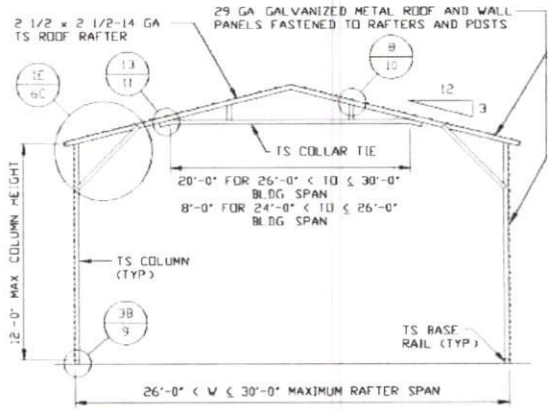

TYPICAL RAFTER/COLUMN END FRAME SECTION

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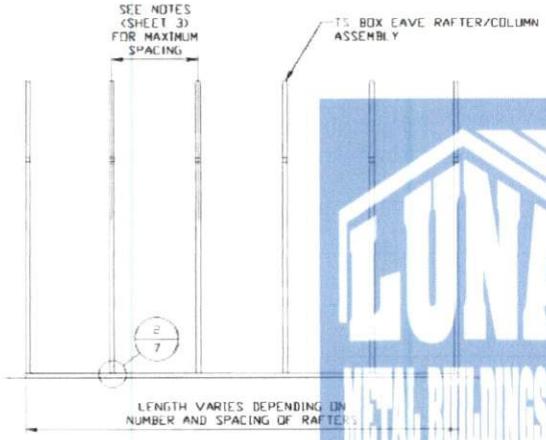

TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE: NTS

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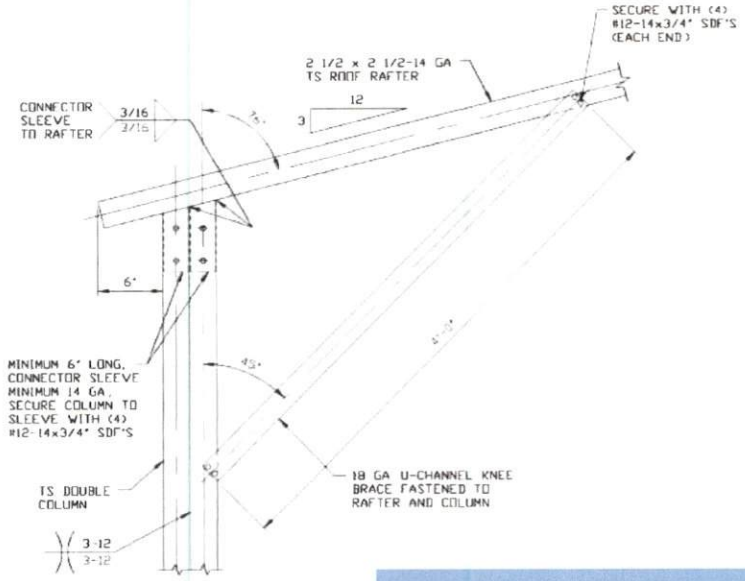
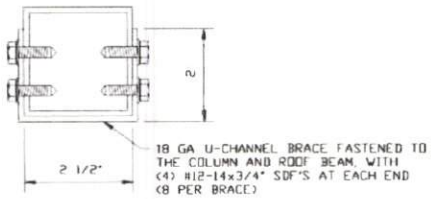
EXPOSURE B
COLUMN CONNECTION DETAILS



BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 10'-0" < TO ≤ 16'-0"

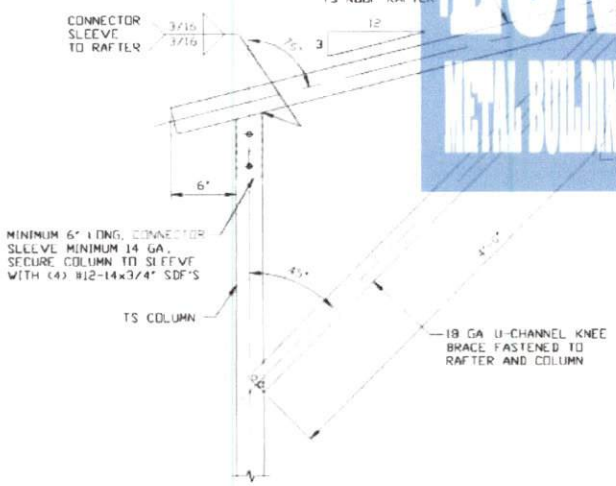
1

SCALE: NTS



BRACE SECTION

SCALE: NTS



BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 8'-0" < TO ≤ 10'-0"

1A

SCALE: NTS

NOTE: SINGLE COLUMN HEIGHT UP TO 12'-0" FOR MAXIMUM 115 MPH WIND SPEED

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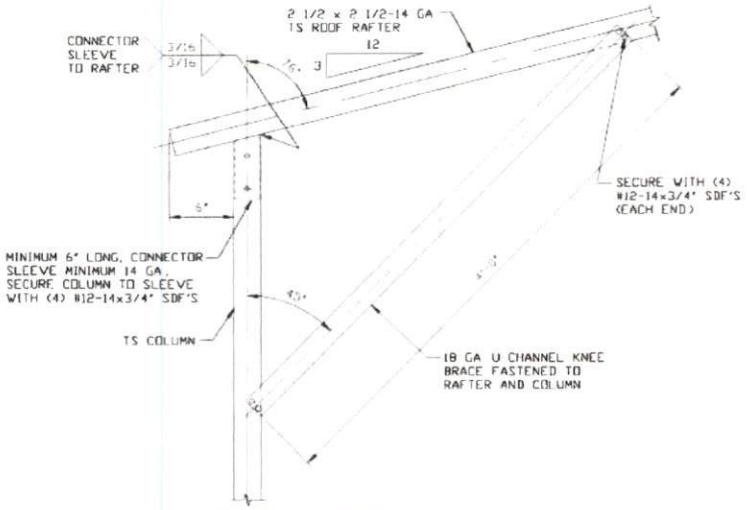
EXPOSURE B
COLUMN CONNECTION DETAILS

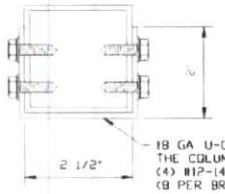


1B

BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS ≤ 8'-0"

SCALE: NTS

NOTE: 2'-0" KNEE BRACE MAY BE USED FOR BUILDING WIDTHS < 28'-0"



BRACE SECTION

SCALE: NTS

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: JG	LUNA METAL BUILDINGS 468 N FAYETTEVILLE ST. ASHEBORO, NC 27203 30'-0"x20'-0" RC I / II ENCLOSED STRUCTURE	
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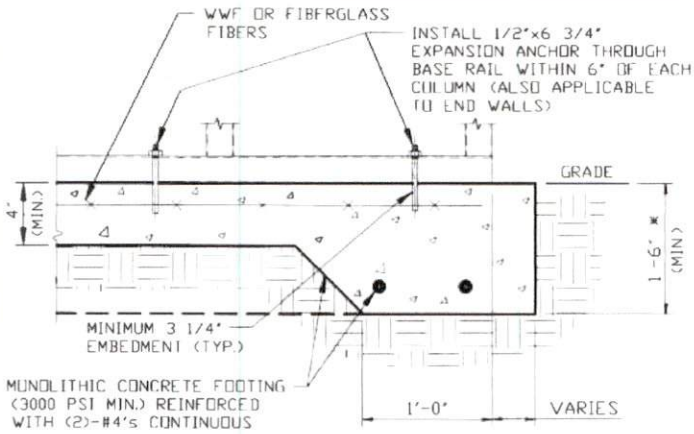
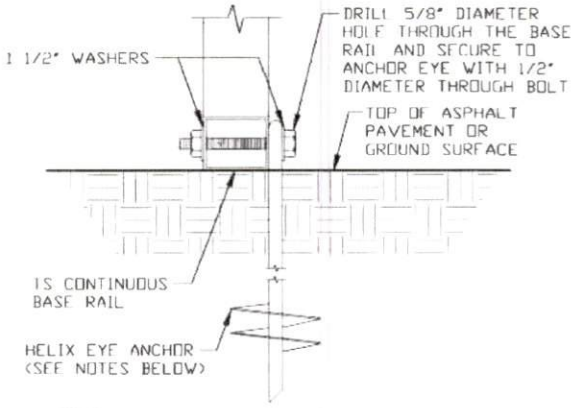
BASE RAIL ANCHORAGE OPTIONS (EXPOSURE B)



2 CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

SCALE: NTS
NOTE: MIN ANCHOR EDGE DISTANCE IS 4"
* COORDINATE WITH LOCAL BUILDING CODE ORD REGARDING REQUIRED FROST DEPTH (LENGTH)



2B GROUND BASE HELIX ANCHORAGE

SCALE: NTS (CAN BE USED FOR ASPHALT)
* COORDINATE WITH LOCAL CODES/ORD REGARDING MIN FROST DEPTH (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 A MIN. 60 KSI 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 LOSE TO MEDIUM DENSE SANDS, FIRM TO STIFFER CLAYS AND SILTS, ALLUVIAL FILL, USE MINIMUM (2) 8" HELICES WITH MINIMUM 60" EMBEDMENT

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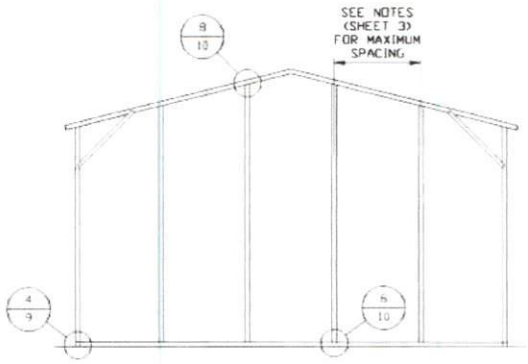
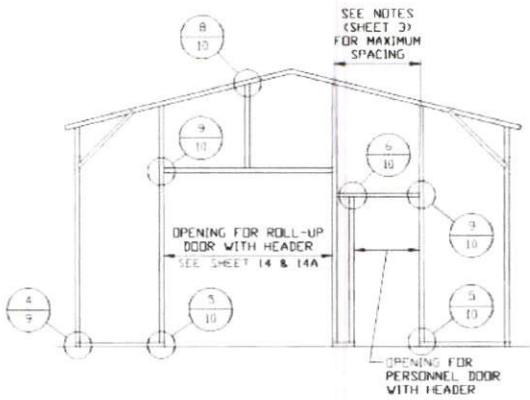
BOX EAVE RAFTER END WALL AND END WALL OPENINGS



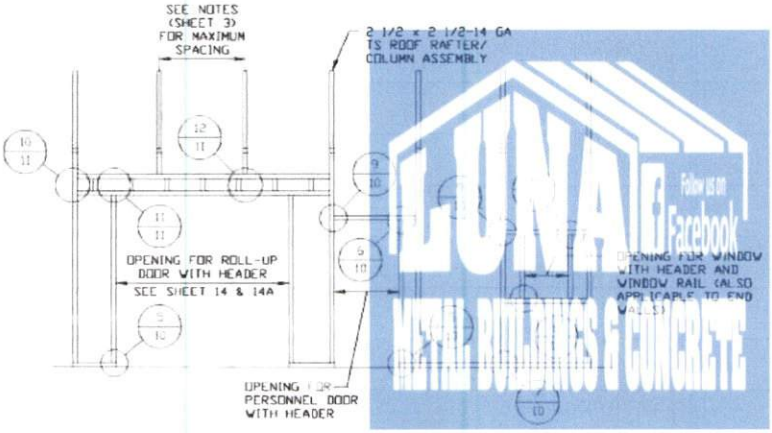
TYPICAL BOX EAVE RAFTER
END WALL FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER END
WALL OPENINGS FRAMING SECTION

SCALE: NTS



TYPICAL BOX EAVE RAFTER
SIDE WALL OPENINGS FRAMING SECTION

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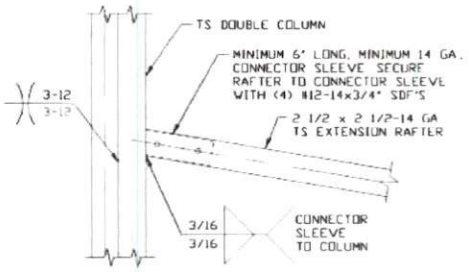
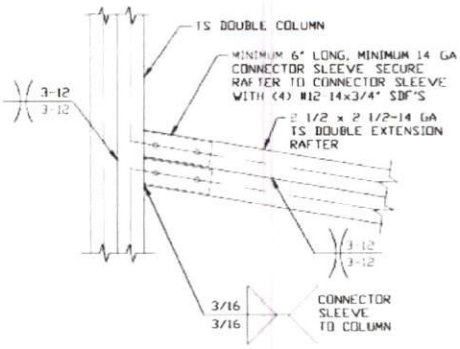
BOX EAVE RAFTER LEAN-TO OPTIONS



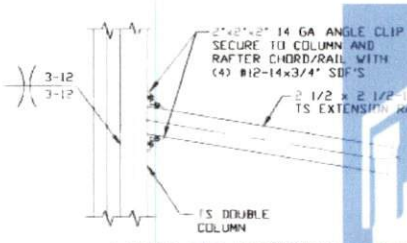
16 LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS ≤ 10'-0"

SCALE: NTS



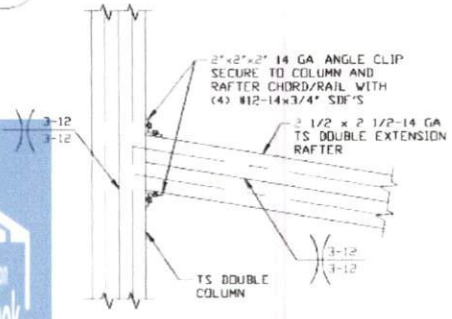
16A LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 10'-0" < TO ≤ 12'-0"

SCALE: NTS



16B LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS ≤ 10'-0"

SCALE: NTS



16C LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR RAFTER SPANS 10'-0" < TO ≤ 12'-0"

SCALE: NTS

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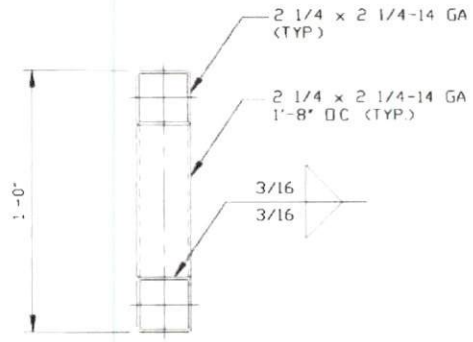
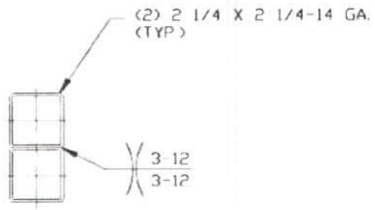
EXPOSURE B
SIDE WALL HEADER OPTIONS

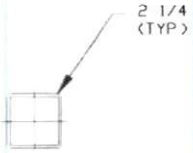


HEADER DETAIL FOR
SPANS 10'-0" < TO ≤ 14'-0"
SCALE: NTS



HEADER DETAIL FOR
SPANS ≤ 10'-0"
SCALE: NTS

END WALL HEADER OPTIONS



HEADER DETAIL FOR
SPANS ≤ 14'-0"
SCALE: NTS

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: JG	LUNA METAL BUILDINGS 468 N FAYETTEVILLE ST. ASHEBORO, NC 27203 30'-0"x20'-0" RC I / II ENCLOSED STRUCTURE		
	CHECKED BY: PDH			
	PROJECT MGR: WSM	DATE: 11-10-20	SCALE: NTS	JOB NO: 20214S
	CLIENT: LUNA METAL	SHT. 14	DWG. NO: SK-3	REV: 0