

STRUCTURAL DESIGN



ENCLOSED BUILDING

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

20 August 2019 Revision 0 M&A Project No. 19164S

Prepared for:

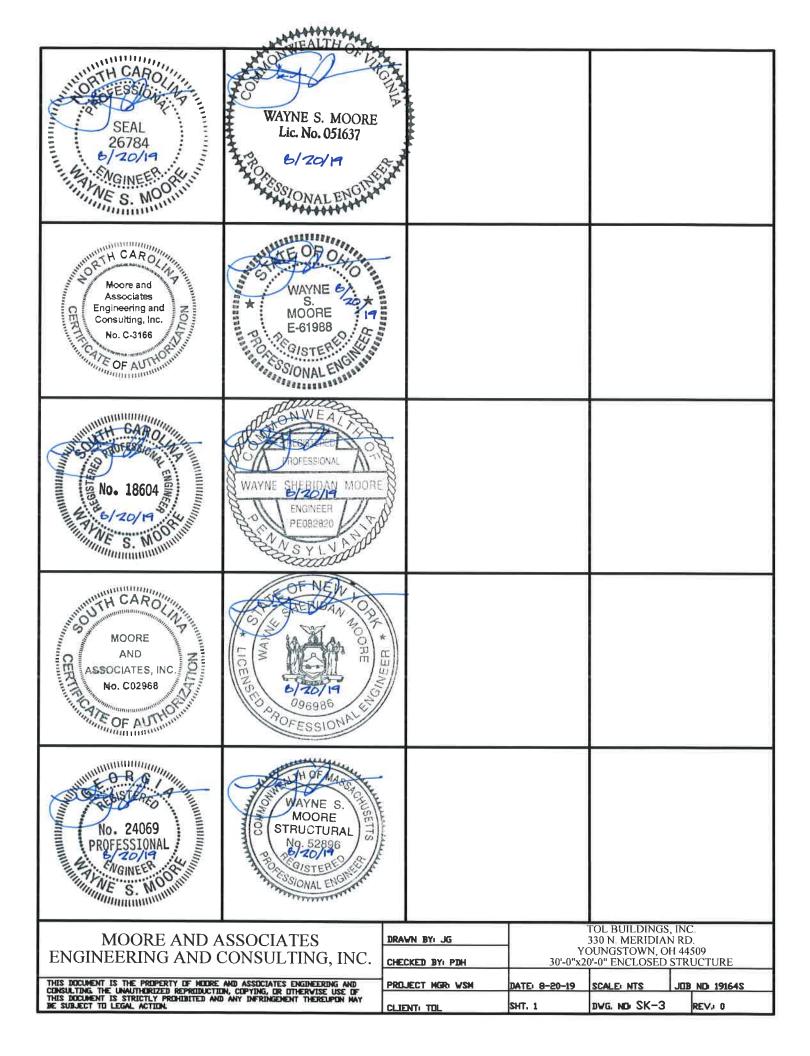
TOL Buildings, Inc. 330 N. Meridian Rd. Youngstown, Ohio 44509

Prepared by:

Moore and Associates Engineering and Consulting, Inc. 1009 East Avenue North Augusta, SC 29841

401 S. Main Street, Suite 200 Mt. Airy, NC 27030





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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 2018 NORTH CAROLINA BUILDING CODE, 2015 INTERNATIONAL BUILDING CODE (IBC). AND 2012 IBC
- 3 DESIGN LOADS ARE AS FOLLOWS
 - A) DEAD LOAD = 15 PSF
 - B) LIVE LOAD = 12 PSF (20 PSF FOR RISK CAT. II)
 - C) GROUND SNOW LOAD
- = 30 PSF (< 24'-0') FOR U-CHANNEL PEAK BRACE = 60 PSF (<30'-0'), WITH WELDED RAFTER TIE TO SINGLE 12 GA TS @ 3'-0' DC = 70 PSF (24'-0' < W < 30'-0') (UNBALANCED SNOW LOADS DUE TO DRIFTING HAVE NOT BEEN EVALUATED.)
- 4 ULTIMATE WIND SPEED (LW) 105 (RC I) (115 MPH (RC I/II) TO 145 (RC I) (155 MPH (RC I/II)) (NOMINAL WIND SPEED 81 (89) TO 108 (120) MPH) MAXIMUM RAFTER/POST AND END POST SPACING = 4.0 FEET (5.0 FEET FOR WIND SPEED 105 MPH (TO < 145 MPH RC | DNLY)
- 5 END WALL COLUMN/POSTS ARE EQUIVALENT TO SIDE WALL COLUMN/POSTS IN SIZE AND SPACING UNLESS NOTED OTHERWISE
- 6 RISK CATEGORY I AND II
- 7 WIND EXPOSURE CATEGORY B OR C
- 8 SPECIFICATIONS APPLICABLE TO 29 GAUGE (FOR SL < 60 PSF) AND 26 GAUGE (FOR SL > 60 PSF) METAL PANELS FASTENED DIRECTLY TO 2 1/2'x2 1/2'-14 GAUGE TUBE STEEL (TS) FOR (RC I) AND 2 1/4'x2 1/4'-12 GAUGE (TS) FOR (RC II) FRAMING MEMBERS (UNLESS NOTED OTHERWISE)
- 9 AVERAGE FASTENER SPACING ON-CENTERS ALONG RAFTERS OR HAT CHANNELS, AND COLUMNS (INTERIOR OR END) = 8° OC (MAX)
- 10 FASTENERS CONSIST OF #12-14×3/4" SELF-DRILLING FASTENER (SDF), USE CONTROL SEAL WASHER WITH EXTERIOR FASTENERS SPECIFICATIONS APPLICABLE ONLY FOR MEAN ROOF HEIGHT OF 20 FEET OR LESS ROOF SLOPES VARY FROM 412, 3:12, 2:12 TO 1:12
- 11 ANCHORS SHALL BE INSTALLED THROUGH BASE RAIL WITHIN 6' OF EACH RAFTER COLUMN ALONG SIDES
- 12 STANDARD GROUND ANCHORS (SOIL NAILS) CONSIST OF #4 REBAR W/ WELDED NUT x 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 UNSUITABLE SOILS AS NOTED
- 13 WIND FORCES GOVERN OVER SEISMIC FORCES SEISMIC PARAMETERS ANALYZED ARE

SDIL SITE CLASS = D RISK CATEGORY I/II/III

I_E= 10

R = 3.25e ecos =202

 $\Lambda = \mathbb{C}^2 M$

S_{DI}= 1258 g

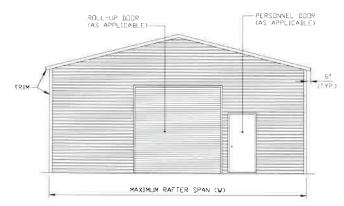
- 14 FOR RISK CATEGORY II. MAXIMUM THRESHOLD HEIGHT FOR PERSONNEL DODR(S) USED FOR DEFINED MEANS OF EGRESS IS 1/2"
- 15 APPLY LAP SEALANT TO METAL ROOF PANELS FOR ROOF SLOPES LESS THAN 312

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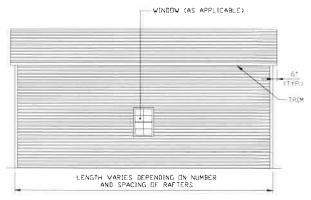
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BDX EAVE FRAME RAFTER STRUCTURE (Sheets 4, 5, 5A, 5B, 5C ,5D, 5E, 6, 6A, 6B, 6C, 6D, 6E, 6F, 6G, 9, 9A, 10, 12, 13, 14, 14A, 16, 17, AND 18



TYPICAL END ELEVATION

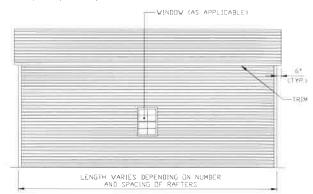


TYPICAL SIDE ELEVATION

BDW FRAME RAFTER STRUCTURE (Sheets 4, 7, 7A, 7B, 7C, 7D, 7E, 8, 8A, 8B, 8C, 8D, 8E, 8F, 8G 9, 9A, 11, 12, 13, 15, 15A, 17 AND 18)



TYPICAL END ELEVATION SCALE NTS



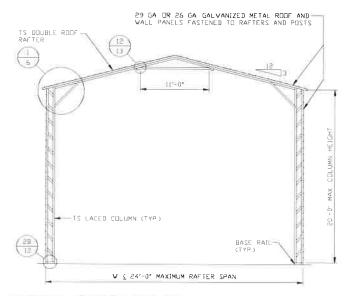
TYPICAL SIDE ELEVATION
SCALE NTS

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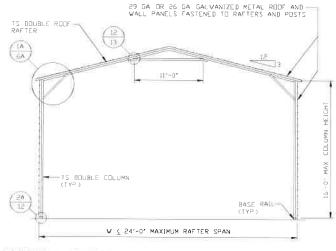
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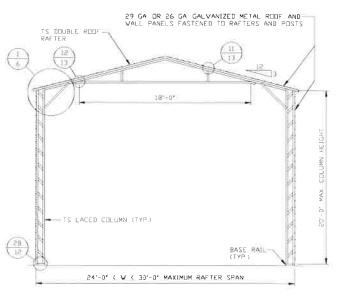
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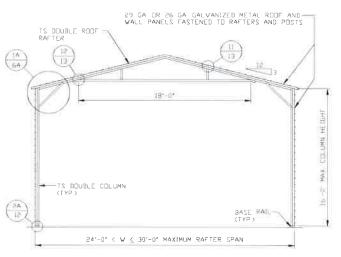
TYPICAL RAFTER/COLUMN END FRAME SECTION



TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE NTS



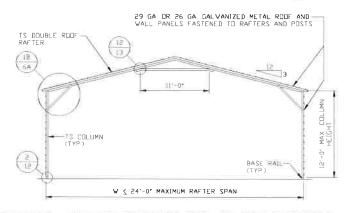
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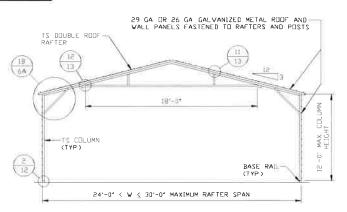


TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE: NTS

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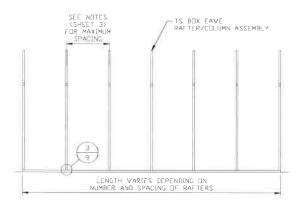
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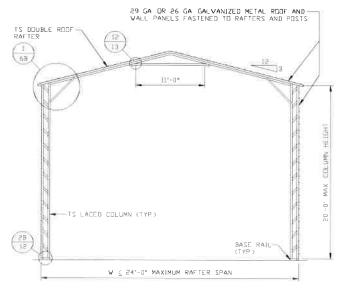


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

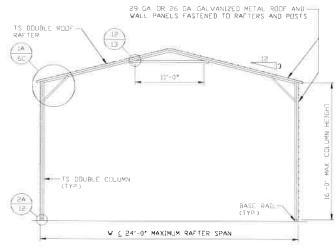
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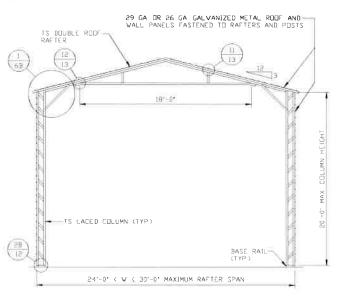
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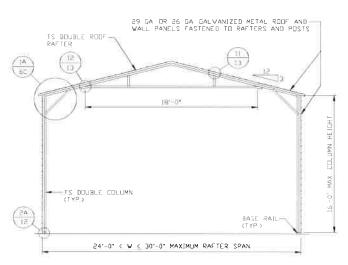
TYPICAL RAFTER/COLUMN END FRAME SECTION



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TYPICAL RAFTER/COLUMN END FRAME SECTION

DWG. NEW SK-3

SHT. 5B

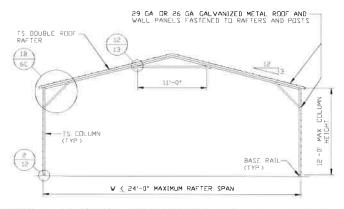
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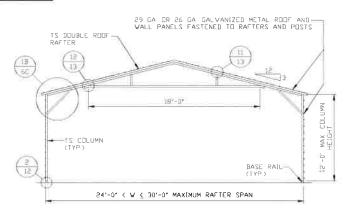
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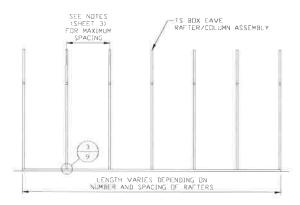




TYPICAL RAFTER/COLUMN END FRAME SECTION

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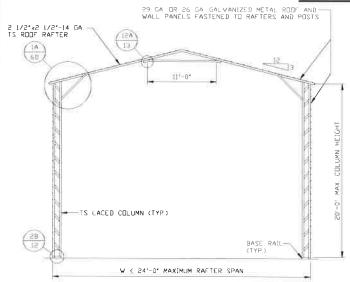


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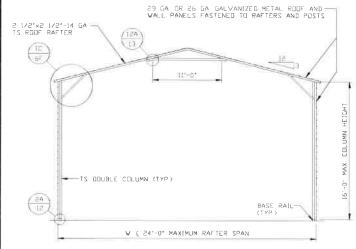
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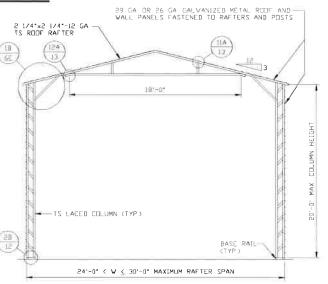
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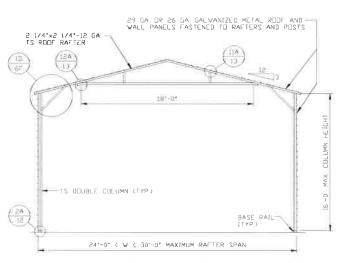
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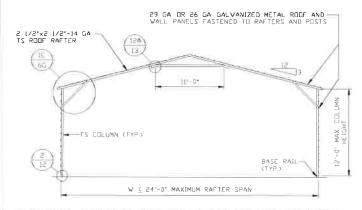
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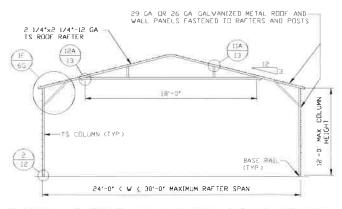
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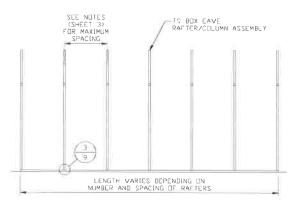
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TYPICAL RAFTER/COLUMN END FRAME SECTION

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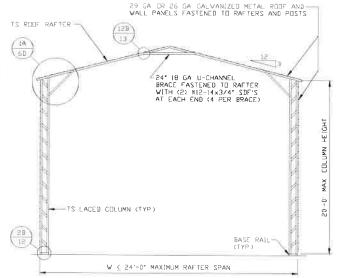


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

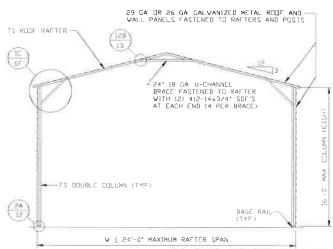
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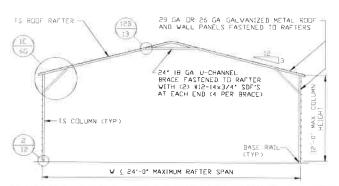
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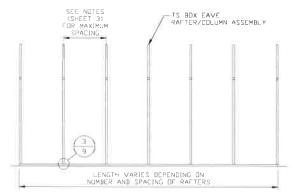
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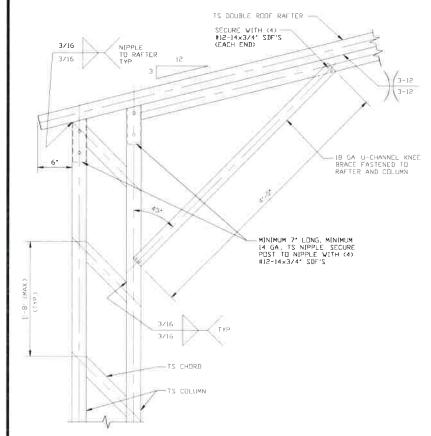
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$60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}$ **EXPOSURE B**



-IB GA U-CHANNEL BRACE FASTENED TO THE COLUMN AND ROOF BEAM WITH (4) BI2-14x3/4" SDF'S AT EACH END (12 PER BRACE)

BRACE SECTION SCALE: NTS

		BOX								
1	1	HEIG	STH	16'	-0"	<	TO	<u>८</u>	20'-	0"
/ ·	J	SCALE	NTS							

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	CLIENT: TOL	SHT. 6	DVG. ND: SK-3	3	REV. 0				
- 5	PREJECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JOE	ND 19164S				
				T		=			
	CHECKED BY: PDH	30'-0"x20'-0" ENCLOSED STRUCTURE							
		7 Y	YOUNGSTOWN, OH 44509						
	DRAWN BY: JG		TOL BUILDINGS, INC. 330 N. MERIDIAN RD.						
_			THOSE DATES TO THE			-			

$60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}$ **EXPOSURE B** TS DOUBLE ROOF RAFTER -SECURÉ WITH (4): #12-14x3/4' SDF'S (EACH END) CONNECTOR SLEEVE TO RAFTER 3/16 3/16 3-12 TS DOUBLE ROOF RAFTER SECURE WITH (4) #12-14x3/4° SDF'S (EACH END) 3/16 CONNECTOR SLEEVE TO RAFTER MINIMUM 7' LONG, — CONNECTOR SLEEVE MINIMUM 14 GA, SECURE COLUMN TO SLEEVE WITH (4) #12-14x3/4' SDE'S 3/16 3-15 MINIMUM 7' LONG CONNECTOR SLEEVE MINIMUM 14 GA SECURE COLUMN TO SLEEVE WITH (4) #12-14×3/4' SDF'S TS DOUBLE COLUMN BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR 18 GA U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN HEIGHTS 12'-0" < T□ < 16'-0" 1A TS COLUMN BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS **≤** 12'-0" 1B 18 GA U-CHANNEL BRACE FASTENED TO THE COLUMN AND ROOF BEAM WITH (4) #12-14×3/4" SDF'S AT EACH END (12 PER BRACE)

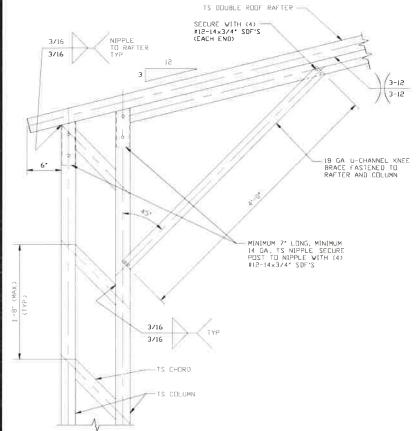
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BRACE SECTION

	CLIENT: TIL	SHT. 6A	DVG. ND SK-	3	REV. 0	
	PROJECT HGR: VSH	DATE: 8-20-19	SCALE: NTS	Jon	ND: 19164S	
C.	CHECKED BY: PDH		OUNGSTOWN, 20'-0" ENCLOSE			
	DRAWN BY: JG		330 N, MERIDIA	N. MERIDIAN RD		

$\frac{60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}}{\text{EXPOSURE C}}$



18 GA U-CHANNEL BRACE FASTENED TO THE COLUMN AND RODE BEAM, WITH (4) BI2-14×374* SDF'S AT EACH END (12 PER BRACE)

BRACE SECTION

SCALE: NTS

BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 16'-0' < TO ≤ 20'-0"

SCALE: NTS

1

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ENGINEERING AND CONSULTING, INC.	CHECKED BY: PDH		YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE		
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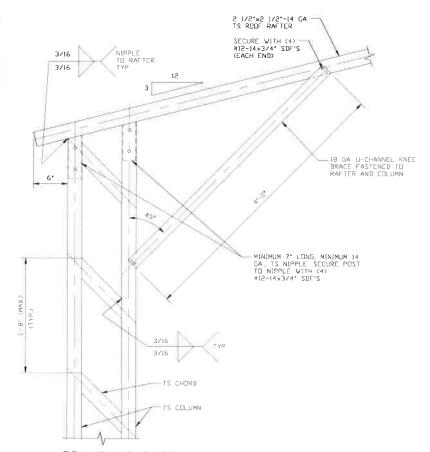
$\underline{60 \text{ PSF} < \text{SL} \leq 70 \text{ PSF}}$ **EXPOSURE C** TS DOUBLE ROOF RAFTER = SECURE WITH (4) = #12-14x3/4' SDF'S (EACH END) CONNECTOR SLEEVE TO RAFTER 3/16 3/16 3-12 3-12 TS DOUBLE ROOF RAFTER SECURE WITH (4) #12-14x3/4' SDF'S (EACH END) CONNECTOR SLEEVE TO RAFTER 3/16 MINIMUM 7' LONG, CONNECTOR SLEEVE MINIMUM 14 GA SECURE COLUMN TO SLEEVE WITH (4) #12-14x3/4' SDF'S MINIMUM 12' LONG = CONNECTOR SLEEVE MINIMUM 14 GA, SECURE COLUMN TO SLEEVE WITH (4) #12-14x3/4' SDF'S 3-15 TS DOUBLE COLUMN BOX EAVE RAFTER COLUMN 18 GA U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN CONNECTION DETAIL FOR HEIGHTS 12'-0' < TO < 16'-0' 1A TS COLUMN BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS **≤** 12'-0" 1B SCALE: NTS -18 GA U-CHANNEL BRACE FASTENED TO THE COLUMN AND ROOF BEAM WITH (4) #12-14×3/4" SDF'S AT EACH END (12 PER BRACE)

BRACE SECTION

SCALE: NTS

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$\frac{SL \leq 60 \text{ PSF}}{EXPOSURE B/C}$



18 GA U-CHANNEL BRACE FASTENED
10 THE COLUMN AND RIDGE BEAM,
WITH (4) 412-14×324* SDF'S AT
EACH END (12 PER BRACE)

BRACE SECTION

SCALE: NTS

BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 16'-0' < TO \(\) 20'-0'

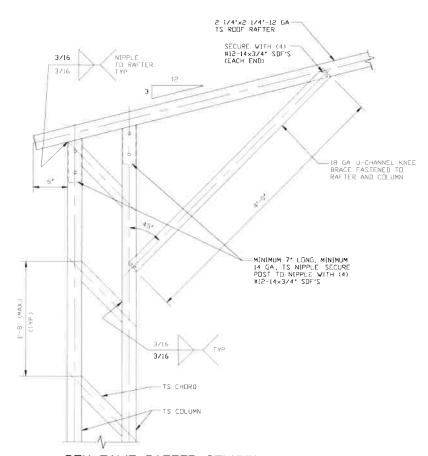
SCALE NTS

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TOL BUILDINGS, INC. 330 N. MERIDIAN RD. YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE

PROJECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JUB NO 19164S
CLIENT: TOL	SHT. 6D	DWG. ND SK-3	REV. 0

$SL \le 60 PSF$ **EXPOSURE B/C**



-18 GA U-CHANNEL BRACE FASTENED TO THE COLUMN AND ROOF BEAM, WITH (4) #12-14×3/4" SDF'S AT EACH END (12 PER BRACE)

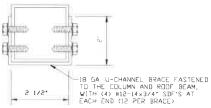
BRACE SECTION

	BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 16'-0" < TO < 20'-0"
(1B)	SCALE NTS

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: JG CHECKED BY: PDH	Y	TOL BUILDINGS. 330 N. MERIDIAN DUNGSTOWN, OI 0'-0" ENCLOSED	N RD H 445	0
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DRAWN BY: JG	330 N. MERIDIAN RD. YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE						
CHECKED BY: PDH							
PREJECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JOB ND 19164S				
CLIENT: TOL	SHT. 6E	DWG. ND: SK-3	REV. 0				

$SL \le 60 PSF$ **EXPOSURE B/C** 2 1/4"x2 1/4"~12 GA TS ROOF RAFTER 2 1/2*x2 1/2*-14 GA TS ROOF RAFTER SECURE WITH (4) = HIZ-L4×3/4' SDF'S (EACH END) SECURE WITH (4) = #12-14×3/4° SDF'S (EACH END) MINIMUM 7' LONG. -CONNECTOR SLEEVE MINIMUM 14 GA. SECURE COLUMN TO SLEEVE WITH (4) #12-14x3/4" SDF'S MINIMUM 7' LONG, CONNECTOR SLEEVE MINIMUM 14 GA, SECURE COLUMN TO SLEEVE WITH (4) #12-14x3/4' SDF'S 18 GA U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN LO GA U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN TS DOUBLE COLUMN -TS DOUBLE COLUMN BOX EAVE RAFTER COLUMN BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR CONNECTION DETAIL FOR HEIGHTS 12'-0" < TO ≤ 16'-0" HEIGHTS 12'-0" < TD ≤ 16'-0" 1D 1C

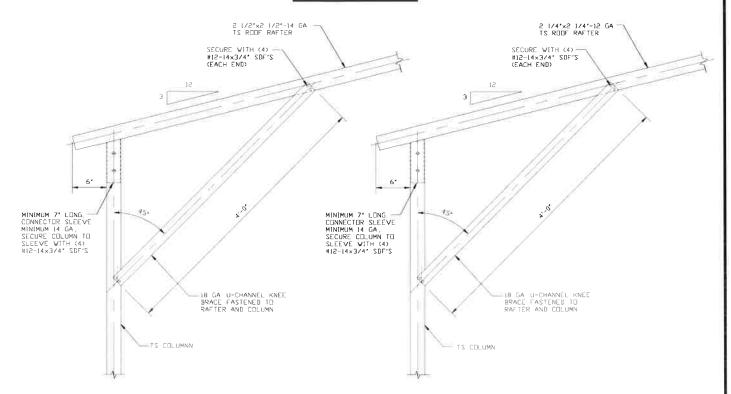


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ENGINEERING AND CONSULTING, INC.	CHECKED BY: PDH	YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE			
MOORE AND ASSOCIATES	DRAWN BY: JG		TOL BUILDINGS, INC. 330 N. MERIDIAN RD.		

$SL \le 60 PSF$ **EXPOSURE B/C**

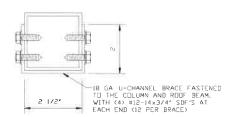


BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR 1E SCALE: NTS

BOX EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS **≤** 12'-0"

SCALE NTS

1F

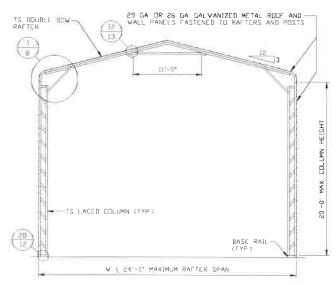


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MOODE AND AGGOGLATEG		1	TOL BUILDINGS,	

$60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}$ **EXPOSURE B**

TS DOUBLE BOW = RAFTER



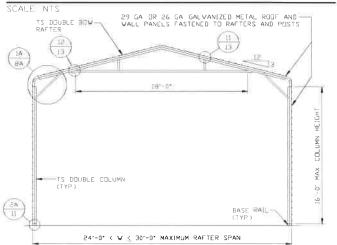
(H) 18'-0" TS LACED COLUMN (TYP) 24'-0' (W < 30'-0' MAXIMUM RAFTER SPAN

29 GA OR 26 GA GALVANIZED METAL ROOF AND-WALL PANELS FASTENED TO RAFTERS AND POSTS

TYPICAL RAFTER/COLUMN END FRAME SECTION

29 GA OR 26 GA GALVANIZED METAL ROOF AND-WALL PANELS FASTENED TO RAFTERS AND POSTS TS DOUBLE BOW RAFTER (AE) 11"-0" TS DOUBLE COLUMN BASE RATE-₩ ≤ 24'-0" MAXIMUM RAFTER SPAN

TYPICAL RAFTER/COLUMN END FRAME SECTION



TYPICAL RAFTER/COLUMN END FRAME SECTION

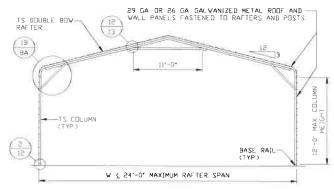
TYPICAL	RAFTER/COLUMN	END	FRAME	SECTION
SCALE: NTS				

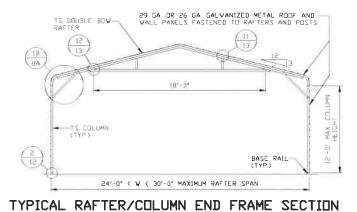
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ENGINEERING AND	CONSULTING, INC.

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	PROJECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JDB	ND 19164S			
1	CHECKED BY: PDH		YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE					
	DRAWN BY: JG	TOL BUILDINGS, INC. 330 N. MERIDIAN RD.						

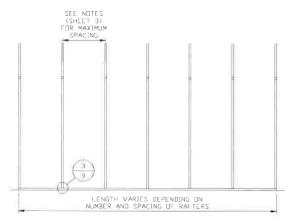
$\frac{60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}}{\text{EXPOSURE B}}$





TYPICAL RAFTER/COLUMN END FRAME SECTION
SCALE NTS

SCALE NTS

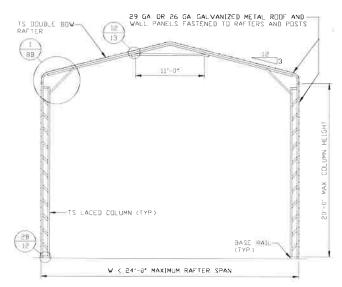


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

SCALE NTS

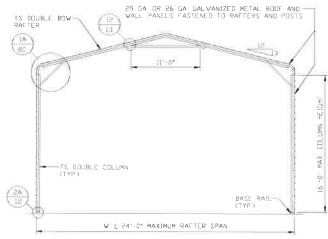
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$\frac{60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}}{\text{EXPOSURE C}}$



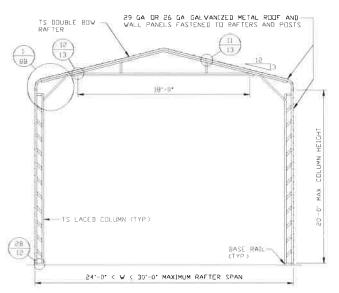
TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE NTS



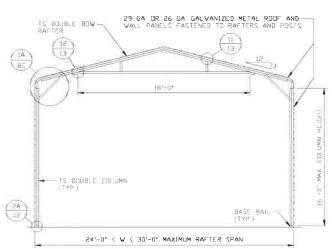
TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALEL NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



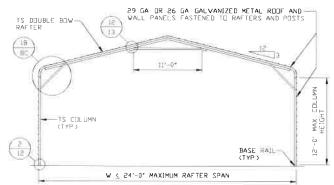
TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE NTS

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.

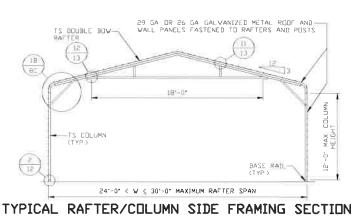
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			OUNGSTOWN, OH				
•	CHECKED BY: PDH	30'-0"x20)'-0" ENCLOSED S	TRUCTURE			
	PROJECT MGR: WSM	DATE: 8-20-19	SCALE: NTS .	JOB NO 19164S			
	CLIENT: TOL	SHT. 7B	DWG. NO SK-3	REV. 0			

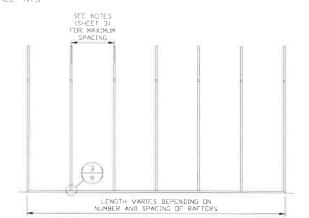
$\frac{60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}}{\text{EXPOSURE B/C}}$



TYPICAL RAFTER/COLUMN END FRAME SECTION



SCALE: NTS

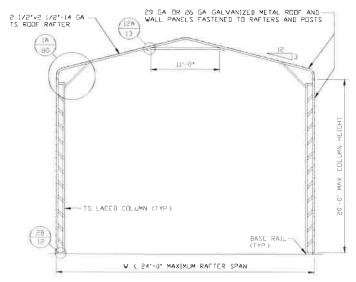


TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

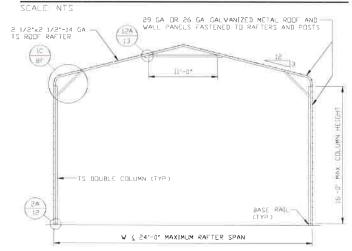
SCALE: NTS

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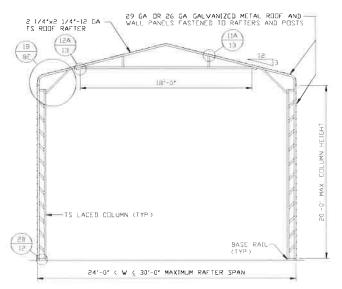
$\frac{SL \le 60 \text{ PSF}}{EXPOSURE B/C}$



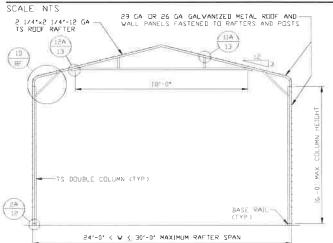
TYPICAL RAFTER/COLUMN END FRAME SECTION



TYPICAL RAFTER/COLUMN END FRAME SECTION



TYPICAL RAFTER/COLUMN END FRAME SECTION



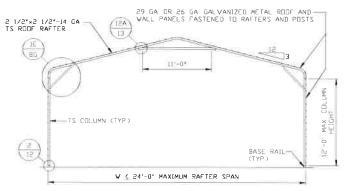
TYPICAL RAFTER/COLUMN END FRAME SECTION

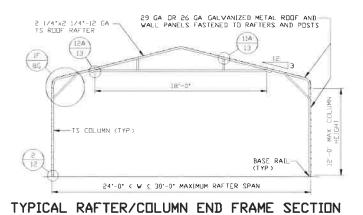
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ENGINEERING AND CONSULTING, INC.

											
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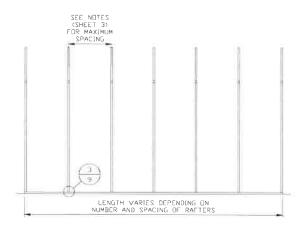
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	PROJECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JOE	ND 19164S			
<u>ي</u>	CHECKED BY: PDH		OUNGSTOWN, O 20'-0" ENCLOSED					
	DRAWN BYI JG	TOL BUILDINGS, INC. 330 N. MERIDIAN RD.						

$SL \le 60 PSF$ **EXPOSURE B/C**





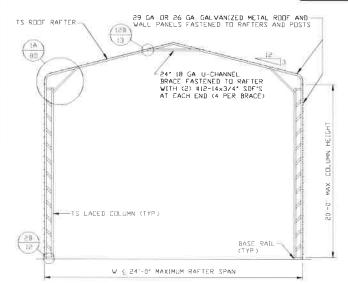
TYPICAL RAFTER/COLUMN END FRAME SECTION SCALE NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

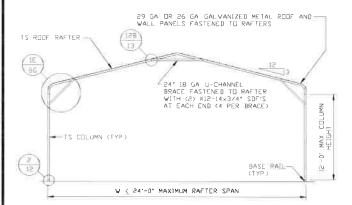
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$\frac{\text{SL} \leq 30 \text{ PSF}}{\text{EXPOSURE B/C}}$



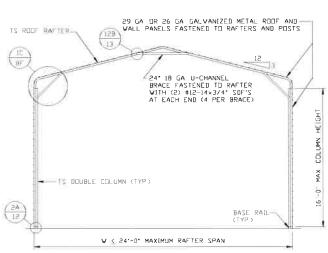
TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE NTS



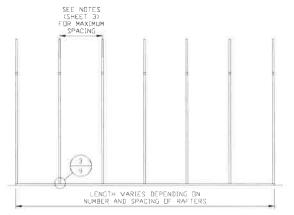
TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE NTS



TYPICAL RAFTER/COLUMN END FRAME SECTION

SCALE: NTS



TYPICAL RAFTER/COLUMN SIDE FRAMING SECTION

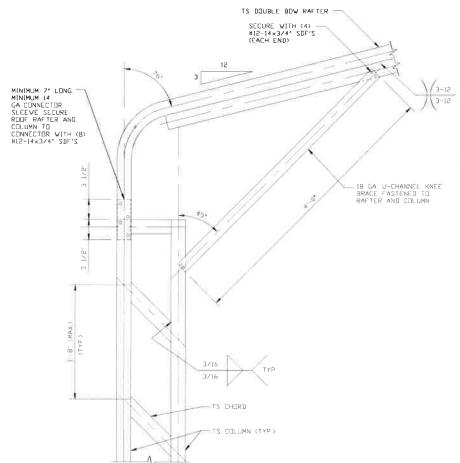
SCALE NTS

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	CLIENT: TOL	SHT. 7F	DWG. ND SK-3	REV. 0			
	PREJECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JOB ND: 19164S			
1	CHECKED BY: PDH		YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE				
	DRAWN BYI JG	TOL BUILDINGS, INC. 330 N. MERIDIAN RD.					

$\frac{60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}}{\text{EXPOSURE B}}$



18 GA U-CHANNEL BRACE FASTENED TID THE COLUMN AND RODE BEAM, VITH (4) #12-14x3/4* SDF'S AT EACH END (12 PER BRACE)

BRACE SECTION

SCALE NTS

BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 16'-0' < TO \(20'-0'

SCALE NTS

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CHECKED BY: PDH)'-0" ENCLOSED :			
	1 vo	DUNGSTOWN, OF	1 44	509	
DRAWN BY: JG	1	330 N. MERIDIAN	1 RD	U .	
		IOL BUILDINGS,	, linc		

$60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}$ **EXPOSURE B** TS DOUBLE BOW RAFTER SECURE WITH (4) #12-14×3/4° SDF'S (EACH END) TS DOUBLE BOW RAFTER SECURE WITH (4) = #I2-I4×3/4' SDF'S (END) 3-12 3-12 MINIMUM 7' LONG MINIMUM 14 GA,CONNECTOR SLEEVE SECURE ROOF RAFTER AND COLUMN TO CONNECTOR WITH (8) #12-14×3/4' SDF'S -18 GA U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN TS DOUBLE COLUMN MINIMUM 7' LONG CONNECTOR SLEEVE MINIMUM 14 GA, SECURE COLUMN TO SLEEVE WITH (4) HI2-14x3/4" SDF'S 18 GA U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN TS COLUMN BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR BOW EAVE RAFTER COLUMN HEIGHTS 12'-0" < T□ < 16'-0" CONNECTION DETAIL FOR 1A SCALE: NTS HEIGHTS **≤** 12'-0" 1B -18 GA U-CHANNEL BRACE FASTENED TO THE COLUMN AND ROOF BEAM, WITH (4) #12-14×3/4" SDF'S AT EACH END (12 PER BRACE)

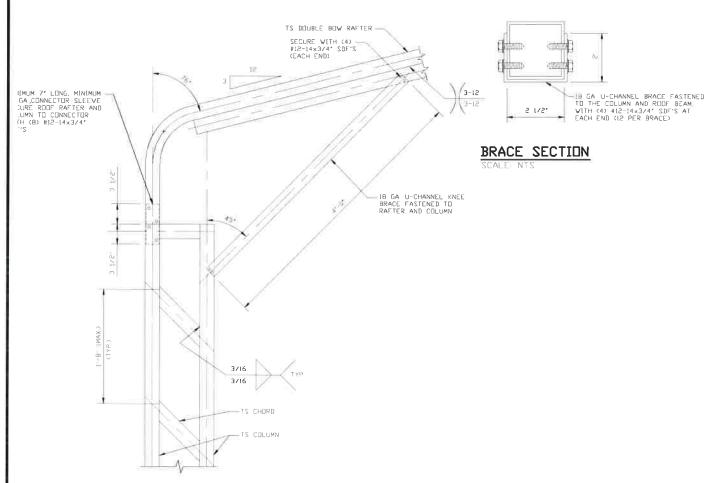
BRACE SECTION

MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING, INC.

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٠.	CHECKED BY: PDH	YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE				
	DRAWN BY: JG	330 N MERIDIAN RD.				

$60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}$ **EXPOSURE C**



BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 16'-0" < T□ < 20'-0"

SCALE: NTS

1

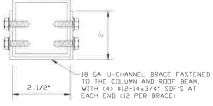
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ECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JOB NO 19164S
KED BY: PDH	YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE		
/N BY: JG	TOL BUILDINGS, INC. 330 N. MERIDIAN RD.		

PROJECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JOB ND 19164S
CLIENT: TOL	SHT. 8B	DWG. NO SK-3	REVJ 0

$60 \text{ PSF} < \text{SL} \le 70 \text{ PSF}$ **EXPOSURE C** TS DOUBLE BOW RAFTER SECURE WITH (4) = #12-14x3/4' SDF'S (EACH END) TS DOUBLE BOW RAFTER = SECURE WITH (4)= #12-14x3/4' SDF'S (EACH END) 3-12 3-12 MINIMUM 7' LONG MINIMUM 14 GA CONNECTOR SLEEVE SECURE RODF RAFTER AND COLUMN TO CONNECTOR WITH (8) #12-14x3/4' SDF'S 18 GA U-CHANNEL KNEE BRACE FASTENED TO RAFTER AND COLUMN TS DOUBLE COLUMN MINIMUM 7' LONG— CONNECTOR SLEEVE MINIMUM 14 GA SECURE COLUMN TO SLEEVE WITH (4) #12-14x3/4' SDF'S TS COLUMN BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 12'-0" < T□ < 16'-0" 1A HEIGHTS ≤ 12'-0" 1B

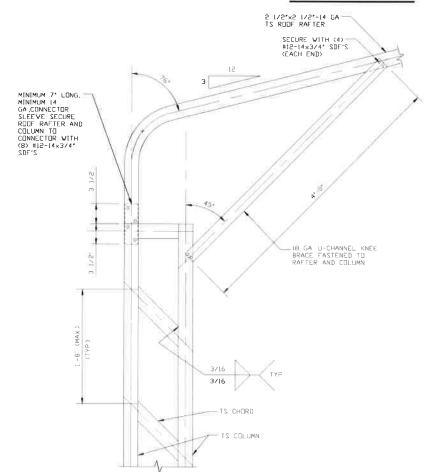


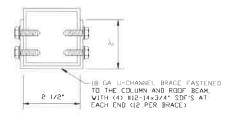
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MOORE AND ASSOCIATES	DRAWN BY: JG	ļ	TOL BUILDINGS, 330 N. MERIDIAN	RD.

$\frac{SL \le 60 \text{ PSF}}{EXPOSURE B/C}$





BRACE SECTION

SCALE: NTS

BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 16'-0' < TO < 20'-0'

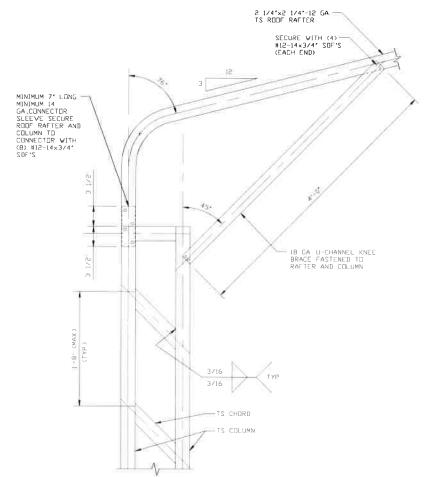
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	YOUNGSTOWN, OH 44509						
DRAVN BY: JG	330 N. MERIDIAN RD.						
		TOL BUILDINGS,	INC	. · · · · · · · · · · · · · · · · · · ·			

$SL \le 60 PSF$ **EXPOSURE B/C**



18 GA U-CHANNEL BRACE FASTENED TO THE COLLUMN AND RODE BEAM WITH (4) #12-14×3/4' SDF'S AT EACH END (12 PER BRACE)

INC

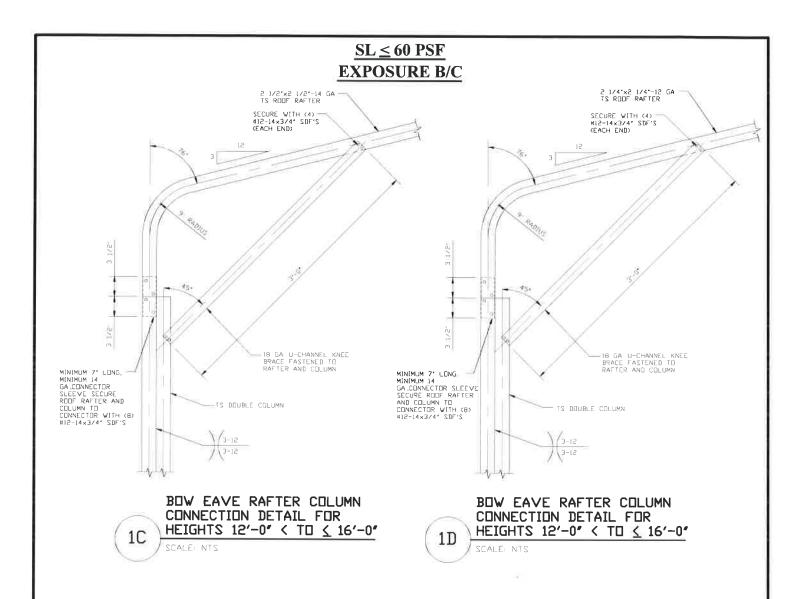
BRACE SECTION SCALE: NTS

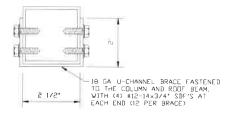
BOW EAVE RAFTER COLUMN CONNECTION DETAIL FOR HEIGHTS 16'-0" < T□ < 20'-0"

1B SCALE NTS

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	MOORE AND ASSOCIATES	DRAWN BY: JG		330 N_MERIDIA			

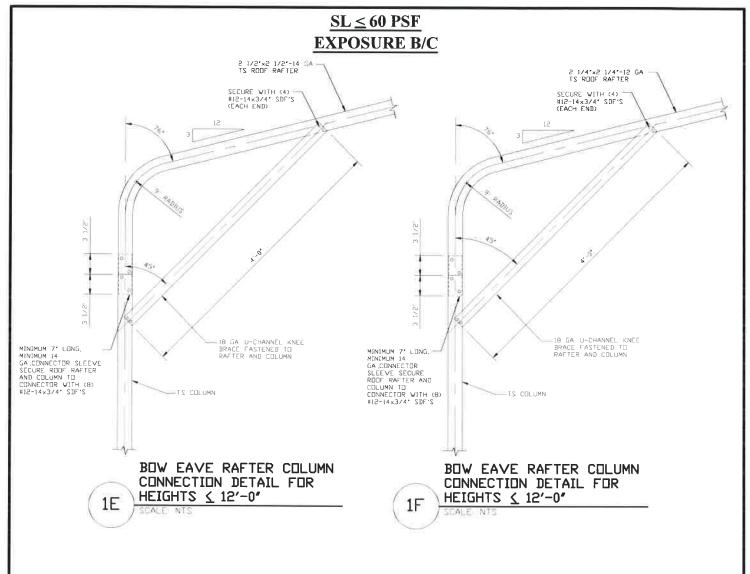
STRUCTURE JDB ND 19164S REV. 0 BE SUBJECT TO LEGAL ACTION CLIENT: TOL SHT. BE DWG. NO SK-3

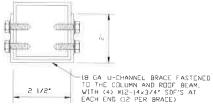




BRACE SECTION SCALE: NTS

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MOORE AND ASSOCIATES	DRAWN BY: JG	TOL BUILDINGS, INC. 330 N. MERIDIAN RD			

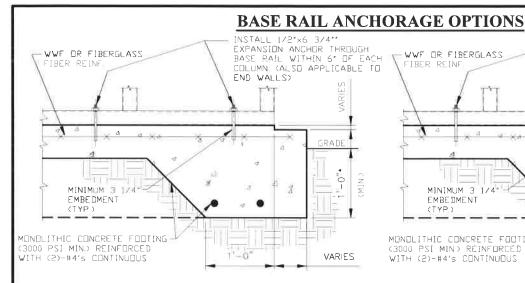




BRACE SECTION

SCALE: NTS

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: JG	YO	TOL BUILDINGS, 330 N. MERIDIAN DUNGSTOWN, OI 0'-0" ENCLOSED	N RD. H 44509
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INSTALL 1/2"x6 3/4" EXPANSION ANCHOR THROUGH BASE RAIL WITHIN 6° OF EACH WWF OR FIBERGLASS FIBER REINF COLUMN (ALSO APPLICABLE TO END WALLS) 7 MINIMUM 3 1/4" EMBEDMENT MONDLITHIC CONCRETE FOOTING-(3000 PSI MIN) REINFORCED VARIES WITH (2)-#4's CONTINUOUS

3A

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

(MINIMUM ANCHOR EDGE DISTANCE IS 4") * COORDINATE WITH LOCAL BUILDING CODE AND/OR BUILDING OFFICIAL REGARDING REQUIRED FOOTING DEPTH

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:

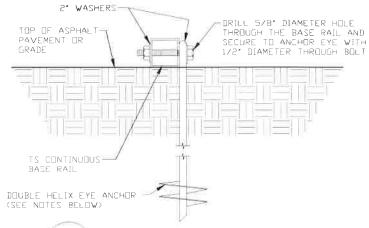
- REINFORCEMENT IS BENT COLD
- THE DIAMETER OF THE BEND MEASURED ON THE INSIDE OF THE BAR, IS NOT LESS THAN SIX-BAR DIAMETERS REINFORCEMENT PARTIALLY EMBEDDED IN CONCRETE SHALL NOT
- BE FIELD BENT

HELIX ANCHOR NOTES:

- 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
- 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
- 4 FOR LODSE 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

CONCRETE MONOLITHIC SLAB BASE RAIL ANCHORAGE

(MINIMUM ANCHOR EDGE DISTANCE IS 4") * COORDINATE WITH LOCAL BUILDING CODE AND/OR BUILDING OFFICIAL REGARDING REQUIRED FOOTING DEPTH



3B

GROUND BASE HELIX ANCHORAGE

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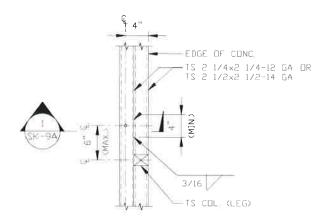
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MY	CLIENT: TOL				

DRAWN BY: JG

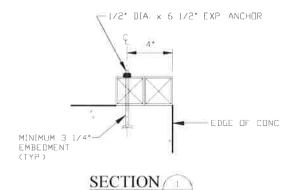
TOL BUILDINGS, INC 330 N. MERIDIAN RD. YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE

MSW SCALE: NTS JOB ND 19164S DATE: 8-20-19 SHT. 9 DWG. NO SK-3 REV. 0

BASE RAIL ANCHORAGE OPTIONS

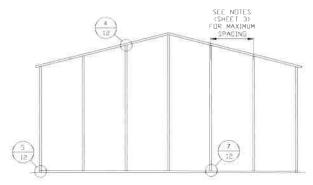


TYPICAL ANCHOR DETAIL WHEN BASE RAIL IS NEAR EDGE OF CONCRETE



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ENGINEEDING AND CONSULTING INC. YOUNGSTOWN, OH 44509	191645
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BOX EAVE RAFTER END WALL AND SIDE WALL OPENINGS

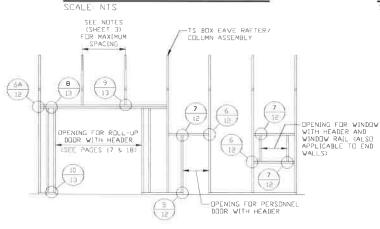


TYPICAL BOX EAVE RAFTER END WALL FRAMING SECTION

SEE NOTES (SHEET 3) FOR MAXIMUM SPACING (1) (12) (6) 16) 7 DPENING FOR ROLL-UP DOOR WITH HEADER (SEE PAGES 17 & 18) DPENING FOR PERSONNEL DOOR VITH HEADER (12)

> TYPICAL BOX EAVE RAFTER END WALL OPENINGS FRAMING SECTION

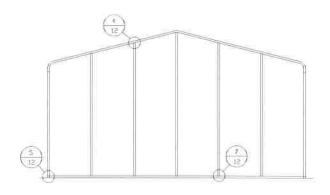
SCALE: NTS



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

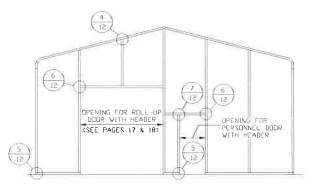
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BOW RAFTER END WALL AND SIDE WALL OPENINGS



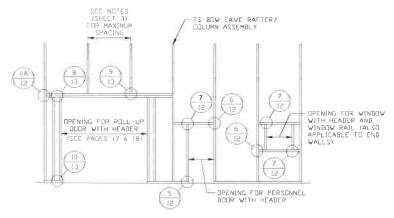
TYPICAL BOW RAFTER END WALL FRAMING SECTION

SCALE NTS



TYPICAL BOW RAFTER END WALL OPENINGS FRAMING SECTION

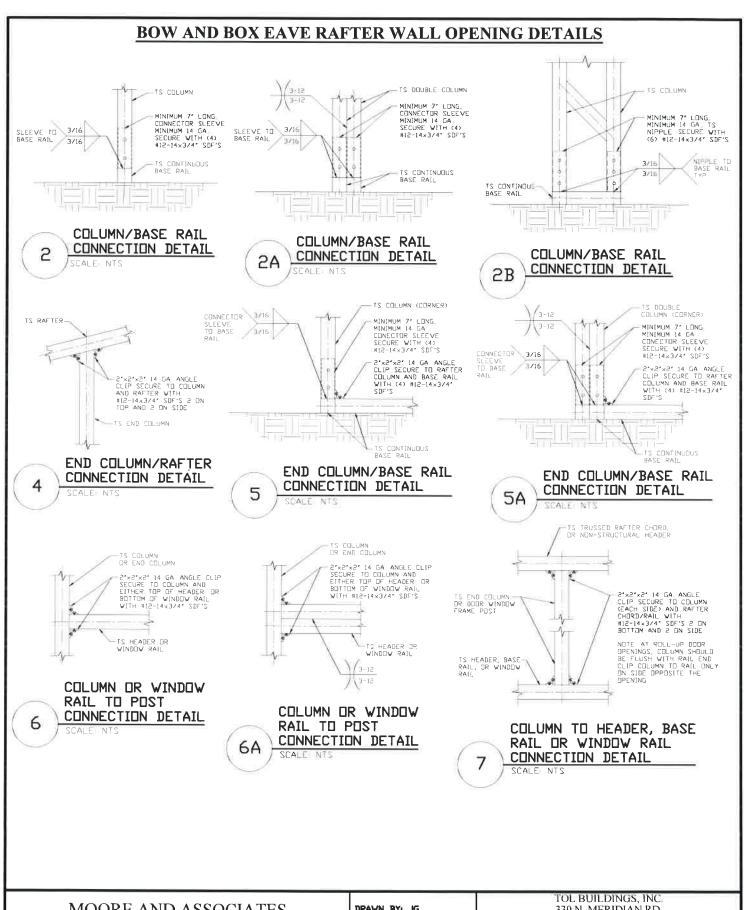
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TYPICAL BOW RAFTER SIDE WALL OPENINGS FRAMING SECTION

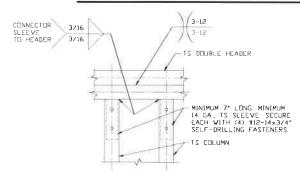
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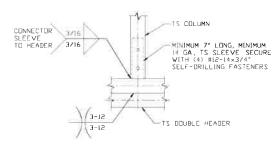
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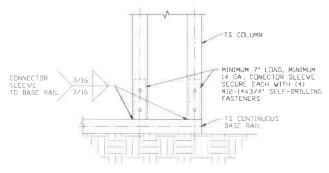
BOW AND BOX EAVE RAFTER WALL OPENING DETAILS

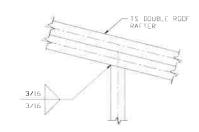




DOUBLE HEADER/COLUMN CONNECTION DETAIL 8



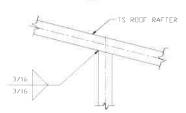


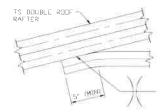


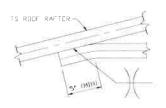
COLUMN/BASE RAIL CONNECTION DETAIL 10

RAFTER TO CHORD CONNECTION DETAIL 11

SCALE NTS







RAFTER TO CHORD CONNECTION DETAIL

COLLAR TIE CONNECTION DETAIL

DRAWN BY: JG

COLLAR TIE CONNECTION DETAIL 12A

11A

12

18 GA U-CHANNEL COLLAR TIE

ATTACH COLLAR TIE
TO ROOF RAFTER WITH
(4) #12-14×3/4'
SDF'S (EACH END)

TS ROOF RAFTER

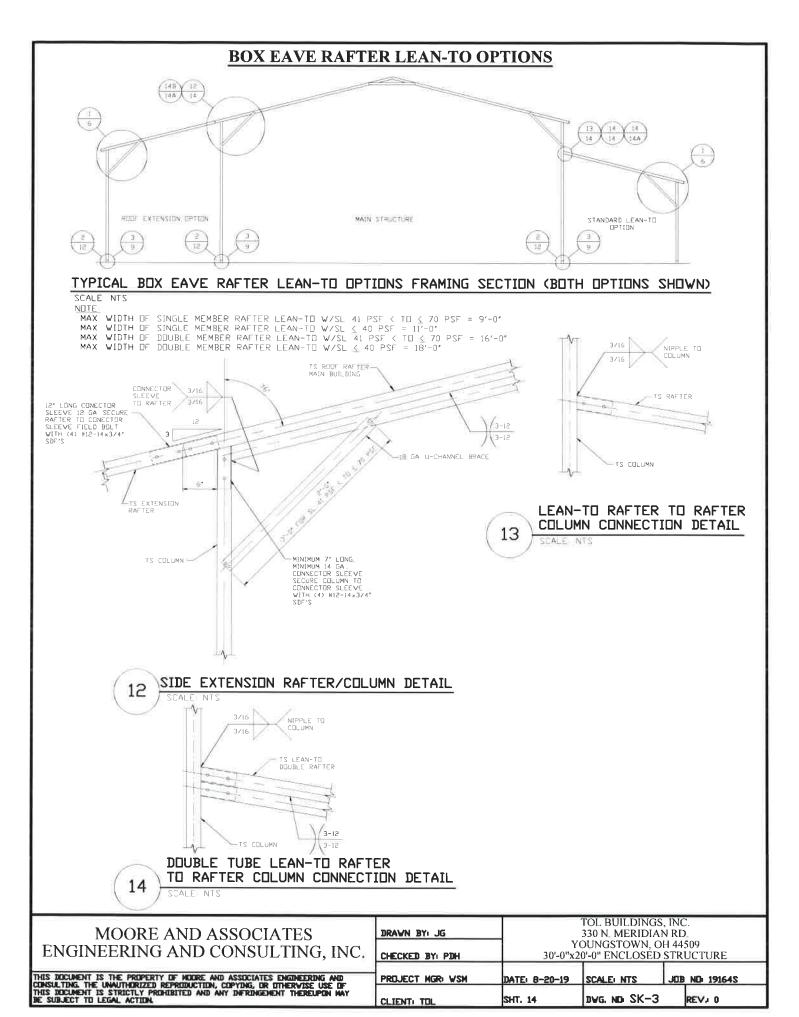
COLLAR TIE CONNECTION DETAIL 12B SCALE NTS

MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING, INC.

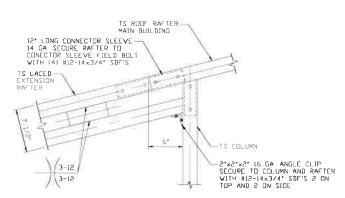
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PROJECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JOB	ND: 19164S			
CHECKED BY: PDH	30'-0"x20	30'-0"x20'-0" ENCLOSÉD STRUCTURE					
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DRAWN BY: JG	330 N. MERIDIAN RD						

TOL BUILDINGS, INC.

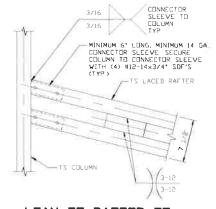
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BOX EAVE RAFTER LEAN-TO OPTIONS



SIDE EXTENSION RAFTER/COLUMN DETAIL FOR SPAN 16'-0" < L < 24'-0"



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR SPAN 16'-0" < L < 24'-0" 14D

2'x2'x2' 16 GA ANGLE CLIP SECURE TO COLUMN AND RAFTER WITH #12-14x3/4' SDF'S 2 ON TOP AND 2 ON SIDE IS LACED RAFTER TS COLUMN 3-12

LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR SPAN 16'-0" < L < 24'-0" 14C

TOL BUILDINGS, INC.

330 N. MERIDIAN RD.

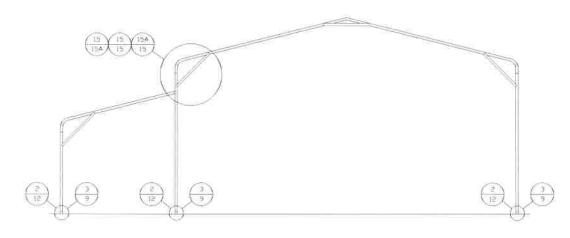
JOB NO 19164S

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC	1
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	DICTURE DIT DO	350 IN MERIDIAN RD				
NIC INC		YOUNGSTOWN, OH 44509				
NO, INC.	CHECKED BY: PDH	30'-0"x2	20'-0" ENCLOSED	STRUCTURE		
EERDIG AND	PREJECT MGR: WSM	DATE: 8-20-19	SCALE: NTS	JDB ND 19164		
vise use of Ereupon May	CLIENT: TOL	SHT. 14A	DWG. ND: SK-3	REV. 0		

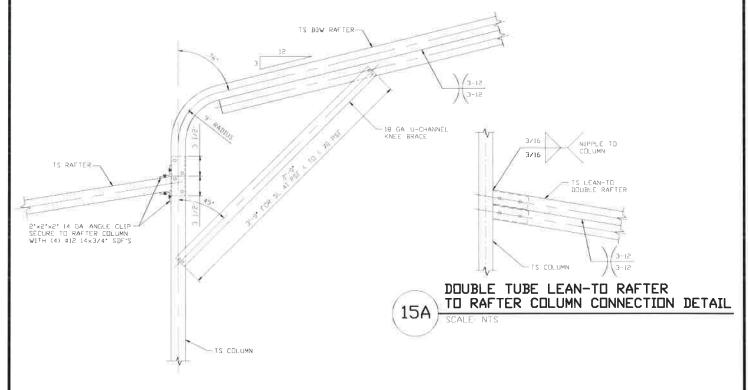
DRAWN BYI JG

BOW RAFTER LEAN-TO OPTION



TYPICAL BOW RAFTER LEAN-TO OPTION FRAMING SECTION

SCALE NTS MAX WIDTH OF SINGLE MEMBER RAFTER LEAN-TO W/SL 41 PSF < TO < 70 PSF = 9'-0' MAX WIDTH OF SINGLE MEMBER RAFTER LEAN-TO W/SL < 40 PSF = 11'-0' MAX WIDTH OF DOUBLE MEMBER RAFTER LEAN-TO W/SL 41 PSF < TO < 70 PSF = 16'-0' MAX WIDTH OF DOUBLE MEMBER RAFTER LEAN-TO W/SL 41 PSF < TO < 70 PSF = 16'-0' MAX WIDTH OF DOUBLE MEMBER RAFTER LEAN-TO W/SL < 40 PSF = 18'-0'



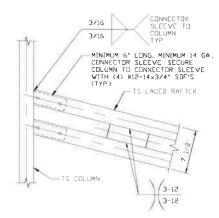
LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL 15 SCALE: NTS

MOORE AND ASSOCIATES
ENGINEERING AND CONSULTING, INC.

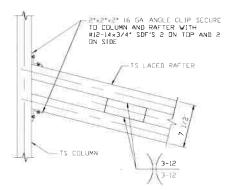
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CLIENT: TOL	SHT. 15	DWG. ND: SK-3	REV. 0	
PROJECT MGR: WSM	DATE: 8-20-19	SCALE: NTS	IOB NO 19164S	
CHECKED BY: PDH		OUNGSTOWN, OH 20'-0" ENCLOSED S		
DRAWN BYI JG	TOL BUILDINGS, INC. 330 N. MERIDIAN RD.			

BOW RAFTER LEAN-TO OPTION



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR SPAN 16'-0" < L \(24'-0" \)



LEAN-TO RAFTER TO RAFTER COLUMN CONNECTION DETAIL FOR SPAN 16'-0' < L \(24'-0' \)

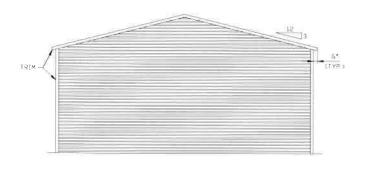
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DRAWN BY: JG	330 N. MERIDIAN RD.				
		YOUNGSTOWN, OH 44509			
CHECKED BY: PDH	30'-0"x20	0'-0" ENCLOSED	STRUCTURE		
PROJECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JDB ND 19164S		
CLIENT: TOL	SHT. 15A	DVG. NO SK-3	REV. 0		

TOL BUILDINGS, INC.

BOX EAVE RAFTER VERTICAL ROOF OPTION

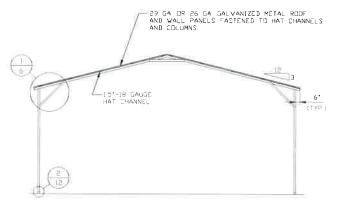


TYPICAL END ELEVATION-VERTICAL ROOF

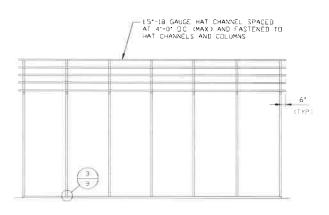
LENGTH VARIES DEPENDING ON NUMBER AND SPACING OF RAFTERS

TYPICAL SIDE ELEVATION—VERTICAL ROOF OPTION

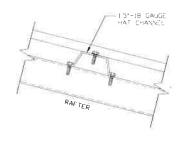
SCALE NTS



TYPICAL SECTION-VERTICAL ROOF



TYPICAL FRAMING SECTION-VERTICAL ROOF OPTION



ROOF PANEL ATTACHMENT

(ALTERNATE FOR VERTICAL ROOF PANELS)
SCALE NTS

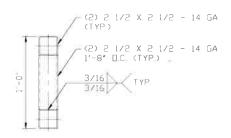
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CLIENT: TOL	SHT. 16	DWG. ND: SK-3		REV. 0	
PROJECT MGR: VSM	DATE: 8-20-19	SCALE: NTS	JOB	ND 19164S	
					_
CHECKED BY: PDH)'-0" ENCLOSÉD :			
	YC	DUNGSTOWN, OF	1 44	509	
DKAWN BTI JG		330 N. MEKIDIAN	N KL);	

TOL BUILDINGS, INC.

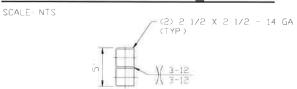
OPTIONAL HEADER

41 PSF < TO ≤ 70 PSF



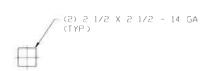
D DETAIL EDD END MALL DOOD

HEADER DETAIL FOR SIDE WALL DOOR □PENINGS 8'-0" < LENGTH ≤ 16'-0"



HEADER DETAIL FOR END WALL DOOR OPENINGS 14'-0' < LENGTH \(\le 20'-0' \)

SCALE: NTS



(2) 2 1/2 X 2 1/2 - 14 GA (TYP)

HEADER DETAIL FOR SIDE WALL DOOR OPENINGS < 8'-0'

SCALE NTS

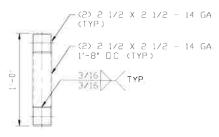
HEADER DETAIL FOR END WALL DOOR OPENINGS & 14'-0'

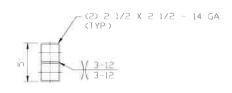
SCALE: NTS

MOORE AND ASSOCIATES ENGINEERING AND CONSULTING, INC.	DRAWN BY: JG CHECKED BY: PDH	TOL BUILDINGS, INC. 330 N. MERIDIAN RD. YOUNGSTOWN, OH 44509 30'-0"x20'-0" ENCLOSED STRUCTURE			Œ
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OPTIONAL HEADER

< 40 PSF





HEADER DETAIL FOR SIDE WALL DOOR OPENINGS 11'-0" < LENGTH < 18'-0"

SCALE: NTS

HEADER DETAIL FOR SIDE WALL DOOR OPENINGS \leq 11'-0"

SCALE: NTS

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CHECKED BY: PDH					
PROJECT MGR: WSM	DATE: 8-20-19	SCALE: NTS	JOB NO 19164S		
CLIENT: TDL	SHT. 18	DWG. ND: SK-3	REV. 0		