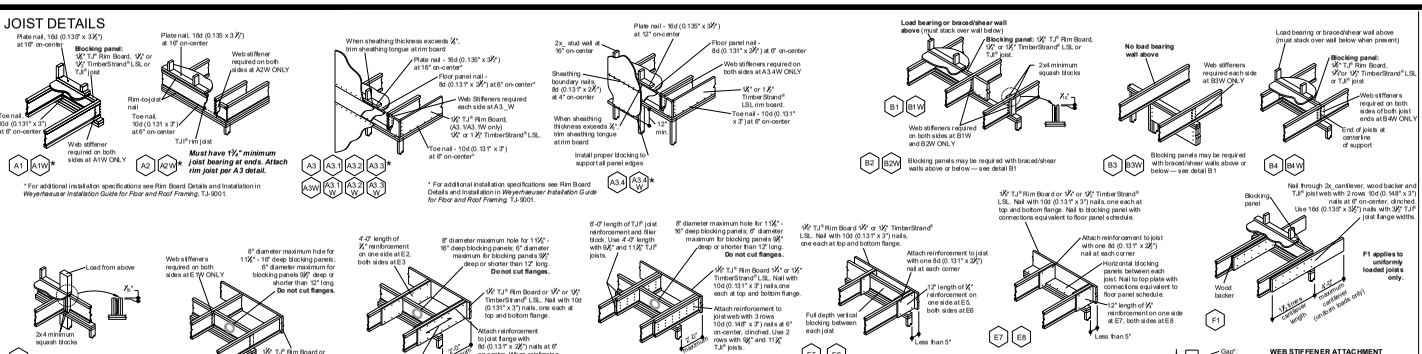
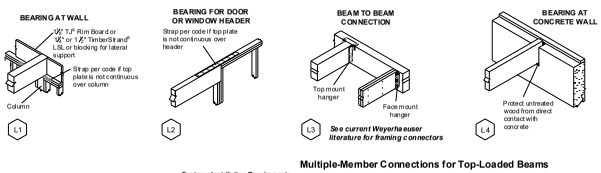
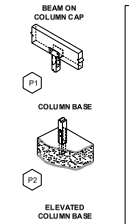
JOIST DETAILS



BEAM DETAILS



COLUMN DETAILS



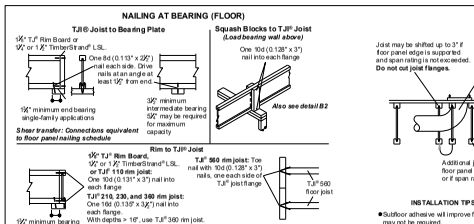
Multiple-Member Connections for Top-Loaded Beams

Fastener Installation Requirements

Piece Width	# of Plies	Fastener Type[1]	Min. Length	# Rows	O.C. Spacing	Location
1½"	2	10d nails	3"	3[2]	12"	One side
		12d-16d nails	3.25"	2[2]		
		Screws	3¼" or ⅜"	2	24"	
	3	10d nails	3"	3[2]	12"	Both sides
		12d-16d nails	3.25"	2[2]		
		Screws	3¼" or ⅜"	2	24"	Both sides
			5"			One side
	4	10d nails[3]	3"	3[2]	12"	One side (per ply)
		12d-16d nails[3]	3.25"	2[2]		
		Screws	5" or 6"	2	24"	Both sides
			6 ¼"			One side
3½"	2	Screws	5" or 6"	2	24"	Both sides
			6 ¼"			One side
		½" bolts	8"	2	24"	

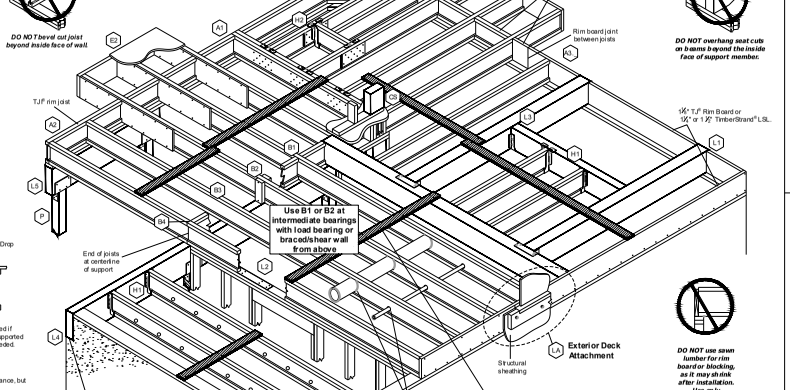
(1) 10d nails are 0.128" diameter; 12d-16d nails are 0.148" - 0.162" diameter; screws are SDS, SDW, USP WS, or TrussLOK®
(2) An additional row of nails is required with depths of 14" or greater.
(3) When connecting 4-ply members, nail each ply to the other and offset nail rows by 2" from the rows in the ply below.

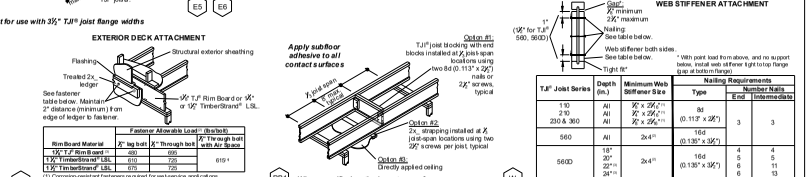
NAILING AT BEARING (FLOOR)



INSTALLATION TIPS

- Subfloor adhesive will improve floor performance, but may not be required.
- Squash blocks and blocking panels carry stacked vertical loads (details B1 and B2). Packing out the web of a T.I® joist (with web stiffeners) is not a substitute for squash blocks or blocking panels.
- When joists are doubled at non-load bearing parallel partitions, space joists apart the width of the wall for plumbing or HVAC.
- Additional joist at plumbing drop (see detail).





FASTENING OF FLOOR PANELS

Guidelines for Closest On-Center Spacing per Row

Nail Size	TJI® 110, 210, and 230	TJI® 360 and 560	Rim Board (⅜" - ½" T.I® TimberStrand® LSL) ⅜"	½"	¾"	TimberStrand® LSL or wider ½"	Microlam® LVL ½"	Parallam® PSL ½"
8d (0.113" x 2½"), 8d (0.131" x 2½")	4"	3"	6"	4"	3"	3"	4"	4"
10d (0.148"x 3"), 10d (0.148"x 3¼")	4"(1)	4"(1)	6"	4"	3"	3"	3"	4"
16d (0.162" x 3½")	6"	4"	10"(4)	6"(4)	4"(4)	4"(4)	3"(4)	4"

(1) Staggered nails when using 4" on-center spacing and maintain ⅜" joist and panel edged distance. One row of fasteners is permitted (two at abutting panel edges) for diaphragms. Fastener spacing for T.I® joists in diaphragm applications cannot be less than shown in table. When fastener spacing for blocking is less than spacing shown above, redesign blocking must be used in lieu of T.I® joists.
(2) For non-diaphragm applications, multiple rows of fasteners are permitted if the rows are offset at least 1" and staggered.
(3) With 10d (0.148" x 1½") nails, spacing can be reduced to 3" on-center for light gauge steel straps.
(4) Can be reduced to 5" on-center if nail penetration into the narrow edge is no more than ½" (to minimize splitting).
(5) Can be reduced to 4" on-center if nail penetration into the narrow edge is no more than ½" (to minimize splitting).
(6) Can be reduced to 3¾" on-center if nail penetration into the narrow edge is no more than ½" (to minimize splitting).
(7) Can be reduced to 3" on-center in field and 6" on-center along panel edge. Fastening requirements on engineered drawings supersede recommendations listed above.
- Maximum nail spacing for T.I® joists is 18" on-center.
- 1-4 ga. staples may be substituted for 8d (0.113" x 2½") nails if minimum penetration of 1" into the T.I® joist or rim board is achieved.
- To minimize splitting, maintain edge distance and row spacing of 2⅜ x nail diameter or ¾", whichever is greater.
- Nailing rows must be offset at least ½" and staggered.
- For recommended nailing and adhesives, see INSTALLATION RECOMMENDATIONS on page 2 of the Weyerhaeuser Installation Guide for Floor and Roof Framing. TJ-9001.

FILLER and BACKER BLOCK SIZES

T.I® Joists	110	210	230 or 360	560	560D
Depth	⅜"- 1 ¼"	14"-16"	⅜"- 1 ¼"	14"-16"	⅜"- 1 ¼"	14"-16"	⅜"- 1 ¼"	14"-16"	18"-20"	22"-24"
Filler Block (1) (Detail H2)	2x6	2x8	2x6 + ¾" sheathing	2x8 + ¾" sheathing	2x6 + ¾" sheathing	2x8 + ¾" sheathing	2x12 + ¾" sheathing	Two 2x6	Two 2x8	Two 2x12	Four ¾" x 10" sheathing
Cantilever Filler (Detail E4)	2x6 6'-0" long	2x10 6'-0" long	2x6 + ¾" sheathing 4'-0" long	2x10 + ¾" sheathing 6'-0" long	2x6 + ¾" sheathing 4'-0" long	2x10 + ¾" sheathing 6'-0" long	Not applicable	Not applicable			
Backer Block (1) (Detail F1 or H2)	¾" or ⅜"		¾" or ⅜"		¾" or 1" Net			2x6	2x8	2x12	Two ¾" x 10" sheathing
Nail Size	Filler	(0.131" x 3")						(0.131" x 3½")			
	Backer							(0.131" x 3")			
Nail Quantity (2)	Filler	15						32		50	
	Backer							15		15	

(1) If necessary, remove filler and backer block height if face mount hangers and maintain ⅜" gap at top of joist, see detail W. Filler and backer block dimensions should accommodate required nailing without splitting (1.5" minimum for backer blocks and 3" minimum for filler blocks).
(2) Clinch nails when possible.

ALLOWABLE HOLES - TJI® Joists

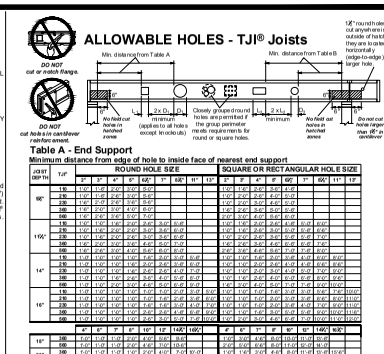


Table A - End Support

Minimum distance from edge of hole to inside face of nearest end support

JOIST DEPTH	T.I®	ROUND HOLE SIZE 2"	3"	4"	5"	6½"	7"	8½"	11"	13"	SQUARE OR RECTANGULAR HOLE SIZE 2"	3"	4"	5"	6½"	7"	8½"	11"	13"
9½"	110	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"					1'-0"	1'-0"	1'-0"	1'-0"	1'-0"				
	210	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"					1'-0"	1'-0"	1'-0"	1'-0"	1'-0"				
	230	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"					1'-0"	1'-0"	1'-0"	1'-0"	1'-0"				
	360	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"					1'-0"	1'-0"	1'-0"	1'-0"	1'-0"				
	560	1'-6"	2'-6"	3'-6"	5'-0"	7'-0"					2'-0"	3'-0"	4'-0"	6'-0"	8'-0"				
11¾"	110	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"			1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"		
	210	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"			1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"		
	230	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"			1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"		
	360	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"			1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"		
	560	1'-6"	2'-6"	3'-6"	5'-0"	7'-0"	8'-0"	9'-0"			2'-0"	3'-0"	4'-0"	6'-0"	8'-0"	9'-0"	9'-0"		
14"	110	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	210	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	230	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	360	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	560	1'-6"	2'-6"	3'-6"	5'-0"	7'-0"	8'-0"	9'-0"	11'-0"	12'-0"	2'-0"	3'-0"	4'-0"	6'-0"	8'-0"	9'-0"	9'-0"	11'-0"	12'-0"
16"	110	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	210	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	230	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	360	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	560	1'-6"	2'-6"	3'-6"	5'-0"	7'-0"	8'-0"	9'-0"	11'-0"	12'-0"	2'-0"	3'-0"	4'-0"	6'-0"	8'-0"	9'-0"	9'-0"	11'-0"	12'-0"

JOIST DEPTH	T.I®	2"	3"	4"	5"	6½"	7"	8½"	11"	13"	2"	3"	4"	5"	6½"	7"	8½"	11"	13"
16"	560	1'-6"	2'-6"	3'-6"	5'-0"	7'-0"	8'-0"	9'-0"	11'-0"	12'-0"	2'-0"	3'-0"	4'-0"	6'-0"	8'-0"	9'-0"	9'-0"	11'-0"	12'-0"
20"	560	1'-6"	2'-6"	3'-6"	5'-0"	7'-0"	8'-0"	9'-0"	11'-0"	12'-0"	2'-0"	3'-0"	4'-0"	6'-0"	8'-0"	9'-0"	9'-0"	11'-0"	12'-0"

Table B - Intermediate or Cantilever Support

Minimum distance from edge of hole to inside face of nearest intermediate or cantilever support

JOIST DEPTH	T.I®	ROUND HOLE SIZE 2"	3"	4"	5"	6½"	7"	8½"	11"	13"	SQUARE OR RECTANGULAR HOLE SIZE 2"	3"	4"	5"	6½"	7"	8½"	11"	13"
9½"	110	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"					2'-0"	2'-0"	2'-0"	2'-0"	2'-0"				
	210	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"					2'-0"	2'-0"	2'-0"	2'-0"	2'-0"				
	230	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"					2'-0"	2'-0"	2'-0"	2'-0"	2'-0"				
	360	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"					2'-0"	2'-0"	2'-0"	2'-0"	2'-0"				
	560	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"					1'-0"	1'-0"	1'-0"	1'-0"	1'-0"				
11¾"	110	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"			1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"		
	210	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"			1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"		
	230	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"			1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"		
	360	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"			1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"		
	560	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
14"	110	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	210	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	230	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	360	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	560	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
16"	110	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	210	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	230	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	360	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
	560	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"

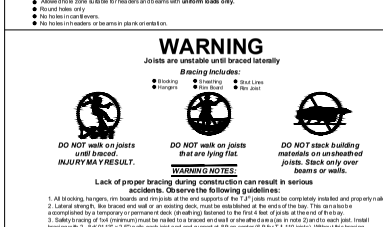
JOIST DEPTH	T.I®	2"	3"	4"	5"	6½"	7"	8½"	11"	13"	2"	3"	4"	5"	6½"	7"	8½"	11"	13"
16"	560	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
20"	560	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"

Tabulated values based on measurements of longest side.

- Leave ¾" of web (minimum) at top and bottom of hole. **DO NOT cut joist flanges.**
- Tables are based on uniform load of 100 pounds per square foot per current design literature.
- For simple span (5" minimum), uniformly loaded joists used in residential applications, one maximum size round hole may be located at the center of the joist span **provided that no other holes occur in the joist.**

ALLOWABLE HOLES - Headers and Beams

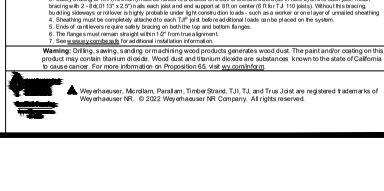
1.55E TimberStrand® LSL Headers and Beams



General Notes

- Allowed hole zone suitable for headers and beams with **uniform and/or concentrated loads anywhere along the member.**
- Round holes only
- No holes in headers or beams in plank orientation.

Other Trus Joist® Headers and Beams



General Notes

- Allowed hole zone suitable for headers and beams with **uniform loads only.**
- Round holes only
- No holes in cantilevers.
- No holes in headers or beams in plank orientation.

WARNING

Joists are unstable until braced laterally

Bracing Includes:

- Blocking
- Hangers
- Sheathing
- Rim Board
- Stud Lines
- Rim Joist

DO NOT walk on joists until braced. INJURY MAY RESULT.

DO NOT walk on joists that are lying flat.

DO NOT stack building materials on unsheathed joists. Stack only over beams or walls.

WARNING NOTES:

Lack of proper bracing during construction can result in serious accidents. Observe the following guidelines:

1. All blocking, hangers, rim boards and rim joists at the end supports of the T.I® joists must be completely installed and properly nailed.
2. Lateral strength, like braced wall and wall or an existing deck, must be established at the ends of the bay. This can be done accomplished by a temporary or permanent deck (sheathing) fastened to the first 4 feet of joists at the end of the bay.
3. Safety bracing of 1x4 (minimum) must be nailed to a braced end wall or sheathed area (as in note 2) and cross joist. Install bracing with 2 - 8d (0.131" x 2.5") nails each joist and end support at 8ft on center (6 ft for T.I 110 joists). Without this bracing, buckling sideways or rollover is highly probable under light construction loads - such as a worker or one layer of unnailed sheathing
4. Sheathing must be completely attached to each T.I® joist before additional loads can be placed on the system.
5. Ends of cantilevers require safety bracing on both the top and bottom flanges.
6. The flanges must remain straight within 1/2" from true alignment.
7. See www.weyerhaeuser.com for additional installation information.

Warning: Drilling, sawing, sanding or machining wood products generates wood dust. The paint and/or coating on this product may contain titanium dioxide. Wood dust and titanium dioxide are substances known to the state of California to cause cancer. For more information on Proposition 65, visit www.oehha.org.

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NO.	DESCRIPTION	DATE	APPR.

REVISIONS

FILE:

11/21/23

SEAL: STATE OF TEXAS — JOSE I. VILLARREAL — 91208 — LICENSED PROFESSIONAL ENGINEER

Villarreal Design Group, LLC
joseivillarrealdesign.com
Texas Firm 12109
(210) 725-6100

SHEET TITLE: TJI DETAILS

GARAGE CONVERSION
129 E ROSEWOOD
SAN ANTONIO, TX 78212

JOB NO:	23-475
DATE:	11/21/23
DESIGNER:	MR
CHECKED:	JIV, PE
DRAWN:	MR
SHEET:	S-5 OF 5