

**STRUCTURAL DESIGN REQUIREMENTS:**

**DESIGN STANDARDS:**

ASCE 7-16 MINIMUM DESIGN LOADS FOR BUILDINGS  
 2018 INTERNATIONAL RESIDENTIAL CODE  
 2018 NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION  
 ACI 318-14 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE  
 ANSI/AISC 360-16 SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS

**DESIGN CRITERIA:**

DEAD LOAD  
 -ROOF 5 PSF (INCLINED) + TIMBER  
 SELFWEIGHT

SNOW LOAD  
 -GROUND SNOW 10 PSF  
 -EXPOSURE FACTOR, C<sub>e</sub> 1.0  
 -IMPORTANCE FACTOR 1.0 (CATEGORY "II" BUILDING)  
 -THERMAL FACTOR, C<sub>t</sub> 1.2  
 -ROOF SLOPE FACTOR, C<sub>s</sub> 1.0

LIVE LOAD  
 -ROOF 60 PSF (PROJECTED)

WIND  
 -3-SEC GUST WIND SPEED 105 MPH (ASCE 7-16 ULTIMATE)  
 -EXPOSURE B  
 -RISK CATEGORY II

SEISMIC  
 -RISK CATEGORY II  
 -IMPORTANCE FACTOR, I<sub>e</sub> 1.0 (CATEGORY "II" BUILDING)  
 -SITE CLASS D  
 -S(DS) 0.25 0.333G  
 -S(D1) 1.05 0.235G  
 -DESIGN CATEGORY D  
 -RESPONSE MOD. FACTOR 1.5  
 -RESPONSE COEFF. 0.222

SOIL  
 MINIMUM ALLOWABLE BEARING CAPACITY: 1500  
 PSF (ASSUMED)

**SITE INFO:**

PROJECT ADDRESS:

**GENERAL NOTES:**

TIMBER FRAME ELEMENTS HAVE BEEN DESIGNED TO RESIST GRAVITY AND LATERAL WIND LOADS.

IT IS THE RESPONSIBILITY OF THE TIMBER FRAME SYSTEM PURCHASER (OWNER AND/OR CONTRACTOR) TO VERIFY ALL DIMENSIONS INDICATED ON THE TIMBER FRAME SYSTEM DRAWINGS.

SOME WARPING, TWISTING, SHRINKING, AND CHECKING OF TIMBERS IS ANTICIPATED AS THEY REACH EQUILIBRIUM MOISTURE CONTENT. CARE SHOULD BE TAKEN TO KEEP PROPER RELATIVE HUMIDITY WITHIN THE STRUCTURE, ESPECIALLY THROUGH THE CONSTRUCTION SEASON AND FIRST FULL HEATING/COOLING CYCLE OF THE BUILDING.

FOR WOOD THAT IS NOT A NATURALLY DURABLE SPECIES, PROTECTION OF THE TIMBERS AGAINST DECAY IS THE RESPONSIBILITY OF THE OWNER, AND SHALL COMPLY WITH SECTION R317 OF THE IRC AND/OR 2304.12 OF THE IBC.

DO NOT SCALE ANY DRAWINGS.

## Cupola Access Bridge & Loft System

REV	DESCRIPTION	DATE
F	FINAL ISSUANCE FOR STAMP	4/4/24
E3	REVISION / FTE STRUCTURAL COMMENTS	4/2/24
E2	REVISION / FTE COMMENTS	3/29/24
D1	INITIAL ISS. - CONCEPT TO CLIENT, ENGINEER	3/9/24

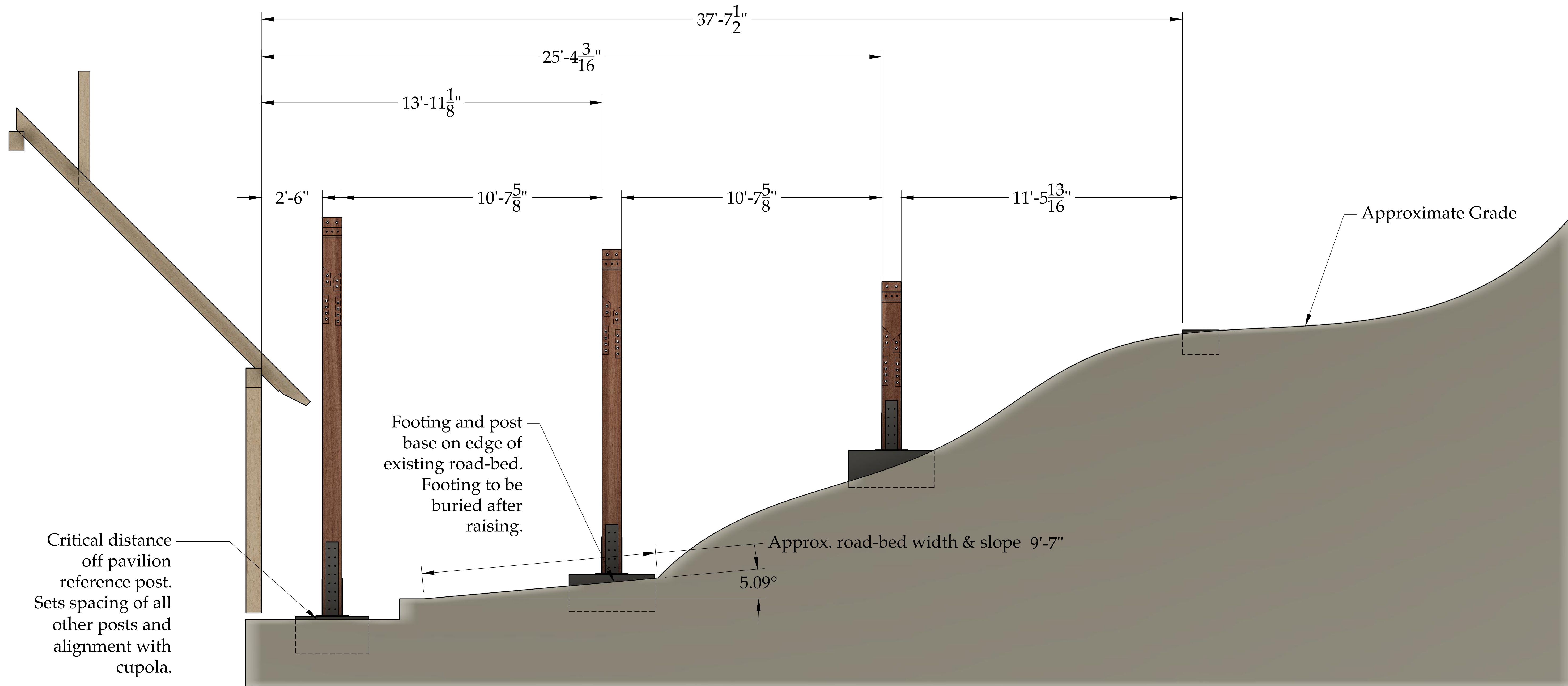
REVISION HISTORY	
ENGINEER	DATE
CHECKED MP	
DRAWN ML	3/9/24

# Overview

LEIPER'S CREEK  
TIMBER FRAMES

<b>Project</b> Cupola Bridge	<b>Part No.</b> Engineer Corrections	ENGINEER FIRE TOWER ENGINEERING	SIZE D	CODE N/A	DWG NO. ENGINEERED ACCESS BRIDGE	REV F
		CHECKED MP	SCALE 1:100	WEIGHT		SHEET 1/12
		DRAWN ML	3/9/24			





Critical distance off pavilion reference post. Sets spacing of all other posts and alignment with cupola.

Footing and post base on edge of existing road-bed. Footing to be buried after raising.

Approx. road-bed width & slope 9'-7"  
5.09°

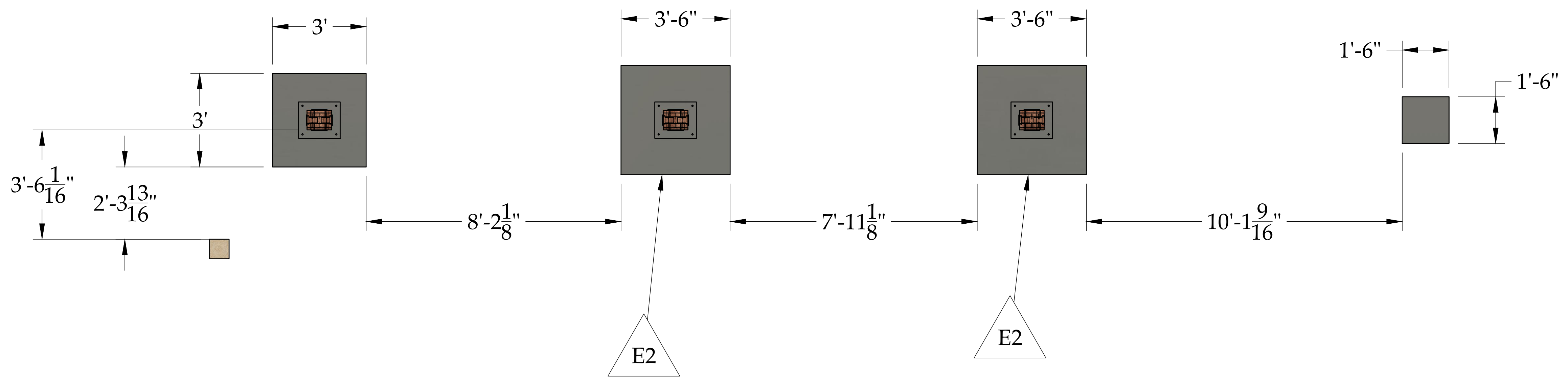
# Post Spacing

LEIPER'S CREEK  
TIMBER FRAMES

Project  
**Cupola Bridge**

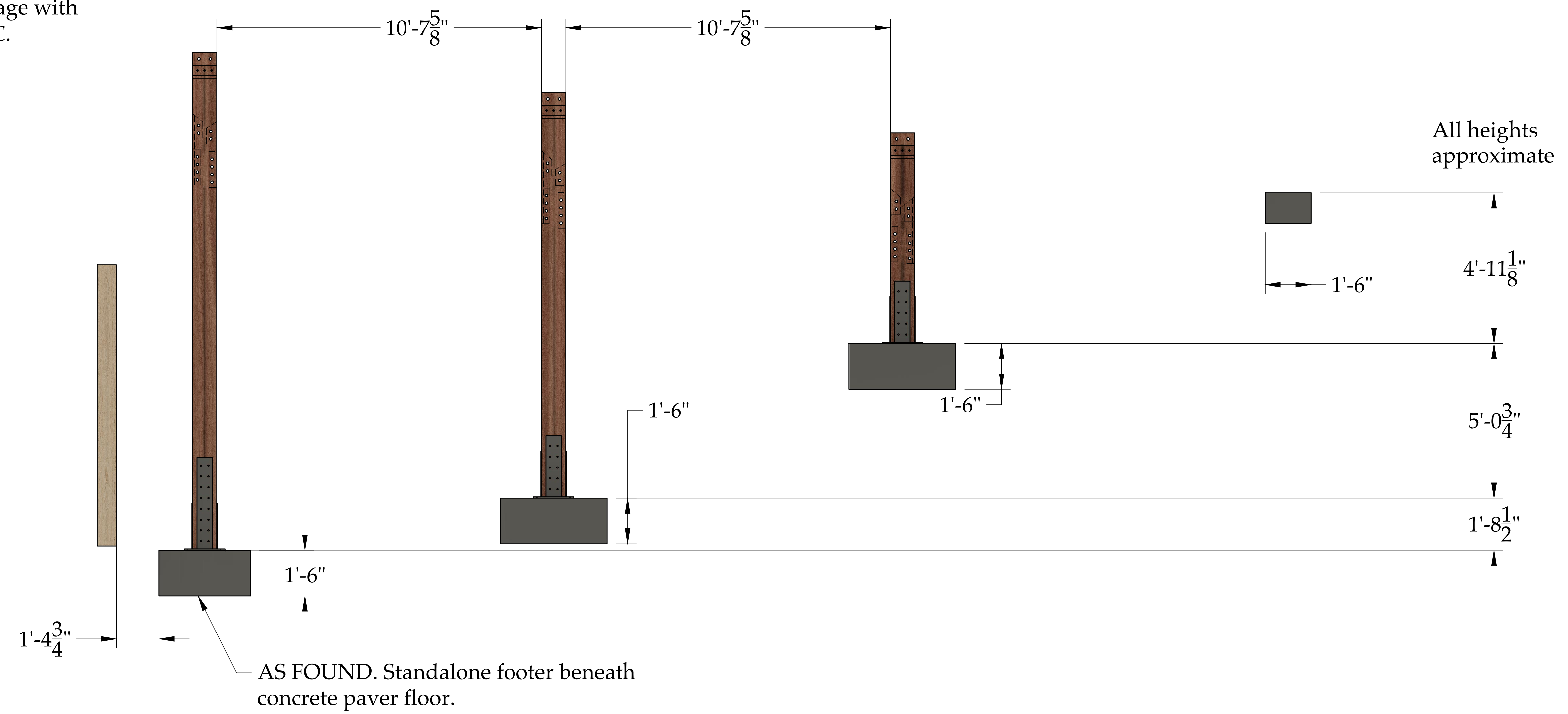
Part No.  
Engineer Corrections

ENGINEER	FIRE TOWER ENGINEERING	SIZE	CODE	DWG NO.	REV
CHECKED	MP	D	N/A	ENGINEERED ACCESS BRIDGE	F
DRAWN	ML	3/9/24	SCALE 1:100	WEIGHT	SHEET 2/12



Note 1 E3

A. 3000 psi concrete. #4 rebar cage with top and bottom lattice 7" O.C.



EARTHWORK:  
COMPLIANCE OF SOIL COMPACTION AND OTHER MEASURES TAKEN TO ACHIEVE THE ALLOWABLE BEARING PRESSURE AND SUFFICIENT DRAINAGE IN AREAS OF BACKFILL SHALL BE FIELD VERIFIED BY A QUALIFIED SOILS ENGINEER AND IS NOT THE RESPONSIBILITY OF FIRE TOWER ENGINEERED TIMBER. FOUNDATION DRAINS MUST BE PROVIDED AROUND THE PERIMETER OF THE STRUCTURE AND MUST DRAIN TO DAYLIGHT.

CONCRETE:  
UNLESS NOTED OTHERWISE, CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF  $f'_c = 3,000$  PSI. ALL CONCRETE EXPOSED TO WEATHER SHALL CONTAIN 6% AIR ENTRAINMENT OR SHOW EQUIVALENT FREEZE-THAW PROTECTION.  
CONCRETE SHALL HAVE A MINIMUM COVER ACCORDING TO:  
- FOOTINGS (TO SOIL) 3"

REINFORCING STEEL SHALL HAVE THE FOLLOWING YIELD STRENGTHS:  
- 40,000psi FOR #5 & SMALLER REBAR  
- 60,000psi FOR #6 & LARGER REBAR

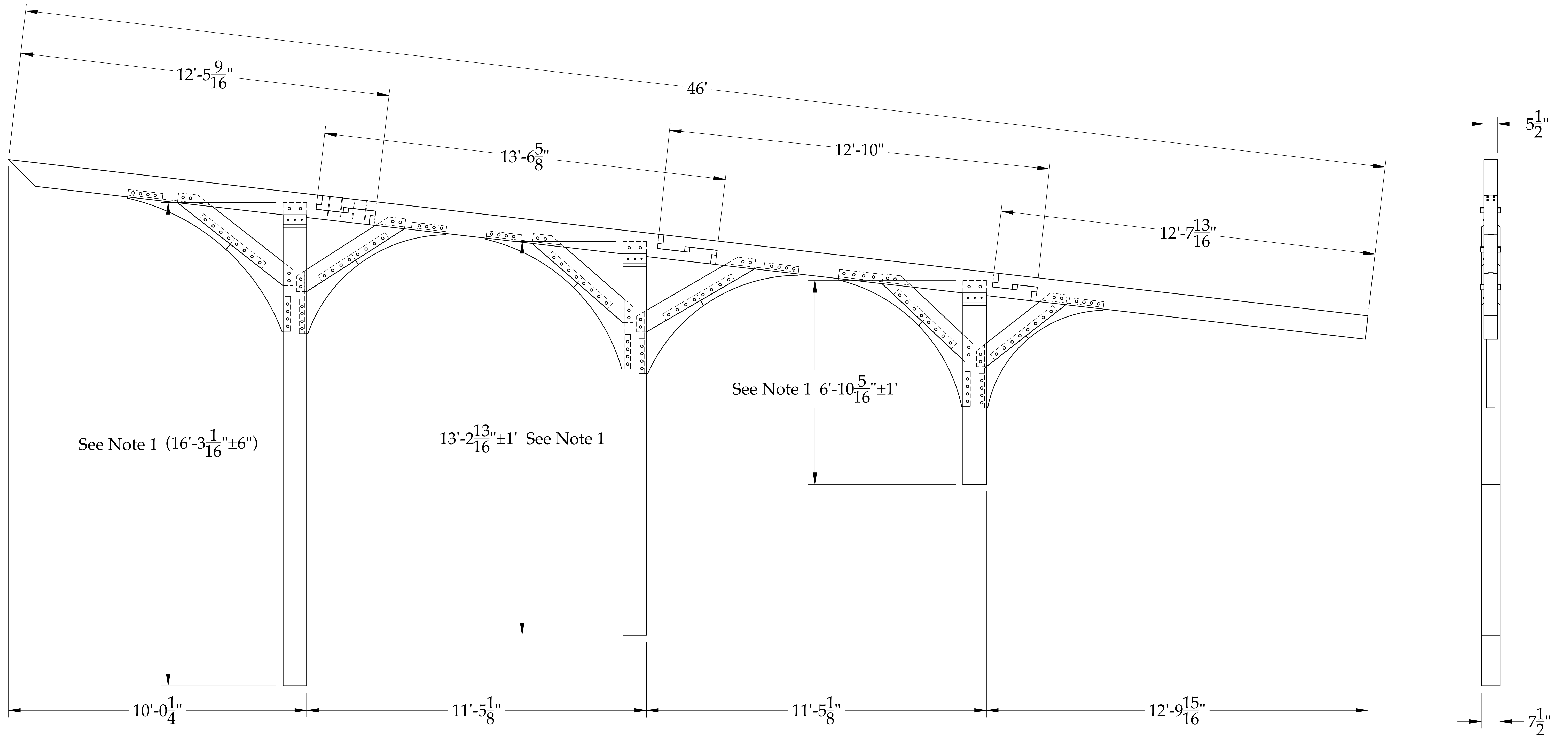
UNLESS NOTED OTHERWISE ON THESE STRUCTURAL DRAWINGS, ALL REBAR ARRANGEMENT AND BENDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ACI DETAILING MANUAL (ACI SP-66).

ALL SLABS, POST PADS, AND FOOTINGS ARE TO BE PLACED ON UNDISTURBED SOIL OR WELL-COMPACTED FILL, OR PINNED TO CLEANED LEDGE. FOUNDATION WALLS ARE TO BE PLUMB, SQUARE, AND SIZED TO WITHIN A 1/4" OF RELATIVE ELEVATIONS SHOWN ON PLANS.

# Footer Details

LEIPER'S CREEK  
TIMBER FRAMES

Project	FIRE TOWER ENGINEERING	SIZE	CODE	DWG NO.	REV
Cupola Bridge	CHECKED MP	D	N/A	ENGINEERED ACCESS BRIDGE	F
Part No.	ENGINEER	SCALE	WEIGHT	SHEET	
Engineer Corrections	DRAWN ML	1:100		3/12	
		3/9/24			



**Note 1**  
 Post lengths are estimated to +/- 1 foot. Final post length to be determined by actual grade at time of assembly.

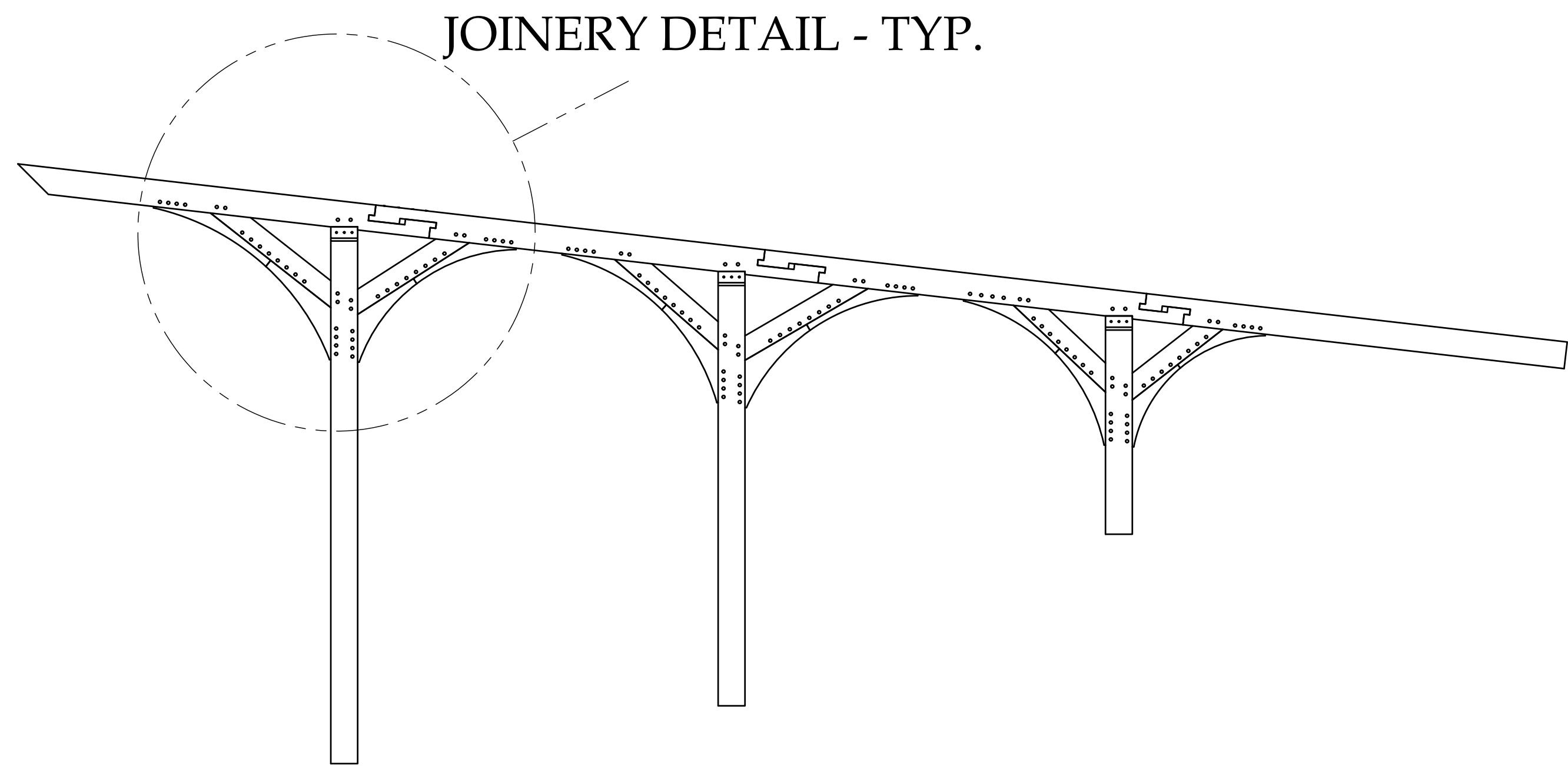
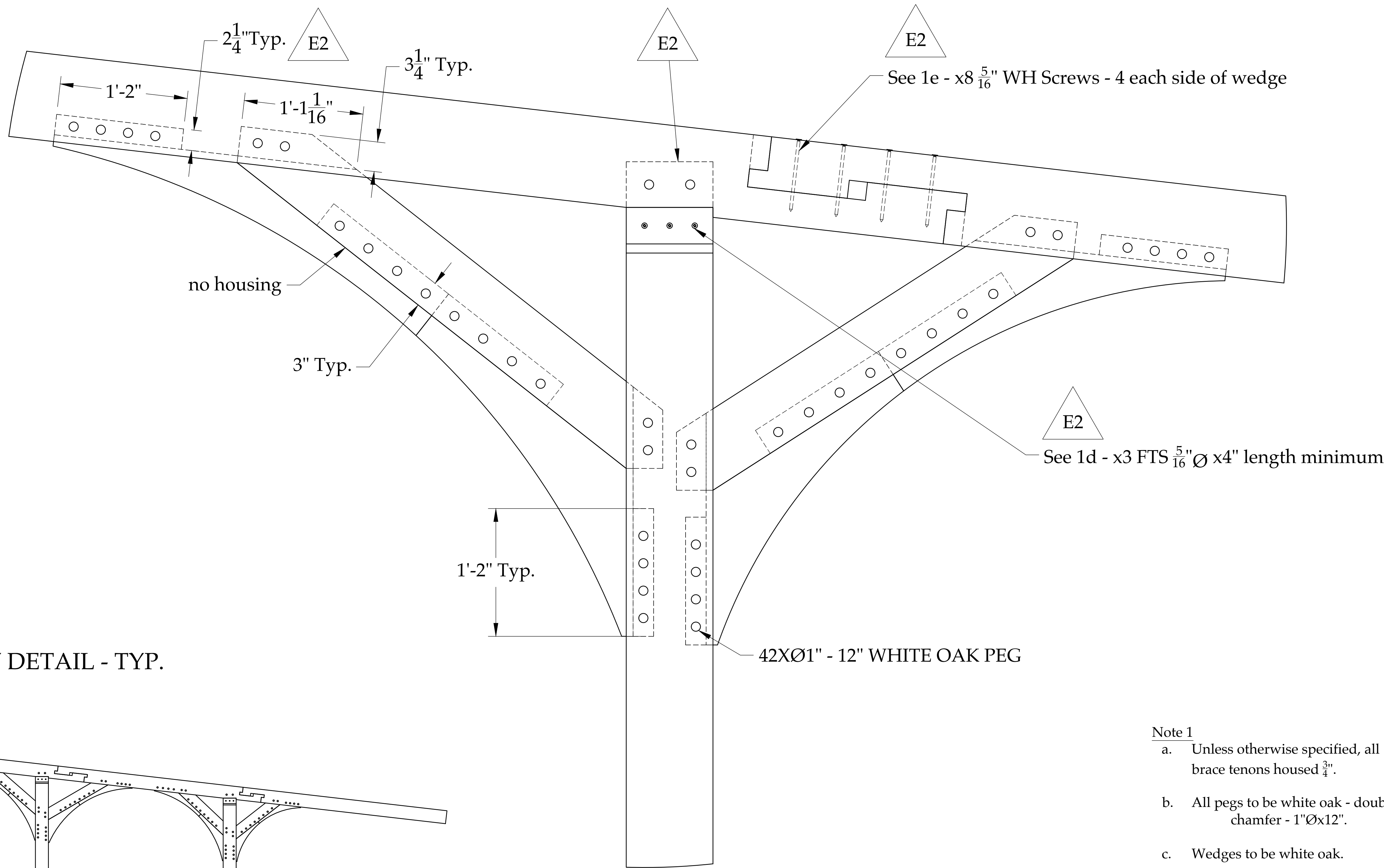
**Note 2**  
 WOOD:  
 TIMBERS  
 UNLESS OTHERWISE NOTED, SOLID SAWN TIMBER SHALL BE WESTERN RED CEDAR #1 OR BETTER, SIZED TO 1/2" UNDER THE STATED NOMINAL DIMENSION. TIMBERS MAY NOT BEAR A GRADE STAMP, BUT SHALL OTHERWISE MEET THE REQUIREMENTS OF #1 OR BETTER MATERIAL. SOME WARPING, TWISTING, AND CHECKING OF TIMBERS IS ANTICIPATED AS THEY REACH EQUILIBRIUM MOISTURE CONTENT.  
 TIMBER SCREWS  
 UNLESS NOTED OTHERWISE, ALL SCREWS SHALL BE BY GRK RSS, ASSY SK, OR ROTHOBLAAS TBS OR OTHER APPROVED SCREW, WITH A SHANK DIAMETER OF AT LEAST 0.2", AND A THREAD DIAMETER OF AT LEAST 0.30". SCREWS HOLES SHALL NOT BE PRE-DRILLED UNLESS OTHERWISE NOTED, AND HAVE AT LEAST 3" OF THREAD PENETRATION INTO THE CONNECTING MEMBER.  
 TIMBER FRAME JOINERY

UNLESS OTHERWISE CALLED OUT IN JOINERY DETAILS ON THE STRUCTURAL AND TIMBER FRAME DRAWINGS, THE JOINERY SHOULD MEET THE FOLLOWING REQUIREMENTS, AND BE DETAILED IN ACCORDANCE WITH TFEC 1-19.  
 ALL PEGS SHALL BE 1" IN DIAMETER, AND MEET THE REQUIREMENTS OF TFEC 1-19.  
 TENONS CONNECTING MEMBERS IN 8X MATERIAL AND LARGER (SMALLEST DIRECTION), SHALL BE 2" THICK AND 5" IN LENGTH, WITH 3" OF RELISH. IN 6X MATERIAL, 1 1/2" THICK, 4" LONG TENONS WITH 2 1/2" RELISH SHALL BE USED. 4X AND SMALLER MATERIAL, INCLUDING BRACES (UNLESS OTHERWISE CALLED OUT) AND STRUTS, SHALL HAVE A 1 1/2" THICK TENON, AT LEAST 3 1/2" IN LENGTH, AND 2 1/2" OF RELISH.

# Post Lengths

LEIPER'S CREEK  
 TIMBER FRAMES

Project <b>Cupola Bridge</b>	Part No. <b>MG-Bridge-170</b>	ENGINEER	FIRE TOWER ENGINEERING	SIZE	CODE	DWG NO.	REV
		CHECKED	MP	D	N/A	ENGINEERED ACCESS BRIDGE	F
		DRAWN	ML	3/9/24	SCALE 1:50	WEIGHT	SHEET 4/12



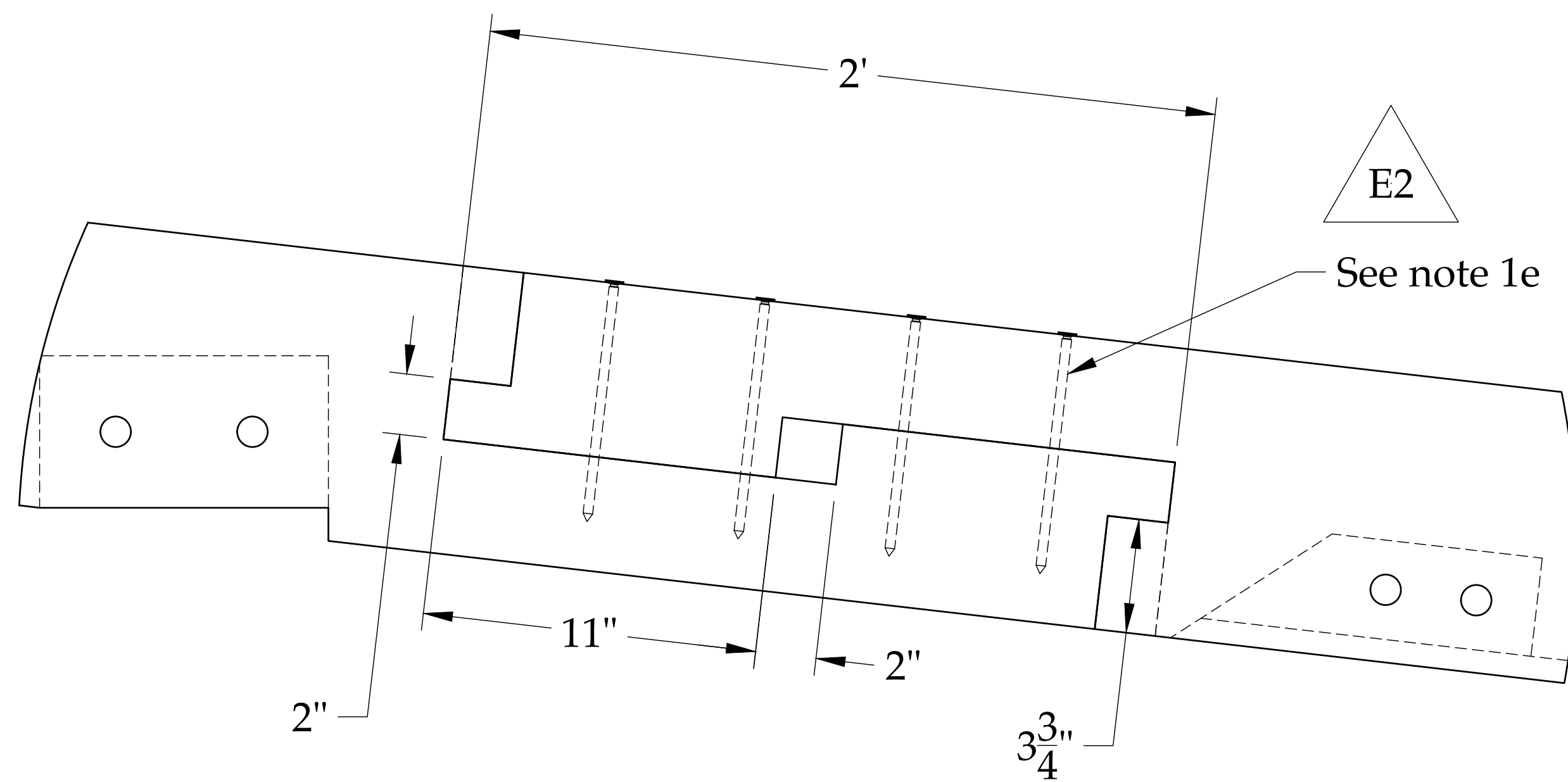
JOINERY DETAIL - TYP.

JOINERY DETAIL - TYP. 1:6

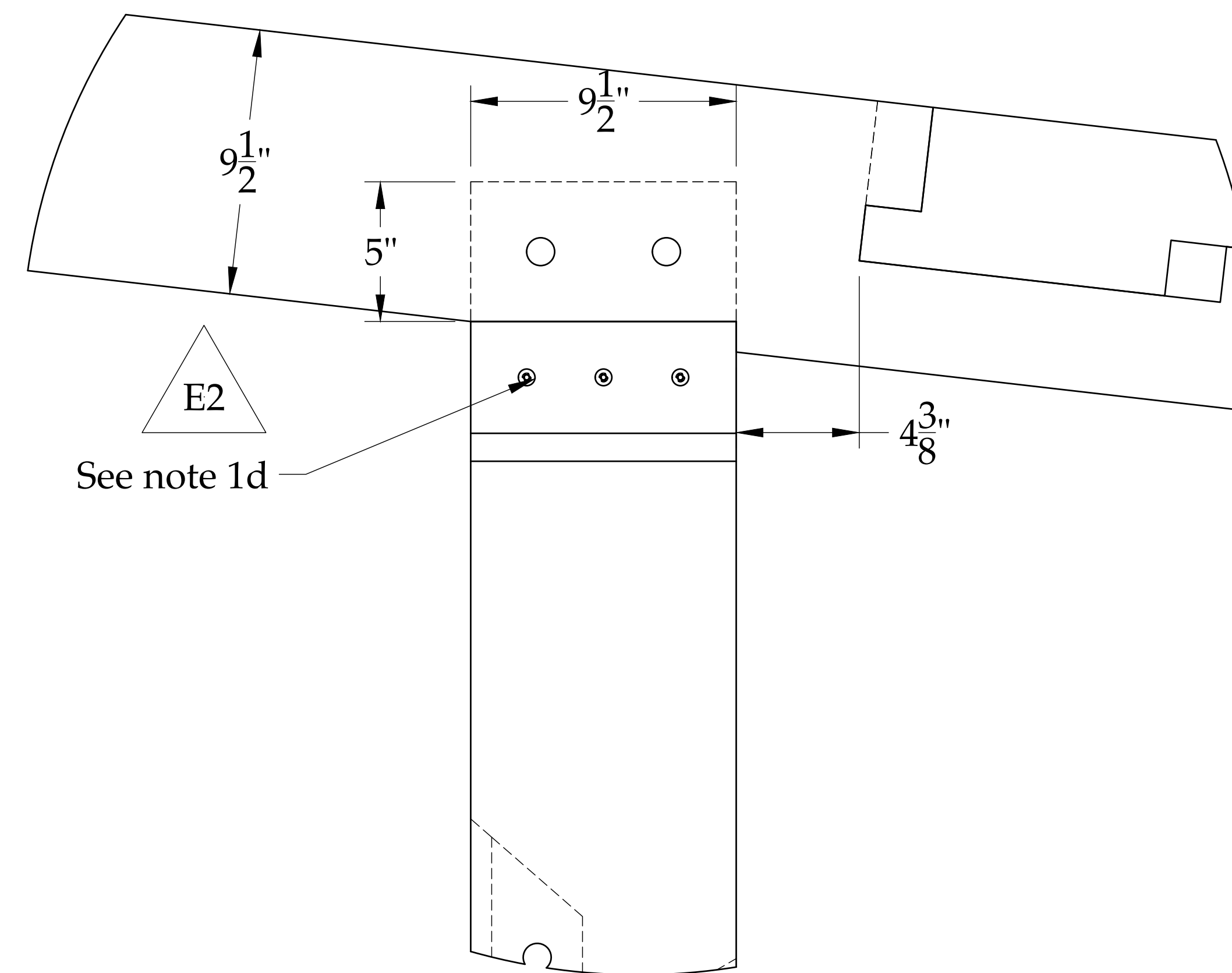
Note 1

- a. Unless otherwise specified, all brace tenons housed  $\frac{3}{4}$ ".
- b. All pegs to be white oak - double chamfer -  $1" \times 12"$ .
- c. Wedges to be white oak.
- d. Shear re-inforcement screws at post top to be FTS  $\frac{5}{16}" \text{Ø} \times 4"$  minimum length.
- e. Scarf joint screws to be 2x4 grid of WHS  $\frac{5}{16}" \text{Ø} \times 8"$  spaced equally on either side of wedge.

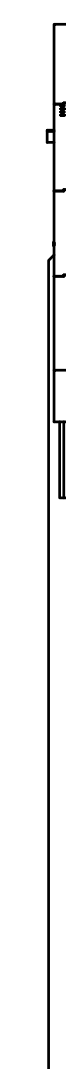
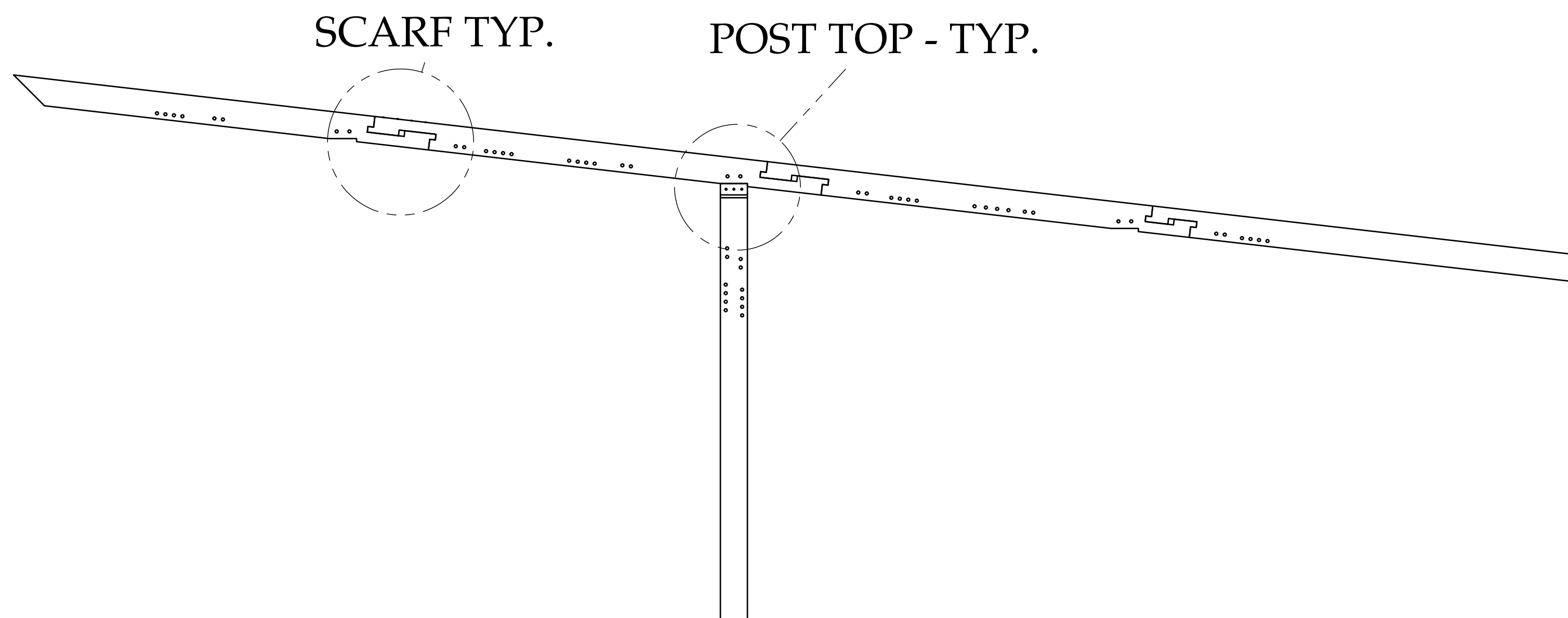




SCARF TYP.  
SCALE 1:4



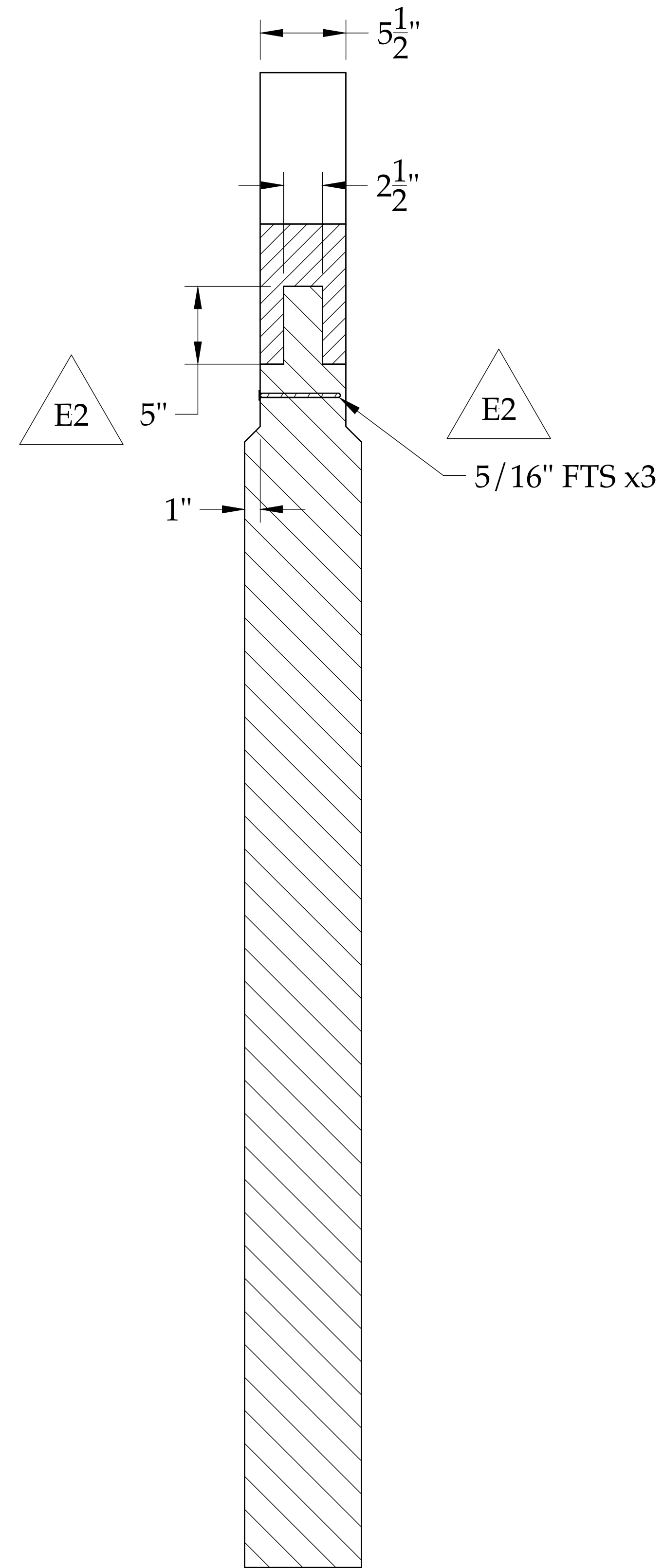
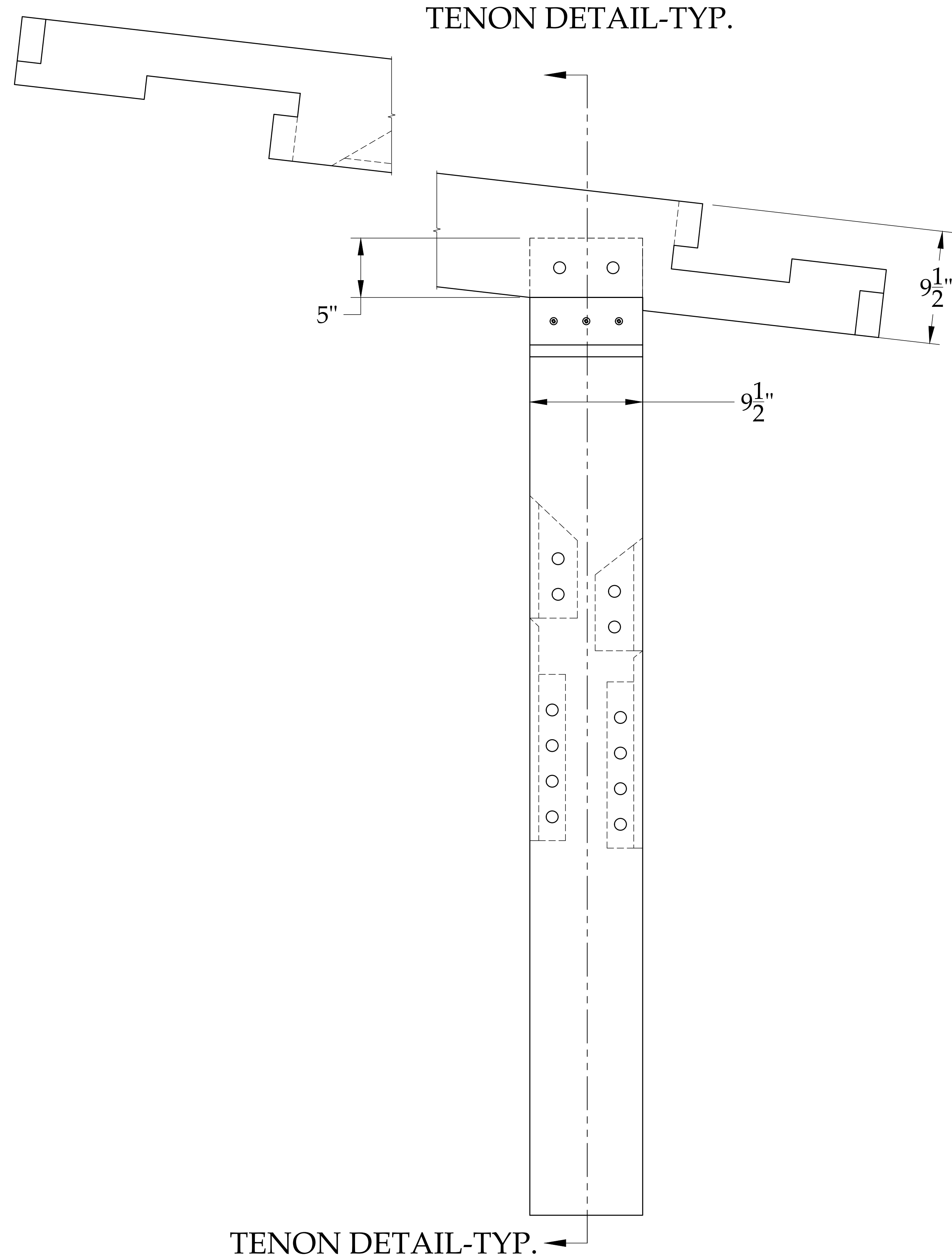
POST TOP - TYP.  
SCALE 1:4



Note 1

- a. Unless otherwise specified, all brace tenons housed  $\frac{3}{4}$ ".
- b. All pegs to be white oak - double chamfer - 1"Øx12".
- c. Wedges to be white oak.
- d. Shear re-inforcement screws at post top to be FTS  $\frac{5}{16}$ "Ø x 4" minimum length.
- e. Scarf joint screws to be 2x4 grid of WHS  $\frac{5}{16}$ "Ø x 8" spaced equally on either side of wedge.

Project	Part No.	ENGINEER	FIRE TOWER ENGINEERING	SIZE	CODE	DWG NO.	REV
Cupola Bridge	MG-Bridge-170	CHECKED	MP	D	N/A	ENGINEERED ACCESS BRIDGE	F
		DRAWN	ML	3/9/24	SCALE 1:50	WEIGHT	SHEET 6/12



**Note 1**

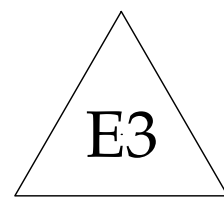
- a. Unless otherwise specified, all brace tenons housed  $\frac{3}{4}$ ".
- b. All pegs to be white oak - double chamfer - 1"Øx12".
- c. Wedges to be white oak.
- d. Shear re-inforcement screws at post top to be FTS  $\frac{5}{16}$ "Ø x 4" minimum length.
- e. Scarf joint screws to be 2x4 grid of WHS  $\frac{5}{16}$ "Ø x 8" spaced equally on either side of wedge.

SECTION TENON DETAIL-TYP.-TENON DETAIL-TYP.  
SCALE 1:6

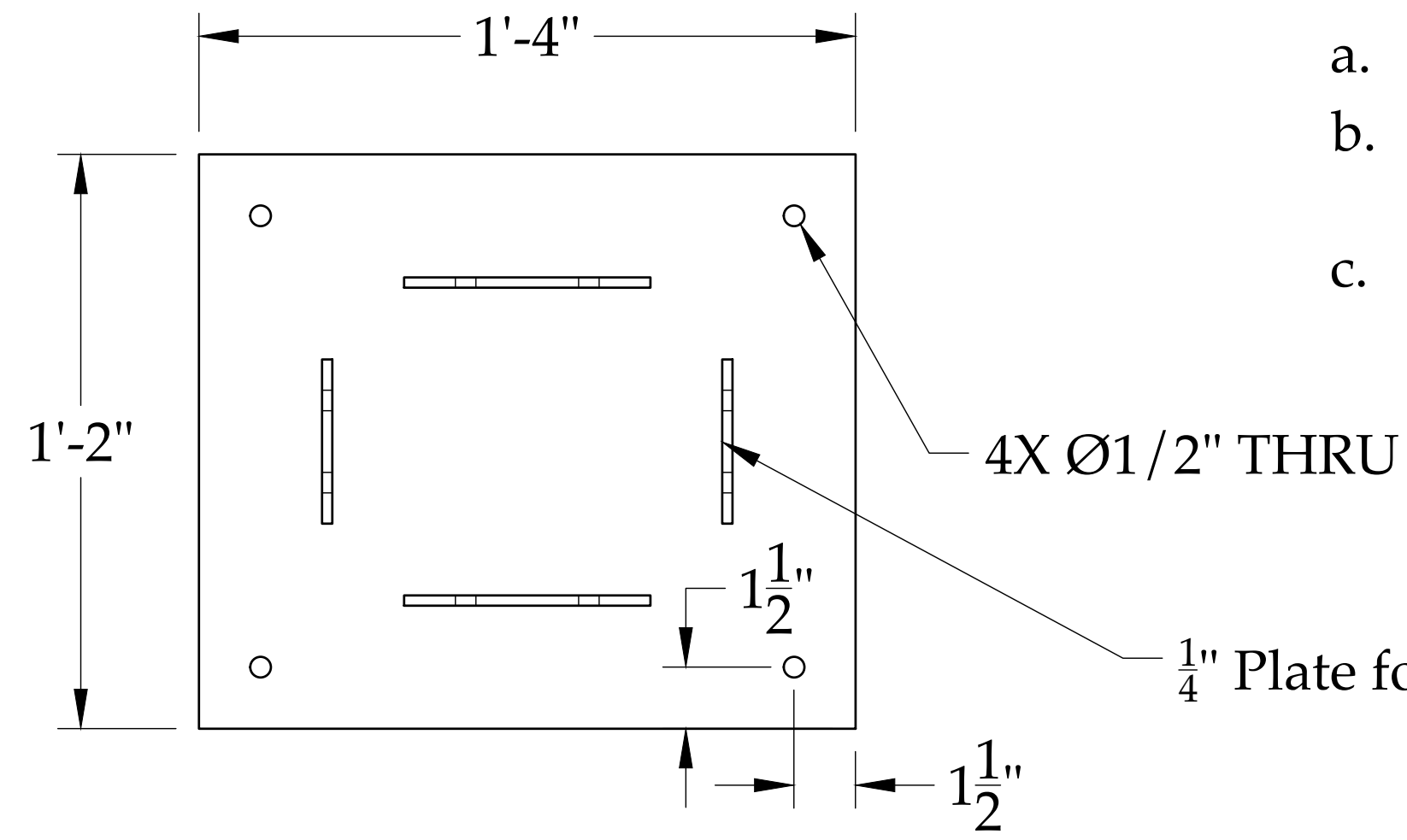
LEIPER'S CREEK  
TIMBER FRAMES

Project	Part No.	ENGINEER	FIRE TOWER ENGINEERING	SIZE	CODE	DWG NO.	REV
Cupola Bridge	MG-Bridge-170	CHECKED	MP	D	N/A	ENGINEERED ACCESS BRIDGE	F
		DRAWN	ML	3/9/24	SCALE 1:100	WEIGHT	SHEET 7/12

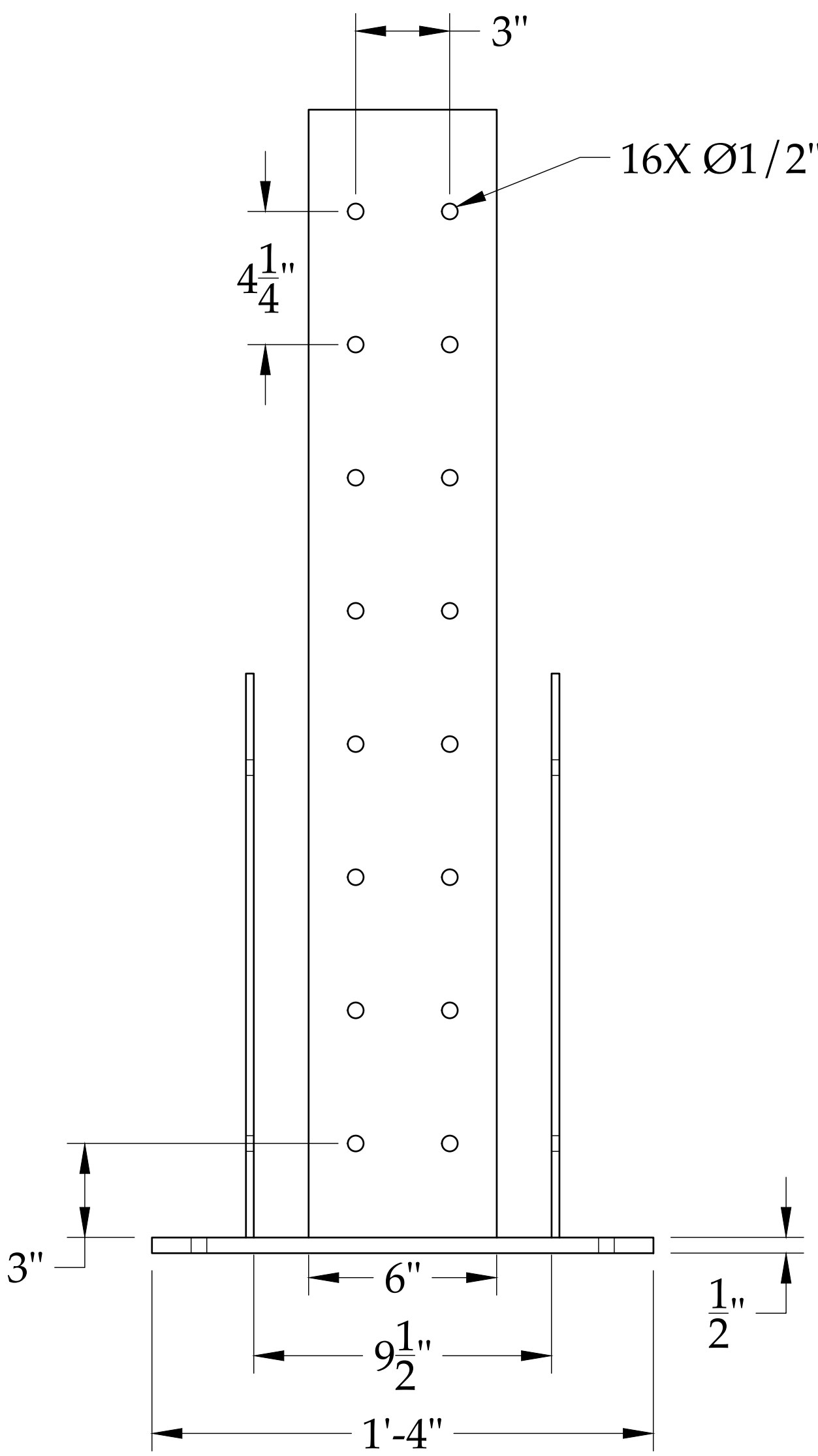
Note 1:



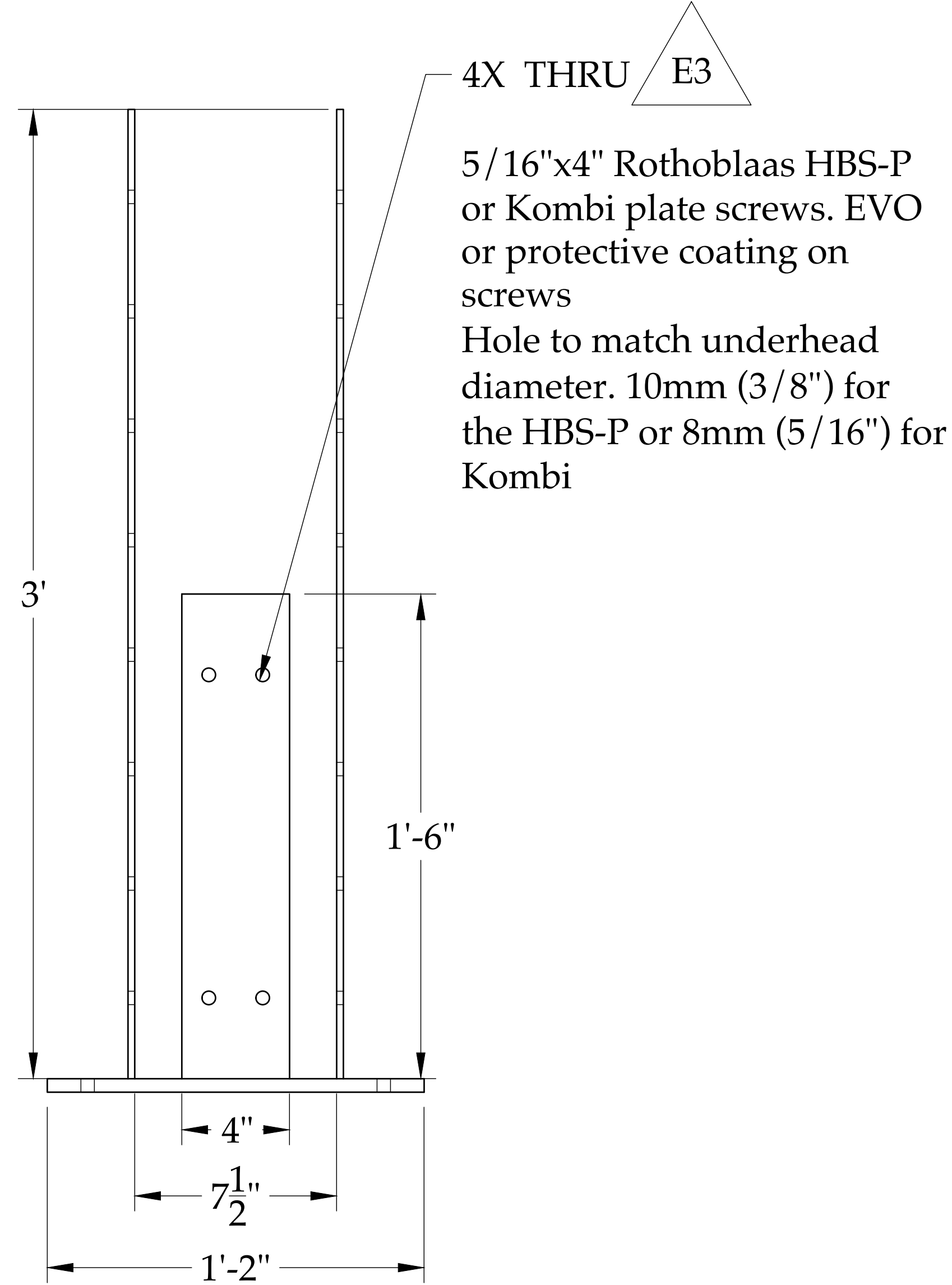
- a. Min 5/8" anchors epoxied into the concrete 8"
- b. 3/16" minimum MIG process fillet weld on all joints unless specified otherwise.
- c. All metal material to be plasma cut out of mild plate steel



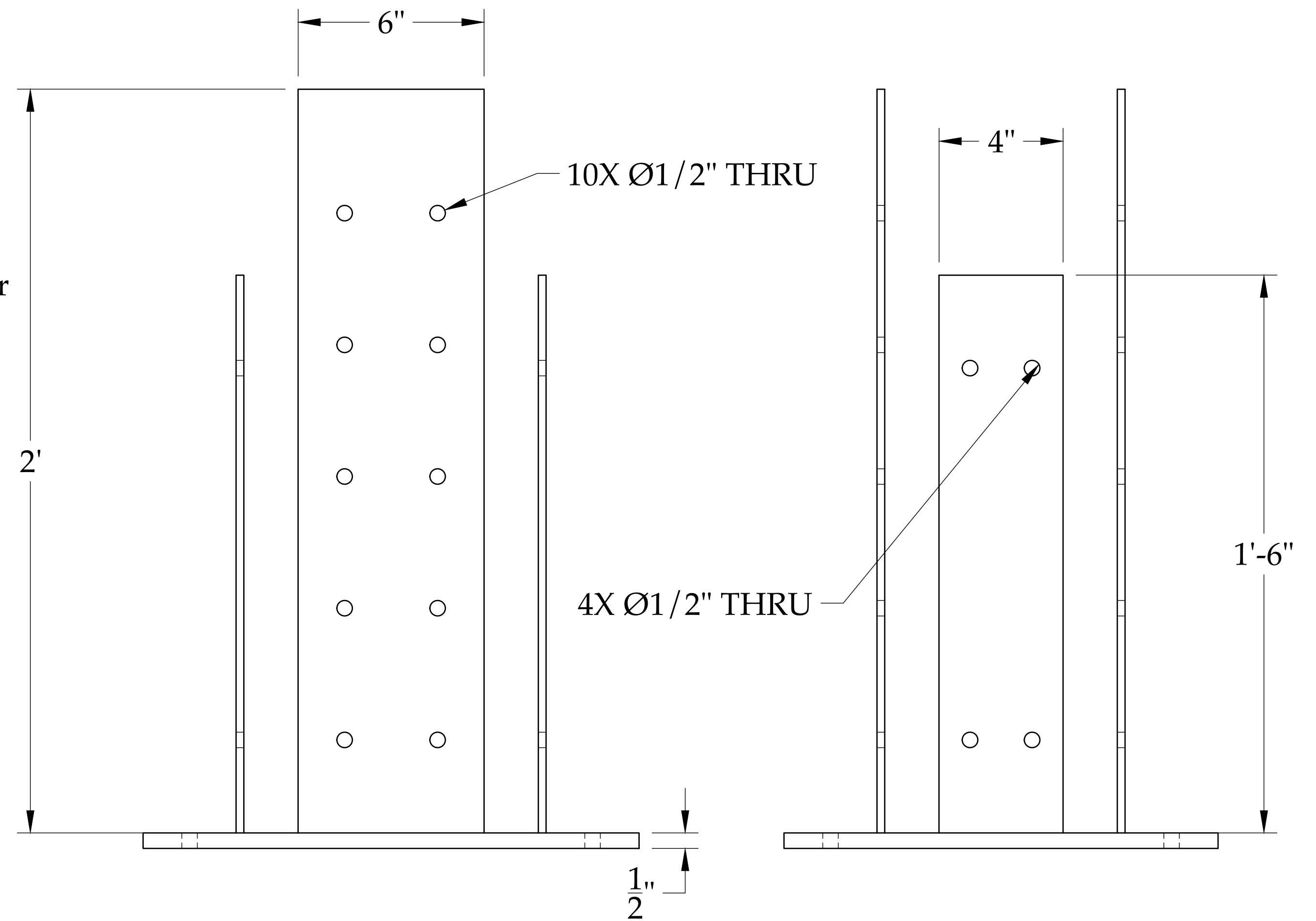
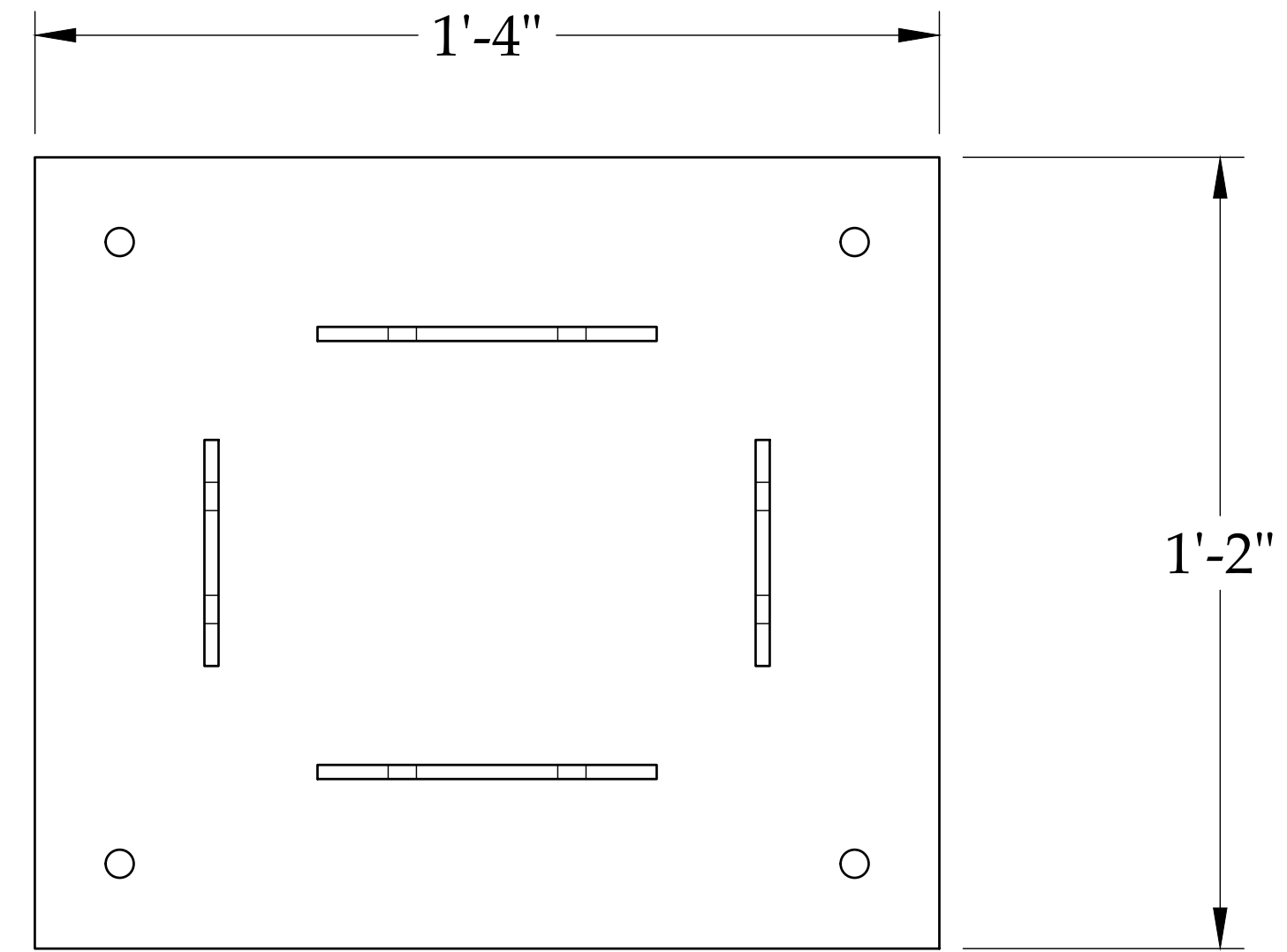
4X Ø1/2" THRU  
1/4" Plate for side wall - TYP E3



E2 36" Moment Base x1



4X THRU E3  
5/16"x4" Rothoblaas HBS-P or Kombi plate screws. EVO or protective coating on screws  
Hole to match underhead diameter. 10mm (3/8") for the HBS-P or 8mm (5/16") for Kombi



E2 24" Moment Base x2

STRUCTURAL STEEL:

FABRICATION AND ERECTION OF ALL STRUCTURAL STEEL SHALL CONFIRM WITH THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION AND ANSI/AISC 360.

MEMBERS  
STEEL PLATES AND ANGLES SHALL BE ASTM GRADE A36 OR BETTER FINISHED PER CLIENT SPECIFICATIONS.

ALL CONNECTIONS NOT SPECIFICALLY DETAILED ON THESE PLANS SHALL BE DETAILED BY THE FABRICATOR.

NO CUTS, HOLES, OR COPES SHALL BE MADE IN THE FIELD. ONLY THOSE SHOWN ON THE FABRICATOR SHOP DRAWINGS, AND MADE IN THE SHOP, SHALL BE PERMITTED.

WELDING  
WELDING SHALL CONFORM TO THE AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE AWS D1.1. ELECTRODES FOR SHOP AND FIELD WELDS SHALL BE CLASS E70XX.

THE MINIMUM FILLET WELD ON ALL CONNECTING MEMBERS MUST COMPLY WITH AISC TABLE J2.4 BASED ON THE THINNEST CONNECTING MEMBER:

t ≤ 1/4"	1/8"
1/4" < t ≤ 3/8"	3/16"
3/8" < t ≤ 1/2"	1/4"
t ≥ 1/2"	5/16"

ANCHOR BOLTS  
POST INSTALLED ANCHORS SHALL BE MANUFACTURED BY SIMPSON, INC. INTERNATIONAL CODE COUNCIL (ICC). BLOW AND CLEAR OUT ALL LOOSE PARTICLES FROM DRILLED HOLE PRIOR TO INSERTING ROD AND EPOXY. USE SIMPSON SET-3G ADHESIVE. CONSULT ENGINEER FOR USE OF ALTERNATE GRADE OR MANUFACTURER EPOXY.

Project	Part No.	ENGINEER	FIRE TOWER ENGINEERING	SIZE	CODE	DWG NO.	REV
Cupola Bridge	Engineer Corrections	CHECKED	MP	D	N/A	ENGINEERED ACCESS BRIDGE	F
		DRAWN	ML	3/9/24	SCALE 1:50	WEIGHT	SHEET 8/12



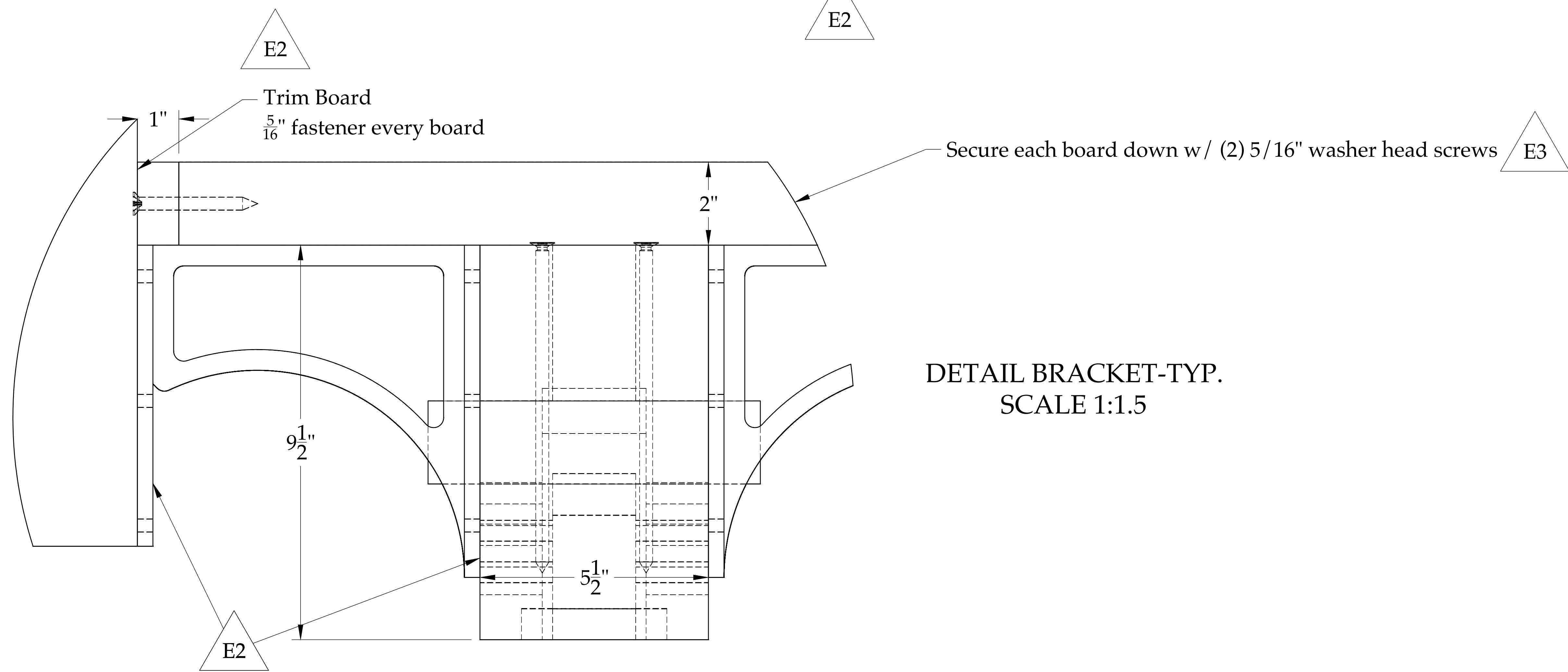
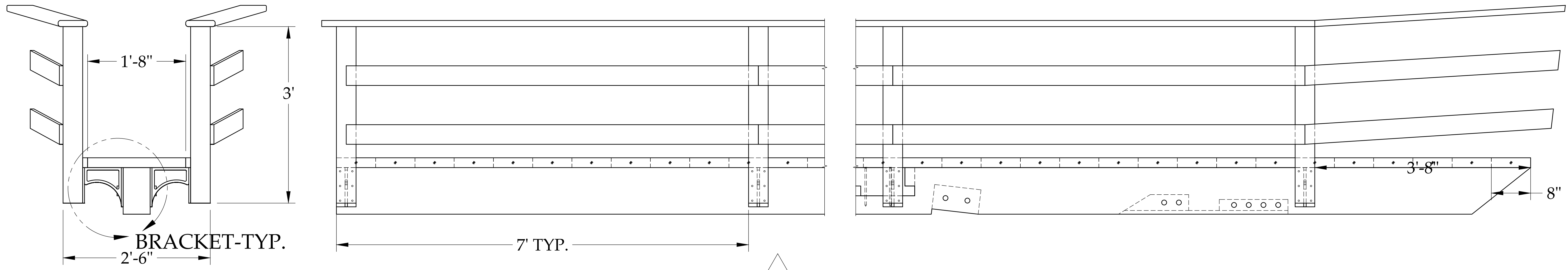


# Walkway Overview

LEIPER'S CREEK  
TIMBER FRAMES

<b>Project</b> Cupola Bridge		<b>Part No.</b> MG-Bridge-167		ENGINEER FIRE TOWER ENGINEERING	SIZE D	CODE N/A	DWG NO. ENGINEERED ACCESS BRIDGE	REV F
CHECKED MP				3/9/24	SCALE 1:100	WEIGHT	SHEET 9/12	
DRAWN ML								

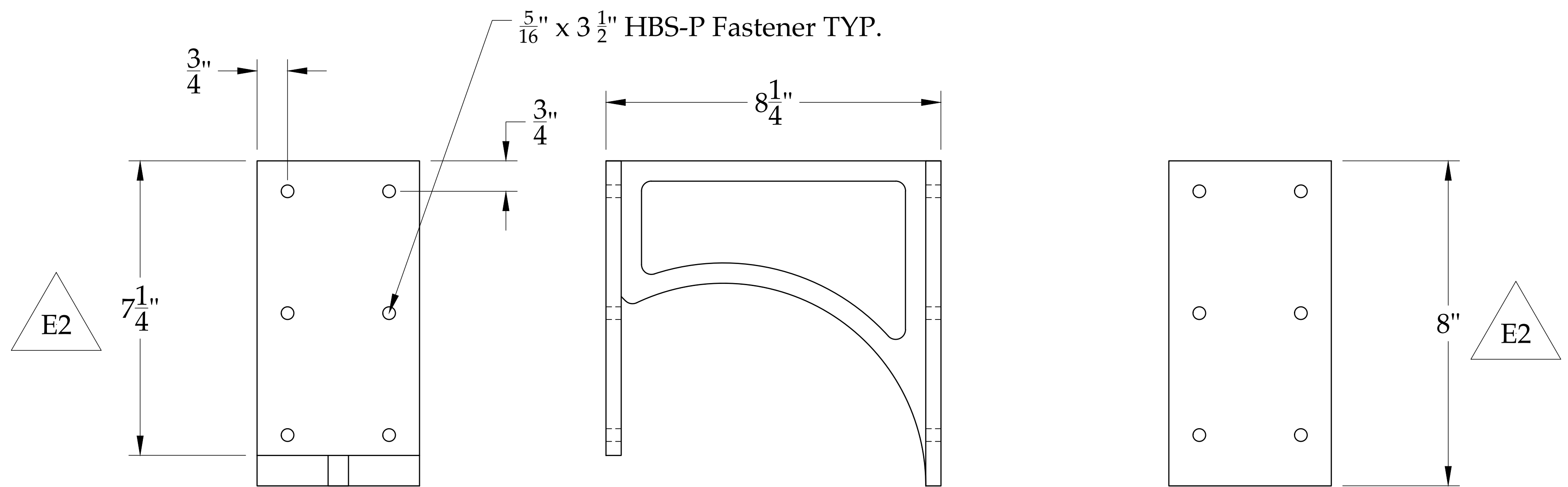
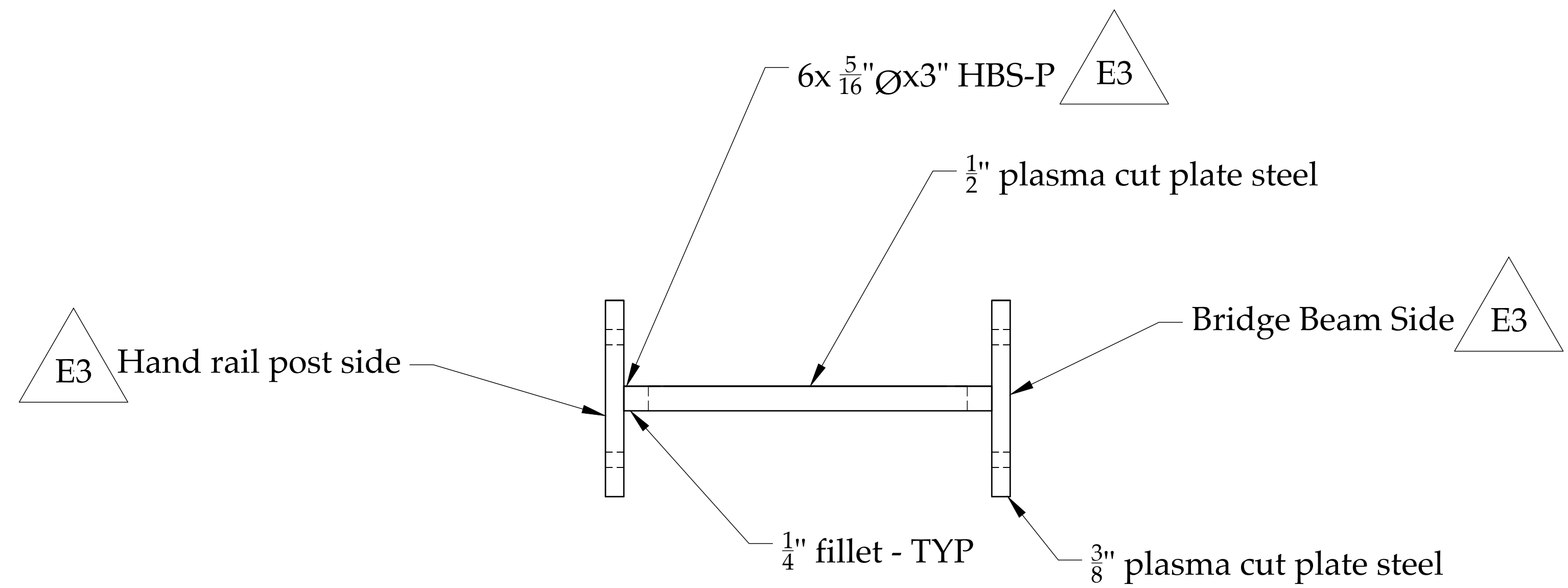
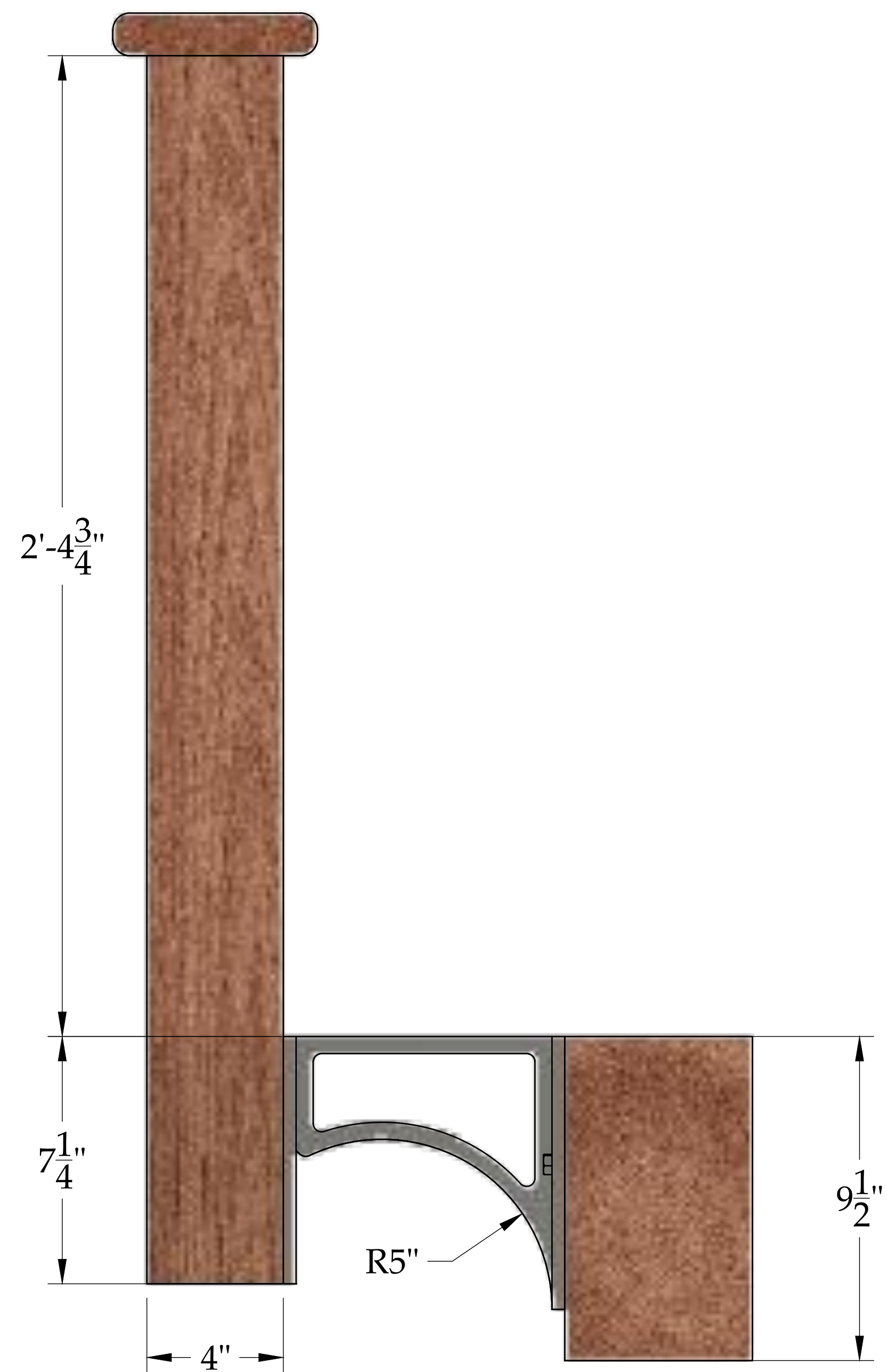




DETAIL BRACKET-TYP.  
SCALE 1:1.5

LEIPER'S CREEK  
TIMBER FRAMES

Project	Part No.	ENGINEER	FIRE TOWER ENGINEERING	SIZE	CODE	DWG NO.	REV
Cupola Bridge	MG-Bridge-167	CHECKED	MP	D	N/A	ENGINEERED ACCESS BRIDGE	F
		DRAWN	ML	3/9/24	SCALE 1:100	WEIGHT	SHEET 10/12



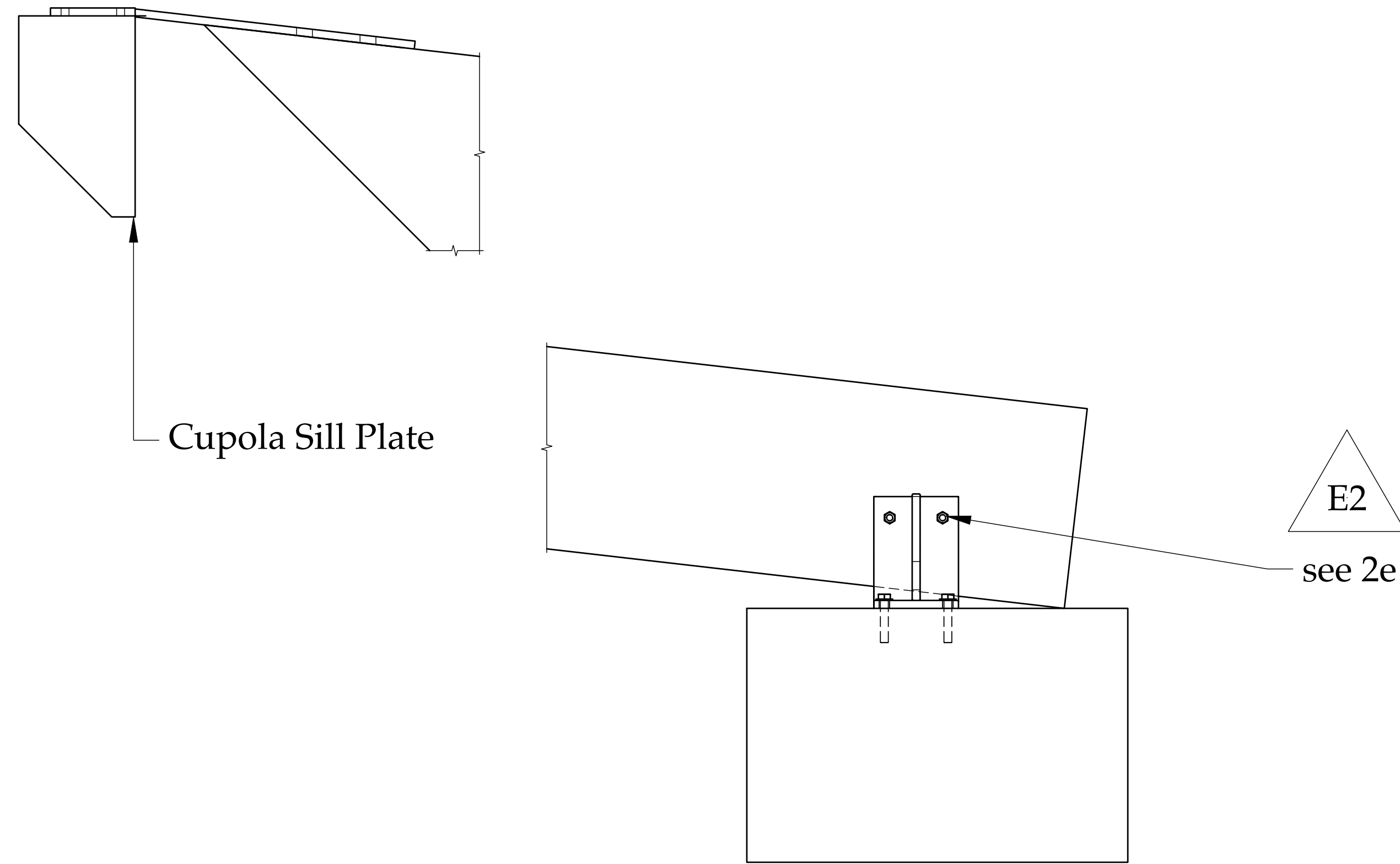
# Handrail Post Support Bracket Detail

LEIPER'S CREEK  
TIMBER FRAMES

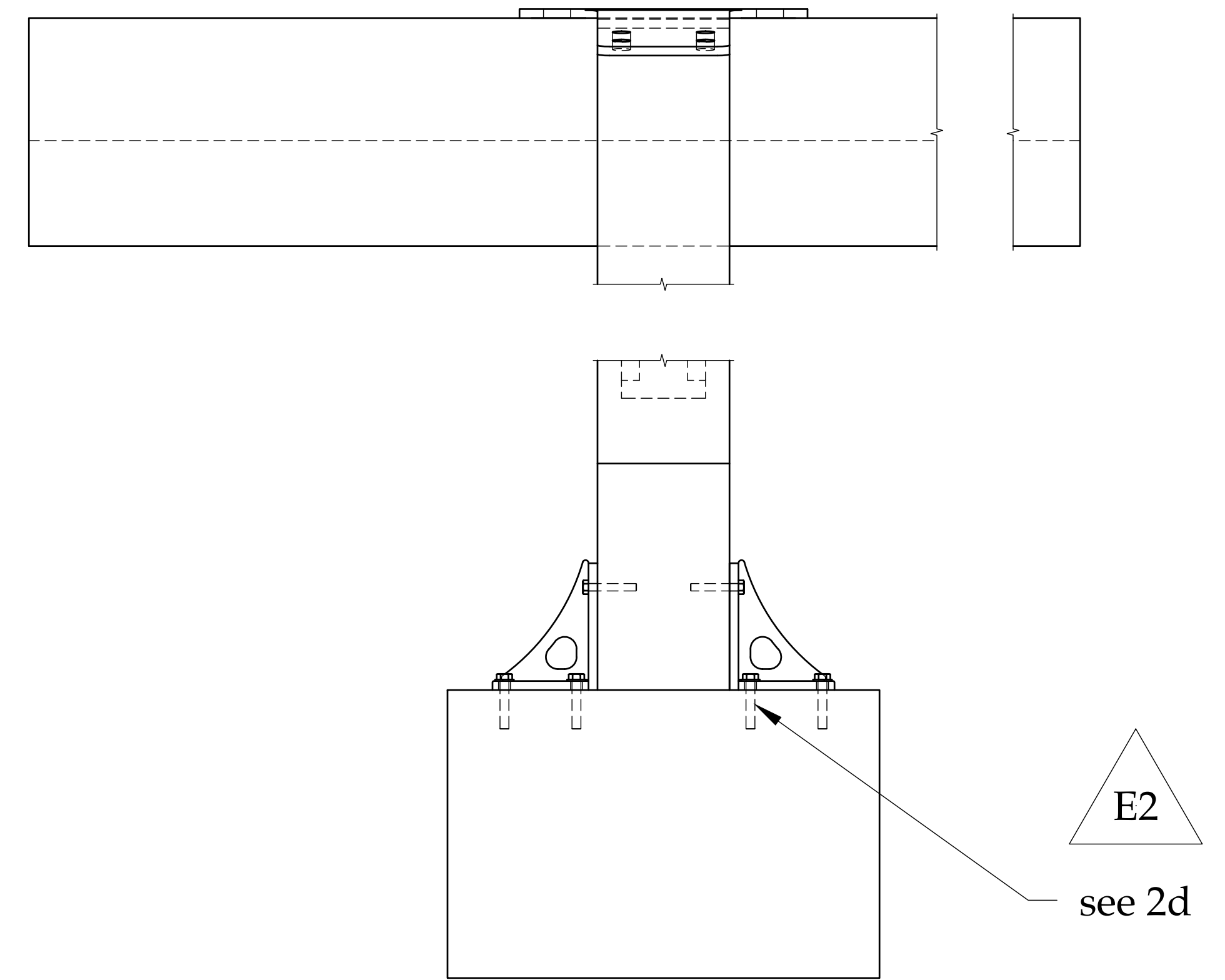
Project Cupola Bridge	Part No. Engineer Corrections	ENGINEER FIRE TOWER ENGINEERING	SIZE D	CODE N/A	DWG NO. ENGINEERED ACCESS BRIDGE	REV F
		CHECKED MP	SCALE 1:50	WEIGHT	SHEET 11/12	
		DRAWN ML	3/9/24			



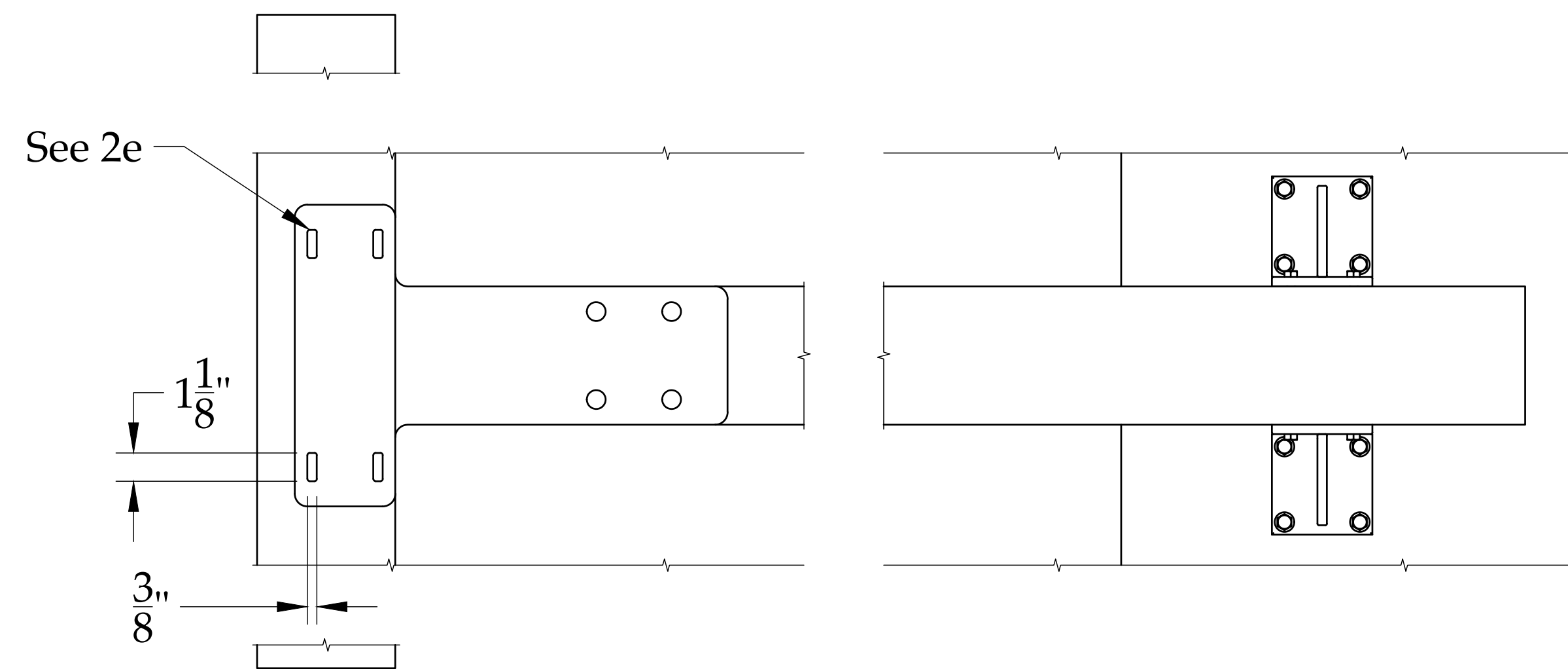
# SIDE



# FRONT



# TOP



## Note 2

- 3/8" mild steel for all brackets and custom hardware unless specified otherwise.
- 3/16" minimum MIG process fillet weld on all joints unless specified otherwise.
- 3000 psi concrete. #4 rebar cage with top and bottom lattice 7" O.C.
- 3/8" Titen HD screws-galvanized for beam end bracket-concrete interface. 3" apart minimum.
- 5/16" x 3" Rothoblaas HBS-P beam-bracket interface.