

# GENERAL STRUCTURAL NOTES

ALL MATERIALS, WORKMANSHIP AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL DRAWINGS, SPECIFICATIONS AND NOTES LISTED BELOW. MINIMUM PROVISIONS OF THE INTERNATIONAL BUILDING CODE, 2006 EDITION, AND LOCAL AMENDMENTS SHALL APPLY WHERE DETAILS ARE NOT SHOWN OR DESCRIBED. OTHER APPLICABLE CODES AND STANDARDS ARE GIVEN BELOW.

## DESIGN LOADS

UNIFORM DEAD LOADS AND LIVE LOADS	BUILDING MATERIALS
1. ROOF LOADS	20 PSF (REDUCTION NOT PERMITTED)
• DEAD LOAD	
• ROOF LIVE LOAD	

## ROOF SNOW LOADS

2. GROUND SNOW LOAD, $P_g$	15 PSF
3. SNOW EXPOSURE FACTOR, $C_e$	0.9
4. SNOW LOAD IMPORTANCE FACTOR, $I_s$	1.0
5. THERMAL FACTOR, $C_t$	1.0
6. FLAT ROOF SNOW LOAD, $P_f$	11.6 PSF

## WIND DESIGN DATA

BASIC WIND SPEED	90 MPH
1. WIND IMPORTANCE FACTOR/BUILDING CATEGORY	1.0/II
2. WIND EXPOSURE CATEGORY	C
3. INTERNAL PRESSURE COEFFICIENT	±0.18 (ENCLOSED)
4. COMPONENT & CLADDING PRESSURE	PER IBC 2006

## EARTHQUAKE DESIGN DATA

1. SEISMIC IMPORTANCE FACTOR, $I_e$	1.0
2. MAPPED SPECTRAL RESPONSE ACCELERATIONS	$S_s = 0.196, S_1 = 0.064$
3. SITE CLASS	D
4. SPECTRAL RESPONSE COEFFICIENTS	$S_{DS} = 0.230, S_{D1} = 0.096$
5. SEISMIC DESIGN CATEGORY	B
6. BASIC SEISMIC-FORCE-RESISTING SYSTEM	SYSTEMS NOT SPECIFICALLY DESIGNED FOR SEISMIC RESISTANCE
7. DESIGN BASE SHEAR	1 KIPS
8. SEISMIC RESPONSE COEFFICIENT, $C_s$	0.050
9. RESPONSE MODIFICATION FACTOR, $R$	3.0
10. ANALYSIS PROCEDURE USED	EQUIVALENT LATERAL FORCE

## FOUNDATIONS

### FOUNDATION DESIGN

- ASSUMED ALLOWABLE SOIL BEARING PRESSURE:
  - COLUMN SPREAD FOOTINGS = 1,500 PSF
  - CONTINUOUS WALL FOOTINGS = 1,500 PSF
  - ENGINEERED FILL = 1,500 PSF
- FOOTINGS SHALL BEAR A MINIMUM OF 2'-0" BELOW FINISHED EXTERIOR GRADE.
- PROTECT BOTTOMS OF EXCAVATION AGAINST FROST AND KEEP FREE OF WATER, DEBRIS AND LOOSE MATERIAL. SOIL BECOMING UNSUITABLE FOR BEARING MUST BE REMOVED.
- EXCESS EXCAVATION BELOW FOOTINGS SHALL BE FILLED WITH LEAN CONCRETE.
- PRIOR TO THE PLACEMENT OF FILL, THE EXISTING SUBGRADE SHALL BE:
  - STRIPPED OF ALL VEGETATION, TOPSOIL, AND ANY OTHER DELETERIOUS MATERIALS.
  - PROOF-ROLL INCLUDING REMOVING AND REPLACING ANY SOFT MATERIAL WHICH EXHIBITS PERMANENT SUBGRADE DEFORMATION EXCEEDING 0.5 INCHES WHEN TRAVERSED BY A LOADED TRUCK WITH A REAR AXLE LOAD OF APPROXIMATELY 16,000 lbs.
  - SCARIFIED TO A DEPTH OF (8) INCHES, AND MOISTURE CONDITIONED (-2% TO +4% OF OPTIMUM) AND COMPACTED TO 95 PERCENT OR MORE OF STANDARD PROCTOR MAXIMUM DRY DENSITY.
- ALL FILL AND NATURAL GRADES (FOR THE CASE WHERE NO FILL IS USED) IN THE BUILDING AREA AND UNDER PARKING, DRIVES, AND WALKS SHALL BE:
  - COMPACTED TO AT LEAST 95 PERCENT OF STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D698) AT A MOISTURE CONTENT AT OR SLIGHTLY IN EXCESS OF THE OPTIMUM (i.e. -2% TO +4% OF OPTIMUM).
  - PLACED IN LIFTS NOT TO EXCEED (8) INCHES IN COMPACTED THICKNESS.
  - TESTED FOR FIELD DENSITY EVERY 3,000 S.F. PER LIFT OF FILL UNDER STRUCTURE.
  - COMPACTION SHALL BE EXTENDED TO 3 FT. BEYOND THE BUILDING FOOTPRINT.
- SELECT FILL REQUIREMENTS:
  - AMOUNT FINER THAN 2-INCH SIEVE = 100%
  - AMOUNT FINER THAN NO. 200 SIEVE = 12% MINIMUM, AND IF  $P_L < 7$ , 60% MAXIMUM.
  - LIQUID LIMIT = 40 MAXIMUM.
  - PLASTICITY INDEX (P.I.) = 5 TO 15
  - MAINTAIN THE MINIMUM RECOMMENDED MOISTURE CONTENT IN THE BUILDING PAD UNTIL THE FLOOR SLAB IS CONSTRUCTED.
  - PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING TO PREVENT PONDING ALONG THE PERIMETER.
- TESTED FOR FIELD DENSITY EVERY 3,000 S.F. PER LIFT OF FILL UNDER STRUCTURE.
- FOUR (4) INCHES OR MORE OF GRANULAR BASE, MEETING THE FOLLOWING REQUIREMENTS, SHALL BE PLACED OVER THE SUBGRADE:
  - PASSING THE 1.5 INCHES SIEVE = 100%
  - PASSING THE #200 SIEVE = 15% OR LESS
  - PLASTICITY INDEX (P.I.) = 6 OR LESS
- THE CONTRACTOR SHALL CONTRACT WITH A QUALIFIED SOILS ENGINEER TO PERFORM TESTING, INSPECT THE FOOTING EXCAVATIONS, PROOF-ROLLING, AND COMPACTION TO VERIFY THE BEARING MATERIAL AND IDENTIFY SOFT AND YIELDING AREAS ON THE SITE.

### CAST-IN-PLACE CONCRETE

#### ALLOWABLE STRESSES, USED IN DESIGN:

- ALL CONCRETE SHALL BE MADE WITH STONE AGGREGATE AND SHALL DEVELOP AT MINIMUM THE FOLLOWING MINIMUM COMPRESSIVE STRENGTH ( $F_c'$ ) IN 28 DAYS:
  - FOOTINGS & GRADE BEAMS:  $F_c' = 3,000$  PSI
  - SLAB ON GRADE:  $F_c' = 3,500$  PSI
- ADDITION OF ANY ADMIXTURES SHALL BE APPROVED BY THE PROJECT STRUCTURAL ENGINEER.
- REINFORCING BARS SHALL CONFORM TO THE ASTM A615 GRADE 60, EXCEPT TIES, STIRRUPS, AND EMBEDDED PLATE ANCHORS, WHICH SHALL CONFORM TO ASTM A615 GRADE 40. DO NOT WELD OR REBEND ANY BARS WITH A YIELD POINT GREATER THAN 40,000 PSI. REINFORCING BAR WELDING SHALL CONFORM TO THE LATEST EDITION OF AWS D1.4.

### REINFORCEMENT PROTECTION:

- CONCRETE POURED AGAINST EARTH = 3"
- CONCRETE POURED IN FORMS BUT EXPOSED TO WEATHER OR EARTH:
  - IF BARS ARE LARGER THAN #5 = 2"
  - IF BARS ARE #5 OR SMALLER = 1 1/2"
  - INTERIOR WALLS AND SLABS = 3/4"
- ALL BAR LENGTHS TO SCALE UNLESS NOTED OTHERWISE. SPLICES ARE 48 BAR DIAMETERS WITH A MINIMUM LAP OF 1'-6". PROVIDE CORNER BARS AT WALL FOOTING AND GRADE BEAM CORNERS, AND INTERSECTIONS. SIZE AND SPACING SHALL MATCH HORIZONTAL BARS.
- PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCING AT POSITIONS SHOWN ON THE PLANS IN ACCORDANCE WITH THE LATEST ACI DETAILING MANUAL.
- WIRE MESH REINFORCEMENT SHALL CONFORM TO ASTM A185. LAP ONE FULL MESH AT SIDE AND END LAPS AND WIRE TOGETHER. PLACE MESH AT MID-DEPTH OF SLAB.
- PROVIDE SLEEVES FOR ALL PIPES PLACED THROUGH CONCRETE WALLS OR SLABS. NO OPENINGS OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS WILL BE PERMITTED, UNLESS ARCHITECT/ENGINEER'S APPROVAL IS SECURED PRIOR TO PLACEMENT OF REINFORCING STEEL.
- VERTICAL CONSTRUCTION JOINTS IN FOOTINGS AND GRADE BEAMS SHALL BE LOCATED WHERE APPROVED BY ARCHITECT/ENGINEER.

### STRUCTURAL STEEL

- STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING:
 

1. WIDE FLANGE BEAMS	ASTM A992 GR 50, $F_y=50$ KSI
2. HSS SQUARE COLUMNS	ASTM A500 GR B, $F_y=46$ KSI
3. PIPE COLUMNS	ASTM A53 GR B, $F_y=35$ KSI
4. OTHER SHAPES, PLATES AND BARS	ASTM A36, $F_y=36$ KSI
5. STRUCTURAL BOLTS	ASTM A325
6. HEADED CONCRETE ANCHORS (H.C.A.)	ASTM A108 TYPE B, $F_u=65$ KSI
- COORDINATE FABRICATION WITH SUPPLIER. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION.
- CONNECTIONS SHALL BE WITH ASTM A325 HIGH STRENGTH BOLTS AND SHALL BE DESIGNED FOR 125% OF THE REACTIONS NOTED ON THE DRAWINGS. CONNECTIONS NOT SPECIFIED ON THE DRAWINGS SHALL BE DETAILED TO HAVE A CAPACITY NOT LESS THAN 1/2 TOTAL UNIFORM LOAD CAPACITY TABULATED IN AISC MANUAL FOR GIVEN SHAPE, SPAN, AND STEEL SPEC. OF BEAM.
- ALL STRUCTURAL WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1 AND PERFORMED BY QUALIFIED WELDERS. ELECTRODE SHALL BE E70XX OR OTHER DEVELOPING  $F_T=72$ KSI. ALL FIELD WELDED CONNECTIONS ARE TO BE SHOWN ON THE SHOP DRAWINGS.
- FURNISH AND HAVE IN PLACE ADEQUATE LATERAL BRACING AND VERTICAL SUPPORT FOR THE SAFE ERECTION AND TRUE ALIGNMENT OF THE STRUCTURAL STEEL UNTIL SUCH TIME AS THE FINAL CONNECTIONS ARE MADE AND THE ROOF OR FLOOR DECKING IS IN PLACE.
- CLEAN AND APPLY ONE COAT OF PRIMER PAINT TO ALL OTHER STEEL IN CONFORMANCE WITH THE SPECIFICATIONS AND THE STEEL STRUCTURES PAINTING COUNCIL.
- PROVIDE 3"x3"x3/16" STEEL ANGLE AROUND OPENING THROUGH ROOF DECK (TYP).
- PROVIDE 4"x4"x1/4" STEEL ANGLE AT ROOF CURB ON ALL ROOF TOP UNITS.

### LIGHT GAUGE METAL FRAMING

- CONTRACTOR SHALL SUBMIT STRUCTURAL CALCULATIONS AND SHOP DRAWINGS FOR METAL STUDS PREPARED BY THE MANUFACTURER FOR THE ARCHITECTS APPROVAL.
- ALL GALVANIZED STUDS AND JOISTS SHALL MEET THE FOLLOWING REQUIREMENTS:
  - 12, 14, AND 18 GAUGE STUDS: ASTM A446, GRADE D,  $F_y, \text{min}=50,000$  PSI
  - 18, AND 20 GAUGE STUDS, TRACK, BRIDGING & ACCESSORIES: ASTM A446X GRADE A,  $F_y, \text{min}=33,000$  PSI
- FASTENING OF COMPONENTS SHALL BE WITH SELF-DRIVING-SCREWS, WELDING, OR AS SHOWN ON DRAWINGS AND SHALL BE SIZED AS RECOMMENDED BY MANUFACTURER.
- WALL STUD BRIDGING AND JOIST BRIDGING SHALL BE PROVIDED AND SPACED AT 4'-0" OC OR AS PER MANUFACTURER'S RECOMMENDATIONS. USE FLAT V STRAP, COLD ROLLED CHANNEL OR SOLID BRIDGING AS RECOMMENDED BY MANUFACTURER.
- JOISTS AND BEAMS SHALL BE LOCATED DIRECTLY OVER BEARING STUDS UNLESS A STRUCTURAL STEEL LOAD DISTRIBUTION MEMBER IS PROVIDED AT THE TOP OF TRACK.
- PROVIDE DOUBLE STUDS AT EACH SIDE OF OPENINGS AT EXTERIOR WALLS. PROVIDE DOUBLE 14 GAUGE STUDS AT EACH SIDE OF OPENINGS 5'-0" WIDE OR GREATER UNLESS NOTED OTHERWISE.
- COORDINATE AND VERIFY ALL OPENINGS THROUGH FLOOR, ROOF AND WALLS WITH MECHANICAL AND ELECTRICAL CONTRACTOR.
- ALL DIMENSIONS SHOWN ON STRUCTURAL DRAWINGS SHALL BE CHECKED AGAINST ARCHITECTURAL DRAWINGS.

### ANCHOR BOLTS

CAST-IN-PLACE ANCHORS SHALL BE ASTM F1554 GR. 36 HEADED ANCHOR RODS OR THREADED ROD WITH AN EMBEDDED NUT.

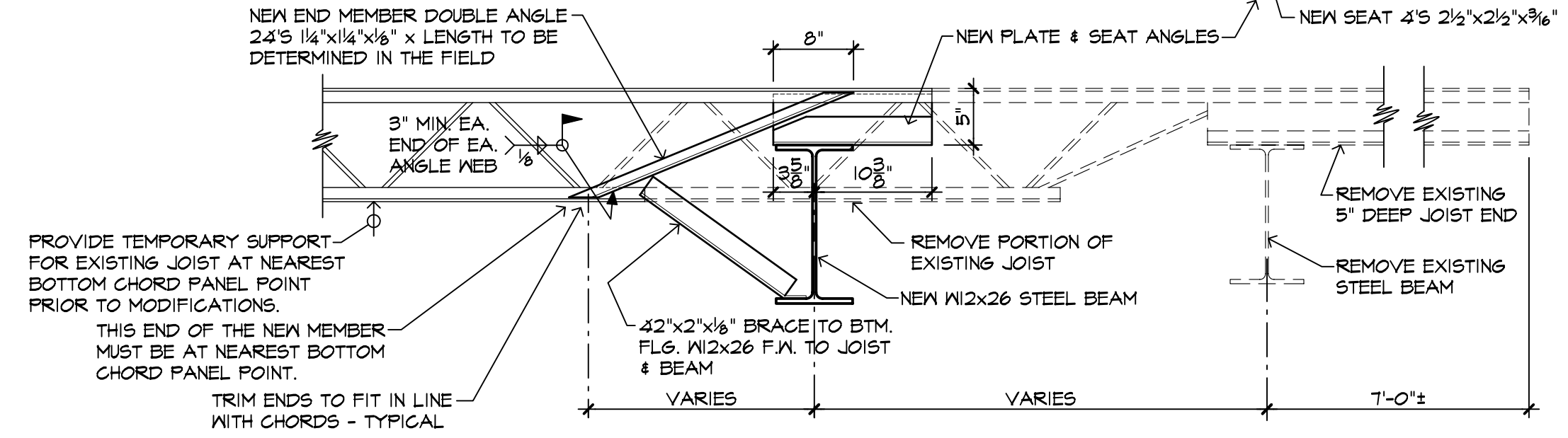
### REBAR TENSION LAP SPLICES IN CONCRETE

BAR SIZE	#3	#4	#5	#6	#7	#8
$F_c'=3,000$ PSI	22"	29"	36"	43"	63"	72"
$F_c'=3,500$ PSI	20"	27"	33"	40"	58"	66"

NOTE: LAP SPLICE LENGTHS ARE REINFORCING STEEL  $F_y=60,000$  PSI.

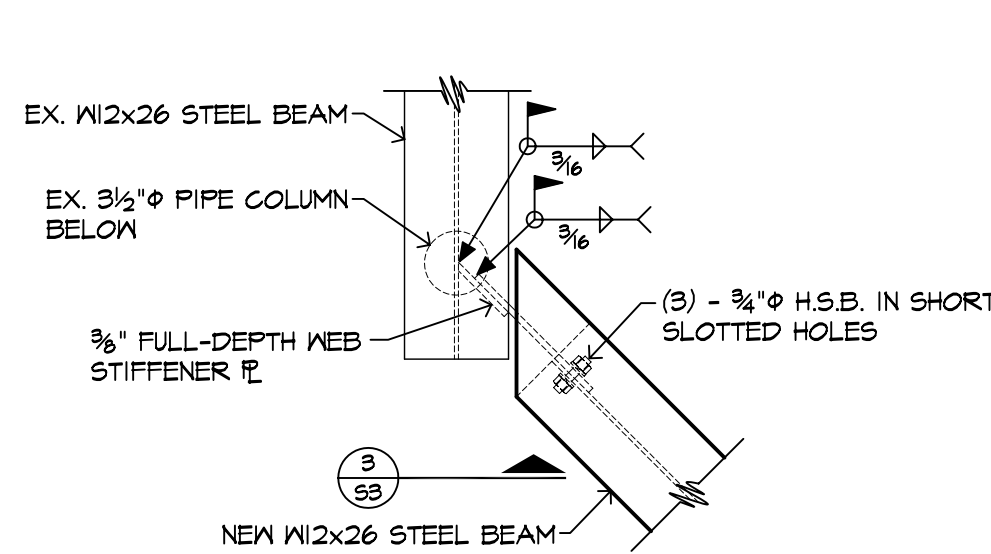
### FIELD JOIST MODIFICATION GENERAL NOTES:

- POSITION NEW WEB MEMBERS IN SAME PLANE AS EXISTING WEB MEMBERS AND WELD AS SHOWN.
- ALL MODIFICATION MATERIAL SHALL BE 36 KSI MINIMUM. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH AWS D11 USING A70XX ELECTRODES.
- ALL MODIFICATIONS SHALL BE PERFORMED BY AN AWS CERTIFIED WELDER.
- WHEN REMOVING ANY MEMBERS, BE CAREFUL NOT TO DAMAGE ANY REMAINING CHORDS OR WEBS.
- FIELD VERIFY THE LENGTHS OF ALL NEW MEMBERS BEFORE CUTTING.



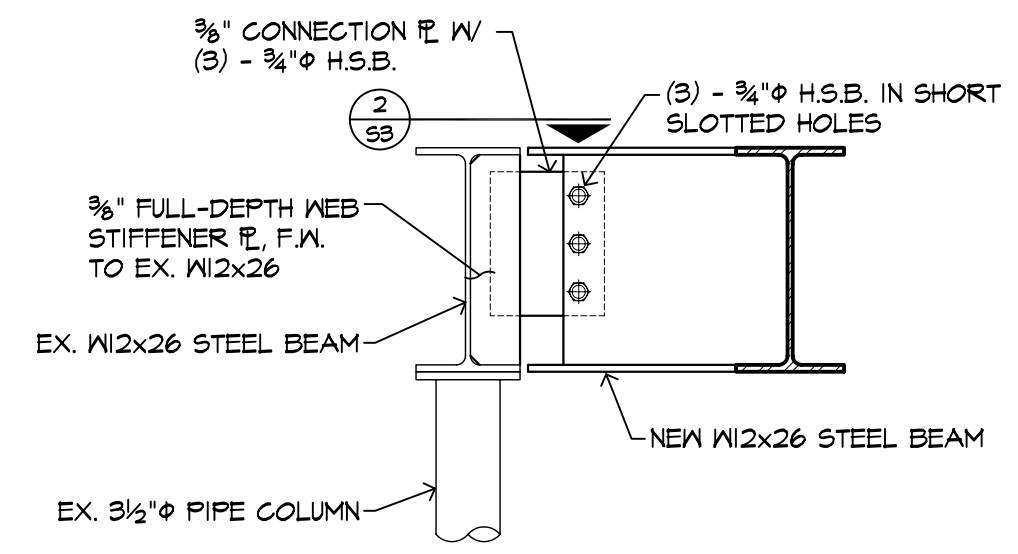
### EXISTING JOIST MODIFICATION DETAIL

1" = 1'-0"



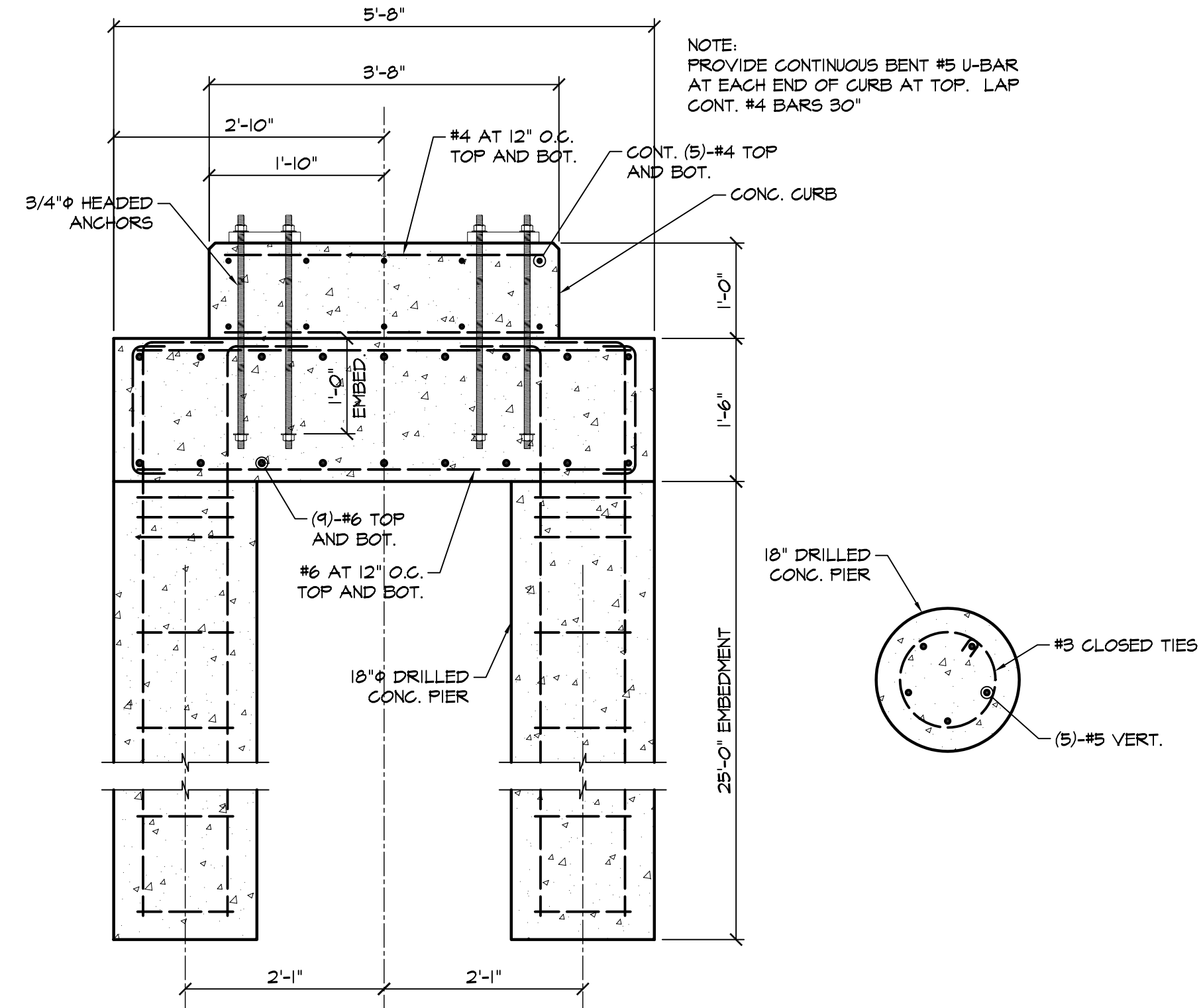
### CONNECTION DETAIL

1" = 1'-0"



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1" = 1'-0"



### PORTAL FOOTING/PIER SECTION

3/4" = 1'-0"

### FIELD JOIST MODIFICATION NOTES:

- CUT EXISTING TOP & BOTTOM CHORD (FIELD VERIFY LENGTH)
- CUT & REMOVE EXISTING WEB MEMBERS AS REQUIRED. DO NOT DAMAGE REMAINING CHORD MATERIAL.
- ADD NEW PLATE & SEAT ANGLES AS SHOWN.
- ADD NEW END DIAGONAL WEB MEMBER AS SHOWN.

