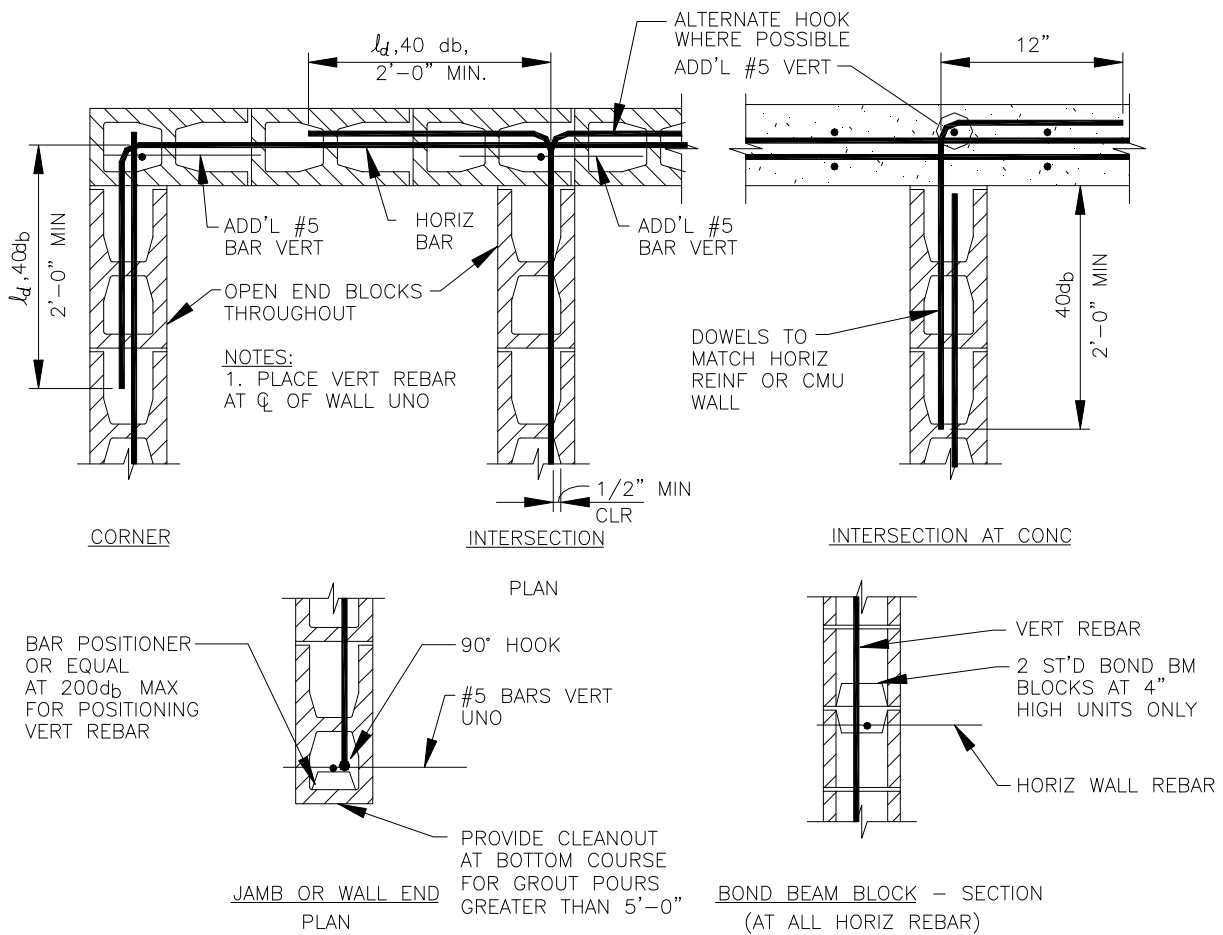


# APPENDIX D - Typical Details

## APPENDIX D – TYPICAL DETAILS

The following sample details were developed to provide insight into how construction details can be developed. The details are intended to be used as an educational aid and are not to be used for construction without the approval and signature of a licensed professional engineer.

The details shown in this Chapter are available from the Concrete Masonry Association of California and Nevada. Contact the Concrete Masonry Association of California and Nevada for information.

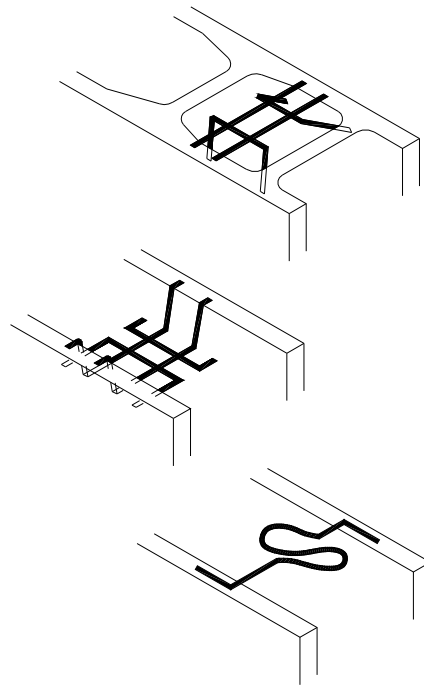


THIS DETAIL AS SHOWN IS INTENDED TO ILLUSTRATE A GENERAL CONCEPT OR METHOD OF CONSTRUCTION. DETAILS THAT SHOW DIFFERENT OR MODIFIED CONCEPTS OR METHODS CAN BE OF EQUAL VALIDITY AND SHOULD NOT BE EXCLUDED FROM CONSIDERATION. THIS DETAIL SHALL NOT BE USED FOR CONSTRUCTION WITHOUT THE APPROVAL AND SIGNATURE OF A LICENSED DESIGN PROFESSIONAL. THE PERSON USING THIS DETAIL SHALL BE RESPONSIBLE FOR ITS COMPLETE DESIGN AND PROPER APPLICATION.

FIGURE D-1 Concrete Block Walls

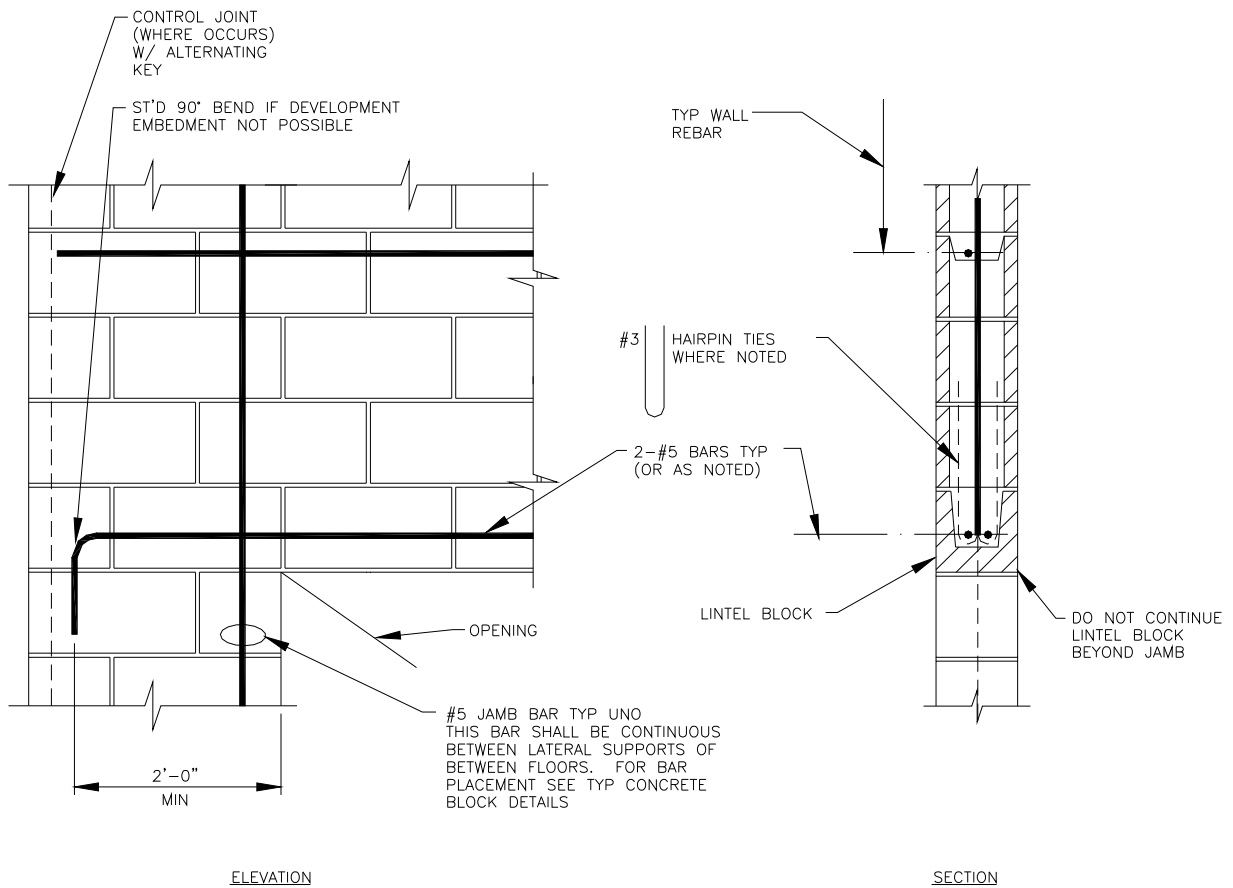
VERTICAL BAR POSITIONER

STANDARD 9 GAGE WITH MILL GALVANIZED FINISH—LOCATE AT TOP OF 1ST COURSE. 1 COURSE BELOW TOP OF WALL WITH A MAXIMUM 200 VERTICAL BAR DIAMETERS. ALLOWS POSITION BAR AT CENTER OF WALL OR EITHER SIDE OF CAVITY. STANDARD SIZES FIT 8" AND 12" BLOCK—OTHER SIZES ON REQUEST. THEY CAN BE FABRICATED TO POSITION DOUBLE VERTICAL BARS AND/OR DOUBLE HORIZONTAL BARS. REQUIRED FOR REINFORCED MASONRY BY UNIFORM BUILDING CODE AND MSJC.



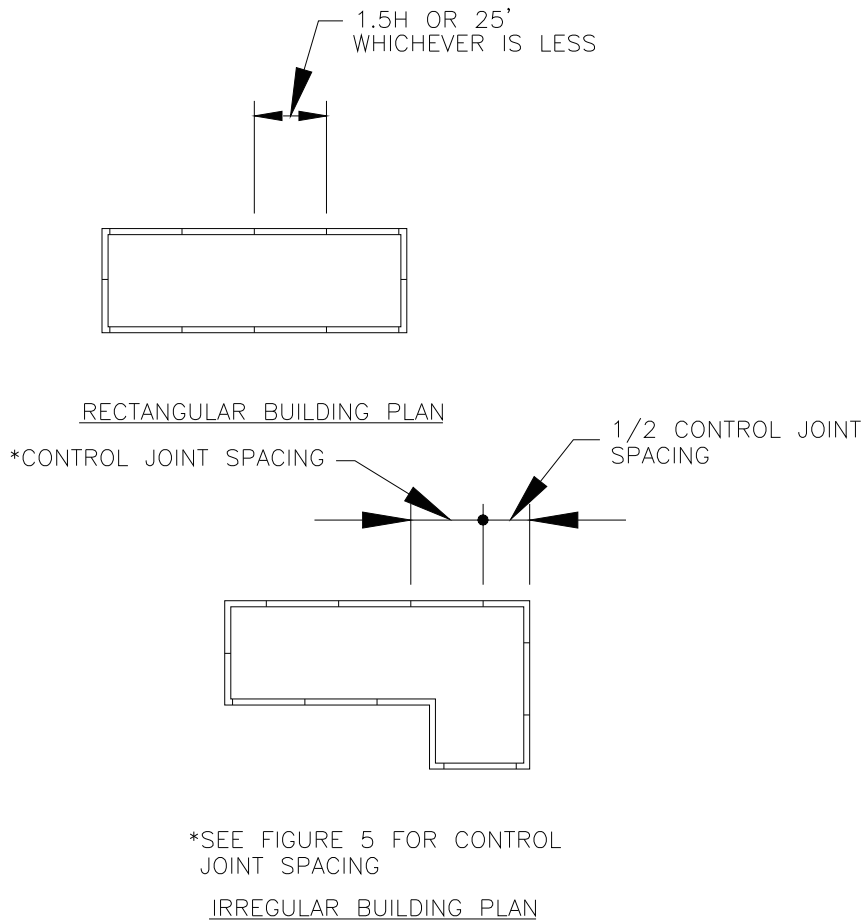
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FIGURE D-2 Sample Bar Positioners



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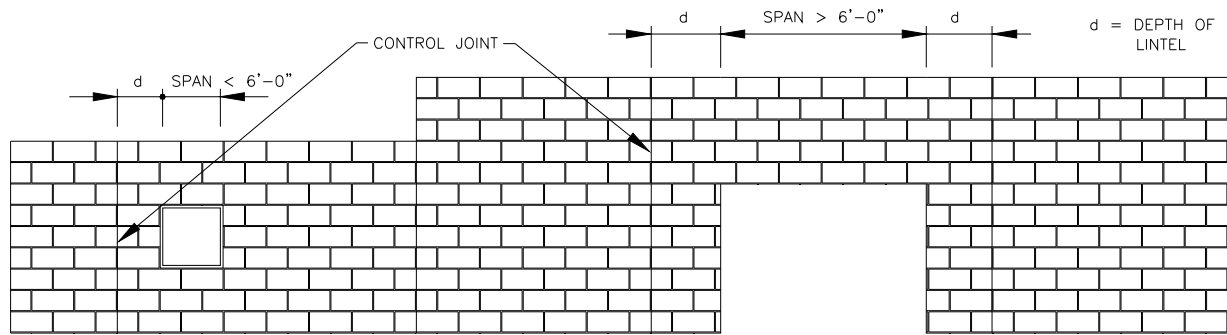
FIGURE D-3 Rebar at CMU Wall Opening



\*SEE FIGURE 5 FOR CONTROL JOINT SPACING

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**FIGURE D-4 Suggested Control Joint Locations**



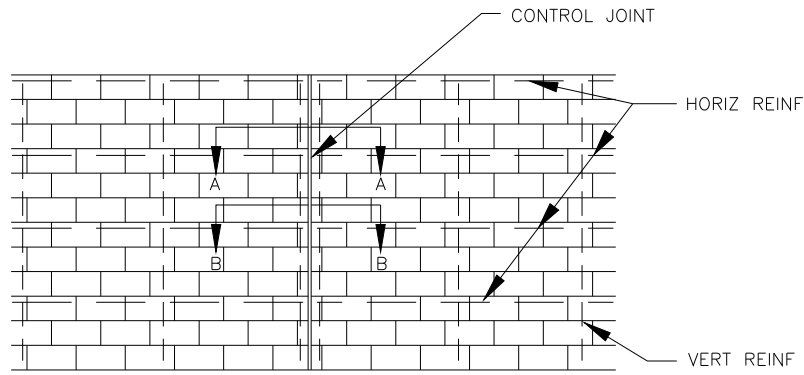
CRITERIA FOR CONTROLLING CRACKING IN REINFORCED CONCRETE MASONRY WALLS

|                               |                       | Crack Control Coefficient |                     |
|-------------------------------|-----------------------|---------------------------|---------------------|
|                               |                       | in/in                     | (mm/mm)             |
| Maximum wall panel dimensions | length, ft (m)        | 0.0010<br>25 (7.62)       | 0.0015<br>20 (6.10) |
|                               | length / height ratio | 2 1/2                     | 2                   |
| Minimum horizontal            |                       | 0.0007                    | 0.0007              |

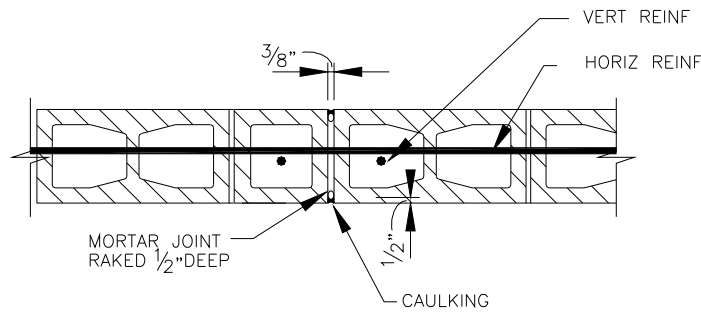
- $A_s$  = cross-sectional area of steel, in<sup>2</sup>/ft (mm<sup>2</sup>/m).
- $A_n$  = net cross-sectional area of masonry, in<sup>2</sup>/ft (mm<sup>2</sup>/m).
- Maximum wall panel dimension criteria need not apply for walls with a minimum horizontal reinforcement area,  $A_s$  of 0.002 times the net cross sectional area of the masonry,  $A_n$ .
- The minimum horizontal reinforcement ratio criteria need not apply for walls with a length not exceeding on half the maximum length values shown above.
- CCC's less than 0.0010 may be available in some areas and spacing could be adjusted accordingly for this as well.
- This criteria is based on an analytical study over a wide geographical area with wide temperature and material property variations. Control joint spacing may be adjusted up or down based on local experience.
- As shrinkage is related to moisture content, consider using the higher crack control coefficient for masonry units that are wet from lack of protection while stored on the jobsite.
- Maximum linear shrinkage = 0.00065

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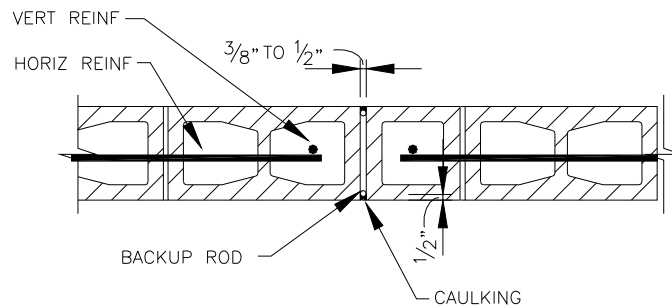
FIGURE D-5 Suggested Locations and Spacing for Control Joints in CMU Walls



ELEVATION OF MASONRY WALL WITH CONTROL JOINT



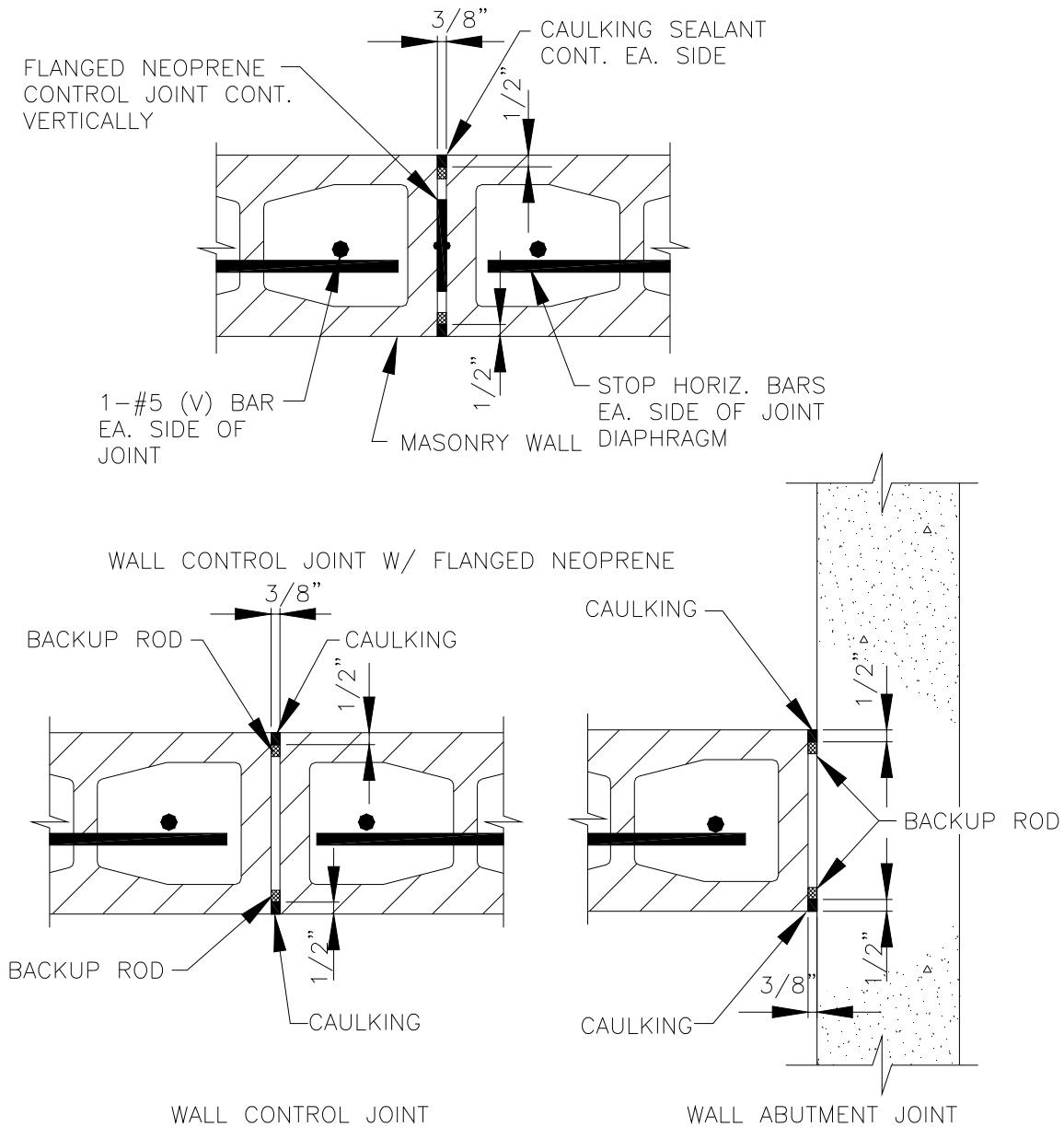
SECTION A-A  
HORIZ REINF CONTINUOUS THROUGH JOINT ONLY AT LEDGER OR LINTEL



SECTION B-B  
HORIZ REINF DOES NOT CROSS JOINT

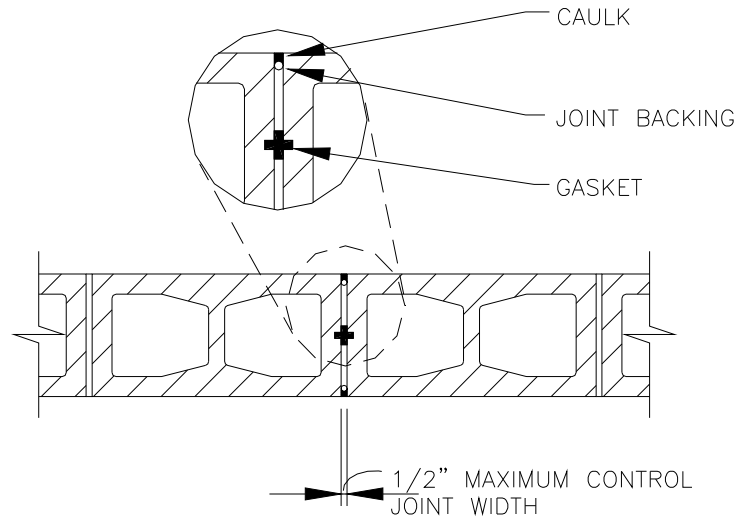
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FIGURE D-6 Control Joint Elevation and Plan

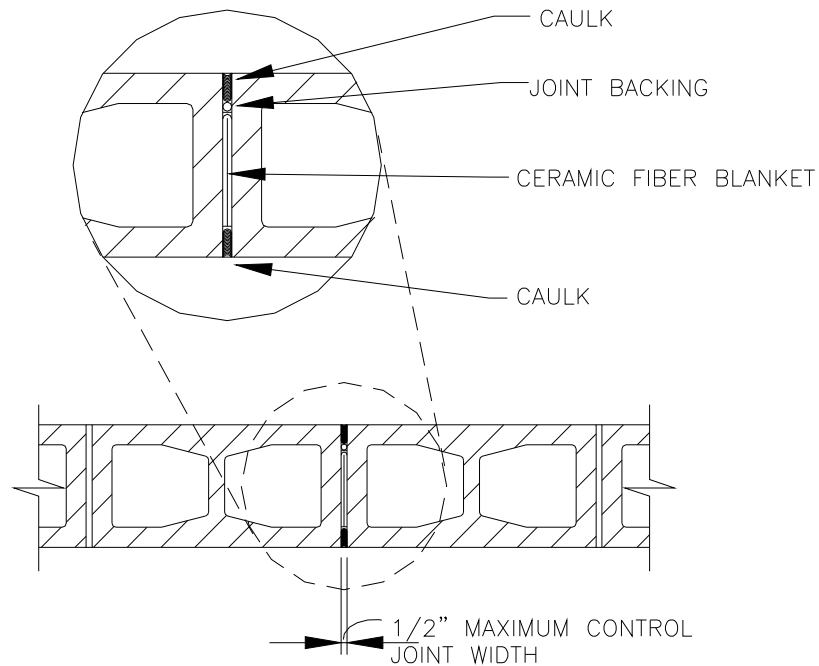


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**FIGURE D-7 Masonry Control Joints**



FOR RATINGS UP TO AND INCLUDING 2 HOURS

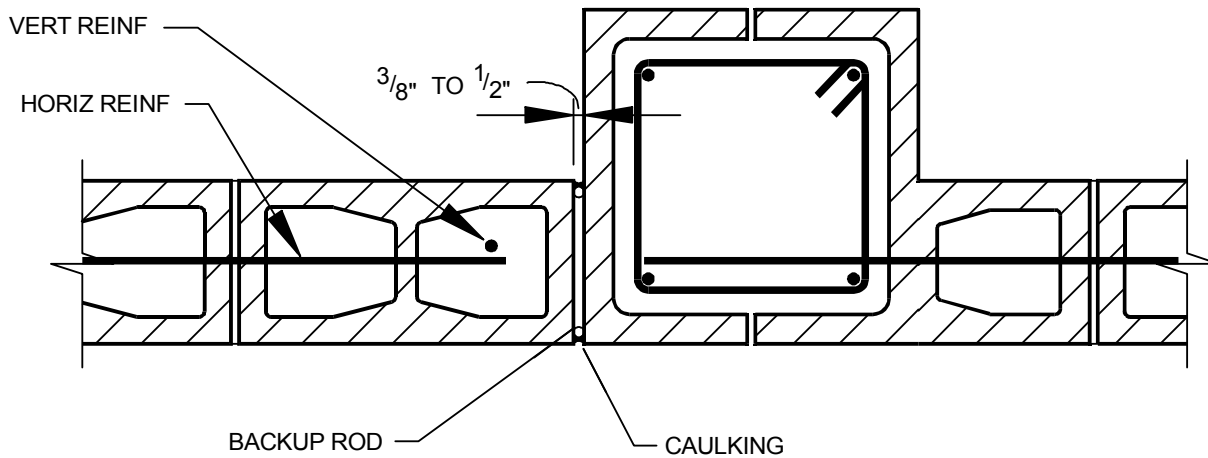


FOR RATINGS UP TO AND INCLUDING 4 HOURS

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**FIGURE D-8 Fire Rated Masonry Control Joint**

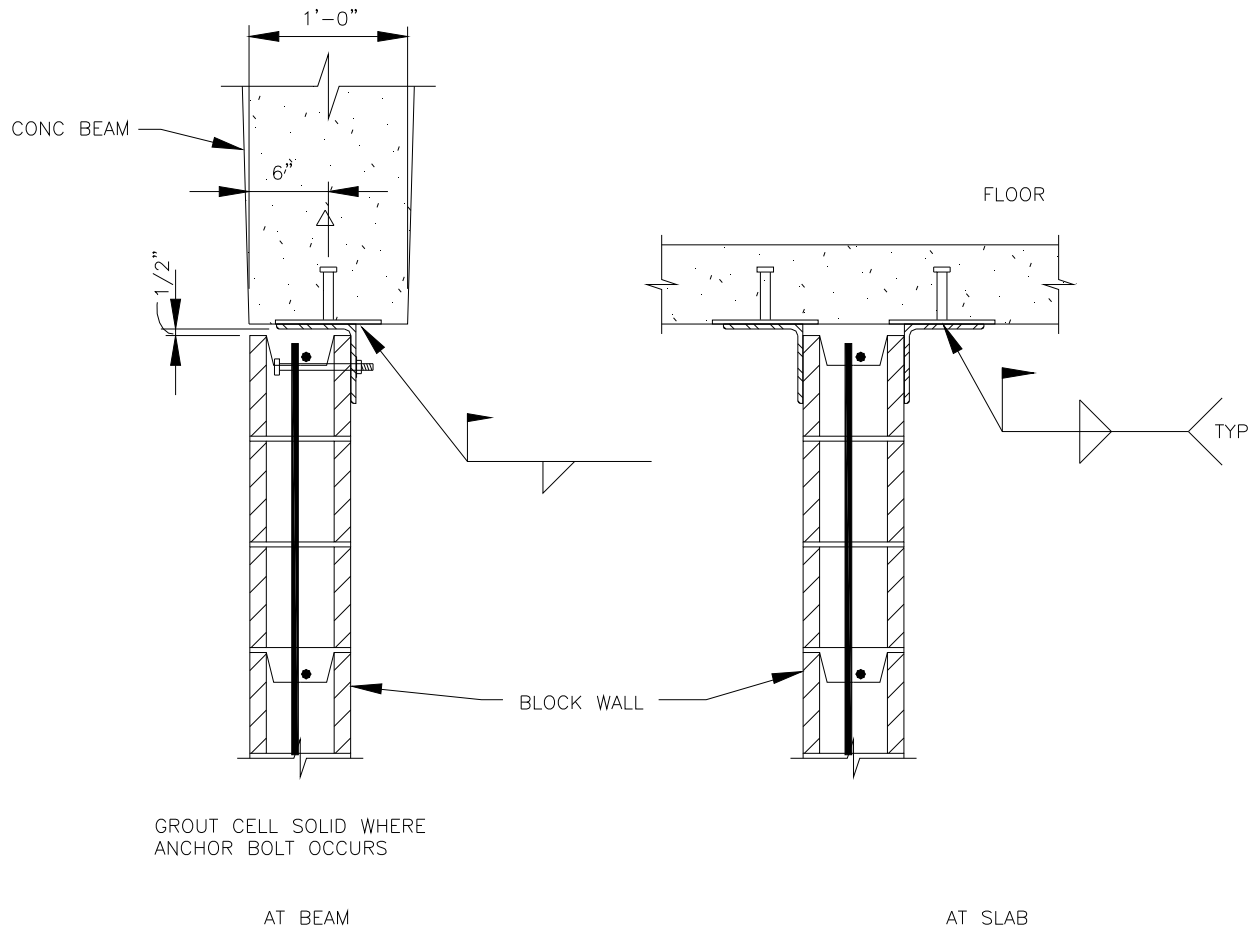




HORIZ REINF DOES NOT CROSS JOINT

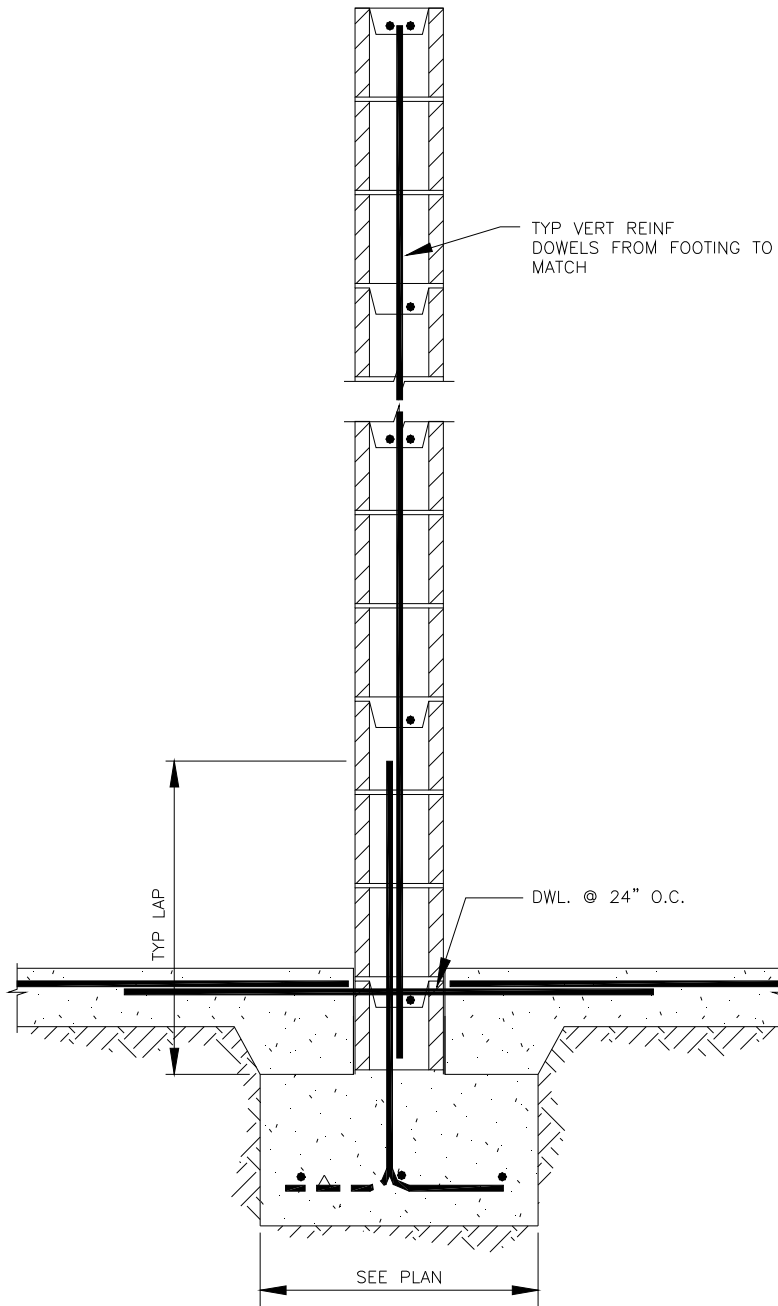
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FIGURE D-9 Control Joint at Pilaster



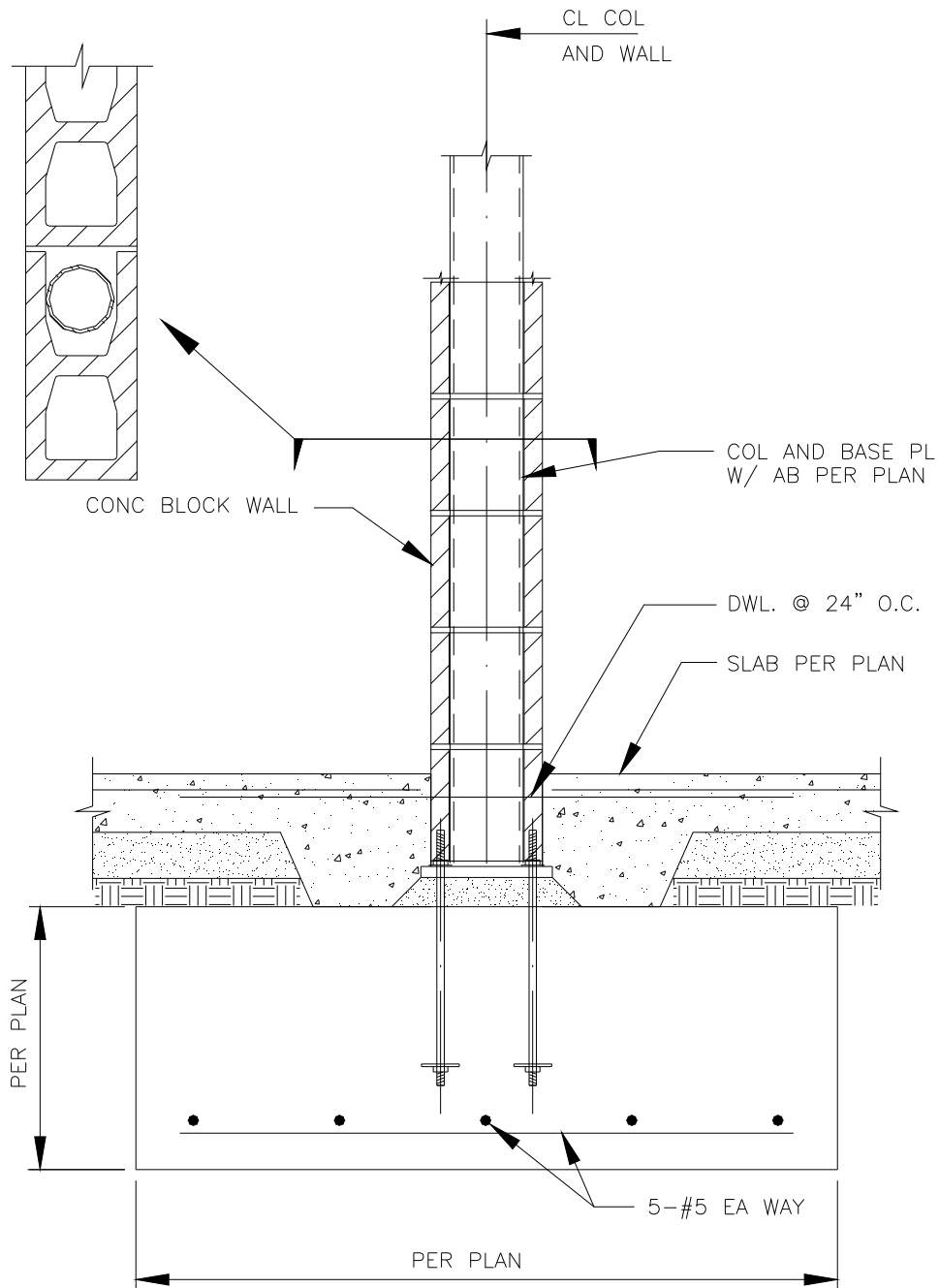
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FIGURE D-10 Masonry Restraint at Concrete



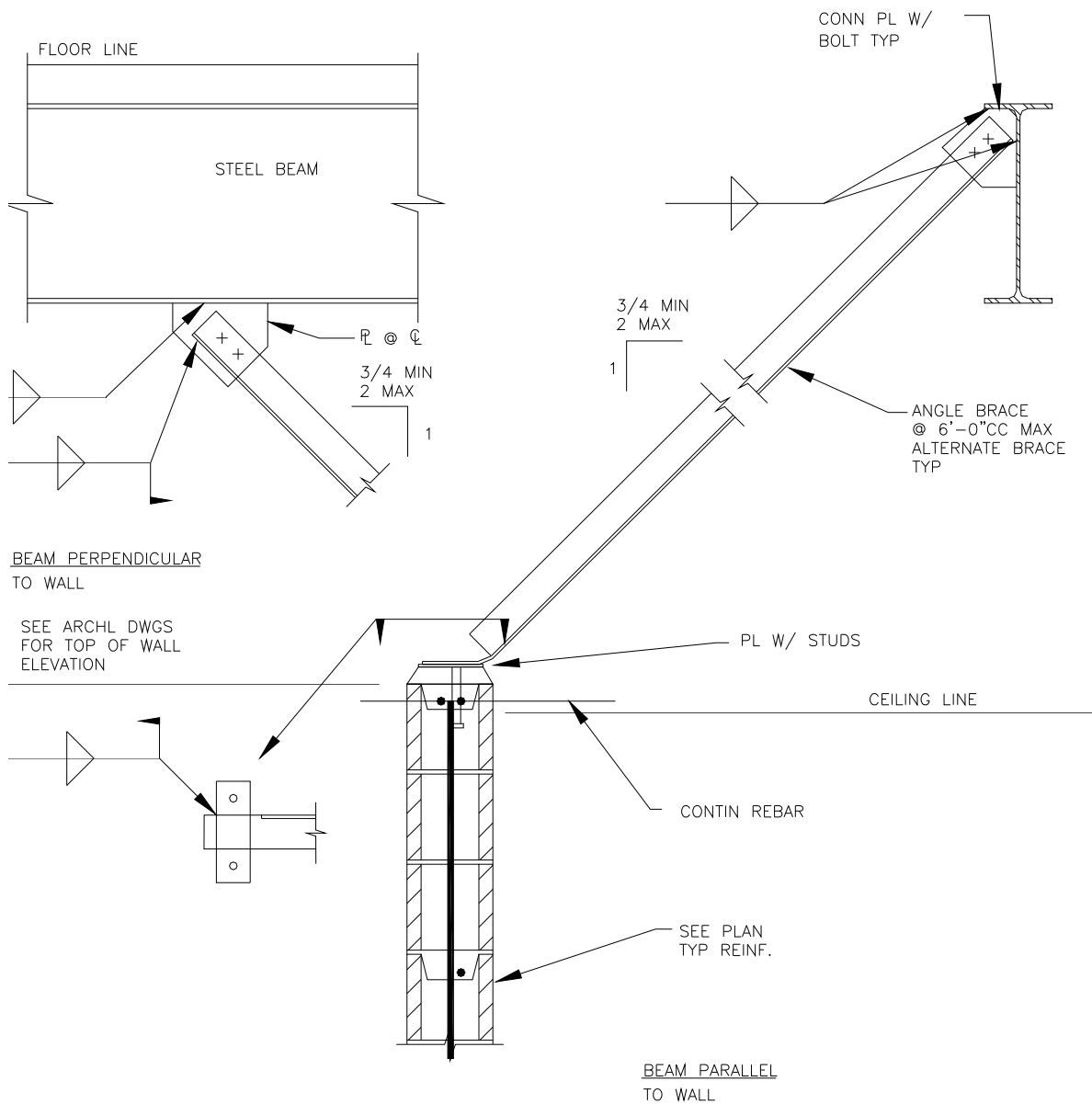
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**FIGURE D-11 Free Standing Wall**



THIS DETAIL AS SHOWN IS INTENDED TO ILLUSTRATE A GENERAL CONCEPT OR METHOD OF CONSTRUCTION. DETAILS THAT SHOW DIFFERENT OR MODIFIED CONCEPTS OR METHODS CAN BE OF EQUAL VALIDITY AND SHOULD NOT BE EXCLUDED FROM CONSIDERATION. THIS DETAIL SHALL NOT BE USED FOR CONSTRUCTION WITHOUT THE APPROVAL AND SIGNATURE OF A LICENSED DESIGN PROFESSIONAL. THE PERSON USING THIS DETAIL SHALL BE RESPONSIBLE FOR ITS COMPLETE DESIGN AND PROPER APPLICATION.

**FIGURE D-12 Pipe Column in Masonry Wall**



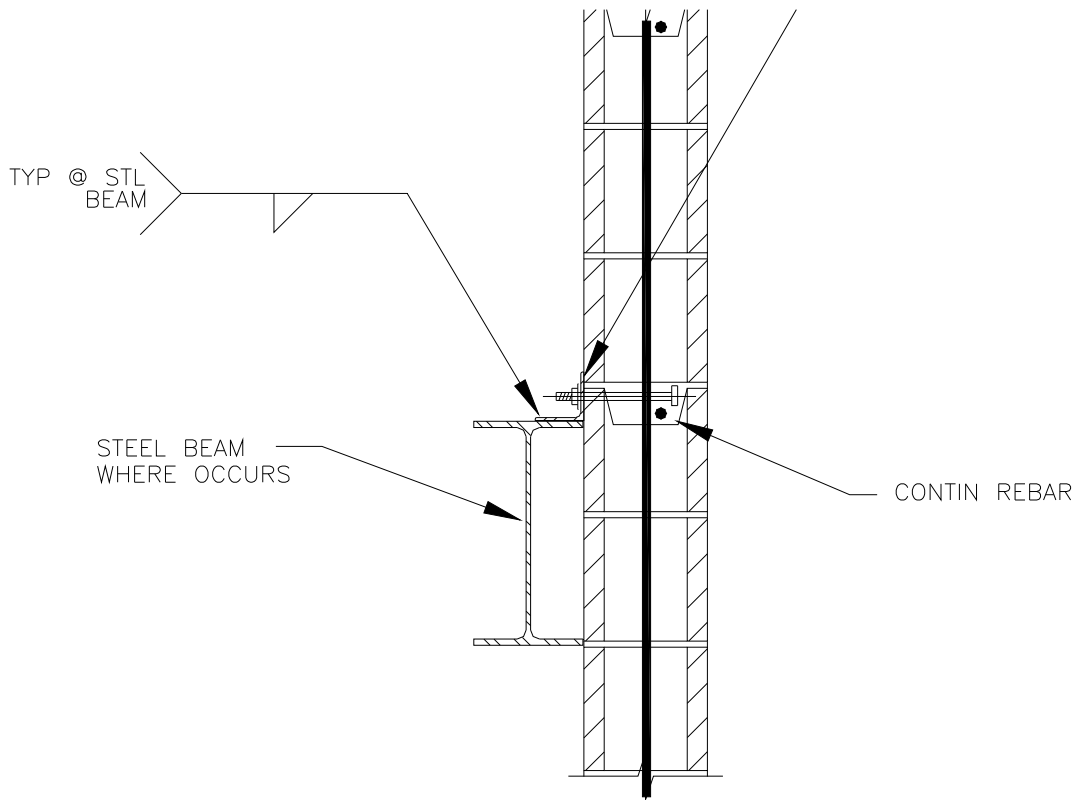
BEAM PERPENDICULAR TO WALL

SEE ARCHL DWGS FOR TOP OF WALL ELEVATION

BEAM PARALLEL TO WALL

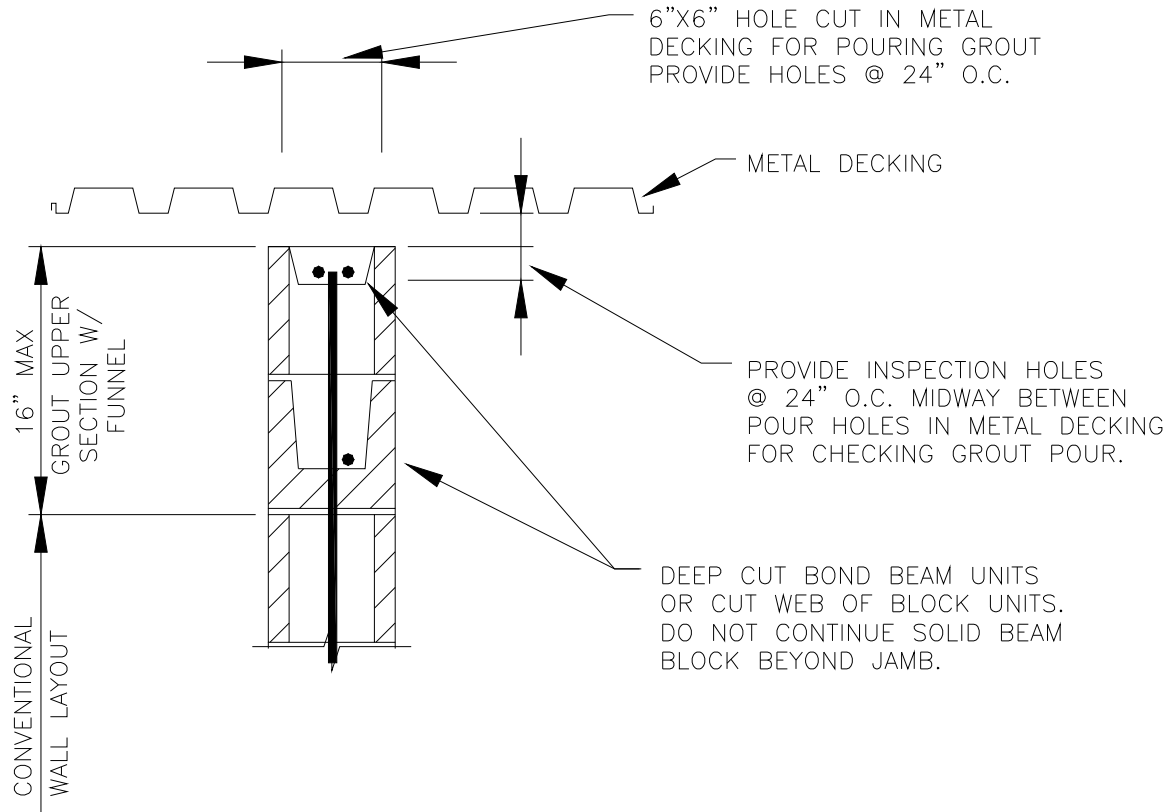
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FIGURE D-13 Top of Wall Bracing



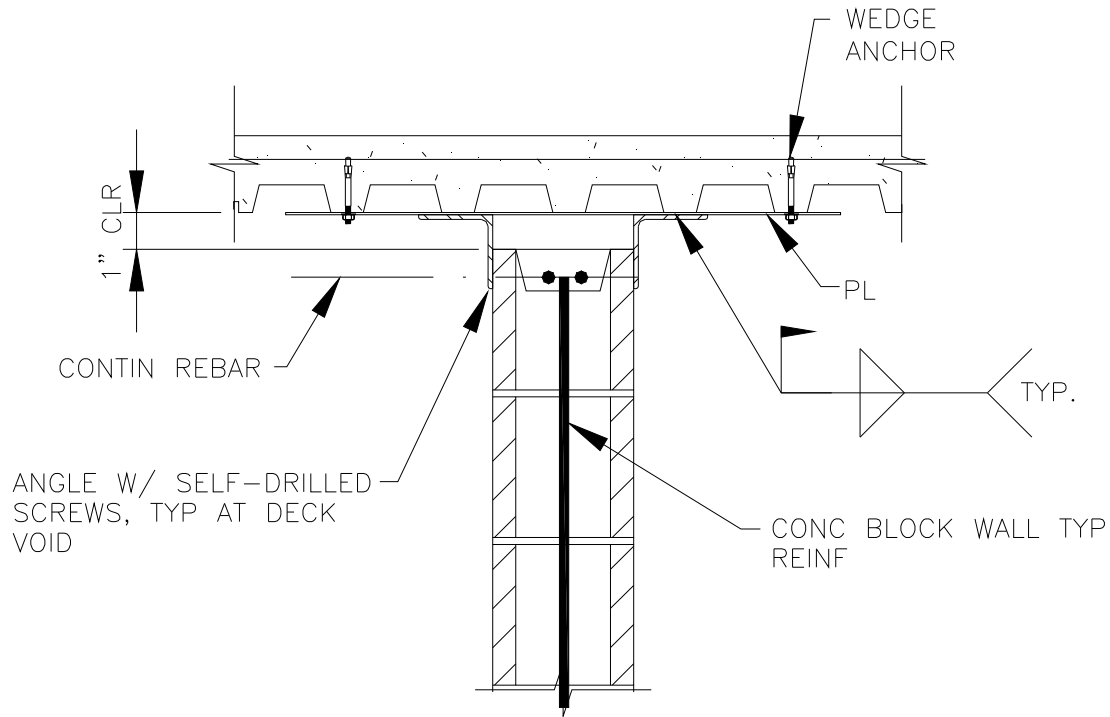
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FIGURE D-14 Anchor Bolts at Block Walls



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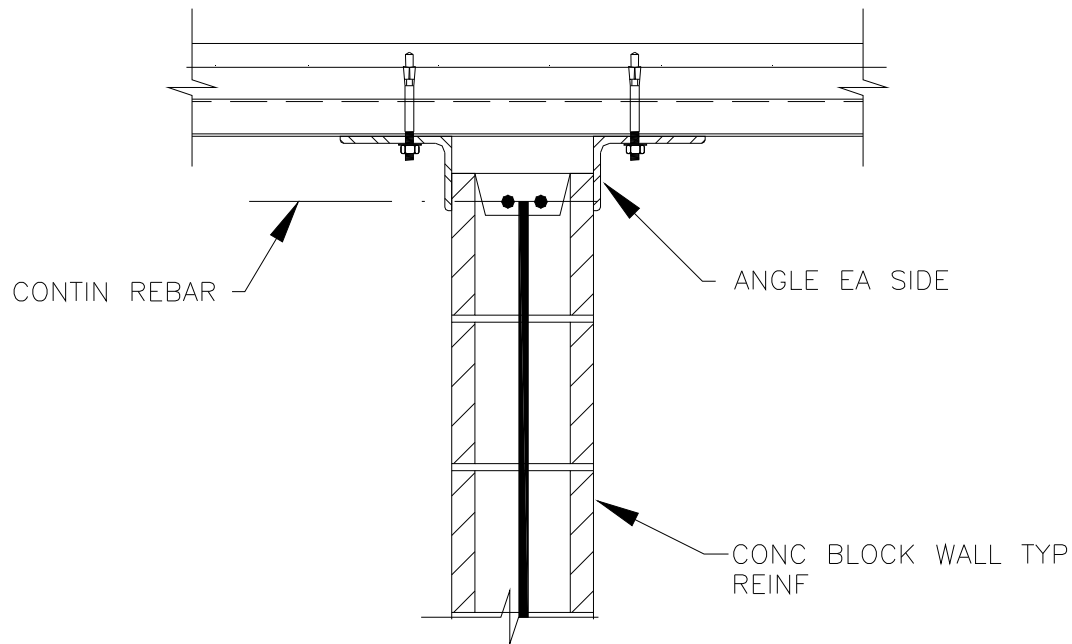
FIGURE D-15 Grout Pour at Top of Wall



THIS DETAIL AS SHOWN IS INTENDED TO ILLUSTRATE A GENERAL CONCEPT OR METHOD OF CONSTRUCTION. DETAILS THAT SHOW DIFFERENT OR MODIFIED CONCEPTS OR METHODS CAN BE OF EQUAL VALIDITY AND SHOULD NOT BE EXCLUDED FROM CONSIDERATION. THIS DETAIL SHALL NOT BE USED FOR CONSTRUCTION WITHOUT THE APPROVAL AND SIGNATURE OF A LICENSED DESIGN PROFESSIONAL. THE PERSON USING THIS DETAIL SHALL BE RESPONSIBLE FOR ITS COMPLETE DESIGN AND PROPER APPLICATION.

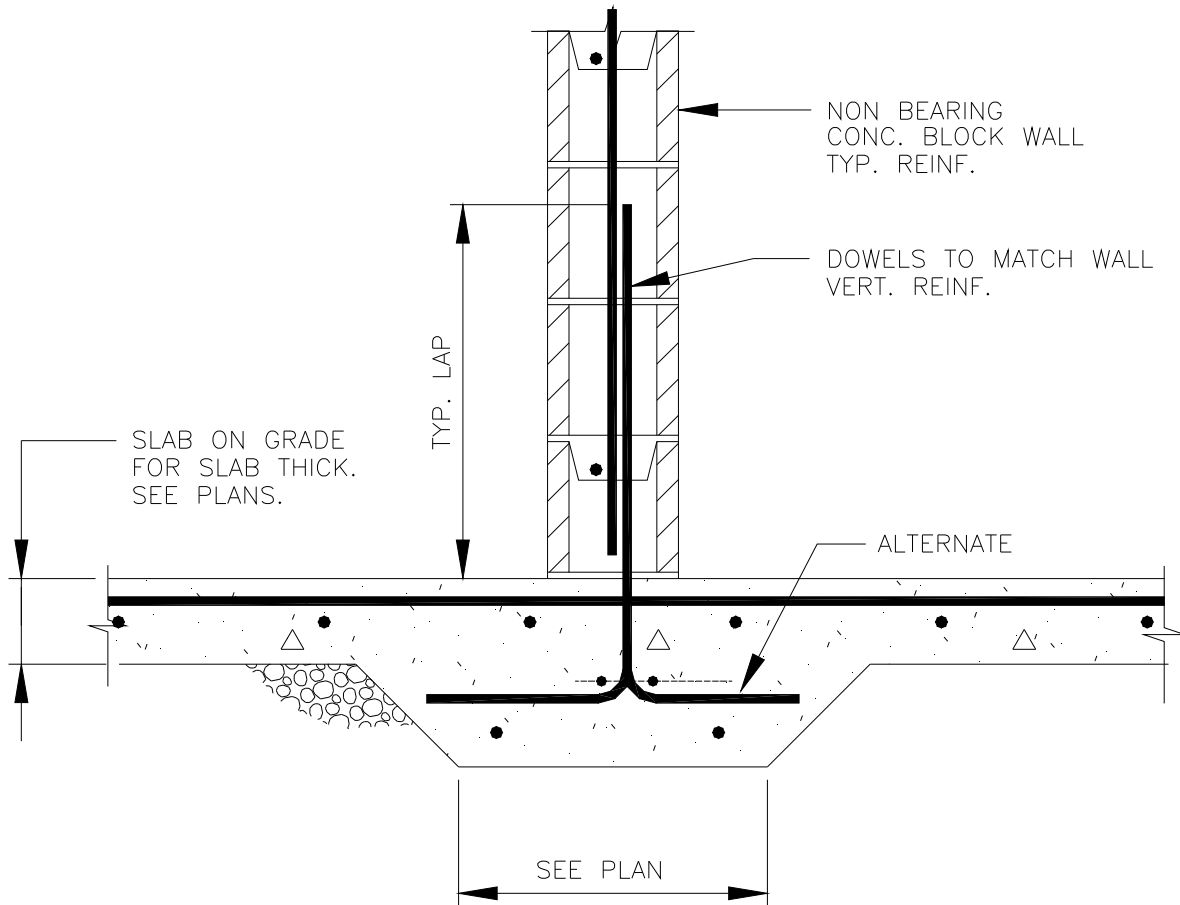
FIGURE D-16 Wall Restraint Parallel to Deck





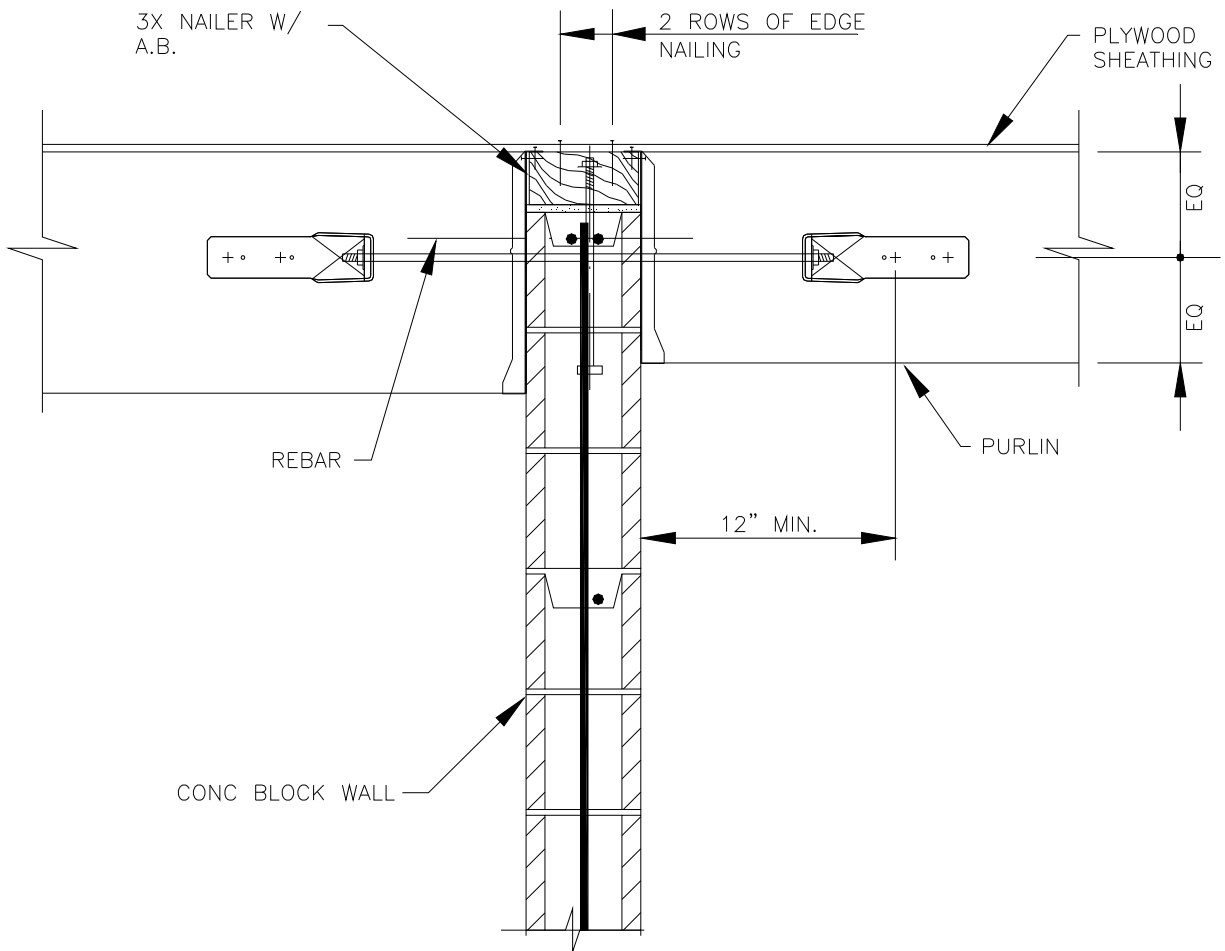
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**FIGURE D-17 Wall Restraint Perpendicular to Deck**



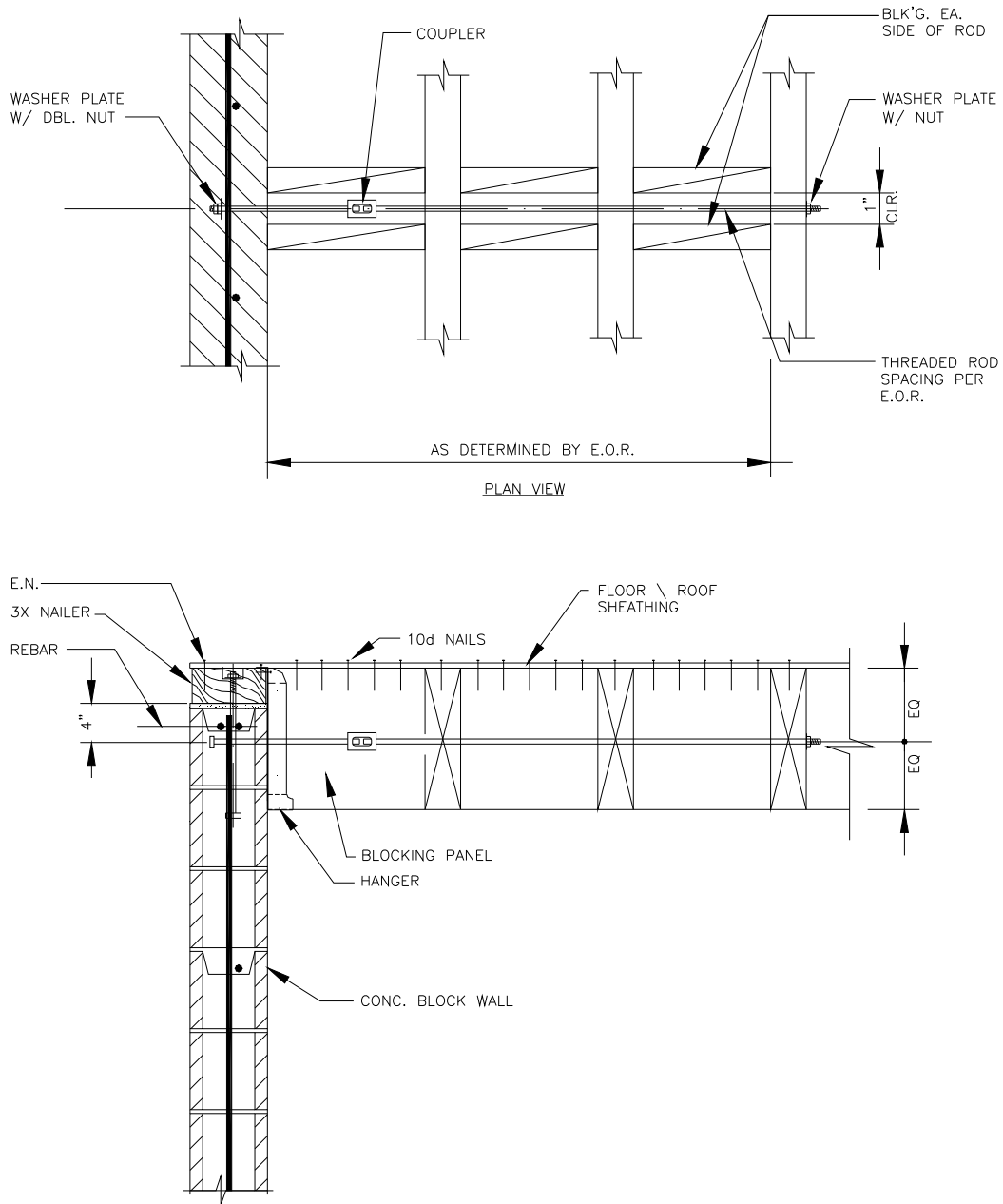
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FIGURE D-18 Wall/Slab on Grade



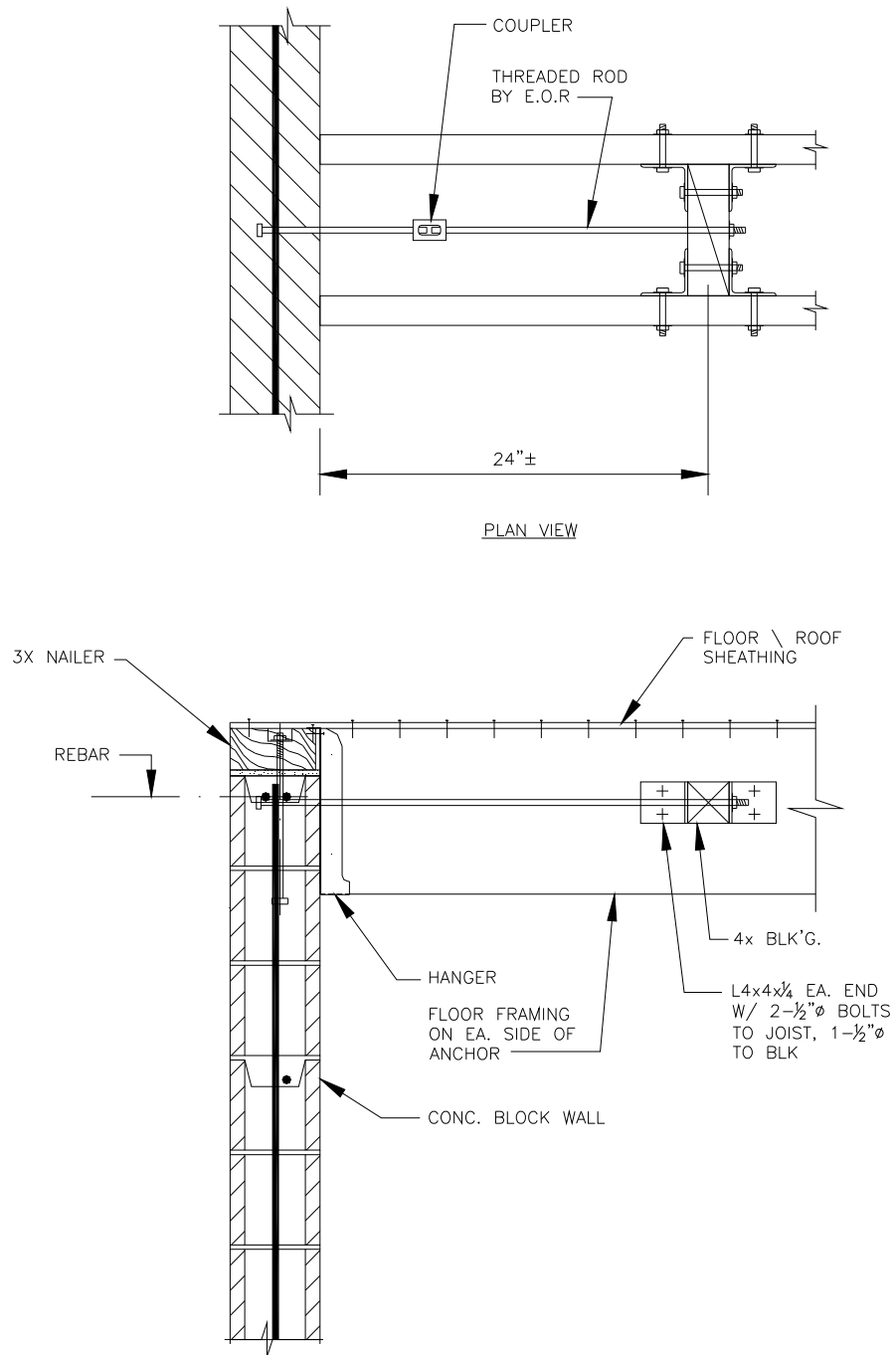
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**FIGURE D-19 Interior Masonry – Perpendicular Wood Beams/Joists**



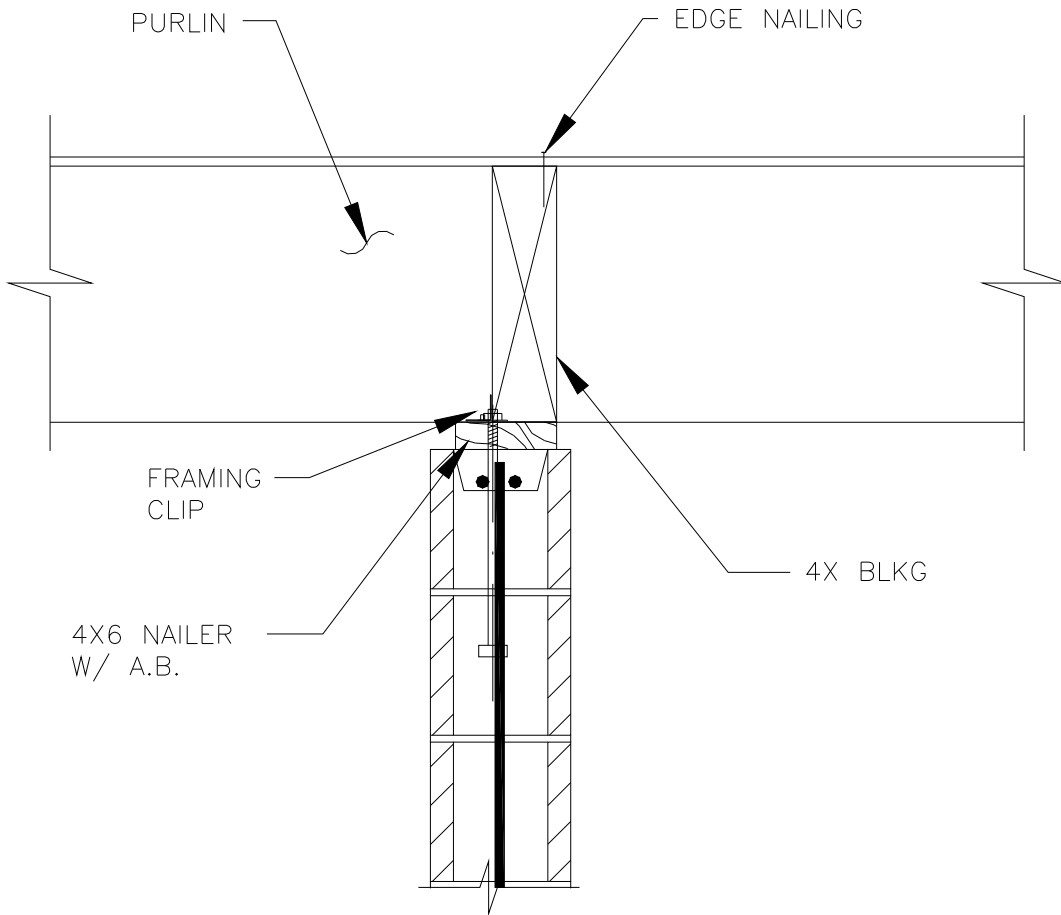
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**FIGURE D-20 Beams/Joists Parallel to Masonry Wall**



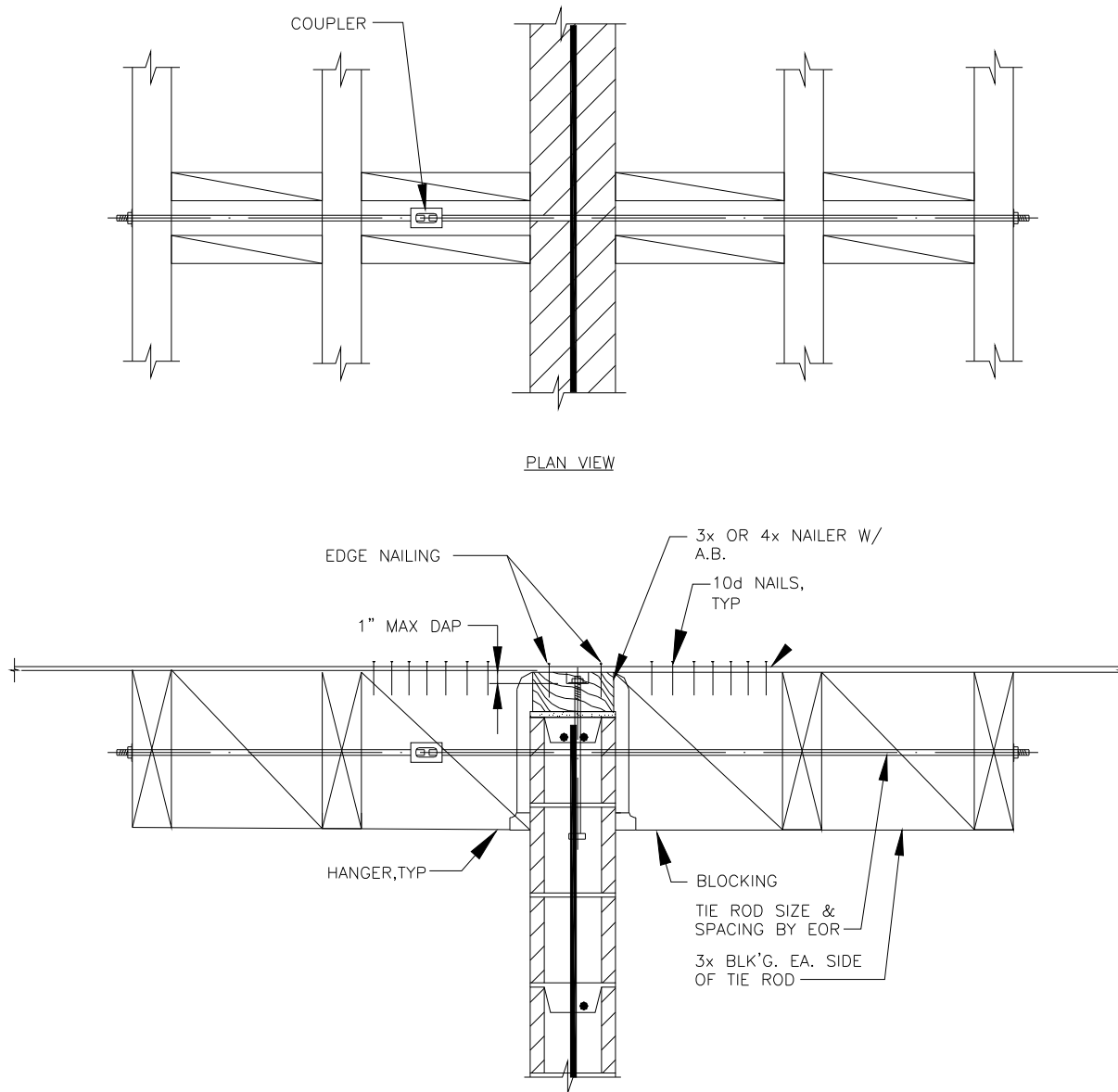
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**FIGURE D-21 Beam/Joists Perpendicular to Masonry Wall**



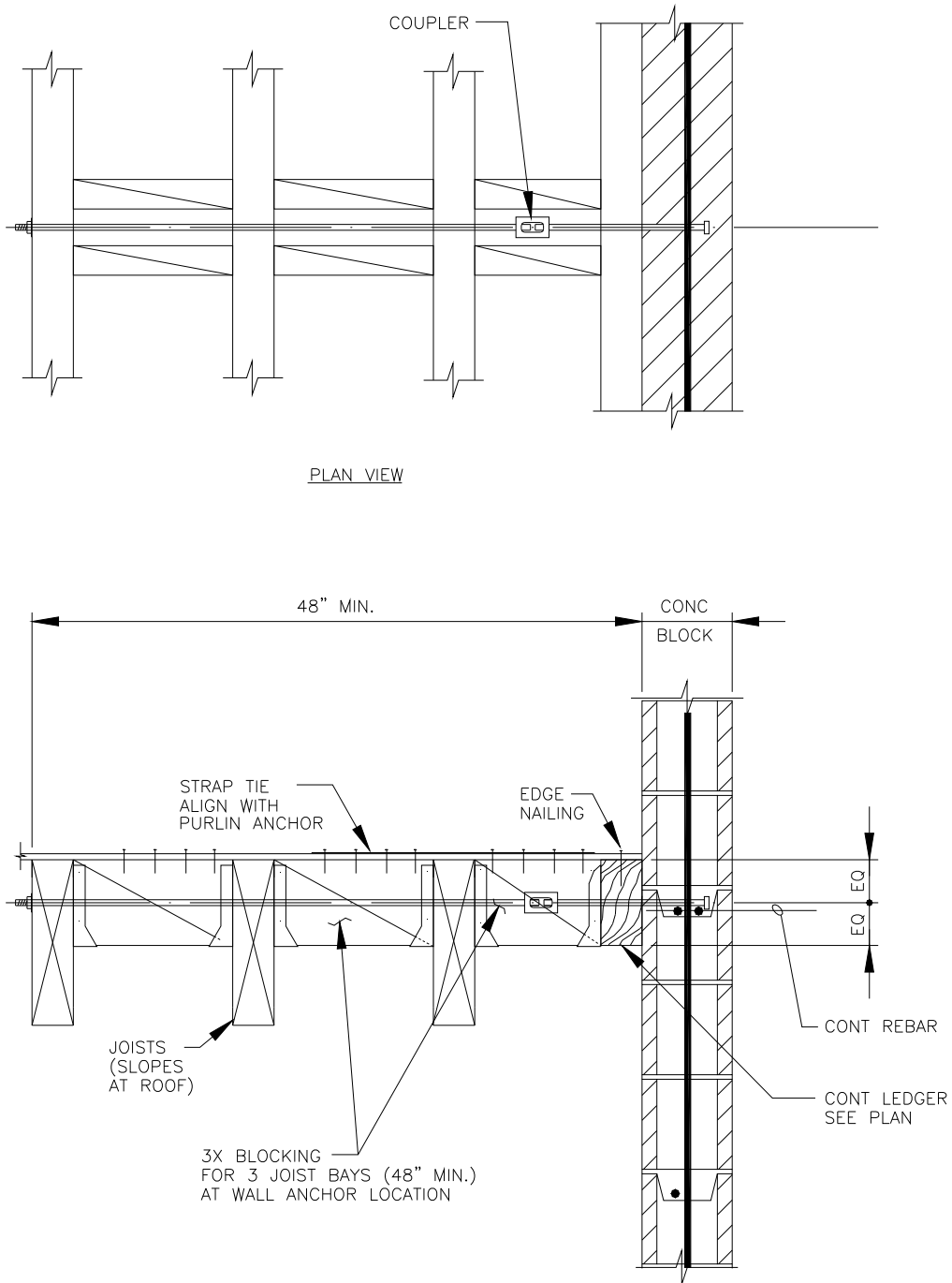
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**FIGURE D-22 Beams/Joists Perpendicular to Masonry Wall**



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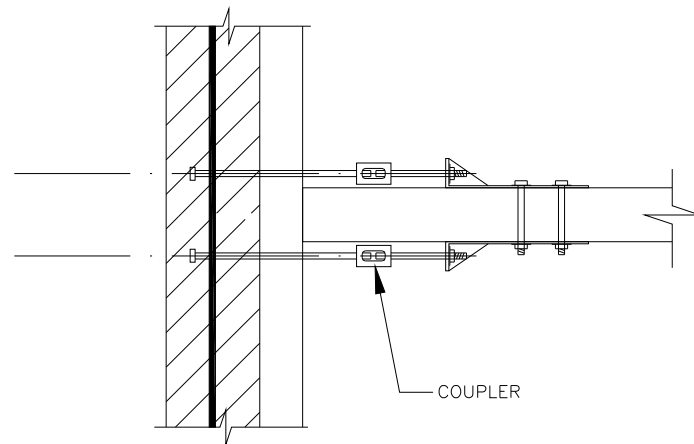
**FIGURE D-23 Wood Joists Parallel to Masonry Wall**



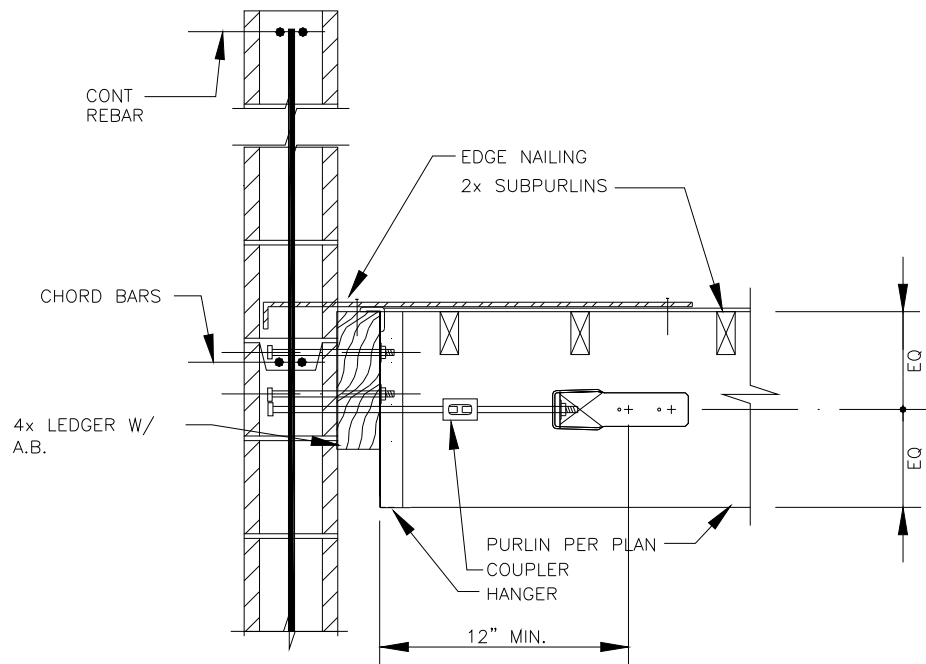
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**FIGURE D-24 Wood Joists Parallel to Masonry Wall**



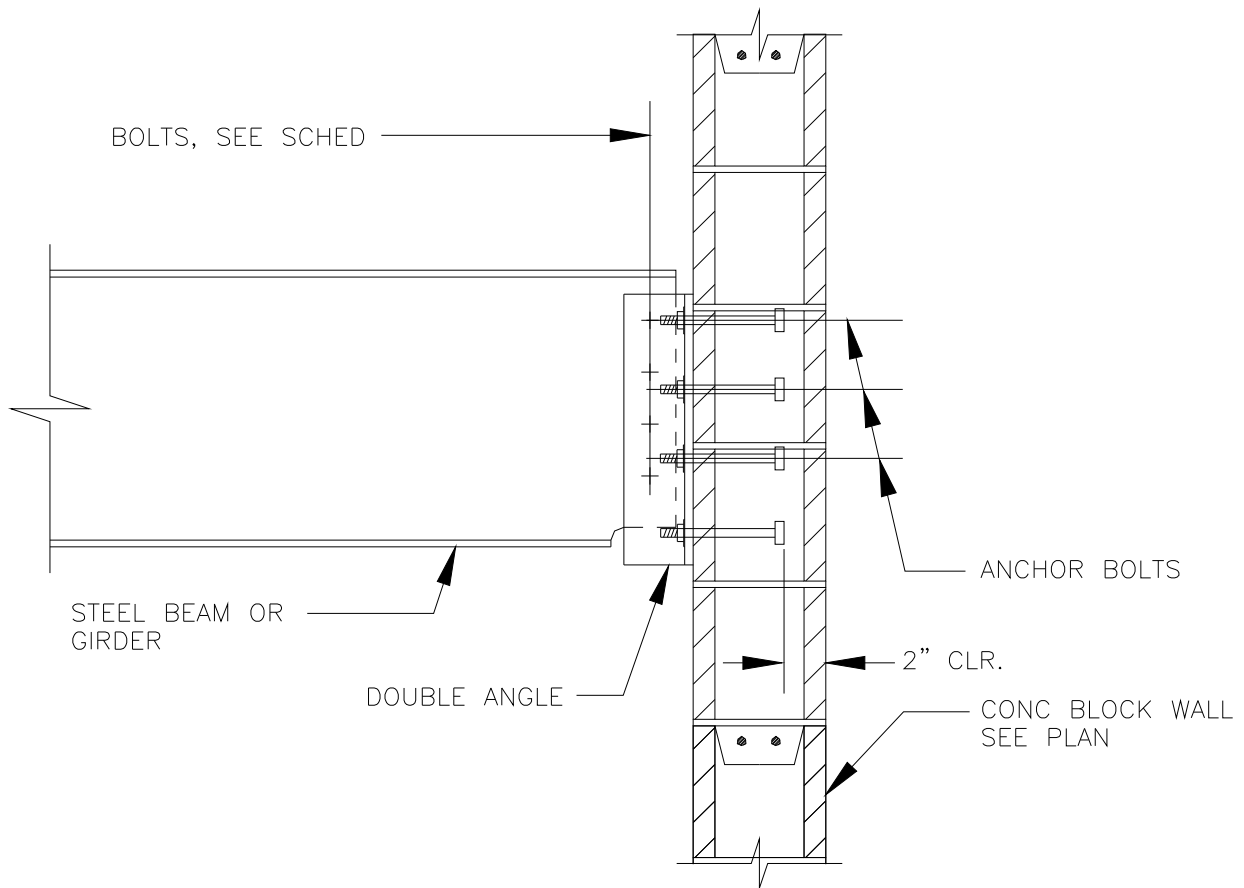


PLAN VIEW



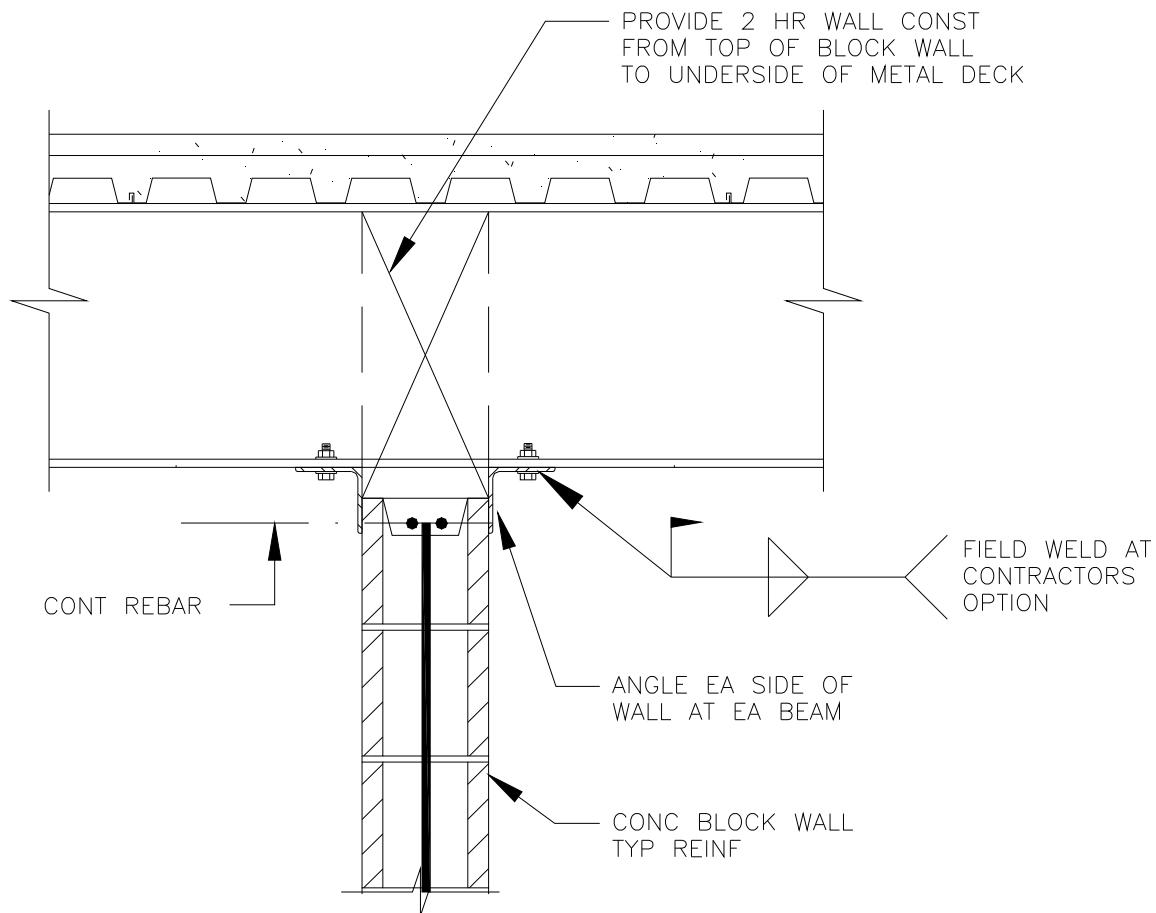
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FIGURE D-25 Wood Joists Perpendicular to Masonry Wall



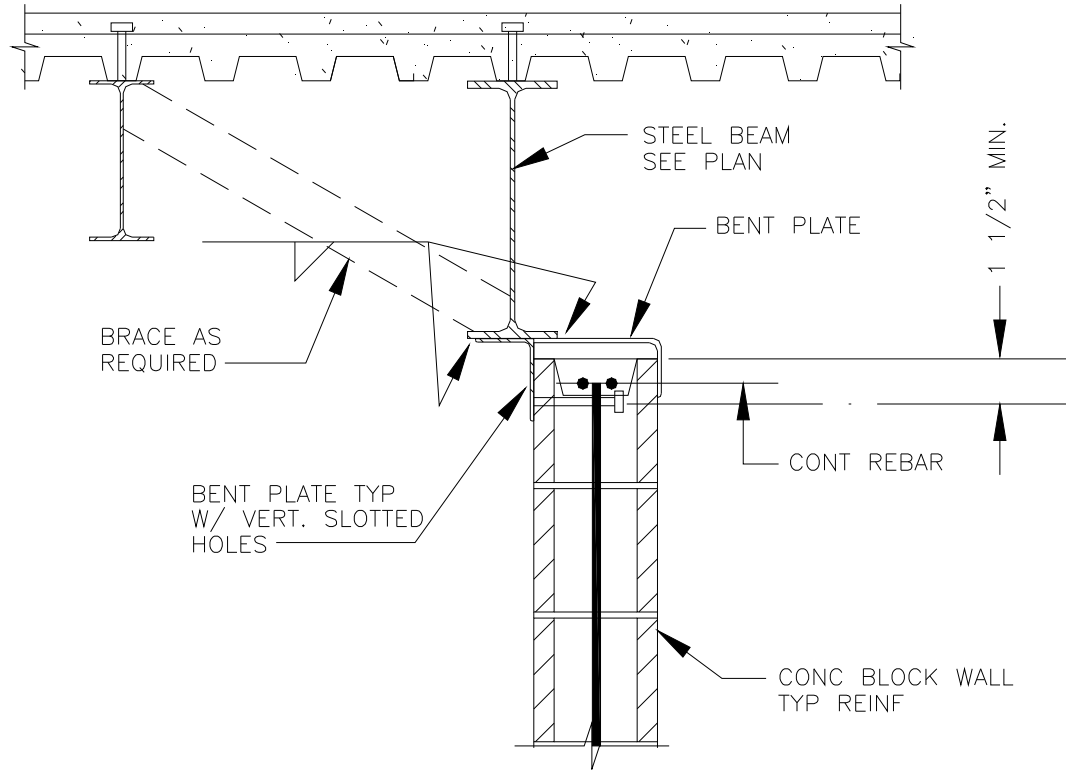
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FIGURE D-26 Steel Beam to Masonry Wall Connection



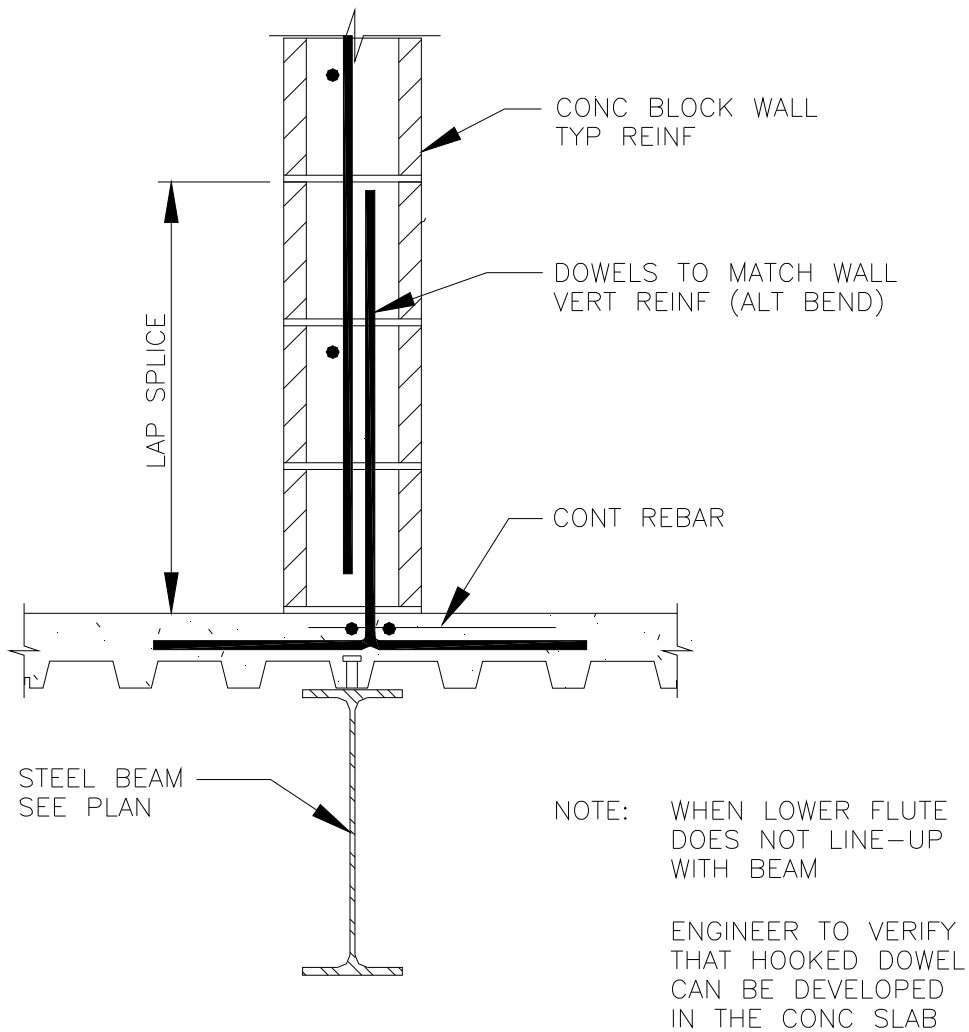
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**FIGURE D-27 Wall Restraint at Perpendicular Steel Beam**



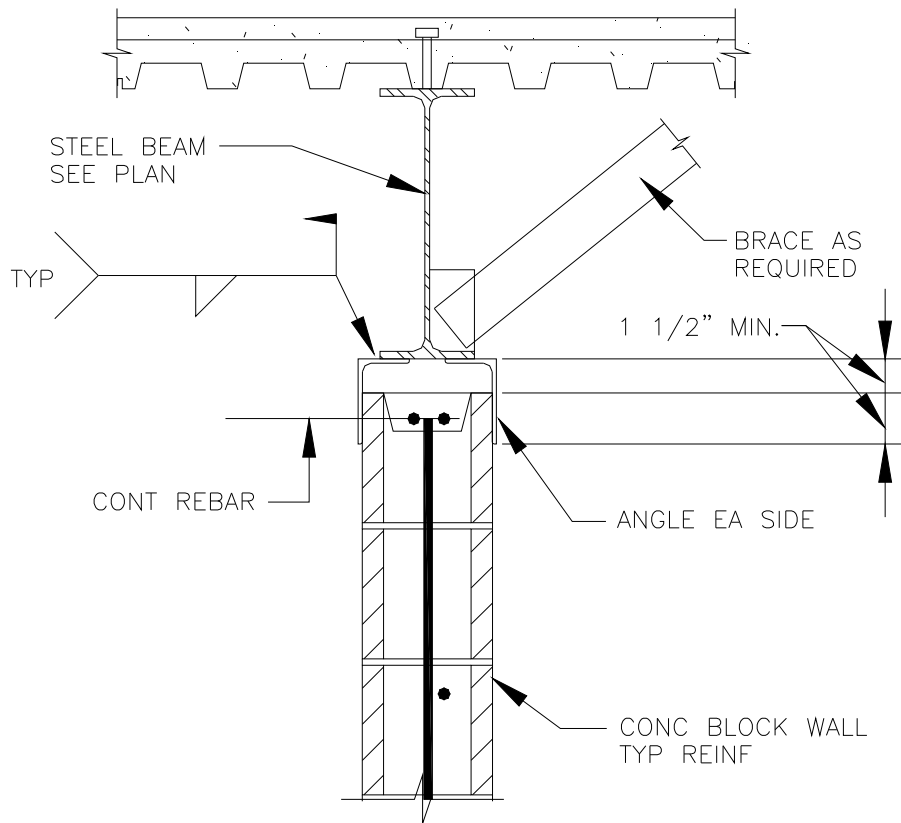
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FIGURE D-28 Wall Offset to Beam



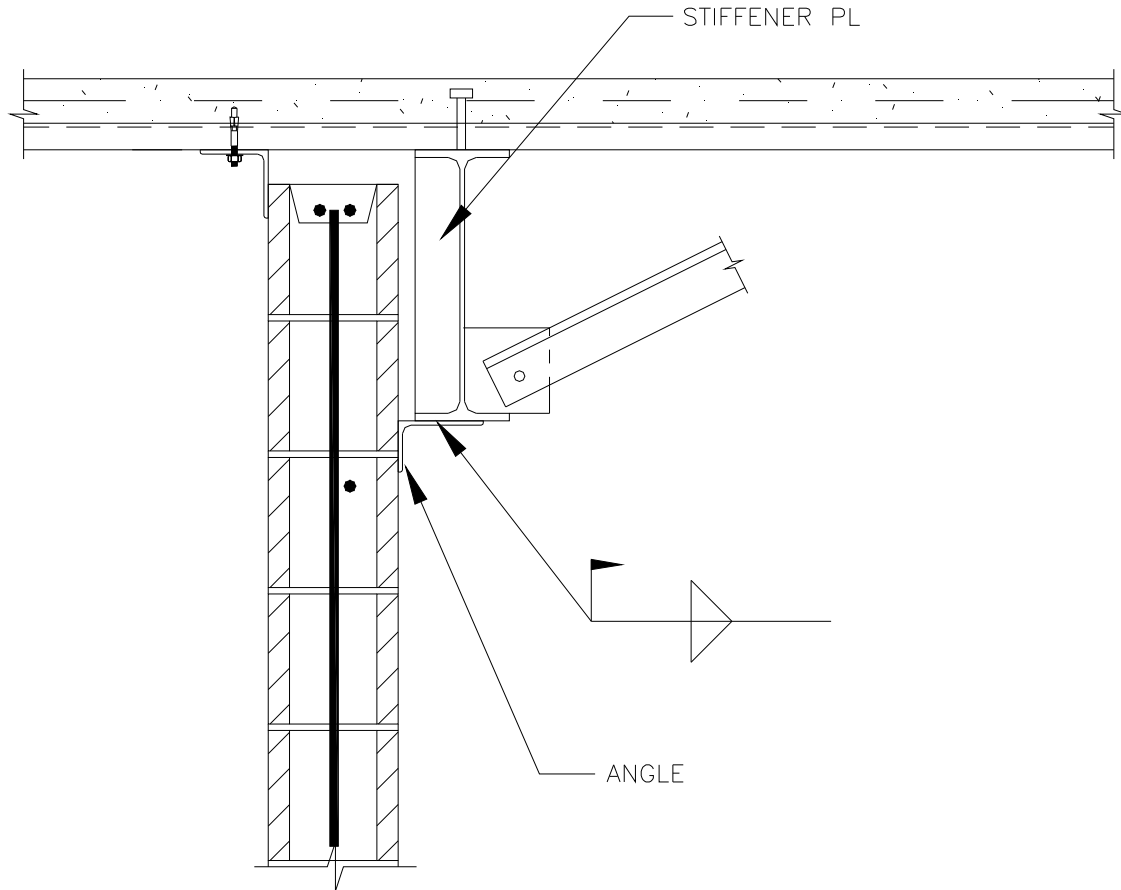
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**FIGURE D-29 Steel Beam Supporting Masonry Wall**



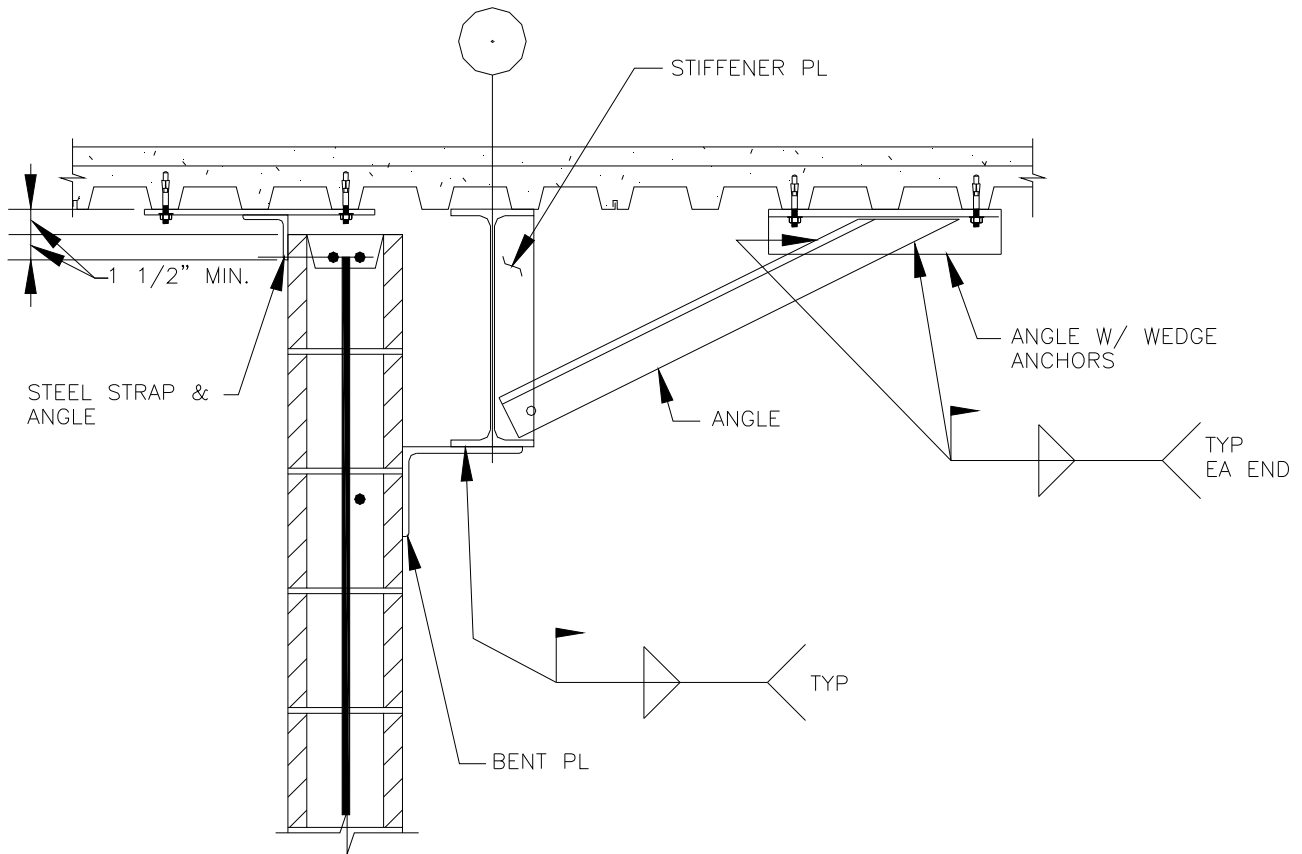
THIS DETAIL AS SHOWN IS INTENDED TO ILLUSTRATE A GENERAL CONCEPT OR METHOD OF CONSTRUCTION. DETAILS THAT SHOW DIFFERENT OR MODIFIED CONCEPTS OR METHODS CAN BE OF EQUAL VALIDITY AND SHOULD NOT BE EXCLUDED FROM CONSIDERATION. THIS DETAIL SHALL NOT BE USED FOR CONSTRUCTION WITHOUT THE APPROVAL AND SIGNATURE OF A LICENSED DESIGN PROFESSIONAL. THE PERSON USING THIS DETAIL SHALL BE RESPONSIBLE FOR ITS COMPLETE DESIGN AND PROPER APPLICATION.

FIGURE D-30 Masonry Wall Under Steel Beam



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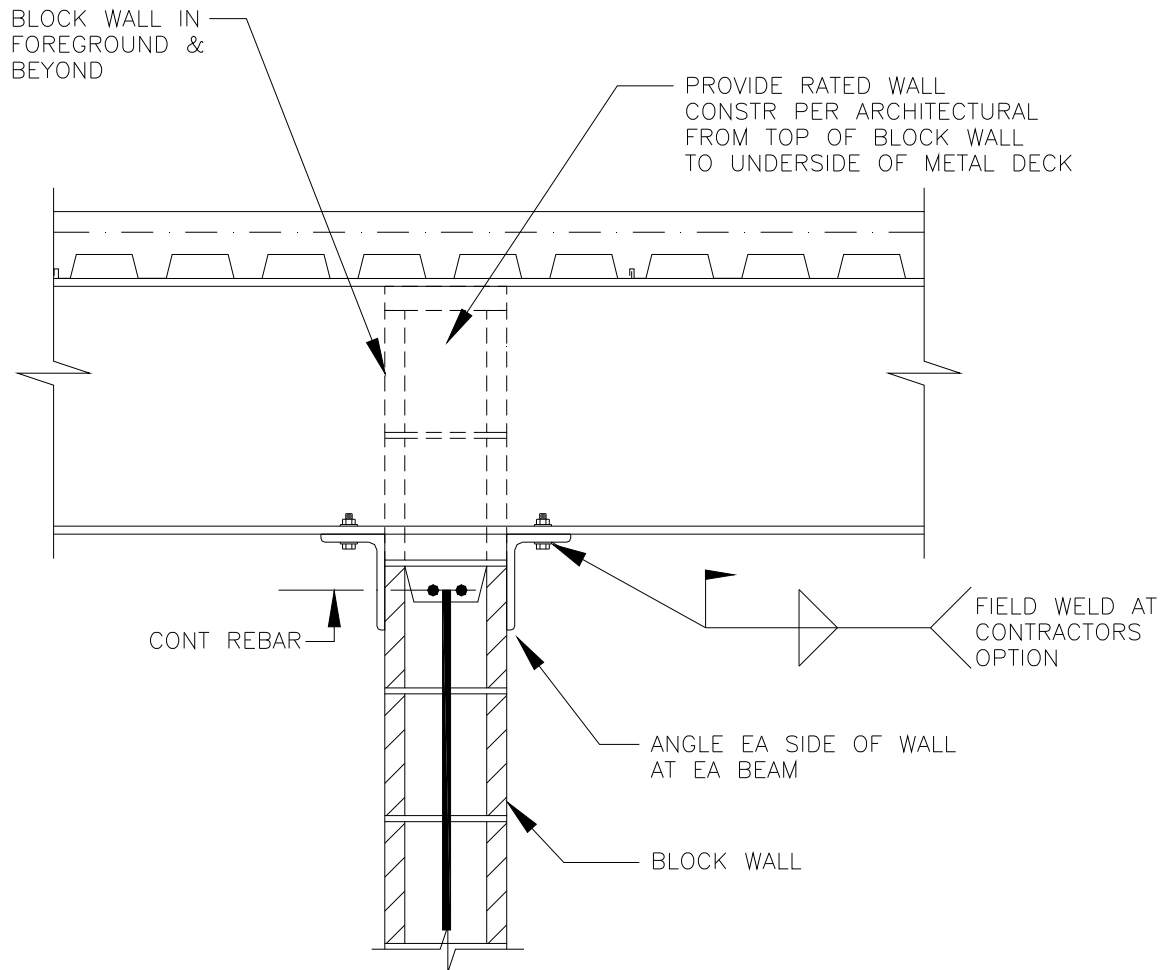
**FIGURE D-31 Masonry Wall Restraint Adjacent to Steel Beam**



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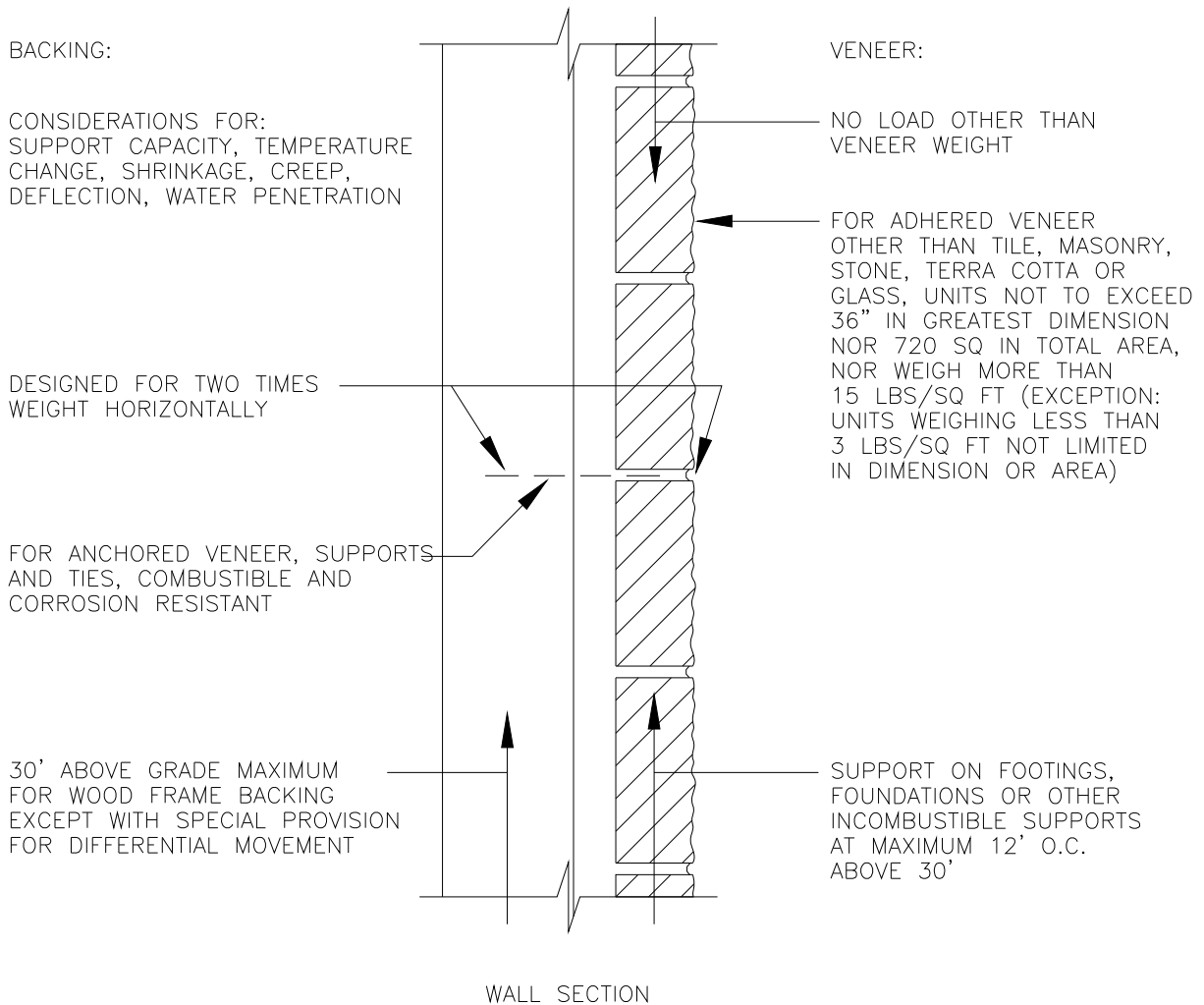
FIGURE D-32 Masonry Wall Restraint Adjacent to Steel Girder





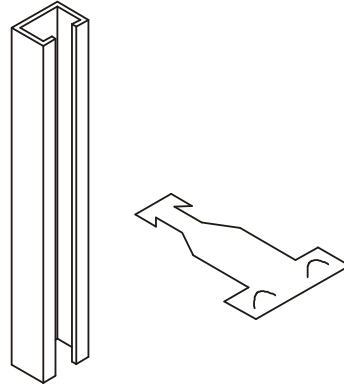
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**FIGURE D-33 Masonry Wall Restraint Perpendicular to Steel Beam**

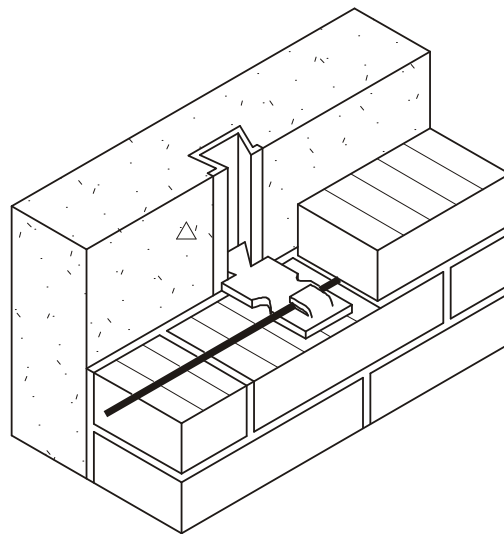


THIS DETAIL AS SHOWN IS INTENDED TO ILLUSTRATE A GENERAL CONCEPT OR METHOD OF CONSTRUCTION. DETAILS THAT SHOW DIFFERENT OR MODIFIED CONCEPTS OR METHODS CAN BE OF EQUAL VALIDITY AND SHOULD NOT BE EXCLUDED FROM CONSIDERATION. THIS DETAIL SHALL NOT BE USED FOR CONSTRUCTION WITHOUT THE APPROVAL AND SIGNATURE OF A LICENSED DESIGN PROFESSIONAL. THE PERSON USING THIS DETAIL SHALL BE RESPONSIBLE FOR ITS COMPLETE DESIGN AND PROPER APPLICATION.

**FIGURE D-34 Veneer Attachment Detail**



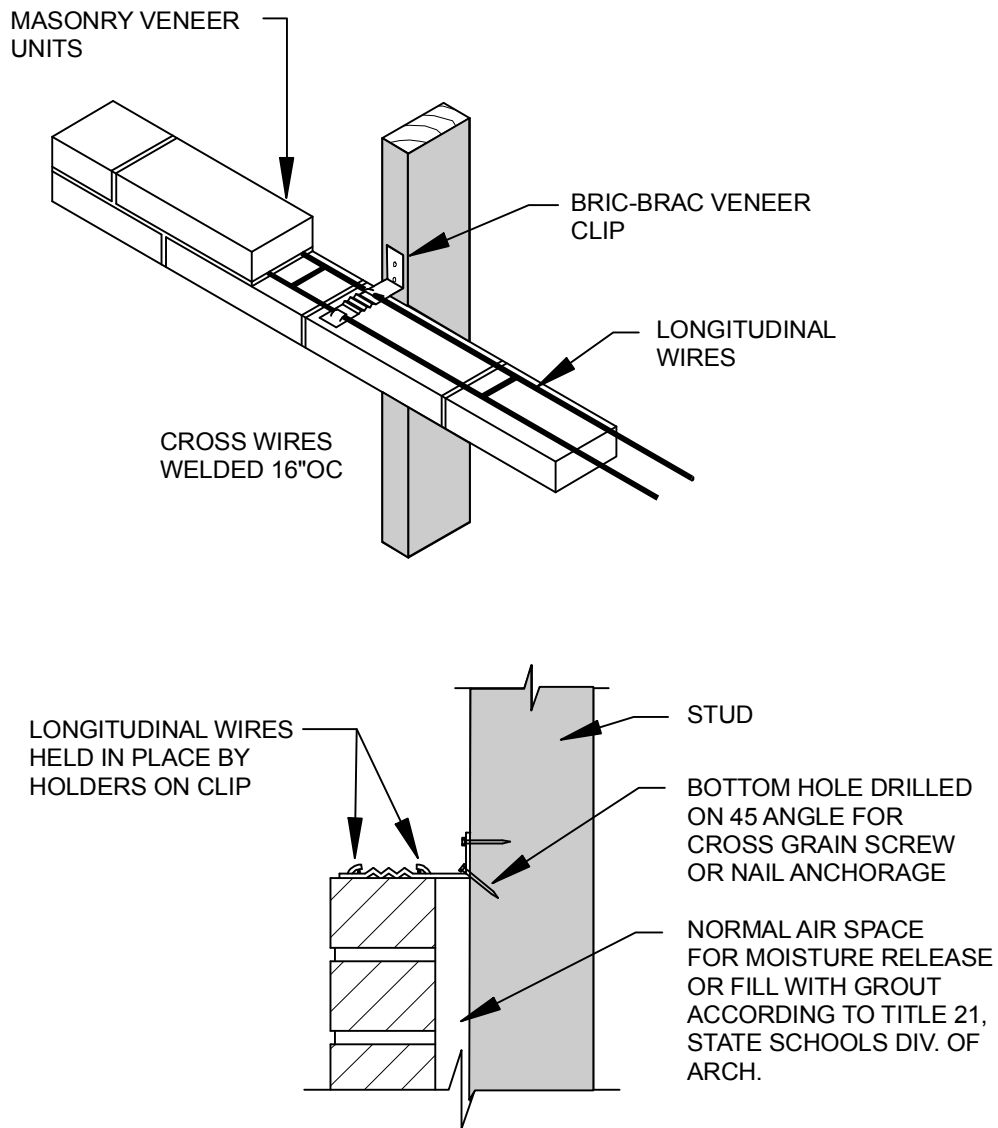
"Burke Fleming type" masonry veneer anchor and slot, which can retain a #9 ga wire



Dovetail type brick anchor, made of 16-gauge by 1" galvanized steel, utilizes heavy hook to enclose 8 or 9 gauge galvanized wire.

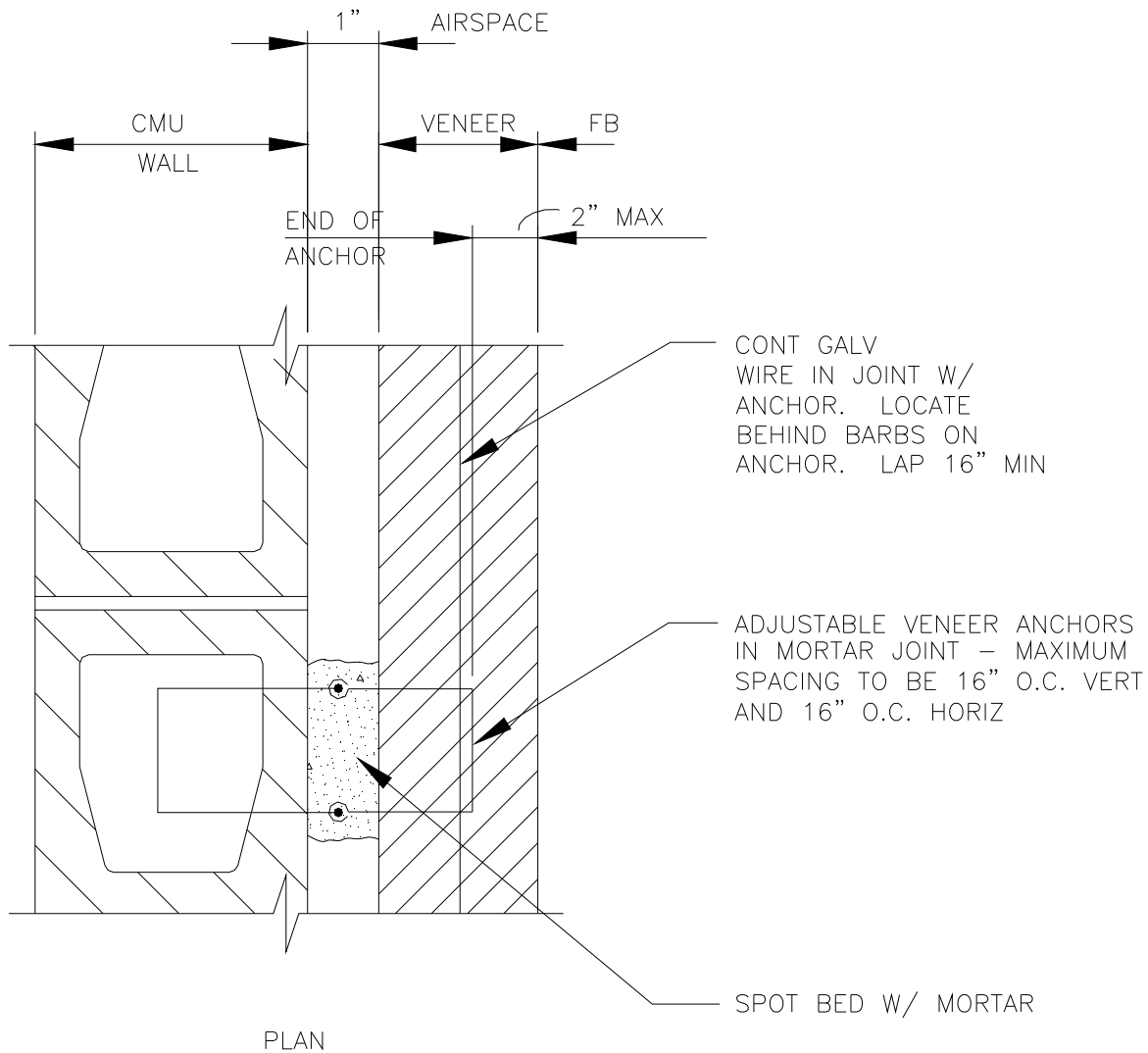
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**FIGURE D-35 Anchor Slot Veneer Tie**



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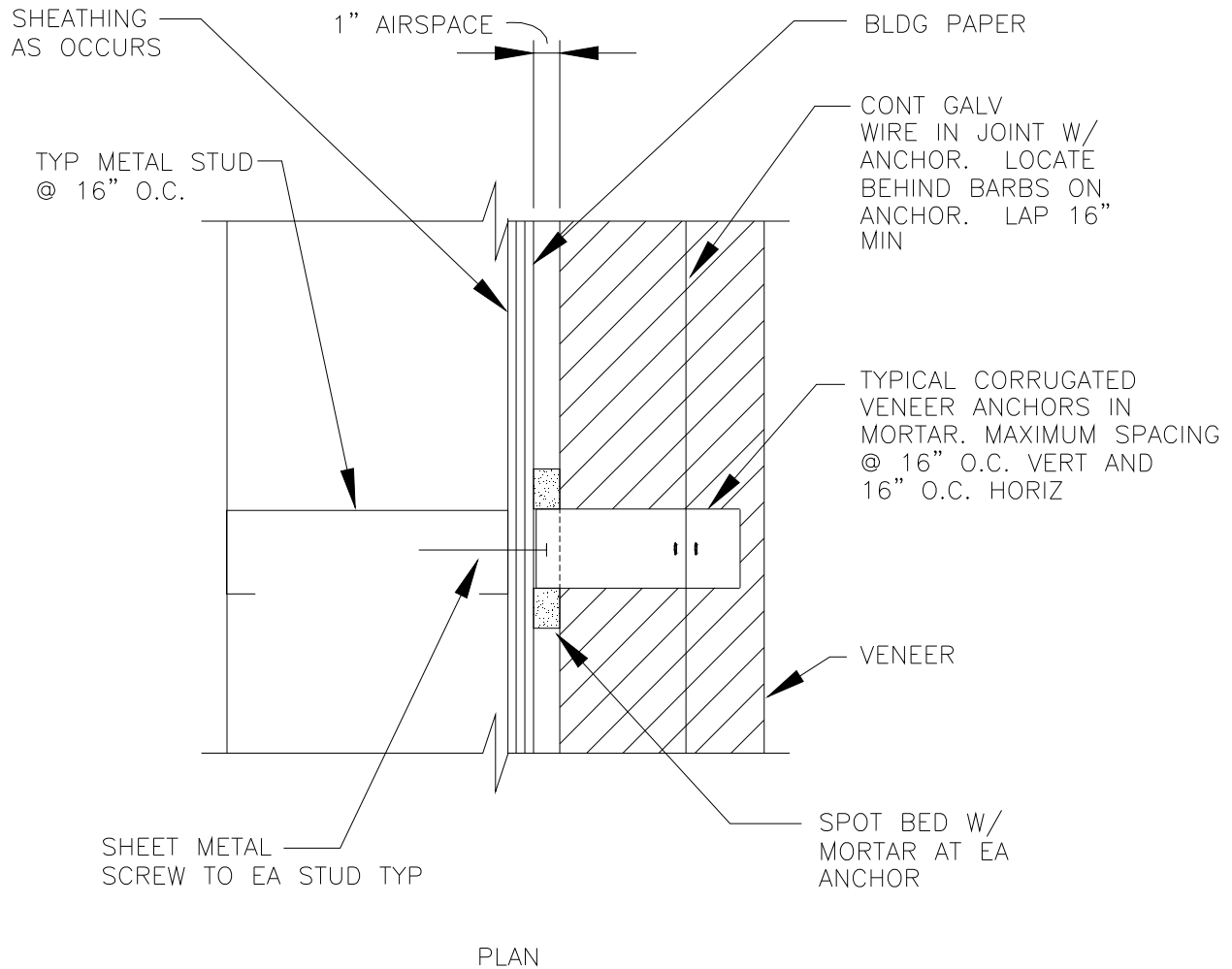
FIGURE D-36 Masonry Veneer on Studs



TYPICAL VENEER ANCHORAGE TO CMU

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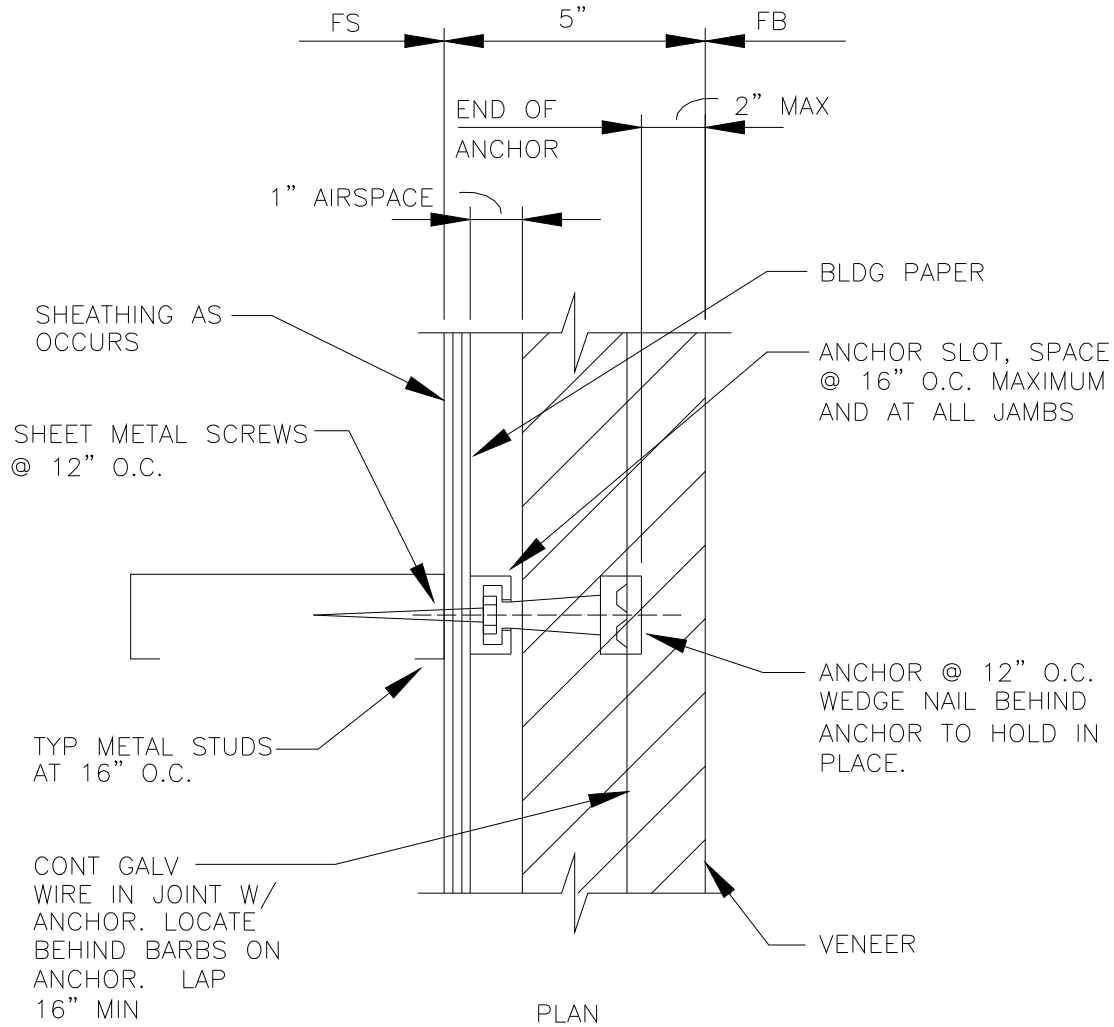
**FIGURE D-37 Veneer Anchorage to Masonry Units**



TYPICAL VENEER ANCHORAGE TO METAL STUDS

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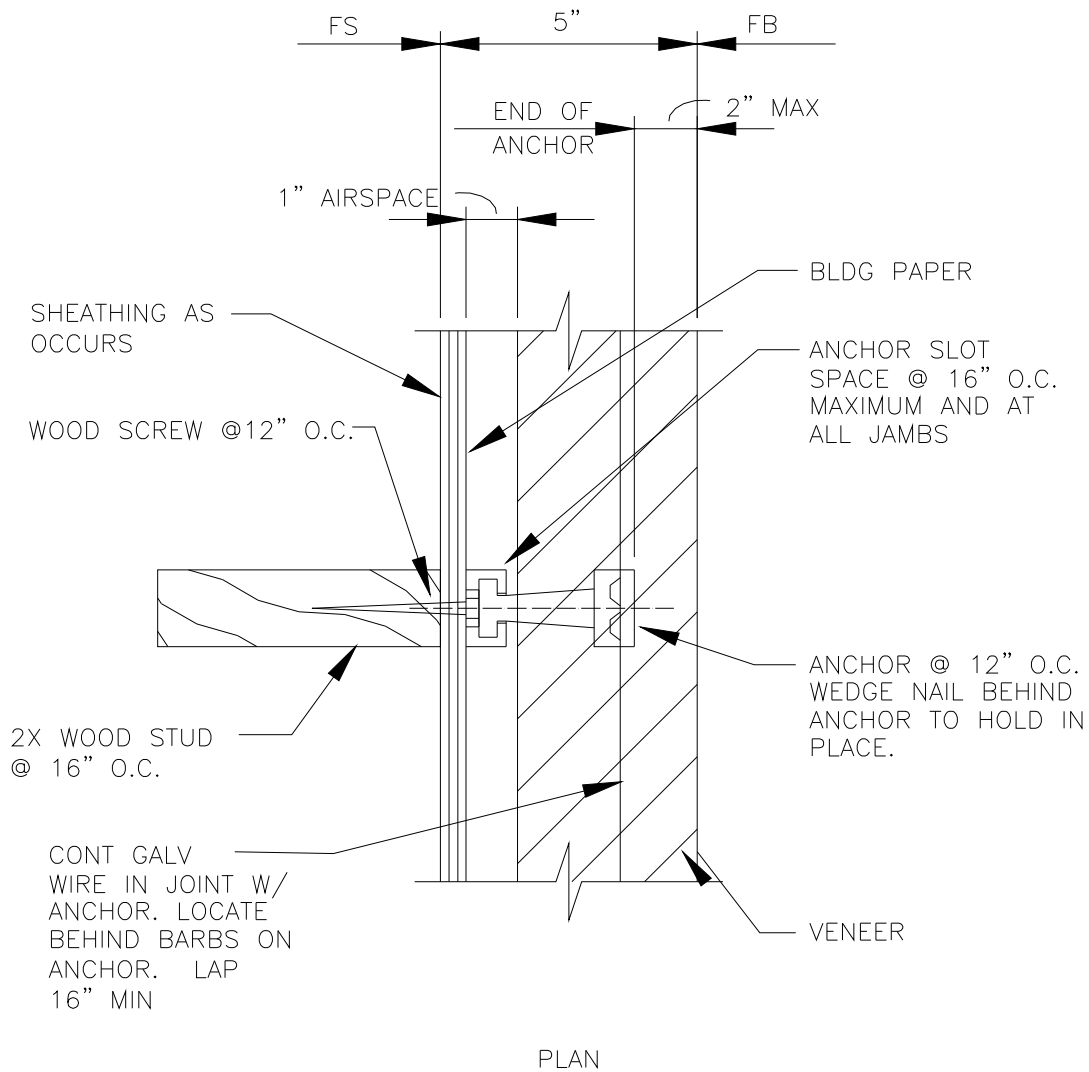
**FIGURE D-38 Corrugated Veneer Anchorage to Metal Studs**



TYPICAL VENEER ANCHORAGE TO METAL STUDS

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**FIGURE D-39 Anchor Slot Veneer Anchorage to Metal Studs**

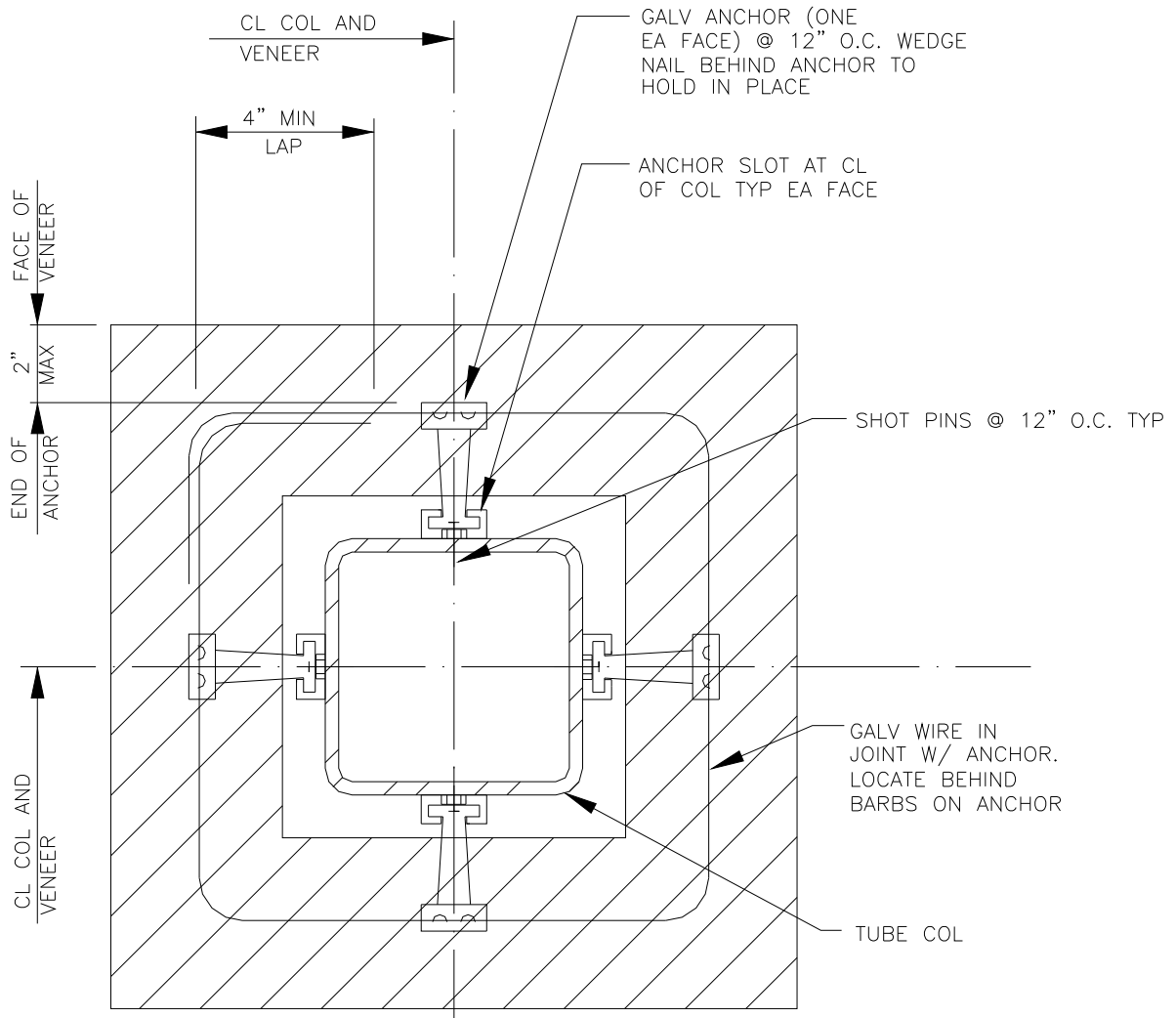


TYPICAL VENEER ANCHORAGE TO WOOD STUDS

THIS DETAIL AS SHOWN IS INTENDED TO ILLUSTRATE A GENERAL CONCEPT OR METHOD OF CONSTRUCTION. DETAILS THAT SHOW DIFFERENT OR MODIFIED CONCEPTS OR METHODS CAN BE OF EQUAL VALIDITY AND SHOULD NOT BE EXCLUDED FROM CONSIDERATION. THIS DETAIL SHALL NOT BE USED FOR CONSTRUCTION WITHOUT THE APPROVAL AND SIGNATURE OF A LICENSED DESIGN PROFESSIONAL. THE PERSON USING THIS DETAIL SHALL BE RESPONSIBLE FOR ITS COMPLETE DESIGN AND PROPER APPLICATION.

**FIGURE D-40 Anchor Slot Veneer Anchorage to Wood Studs**

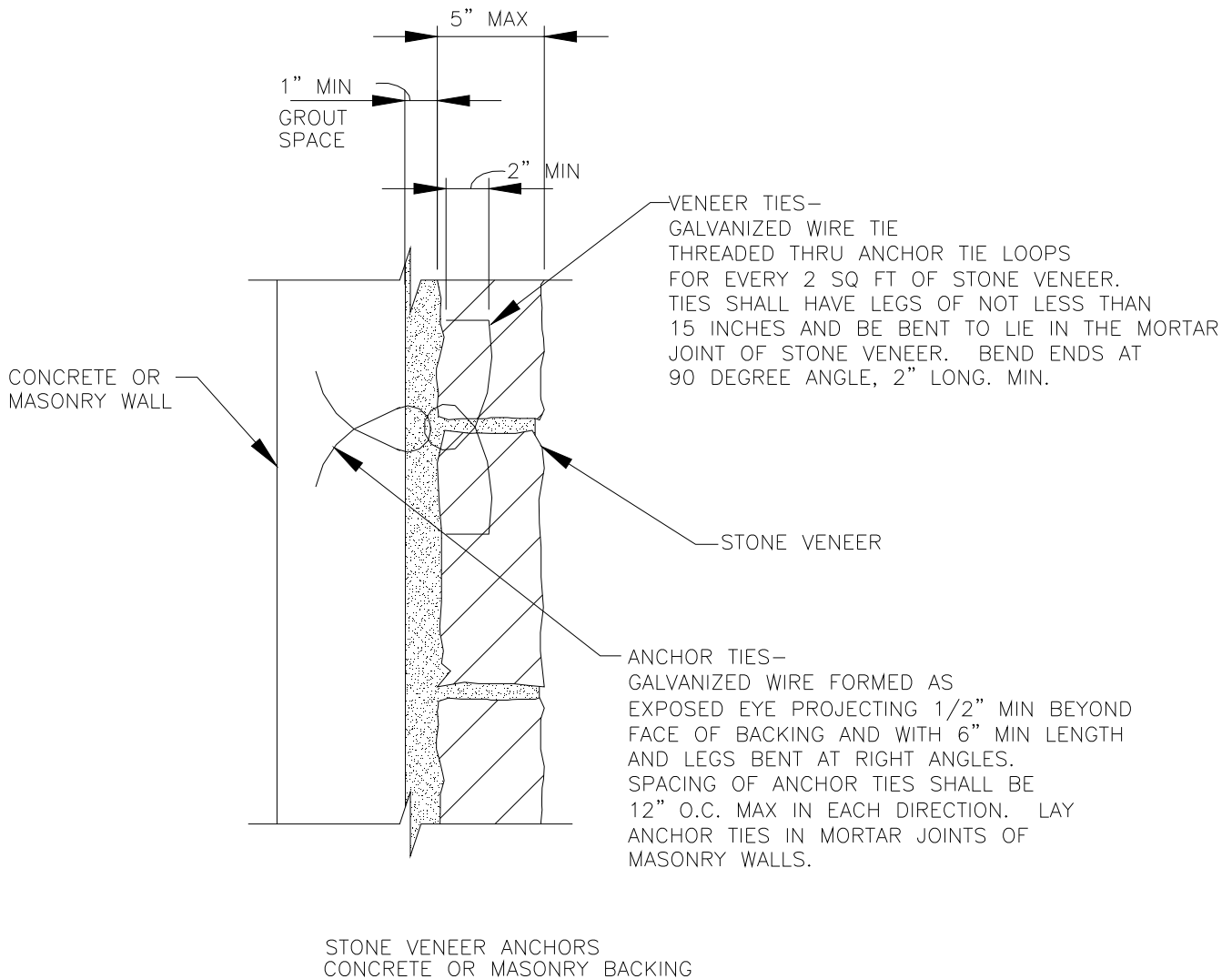




TYPICAL VENEER ANCHORAGE TO TS COLUMN

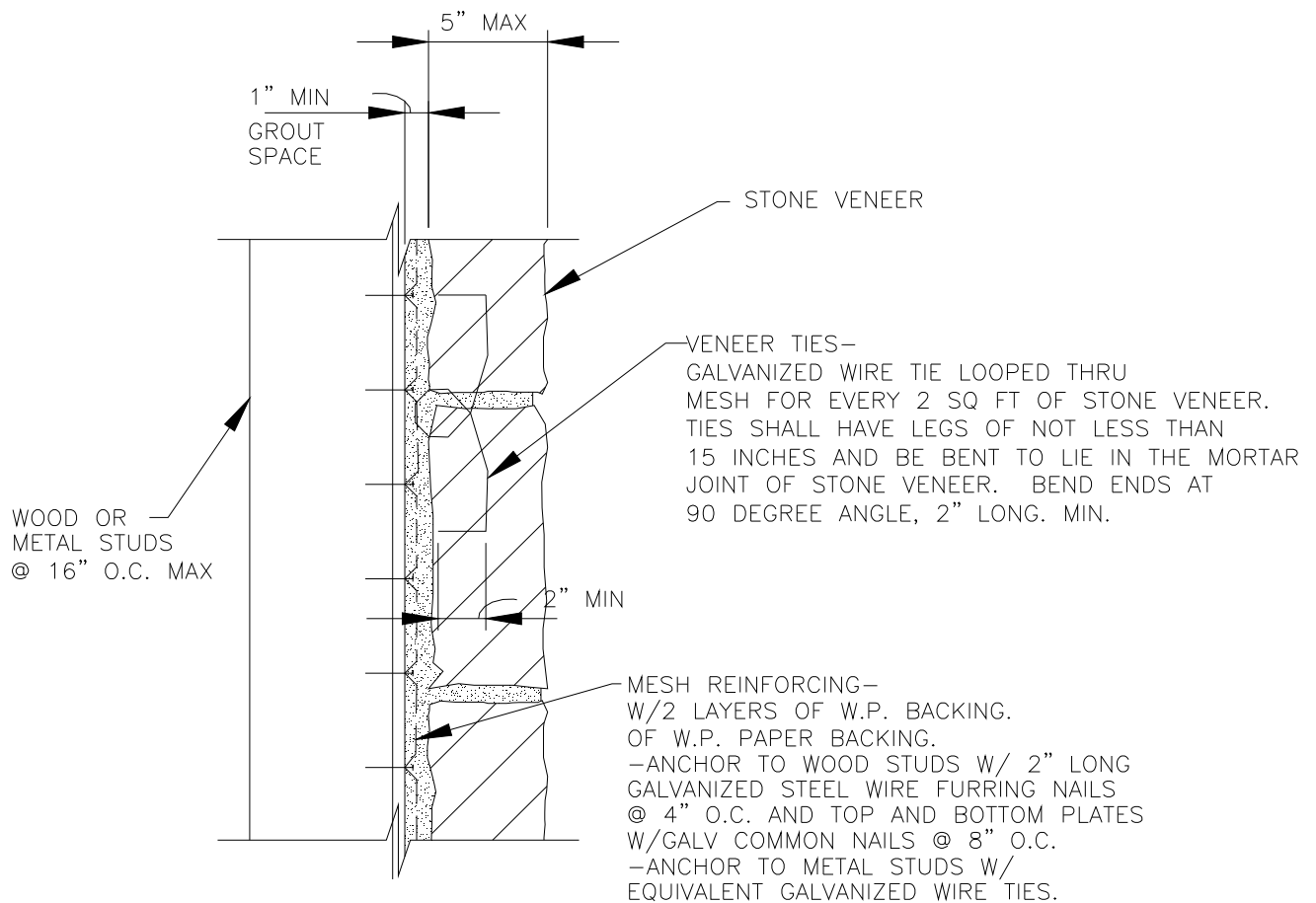
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**FIGURE D-41 Veneer Anchorage to HSS Column**



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**FIGURE D-42 Stone Veneer Anchorage to Concrete or Masonry Wall**



STONE VENEER ANCHORS  
WOOD OR METAL STUD BACKING

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**FIGURE D-43 Stone Veneer Anchorage to Wood or Metal Stud**