Single Wythe 8” Concrete Masonry Walls

Most contemporary masonry walls consist of two separate wythes, comprised of one wythe of brick and one wythe of concrete masonry. However, there is an alternative masonry wall design that can produce economical and structural benefits.

Concrete masonry units are strong in compression and can be produced with strengths in excess of 3000 p.s.i. This is one of the reasons that concrete masonry units are desirable for load bearing, single wythe, concrete masonry wall design.

Also, corresponding tensile and flexural bond strengths in the mortar joints contribute to the overall structural design of the wall, and a standard mortar, like type “N” by proportion or type “S” by physical property, will provide the structural strength required.

An 8” concrete masonry bearing wall is a popular wall type that is utilized in single-wythe masonry construction for condominium and other types of buildings in the Midwest. When designed and constructed properly, these walls will perform as intended.

Wall Design

A single wythe concrete masonry wall must be designed with all the typical elements common for a successful multi-wythe wall.

The wall must be able to resist moisture penetration or the collection of water within the wall system. Also, the single wythe wall must be capable of resisting lateral wind loads and concrete masonry shrinkage cracks.

Water penetration of the concrete masonry units and mortar must be addressed by adding water repellent to the concrete masonry units during the manufacturing process and to the mortar during the construction process.

Structural stability of the single wythe wall can be achieved by adding reinforcement in the concrete masonry cores and grouting them solid. Reinforcement bar size and spacing must be determined by the structural engineer.

Wall Base

The bottom of the wall must be protected from water infiltration by installing through wall flashing and weeps. This is achieved by installing two wythes of 4” concrete masonry and stepping the flashing up and into the concrete masonry backup **(Figure 1).**

Wall Openings

Like most typical masonry buildings, wall openings must be protected from water infiltration at the window head above the opening. At this location, the flashing should be stepped up between two - 4” concrete masonry wythes and terminated into the concrete masonry backup, as indicated in **Figure 2.** Also, it is more practical and inexpensive if a precast concrete lintel is provided to support the back-half of the concrete masonry above.

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Single Wythe 8" Concrete Masonry Walls (continued)

Lateral Support

The concrete masonry wythe must be designed to resist wind loads at the masonry wall and horizontal member connections to the wall. There are multiple acceptable connections at this point, depending upon the height and function of the wall.

The type of connection between the joists and wall would depend upon the type of roof and floor system. Also, vertical elements, such as masonry shear walls, should be considered.

If the building is residential, it is more likely that wood frame structural components might be used to lateral brace the wall against wind loads as indicated in **Figure 3.**

If the building is commercial, with wider spaces required, and longer spans needed, then a frame, incorporating steel joists welded to steel ledger angles, would be more likely used, as indicated in **Figure 4.**

Parapet Wall

The primary purpose of a parapet wall is to keep water from entering into the masonry wall below. Wall copings are typically manufactured from limestone or precast concrete and are capable of resisting water penetration into the wall beneath.

Also, lateral support is required along the roof top to support the masonry above and below the roof line, as indicated in **Figure 5.**

Wall Movement

Concrete masonry shrinks, just as cast in place concrete does. This shrinkage is due to initial drying of the material. Therefore, this shrinkage must be accommodated to prevent cracks from developing in the concrete masonry walls. Shrinkage cracks are not structural and are more of an aesthetic issue.

Control joints regulate where the concrete masonry shrinkage cracks occur in the concrete masonry walls. A control joint will accommodate shrinkage by creating a plane of weakness to accommodate where the concrete masonry will crack. As a result, a shrinkage crack will not be observable in the concrete masonry wall. See Figure 6. Control joints should be spaced at 20'-0" horizontal intervals.

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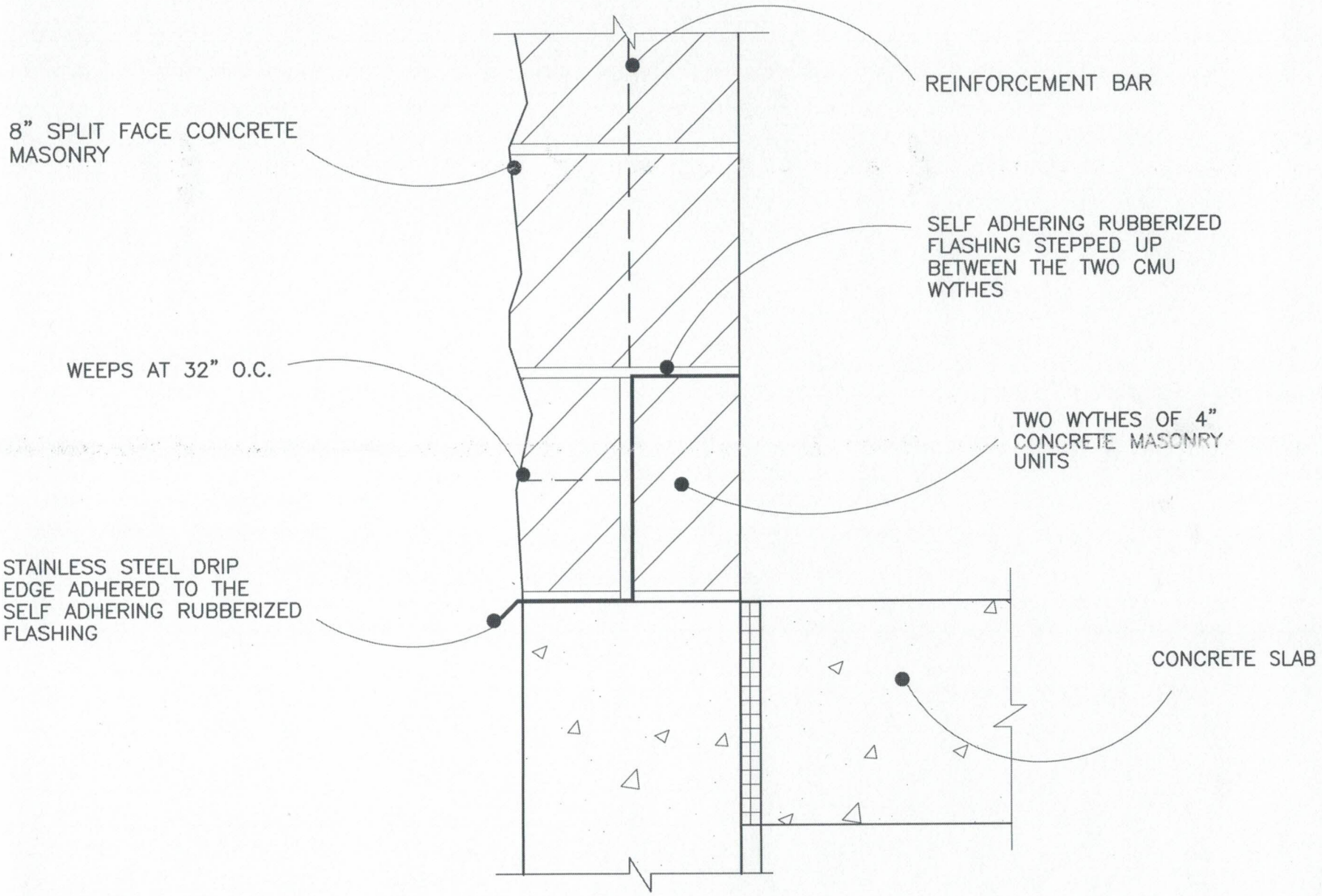
REINFORCEMENT BAR
8" SPLIT FACE CONCRETE MASONRY
SELF ADHERING RUBBERIZED FLASHING STEPPED UP BETWEEN THE TWO CMU WYTHES
WEEPS AT 32" O.C.
TWO WYTHES OF 4" CONCRETE MASONRY UNITS
STAINLESS STEEL DRIP EDGE ADHERED TO THE SELF ADHERING RUBBERIZED FLASHING
CONCRETE SLAB

FIGURE 1.

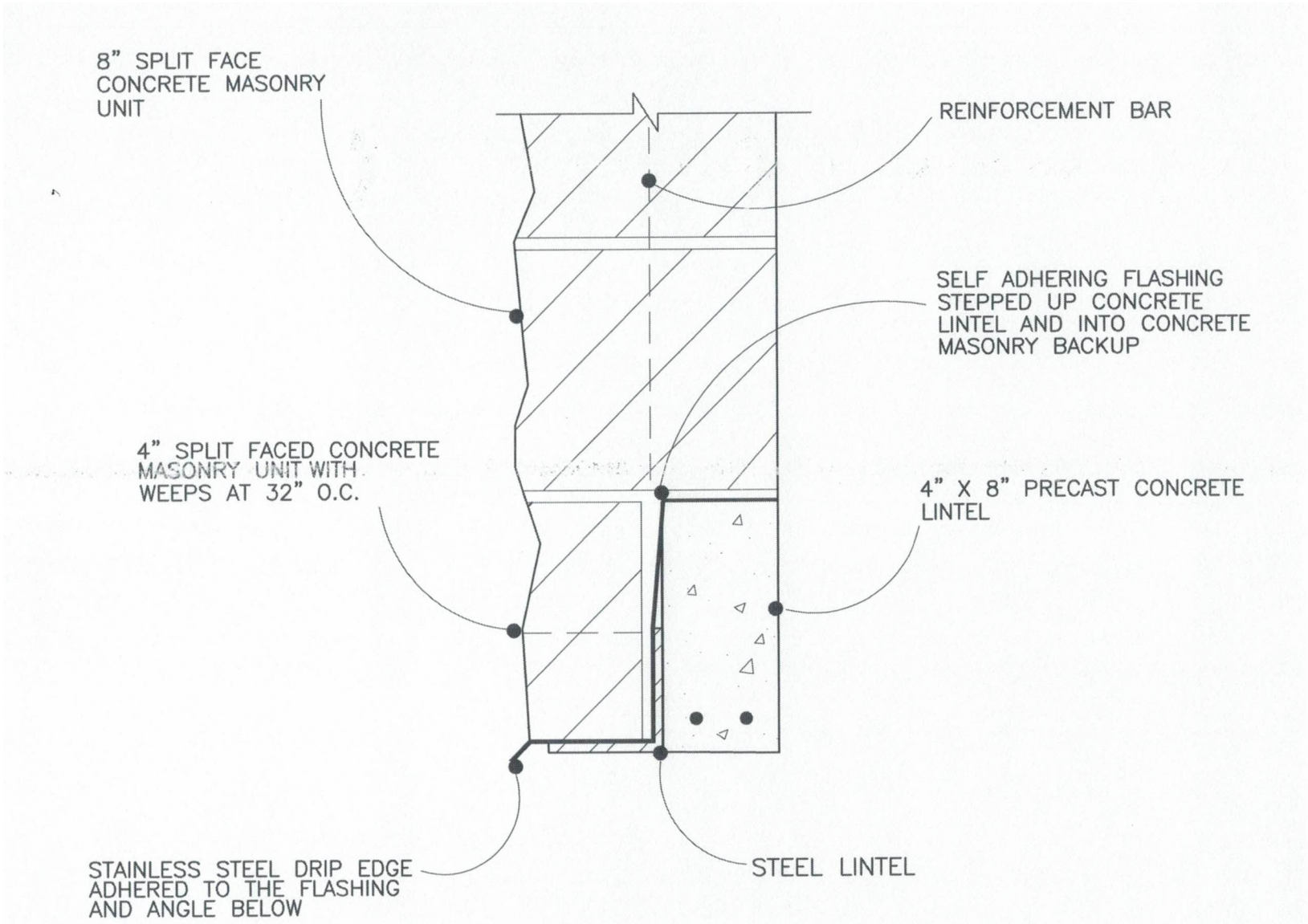
8" SPLIT FACE
CONCRETE MASONRY
UNIT
REINFORCEMENT BAR
SELF ADHERING FLASHING
STEPPED UP CONCRETE
LINTEL AND INTO CONCRETE
MASONRY BACKUP
4" SPLIT FACED CONCRETE
MASONRY UNIT WITH
WEEPS AT 32" O.C.
4" X 8" PRECAST CONCRETE
LINTEL
STAINLESS STEEL DRIP EDGE
ADHERED TO THE FLASHING
AND ANGLE BELOW
STEEL LINTEL

FIGURE 2

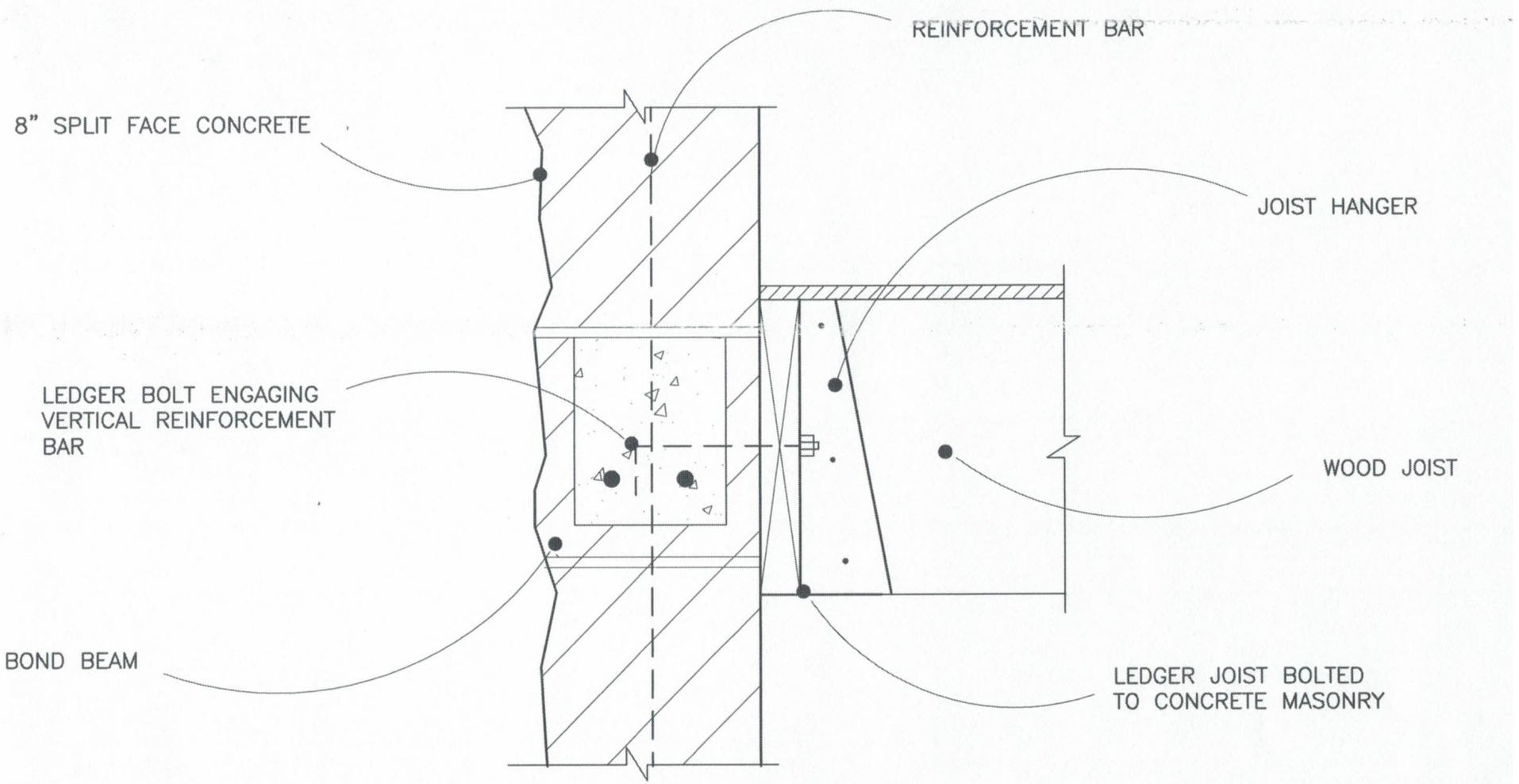
REINFORCEMENT BAR
8" SPLIT FACE CONCRETE
JOIST HANGER
LEDGER BOLT ENGAGING VERTICAL REINFORCEMENT BAR
WOOD JOIST
BOND BEAM
LEDGER JOIST BOLTED TO CONCRETE MASONRY

FIGURE 3.

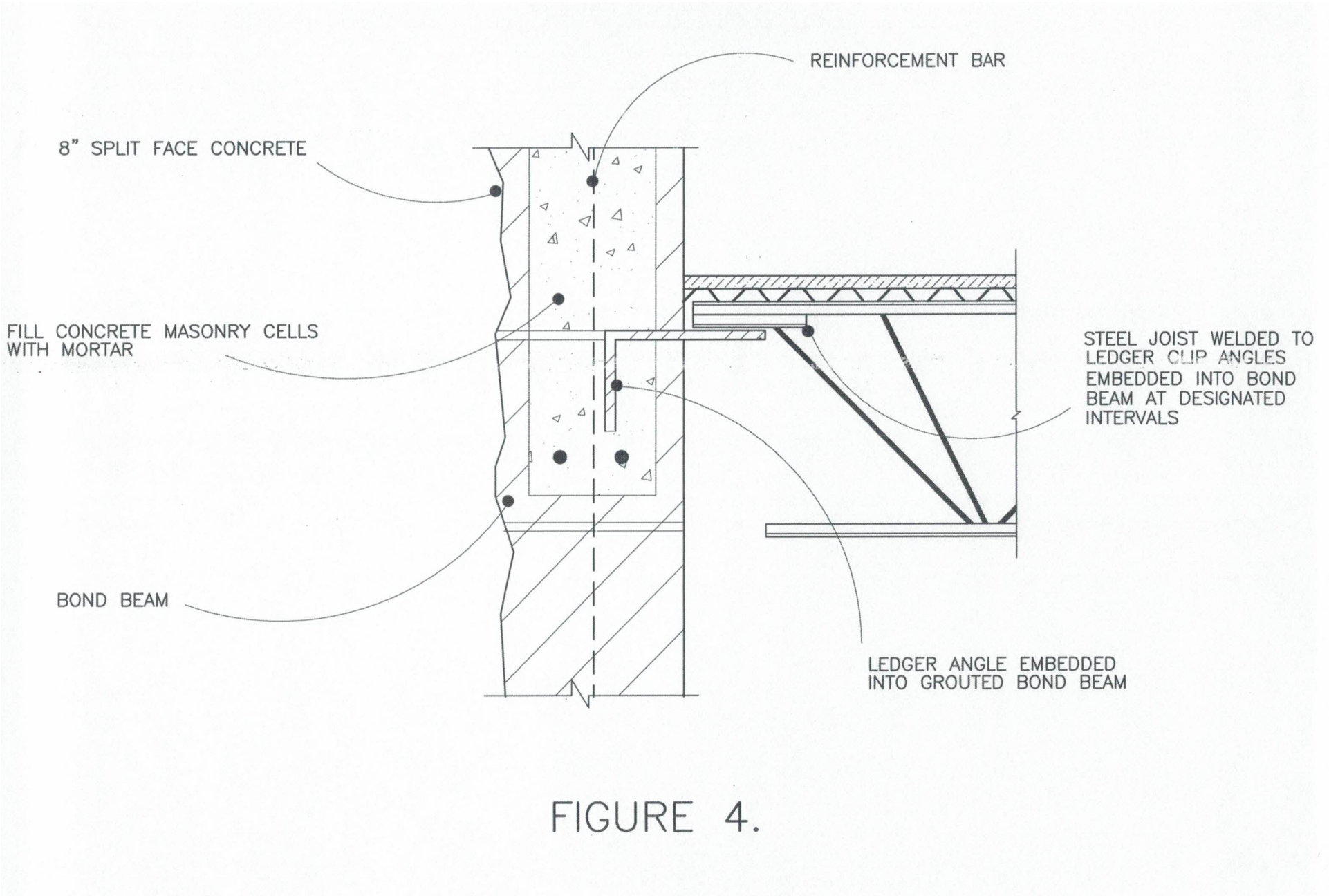
REINFORCEMENT BAR
8" SPLIT FACE CONCRETE
FILL CONCRETE MASONRY CELLS WITH MORTAR
STEEL JOIST WELDED TO LEDGER CLIP ANGLES EMBEDDED INTO BOND BEAM AT DESIGNATED INTERVALS
BOND BEAM
LEDGER ANGLE EMBEDDED INTO GROUTED BOND BEAM

FIGURE 4.

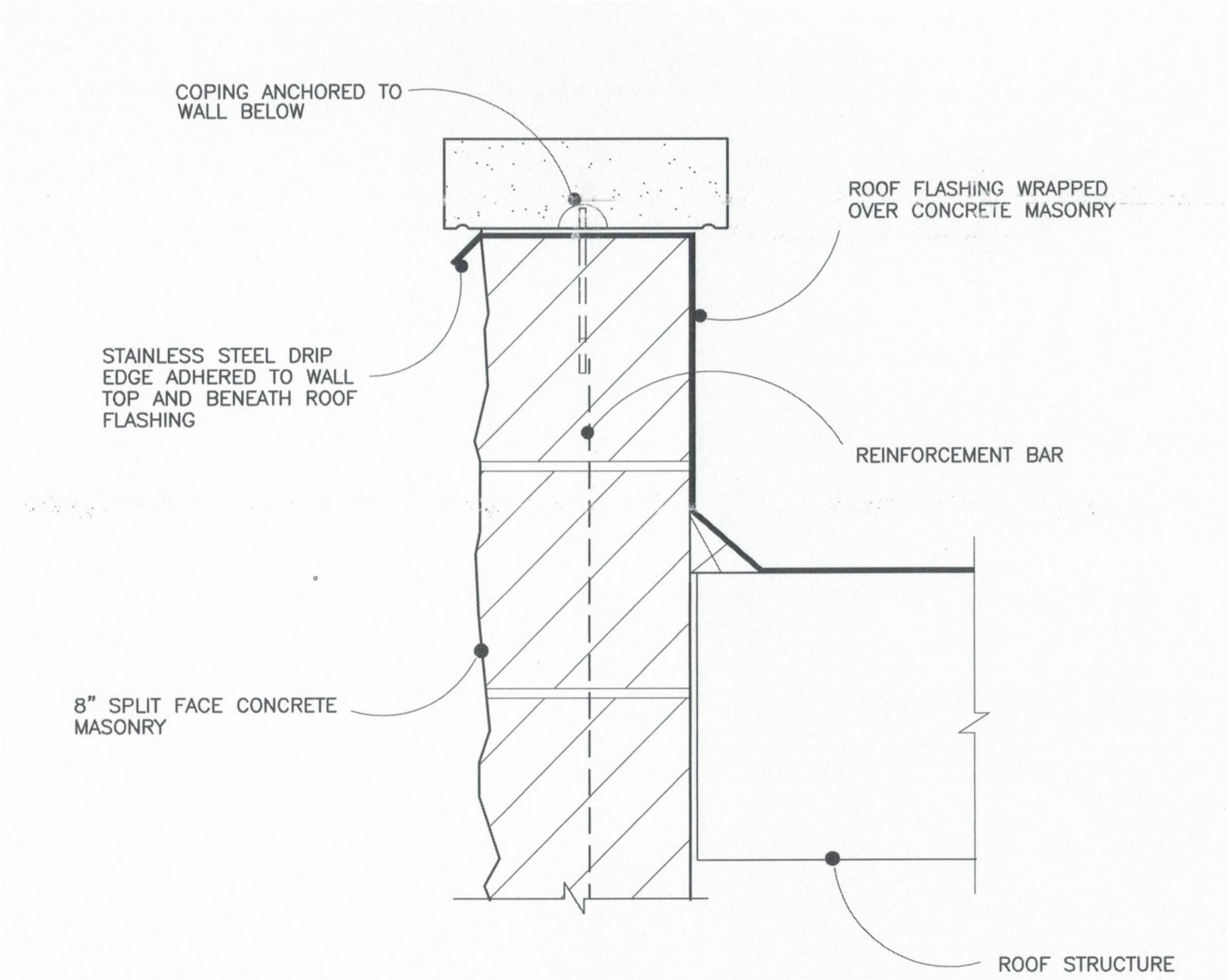
COPING ANCHORED TO WALL BELOW
ROOF FLASHING WRAPPED OVER CONCRETE MASONRY
STAINLESS STEEL DRIP EDGE ADHERED TO WALL TOP AND BENEATH ROOF FLASHING
REINFORCEMENT BAR
8" SPLIT FACE CONCRETE MASONRY
ROOF STRUCTURE

FIGURE 5.

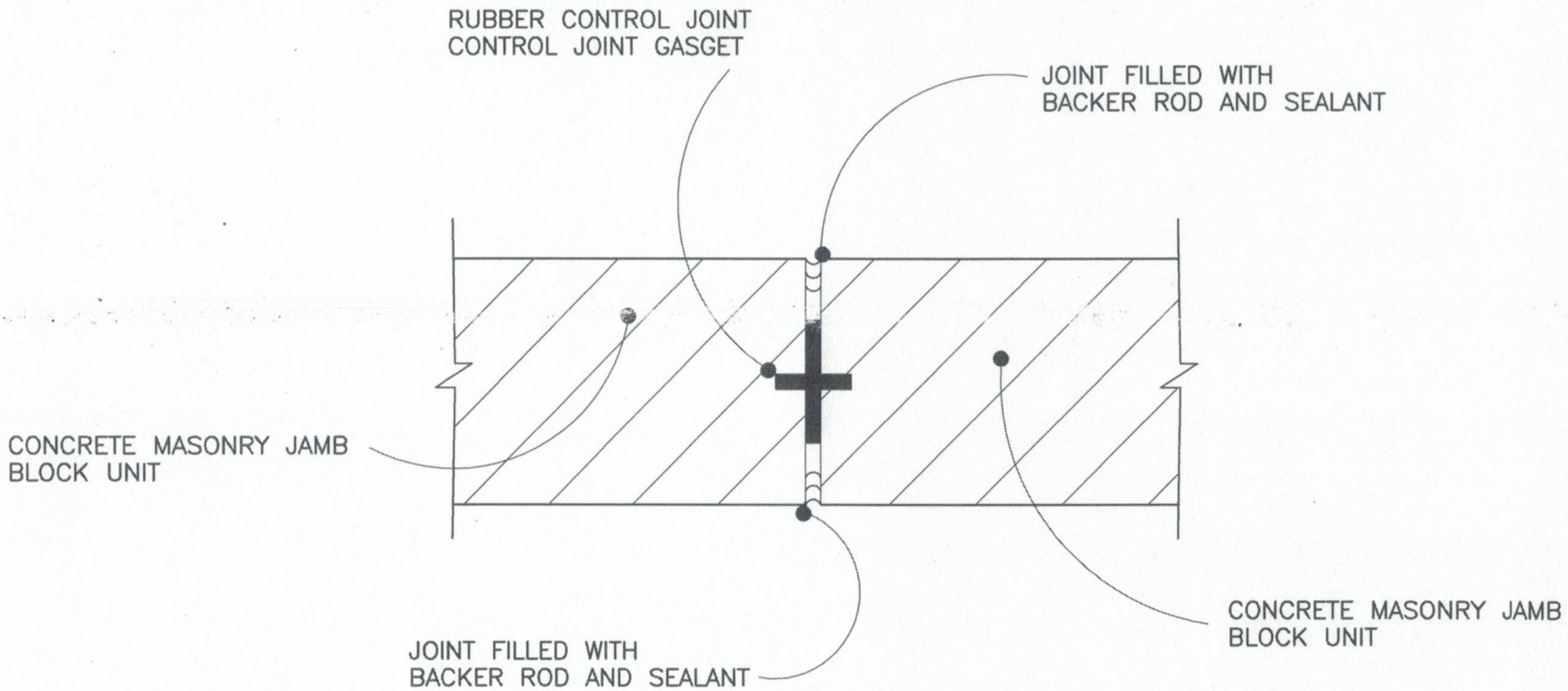
RUBBER CONTROL JOINT
CONTROL JOINT GASGET
JOINT FILLED WITH
BACKER ROD AND SEALANT
CONCRETE MASONRY JAMB
BLOCK UNIT
JOINT FILLED WITH
BACKER ROD AND SEALANT
CONCRETE MASONRY JAMB
BLOCK UNIT

FIGURE 6.