

*MASONRY DETAILS
FOR
RESIDENTIAL CONSTRUCTION*

by

Dr. M.A. Hatzinikolas, P.Eng.

Canadian Masonry Research Institute
February 1994

**CANADIAN
MASONRY
RESEARCH
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Masonry Details for Residential Construction

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Recommended Components And Accessories For Constructing Masonry Veneers

Mortar

Use Type S or Type N mortar mixed in proportions by volume as per CSA Standard A179 "Mortar and Grout for Unit Masonry".

Mortar Proportions by Volume

Mortar Type	Portland Cement	Hydrated Lime or Lime Putty	Aggregate*
S	1	1/2	4-1/2
N	1	1	6

OR

Mortar Type	Portland Cement	Masonry Cement	Aggregate*
S	1/2	1 (Type H)	4-1/2
N	0	1 (Type H)	3

Ties

For cavities less than or equal to 25 mm, 22 gauge corrugated strips can be used to fasten the wall to the backup system. Corrugated strips should be hot dip galvanised for corrosion protection. They should be fastened to the wood frame by means of galvanised spiral nails penetrating a minimum of 63 mm into the wood frame. The position and placing of the corrugated strip should be as shown in Figure 18, adopted from CSA Standard A370 "Connectors for Masonry".

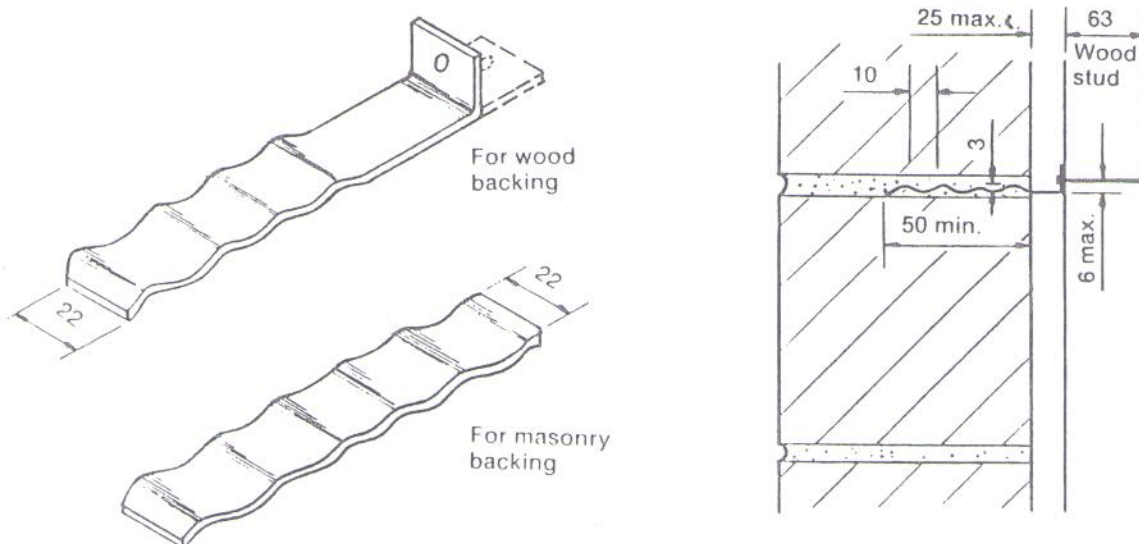


Figure 19: Corrugated Strip Tie Installation Guidelines

The guidelines for installation and limitations of the corrugated strip ties as stated in CSA Standard A370-M84 should be followed.

Standard corrugated strip ties normally used to connect masonry veneer to its structural backing in buildings not exceeding 11 m in height, shall have corrugations over at least the embedment length and the following characteristics:

- (a) thickness: 0.76 ± 0.05 mm;
- (b) width: 22 ± 2 mm;
- (c) wavelength of corrugations: 10 ± 1 mm; and
- (d) depth of corrugations from crest to trough: 2 to 3 mm.

Where standard corrugated strip ties are used to connect masonry veneer to a structural backing

- (a) the ties shall be embedded at least 50 mm in masonry units;
- (b) the maximum unsupported length of tie between the veneer and its structural backing shall be 25 mm;
- (c) strip ties shall be connected directly to the studs or other structural backing; and
- (d) strip ties shall not be bent or sloped between the veneer and the structural backing, except as specified in Clause 9.2.1.3.

Where standard corrugated strip ties are to be connected to steel studs, the load capacity and performance of the fasteners used shall be determined by physical testing in accordance with Clause 11.

The maximum spacing for standard corrugated strip ties where pressure on the veneer does not exceed 1.4 kPa shall be as follows:

Spacing combinations, mm

Maximum cavity width mm	Horizontal	Vertical
25	(a) 400 or (b) 600	600 400

Flashing and weep holes should be incorporated into the veneer wall at the base level. Flashing should also be installed at the window sills and wherever angle iron is used to support the veneer. Good quality flashing materials installed with slope and a drip edge this will ensure proper drainage and durability.

Masonry Units

The details contained in this booklet are applicable for tyndall stone, burned clay units and concrete bricks.

For projects incorporating long walls and where the walls are supported by flexible structural components, control joints must be incorporated into the wall assemblies.

Caution: The use of used masonry units (reclaimed bricks) requires careful selection of the units to ensure that these units were meant for exterior application. Reclaimed backup bricks deteriorate very rapidly when used in exterior applications. Units new and old used to construct backup walls must satisfy the existing (current) manufacturing standards especially current durability requirements.

Flashing

A sheet of impervious material built into the structure to prevent moisture penetration and/or to direct water which may penetrate the veneer to the outside. Suitable materials to be used for flashing shall not be less than the following.

Polyethylene sheet 0.15 mm;

Sheet lead, 1.73 mm;

Galvanised steel, 0.33 mm;

Copper, 0.36 mm;

Copper, 0.05 mm laminated to felt or kraft paper;

Zinc, 0.46 mm; and

Poly(vinyl chloride), 0.50 mm

Construction Details for Residential Buildings

Following figures show the construction details for residential buildings.

Figure 1	Building elevation
Figure 2	Brick veneer over garage door opening
Figure 3	Typical brick angle support detail for garage opening
Figure 4	Brick veneer supported by truss (typically over attached garages)
Figure 5	Alternate brick veneer supported by truss (typically over attached garages)
Figure 6	Section through brick veneer supported by truss (typically over attached garages)
Figure 7	Section through alternate brick veneer supported by truss (typically over attached garages)
Figure 8	Typical wall section
Figure 9	Alternate brick detail at soffit
Figure 10	Typical steel shelf angle brick support
Figure 11	Typical concrete foundation wall brick support detail
Figure 12	Wall section with insulation in the cavity
Figure 13	Steel shelf angle brick support detail with cavity insulation
Figure 14	Steel shelf angle brick support detail at stud wall for window openings
Figure 15	Brick shelf angle support detail for bay window
Figure 16	Section through typical brick shelf angle support detail for bay window
Figure 17	Typical brick angle support detail for bay window
Figure 18	Window opening with loose angle iron lintel

Tables 1 presents the spacing of anchors to be used to anchor the brick veneer support steel shelf angle to the concrete wall and Table 2 presents the Maximum allowable spans for steel shelf angles supporting the brick veneer.

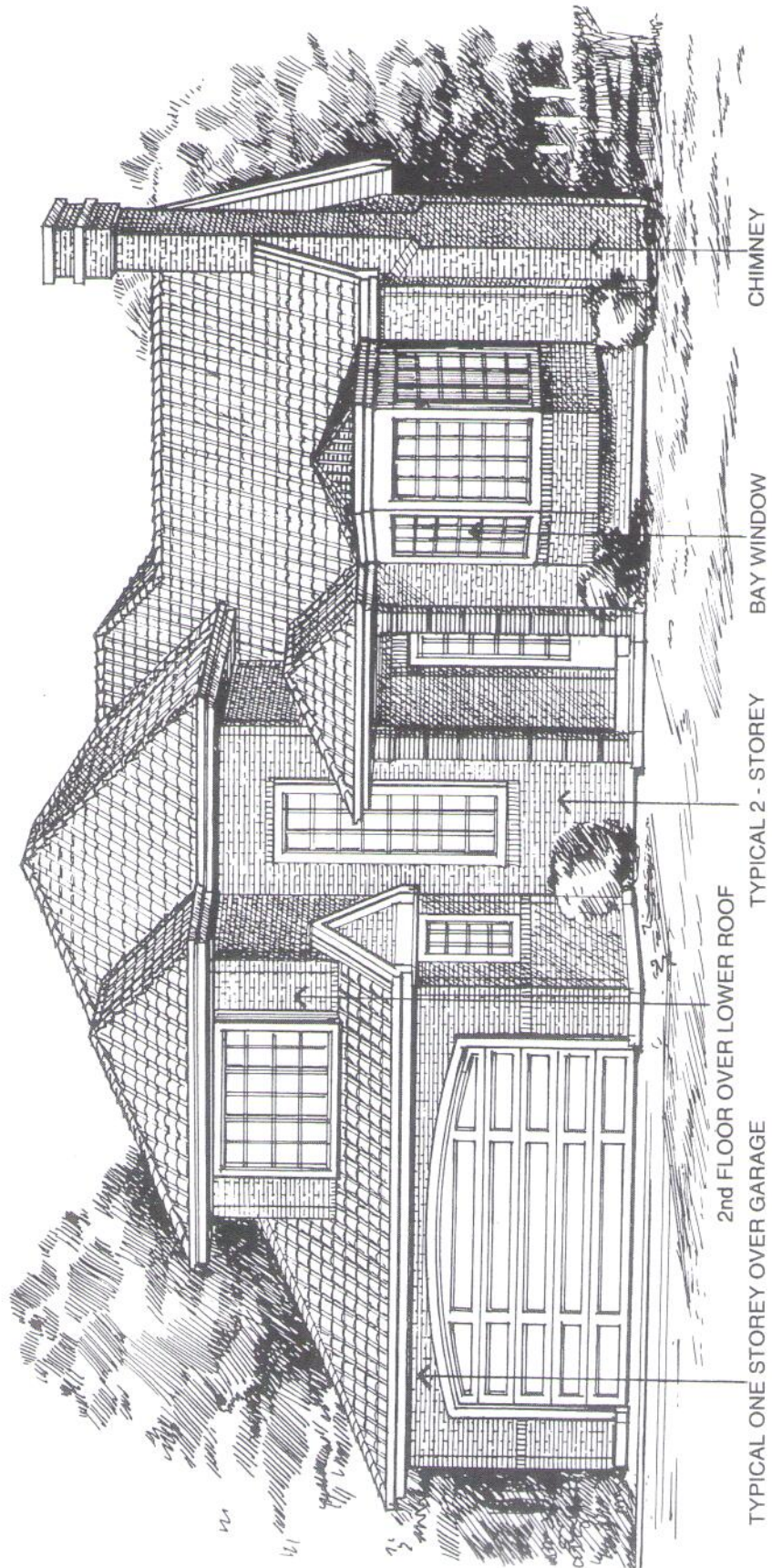


Figure 1 Building Elevation

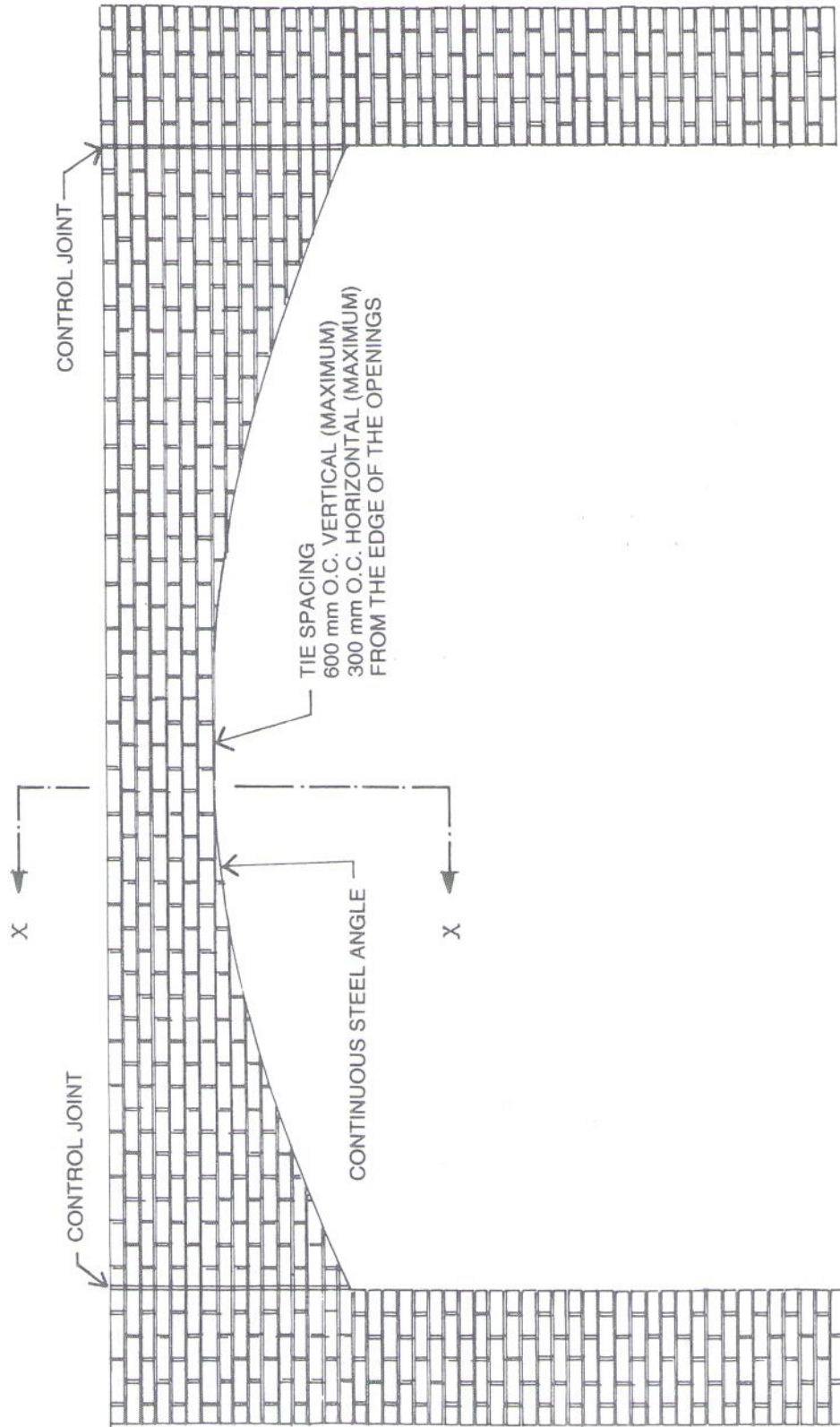


Figure 2 Brick veneer over garage door opening

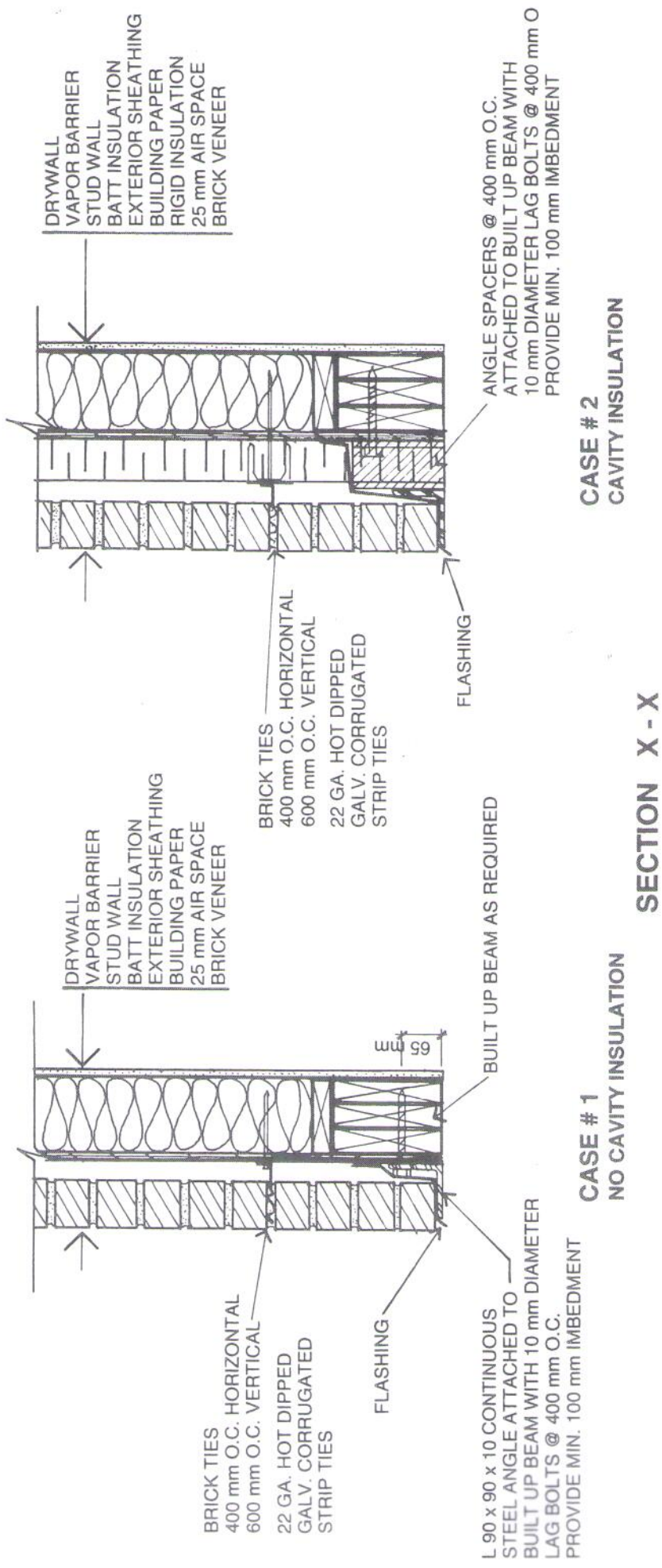


Figure 3 Typical brick angle support detail for garage opening

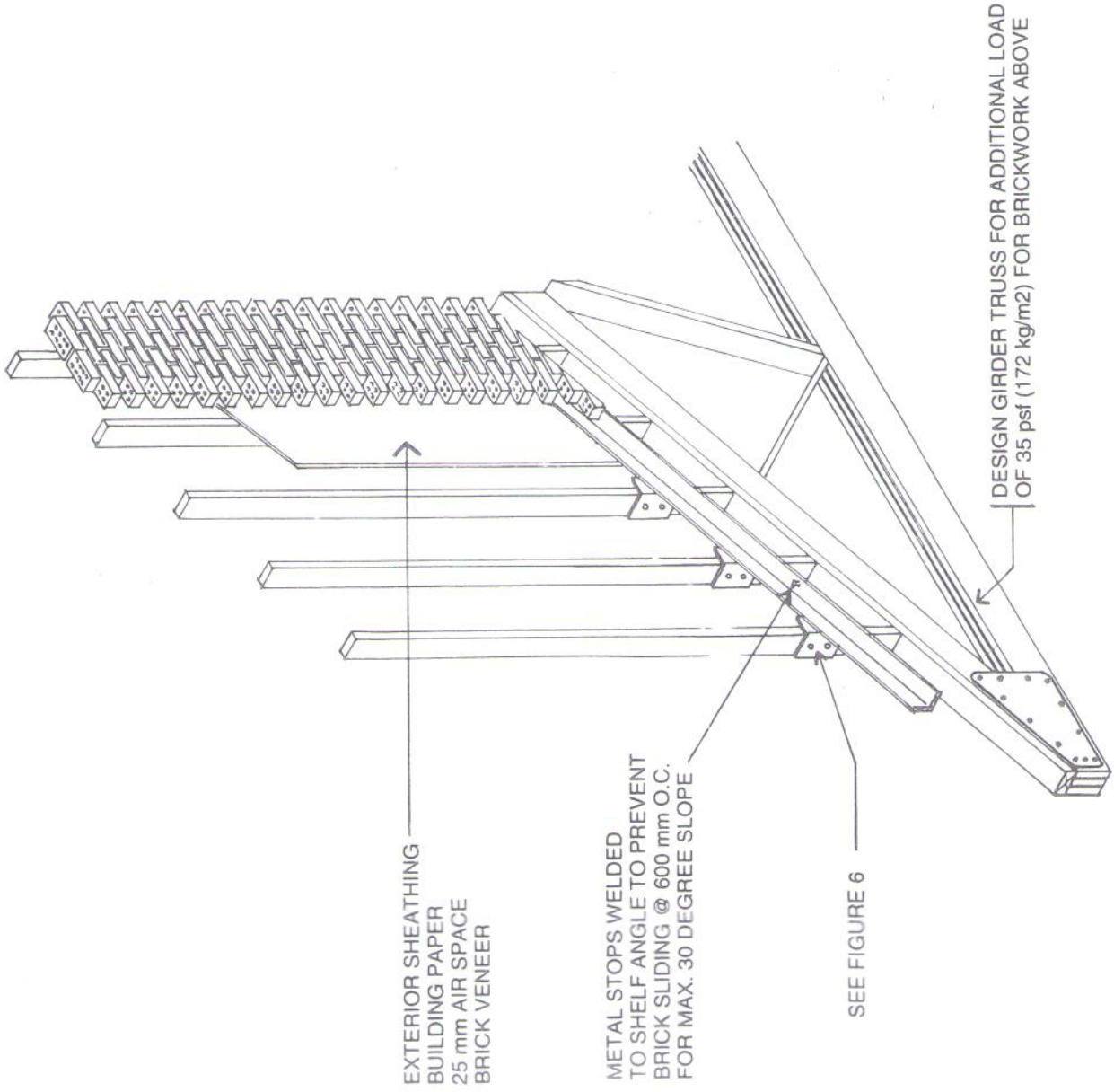
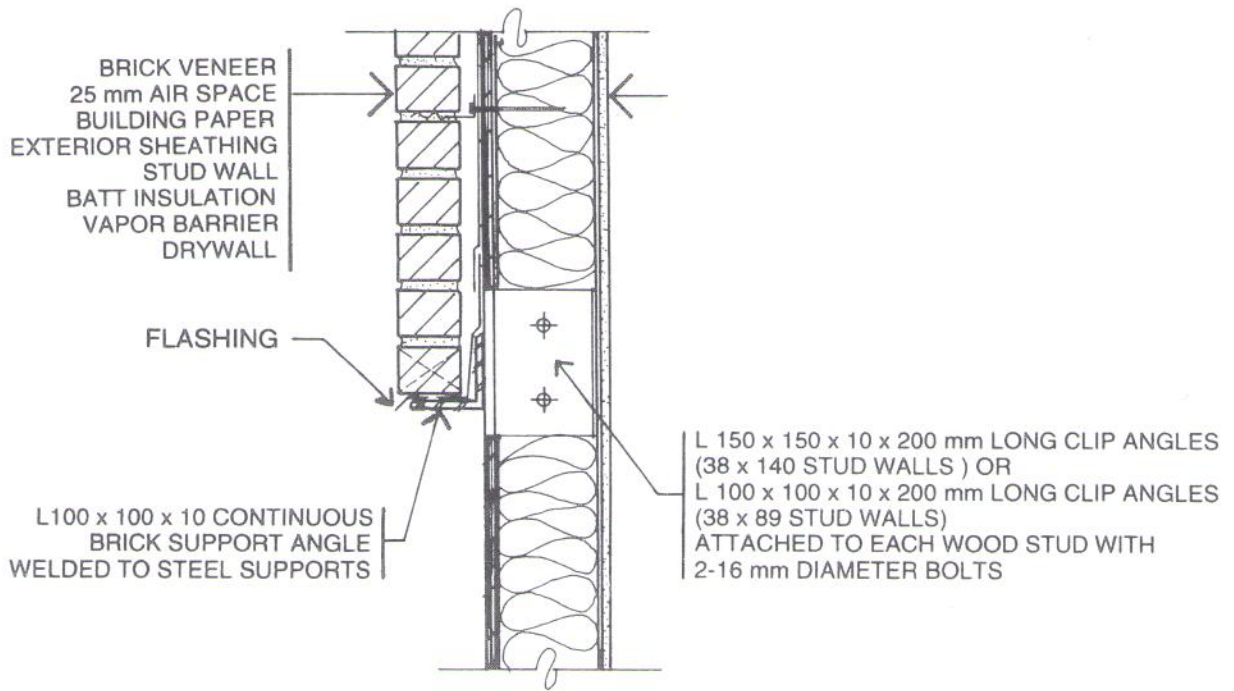
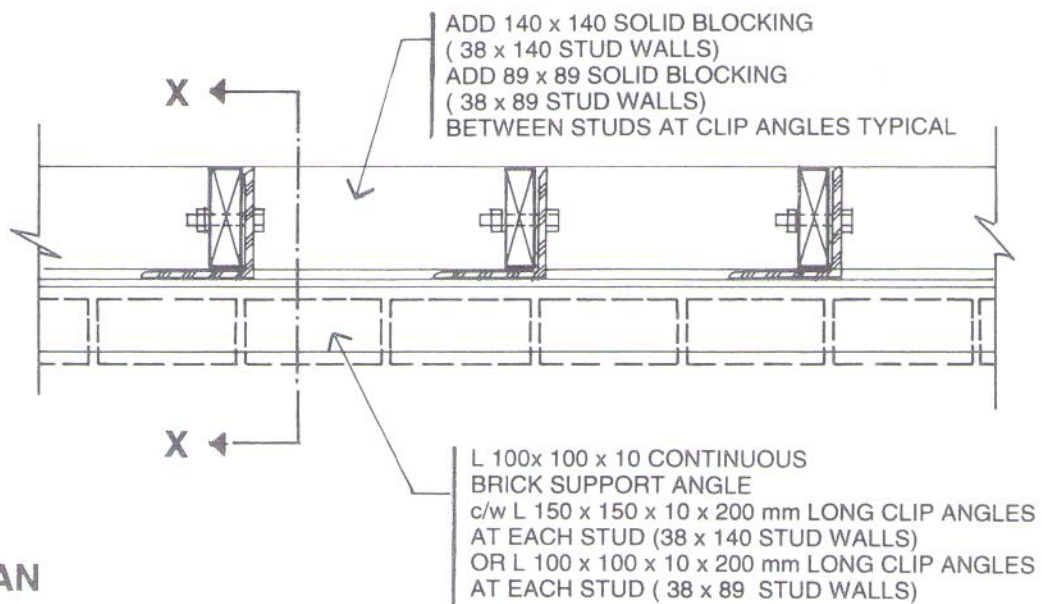


Figure 4 Brick veneer supported by truss (typically over attached garages)

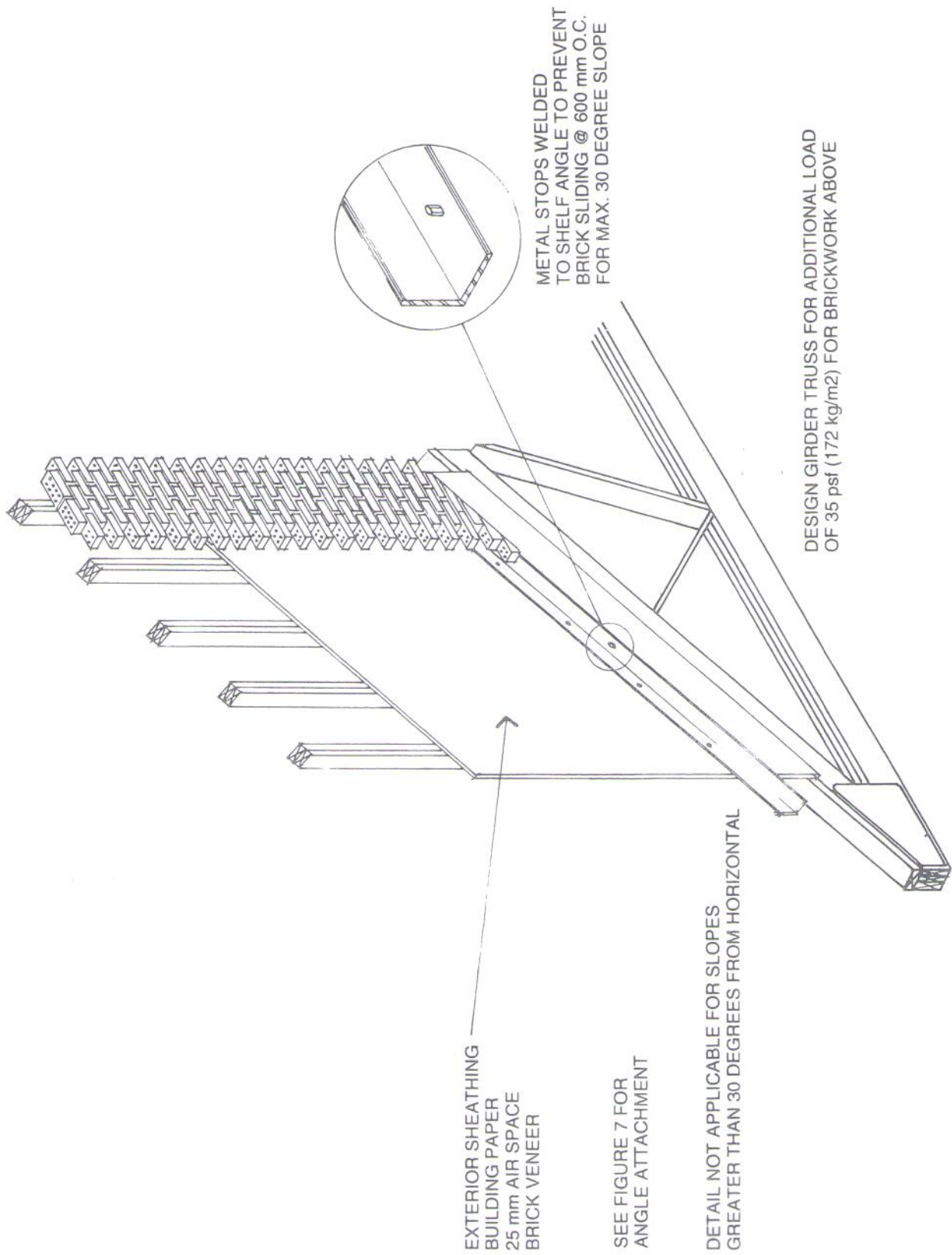


SECTION X - X



PLAN

Figure 5 Alternate brick veneer supported by truss (typically over attached garages)



**Figure 6 Section through brick veneer supported by truss
(typically over attached garages)**

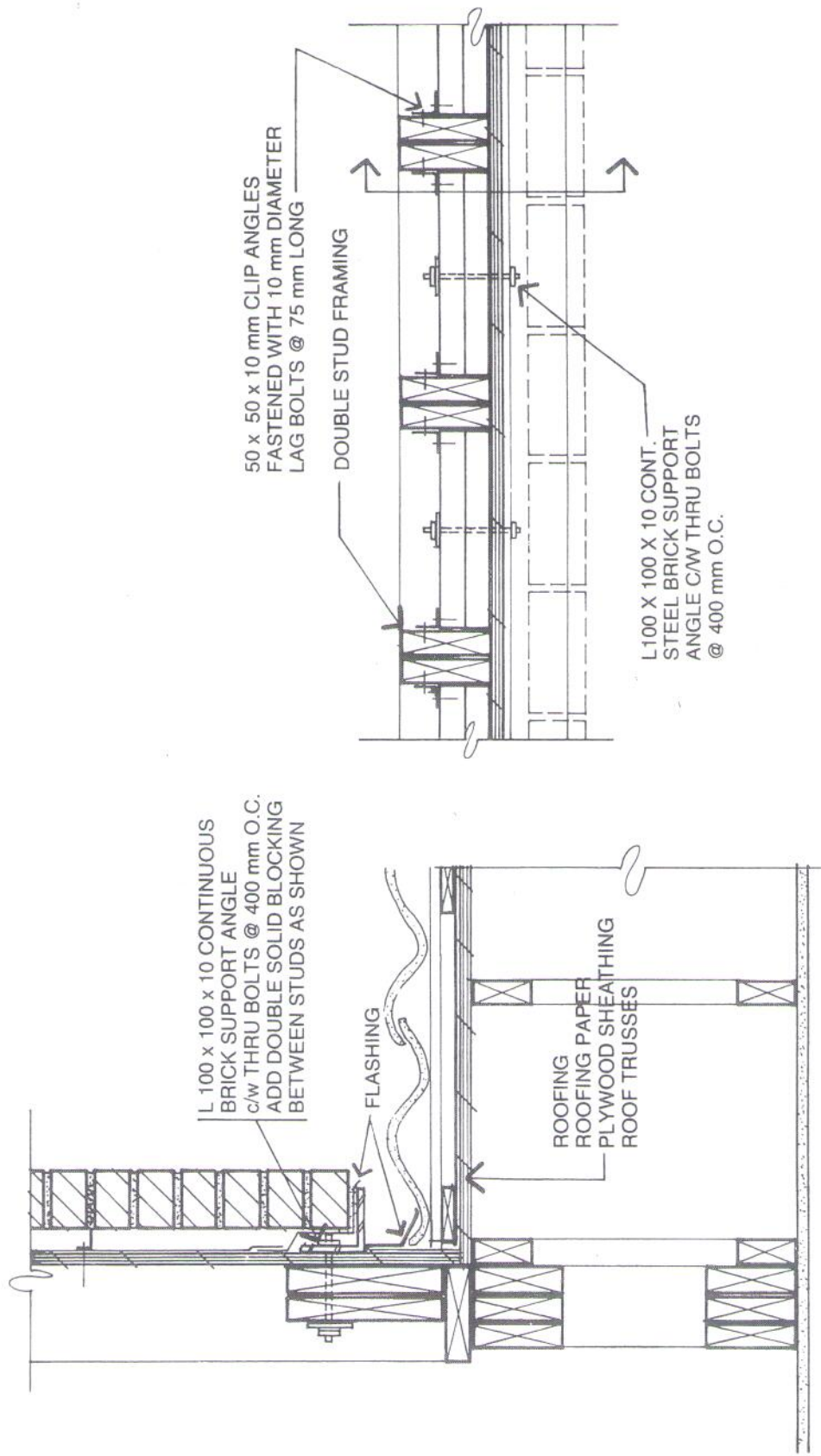


Figure 7 Section through alternate brick veneer supported by truss
 (typically over attached garages)

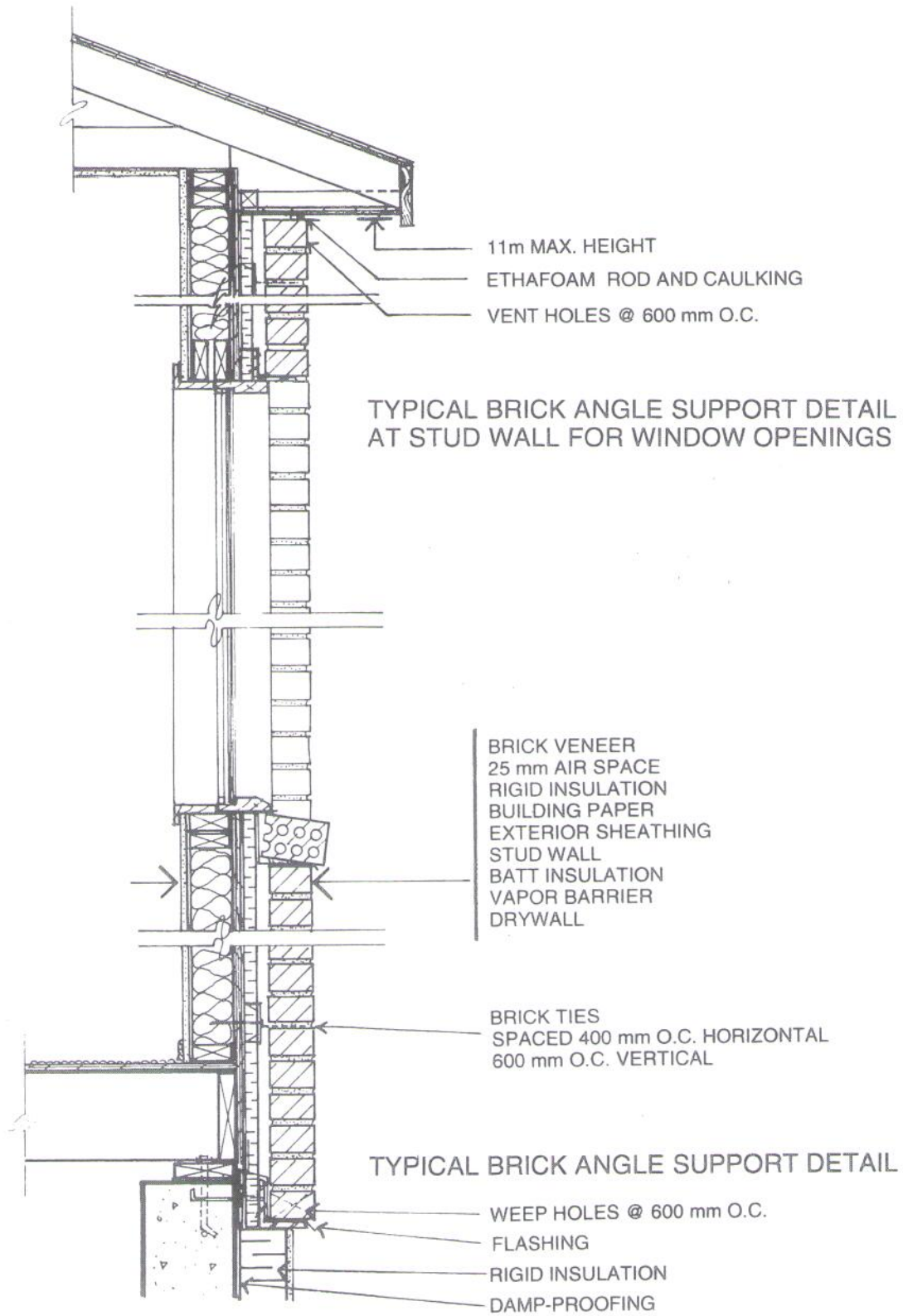


Figure 8 Typical wall section

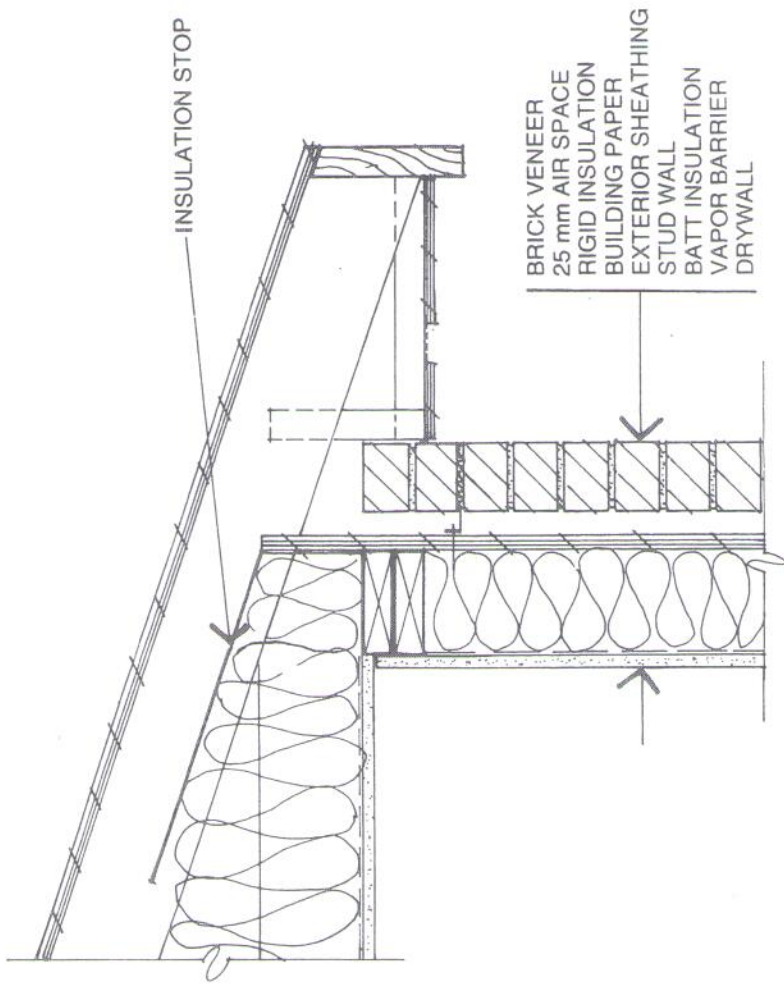


Figure 9 Alternate brick detail at soffit

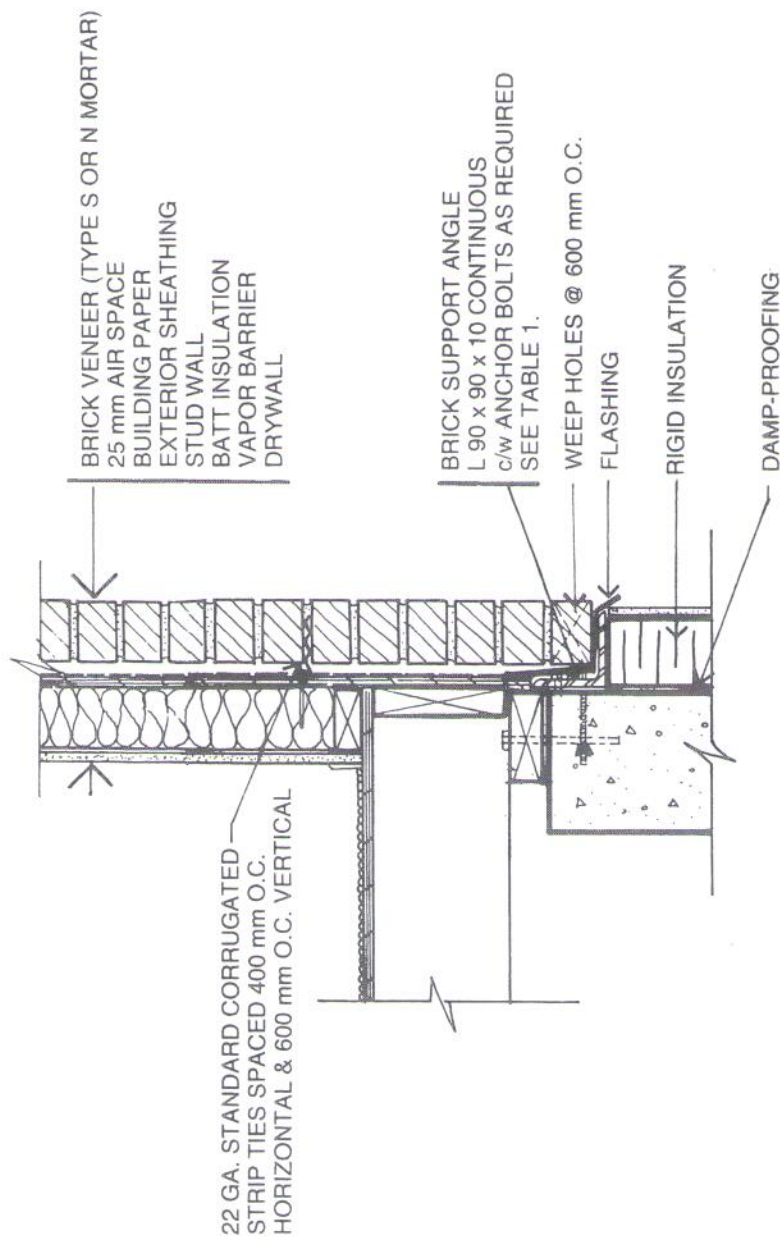


Figure 10 Typical steel shelf angle brick support

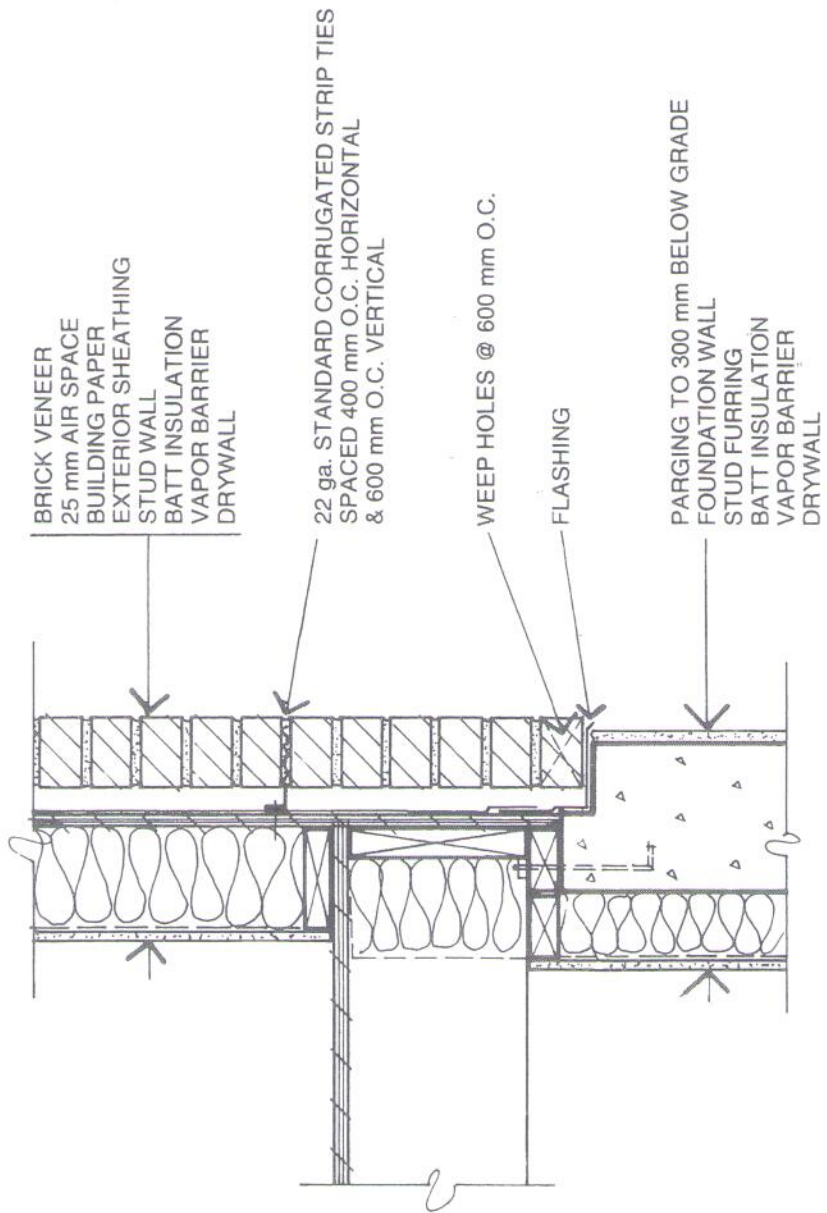


Figure 11 Typical concrete foundation wall brick support detail

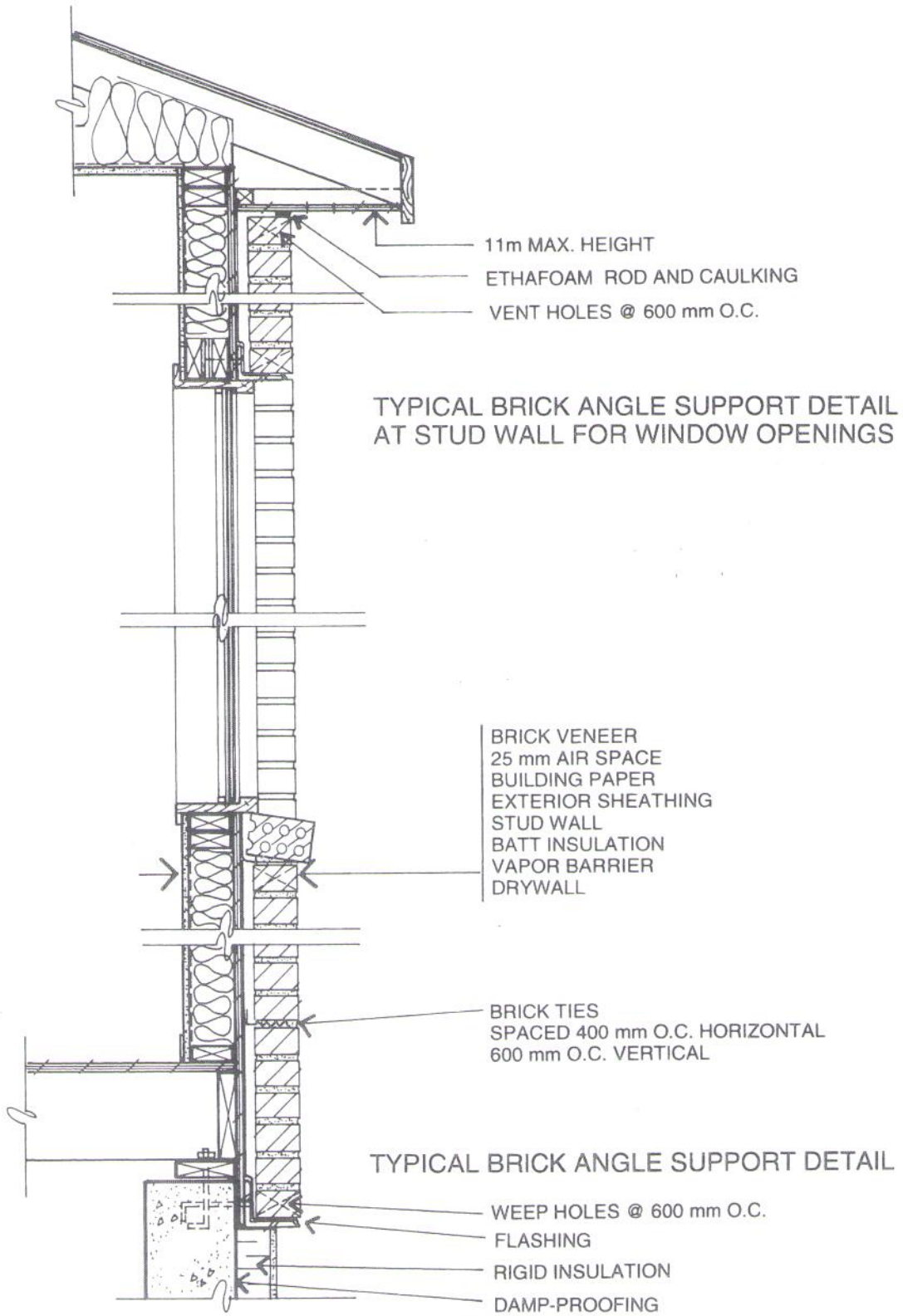


Figure 12 Wall section with insulation in the cavity

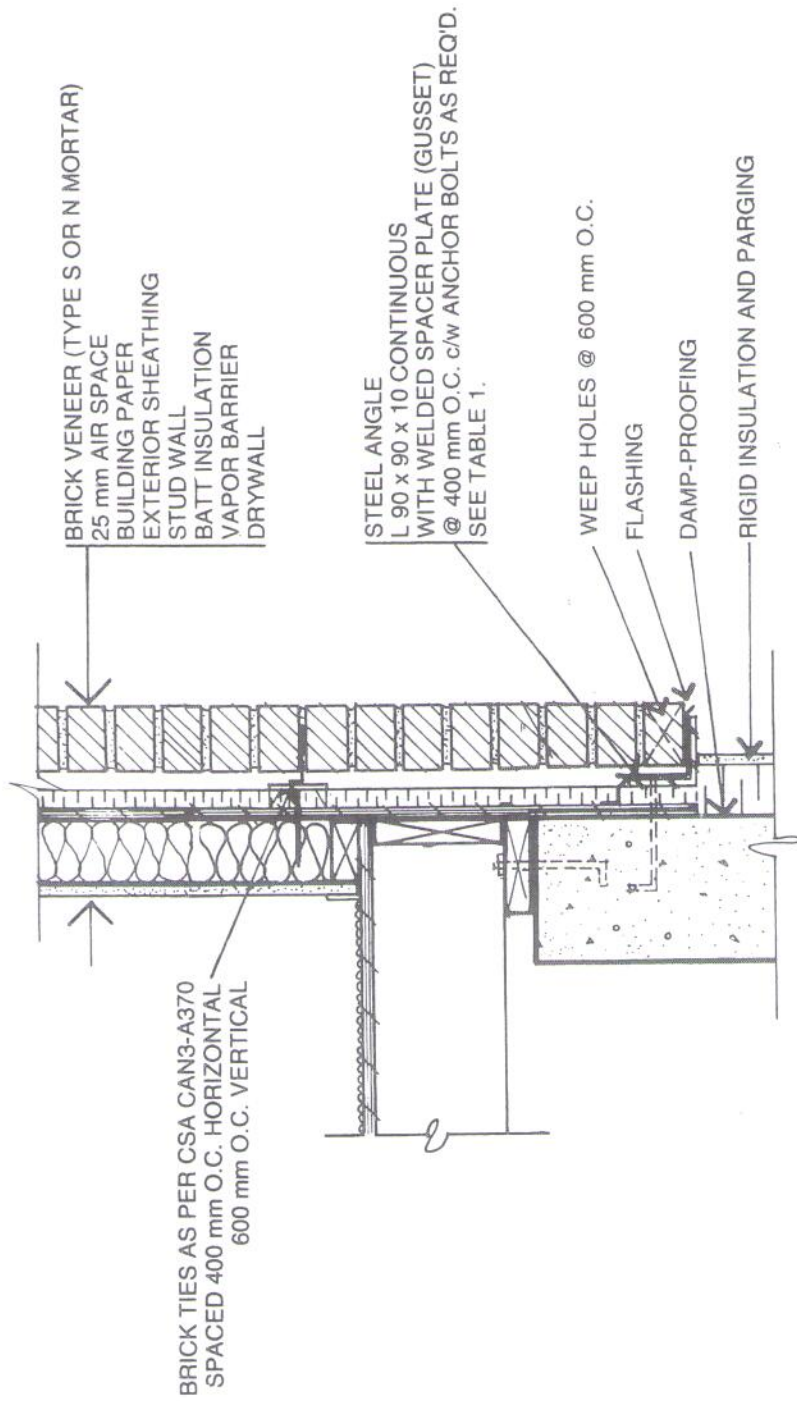


Figure 13 Steel shelf angle brick support detail with cavity insulation

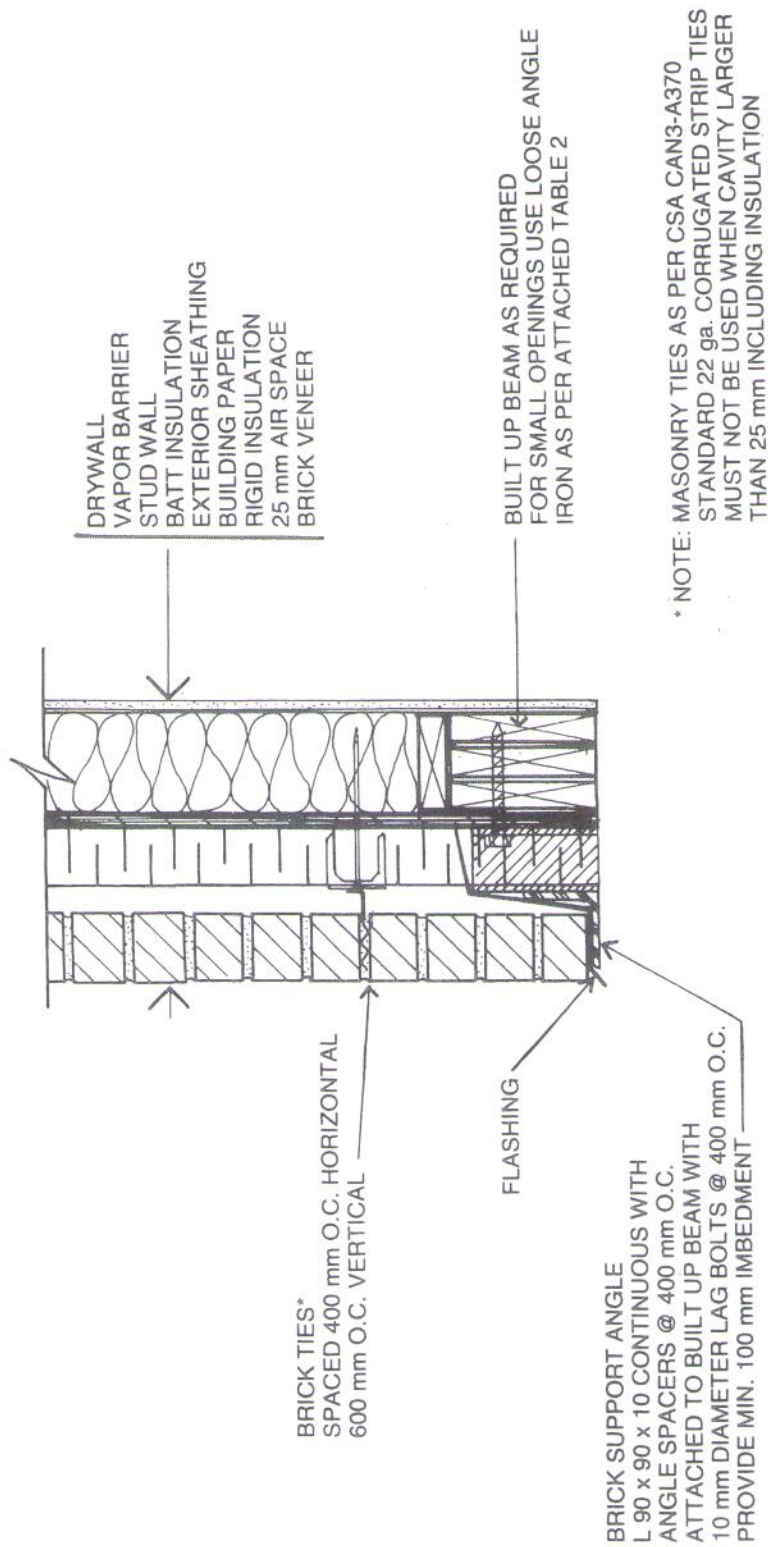


Figure 14 Steel shelf angle brick support detail at stud wall for window openings

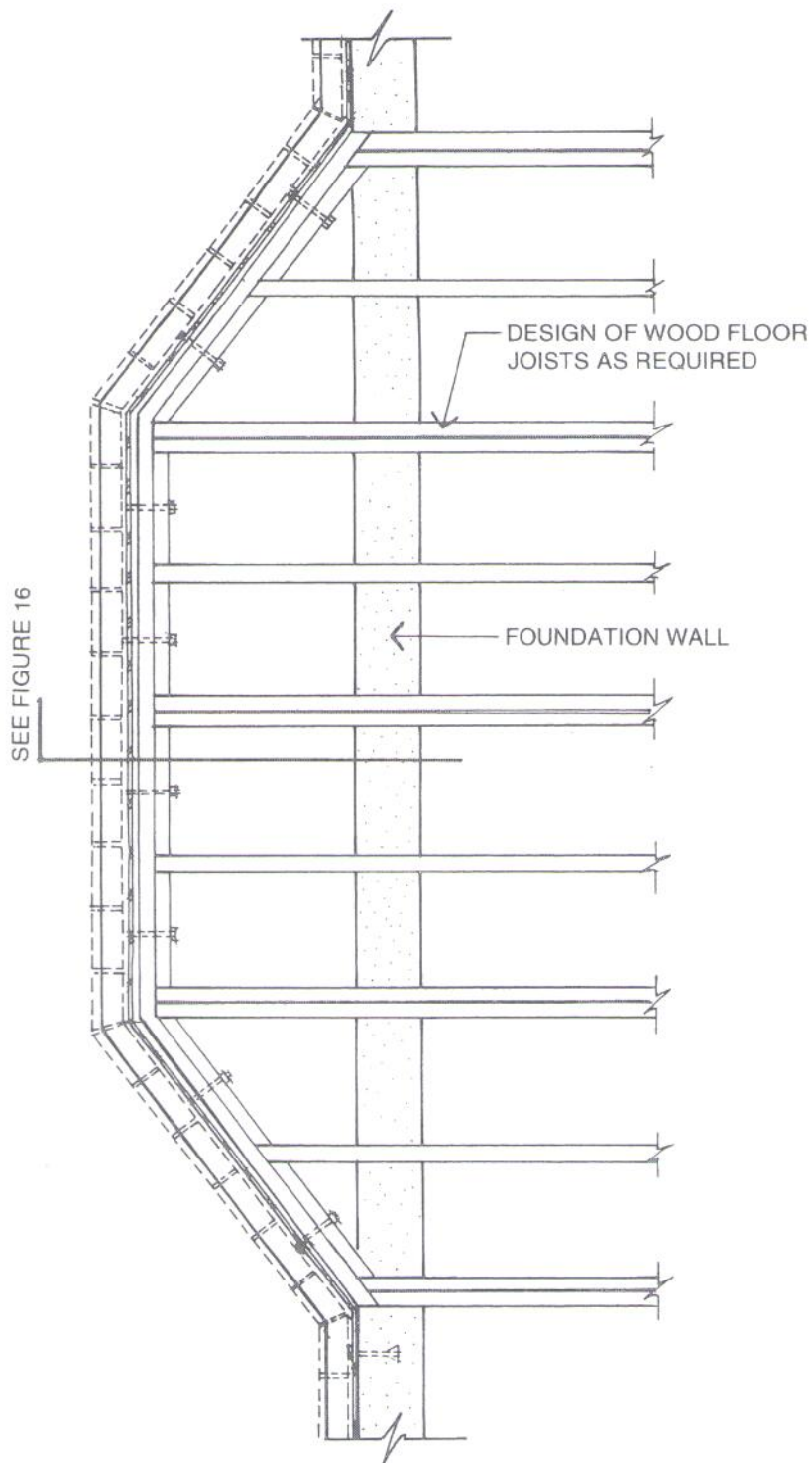


Figure 15 Brick shelf angle support detail for bay window

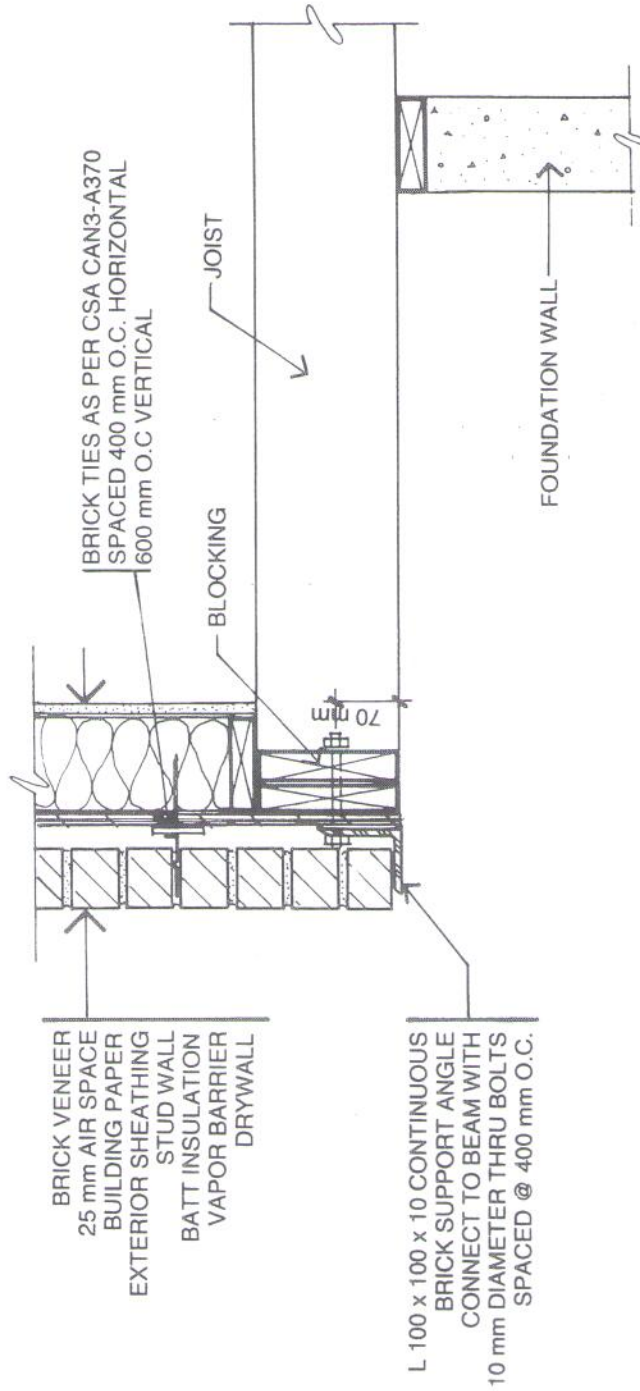


Figure 16 Section through typical brick shelf angle support detail for bay window

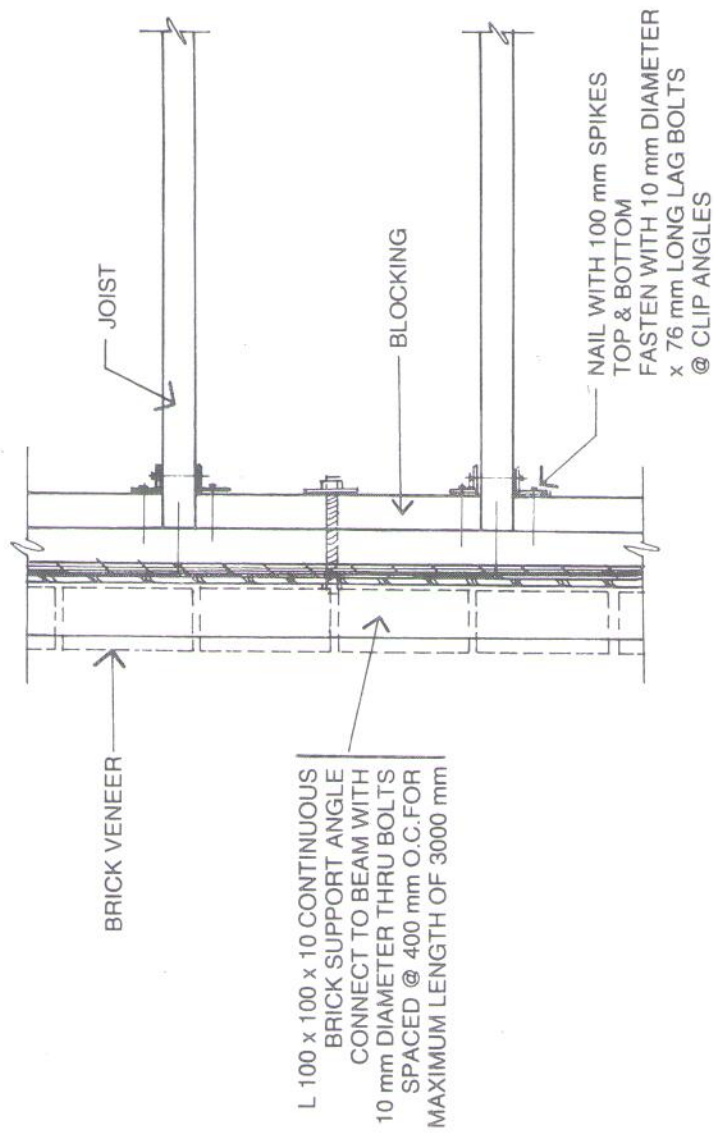


Figure 17 Typical brick angle support detail for bay window

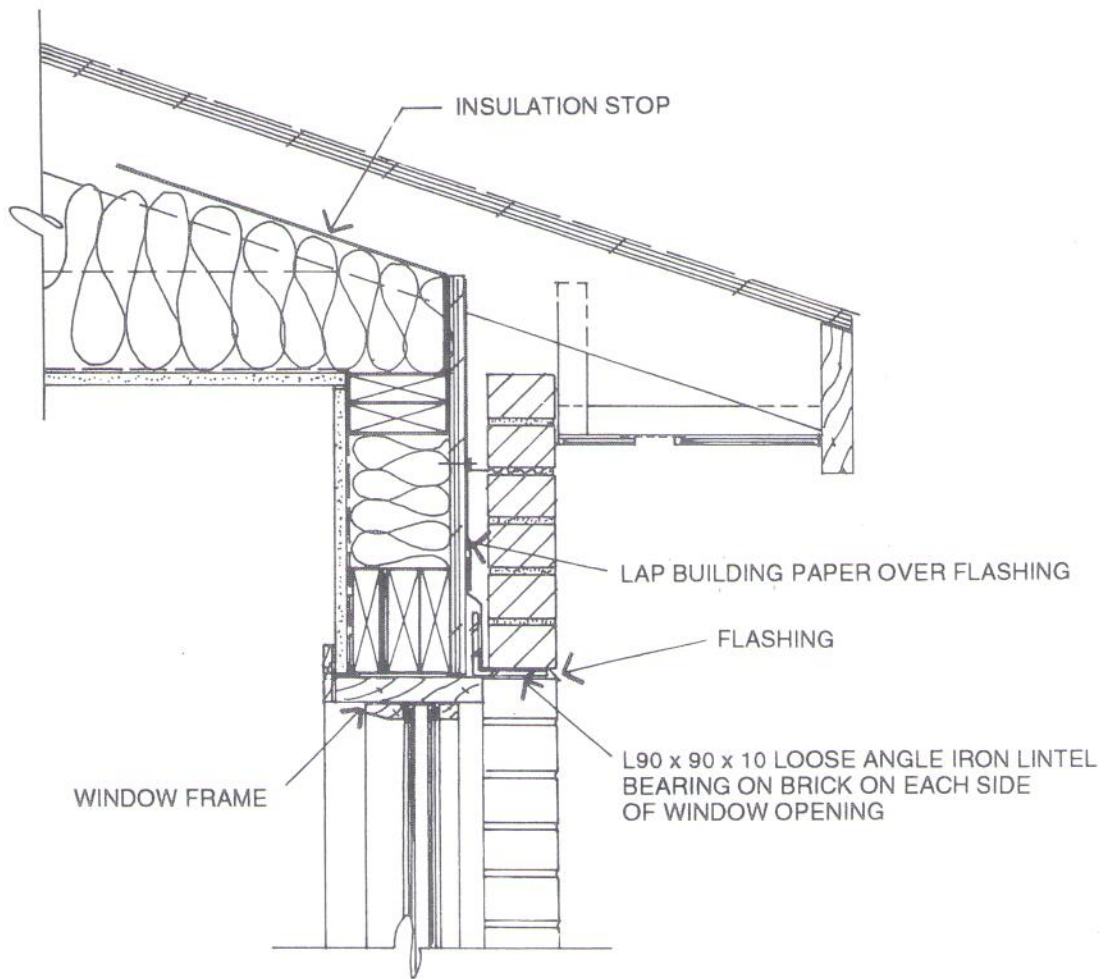


Figure 18 Window opening with loose angle iron lintel

Table 1 Anchoring on concrete basement wall 90 mm x 90 mm x 10 mm angle iron to provide support for brick veneer

Height of Brick, m	Spacing			
	Drop-In Anchor		Wedge Anchor	
	1/2" Dia.	5/8" Dia.	1/2" Dia.	5/8" Dia.
1.2	1.10 m	1.20 m	1.20 m	1.20 m
1.8	0.70 m	1.20 m	1.10 m	1.20 m
2.4	0.50 m	0.90 m	0.80 m	1.10 m
3.0	0.45 m	0.70 m	0.60 m	0.90 m
3.6	0.35 m	0.60 m	0.50 m	0.75 m
Min. Embedment	50 mm	60 mm	60 mm	70 mm
Min. Edge Distance	65 mm	80 mm	65 mm	80 mm

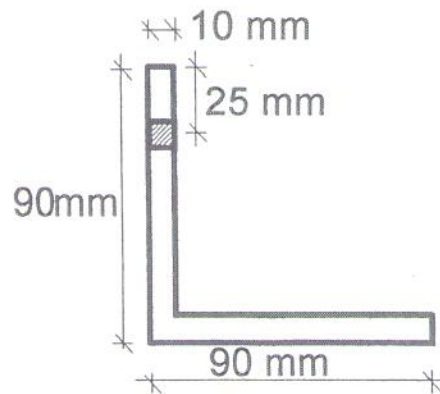


Table 2
 Maximum Allowable Spans for Steel Lintels
 Supporting Masonry Veneer--with Imperial Equivalents

Minimum angle size		Brick thickness			Stone thickness		
mm	Inches	75 mm	3 Inches	90 mm	3-5/8 Inches	100 mm	4 Inches
		Span			Span		
90x75x6.0	3.5x3x0.25	2500"	8 ft 4 in	--	--	--	--
90x90x6.0	3.5x3.5x0.25	2600"	8 ft 5 in	2500	8 ft 1 in	2300"	7 ft 7 in
100x90x6.0	4x3.5x0.25	2800"	9 ft 3 in	2700	8 ft 10 in	2500"	8 ft 3 in
125x90x6.0	5x3.5x0.25	3300"	10 ft 10 in	3100	10 ft 4 in	2900"	9 ft 7 in
150x90x6.0	6x3.5x0.25	3700"	12 ft 3 in	3500	11 ft 8 in	3300"	10 ft 11 in

Adopted from CSA standard CAN3-A370-M84, "Connectors for Masonry"

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